

**EX-POST PROJECT EVALUATION 2013**

**PACKAGE III-2**

**(Viet Nam)**

**August 2014**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

---

**SANSHU ENGINEERING CONSULTANT**

EV
JR
14-39

## 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 2011, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2010. 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.

August 2014  
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.

The Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project  
Regional and Provincial Hospital Development Project

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

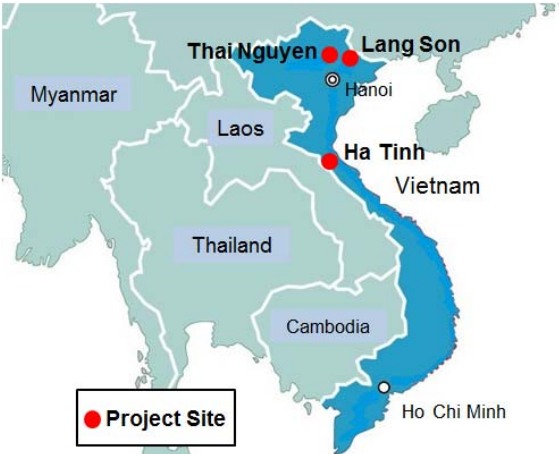
0. Summary

This project aimed at strengthening the referral system and improving the level of healthcare services of the regional core hospitals in Thai Nguyen, Lang Son, and Ha Tinh Provinces, which are located in northern areas in Vietnam, by providing (procuring) medical equipment and trainings to these hospitals.

Relevance of this project is high, as the project is consistent with priority areas of Vietnam’s development plans and Japan’s ODA policy, and moreover development needs for the project are high. All medical equipment procured under the project are effectively utilized except for some equipment that are currently out of order, and results of the beneficiary survey revealed that knowledge and technical skills of participants were advanced due to trainings provided under the project. Moreover, hospital mortality rate and the number of cases of nosocomial infection in three hospitals have largely decreased since the time of project appraisal, and the number of operations, outpatients, and patients referred from lower level hospitals have largely increased since the time of appraisal. Thus, effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. Sustainability of the project is high, as no major problem has been observed in institutional, technical and financial aspects of operation and maintenance.

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

1. Project Description



Project Locations



CT Scanner

1.1 Background

Healthcare delivery system in Vietnam is classified as follows: 1) large urban hospitals that are

expected to provide advanced medical treatment (tertiary institutions), 2) a) provincial general hospitals under the jurisdiction of each provincial government that are expected to function as a central core hospital in each province and b) regional hospitals under the jurisdiction of the Ministry of Health that are expected to function as an intermediary hospital (cross-provincial) between secondary and tertiary institutions (secondary institutions), and 3) commune<sup>1</sup> health centers and district hospitals that are expected to provide basic healthcare in rural areas (primary institutions)<sup>2</sup>. However, at the time of project appraisal, the division of roles among different levels of medical institutions was not clearly defined and medical skills and services provided by primary and secondary institutions were not trusted by patients, and thus, patients with minor ailments received medical treatment in tertiary institutions in large cities and a referral system, in which patients are transferred to different levels of institutions according to the extent of diseases, was not functioning properly<sup>3</sup>. This tendency was evident in northern Vietnam, which is the target area of this project, as each level of medical institutions could not function adequately due to deteriorated medical equipment and a lack of medical skills and managerial abilities, and patients were concentrated in tertiary institutions in the country's capital (Bach Mai Hospital in Hanoi, etc.), and hence it was urgently needed to establish the referral system and improve healthcare services by strengthening functions of secondary institutions<sup>4</sup>. In light of these situations, this project selected provincial general hospitals in Lang Son and Ha Tinh provinces and Thai Nguyen Central General Hospital from provincial hospitals (secondary institutions) in northern areas, based on criteria such as 1) hospitals that have not received and have no plan to receive assistance from other donors, 2) hospitals where renovation of buildings are not needed for installing equipment, and 3) hospitals that urgently need to strengthen their functions as secondary institutions, as they are located far from Bach Mai Hospital<sup>5</sup>.

1.2 Project Outline

The objective of this project is to strengthen the referral system and improve the level of healthcare services of the regional core hospitals in Thai Nguyen, Lang Son, and Ha Tinh Provinces in northern areas of Vietnam, by providing (procuring) medical equipment and trainings to these hospitals, thereby contributing to better health of local residents.

Loan Approved Amount/ Disbursed Amount	1,805 million yen / 1,611 million yen	
Exchange of Notes Date/ Loan Agreement Signing Date	March, 2006 / March, 2006	
Terms and Conditions	Interest Rate	1.3%

<sup>1</sup> Commune is a local administrative unit following a province and a district.  
<sup>2</sup> Source: JICA appraisal document  
<sup>3</sup> Source: same as above  
<sup>4</sup> Source: same as above  
<sup>5</sup> Source: same as above

	Repayment Period (Grace Period) Conditions for Procurement:	30 years (10 years) General Untied
Borrower / Executing Agency(ies)	Government of the Socialist Republic of Viet Nam/ Ministry of Health	
Final Disbursement Date	August, 2011	
Main Contractor (Over 1 billion yen)	-	
Main Consultant (Over 100 million yen)	System Science Consultants (Japan)	
Feasibility Studies, etc.	F/S: Pilot Study for Project Formulation for Health Service Improvement (2005)	
Related Projects	The Bach Mai Hospital Project for Strengthening Training Capacity for Provincial Hospitals (2006-2009)	

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Masami Tomita, Sanshu Engineering Consultant

### 2.2 Duration of Evaluation Study

Duration of the Study: October, 2013 –September, 2014

Duration of the Field Study: December 7– December 28, 2013 / March 16–April 6, 2014

## 3. Results of the Evaluation (Overall Rating: A<sup>6</sup>)

### 3.1 Relevance (Rating: ③<sup>7</sup>)

#### 3.1.1 Relevance to the Development Plan of Vietnam

At the time of project appraisal, reducing population growth rate, increasing average life expectancy and improving nutrition conditions were the health sector's targets for social and economic development of Vietnam as stated in "Strategy for Socio-Economic Development 2001-2010". In order to achieve the targets, improvement of quality of medical and healthcare services was necessary, and 1) improvement of regional core hospitals, 2) construction and strengthening of advanced medical centers, and 3) capacity building of medical staff in remote areas were pursued<sup>8</sup>. In particular,

<sup>6</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>7</sup> ③: High, ② Fair, ① Low

<sup>8</sup> Source: JICA appraisal document

improvement of regional core hospitals and strengthening of regional healthcare were promoted<sup>9</sup>. Moreover, “National Health Strategy 2001-2010” and “Hospital Network Development Plan 2002-2010” were formulated as specific policies, in which policy reforms including healthcare expenses, promotion of voluntary insurance, modernization of medical facilities and equipment, improvement of regional core hospitals, and assignment of medical staff according to actual needs were stipulated<sup>10</sup>.

On the other hand, at the time of ex-post evaluation, dissemination of health insurance among impoverished people and workers in agricultural, fishery and forestry sectors, provision of preventive healthcare to prevent contracting infectious diseases, malnutrition and chronic diseases, and comprehensive renovation of the policy on hospital fees and the mechanism on public health services are emphasized in “Socio-Economic Development Plan for 2011-2015”<sup>11</sup>. Moreover, proactive preventive medicine, early detect and timely cure of diseases, reducing patient overload in central-level hospitals, upgrading medical infrastructures in communal or ward medical stations, and speeding up human resource development for healthcare sector are emphasized in “Sustainable Development Strategy for 2011-2020” as priority issues of the health sector<sup>12</sup>.

Therefore, provision of comprehensive and high-quality healthcare service to nationals through strengthening of regional healthcare and reducing patient overload in higher level medical institutions is emphasized in Vietnam’s national development plans both at the time of project appraisal and ex-post evaluation, which is consistent with the project objective.

### 3.1.2 Relevance to the Development Needs of Vietnam

At the time of project appraisal, with Vietnamese government’s efforts to expand basic healthcare services and immunization programs, the percentage of patients with infectious diseases was largely declining, however, non-infectious maladies such as injuries, accident victims, stroke and heart failure were increasing. In particular, injuries from traffic accidents were increasing, however, there were not enough hospitals in rural areas that could perform operations required for such injuries<sup>13</sup>. As explained above, the referral system in Vietnam was not functioning properly, and particularly in northern Vietnam, which is the target area of this project, deterioration of medical equipment and a lack of medical skills and managerial abilities were in a serious situation due to the weaker economy of the region and unstable hospital revenues, and thus medical institutions at each level could not function adequately. Therefore, patients were concentrated in high-level hospitals in the country’s capital (Bach Mai Hospital in Hanoi, etc.), and urgent intervention was needed<sup>14</sup>.

At the time of ex-post evaluation, major reasons for hospitalization in the hospitals targeted by the project are non-infectious maladies such as injuries from traffic accidents, cancers, diabetes,

---

<sup>9</sup> Source: JICA appraisal document

<sup>10</sup> Source: same as above

<sup>11</sup> Vietnamese government HP (<http://www.vietnam.gov.vn/>)

<sup>12</sup> Source: same as above

<sup>13</sup> Source: JICA appraisal document

<sup>14</sup> Source: same as above

hypertension and heart failures, while infectious diseases such as pneumonia and septicaemia are still seen, and thus advanced medical equipment and trainings provided under the project are needed<sup>15</sup>. According to the project-targeted hospitals, there are certain numbers of relatively wealthy patients with minor ailments who prefer to be treated in tertiary institutions in large cities even at the time of ex-post evaluation. Thus, it cannot be said that the referral system in Vietnam is perfectly functioning yet. As explained below, this project is considered to have contributed to the improvement of the referral system to a certain extent, and medical equipment and trainings provided under the project are necessary for further improvement of the referral system, and thus needs for the project are still high.

Therefore, advanced medical equipment and trainings are required in the project-targeted hospitals both at the time of project appraisal and ex-post evaluation, and this project is consistent with development needs of Vietnam.

### 3.1.3 Relevance to Japan's ODA Policy

The assistance policy in Japan's Country Assistance Policy for Vietnam (2004) states that "for enhancing the functions of medical institutions, given that it is necessary to establish a "referral system" whereby cooperation and division of roles are allocated among the primary (commune), secondary (provincial) and tertiary (state) levels, priority for assistance is given to policy areas, as well as the development of facilities and installation of equipment, human resources development and management support at the tertiary (state) level and at the secondary (provincial) level in model provinces"<sup>16</sup>. Moreover, Medium-Term Strategy for Overseas Economic Cooperation Operations of JICA (2005) states that redressing regional disparities, poverty reduction and enhancing the quality of life are priority areas for economic cooperation in Vietnam and assistance for human resource development is emphasized, and this project was to expand healthcare services to impoverished areas and support human resource development, which was consistent with JICA's strategy<sup>17</sup>.

Therefore, this project was consistent with Japan's ODA policy at the time of project appraisal.

This project has been highly relevant to Vietnam's development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

## 3.2 Effectiveness<sup>18</sup> (Rating: ③)

### 3.2.1 Quantitative Effects (Operation and Effect Indicators)

#### 3.2.1.1 Hospital Mortality

Baseline data of hospital mortality in each hospital at the time of project appraisal and target figures and actual figures after project completion are shown in Table 1.

---

<sup>15</sup> Source: answers to the questionnaire

<sup>16</sup> Source: JICA appraisal document

<sup>17</sup> Source: same as above

<sup>18</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.



Table 1: Hospital Mortality Rate

(Unit: %)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion) <sup>19</sup>	Increase/Decrease Rate from Baseline
Thai Nguyen	1.2	10% Decrease	0.14	88% Decrease
Lang Son	0.7		0.12	83% Decrease
Ha Tinh	1.1		0.43	61% Decrease

Source: Baseline and target: JICA appraisal document, actual: answers to the questionnaire

Note: While a basis for calculation of baseline data is not mentioned in the appraisal document and hence unknown, actual figures are calculated as follows: hospital mortality rate = the number of deceased patients / the number of inpatients x 100.

Hospital mortality rate has largely decreased in all hospitals and its reasons are; 1) ability of these hospitals to examine and treat patients was improved due to many medical equipment and trainings provided by the project as well as by the Vietnamese government; and 2) previously, the cause of illness was often not identified due to a lack of equipment and skills of medical staff and consequently many patients died in these hospitals without proper diagnosis, however, advanced medical equipment and trainings provided under the project enabled proper diagnosis and patients who have an advanced stage and cannot be treated in these hospitals are now referred to higher level hospitals and terminal patients are advised to have home treatment<sup>20</sup>. This indicates an improvement from the previous situation in which many patients died without the cause of illness being identified, as proper diagnosis can now be provided. In addition, infant ventilators and incubators provided under the project have contributed to a reduction of infant mortality rate and hemodialysis apparatus is also effective in this regard<sup>21</sup>.

### 3.2.1.2 Average Length of Stay of Patients

Baseline data of average length of stay of patients in each hospital at the time of project appraisal and target figures and actual figures after project completion are shown in Table 2.

Table 2: Average Length of Stay of Patients

(Unit: day)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	9.6	20% Decrease	7.7	20% Decrease
Lang Son	6.2		6.7	8% Increase
Ha Tinh	9.0		6.8	24% Decrease

Source: Baseline and target: JICA appraisal document, actual: answers to the questionnaire

<sup>19</sup> At the time of project appraisal, the project was planned to be completed in 2009, and target figures were set for 2012, which is 3 years after project completion. However, the project was actually completed in 2011, and thus actual figures in 2013, which is 2 years after project completion, are used for comparison (this is applied to all the tables in this report).

<sup>20</sup> Source: interviews with each hospital

<sup>21</sup> Source: same as above

Actual figures have decreased in Thai Nguyen and Ha Tinh, as medical treatment became faster due to many medical equipment and trainings provided by the project as well as by the Vietnamese government, and procurement of medicine became easier than before<sup>22</sup>. On the other hand, the actual figure slightly increased in Lang Son due to following reasons; 1) recently the oncology department and the rehabilitation department have been newly established in the hospital, and treatment in these departments usually takes longer compared with other types of illness; and 2) the number of beds approximately doubled compared with the number at the time of project appraisal (approximately 300 beds), and the number of inpatients largely increased while the number of equipment and medical staff cannot be changed drastically<sup>23</sup>. Taking into account these reasons, while the actual figure increased by 8%, the average length of stay of patients in the hospital is almost the same as that of other hospitals and actual figure is not so high.

### 3.2.1.3 Number of Referrals to Higher Level Hospitals

Baseline data of the number of referrals from each hospital to higher level hospitals at the time of project appraisal and target figures and actual figures after project completion are shown in Table 3.

Table 3: Number of Referrals to Higher Level Hospitals

(Unit: case)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	1,760	20% Decrease	2,220	26% Increase
Lang Son	1,033		3,883	276% Increase
Ha Tinh	7,658		4,429	42% Decrease

Source: Baseline and target: JICA appraisal document, actual: answers to the questionnaire

Note: the baseline data of Thai Nguyen written in JICA appraisal document was 76, however, the correct baseline data was 1,760, and the baseline data of Ha Tinh written in the appraisal document was 658, however, the correct baseline data was 7,658, according to the executing agency.

The number of referrals to higher level hospitals has decreased largely in Ha Tinh, however, it increased in Thai Nguyen and Lang Son. While various factors influence the changes of the number of referrals to higher level hospitals, major reasons of the increase in Thai Nguyen and Lang Son are; 1) the level of diagnosis and treatment has become improved in these hospitals due to advanced medical equipment and trainings provided under the project, consequently the number of patients has largely increased; 2) related to 1) above, patients with more serious medical conditions have come to visit these hospitals; 3) previously patients did not trust clinical skills of these hospitals and used to visit higher level hospitals directly, however, the health insurance policy was revised recently in which patients who visit higher level hospitals without being referred from lower level hospitals are now charged 70% of medical service fee, and patients who are referred from lower level hospitals to higher level hospitals are charged 20% only of medical service fee. Consequently, the number of patients who

<sup>22</sup> Source: interviews with each hospital

<sup>23</sup> Source: same as above

visit lower level hospitals has increased; 4) particularly in Lang Son, which has a border with China, the amount of businesses between Lang Son province and China has recently increased and a population that moved from other provinces to Lang Son province has temporarily increased. Consequently, the number of patients in the province has also increased; and 5) related to 4) above, there are many patients who ask the hospital to refer to hospitals in their hometown when they finish their work and go home<sup>24</sup>. On the other hand, major reasons of the decrease in Ha Tinh are; 1) a necessity to refer patients to higher level hospitals has decreased, as the hospital can now provide proper diagnosis and treatment of various illness due to advanced medical equipment and trainings provided under the project; 2) while road conditions between Thai Nguyen / Lang Son and Hanoi, where higher level hospitals are located, have been improved recently and transfer of patients has become easier than before, moving from Ha Tinh to Hanoi is not so easy (hence it would be more difficult for the hospital to refer patients to hospitals in Hanoi and even if being referred, patients might not be able to go to Hanoi themselves, compared with Thai Nguyen and Lang Son); and 3) while a population in Thai Nguyen and Lang Son has increased accompanying a recent development of mining businesses in Thai Nguyen and exports and imports of goods from/to China in Lang Son, such change is not seen in Ha Tinh and a population has been constant in the province before and after the project implementation<sup>25</sup>.

3.2.1.4 Number of Operations

Baseline data of the number of operations in each hospital at the time of project appraisal and target figures and actual figures after project completion are shown in Table 4.

Table 4: Number of Operations

(Unit: case)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	5,057	10% Increase	12,566	148% Increase
Lang Son	2,470		6,345	157% Increase
Ha Tinh	2,898		8,280	186% Increase

Source: Baseline and target: JICA appraisal document, actual: answers to the questionnaire

The number of operations has largely increased in all hospitals. This is because various kinds of operations can now be conducted, as many medical equipment and trainings were provided under the project and medical staff’s skills were improved<sup>26</sup>.

3.2.1.5 Number of Cases of Non-Identified Cause of Deaths

At the time of project appraisal, the number of cases of non-identified cause of deaths was 7 in

<sup>24</sup> Source: interviews with each hospital  
<sup>25</sup> Source: same as above  
<sup>26</sup> Source: same as above

Thai Nguyen, 0 in Lang Son, and 15 in Ha Tinh, which was expected to decrease by 10% in the target year. However, actual figures after project completion are unknown as none of the hospitals has such data.

### 3.2.1.6 Number of Cases of Nosocomial Infection

Baseline data of the number of cases of nosocomial infection in each hospital at the time of project appraisal and target figures and actual figures after project completion are shown in Table 5.

Table 5: Number of Cases of Nosocomial Infection

(Unit: case)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	N/A	10% Decrease	2.8%	N/A
Lang Son	141		21	85% Decrease
Ha Tinh	186		11	94% Decrease

Source: Baseline and target: JICA appraisal document, actual: answers to the questionnaire

Note: the figure in Thai Nguyen is not the number of cases but a ratio of nosocomial infection (infected patients / total inpatients x 100). The ratio cannot be calculated for Lang Son and Ha Tinh, as data on the number of infected patients and total inpatients in these hospitals was not collected.

The number of cases of nosocomial infection has largely decreased in Lang Son and Ha Tinh. Reasons of this are; 1) necessary equipment such as high-pressure steam sterilizer were provided under the project; 2) disposable medical instruments are now used; and 3) the nosocomial department has been established within the hospitals and internal environment has been improved<sup>27</sup>.

### 3.2.1.7 Number of Outpatients

Baseline data of the number of outpatients in each hospital at the time of project appraisal and actual figures after project completion are shown in Table 6.

