Thailand

Rural Health Infrastructure Strengthening Project

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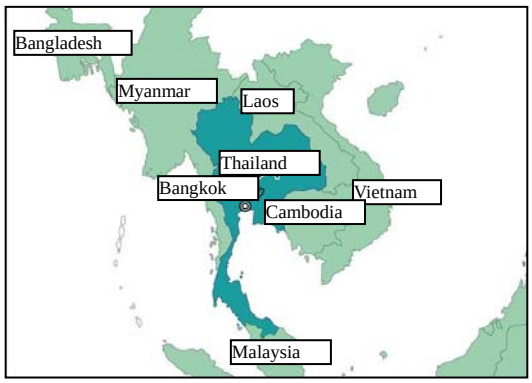
Field Survey: December 2005

## 1. Project Profile and Japan's ODA Loan




Map of project area

Target region: the whole of Thailand

Site photograph: A tablet counter procured by this project

### 1.1 Background

During the Seventh National Economic and Social Development Plan (Seventh NESDP: 1991-96), the Government of Thailand intended to secure minimum medical services and improve the health levels in provincial communities. Almost all prefectures, counties and villages in Thailand had public health facilities.

Although each major city had a regional hospital and each provincial city had a provincial hospital[1], there were no health facilities in provincial communities that can offer advanced medical services as seen in private hospitals in the Bangkok area. There was a wide gap between the medical level in the capital area and that in the provinces. In provincial public health facilities, medical equipment had not been sufficiently enhanced and improved because of lack of funds, and it is difficult to offer high-quality medical services. The Government of Thailand had been regarding the public's health enhancement and access to medical services as important issues, particularly enhancement of provincial medical services.

### 1.2 Objective

This project aims to improve and expand public health and medical facilities in the provinces and enhance provincial medical services, thereby contributing to the public's

[1] Public health facilities in counties and villages (village health centers and county hospitals) have little full-time health manpower and only provide primary health care. In rural communities, provincial hospitals and regional hospitals mainly offer higher-level (secondary to tertiary) medical services.

health improvement.

1.3 Project scope

Providing medical equipment to a total of 93 hospitals: regional hospitals (17); provincial hospitals (75); and general hospital (1)

1.4 Borrower/Executing agency

Kingdom of Thailand/Ministry of Public Health

1.5 Outline of Loan Agreement

| | |
|---|---|
| Loan Amount/Disbursed Amount | 4,959 million yen/3,255 million yen |
| Loan Agreement | September 1996 |
| Terms and Conditions<br>- Interest Rate<br>- Repayment Period<br>(Grace Period)<br>- Procurement | <br>2.7 %/year<br>25 years<br>7 years<br>General untied |
| Final Disbursement Date | October 2003 |
| Main Contractor(s) | Toshiba Corporation and others |
| Consulting Services | International Total Engineering Corporation |
| Feasibility Study (F/S) etc. | None |

## 2. Evaluation Result

2.1 Relevance

2.1.1 Relevance at the time of appraisal

The Seventh NESDP had the objectives of “improvement in human resources, the quality of life, and the quality of the environment.”

The development plans of the health care sector have been set with the form corresponding to NESDP. While the quantitative expansion of medical treatment was esteemed from the First to the Sixth Five-Year National Health Development Plans, after the Seventh Five-Year National Health Development Plan (1992-96), the qualitative improvement of medical treatment has been aimed at, and especially the expansion of medical services to residents in the remote places and the poor has been raised as important measures.

This project aims to offer medical equipment to provincial hospitals which have offered medical services of comparatively lower quality because of the deficiency of

medical equipment, notwithstanding having been expected to offer higher-quality medical services to local areas. As the targets for this project, those regional hospitals and provincial hospitals that are expected to satisfy the needs for the secondary and tertiary medical care in local areas have been selected. This project follows the policies and measures as mentioned above, and, therefore, the project at the time of the appraisal was relevant.

2.1.2 Relevance of the plan at the time of evaluation

The Eighth NESDP (1996-2001) was intended to achieve (1) the physical and mental healthiness of all people and (2) the development of a social system, environment, and management system to promote health and the development of healthcare. The Ninth NESDP advocates “sustainable development through development that balances human resources, socioeconomic aspects, and natural resources.” One of the issues of the Ninth NESDP is the protection and enhancement of educational and health human resources which form foundations for this development. Rural development and poverty reduction are also major issues, as well as securing access of all the people to medical care.

Although the Eighth Five-Year National Health Development Plan raised the “human-oriented medical care” and aimed to promote holistic medicine, due to the occurrence of the economic crisis during the planning period, the economically vulnerables were set at the center of medical care. The universal healthcare system was announced in February 2001 and implemented from 2002. This system was to provide the strata of society, which was previously precluded from the scope of medical insurance system, with opportunities to get medical care with 30 baht and make it possible to give all the people the benefit of insured healthcare.