Table 6: Number of Outpatients

(Unit: person)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	6,730	None	39,117	481% Increase
Lang Son	N/A		16,558	N/A
Ha Tinh	29,994		41,794	39% Increase

Source: answers to the questionnaire (no target set at the time of project appraisal)

The number of outpatients has increased to certain extent in Ha Tinh and largely in Thai Nguyen. Reasons of this are; 1) various examinations such as X-ray, endoscopic and clinical examinations can

<sup>27</sup> Source: interviews with each hospital

now be conducted due to advanced medical equipment and trainings provided under the project; 2) the number of people who have health insurance has increased; and 3) some diseases which previously required hospitalization can now be treated on an outpatient basis<sup>28</sup>.

### 3.2.1.8 Bed Occupancy Rate

Baseline data of bed occupancy rate in each hospital at the time of project appraisal and actual figures after project completion are shown in Table 7.

Table 7: Bed Occupancy Rate

(Unit: %)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	N/A	None	93	N/A
Lang Son	100		103	3% Increase
Ha Tinh	113		132	17% Increase

Source: answers to the questionnaire (no target set at the time of project appraisal)

Reasons for bed occupancy rate being remained at almost 100% in Thai Nguyen and Lang Son despite that the numbers of operations and patients have largely increased in these hospitals are; 1) the number of beds has largely been increased in these hospitals recently<sup>29</sup>; and 2) particularly in Thai Nguyen, 4 hospitals have been established in the neighbourhood within the last 2 years<sup>30</sup>.

### 3.2.1.9 Number of Referrals from Lower Level Hospitals

Baseline data of the number of referrals from lower level hospitals to each hospital at the time of project appraisal and actual figures after project completion are shown in Table 8.

Table 8: Number of Referrals from Lower Level Hospitals

(Unit: case)

	Baseline (2004)	Target (2012/3years after completion)	Actual (2013/2years after completion)	Increase/Decrease Rate from Baseline
Thai Nguyen	22,400	None	25,657	15% Increase
Lang Son	35,050		61,100	74% Increase
Ha Tinh	17,178		30,136	75% Increase

Source: answers to the questionnaire (no target set at the time of project appraisal)

The number of referrals from lower level hospitals has increased in all hospitals. It increased as

<sup>28</sup> Source: interviews with each hospital

<sup>29</sup> According to interviews with hospitals, the number of beds increased from approximately 700 (at the time of project appraisal) to over 1,000 in Thai Nguyen and it increased from approximately 300 (at the time of project appraisal) to approximately 600 in Lang Son.

<sup>30</sup> Source: interviews with each hospital

various examinations and treatment can now be provided due to many medical equipment and trainings provided under the project and the skills of medical staff having been improved<sup>31</sup>.

3.2.2 Qualitative Effects

At the time of project appraisal, target figures were set for the operation and effect indicators explained above only, however, various factors other than this project, such as revision of healthcare policies and changes in population growth rate and geographical conditions in project-targeted areas, are considered to influence on achieving these target figures and thus, to understand more direct effects of this project is necessary. Therefore, surveys were conducted in the ex-post evaluation on utilization of medical equipment procured under the project and whether the knowledge and skills of participants were advanced after attending trainings provided under the project, through interviews with each hospital and a beneficiary survey.

3.2.2.1 Utilization of Medical Equipment Procured under the Project

According to answers to the questionnaire provided by each hospital and interviews with representatives of each hospital, all medical equipment procured under the project are utilized except for some equipment that are currently out of order. In particular, equipment for diagnostic imaging, laboratory testing, surgery, emergency resuscitation, hemodialysis apparatus, extracorporeal shock wave lithotripter, phaco emulsifier system etc. are beneficial and highly utilized.

Moreover, following results were seen from the beneficiary survey<sup>32</sup>.

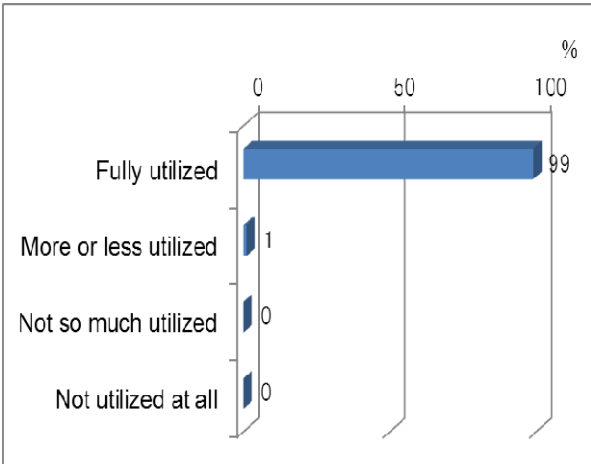


Figure 1: Utilization of Procured Equipment

Answer	Persons
Ultrasound Scanner	88
Patient Monitor	84
Gastro and Colono Videoscope	80
X-ray Apparatus, Fluoroscopy	74
Automatic Hematology Analyzer	74
Suction Unit	72
Hemodialysis Apparatus	70
Automatic Urine Analyzer	68
Electrocardiograph	67
Infant Incubator	66
Infusion Pump	66

Table 9: Examples of Most Frequently Used Equipment (multiple answers)

As shown in Figure 1, 99% of beneficiaries answered that equipment procured under the project are “fully utilized” and 1% answered that these are “more or less utilized”. Table 9 shows a list of equipment that are highly utilized among those procured under the project, and when a surveyor asked

<sup>31</sup> Source: interviews with each hospital

<sup>32</sup> The beneficiary survey was conducted in the following manner. Time: January 2014, the number of samples: 105 in total (35 from each hospital, of which 15 doctors, 10 nurses and 10 technicians), method: questionnaire survey

how frequently these equipment are used, 99% answered that they are used almost everyday and 1% answered that they are used several times a week. On the other hand, according to the survey results, equipment that are not so frequently used are ironing machine, traction frame, tube washer, needle destroyer, semi-automatic blood analyser, and ultrafiltration system etc. (frequency of use is several times per month or per several months). Reasons of this are that fuel cost is large (for ironing machine), that these equipment are not so related to beneficiaries' own tasks and that they are not so frequently needed in beneficiaries' departments etc. However, the results of the beneficiary survey indicate that most of equipment procured under the project are effectively utilized except for some equipment.

3.2.2.2 Changes of the Amount of Knowledge of Beneficiaries after Attending Trainings

According to answers to the questionnaire provided by each hospital and interviews with representatives of each hospital, approximately 300 medical staff from each hospital attended trainings provided under the project, and the amount of their knowledge has increased and their skills of examination, surgery and treatment have been improved. For example, their knowledge and skills on hemodialysis, extracorporeal shock wave lithotripsy, various surgeries such as neurosurgery, vascular surgery and phaco surgery, endoscopy, and cares for preterm birth and premature neonate etc. have advanced.

Moreover, following results were seen from the beneficiary survey.

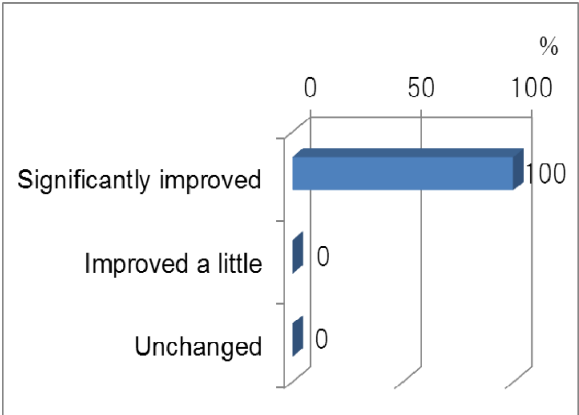


Figure 2: Changes of Knowledge and Skills of Participants after Attending Trainings

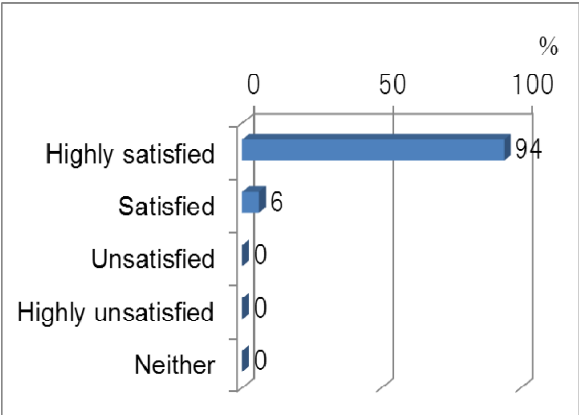


Figure 3: The Level of Satisfaction with Contents of Trainings

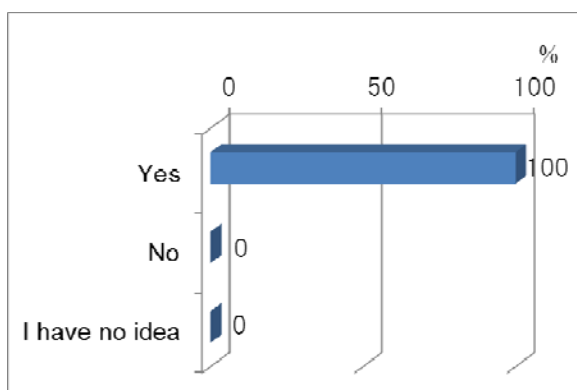


Figure 4: Whether the Level of Medical Services Have Been Improved after the Project

Regarding Figure 3, reasons for satisfaction with trainings are because participants' skills were improved, their amount of knowledge increased, and training programs were consistent with their actual needs etc. Regarding Figure 4, reasons for why participants think that the level of medical services have been improved are because many new examinations and treatment can now be provided, patients' satisfaction were improved, and rapid diagnosis of disease became materialized etc. Thus, the results of the beneficiary survey suggest that knowledge and skills of participants have been advanced after attending trainings and consequently the level of medical services provided in the hospitals have been improved. However, according to interviews with representatives of each hospital, there were some cases in which trainings on how to use medical equipment were not provided for a long time after these equipment were delivered due to a delay of contract procedures. Trainings need to be completed before procurement of equipment.

### 3.3 Impact

#### 3.3.1 Intended Impacts

##### 3.3.1.1 Benefits on Target Areas and Local Residents

Changes on infant mortality rate in provinces covered by the project are shown in Table 10.

Table 10: Infant Mortality Rate in 3 Provinces (less than one year old)

(Unit: %)

	At the Time of Appraisal (2005)	After Project Completion (2012)
Thai Nguyen Province	4.4	3.6
Lang Son Province	2.2	1.2
Ha Tinh Province	5.1	3.9

Source: answers to the questionnaire

Infant mortality rate has decreased after project completion in all the above provinces, and according to interviews with the hospitals targeted by the project, this is because, 1) in addition to this project, Vietnamese government and other donors provided medical equipment to other hospitals in



these provinces and 2) patient transportation became faster than before due to improvement of roads etc. As the hospitals targeted by the project explained that equipment procured under the project contributed to the reduction of infant mortality rate in these hospitals, this project is considered to have contributed to the reduction of the rate in these provinces to a certain extent.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

At the time of project appraisal, as negative impact on environment that might be caused by this project was considered minimal, a preparation of an environmental impact assessment (EIA) report was not legally required<sup>33</sup>. On the other hand, among the medical wastes that were expected to increase due to the project, solid medical wastes were to be incinerated in the hospitals, and liquid medical wastes were to be disposed in drains after being treated to meet waste standards by heat sterilization and microbiological treatment equipment<sup>34</sup>. Wastes from radiation therapy were to be collected and disposed by the government<sup>35</sup>. Moreover, in addition to monitoring by departments specialized in medical waste disposal at each hospital, there were to be regular inspections by the provincial and central governments to monitor water quality and medical wastes<sup>36</sup>.

At the time of ex-post evaluation, these medical wastes are processed properly as planned in the project appraisal and monitoring on water quality and medical wastes is conducted<sup>37</sup>.

3.3.2.2 Land Acquisition and Resettlement

There was no land acquisition or resettlement of residents under this project<sup>38</sup>.

This project has largely achieved its objectives. Therefore its effectiveness and impact is high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

Outputs of this project are provision (procurement) of medical equipment and trainings, and as types and quantities of equipment are enormous, planned and actual quantities of major component only (equipment whose unit cost is over 5 million yen) are shown below.

Table 11: Procured Equipment (Planned and Actual)

Hospital	Equipment	Planned	Actual
Thai Nguyen	High-Pressure Steam Sterilizer	4	1
	C-arm TV System for Surgical Use	1	1
	X-ray Angiography System	1	1
	Polygraph	1	1

<sup>33</sup> Source: JICA appraisal document

<sup>34</sup> Source: same as above

<sup>35</sup> Source: same as above

<sup>36</sup> Source: same as above

<sup>37</sup> Source: answers to the questionnaire

<sup>38</sup> Source: same as above

	Automatic Injector	1	0
	Virtual Training Machine	1	0
	Extracorporeal Shock Wave Lithotripter	1	1
	Hemodialysis Apparatus	5	5
	Incinerator	1	0
	Ultrasound Scanner, Color Doppler	2	1
	Electroencephalograph	1	1
	Automatic Biochemistry Analyzer	1	1
	Semi-automatic Hematology Analyzer	1	1*
	X-ray Mammography Unit	1	0
	Infant Ventilator for Neonate	2	5
	Gastro Fiberscope (Videoscope)	3	2
	Colono Fiberscope (Videoscope)	1	1
	X-ray Apparatus, Fluoroscopy	0	1
	CT Simulator for Radiotherapy with Phantom	0	1
	Types of Equipment in Total	161	90
Lang Son	High-Pressure Steam Sterilizer	5	5
	C-arm TV System for Surgical Use	1	1
	Automatic Biochemistry Analyzer	1	1
	X-ray Apparatus, Fluoroscopy	1	1
	X-ray Mammography Unit	1	1
	Ultrasound Scanner, Color Doppler	1	2
	Whole Body CT Scanner	1	1
	Electric Power Generator	1	1
	Medical Gas System	1	1
	Incinerator	1	0
	Hemodialysis Apparatus	5	11
	Semi-automatic Hematology Analyzer	1	1*
	Infant Ventilator for Neonate	2	1
	Automatic Immune Assay Analyzer	0	1
	Phaco Emulsifier System	0	1
	Oxygen Tank	0	1
Types of Equipment in Total	172	164	
Ha Tinh	High-Pressure Steam Sterilizer	5	5
	C-arm TV System for Surgical Use	1	1
	Hemodialysis Apparatus	10	13
	Continuous Slow Hemofiltration System	1	1
	Blood Gas Analyzer	1	2
	Automatic Biochemistry Analyzer	1	1
	X-ray Apparatus, Fluoroscopy	1	1
	Ultrasound Scanner, Color Doppler	1	2
	Medical Gas System	1	1
	Phaco Emulsifier System	1	1
	Incinerator	1	0
	Colono Fiberscope (Videoscope)	2	2
	Broncho Fiberscope	1	1
	Urono Fiberscope System with TV	0	1
	Ironing Machine	1	1
	Lithotripter System	0	1
Automatic Immune Assay Analyzer	0	1	
Types of Equipment in Total	184	178	

Source: planned: JICA appraisal document, actual: JICA internal document and interviews with each hospital

\*: For hematology analyzer, while it was planned to purchase semi-automatic one, actually procured was automatic.

Regarding types and quantities of medical equipment, consultants conducted surveys and

interviews in detail on actual situations and needs in each hospital after consulting service started, and these equipment were procured based on the result of the surveys, and thus planned and actual types and quantities of equipment turned out to be different<sup>39</sup>.



X-ray Apparatus, Fluoroscopy



Ultrasound Scanner, Color Doppler

In order to achieve the project objective, which is to improve the level of healthcare services of the hospitals, advancement of examination and treatment techniques using procured equipment is necessary, and thus trainings were planned to be provided for the contents below.

Table 12: Contents of Trainings Planned during Project Appraisal

Content	Period
General and Emergency Operation Technique	1 month
Infectious Disease Control (including avian flu)	1 week
Maternal and Newborn Care	1 month
Hospital Management	2 weeks (in Japan)
Patient Records Management	2 weeks
Medical Equipment Management and Use	2 weeks
Maintenance of Medical Equipment	2 weeks
(Thai Nguyen only) Diagnosis and Treatment Technique on Circulatory Disease and Cancer	2 weeks (in Japan) / 3 months (in Vietnam)

Source: JICA appraisal document

Above trainings were planned to be implemented making the maximum use of and improving further the training schemes of the Vietnamese government such as DOHA activities<sup>40</sup> conducted by Bach Mai hospital with assistance from JICA, and advanced trainings that were unable to be provided by DOHA (trainings on hospital management and surgeries) were planned to be provided by medical and research institutions in Japan<sup>41</sup>.

Contents of trainings actually implemented under the project are shown below.

<sup>39</sup> Source: interviews with the executing agency

<sup>40</sup> DOHA stands for Direction Office for Healthcare Activities. Bach Mai hospital in Hanoi provides technical guidance to secondary institutions through DOHA.

<sup>41</sup> Source: JICA appraisal document

Table 13: Actual Training Contents

Hospital	Content	Number of Trainees	Period
Thai Nguyen	Hospital Management Related	7	2 weeks (in Japan/ 2 doctors) – 1 month
	Operation and Maintenance of Medical Equipment	3	1 month
	Maternal and Newborn Care	37	3 weeks – 3 months
	Operation Technique Related (Neuro-Surgery, thoracic surgery, endoscopic surgery, phaco surgery, technical coronary arteries stenting, anaesthetized technique etc.)	32	2 weeks – 6 months
	Aggressive Treatment	86	3 weeks – 4.5 months
	Emergency Care	51	1 – 3 months
	Medical Examination and Analysis Related	11	2 weeks (in Japan/ 1 doctor) – 1 month
	Cardiovascular Disease	6	1 – 7 months
	Digestive Disease	31	1 month
	Other (Cancer, radiation therapy, lithotripsy technique, trauma and orthopedic, internal medicine, etc.)	9	2 weeks (in Japan/ 3 doctors) – 2 months
	Total	273	
Lang Son	Hospital Management Related	8	2 weeks (in Japan/ 2 doctors) – 1 month
	Operation and Maintenance of Medical Equipment	3	1 month
	Maternal and Newborn Care	24	1 month
	Operation Technique Related (Neuro-Surgery, thoracic surgery, cranial surgery, endoscopic surgery, phaco surgery, anaesthetized technique etc.)	81	1 week – 9 months
	Aggressive Treatment	4	1 month
	Emergency Care	8	1 month
	Medical Examination and Analysis Related	34	1 week – 2.5 months
	Patient Care	117	1 – 2 weeks
	Other (Cardiovascular disease, digestive disease, hemodialysis, rehabilitation techniques etc.)	15	1 – 2 months
	Total	294	
	Ha Tinh	Hospital Management Related	7
Operation and Maintenance of Medical Equipment		113	1 week – 1 month
Maternal and Newborn Care		37	2 weeks – 1.5 months
Operation Technique Related (Neuro-Surgery, thoracic surgery, endoscopic surgery, surgery to replace the femoral head, cranial, and spinal, vascular surgery, throat surgery, phaco surgery, anaesthetized technique etc.)		45	2 weeks – 3 months
Aggressive Treatment		13	1 month
Emergency Care		10	1 month
Medical Examination and Analysis Related		31	2 weeks – 1.5 months
Cardiovascular Disease		16	2 – 3 weeks
Other (Lithotripsy technique, hemodialysis, physical therapy, technical stretching lumbar spine and neck, digestive disease etc.)		65	2 weeks – 3 months
Total		337	

Source: answers to the questionnaire

Contents and periods of trainings were studied and planned in detail after the project was started and changed from a plan according to actual needs of each hospital<sup>42</sup>. Moreover, some trainings on operation techniques, aggressive treatment, medical examination and analysis, and emergency care etc. were implemented utilizing DOHA activities conducted by Bach Mai hospital<sup>43</sup>.

Planned and actual contents of consulting services (CS) for the project are shown below.

Table 14: Consulting Service (Planned and Actual)

Planned	Actual
<ul style="list-style-type: none"> <li>• Assistance for selection of suppliers/ Supervision of delivery and installation of equipment</li> <li>• Assistance for trainings implementation</li> <li>• Feasibility study for the next phase (10 hospitals)</li> <li>• Facilitation of the implementation of national guidelines for referral system</li> <li>• Monitoring of the development of Health Care Fund for the Poor etc.</li> <li>• Foreign CS: 38M/M, Local CS: 49M/M</li> </ul>	<ul style="list-style-type: none"> <li>• Assistance for selection of suppliers/ Supervision of delivery and installation of equipment</li> <li>• Assistance for trainings implementation</li> <li>• Feasibility study for the next phase (20 hospitals)</li> <li>• Facilitation of the implementation of national guidelines for referral system</li> <li>• Monitoring of the development of Health Care Fund for the Poor etc.</li> <li>• Foreign CS: 39M/M, Local CS: 46M/M</li> </ul>

Source: planned: JICA appraisal document, actual: JICA internal document and answers to the questionnaire

The period of consulting services was extended accompanying the delay of project implementation, however, planned and actual mans-months are almost the same, as consultants worked for necessary hours only during the contract period<sup>44</sup>.

### 3.4.2 Project Inputs

#### 3.4.2.1 Project Cost

The planned project cost at the time of project appraisal was 2,124 million yen (foreign currency: 1,014 million yen, local currency: 1,110 million yen), of which Japanese ODA loan portion was 1,805 million yen<sup>45</sup>. On the other hand, the actual project cost was 1,873 million yen (foreign currency: 439 million yen, local currency: 1,434 million yen), of which Japanese ODA loan portion was 1,611 million yen<sup>46</sup>, and it was lower than planned (88% against the plan). The exchange rate fluctuated a lot during the project implementation, and while the actual project cost exceeds the planned cost by approximately 30% in terms of VND (Vietnamese dong), the actual cost is lower than the planned cost

<sup>42</sup> Source: interviews with the executing agency  
<sup>43</sup> For trainings implemented utilizing DOHA activities, 36 in total of doctors, nurses and technicians from Thai Nguyen hospital, 40 in total of doctors, nurses and technicians from Lang Son hospital, and 165 in total of doctors, nurses and technicians from Ha Tinh hospital attended in 2010 (source: answers to the questionnaire).  
<sup>44</sup> Source: interviews with the executing agency  
<sup>45</sup> Source: JICA appraisal document  
<sup>46</sup> According to the executing agency, all the cost except for administration cost and tax and duties was covered by Japanese ODA loan, and thus the total project cost was calculated by using the amount provided by JICA for equipment, trainings, consulting service and interest and converting the amount in VND provided by the executing agency for administration cost and tax and duties using the average exchange rate of 1 yen = 176.64VND of the loan disbursement period.

in terms of Japanese yen. Changes of types and quantities of medical equipment are also considered to have affected this difference.

#### 3.4.2.2 Project Period

The planned project period at the time of project appraisal was 34 months in total from March 2006 (signing of the loan agreement) to December 2008 (completion of provision (procurement) of equipment and trainings)<sup>47</sup>. On the other hand, the actual project period was 65 months in total from March 2006 (signing of the loan agreement) to July 2011 (completion of provision (procurement) of equipment and trainings)<sup>48</sup>, and it was significantly longer than planned (191% against the plan). The reasons for the actual project period significantly exceeding the planned period were; 1) a selection of consultants was overly delayed and another 6 months was required before actual commencement of consulting service after signing a contract in April 2008; 2) bidding documents needed to be submitted to JICA for concurrence through the Ministry of Health and provincial People's Committees, which required a long time; 3) in addition to the types of equipment procured being enormous, the number of procurement packages for equipment was changed (10 packages were planned at first, which was changed to 13 packages after the project started), and 3 more packages were added (16 packages in total), and its procurement procedures required a long time; and 4) each hospital needed to contract with 9 institutions for trainings and thus, a contract procedure and management became complicated and arrangements among stakeholders were prolonged<sup>49</sup>. In the beginning, the procurement procedure for trainings were planned to be the same as for consulting service, however, it was simplified (each hospital became able to contract with training institutions directly without concurrence from JICA) in order to avoid a further delay, based on a condition that trainings must be implemented for contents and periods agreed between the Vietnamese side and JICA in advance<sup>50</sup>.

---

<sup>47</sup> Source: JICA appraisal document

<sup>48</sup> Source: answers to the questionnaire

<sup>49</sup> Source: JICA internal document and answers to the questionnaire

<sup>50</sup> Source: JICA internal document

Table 15: Comparison of Project Period

Content	Planned	Actual
Selection of Consultant	June 2006 – November 2006 (6 months)	July 2007 – April 2008 (10 months)
Consulting Service	December 2006 – December 2008 (25 months)	May 2008 – June 2011 (38 months)
Selection of Suppliers	December 2006 – December 2007 (13 months)	Thai Nguyen: March 2010 – March 2011 (13 months) Lang Son: March 2009 – March 2010 (13 months) Ha Tinh: June 2009 – April 2011 (23 months)
Delivery and Installation Works	January 2008 – September 2008 (9 months)	Thai Nguyen: June 2010 – June 2011 (13 months) Lang Son: January 2010 – June 2011 (18 months) Ha Tinh: September 2009 – June 2011 (22 months)
Trainings	January 2007 – December 2008 (24 months)	February 2009 – July 2011 (30 months)

Source: planned: JICA appraisal document, actual: answers to the questionnaire

### 3.4.3 Results of Calculations of Internal Rates of Return (Reference only)

IRR was not calculated at the time of project appraisal, and thus it is not re-calculated at the time of ex-post evaluation.

While actual project outputs were changed from the plan, this change was necessitated as a result of the detailed surveys and interviews conducted by consultants to check actual situations in each hospital, and thus the change is considered to be reasonable. Although the project cost was within the plan, the project period exceeded the plan<sup>51</sup>. Therefore efficiency of the project is fair.

## 3.5 Sustainability (Rating: ③)

### 3.5.1 Institutional Aspects of Operation and Maintenance (O&M)

At the time of project appraisal, each hospital was to operate and maintain equipment procured under the project, and a maintenance department existed and maintenance engineers were assigned in these hospitals<sup>52</sup>. At the time of ex-post evaluation, each hospital operates and maintains equipment procured under the project as assumed at the time of appraisal.

The number of maintenance staff at the time of both project appraisal and ex-post evaluation is shown below.

<sup>51</sup> It is not possible to reflect the change of all the project outputs in the analysis of project cost, as the types of equipment procured under the project are over hundreds and the actual unit cost of all the procured equipment was unavailable.

<sup>52</sup> Source: JICA appraisal document

Table 16: The Number of Maintenance Staff in Each Hospital

(Unit: person)

Hospital	At the Time of Project Appraisal	At the Time of Ex-Post Evaluation
Thai Nguyen	11	12 (Total Number of Staff: 992)
Lang Son	5	10 (Total Number of Staff: 670)
Ha Tinh	10	12 (Total Number of Staff: 653)

Source: at the time of project appraisal: JICA internal document, at the time of ex-post evaluation: answers to the questionnaire

The current number of maintenance staff increased slightly compared with that at the time of project appraisal, and all hospitals explained that the number of these staff is sufficient to maintain medical equipment, and thus no major problem is seen regarding institutional aspects of O&M.

### 3.5.2 Technical Aspects of Operation and Maintenance

As explained above, trainings provided under the project include O&M of medical equipment, and 3 staff each from Thai Nguyen and Lang Son hospitals attended the trainings for 1 month and 113 staff from Ha Tinh hospital attended the trainings for 1 week to 1 month.

12 maintenance staff in Thai Nguyen hospital is comprised of 3 engineers, 7 technicians and 2 others, and they have work experience of 7 to 18 years<sup>53</sup>. Among them, 7 staff attended training on equipment maintenance for 3 months in Italy in 2012, with assistance from the Italian government<sup>54</sup>.

10 maintenance staff in Lang Son hospital is comprised of 1 engineer, 7 technicians and 2 others, and they have work experience of 2 to 20 years<sup>55</sup>. Among them, 2 technicians attended training on maintenance of equipment for emergency care for 1 month in University of Occupation and Repair of Equipment, which is a subordinate institution of Ministry of Health in 2012<sup>56</sup>.

12 maintenance staff in Ha Tinh hospital is comprised of 4 engineers, 7 technicians and 1 other, and they have work experience of 5 to 20 years<sup>57</sup>. According to the hospital, external trainings have not been conducted since project completion, however, staff receive guidance on maintenance from equipment providers according to their necessity if they have any problems.

According to these hospitals, there is no problem regarding technical capacity of maintenance staff, trainings are provided, and manuals for equipment maintenance are in place. Therefore, no major problem is seen regarding technical aspects of O&M.

### 3.5.3 Financial Aspects of Operation and Maintenance

At the time of project appraisal, in principle, each hospital was to secure budget for O&M of equipment, and in case these hospitals were unable to secure sufficient budget, either Ministry of Health (Thai Nguyen) or Department of Health in the provincial government (Lang Son and Ha Tinh)

<sup>53</sup> Source: answers to the questionnaire

<sup>54</sup> Source: same as above

<sup>55</sup> Source: same as above

<sup>56</sup> Source: same as above

<sup>57</sup> Source: same as above



was to provide a budget necessary for O&M<sup>58</sup>. Revenues (from insurance fee and hospital fee) of each hospital at the time of project appraisal were 19,417 million VND in Thai Nguyen, 7,691 million VND in Lang Son, and 15,603 million VND in Ha Tinh<sup>59</sup>.

Revenues and expenditures of each hospital in recent 3 years are shown below.

Table 17: Revenues and Expenditures of Thai Nguyen Hospital

(Unit: million VND)

Item	2011	2012	2013
<b>Revenue</b>			
Government Budget	33,441	35,977	60,830
Insurance Fee	36,894	79,277	119,000
Hospital Fee	63,527	44,601	52,270
Socialization Services	0	0	0
Other	6,166	6,082	6,836
<b>Total</b>	<b>140,028</b>	<b>165,937</b>	<b>238,936</b>
<b>Expenditure</b>			
Salary and Bonus	49,279	63,678	93,697
Administrative Fee	8,290	8,198	11,913
Equipment Maintenance and Repair Fee	1,381	1,493	2,166
Equipment Purchasing Fee	0	408	1,500
Drugs and Consumables Fee	74,212	86,820	118,622
Career Development Fee	6,467	5,000	10,490
Other	399	340	548
<b>Total</b>	<b>140,028</b>	<b>165,937</b>	<b>238,936</b>
<b>Balance</b>	<b>0</b>	<b>0</b>	<b>0</b>

Source: answers to the questionnaire

Note: "Socialization Services" is revenue from activities providing healthcare services for people who do not have health insurance, in cooperation with companies and/or organizations.

<sup>58</sup> Source: JICA appraisal document

<sup>59</sup> Source: same as above

Table 18: Revenues and Expenditures of Lang Son Hospital

(Unit: million VND)

Item	2011	2012	2013
<b>Revenue</b>			
Government Budget	31,901	39,033	55,443
Insurance Fee	45,165	52,352	71,490
Hospital Fee	15,717	18,164	23,241
Socialization Services	4,312	6,346	8,289
Other	1,064	1,347	1,495
<b>Total</b>	<b>98,159</b>	<b>117,242</b>	<b>159,958</b>
<b>Expenditure</b>			
Salary and Bonus	33,445	48,644	59,925
Administrative Fee	6,958	8,758	12,061
Equipment Maintenance and Repair Fee	2,647	2,801	2,705
Equipment Purchasing Fee	528	460	2,332
Drugs and Consumables Fee	45,377	45,186	44,438
Career Development Fee	5,144	4,301	7,102
Other	4,060	7,092	19,395
<b>Total</b>	<b>98,159</b>	<b>117,242</b>	<b>147,958</b>
<b>Balance</b>	<b>0</b>	<b>0</b>	<b>12,000</b>

Source: answers to the questionnaire

Table 19: Revenues and Expenditures of Ha Tinh Hospital

(Unit: million VND)

Item	2011	2012	2013
<b>Revenue</b>			
Government Budget	30,472	33,921	48,244
Insurance Fee	47,948	72,101	76,311
Hospital Fee	11,128	28,293	27,260
Socialization Services	2,557	4,294	5,290
Other	1,077	0	326
<b>Total</b>	<b>93,182</b>	<b>138,609</b>	<b>157,431</b>
<b>Expenditure</b>			
Salary and Bonus	29,931	45,279	60,640
Administrative Fee	7,994	10,394	12,014
Equipment Maintenance and Repair Fee	1,307	1,727	2,189
Equipment Purchasing Fee	692	2,151	1,627
Drugs and Consumables Fee	46,245	71,402	75,764
Career Development Fee	6,162	4,000	2,034
Other	35	2,036	3,058
<b>Total</b>	<b>92,366</b>	<b>136,989</b>	<b>157,326</b>
<b>Balance</b>	<b>816</b>	<b>1,620</b>	<b>105</b>

Source: answers to the questionnaire

At the time of ex-post evaluation, revenues of all hospitals have largely increased compared with those at the time of project appraisal and revenues and expenditures are almost balanced. In all hospitals revenues from government budget and insurance fee have largely increased, and this is due

to an increase of the number of beds and patients, wage growth of hospital staff and an increase of hospital fee following the policy of the Vietnamese government in recent years<sup>60</sup>. None of these hospitals has problems in securing enough budget for usual O&M, and while they sometimes face difficulties in securing budget for a major repair of equipment that needs to be conducted by equipment suppliers, and in such case they request the government to allocate budget for such repair and the repair is conducted with budget provided in the next year<sup>61</sup>. As explained below, no case was observed in which equipment are not used for a long time due to a lack of maintenance budget, and thus there seems to be no major problem regarding securing budget.

### 3.5.4 Current Status of Operation and Maintenance

All hospitals have an equipment maintenance plan and regular maintenance is conducted based on the plan, and they also have using logs and incident reports.

Among equipment provided under the project, below are out of use currently.

Table 20: List of Equipment Not Used Currently

Hospital	Equipment	Current Situation
Thai Nguyen	<ul style="list-style-type: none"> <li>• 2 endoscopes</li> <li>• 1 extracorporeal shock wave lithotripter</li> </ul>	Out of use for 1 – 3 months, and both equipment are to be repaired with budget allocated by Ministry of Health this year.
Lang Son	<ul style="list-style-type: none"> <li>• 1 out of 5 anesthesia apparatus</li> </ul>	Out of use for 7 months, and currently waiting for a delivery of parts from British supplier.
Ha Tinh	<ul style="list-style-type: none"> <li>• 1 general X-ray diagnosis unit</li> <li>• 1 ironing machine</li> </ul>	General X-ray diagnosis unit: out of use for 2 months, and currently waiting for a delivery of parts from a supplier. Ironing machine: Never been used, as it was not needed for the size of the hospital so far. However, hospital buildings were expanded at the end of 2013 and this will be used from 2014.

Source: interviews with each hospital

As shown above, there are some equipment that are not used currently, however, each hospital is dealing with a repair of equipment and procurement of necessary parts in an appropriate manner, and thus no major problem is seen regarding the current status of O&M.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore sustainability of the project effect is high.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

This project aimed at strengthening the referral system and improving the level of healthcare services of the regional core hospitals in Thai Nguyen, Lang Son, and Ha Tinh Provinces, which are located in

<sup>60</sup> Source: interviews with each hospital

<sup>61</sup> Source: same as above

northern areas in Vietnam, by providing (procuring) medical equipment and trainings to these hospitals.

Relevance of this project is high, as the project is consistent with priority areas of Vietnam's development plans and Japan's ODA policy, and moreover development needs for the project are high. All medical equipment procured under the project are effectively utilized except for some equipment that are currently out of order, and results of the beneficiary survey revealed that knowledge and technical skills of participants were advanced due to trainings provided under the project. Moreover, hospital mortality rate and the number of cases of nosocomial infection in three hospitals have largely decreased since the time of project appraisal, and the number of operations, outpatients, and patients referred from lower level hospitals have largely increased since the time of appraisal. Thus, effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. Sustainability of the project is high, as no major problem has been observed in institutional, technical and financial aspects of operation and maintenance.

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

#### 4.2 Recommendations

##### 4.2.1 Recommendations to the Executing Agency

None

##### 4.2.2 Recommendations to JICA

None

#### 4.3 Lessons Learned

##### 4.3.1 Necessity to Manage Risks When Providing Japanese ODA Loans to an Executing Agency for the First Time

Actual project period largely exceeded the planned period, resulting from the selection of consultants being overly delayed. According to the executing agency, this project was their first Japanese ODA loan project and domestic approval procedures for procurement required a long time. A realistic implementation schedule should be planned taking into account procurement procedures in the borrower's country and JICA should consider how to deal with these problems during project appraisal if there is a risk of delay because executing agencies are unfamiliar with Japanese ODA Loan procedures. For example, the World Bank prepares a procurement assessment report for a new project during appraisal based on the country procurement assessment report, and the Bank assesses executing agencies' capabilities and risks related to procurement and formulates a detailed project implementation plan based on the report, which could be one of the options.

#### 4.3.2 Necessity to Set Appropriate Operation and Effect Indicators

The project objective is stated as strengthening the referral system and improving the level of healthcare services in target areas and 6 indicators including hospital mortality, average length of stay of patients, number of referrals to higher level hospitals, number of operations, number of cases of non-identified cause of deaths, and number of cases of nosocomial infection are selected as operation and effect indicators in the appraisal document. However, project output is a provision of medical equipment and trainings, and thus, there is a gap between the project objective and output. Based on the project output, a project objective should be improvement of healthcare services in three hospitals, and whether procured equipment are properly utilized and whether knowledge and skills of participants were advanced after attending the trainings etc. should be selected as indicators to examine direct effect of the project. When planning a similar type of a project in future, a project objective should be defined specifically relating to the project output and appropriate indicators should be selected.

#### 4.3.3 Necessity to Review Timings of Providing Trainings Effectively

According to hospitals covered by this project, there were some cases in which trainings on how to use medical equipment were not provided for a long time after these equipment were provided. Trainings should be planned well so that they can be completed before procurement of equipment, in order to materialize project effects as early as possible.

### Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs	Procurement of medical equipment Provision of medical trainings (See "3.4.1 Output" for details)	Procurement of medical equipment Provision of medical trainings (See "3.4.1 Output" for details)
2.Project Period	March 2006 – December 2008 (34 months)	March 2006 – July 2011 (65 months)
3.Project Cost		
Amount paid in Foreign currency	1,014million yen	439million yen
Amount paid in Local currency	1,110million yen (157,897 million VND)	1,434million yen (253,301 million VND)
Total	2,124million yen	1,873million yen
Japanese ODA loan portion	1,805million yen	1,611million yen
Exchange rate	1 yen = 142.25VND (As of October 2005)	1 yen = 176.64VND (Average between March, 2006 and August, 2011)

Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project  
Transport Infrastructure Development Project in Hanoi

External Evaluator: Yasuhiro Kawabata, Sanshu Engineering Consultant

0. Summary

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which caused bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The project has been highly relevant to the development plans and needs of Vietnam, as well as Japan's ODA policies. The current through traffic at three intersections, which was counted by simple traffic count surveys under the ex-post evaluation study, is 66,000 - 82,000 vehicles/day, which exceeded the highway capacity for a 4-lane highway, and it is very high. It is possible that heavier traffic jam than what it is at the time of ex-post evaluation would have occurred around each intersection if the project should not have been implemented. It is also considered that the project has been contributing to alleviation of traffic congestion to some extent in a short term as an impact of the project. Thus, the project has largely achieved its objectives, and the effectiveness and impact are high. Actual outputs differ from the originally planned project scope. Changes made are due to revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate. The project cost was higher than planned, and the project period was significantly longer than planned. Therefore, efficiency of the project is considered low. No major problems have been observed in the institutional, technical and financial aspects, therefore sustainability of the project effect is considered high.

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

1. Project Description



1.1 Background

At the appraisal time, the capital city Hanoi had a population of 2.5 million, and was the largest city in the northern Vietnam. The economy of Hanoi city had been rapidly growing since adoption of the Doi Moi policy<sup>1</sup> in 1986. The growth rate of real GDP of Hanoi city in 1997 was about 13%, which was higher than the national average (9%). However, migration of population into the existing urban area and concentration of economic activities had more advanced with the rapid economic growth, and the city had a mix of residential, commercial and industrial districts with sprawling urban area, resulting in deterioration of urban environment. Under such circumstances, Japan International Cooperation Agency (JICA) conducted the Special Assistance for Project Formation (SAPROF), selected the high priority urban infrastructure projects, and identified the subject project as an ODA loan project, since the subject project aimed to advance development of the transport infrastructure in Hanoi city.

1.2 Project Outline

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which cause bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The location of the project site is shown in Figure 1.

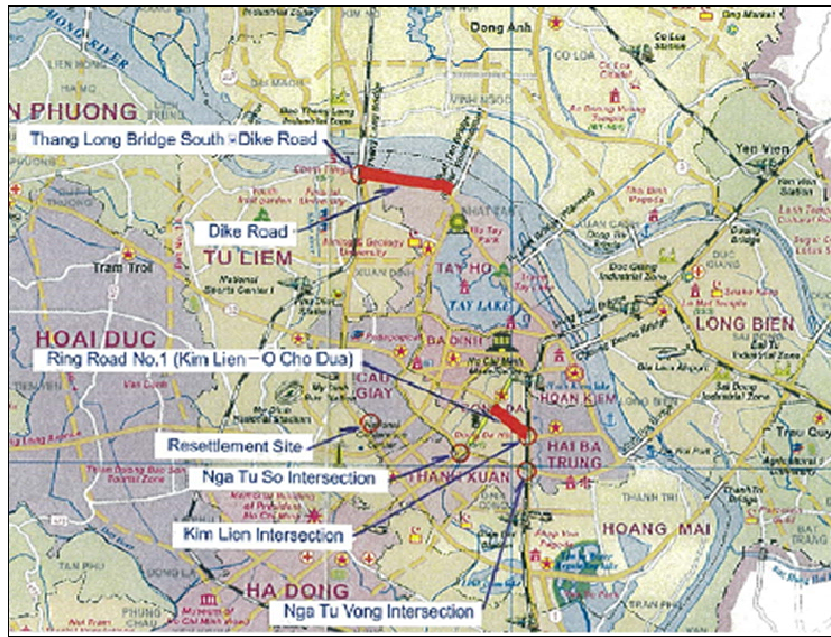


Figure 1 Location of Project Site

<sup>1</sup> Reforms aiming to create a new trend in the economical and social philosophy aspects.



Loan Approved Amount/ Disbursed Amount	12,510 million yen/8,389 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1999/March 1999
Terms and Conditions	- For civil work and procurement Interest Rate: 1.80%, Repayment Period: 30 years (Grace Period: 10 years) Conditions for Procurement: general untied - For Consulting services Interest Rate: 0.75% Repayment Period: 40 years (Grace Period: 10 years) Conditions for Procurement: bilateral tied
Borrower / Executing Agency(ies)	Socialist Republic of Viet Nam /Hanoi People's Committee (HPC)
Final Disbursement Date	January 2011
Main Contractor (Over 1 billion yen)	Mitsui-Sumitomo Construction Co./Vinaconex (Vietnam)(JV), Song Hong Construction Corp.(Vietnam)/Vinaconex (Vietnam)(JV), Taisei Construction Co.
Main Consultant (Over 100 million yen)	Japan Bridge and Structure Institute Inc.
Feasibility Studies, etc.	Special Assistance for Project Formulation for the Infrastructure Development Project in Hanoi Capital Region, 1998
Related Projects (if any))	Technical Cooperation: • The Comprehensive Urban Development Programme in Hanoi City by JICA , 2004.1-2007.3 • The Project for Improving Public Transportation in Hanoi by JICA, 2011.7 - 2014.6 Other International Organizations: • Hanoi Urban Transport Development Project by World Bank, 2007-2013

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Yasuhiro Kawabata, Sanshu Engineering Consultant

### 2.2 Duration of Evaluation Study

The Ex-Post Evaluation was conducted during the following period.

Duration of the Study: October 2013 – September 2014

Duration of the Field Study: December 7 – December 14, 2013, March 16 – 22, 2014

## 3. Results of the Evaluation (Overall Rating: B<sup>2</sup>)

<sup>2</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

### 3.1 Relevance (Rating: ③<sup>3</sup>)

#### 3.1.1 Relevance to the Development Plan of Vietnam

In the "Socioeconomic Development Strategy (1991-2000)", which was effective at the appraisal time (1998), the following targets were set: i) double the income within 10 years; ii) increase investment for infrastructure development; iii) create employment opportunities in the high-productive jobs; and iv) promote foreign direct investment. In 1997, "A Revised Master Plan for Hanoi Metropolitan Land Use Plan targeting for 2020" was issued, and countermeasures for agendas (including improvement of urban transport network) to be addressed were recommended to improve deteriorating urban environment and enhance the urban functions.

In the "10-Year Socioeconomic Development Strategy (2011-2020)," which was adopted in January 2011, the following agendas were set as priorities: 1) establishment of the market economy system aiming at the socialism society; 2) development of human resources; 3) development of infrastructure, particularly in the transport and urban development sectors. In the "5-Year Socioeconomic Development Plan (2011-2015)," which discusses the above mentioned 10-Year Socioeconomic Development Strategy more in detail, it is stated that the comprehensive target for 5 years is to establish the foundation for the industrialized country by 2020, and is also suggested that the urban transport system is rapidly developed as a part of the target.

As mentioned above, at both appraisal and ex-post evaluation stages, the implementation of the project was relevant to the development policies of the Vietnamese Government.

#### 3.1.2 Relevance to the Development Needs of Vietnam

With the rapid economic growth after adopting the Doi Moi policy in 1986, in capital city Hanoi, migration of population into the existing urban areas and concentration of economic activities had advanced, and thus the urban environment had been deteriorated. Moreover, traffic volume had rapidly increased and the population density had gone up so that the development of urban infrastructure including roads, water supply and sewage system could not catch up with the demand. Thus, the urban function was heavily inhibited. Particularly, the road network was fundamentally as what was developed in the French colonization era, and the road width in the old urban area was as narrow as it was. Thus, roads could not accommodate the traffic increase caused by the rapid increase of motorbikes and other vehicles so that heavy traffic congestion had occurred in some intersections in the city center. Consequently, construction/improvement of intersections and widening/improvement of urban city roads with narrower roadway were considered

---

<sup>3</sup> ③: High, ② Fair, ① Low

the urgent issues to be addressed.

In Hanoi city, as of the ex-post evaluation stage (2013), population is still increasing (2.6 times<sup>4</sup> of that of the year 2000), and the number of vehicles has been increasing rapidly (4.8 times of that of the year 2000 regarding automobiles, and 2.7 times of that of 2000 regarding motorbikes). Thus, the traffic congestion has been worsened. In order to alleviate congestion and promote healthy urban development, in “the Transport Plan targeting for 2020 in Hanoi” issued by the Vietnamese Government in 2008, construction of 5 routes of urban railway/metro lines was proposed, and construction of some routes has commenced. Until the development of urban railway network has been completed, HPC is planning to promote use of bus transport in order to alleviate traffic congestion. However, the share of bus transport among urban transport modes is currently about 10%, and use of private transport modes including motorbikes and private cars still occupies about 80% - 90%, resulting in a major factor for traffic congestion.

Recently, heavy traffic congestion has occurred in intersections in the city center due to increase of traffic caused by the rapid increase of motorbikes and other vehicles, and thus, construction/improvement of intersections and widening/improvement of urban city roads were considered urgent issues to be addressed. The project aiming at alleviation of traffic congestion, therefore, was relevant to the development needs at both appraisal and ex-post evaluation stages.

### 3.1.3 Relevance to Japan’s ODA Policy

In the Country Assistance Strategy for Vietnam (1994-1999), which was valid at the appraisal time, the Japanese Government intended to give a priority to assist in development of infrastructure (particularly power and transport sectors), which supports attraction of foreign investment needed for the export-oriented economic growth, the development of human resources and institutional reforms needed for transition to market economy, and the improvement of living (urban) environment. Since objectives of the project were to contribute to development of regional economy and improvement of urban environment by constructing and improving roads and intersections, which caused bottlenecks in road traffic, the project was relevant to the assistance policies of the Japanese Government.

Accordingly, the project has been highly relevant to the Vietnamese development plan, development needs, as well as Japan’s ODA policy. Therefore its relevance is high.

---

<sup>4</sup> In 2008, Hanoi city annexed neighboring provinces and the area was expanded. Thus, population was doubled at once.

### 3.2 Effectiveness<sup>5</sup> (Rating: ③)

#### 3.2.1 Quantitative Effects (Operation and Effect Indicators)

At the appraisal time, operation and effect indicators were not established for the project. The basic operation and effect indicator to examine the quantitative effect with respect to improvement of intersections and development of roads included in the project is traffic volume. However, since the baseline data and the projected traffic volume at the planning stage, and actual figures at the project completion were not available, traffic counting was briefly undertaken during the ex-post evaluation study. At three intersections and along Dike Road, which are major project components, and where a traffic counting by videos is feasible, through traffic<sup>6</sup> passing an underpass or flyovers constructed in the project and through traffic on service roads were counted by type of vehicle during the morning peak hour (from 7:00 AM to 8:00 AM) on January 7 through January 10, 2014. Regarding the traffic volume of Dike Road, the cross sectional traffic volume of a 4-lane road (2 lanes for each direction) was counted by type of vehicle. Based on the surveyed results, the peak-hour traffic volume was converted to the daily traffic volume (in passenger car unit) referring to the relevant data and information available.

Table 1 Daily Traffic Volume

Unit: Passenger Car Unit (vehicles/day)

Intersection/road	Peak-Hour Traffic in 2014		Daily Traffic Volume in 2014		Total Traffic Volume in 1999
	Through Traffic volume	Total Traffic Volume including side roads	Through Traffic volume	Total Traffic Volume including side roads	
Kim Lien Intersection	10,800	15,800	67,400	98,600	58,600
Nga Tu Vong Intersection	10,500	14,100	65,800	87,900	43,000
Nga Tu So Intersection	13,100	17,100	81,600	106,800	65,000
Dike Road	3,500	n.a.	21,900	n.a.	n.a.

Note 1: Conversion rates to passenger car unit: bicycle/motorbike 0.5, passenger car/taxi 1.0, public bus 2.5, private bus 2.0, truck 2.5 (Source: TCXDVN 104: "2007 Urban roads - Specifications for design")

Note 2: Peak hour factor: 0.16 (Source: The Comprehensive Urban Development Program in Hanoi Capital City - Urban Transport Sector)

Note 3: Traffic volume in 1999 is the results surveyed by HPC's Transportation Department

The daily traffic volume shown in the above table indicates how much three intersections and a road under the project, currently handle traffic volume. The through traffic volume at 3 intersections is between 66,000 and 82,000 vehicles/day, which exceeds the highway capacity for a 4-lane highway (about 50,000 vehicles/day). The result indicates that the congestion time per day is longer than before. Even though the

<sup>5</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.

<sup>6</sup> Through traffic means traffic volume passing an underpass (a road at the excavated lower level of a grade separated intersection), or a flyover (an upper level road that crosses over an intersection).

road sections with higher traffic volume at three intersections were grade separated under the project, at-grade roads crossing the target flyovers or an underpass are also heavily trafficked arterial roads and are heavily congested. It is supposed that much worse traffic congestion than current condition could have occurred around these intersections if it were not for the project implementation. Thus, contribution of the project is considered high.

There are two points to be noted regarding the transport condition in Hanoi: 1) travel of trucks in the city center is allowed only during the period from 10:00 PM to 5:00 AM in order to alleviate traffic congestion during day time; and 2) currently, about 80-90% (on an absolute number basis) of vehicles in the city are motorbikes, and the share of cars (passenger cars) is still low. However, as economy grows, the conversion rate from motorbikes to passenger cars by citizens will become higher year by year so that traffic congestion will be further worsened.

### 3.2.2 Qualitative Effects

At the appraisal time, alleviation of traffic congestion and improvement of logistic efficiency by the project was anticipated. Although the traffic congestion at intersections under the project has been alleviated, traffic congestion likely occurs at other intersections since there are a lot of intersections beside three intersections in Hanoi.

In addition, contribution to improvement of urban environment such as alleviation of traffic noise and air pollution at three intersections was also anticipated. It is considered that noise level was lowered at least in one direction at each intersection by elimination of stopping and starting at intersections because of construction of a grade separation. However, since the traffic volume of at-grade roads crossing flyovers or an underpass has been increasing every year, no residents around the project sites recognize that improvement was made on the traffic noise. Regarding air pollution, emission of polluted materials from motorbikes was a problem. Its main causes could be: i) old motorbikes and cars, which exhaust more polluted materials are still running; and ii) high sulfur fuel causing air pollution is still sometimes used. (Source: Current Condition of Environmental Pollution in Vietnam (Abstract of 2009 Report)) Thus, contribution to alleviation of traffic noise and air pollution by the project is considered minimal.

## 3.3 Impact

### 3.3.1 Intended Impacts

Even though it is a limited impact, alleviation of traffic congestion is considered contribution by the project. As economy has grown, the Vietnamese Government has planned to construct the urban railway system and other modes to alleviate traffic

congestion in Hanoi city, and some of the route sections have been already under construction at the time of ex-post evaluation. However, until the urban railway system has been developed to some degree, promotion of plans aiming at tackling the traffic congestion is essential in the short term, such as grade separation of intersections connecting arterial roads and development of bus lanes. The subject project has contributed to the alleviation of traffic congestion in the short-term aspect.

However, since only the grade separation of intersections connecting arterial roads or the development of bus lanes cannot fundamentally resolve the city-wide traffic congestion, part of the important ring roads and radial roads need to be upgraded to partially access-controlled highways<sup>7</sup> or to viaducts in the medium- and long term. Thus, regarding intersections and roads, which were constructed/improved under the project and partially contributed to the alleviation of traffic congestion, the planning and designs for further improvement and/or reconstruction should be later considered taking into account the development plan for the future transport network in Hanoi.

### 3.3.2 Other Impacts

#### (1) Impacts on the natural environment

At the appraisal time, no remarkable environmental impacts were anticipated since the project scope including 10 subcomponents under the project was considered “small work”. Thus, the environmental category was classified as “B”. However, since the original plan of constructing a flyover crossing over National Road No.1 at Kim Lien intersection was changed to the plan of constructing an underpass passing through National Road No.1, resubmission of a feasibility study (F/S) and an environmental impact assessment (EIA) was required. The preliminary EIA was approved by Ministry of Natural Resources and Environment (MONRE) on October 11, 2002 and the final EIA was approved by 2006 before commencement of construction work. Moreover, since a flyover was to be added to Nga Tu So intersection, a new EIA was required and it was approved by MONRE on October 1, 2003. Concerns/issues pointed out in the EIA included traffic management during construction, disposal of waste soils, excavation method, and construction waste materials. According to the executing agency, these concerns/issues were handled during the project implementation according to the manner stated in the EIA. Since the project is basically improvement and rehabilitation of the existing facilities, there is no case in which the environmental condition after the project was worsened than before the project.

#### (2) Land Acquisition and Resettlement

---

<sup>7</sup> Highway to which entrance and exit are provided only at limited locations (interchanges).

Regarding land acquisition and resettlement planned at appraisal, resettlement totaling 1,540 households was anticipated with the following distribution: 150 households for improvement of Nga Tu So intersection, 90 households for improvement of Dike Road, and 1,300 households for improvement of Ring Road No.1 (Kim Lien - O Cho Dua). According to the plan, although no additional land acquisition was required, a lot with a total area of 45.3 ha surrounded by Ring Road No.3 and Hoa Lac Highway was to be secured as a resettlement site for residents. Resettlement was to be undertaken for three years from year 2000 to year 2002, and monitoring on living condition after resettlement was required.

After the project commenced, the detail designs were undertaken, and the project scope was changed based on the results of double check on the field condition including traffic condition and due to revision of plans of relevant projects by HPC. Consequently, the estimated quantities on land acquisition and resettlement were revised. According to the report by the executing agency, the actual land area acquired under the project was 63.13 ha, which was larger than planned, and the number of resettled households was 1,792. The total amount of compensation paid was about 1,586 billion VND (Vietnamese Dong).

Table 2 Land Acquisition/Resettlement

Subcomponent	Land Area (ha)	Land Area acquired (ha)	Number of resettled households received compensation	Number of resettled households	Compensation paid (billion VND)
Kim Lien Intersection	6.13	0	-	-	16.489
Nga Tu Vong Intersection	4.69	0.31	180	82	75.820
Nga Tu So Intersection	9.44	3.30	892	881	733.497
Thang Long Bridge South - Dike Road and Dike Road	19.15	3.91	402	10	21.446
Kim Lien—O Cho Dua	5.94	5.01	931	819	685.202
Infrastructure development for resettlement site	56.40	50.6	731	-	53.680
Pedestrian Overbridges	0.35	0	-	-	-
Total	102.10	63.13	2,835	1,792	1,586.134

Source: Responses to the Questionnaire

Note 1: "Resettled households received compensation" mean households who received compensation for loss or damage of houses and/or asset including resettlement.

Land acquisition and resettlement activities were implemented according to the laws and decrees in Vietnam during 2001 – 2006 (original plan was from 2000 to 2002) due to the following reasons: 1) preparation of a new Resettlement Action Plan (RAP) was required since major design changes were made on some subcomponents after detail designs were completed; and 2) more time than expected was needed for negotiations on alternative lands and amount of compensation since the project is located in the city

central district. Regarding resettlement on Nga Tu Vong Intersection, Thang Long Bridge South - Dike Road and Dike Road among subcomponents included in the project, the planned resettlement site to be developed under the project had not been completed yet at the time of commencement of civil work for these interchanges/road (as of 2002) due to delay of the project implementation. As a result, residents moved to other resettlement sites which had been completed.<sup>8</sup> On the other hand, almost 100% of households resettled due to construction of Nga Tu So Intersection and improvement of Kim Lien - O Cho Dua Road received compensation and moved to the resettlement site (apartments), which was developed under the project after 2005. According to the executing agency, residents could move into the new apartment with lower price, and they are satisfied with the arrangements. The Japanese ODA loan portion for the project covered only infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system), and the housing complex in the site was constructed with local funds of HPC.