The Ninth Five-Year National Health Development Plan (2002-2006) aims to promote the holistic medical care upholding the spirit of the Eighth Plan. The key points of the Ninth Health Development Plan are: (1) promotion of preventive medicine; (2) enhancement of medical insurance; (3) promotion of learning-type participatory medical care; and (4) medical research and development of healthcare that utilizes international medical care and traditional Thai medicine. The issue of the Ninth Plan is to secure all the people’s access to higher-quality medical care.

The importance of the project is unchanged because there is still a wide economic gap between the capital area and the provinces, and also a concrete need to enrich the healthcare for provincial residents. In the project implementation, while part of medical equipment to be procured was changed to respond to the demand of hospitals, and while project outputs were adjusted in order to be more consistent with the needs in local areas (see 2.1.1 “Outputs”), there were no changes of target hospitals and the equipment

was provided to the hospitals responsible for secondary and tertiary healthcare. The need for medical equipment is constantly high in hospitals in order to keep up with the demand for medical services resulting from the introduction of the universal healthcare system. It can be seen that this project follows the policies and measures at the time of the ex-post evaluation, and it continues to have relevance.

2.2 Efficiency

2.2.1 Outputs

(Medical equipment)

Medical equipment was offered to the 93 public hospitals targeted in the project plan according to plan.

During the project implementation, types and the number of equipment were changed because the Ministry of Public Health, the executing agency, conducted review of medical equipment to be adopted according to the needs of hospitals. The number of equipment was changed from 2,427 (39 types) at the time of the appraisal to 2,127 (33 types) at the beginning of procurement, and finally to 1,867 (31 types) at the time of the project completion (see Table 1).

Because the number and types of medical equipment were changed in consideration of the needs for equipment, medical practices, skills to use and maintain equipment at each hospital, the change in the outputs is appropriate.

It is reasonably concluded that the outputs were as expected at the time of the appraisal.

Table 1. Changes of Procured Equipment

| | Appraisal | | Beginning of procurement | | Project completion | |
|---|---|---|---|---|---|---|
| | Type | Unit | Type | Unit | Type | Unit |
| Radiation equipment | 9 | 266 | 9 | 232 | 8 | 217 |
| Endoscope | 11 | 266 | 10 | 308 | 10 | 312 |
| Lab/Pharmacy | 6 | 250 | 3 | 176 | 2 | 63 |
| Ophthalmology treatment equipment | 3 | 30 | 3 | 30 | 3 | 61 |
| Clinical equipment | 6 | 1,070 | 6 | 1,296 | 6 | 1,147 |
| Dialysis | 2 | 45 | 2 | 85 | 2 | 67 |

| | | | | | | |
|---|---|---|---|---|---|---|
| equipment | | | | | | |
| Others | 2 | 500 | 0 | 0 | 0 | 0 |
| Total | 39 | 2,427 | 33 | 2,127 | 31 | 1,867 |

(Training)

The consulting service covered the training for the maintenance of the medical equipment in the original plan. However, the training was not conducted[2].

2.2.2 Project period

Although the project was planned to be completed in February 1999, the actual project completion was in August 2002. There was a delay of three years and six months. Since the time for the implementing schedule in the original plan was relatively short, a little delay were anticipated at the time of planning. The delay over three years was due to the slow start of procurement caused by the slow preparation of procurement list, and the prolonged period for procurement process (see Table 2).

Table 2. Comparison between the Planned Schedule and the Actual Performance

| Contents | Planned schedule | Actual performance |
|---|---|---|
| Loan agreement | September 1996 | September 1996 |
| Procurement of equipment | January 1997<br>-December 1998 | January 1999<br>-December 2000 |
| Distribution of equipment to hospitals | January 1998<br>-December 1998 | May 2000<br>-December 2001 |
| Project completion | February 1999 | August 2002 |
| Implementation period of the project | 30 months | 72 months |

Data Source: Project Completion Report and “the Evaluation Report of the Strengthening Health Care Facilities at the Provincial and Health Service Loan Project under OECF LOAN AGREEMENT TXX-8”（Ministry of Public Health）

2.2.3 Project cost

Although the total project cost was planned to be 5,020 million yen, the actual cost was 3,255 million[3] yen. The reason behind lower costs was price reduction by intense competition in tendering.

It is reasonable to conclude that there was no problem in project cost. The scope of

[2] Although the training was not conducted, each hospital has implemented maintenance, and it can be seen there is generally no serious maintenance issue (see 2.5 “Sustainability”).

[3] Based on “The Evaluation Report of the Strengthening Health Care Facilities at the Provincial and Health Service Loan Project under OECF LOAN AGREEMENT TXX-8” (The Ministry of Public Health)

project was achieved within the original cost projection.