Resettlement Site

### (3) Other Positive and Negative Impacts

None.

Since the projected traffic volume at the planning stage and data on actual volume were not available, no comparison between actual volume and baseline/benchmark data could be made. The through traffic volume at 3 intersections, which was counted through the simple surveys at the time of the ex-post evaluation study, was between 66,000 and 82,000 vehicles/day, which exceeds the highway capacity for a 4-lane highway, and is quite high. If the project should not have been implemented, much worse traffic congestion than the current congestion would have occurred around these intersections. In addition, it is considered that the project contributes to some degree to alleviation of

---

<sup>8</sup> The information on number of residents moved to other resettlement sites was not available.



traffic congestion in a short term as a project impact.

The project has largely achieved its objectives. Therefore, the effectiveness and impact is high.

### 3.4 Efficiency (Rating: ①)

#### 3.4.1 Project Outputs

The original and actual output of the project is shown in Table 3.

Table 3 Comparison of Output (original and actual)

	Project Scope at Appraisal	Project Scope at Project Completion
Civil work	<p>(1) Improvement of intersections</p> <p>1) Kim Lien Intersection (construction of a flyover across National Road No.1)</p> <p>2) Nga Tu Vong Intersection (construction of a flyover across National Road No.1) (4-lane, length: 365m)</p> <p>3) Nga Tu So Intersection (improvement of an at-grade intersection and installation of signals) including tunnels for pedestrians and a technical tunnel</p> <p>(2) Construction of a mini-bypass</p> <p>1) Thang Long Bridge South - Dike Road section</p> <p>(3) Improvement of city roads</p> <p>1) Dike Road (Thang Long Bridge South – Ring Road No. 2) (length: 3.6km)</p> <p>2) Ring Road No. 1 (Kim Lien - O Cho Dua section) (pavement of about 1.2km section, utility conduit, lighting)</p> <p>3) Tran Khat Chan Street</p> <p>4) Lang Trung/Lieu Giai Street</p> <p>5) Hoang Quoc Viet Street</p> <p>(4) Infrastructure development of the resettlement site</p> <p>1) Infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system)</p>	<p>(1) Improvement of intersections</p> <p>1) Kim Lien Intersection (construction of an underpass passing under National Road No.1) (length: 645m)</p> <p>2) Nga Tu Vong Intersection (construction of a flyover along National Road No.1) (4-lane, length: 250m)</p> <p>3) Nga Tu So Intersection (improvement of an at-grade intersection and construction of a flyover across Ring Road No.2 (4-lane, length: 441m) including tunnels for pedestrians and a technical tunnel</p> <p>(2) Construction of a mini-bypass</p> <p>1) Thang Long Bridge South - Dike Road section - as planned</p> <p>(3) Improvement of city roads</p> <p>1) Dike Road (Thang Long Bridge South – Ring Road No. 2) – almost as planned (length: 4.2km)</p> <p>2) Ring Road No. 1 (Kim Lien - O Cho Dua section) – almost as planned (length: 1.9km)</p> <p>3) Tran Khat Chan Street – deleted from the project</p> <p>4) Lang Trung/Lieu Giai Street - deleted from the project</p> <p>5) Hoang Quoc Viet Street - deleted from the project</p> <p>(4) Infrastructure development of the resettlement site</p> <p>1) Infrastructure development of the resettlement site - as planned</p> <p>(5) Installation of pedestrian overbridges – additional work: 18 pedestrian overbridges were planned. However, only 17 units have completed.</p>
Consulting services	<ul style="list-style-type: none"> <li>• Detail design</li> <li>• Assistance in tendering (preparation, evaluation)</li> <li>• Construction supervision and assistance in environmental countermeasures</li> </ul> <p>Foreign experts: 291M/M (140M/M (project management)</p>	<p>Original scope of work: as planned</p> <p>However, input was substantially increased due to revisions of outputs and substantial extension of the project period.</p>

	+74M/M (detail designs & supervision) + 77M/M (planning and designs of the resettlement site) Local experts: 517M/M Technical assistants: not mentioned. Administrative: not mentioned.	
--	---	--

Main revisions made on the scope of the work after the detail designs and the reasons for revisions are as follows:

- (1) The original plan of constructing a flyover crossing over National Road No.1 at Kim Lien intersection was changed to the plan of constructing an underpass passing through National Road No.1. Main reasons for the design change are as follows: 1) it is difficult to widen the existing National Road No. 1 in order to construct a flyover; and 2) if a flyover should be constructed, it needs to cross over the viaduct for a railway line (future plan), resulting in the roadway with very high elevation.
- (2) After reviewing the projected traffic volume at Nga Tu So intersection, it became clear that an at-grade intersection could not handle the traffic volume since the traffic volume increased much more than originally planned. Thus, the original plan was changed to a flyover.
- (3) Improvement of Tran Khat Chan Street, Lang Trung Street - Lieu Giai Street, and Hoang Quoc Viet Street was implemented with local funds of HPC since the improvement work needed to be done ahead of the original schedule so that these streets were dropped from the project's financing portion.
- (4) After the SAPROF study was conducted, importance of traffic safety measures was recognized. (The risk that citizens cross arterial roads at locations without traffic signals was noted.) Thus, it was agreed that pedestrian overbridges would be constructed at 18 sites.

The scope of work and bill of quantities for 7 subcomponents, which were included in the original project scope, were also revised based on the results of detail designs.



## Kim Lien Intersection (Underpass)

## Nga Tu Vong Intersection (Flyover)

As mentioned above, actual outputs differ from the originally planned project scope. Changes made are due to the revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate.

## 3.4.2 Project Inputs

## 3.4.2.1 Project Cost

The estimated project cost at appraisal was 19,054 million yen (1,891.9 billion VND (Vietnamese Dong)), of which the total Japanese ODA loan was 12,510 million yen. The actual project cost was 22,132 million yen (of which the total Japanese ODA loan was 8,389 million yen, and is higher than planned (equivalent to 116% of the planned cost). However, the actual project cost in local currency was 2,904.8 billion VND and is equivalent to 152% of the planned cost.

Table 4 Comparison of Project Cost (Planned and Actual)

Item	Planned (at appraisal)				Actual (million VND)		
	ODA loan (million yen)	Own fund (million yen)	Total (million yen)	Total (billion VND)	ODA loan	Own fund	Total
• Civil Work	8,848	0	8,848	878.52	852,400	217,546	1,069,946
1. Kim Lien Intersection (construction of)	2,100	0	2,100	208.51	249,600	45,488	295,088
2. Nga Tu Vong Intersection (construction of flyover)	2,100	0	2,100	208.51	39,000	10,890	49,890
3. Nga Tu So Intersection (improvement of at- grade intersection)	287	0	287	28.50	145,900	28,963	174,863
4. Thang Long Bridge South - Dike Road	700	0	700	69.50	76,300	11,131	87,431
5. Dike Road (Thang Long Bridge South - Ring Road)	1,008	0	1,008	100.08			
6. Ring Road No.1 (Kim Lien – O Cho Dua)	416	0	416	41.30	68,800	4,244	73,044
7. Tran Khat Chan Street	294	0	294	29.19	-	-	-
8. Lang Trung Street - Lieu Giai Street	220	0	220	21.84	-	-	-
9. Hoang Quoc Viet Street	29	0	29	2.88	-	-	-
10. Development of infrastructure of resettlement site	1,694	0	1,694	168.20	158,800	78,040	236,840
11. Installation of pedestrian overbridges - additional work	-	-	-		114,000	38,790	152,790
Price escalation	600	0	600	59.57	-	-	-
Contingency	946	0	946	93.93	-	-	-
• Consulting services	1,290	0	1,290	128.08	183,300	0	183,300

• Compensation for resettlement	0	4,879	4,879	484.43	0	1,586,134	1,586,134
• Management	0	497	497	49.35	-	-	-
• Tax	0	1,168	1,168	115.97	-	-	-
• Interest during construction	826	0	826	82.01	65,438	0	65,438
Total	12,510	6,544	19,054	1,891.87	1,101,138	1,803,680	2,904,818
					in Japanese yen 22,132 million yen		

Source: Planned figures (project appraisal documents), Actual figures (the executing agency's responses to the questionnaire)

Exchange rates (at appraisal): 1 US\$ =140 yen, 1 US\$ =13,900VND (Vietnamese dong), 1 VND= 0.01 yen, 1 yen =99.29VND

Exchange rates (actual): Since the actual project cost (ODA loan portion) is 1,101.1 billion VND in local currency, and the disbursed amount of loan in Japanese yen is 8,389 million yen, the average exchange rate is 1VND=0.007619 yen.

Note 1: The interest during construction includes service charges.

The total project cost approved by the Vietnamese Government on April 26, 2000, was 1,933 billion VND (19,330 million yen in Japanese yen). After the project commenced, the project scope was revised based on the results of detail designs and due to revisions of project plans of HPC. Main reasons for increase or decrease of the project cost are as follows:

- 1) A planned flyover at Kim Lien intersection was changed to an underpass.
- 2) A planned at-grade intersection at Nga Tu So intersection was changed to a flyover.
- 3) Since the roadway width of Ring Road No.1 (Kim Lien—O Cho Dua section) was widened to 50m through improvement work, public work such as water supply, sewage system and lighting facilities was increased.
- 4) Public work (development of roads, power lines, water supply and sewage system) was increased for infrastructure development in the resettlement site.
- 5) Pedestrian overbridges were installed at 18 sites as part of traffic safety measures.
- 6) Increase of compensation for resettlement.
- 7) Substantial extension of the project period.
- 8) Improvement of Tran Khat Chan Street, Lang Trung Street - Lieu Giai Street, and Hoang Quoc Viet Street was dropped from the Japanese ODA financing portion due to changes of project plans of HPC.

#### 3.4.2.2 Project Period

The original project period planned at appraisal was from March 1999 (signing of the Loan Agreement) to June 2004 (completion of civil work) with a total period of 64 months. The actual project period was from March 1999 to December 2013 (first field study by the post evaluation team) with a total period of 178 months, which is equivalent to 278% of the plan and significantly higher than planned.

Table 5 Comparison of Project Period (Original Plan and Actual)

	Plan (at L/A signing)	Actual
Selection of Consultants	Not mentioned.	2000.10 - 2001.7
Detail design	Not mentioned.	Undertaken for each subcomponent during 2001-2007.
Land Acquisition	Not mentioned.	Implemented for each subcomponent during 2001 - 2006
Bidding for Civil Work	Not mentioned.	Implemented during 2001 - 2009
Civil Work	1999.10 - 2004.6	2002.11 - 2010.12
1. Kim Lien Intersection (original construction plan of a flyover was changed to the plan of an underpass)	2000.7 - 2002.7	2006.7 - 2009.9
2. Nga Tu Vong Intersection (construction of a flyover)	2000.7 - 2002.7	2002.3 - 2006.12
3. Nga Tu So Intersection (improvement of an at-grade intersection)	2001.10 - 2003.6	2005.4 - 2007.7
4. Thang Long Bridge South - Dike Road	2002.7 - 2004.6	2002.11 - 2006.9
5. Dike Road (Thang Long Bridge South – Ring Road No.2)	2002.7 - 2004.6	2002.11 - 2003.12
6. Ring Road No.1 (Kim Lien – O Cho Dua)	2000.7 - 2002.6	2005.10 - 2008.11
7. Infrastructure Development of Resettlement Site	1999.10 - 2001.6	2005.12 - 2010.12
8. Installation of Pedestrian Overbridges – additional work		2009.10 - 2013.12 (17 sites completed)
Consulting Services	1999.07 – 2004.9	2001.07 - 2010.12

Source: Project appraisal documents, Project Completion Report, Responses to the Questionnaire

Main reasons for extension of the project period are as follows:

- 1) After signing of the Loan Agreement, consultant selection was delayed by more than two years due to process of interval clearance in Vietnam.
- 2) It took a longer time to secure an approval for an EIA report and a revised F/S report by relevant agencies especially regarding the Kim Lien intersection, and also for a F/S report regarding the infrastructure development in the resettlement area.
- 3) As discussed above, it took a longer time to undertake land acquisition activities for all the subcomponents.
  - i) Kim Lien intersection: extension of the construction period by 16 months due to delay of land acquisition.
  - ii) Nga Tu So intersection: Construction of pedestrian tunnels was delayed due to land acquisition problems.
  - iii) Construction of a Mini-bypass: Construction period was extended due to delay of land acquisition.
  - iv) Kim Lien – O Cho Dua section: Construction period was extended due to delay of

land acquisition and undertaking of studies on countermeasures for cultural heritage conservation during the construction.

- v) The construction period was substantially delayed due to the lack of capacity of the contractor, who was in charge of infrastructure development of the resettlement site.
- vi) Installation of pedestrian overbridges: Installation of 18 units of pedestrian overbridges was added to the project in 2007. After commencement of the construction work (in October 2009), residents objected to location for some overbridges. In addition, inconvenience that foundation of some overbridges comes in contact with the underground public utilities was found. Thus, only 17 overbridges out of 18 units were completed by the time of first field survey by the ex-post evaluation team.



Thang Long Bridge South - Dike Road



Dike Road

The project cost exceeded the plan, while the project period significantly exceeded the plan. Therefore, efficiency of the project is low.

### 3.4.3 Results of Calculations of Internal Rates of Return (IRR)

The Economic Internal Rate of Return (EIRR) for the whole project calculated at appraisal was 19.8%. Recalculation of EIRR at the ex-post evaluation stage was not made, since the relevant information and data on costs and benefits to calculate the EIRR at completion of the project was not provided by the executing agency.

## 3.5 Sustainability (Rating: ③)

### 3.5.1 Institutional Aspects of Operation and Maintenance

Transport Infrastructure Maintenance Project Management Unit (PMU) of Hanoi People's Committee (HPC)'s Transportation Department is responsible for operation and maintenance of infrastructure completed under the project, including programming of the annual maintenance plans and budget planning. The PMU is responsible for operation and

maintenance of a highway network with a total length of 1,900km including national roads, provincial roads and other roads within Hanoi city. The total number of staff of the PMU is about 65, and among which about 40 staff are engineers or technicians. All the maintenance work in the field, including daily maintenance work (including inspection of the road conditions), periodic maintenance and major rehabilitation work, is entrusted to the state-owned company under Transportation Department and a joint-stock company and the PMU is supervising these companies. The maintenance work for three intersections and Ring Road No.1 (Kim Lien—O Cho Dua section) except Dike Road completed under the project is undertaken by a state-owned company (Hanoi Transport Infrastructure Company) with a total number of about 540 staff. Maintenance of Dike Road is undertaken by a joint-stock company (Hanoi Transport Construction Company No.2) with a total number of about 300 staff.

Maintenance of plants, lighting and drainage facilities is undertaken by HPC's Construction Department; and maintenance of traffic signals by HPC's Police Department in coordination with HPC's PMU.



Ring Road No.1(Kim Lien - OCho Dua section)

### 3.5.2 Technical Aspects of Operation and Maintenance

All 40 technical staff of Transport Infrastructure Maintenance PMU have a qualification of university graduate or above. According to the PMU, the technical capability of each technical staff of the PMU (management, engineers, and technicians) is considered appropriate and the number of staff allocated is also considered sufficient. All the staff regularly take the internal training implemented by Transport Department and the training programs offered include the following subjects: new technology on maintenance work, new materials/equipment used for maintenance work, and project management. Overseas training (including in Japan) is also implemented and staff have been sent to overseas. Various guidelines and manuals are well prepared including followings: Transport Infrastructure Management and Maintenance Standards; Construction and Maintenance Work Unit Price; Maintenance Work Measurement and

Acceptance Standards, and Routine Maintenance Manual.

Hanoi Transport Infrastructure Company, which is responsible for maintenance of three intersections and Ring Road No.1 (Kim Lien – O Cho Dua section), has about 540 staff. Among the total staff, about 170 are professional staff and the remaining 370 are technicians/workers. Professional staffs are graduates of graduate school or 4-5 year university or 3-year college and most of them are engineers. The staff regularly take the internal training or training program offered by the external institutes. The training programs which staff regularly take include the general modules (fire fighting, safety management and control at job sites, security measures, company's regulation and operational manuals and others), and specific and particular modules (bridge and road maintenance and others), which are offered corresponding to specialty of each staff. The company makes effort to improve technical capacity of the staff through recruiting qualified professionals and undertaking training program regularly.

According to Transport Infrastructure Maintenance PMU, technical capacity of the staff of Hanoi Transport Construction Company No.2, which is responsible for maintenance of Dike Road, and the training program to improve technical capacity are considered appropriate.

### 3.5.3 Financial Aspects of Operation and Maintenance

Expenditures for routine maintenance disbursed from the Hanoi city's general budget for above mentioned three intersections and Kim Lien – O Cho Dua section for the past 3 years is shown in Table 6.

Table 6 Expenditures disbursed for Routine Maintenance Work

Unit: million Vietnam Dong

Intersection/Road	Expenditure		
	2011	2012	2013
1) Kim Lien Intersection	1,200	2,300	3,000
2) Nga Tu Vong Intersection	50	550	70
3) Nga Tu So Intersection	1,800	2,500	3,200
4) Kim Lien – O Cho Dua	10	12	15

Source: Transport Infrastructure Maintenance PMU

Note 1: Routine maintenance includes daily inspections, clearing and small repairs.

The reason for higher maintenance cost for Kim Lien intersection is that the subject project road is an underpass passing under National Road No.1 and thus costs for assigning securities and for operating equipment such as surveillance cameras are needed. Regarding the maintenance cost for Nga Tu So intersection, the subject project road is a



flyover crossing over Ring Road No.2, and in addition underground passages for pedestrians and cyclists are constructed under the at-grade intersection to connect all directions. Thus, it causes higher maintenance costs than those for other items for allocation of security guards, maintenance of fire extinguishers, operation and maintenance of surveillance cameras, and maintenance of other facilities. The operation and maintenance costs for the above mentioned two intersections include those for training and on-the-job training on road safety and fire prevention for security guards and management staff.

Expenditures disbursed from the HPC's general budget for periodic maintenance for above mentioned three intersections and Kim Lien – O Cho Dua section for the past 3 years is shown in Table 7.

Table 7 Expenditures disbursed for Periodic Maintenance Work

Unit: million Vietnam Dong

Intersection/Road	Expenditure		
	2011	2012	2013
1) Kim Lien Intersection	3,000	-	1,200
2) Nga Tu Vong Intersection	-	450	800
3) Nga Tu So Intersection	-	-	800
4) Kim Lien – O Cho Dua	200	100	100

Source: Transport Infrastructure Maintenance PMU

Expenditure accrued in 2011 with respect to Kim Lien Intersection is construction cost for the additional retaining wall to prevent inflow of rain water into the underpass section, while, expenditure accrued in 2013 is for repainting of retaining wall. Expenditure accrued in 2012 with respect to Nga Tu Vong Intersection is costs for repainting of markings on the pavement, and that accrued in 2013 is for repainting of retaining wall. Expenditure accrued in 2011 with respect to Kim Lien Intersection is costs for removing median barriers on roadway, while those accrued in 2012 and 2013 are both for repainting of markings on the pavement.

According to Transport Infrastructure Maintenance PMU, the present maintenance budget (needed for routine operation and maintenance) allocated to three intersections and Kim Lien – O Cho Dua section is considered sufficient. Regarding the budget needed for periodic maintenance, since the quality of infrastructure constructed under the project is high, the expenditure is minimal and budget is appropriately allocated as needed.

#### 3.5.4 Current Status of Operation and Maintenance

Regarding the regular inspection of equipment/device/infrastructure installed or constructed under the project, existence or non-existence of irregularities is checked

through visual inspection as part of daily routine maintenance work. Since water leakage from the excavated side-walls was found at a few spots in half a year after the project completion at Kim Lien intersection, repair was made during the defect liability period (2009 - 2011) and the project was officially handed over to the executing agency. Although seepages have been still found at other spots during the rainy season, Transport Infrastructure Maintenance PMU has conducted repair work as a part of routine maintenance work. The ex-post evaluation team conducted ocular inspection of intersections, roads, resettlement sites and additional pedestrian overbridges under the project, and found no particular problems.

No particular problems are found in the maintenance management system and the technical skills for intersections and roads constructed by the project, and the maintenance budget is appropriately allocated. From the ocular inspection during the field surveys, no major damage nor defect on equipment and infrastructure installed or constructed under the project was observed.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance system. Therefore sustainability of the project effect is high.

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

Objectives of the project were to alleviate traffic congestion and to enhance the logistics' efficiency in Hanoi city by constructing and improving roads and intersections, which caused bottlenecks in road traffic, thereby contributing to development of regional economy and improvement of urban environment. The project has been highly relevant to the development plans and needs of Vietnam, as well as Japan's ODA policies. The current through traffic at three intersections, which was counted by simple traffic count surveys under the ex-post evaluation study, is 66,000 - 82,000 vehicles/day, which exceeded the highway capacity for a 4-lane highway, and it is very high. It is possible that heavier traffic jam than what it is at the time of ex-post evaluation would have occurred around each intersection if the project should not have been implemented. It is also considered that the project has been contributing to alleviation of traffic congestion to some extent in a short term as an impact of the project. Thus, the project has largely achieved its objectives, and the effectiveness and impact are high. Actual outputs differ from the originally planned project scope. Changes made are due to revisions of project plans of Hanoi People's Committee (HPC) after signing of the Loan Agreement and to the results of detail designs, and they are considered appropriate. The project cost was higher

than planned, and the project period was significantly longer than planned. Therefore, efficiency of the project is considered low. No major problems have been observed in the institutional, technical and financial aspects, therefore sustainability of the project effect is considered high.

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

## 4.2 Recommendations

### 4.2.1 Recommendations to the Executing Agency

It is recommended to conduct regular traffic counting, at the same location and at same time of the year, along ordinary roads and at intersections. The traffic volume is a fundamental data for planning and programming its yearly maintenance and management work, and for preparation of future road development plans. Therefore, the Maintenance Division in charge should conduct traffic counts, analyze and store the data, and utilize them for future planning.

### 4.2.2 Recommendations to JICA

None.

## 4.3 Lessons Learned

### (1) Thorough appraisal taking into consideration rapidly changing urban condition

Under the project, the project period was extended due to substantial revisions on the project scope. In the large-scale infrastructure projects in the urban area, the project scope could be changed in order to respond to rapidly changing urban traffic condition. At the appraisal time, it is needed to thoroughly appraise/confirm the plans of relevant infrastructure projects in the discussions with the borrower country taking into account the risk of rapidly changing traffic condition.

### (2) Undertaking of detailed confirmation studies due to substantial changes of the project scope

When major changes were made on the project scope after detail designs like under this project, detailed confirmation studies should be undertaken. It is essential to consider revisions on the project plan/program and target numbers (value) of indicators based on the review results on the project scope, projects costs, project period and monitoring indicators. In such a case, since there may be the possibility of the need for revision on environmental and social considerations aspects, it is needed to review whether or not the project tackles the issue appropriately at the detailed confirmation study.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
<p>1. Output</p> <p>1) Civil Work</p>	<p>(1) Improvement of intersections</p> <p>1) Kim Lien Intersection (construction of a flyover across National Road No.1)</p> <p>2) Nga Tu Vong Intersection (construction of a flyover across National Road No.1) (4-lane, length: 365m)</p> <p>3) Nga Tu So Intersection (improvement of an at-grade intersection and installation of signals) including tunnels for pedestrians and a technical tunnel</p> <p>(2) Construction of a mini-bypass</p> <p>1) Thang Long Bridge South - Dike Road section</p> <p>(3) Improvement of city roads</p> <p>1) Dike Road (Thang Long Bridge South – Ring Road No. 2) (length: 3.6km)</p> <p>2) Ring Road No. 1 (Kim Lien - O Cho Dua section) (pavement of about 1.2km section, utility conduit, lighting)</p> <p>3) Tran Khat Chan Street</p> <p>4) Lang Trung/Lieu Giai Street</p> <p>5) Hoang Quoc Viet Street</p> <p>(4) Infrastructure development of the resettlement site</p> <p>1) Infrastructure development of the resettlement site (clearing of the site, installation of roads, power lines, water supply/sewage system)</p>	<p>(1) Improvement of intersections</p> <p>1) Kim Lien Intersection (construction of an underpass passing under National Road No.1) (length: 645m)</p> <p>2) Nga Tu Vong Intersection (construction of a flyover along National Road No.1) (4-lane, length: 250m)</p> <p>3) Nga Tu So Intersection (improvement of an at-grade intersection and construction of a flyover across Ring Road No.2 (4-lane, length: 441m) including tunnels for pedestrians and a technical tunnel</p> <p>(2) Construction of a mini-bypass</p> <p>1) Thang Long Bridge South - Dike Road section - as planned</p> <p>(3) Improvement of city roads</p> <p>1) Dike Road (Thang Long Bridge South – Ring Road No. 2) – almost as planned (length: 4.2km)</p> <p>2) Ring Road No. 1 (Kim Lien - O Cho Dua section) – almost as planned (length: 1.9km)</p> <p>3) Tran Khat Chan Street – deleted from the project</p> <p>4) Lang Trung/Lieu Giai Street - deleted from the project</p> <p>5) Hoang Quoc Viet Street - deleted from the project</p> <p>(4) Infrastructure development of the resettlement site</p> <p>1) Infrastructure development of the resettlement site - as planned</p>
<p>2) Consulting Services</p>	<ul style="list-style-type: none"> <li>• Detail designs</li> <li>• Assistance in tendering (preparation, evaluation)</li> <li>• Construction supervision and assistance in environmental countermeasures</li> </ul> <p>Foreign experts: 291M/M (140M/M (project management) +74M/M (detail designs &amp; supervision) + 77M/M (planning and designs of the resettlement site)</p> <p>Local experts: 517M/M</p> <p>Technical assistants: not mentioned.</p> <p>Administrative: not mentioned.</p>	<p>(5) Installation of pedestrian overbridges – additional work: 18 pedestrian overbridges were planned. However, only 17 units have completed.</p> <p>Original scope of work: as planned</p> <p>However, input was substantially increased due to revisions of outputs and substantial extension of the project period.</p>

2. Project Period	March 1999 -June 2004 (64 months)	March 1999 -December 2013 (178 months)
3. Project Cost		
Amount paid in Foreign currency	9,176 million yen	Unknown
Amount paid in Local currency	9,878 million yen	Unknown
Total	19,054 million yen	22,132 million yen
Japanese ODA loan portion	12,510 million yen	8,389 million yen
Exchange rate	1VND = 0.010 yen (As of October 1998)	1VND = 0.007612 yen (Average between March 1999 and December 2013)

The Socialist Republic of Viet Nam

Ex-Post Evaluation of Japanese ODA Loan Project  
Central Vietnam Rural Telecommunication Network Project

External Evaluator: Masami Tomita, Sanshu Engineering Consultant

## 0. Summary

This project aimed at eradicating villages with no telecommunication network and improving telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region.

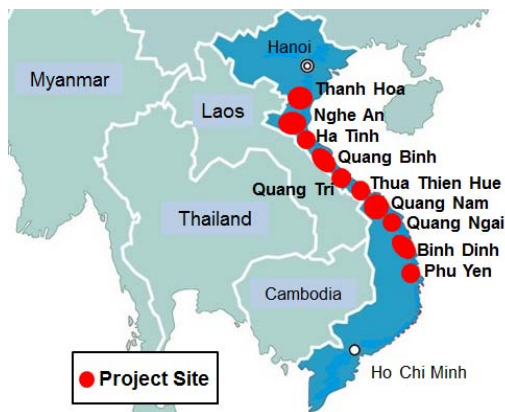
Relevance of this project is high, as the project is consistent with priority areas of Vietnam's development plans and Japan's ODA policy, and moreover development needs for the project are high. As a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are rapidly increasing at the time of ex-post evaluation. Accompanying this trend, the utilization ratio of digital switching systems etc. procured under the project has been decreasing, however, core transmission lines developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years<sup>1</sup>. This project has contributed to eradication of villages with no telecommunication network in the project-targeted areas, actual figures of telephone density in 2010 largely exceed the estimated figures, and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and thus effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. While no major problem has been observed in institutional and technical aspects of operation and maintenance (O&M) at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Thus, sustainability of the project is fair.

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

---

<sup>1</sup> Core transmission lines (optical fiber cables) developed under the project are also used for mobile and internet communications and sufficient transmission capacity to support a rapid increase of an usage of mobile phones and internet in recent years is secured, and thus this project has contributed to the diffusion of mobile phones and internet in recent years.

## 1. Project Description



Project Locations



Digital Switching System

### 1.1 Background

Telephone density in Vietnam was merely 0.18% on average in 1985, which was improved to 1.05% in 1995, which was at the time of project appraisal, and switching systems in the country was fully digitalized in the same year, and the Vietnamese government was promoting expansion of telephone networks in provinces, cities and districts all over the country<sup>2</sup>. However, 1.05% of telephone density was still low, compared with that of other ASEAN countries (14.7% in Malaysia, 4.7% in Thailand, 1.7% in the Philippines, and 1.3% in Indonesia)<sup>3</sup>. Moreover, regional disparities on telephone density in Vietnam were large, for example, while telephone density was approximately 20% in two large cities like Hanoi and Ho Chi Minh, it was particularly low in regional areas and approximately 0.6% in central Vietnam at the time of project appraisal, which was the area targeted by the project<sup>4</sup>. Under such situation, the Vietnamese government planned to improve telephone density to 5% on average by 2000, and while telecommunication networks in large cities were to be developed with private funds in principle, those in regional areas, where profitability is low, were to be developed with financial assistance from donors, and the ODA loan for this project was requested by the government<sup>5</sup>. This project was implemented under such situation.

### 1.2 Project Outline

The objective of this project is to eradicate villages with no telecommunication network and improve telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region, thereby contributing to the reduction of regional disparities and promotion of economic development of central Vietnam.

<sup>2</sup> Source: JICA appraisal document

<sup>3</sup> Source: same as above

<sup>4</sup> Source: same as above

<sup>5</sup> Source: same as above

Loan Approved Amount/ Disbursed Amount	11,332 million yen / 5,912 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 1998 / March 1998
Terms and Conditions	Interest Rate 1.8% Repayment Period 30 years (Grace Period) (10 years) Conditions for Procurement: General Untied
Borrower / Executing Agency(ies)	Government of the Socialist Republic of Viet Nam / Viet Nam Posts and Telecommunications (VNPT)
Final Disbursement Date	January 2010
Main Contractor (Over 1 billion yen)	Marubeni (Japan)/Ericsson (Sweden)(JV), Siemens AG (Germany), Commuture (Japan)/Marubeni (Japan)/Fujikura(Japan)(JV)
Main Consultant (Over 100 million yen)	Deutsche Telepost Consulting GMBH (Germany)
Feasibility Studies, etc.	F/S conducted by VNPT (1997)

## 2. Outline of the Evaluation Study

### 2.1 External Evaluator

Masami Tomita, Sanshu Engineering Consultant

### 2.2 Duration of Evaluation Study

Duration of the Study: October, 2013 –September, 2014

Duration of the Field Study: December 7– December 28, 2013 / March 16–April 6, 2014

### 2.3 Constraints during the Evaluation Study

In the ex-post evaluation, in order to analyze financial aspects of sustainability, financial statements in recent three years of Viet Nam Posts and Telecommunications (VNPT), which is the O&M agency of equipment procured under the project, were requested. However, they were not provided on the grounds that they are highly confidential. Thus, financial situation of VNPT could not be sufficiently verified.



### 3. Results of the Evaluation (Overall Rating: B<sup>6</sup>)

#### 3.1 Relevance (Rating: ③<sup>7</sup>)

##### 3.1.1 Relevance to the Development Plan of Vietnam

At the time of project appraisal, as explained above, telephone density in Vietnam was 1.05% on average (1995), which was low compared with that of other ASEAN countries, and telephone density in regional areas was particularly low (0.6% on average in 10 provinces that were targeted by the project)<sup>8</sup>. Therefore, the Vietnamese government planned to promote construction of telecommunication networks in the country and improve telephone density to 5% by 2000 during the period of “the Sixth Five-Year Socio-Economic Development Plan (1996-2000)”<sup>9</sup>. Moreover, development and economic growth of central Vietnam, which lagged behind economically compared with northern and southern Vietnam, was an important goal for the Vietnamese government, and this project targeted 10 provinces, where economic growth was expected, out of 19 provinces in total in central Vietnam<sup>10</sup>.

At the time of ex-post evaluation, “the Development Plan of National Telecommunications in Vietnam until 2020” (issued in 2012) states that the country will construct and develop modern (high volume and high speed) telecommunication infrastructures in remote areas as well as in socio – economically underdeveloped areas, to enhance the quality of life of people<sup>11</sup>. Specific goals stated in the Plan are; to increase fixed-line phone density to 15-20% and mobile phone density to 140% by 2015 and to increase fixed broadband internet density to 15-20% and mobile broadband internet density to 35-40% by 2020 etc.<sup>12</sup>

Therefore, to improve telephone density in Vietnam including economically lagged behind areas is emphasized in Vietnam’s national plans both at the time of project appraisal and ex-post evaluation, and the project objective is consistent with national policies.

##### 3.1.2 Relevance to the Development Needs of Vietnam

At the time of project appraisal, in 10 provinces at coastal areas that were targeted by the project, there was no telecommunication network in over 800 villages out of approximately 2,000 villages in total, and these villages were located at mountainous areas that were not reachable by automobiles, and there was no public communication means in these villages except for postmen who visited them twice or three times a week, which required urgent intervention for social welfare in the region<sup>13</sup>.

At the time of ex-post evaluation, as explained below, telephone density in the project-targeted areas has been largely improved since the time of project appraisal. However, as a recent trend in the telecommunication sector which can be seen in specific goals stated in the Development Plan of

<sup>6</sup> A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

<sup>7</sup> ③: High, ② Fair, ① Low

<sup>8</sup> Source: JICA appraisal document

<sup>9</sup> Source: same as above

<sup>10</sup> Source: same as above

<sup>11</sup> Source: document provided by the executing agency

<sup>12</sup> Source: same as above

<sup>13</sup> Source: JICA appraisal document

National Telecommunications in Vietnam mentioned above, needs for fixed-line phones have been decreasing and needs for mobile phones have been increasing. This project aimed at increasing fixed-line phone density, as it was planned during the 1990s, however, core transmission lines (optical fiber cables: OFC) installed under the project are utilized for mobile phone communications as well, and thus, needs for the expansion of telecommunication networks have not been diminished today. Moreover, at the time of ex-post evaluation, an industrial port and oil refine industrial park were developed in the project-targeted provinces, which raised demands for provision of telecommunication networks<sup>14</sup>.

Therefore, telecommunication networks are needed in the project-targeted areas both at the time of project appraisal and ex-post evaluation, and needs for the project are high.

### 3.1.3 Relevance to Japan's ODA Policy

The previous ODA Charter of Japan (issued in 1992) states that East Asia is a dynamic region in the world and to maintain and promote economic development in the region is important for development of the world economy, and at the same time, the region contains countries with a large population who suffer from poverty, which requires a continued emphasis on Asian region for assistance<sup>15</sup>. Moreover, prioritized areas for assistance were stated as global scale issues, basic human needs, technological improvement through development of human resources and research cooperation, and infrastructure development etc., and this project was categorized as infrastructure development<sup>16</sup>.

Therefore, this project was consistent with Japan's ODA policy at the time of project appraisal.

This project has been highly relevant to Vietnam's development plan, development needs, as well as Japan's ODA policy. Therefore its relevance is high.

## 3.2 Effectiveness<sup>17</sup> (Rating: ③)

### 3.2.1 Quantitative Effects (Operation and Effect Indicators)

While no operation and effect indicator was set except for the number of no-telecommunication villages in the project-targeted provinces at the time of project appraisal, effectiveness of the project is evaluated at the time of ex-post evaluation using basic indicators to evaluate a telecommunication project such as utilization ratio, telephone density, waiting list for main lines, telephone traffic, fault ratio, and internet density, as well as the number of no-telecommunication villages.

#### 3.2.1.1 Telephone Main Lines in Operation - Exchange Capacity Ratio (Utilization Ratio)

Telephone main lines in operation – exchange capacity ratio (utilization ratio) of digital switching systems procured under the project after the project completion is shown in Table 1.

---

<sup>14</sup> Source: answers to the questionnaire

<sup>15</sup> Source: Ministry of Foreign Affairs HP ([http://www.mofa.go.jp/mofaj/gaiko/oda/seisaku/taikou/sei\\_1\\_1.html](http://www.mofa.go.jp/mofaj/gaiko/oda/seisaku/taikou/sei_1_1.html))

<sup>16</sup> Source: same as above

<sup>17</sup> Sub-rating for Effectiveness is to be put with consideration of Impact.

Table 1: Telephone Main Lines in Operation - Exchange Capacity Ratio (Utilization Ratio)

(Unit: %)

Province	Actual (2011)	Actual (2012)	Actual (2013)
Thanh Hoa	100	100	77
Nghe An	94	59	50
Ha Tinh	76	68	67
Quang Binh	87	83	79
Quang Tri	100	100	99
Thua Thien Hue	96	91	86
Quang Nam	58	54	50
Quang Ngai	90	90	90
Binh Dinh	57	86	84
Phu Yen	95	60	57
Average	85	79	74

Source: answers to the questionnaire

Note: target figures were not set in JICA appraisal document.

In the field surveys for ex-post evaluation, it was found out that installation of digital switching systems was completed and they started to be used in 2005, which was 6 years before the project completion (2011), and they have been utilized for 8 years<sup>18</sup>. According to the executing agency, the utilization ratio was very high at almost 100% after the switching systems started to be used, however, the ratio is decreasing currently. Moreover, according to the executing agency, the life of switching systems is approximately 7 years in general in Vietnam, and thus installation of new switching systems will be needed soon. The utilization ratio was very high at almost 100% after the switching systems started to be used, and while the ratio is decreasing currently, it is still relatively high at 74%, and the reason for the decrease is due to the decreasing trend of fixed-line phones in recent years, and thus this should not be judged negatively in evaluating effectiveness.

### 3.2.1.2 Number of No-Telecommunication Villages in 10 Provinces

Actual figures of the number of villages with no telecommunication network in 10 provinces covered by the project at the time of project appraisal and target and actual figures after the project completion are shown in Table 2.

<sup>18</sup> Source: interviews with the executing agency

Table 2: Number of No-Telecommunication Villages in 10 Provinces

(Unit: village)

Province	Actual (1997)	Target (after project completion)	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	350	0	2	2	0	0
Nghe An	178	0	0	0	0	0
Ha Tinh	81	0	0	0	0	0
Quang Binh	47	0	2	0	0	0
Quang Tri	25	0	4	4	4	4
Thua Thien Hue	1	0	0	0	0	0
Quang Nam	83	0	16	16	16	16
Quang Ngai	25	0	0	0	0	0
Binh Dinh	N/A	0	0	0	0	0
Phu Yen	17	0	0	0	0	0
Total	807	0	24	22	20	20

Source: actual figures in 1997 and target figures: JICA appraisal document, actual figures after 2010: answers to the questionnaire

Note: above figures show the number of villages where subscribers of VNPT do not exist (fixed & mobile).

At the time of ex-post evaluation, the number of villages with no telecommunication network in 10 provinces is 20 in total. However, according to VNPT provincial offices, actual figures in Table 2 show the number of villages where subscribers of VNPT do not exist, and 4 villages in Quang Tri and 9 villages in Quang Nam are provided with telecommunication services from other providers<sup>19</sup>. Thus the real number of no-telecommunication villages is 7 only.

### 3.2.1.3 Telephone Density in 10 Provinces

Actual figures of telephone density in 10 provinces covered by the project at the time of project appraisal and estimated and actual figures after the project completion are shown in Table 3.

<sup>19</sup> At the time of project appraisal, a telecommunication service provider in Vietnam was VNPT only, however, there are many providers such as Viettel and EVN Telecom etc. at the time of ex-post evaluation.

Table 3: Telephone Density in 10 Provinces<sup>20</sup>

(Unit: %)

Province	Actual (1995)	Estimated (2010)	Actual (2010)		Actual (2011) (Project Completion)		Actual (2012)		Actual (2013)	
			Fixed	Mobile	Fixed	Mobile	Fixed	Mobile	Fixed	Mobile
Thanh Hoa	0.32	5.9	13.71	10.49	12.59	12.08	7.60	12.97	4.78	13.29
Nghe An	0.47	8.8	7.97	9.74	5.49	10.03	4.26	11.71	3.84	12.54
Ha Tinh	0.30	6.8	5.55	N/A	3.74	N/A	2.52	N/A	1.90	N/A
Quang Binh	0.48	5.1	8.77	21.23	6.13	20.45	4.83	21.93	4.15	23.06
Quang Tri	1.05	8.3	8.15	11.84	6.35	16.23	5.17	29.25	4.20	19.00
Thua Thien Hue	1.08	18.4	12.16	11.77	12.07	14.56	10.47	17.79	10.17	14.10
Quang Nam	0.59	8.7	4.63	4.58	3.69	6.21	2.97	11.83	2.52	6.49
Quang Ngai	0.71	10.9	7.72	13.38	6.00	8.48	4.23	9.24	3.32	7.47
Binh Dinh	0.75	12.0	7.26	9.44	6.85	8.32	4.17	10.55	3.70	8.60
Phu Yen	0.65	9.7	4.91	9.22	3.80	16.72	3.15	19.66	2.97	22.78
Average	0.64	9.5	8.08	11.30	6.67	12.56	4.94	16.10	4.15	14.15

Source: actual figures in 1995: JICA appraisal document, actual figures after 2010: answers to the questionnaire

Note: Estimated figures for 2010 = estimated number of VNPT subscribers in each province written in JICA appraisal document / population in each province in 2010 x 100. Actual figures = actual number of VNPT subscribers in each province / population in each province x 100.

In line with the tendency in the telephone market in Vietnam in recent years, fixed phone density has been decreasing, and on the other hand, mobile phone density has been rapidly increasing in the project-targeted areas. As core transmission lines (OFC) installed under the project are utilized for mobile phone communications as well, this project also contributed to the increase of mobile phone density in recent years. Moreover, comparing actual figures (fixed and mobile) in 2010 with estimated figures (no distinction between fixed and mobile) in 2010, actual figures largely exceed the estimated figures.

#### 3.2.1.4 Waiting List for Main Lines (Fixed-Line Phone) in 10 Provinces

The number of waiting applicants (waiting list for main lines) of fixed-line phones in 10 provinces has been zero since the project completion, accompanying the decreasing number of fixed-line phone subscribers<sup>21</sup>.

#### 3.2.1.5 Telephone Traffic in 10 Provinces

Actual figures of telephone traffic between fixed-line phones in 10 provinces covered by the project are shown in Table 4, actual figures of telephone traffic between fixed-line and mobile phones are shown in Table 5, and actual figures of telephone traffic between mobile phones are shown in Table 6.

<sup>20</sup> While a telecommunication service provider in Vietnam was VNPT only at the time of project appraisal, according to HP of Ministry of Information and Communications in Vietnam, a market share of VNPT among fixed-line phone service providers in Vietnam in 2011 is 68%, and the share of VNPT (Vinaphone only) among mobile phone service providers is 30%.

<sup>21</sup> Source: answers to the questionnaire

Table 4: Telephone Traffic (Fixed-Line to Fixed-Line) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)		Actual (2011) (Project Completion)		Actual (2012)		Actual (2013)	
	Local	Long Distance	Local	Long Distance	Local	Long Distance	Local	Long Distance
Thanh Hoa	199,795	12,693	102,749	7,202	49,526	4,026	32,878	2,896
Nghe An	72,258	9,696	34,492	5,567	20,713	4,010	14,568	3,095
Ha Tinh	22,216	4,418	9,385	2,342	4,937	1,418	3,114	989
Quang Binh	43,491	3,084	23,191	2,098	13,437	1,467	9,055	1,181
Quang Tri	34,925	3,586	19,305	2,189	11,431	1,381	7,938	1,061
Thua Thien Hue	75,856	5,826	55,797	4,488	37,919	3,527	28,718	2,946
Quang Nam	42,117	6,647	18,649	4,633	13,981	3,924	11,532	3,444
Quang Ngai	45,502	5,295	25,548	3,493	15,326	2,492	11,156	2,034
Binh Dinh	50,586	4,840	33,164	4,015	22,469	3,505	19,208	2,086
Phu Yen	19,937	2,305	13,714	1,661	10,386	1,417	8,747	1,461
Total	606,682	58,389	335,996	37,687	200,127	27,165	146,915	21,194

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between fixed-line phones using VNPT network in each province.

Table 5: Telephone Traffic (Fixed-Line and Mobile) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	90,598	58,923	99,799	72,843
Nghe An	51,922	32,631	26,749	24,189
Ha Tinh	22,228	13,197	9,749	7,985
Quang Binh	29,309	19,907	15,425	13,290
Quang Tri	18,650	13,765	11,092	9,615
Thua Thien Hue	42,994	33,618	30,589	25,382
Quang Nam	45,201	28,897	27,085	26,821
Quang Ngai	35,699	27,435	22,202	20,182
Binh Dinh	39,571	32,879	27,022	17,316
Phu Yen	10,930	9,378	10,244	13,231
Total	387,102	270,629	279,956	230,854

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between fixed-line and mobile phones using VNPT network in each province. Above data could not be divided into local calls and long distance calls.

Table 6: Telephone Traffic (Mobile to Mobile) in 10 Provinces

(Unit: thousand call-minutes)

Province	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	N/A	N/A	751,964	908,209
Nghe An	N/A	N/A	N/A	N/A
Ha Tinh	N/A	N/A	N/A	N/A
Quang Binh	N/A	N/A	N/A	N/A
Quang Tri	N/A	79,216	138,574	151,644
Thua Thien Hue	156,398	255,015	321,934	255,515
Quang Nam	98,891	108,911	132,872	164,628
Quang Ngai	74,819	93,605	42,845	38,371
Binh Dinh	N/A	N/A	N/A	N/A
Phu Yen	28,670	59,459	79,164	68,003
Total	358,778	596,205	1,467,353	1,586,369

Source: answers to the questionnaire

Note: Baseline and target figures were not set in JICA appraisal document. Above figures show traffic volume (number of calls x average call time) between mobile phones using VNPT network in each province. Above data could not be divided into local calls and long distance calls. Mobile phone services utilizing core transmission lines installed under the project are provided by Vinaphone among VNPT Group, and many VNPT provincial offices do not have traffic data between mobile phones.

Accompanying a decrease of fixed-line phone density, telephone traffic between fixed-line and fixed-line phones and between fixed-line and mobile phones has been decreasing. On the other hand, telephone traffic between mobile and mobile phones has been increasing and the volume is a lot larger than the volume of fixed-line phones. As core transmission lines (OFC) installed under the project are utilized for mobile phone communications as well, this project is considered to have contributed to the increase of telephone traffic between mobile phones to a certain extent.

#### 3.2.1.6 Fault Ratio in 10 Provinces

Detailed data in each province was unable to be obtained, however, according to the executing agency, fault ratio is nearly zero such as 0.001%, and thus there is considered to be no major problem in terms of the quality of phone calls.

#### 3.2.1.7 Internet Density in 10 Provinces

Actual figures of internet density at the time of project appraisal and after the project completion in 10 provinces covered by the project are shown in Table 7.

Table 7: Internet Density in 10 Provinces

(Unit: %)

Province	Actual (1995)	Actual (2010)	Actual (2011) (Project Completion)	Actual (2012)	Actual (2013)
Thanh Hoa	0	1.57	2.03	2.09	2.16
Nghe An	0	1.97	2.36	2.54	2.77
Ha Tinh	0	1.88	1.93	1.97	2.20
Quang Binh	0	2.80	2.83	2.90	3.02
Quang Tri	0	1.70	2.20	2.90	3.80
Thua Thien Hue	0	1.59	2.08	4.14	4.95
Quang Nam	0	1.51	1.59	1.74	1.83
Quang Ngai	0	1.66	1.57	1.66	1.85
Binh Dinh	0	2.04	2.66	2.45	2.61
Phu Yen	0	1.96	2.08	2.44	2.75
Average	0	1.87	2.13	2.48	2.79

Source: answers to the questionnaire

Note: Target figures were not set in JICA appraisal document. Above figures show the ratio of the number of subscribers of VNPT's fixed broadband internet against population in each province.

The number of broadband internet subscribers in Vietnam is still small<sup>22</sup>, however, it has been increasing gradually, and as core transmission lines (OFC) installed under the project are utilized for internet as well, this project is considered to have contributed to the increase of internet density in recent years.

### 3.3 Impact

#### 3.3.1 Intended Impacts

##### 3.3.1.1 Reduction of Regional Disparities and Promotion of Economic Development of Central Vietnam

At the time of project appraisal, this project aimed at contributing to reduction of regional disparities and promotion of economic development of central Vietnam. While it is difficult to present specifically the degree of contribution of the project, monthly average income per capita by region from the time of project appraisal to the time of ex-post evaluation is shown in Table 8 for reference.

Table 8: Monthly Average Income per Capita by Region

(Unit: thousand VND)

Region	1999	2004	2008	2012
North Central and Central Coastal Areas	229	361	728	1,469
Central Highlands	345	390	795	1,631
Northern Midlands and Mountain Areas	199	327	657	1,285
South East Area	571	893	1,773	3,241

Source: Vietnam National Statistical Office

<sup>22</sup> According to Vietnam ICT White Book 2011, the number of broadband internet subscribers is 4.20 persons per 100 persons in 2010 (national average).



The project-targeted areas are included in “North Central and Central Coastal Areas” above, and the increasing rate of income per capita in the region from 1999 to 2012 is 541% (the increasing rate in other regions is; 373% in central highlands, 546% in northern midlands and mountain areas, and 468% in south east area), and central Vietnam has seen a remarkable economic development in the past 10 years. This project is considered to have contributed to the increase of income per capita to some extent, by improving telecommunication services in the region.

### 3.3.2 Other Impacts

#### 3.3.2.1 Impacts on the Natural Environment

At the time of project appraisal, no negative environmental impact due to the project was expected, and an environmental impact assessment (EIA) report was to be submitted to relevant authorities during detailed design and to be approved<sup>23</sup>. However, as the loan agreement of this project was as old as 1998, which is 16 years ago, the EIA report was not available. According to the executing agency, there was no negative environmental impact caused under this project.

#### 3.3.2.2 Land Acquisition and Resettlement

At the time of project appraisal, no land acquisition or resettlement of residents was expected<sup>24</sup>. According to the executing agency, while compensation was paid to some land owners to bury transmission cables, all these areas were restored to their original state, and no land acquisition or resettlement was required under the project.

As explained above, as a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are increasing. Thus, the utilization ratio of telecommunication equipment for fixed-line phones procured and installed under the project, fixed-line phone density and telephone traffic of fixed-line phones have been decreasing in recent years. However, core transmission lines (OFC) developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years. Moreover, this project has contributed to eradication of villages with no telecommunication network, which was the objective of this project, and actual figures of telephone density at the time of ex-post evaluation largely exceed the estimated figures for 2010. Despite of its decreasing trend, fixed-line phones are still used and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and this project is considered to have contributed to the reduction of regional disparities to some extent. Therefore its effectiveness and impact are high.

---

<sup>23</sup> Source: JICA appraisal document

<sup>24</sup> Source: same as above

### 3.4 Efficiency (Rating: ②)

#### 3.4.1 Project Outputs

Outputs of the project (planned and actual) are shown below.

Table 9: Comparison of Outputs (Planned/ Actual)

Item	Planned	Actual
Construction Works/ Procurement	<ul style="list-style-type: none"> <li>• Digital Switching System: 118,728 lines</li> <li>• STM<sup>25</sup> : 157 set</li> <li>• Network Management System: 10 set</li> <li>• Optical Fiber Cable: 1,681 km</li> <li>• Microwave Transmission System: 8 set</li> <li>• Outside Plant (Cable): 498,690 pair-km</li> <li>• Wireless Local Loop: 9,100 lines</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Switching System: 138,173 lines</li> <li>• STM : 219 set</li> <li>• Network Management System : 10 set</li> <li>• Optical Fiber Cable: 2,656 km</li> <li>• Microwave Transmission System: 4 set</li> <li>• Outside Plant (Cable): cancelled</li> <li>• Wireless Local Loop: 7,043 lines</li> </ul>
Consulting Service (CS)	<ul style="list-style-type: none"> <li>• Review of F/S and detailed design</li> <li>• Preparation of bidding documents and tender assistance for evaluation of contractors</li> <li>• Supervision of delivery and installation of equipment</li> <li>• Foreign CS: 148M/M, Local CS: 918M/M</li> </ul>	<ul style="list-style-type: none"> <li>• Review of F/S and detailed design</li> <li>• Preparation of bidding documents and tender assistance for evaluation of contractors</li> <li>• Supervision of delivery and installation of equipment</li> <li>• Foreign CS: 271M/M, Local CS: 974M/M</li> </ul>

Source: planned: JICA appraisal document, actual: answers to the questionnaire and interviews with the executing agency

As shown in Table 9, actual outputs of the project were changed from the plan. Reasons for the change are below:

1) Telecommunication needs in the project-targeted areas changed while the project implementation was prolonged (see 3.4.2.2 Project Period for details), which required changes of outputs, and moreover, layouts of infrastructures including roads, ports, industrial parks etc. were changed, which also required changes of project outputs<sup>26</sup>.

2) In addition to the above, the procurement amount of switching systems and core transmission lines needed to be increased in order to secure telecommunications in the project areas, as these areas were often hit by floods and hurricane<sup>27</sup>.

3) Actual amount of microwave transmission systems procured under the project was decreased, because VNPT procured some equipment using other source of funds, due to a delay of project implementation<sup>28</sup>.

4) The portion of outside plant (copper cables) was cancelled under the project, because the contractor could not afford the contract due to a sharp rise of the copper price, then VNPT procured some equipment using own funds for the urgently needed areas, and the rest was to be covered by

<sup>25</sup> STM stands for Synchronous Transport Module, and this is a virtual telecommunication line which is a multiplexing unit in SDH (Synchronous Digital Hierarchy).

<sup>26</sup> Source: JICA internal document and interviews with the executing agency

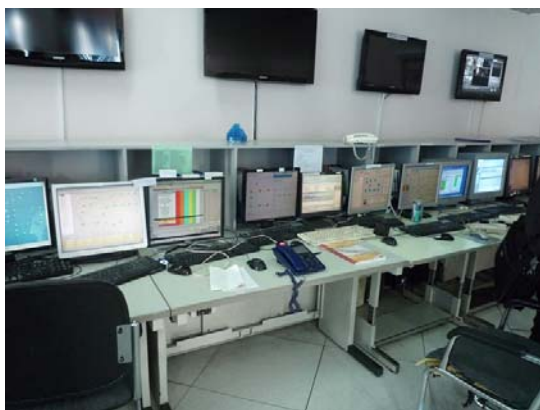
<sup>27</sup> Source: same as above

<sup>28</sup> Source: same as above

wireless local loop (WLL) and OFC<sup>29</sup>.

5) Actual amount of WLL was decreased, as the number of villages which were to be covered by WLL decreased, due to a delay of project implementation<sup>30</sup>.

According to Vietnam ICT White Book 2011, fixed-line phone density in Vietnam started to decrease after 2010, which was close to the project completion, and thus there seems to have been no major change of project outputs caused by the decrease of fixed-line phone density<sup>31</sup>.



Network Management System



Microwave Transmission Tower

### 3.4.2 Project Inputs

#### 3.4.2.1 Project Cost

The planned project cost at the time of project appraisal was 13,332 million yen (foreign currency: 10,282 million yen, local currency: 3,050 million yen), of which Japanese ODA loan portion was 11,332 million yen<sup>32</sup>. On the other hand, the actual project cost was 8,112 million yen (foreign currency: 5,171 million yen, local currency: 2,941 million yen), of which Japanese ODA loan portion was 5,912 million yen<sup>33</sup>, and it was lower than planned. The planned project cost taking into account the increase and decrease of major project outputs is 11,084 million yen, and comparing this amount with actual project cost, the actual cost is 73% against the plan<sup>34</sup>. Reasons for the actual cost being much lower than the planned cost are a cancellation of outside plant (cables), falling prices of telecommunication equipment and fluctuation of exchange rate (1 yen = 98.55 VND at the time of

<sup>29</sup> Source: JICA internal document and interviews with the executing agency

<sup>30</sup> Source: same as above

<sup>31</sup> Source: interviews with the executing agency

<sup>32</sup> Source: JICA appraisal document

<sup>33</sup> Source: answers to the questionnaire and JICA internal document

<sup>34</sup> Taking into account major changes of project outputs, 1) the revised planned cost of digital switching systems is 420 million yen more than the original cost (an increase of 19,445 lines x 180 USD (unit cost at the time of appraisal) x 120 yen (exchange rate at the time of appraisal)), 2) the revised planned cost of OFC is 585 million yen more than the original cost (an increase of 975 km x 5,000 USD (unit cost at the time of appraisal) x 120 yen), 3) the revised planned cost of outside plant is 2,459 million yen less than the original cost (due to cancellation), and 4) the revised planned cost of WLL is 794 million yen less than the original cost (a decrease of 47 set of base stations x 140,000 USD (unit cost at the time of appraisal) x 120 yen) + (a decrease of 18 set of terminal stations x 2,000 USD (unit cost at the time of appraisal) x 120 yen). From the above, the revised planned cost in total becomes 11,084 million yen, and the actual cost (8,112 million yen) is 73% against the plan.

loan agreement, and 1 yen = 198.37 VND at the time of disbursement completion) etc.

#### 3.4.2.2 Project Period

The planned project period at the time of project appraisal was 34 months in total from March 1998 (signing of the loan agreement) to December 2000 (completion of construction works and operating test)<sup>35</sup>. On the other hand, the actual project period was 161 months in total from March 1998 (signing of the loan agreement) to July 2011 (completion of construction works and operating test)<sup>36</sup>, and it was significantly longer than planned (474% against the plan). Reasons for the actual project period significantly exceeding the planned period are as follows;

1) Processes for selection of consultants, detailed design, selection of contractors and suppliers, and construction and installation works were delayed due to a long time required for obtaining necessary approvals from relevant domestic organizations for project implementation and delays in administrative procedures<sup>37</sup>.

2) Telecommunication needs in the project-targeted areas changed while the project implementation was prolonged, which required resurvey, redesign, and changes of configurations and locations for installing telecommunication equipment<sup>38</sup>.

3) For installation of SDH and microwave transmission systems, in addition to the above reasons, it was required to wait for a procurement of OFC to connect stations, and moreover, due to fault of equipment supplied by contractor, it took a long time to deal with the problem and replace faulty equipment<sup>39</sup>.

4) Regarding WLL, related to the changes of locations explained above, it was found out that telecommunication networks were already provided by VNPT provincial offices in some project areas, that there were some areas where land acquisition was difficult and that some areas were affected by bombs and land mines, and thus VNPT requested to install a base station in a location different from the original plan, which required a long time for review and approval<sup>40</sup>.

5) Regarding transmission cables, as explained above, after a contractor was selected, the copper price rose sharply and the contractor could not afford the contract, and thus the contract package for transmission cables was divided into 2 packages (OFC and copper cable). Then VNPT procured some copper cables using own funds for the urgently needed areas, and the rest was to be covered by WLL and OFC, and the bidding for copper cables was cancelled and re-bidding for OFC was conducted. This whole process required a long time<sup>41</sup>. Moreover, a long time was required for land clearance to install OFC, natural disaster (flood and hurricane) affected the project areas, and skills and management capabilities of contractors were low, all of which also caused a delay<sup>42</sup>.

---

<sup>35</sup> Source: JICA appraisal document

<sup>36</sup> Source: answers to the questionnaire

<sup>37</sup> Source: JICA internal document and interviews with the executing agency

<sup>38</sup> Source: same as above

<sup>39</sup> Source: same as above

<sup>40</sup> Source: same as above

<sup>41</sup> Source: same as above

<sup>42</sup> Source: same as above

Table 10: Comparison of Project Period<sup>43</sup>

Content	Planned	Actual
Selection of Consultants	November 1997 – June 1998 (8 months)	July 1999 – March 2000 (9 months)
Detailed Design	July 1998 – August 1998 (2 months)	June 2000 – March 2001 (10 months)
Selection of Contractors	July 1998 – May 1999 (11 months)	Package 1: November 2002 – March 2004 (17 months) Package 2: August 2002 – September 2003 (14 months) Package 3: June 2004 – October 2005 (17 months) Package 4: October 2007 – September 2008 (12 months)
Construction and Installation Works	July 1999 – October 2000 (16 months)	Package 1: July 2004 – July 2005 (13 months) Package 2: March 2004 – October 2008 (56 months) Package 3: January 2006 – October 2008 (34 months) Package 4: November 2008 – July 2011 (33 months)
Operating Test	November 2000 – December 2000 (2 months)	Package 1: July 2005 Package 2: October 2008 Package 3: October 2008 Package 4: July 2011

Source: planned: JICA appraisal document, actual: JICA internal document and answers to the questionnaire

### 3.4.3 Results of Calculations of Internal Rates of Return (Reference only)

#### 3.4.3.1 Financial Internal Rate of Return (FIRR)

While FIRR was estimated as 4.99% at the time of project appraisal, it cannot be calculated at the time of ex-post evaluation, as data on revenues from this project (financial data) was not available due to its high confidentiality.

#### 3.4.3.2 Economic Internal Rate of Return (EIRR)

At the time of project appraisal, EIRR was not calculated on the ground that this project is to contribute to improving the quality of life of people by eradicating villages with no telecommunication network, which is not suitable for calculation of EIRR, and thus EIRR is not calculated in ex-post evaluation.

Although the project cost was within the plan even after taking into account major changes of project outputs, the project period exceeded the plan. Therefore efficiency of the project is fair.

## 3.5 Sustainability (Rating: ②)

### 3.5.1 Institutional Aspects of Operation and Maintenance (O&M)

<sup>43</sup> Package 1: digital switching system, Package 2: SDH and microwave transmission system, Package 3: WLL, and Package 4: transmission cables

At the time of project appraisal, VNPT was to be responsible for O&M<sup>44</sup>. VNPT was in charge of post and telecommunication services and owned 39 subsidiary companies. It also had 67 P&T (Posts & Telecommunications, equivalent to its provincial offices) in provinces and major cities, and approximately 45,000 employees<sup>45</sup>. Actual inspection and maintenance works were to be conducted by P&T in each province in accordance with guidance from VNPT<sup>46</sup>.

At the time of ex-post evaluation, VNPT has been reorganized as VNPT Group which consists of a parent company, 5 financially-independent subsidiary companies and some joint-venture companies, and total number of employees is approximately 50,000<sup>47</sup>. O&M of telecommunication equipment procured under the project except for WLL is conducted by VNPT provincial offices and O&M of WLL is conducted by Vinaphone (both VNPT provincial offices and Vinaphone belong to the parent company)<sup>48</sup>. The number of employees in each VNPT provincial office is shown below.

Table 11: The Number of Employees in VNPT Provincial Offices in 10 Provinces

(Unit: person)

Province	Total	Technical Staff	Breakdown of Technical Staff	
			Equipment Operation	Maintenance of Access Network
Thanh Hoa	787	480	175	305
Nghe An	1,052	683	300	383
Ha Tinh	Approximately 500	Approximately 200	28	99
Quang Binh	480	320	22	298
Quang Tri	370	148	23	125
Thua Thien Hue	551	237	90	147
Quang Nam	481	240	140	100
Quang Ngai	421	278	17	261
Binh Dinh	486	310	40	270
Phu Yen	351	182	36	146

Source: interviews with VNPT provincial offices

Note: According to VNPT provincial offices, assignment of works is changed according to actual needs and situations, and the breakdown of technical staff above is not fixed, and thus the breakdown above is for reference only.

Equipment procured and installed under the project are operated as part of the whole equipment operated by VNPT provincial offices, and thus the exact number of employees who are in charge of O&M of equipment procured under the project only is unknown. However, according to the executing agency, equipment procured under the project are approximately 10% of the whole equipment, and thus approximately 10% of employees above are considered to be in charge of O&M of equipment procured under the project. VNPT Group has a sufficient number of employees, and each provincial office also explained that the number of employees is sufficient, and thus no particular problem is seen in institutional aspects of O&M. However, according to VNPT Group, reorganization of the Group is

<sup>44</sup> Source: JICA appraisal document

<sup>45</sup> Source: same as above

<sup>46</sup> Source: same as above

<sup>47</sup> Source: VNPT HP (<http://www.vnpt.vn/>) and answers to the questionnaire

<sup>48</sup> Source: answers to the questionnaire

planned in near future. Currently the Group has two mobile phone companies such as Vinaphone and Vietnam Mobile Telecom Services Company (VMS MobiFone)<sup>49</sup>, and the latter is expected to become separated from the Group, however, more details about the reorganization are unknown<sup>50</sup>. However, as explained above, O&M of equipment procured under the project are conducted by VNPT provincial offices and Vinaphone, and the separation of VMS MobiFone will not have a major impact on institutional aspects of O&M of equipment procured under the project, according to the Group<sup>51</sup>.

### 3.5.2 Technical Aspects of Operation and Maintenance

Details on technical aspects of employees in VNPT provincial offices are shown below.

Table 12: Details on Technical Aspects of Employees in VNPT Provincial Offices in 10 Provinces

Province	Education	Average Years of Work Experience of Technical Staff
Thanh Hoa	Among 787 (the total number of employees) <ul style="list-style-type: none"> <li>• Master degree: 4</li> <li>• Bachelor in engineering: 412</li> <li>• Bachelor degree (not engineering): 171</li> <li>• Technical school: 200</li> </ul>	Approximately 10 years
Nghe An	Among 683 technical staff <ul style="list-style-type: none"> <li>• Master degree: 6</li> <li>• Bachelor in engineering: 203</li> <li>• Bachelor degree (not engineering): 64</li> <li>• Technical school: 410</li> </ul>	Approximately 13 years
Ha Tinh	Among approximately 500 employees in total, approximately 140 have a bachelor degree in engineering.	Approximately 10 years
Quang Binh	Among approximately 480 employees in total, approximately 220 have a bachelor degree in engineering.	Approximately 10 years
Quang Tri	Among 148 technical staff <ul style="list-style-type: none"> <li>• Master degree: 9</li> <li>• Bachelor in engineering: 50</li> <li>• Bachelor degree (not engineering): 5</li> <li>• Technical school: 84</li> </ul>	Approximately 10 years
Thua Thien Hue	Among 237 technical staff <ul style="list-style-type: none"> <li>• Bachelor in engineering: 101</li> <li>• Bachelor degree (not engineering): 16</li> <li>• Technical school: 120</li> </ul>	Approximately 11 years
Quang Nam	Among 240 technical staff <ul style="list-style-type: none"> <li>• Master degree: 4</li> <li>• Bachelor in engineering: 116</li> <li>• Bachelor degree (not engineering): 24</li> <li>• Technical school: 96</li> </ul>	Approximately 13 years
Quang Ngai	Among 278 technical staff <ul style="list-style-type: none"> <li>• Bachelor in engineering: 54</li> <li>• Bachelor degree (not engineering): 22</li> <li>• Technical school: 202</li> </ul>	Approximately 14 years

<sup>49</sup> VMS MobiFone was established as a joint stock company funded by the Vietnamese government and a Swedish company in 1993, and Vinaphone was established in 1996 fully funded by the Vietnamese government.

<sup>50</sup> Source: interviews with the executing agency

<sup>51</sup> Source: same as above

Binh Dinh	Among 310 technical staff <ul style="list-style-type: none"> <li>• Master degree: 5</li> <li>• Bachelor in engineering: 60</li> <li>• Bachelor degree (not engineering): 33</li> <li>• Technical school: 212</li> </ul>	Approximately 20 years
Phu Yen	Among 182 technical staff <ul style="list-style-type: none"> <li>• Master degree: 1</li> <li>• Bachelor in engineering: 72</li> <li>• Bachelor degree (not engineering): 25</li> <li>• Technical school: 84</li> </ul>	Approximately 12 years

Source: interviews with VNPT provincial offices

During the project implementation, various trainings on O&M of equipment procured and installed under the project were provided by contractors (lengths of these trainings differ from three days to one month, depending on training contents) and 655 employees in total attended<sup>52</sup>. Moreover, after the project completion, trainings on O&M are provided every year by inviting lecturers from inside and outside of VNPT provincial offices and O&M manuals are also in place in each provincial office<sup>53</sup>.

Sufficient number of engineers and technicians are assigned, trainings have been provided for employees during and after the project implementation, and O&M manuals are in place, and thus no particular problem is seen regarding technical aspects of O&M.

### 3.5.3 Financial Aspects of Operation and Maintenance

Financial situation (sales revenue and profit) of VNPT at the time of project appraisal is shown below.

Table 13: Sales Revenue and Profit of VNPT (at the Time of Project Appraisal)

(Unit: billion VND)

	1995	1996
Sales Revenue	4,987	5,952
Profit Before Tax	1,202	1,708
Profit After Tax	658	939

Source: JICA appraisal document

According to the table above, after-tax profit rate was 13-16%, and moreover, capital-to-asset ratio was 62%, and VNPT was regarded as in a good financial condition<sup>54</sup>.

At the time of ex-post evaluation, VNPT provincial offices, which actually conduct O&M of equipment procured and installed under the project, belong to VNPT Group (parent company), and part of revenues of provincial offices is received by the Group and in case of losses in provincial offices, such losses are financed by the Group<sup>55</sup>. As financial statements of the Group was not provided on the ground that they are highly confidential, sales revenue and gross profit of the Group in

<sup>52</sup> Source: answers to the questionnaire

<sup>53</sup> Source: interviews with the executing agency

<sup>54</sup> Source: JICA appraisal document

<sup>55</sup> Source: interviews with the executing agency



recent three years published on an online newspaper are shown below.

Table 14: Sales Revenue and Gross Profit of VNPT Group (at the Time of Ex-Post Evaluation)

(Unit: billion VND)

	2010	2011	2012
Sales Revenue	101,569	120,800	130,000
Gross Profit	11,200	10,000	8,500

Source: VnEconomy (<http://vneconomy.vn/>)

Sales revenue of VNPT Group has largely increased compared with the amount before the project implementation, and according to information provided by a project-related party, net profit of the Group has been positive in recent four years and net profit to sales is approximately 1 to 3%.

O&M cost (approximate calculation) of equipment procured and installed under the project in VNPT provincial offices is shown below.

Table 15: O&M Cost of Project Equipment in VNPT Provincial Offices (Approximate Calculation)

(Unit: million VND)

Province	O&M Cost	
Thanh Hoa	Equipment	1,300
	Salary	1,000
	Technical Support	1,700
	<b>Total</b>	<b>4,000</b>
Nghe An	Equipment	1,000
	Salary	2,100
	Technical Support	500
	<b>Total</b>	<b>3,600</b>
Ha Tinh	Equipment	280
	Salary	300
	Technical Support	N/A
	<b>Total</b>	<b>580</b>
Quang Binh	Equipment	300
	Salary	400
	Technical Support	100
	<b>Total</b>	<b>800</b>
Quang Tri	Equipment	150
	Salary	840
	Technical Support	270
	<b>Total</b>	<b>1,260</b>
Thua Thien Hue	Equipment	200
	Salary	750
	Technical Support	270
	<b>Total</b>	<b>1,220</b>
Quang Nam	Equipment	560
	Salary	600
	Technical Support	200
	<b>Total</b>	<b>1,360</b>
Quang Ngai	Equipment	360

	Salary	300
	Technical Support	485
	<b>Total</b>	<b>1,145</b>
Binh Dinh	Equipment	150
	Salary	250
	Technical Support	300
	<b>Total</b>	<b>700</b>
Phu Yen	Equipment	250
	Salary	400
	Technical Support	280
	<b>Total</b>	<b>930</b>

Source: interviews with VNPT provincial offices

O&M cost (approximate calculation) of equipment procured and installed under the project in VNPT provincial offices is approximately 700 million – 4,000 million VND (it varies depending on the number of subscribers and quantities of equipment procured etc. in each province), which is only 0.0005 - 0.003% of sales revenue of the Group, and the impact of the O&M cost on the Group’s financial condition is very small. According to the executing agency, currently necessary expenses are fully covered by sales revenue and government subsidy is not provided, and thus there seems to be no major problem in the Group’s financial condition. However, as explained above, since financial statements of the Group was not provided, the Group’s financial condition could not be analysed sufficiently in detail, and it is also not very clear what impact the reorganization of the Group (separation of VMS MobiFone) will have on the Group’s financial condition.

#### 3.5.4 Current Status of Operation and Maintenance

O&M is regularly conducted based on O&M manuals etc. in VNPT provincial offices<sup>56</sup>. However, utilization ratio of digital switching systems (see “3.2 Effectiveness”) and WLL facilities has been decreasing due to the decrease of subscribers of fixed-line phones in recent years<sup>57</sup>. Microwave transmission equipment is currently not used in Quang Tri and Phu Yen, due to the decrease of needs for fixed-line phones, low quality and not being suited for the local configuration network etc.<sup>58</sup> However, a capacity of microwave transmission is generally small, and thus it is usually replaced by OFC when the demand for telecommunication increases.

Therefore, no major problem is seen regarding current O&M status.

While no major problem has been observed in institutional and technical aspects of O&M at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Therefore sustainability of the project effect is fair.

<sup>56</sup> Source: interviews with the executing agency

<sup>57</sup> Source: same as above

<sup>58</sup> Source: same as above

## 4. Conclusion, Lessons Learned and Recommendations

### 4.1 Conclusion

This project aimed at eradicating villages with no telecommunication network and improving telecommunication services in central Vietnam, which lagged behind economically compared with northern and southern Vietnam, by constructing telecommunication networks in the region.

Relevance of this project is high, as the project is consistent with priority areas of Vietnam's development plans and Japan's ODA policy, and moreover development needs for the project are high. As a worldwide trend in the telecommunication sector, while needs for fixed-line phones are decreasing, needs for mobile phones are rapidly increasing at the time of ex-post evaluation. Accompanying this trend, the utilization ratio of digital switching systems etc. procured under the project has been decreasing, however, core transmission lines developed under the project are also used for mobile and internet communications, and thus this project has contributed to the diffusion of mobile phones and internet in recent years. This project has contributed to eradication of villages with no telecommunication network in the project-targeted areas, actual figures of telephone density in 2010 largely exceed the estimated figures, and telecommunication services in the project-targeted areas have been improved by the diffusion of both fixed-line and mobile phones, and thus effectiveness and impact of the project are high. Efficiency of the project is fair, as actual project period largely exceeded planned period, while actual project cost was within the planned cost. While no major problem has been observed in institutional and technical aspects of O&M at the time of ex-post evaluation, financial situation of O&M agency could not be sufficiently verified, as its financial statements were not provided. Moreover, reorganization of the O&M agency is planned in the near future, and its influence on future O&M is somewhat uncertain. Thus, sustainability of the project is fair.

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

### 4.2 Recommendations

#### 4.2.1 Recommendations to the Executing Agency

None

#### 4.2.2 Recommendations to JICA

None

### 4.3 Lessons Learned

**Necessity to Implement a Telecommunication Project Promptly from Project Appraisal to Completion / Necessity to Evaluate Implementation Capacity of an Executing Agency and Related Risks:** Actual project period was 161 months compared with planned period of 34 months, and overly exceeded the plan (474% against the plan). Ex-post evaluation was conducted 15 years after the loan agreement, and while the project aimed at increasing fixed-line phone density at the time

of project appraisal, mobile phone communications are dominant globally in recent years and the utilization ratio of digital switching systems procured under the project is decreasing at the time of ex-post evaluation. As technology innovation speed is fast in the telecommunication sector, a project plan needs to be prepared taking into account the speed of future technology innovation and future income levels in the given country very carefully and need to be implemented promptly. In addition, during appraisal, it is necessary to check in detail procurement procedures in a country where a project is going to be implemented, evaluate implementation capacity of an executing agency and related risks, and carefully consider whether the lending scheme as Japanese ODA loan is suitable for the project.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs	<ul style="list-style-type: none"> <li>• Digital Switching System: 118,728 lines</li> <li>• STM : 157 set</li> <li>• Network Management System: 10 set</li> <li>• Optical Fiber Cable: 1,681 km</li> <li>• Microwave Transmission System: 8 set</li> <li>• Outside Plant (Cable): 498,690 pair-km</li> <li>• Wireless Local Loop: 9,100 lines</li> </ul>	<ul style="list-style-type: none"> <li>• 138,173 lines</li> <li>• 219 set</li> <li>• 10 set</li> <li>• 2,656 km</li> <li>• 4 set</li> <li>• Cancelled</li> <li>• 7,043 lines</li> </ul>
2.Project Period	March 1998 – December 2000 (34 months)	March 1998 – July 2011 (161 months)
3.Project Cost		
Amount paid in Foreign currency	10,282 million yen	5,171 million yen
Amount paid in Local currency	3,050 million yen (31 million VND)	2,941 million yen (22 million VND)
Total	13,332 million yen	8,112 million yen
Japanese ODA loan portion	11,332 million yen	5,912 million yen
Exchange rate	1VND = 97.46 yen (As of October 1997)	1 VND = 135.69 yen (Average between March 1998 and January 2010)