2.3 Effectiveness

The equipment was procured in four packages. Procured medical equipment was roughly classified as (1) radiation equipment, (2) endoscopes, (3) lab/pharmacy equipment, (4) surgical equipment, (5) ophthalmology treatment equipment and (6) dialysis equipment.

Sales agents of medical equipment gave instructions how to use the equipment and most hospitals had experiences in handling most of the equipment, and the hospitals used it with reference to the instruction manuals. As to endoscopes, since the equipment was offered only to the hospitals which have doctors trained for the use of it, the doctors did not face a problem in operating the equipment.

Picture 1: A X-ray camera procured by this project

Out of 93 hospitals, which were furnished with the medical equipment, 65 hospitals replied to questionnaires (see Table 3).

70% or more of the medical equipment other than the ophthalmology treatment equipment (the radiation equipment, endoscope equipment, lab and pharmacy equipment, surgical equipment and dialysis equipment) is used every day and 90% or more of it is being used 1-5 or more times a month; thus, it is considered that the equipment fits medical care needs. The equipment most frequently used is the X-ray machinery and respiratory apparatus for new-born babies. The same opinion was also withdrawn from our interviews with medical workers[4]. The medical workers referred the X-ray machinery and endoscopes as the equipment of high effectiveness.

On the other hand there was some equipment that was not in use. There were 13 automatic endoscope washing machines that were not currently in use, though 40 machines were offered to the 65 hospitals, which replied to questionnaires. One opinion was that because there were not many endoscopes offered to the hospitals, hand washing is easier and quicker to do. Another opinion was that it is not possible to use the washing machines because it is impossible to ensure the quality of the water used for the machines (that is, there are no water purifiers). As for the laser surgery equipment for ophthalmology, five out of 12 units were not in use. Many people said that it was impossible to use the laser surgery equipment because of their malfunction, and that they had postponed the repair because it cost the same as purchasing anew. As

[4] During hospital visits, the opinions of physicians, nurses and X-ray technicians using the equipment were heard.

for the pressure controlled respirators, 28 of 97 units were not in use. It was said that because it was not possible to adjust the humidity of the running air, the machinery was not suited for use over a long time in many cases, and that its specification differed from the respiratory equipment that is generally used in Thailand, and that the machines were inconvenient to use; therefore they did not use them.

Although there were several problems mentioned above, most of the machines are frequently used in each hospital and useful for the improvement of medical care; we received many expressions of gratitude for the support of Japan. It is judged that the effectiveness of the project is acknowledged in general, though there is several problems with individual equipment. From the visit of several hospitals, we learned that the hospitals, which have managerial capability (such as maintenance of equipment, records of usage, and scheme of equipment selection), keep themselves and their operating rooms in order and use the provided equipment very effectively.

Table 3. Situation of Use and Maintenance of Equipment[5]

| | | | | | |
|---|---|---|---|---|---|
| Radiation equipment | | | | | |
| Types | 7 | | | | |
| Units | 168 | | | | |
| Units given in response | 160 | | Situation of maintenance | | |
| Everyday | 149 | 93.1% | Good | 98 | 65.8% |
| 5-10 times a month | 8 | 5.0% | Normal | 48 | 32.2% |
| 1-5 times a month | 0 | 0.0% | Bad | 3 | 2.0% |
| Not used | 3 | 1.9% | Total | 149 | 100.0% |

[5] The types and units of equipment constitute the total of equipment offered to the hospitals which replied to questionnaires. The responded units constitute the number of equipment of which the valid responses were made.

| | | | | | |
|---|---|---|---|---|---|
| Endoscopes | | | | | |
| Types | 9 | (Except endoscope washers) | | | |
| Units | 200 | | | | |
| Units given in response | 182 | | Situation of maintenance | | |
| Everyday | 70 | 38.5% | Good | 97 | 61.0% |
| 5-10 times a month | 38 | 20.9% | Normal | 40 | 25.2% |
| 1-5 times a month | 56 | 30.8% | Bad | 22 | 13.8% |
| Not used | 18 | 9.9% | Total | 159 | 100.0% |
| Lab / Pharmacy equipment | | | | | |
| Types | 2 | | | | |
| Units | 46 | | | | |
| Units given in response | 40 | | Situation of maintenance | | |
| Everyday | 33 | 82.5% | Good | 23 | 60.5% |
| 5-10 times a month | 4 | 10.0% | Normal | 10 | 26.3% |
| 1-5 times a month | 0 | 0.0% | Bad | 5 | 13.2% |
| Not used | 3 | 7.5% | Total | 38 | 100.0% |
| Ophthalmology treatment equipment | | | | | |
| Types | 3 | | | | |
| Units | 29 | | | | |
| Units given in response | 28 | | Situation of maintenance | | |
| Everyday | 5 | 12.5% | Good | 12 | 50.0% |
| 5-10 times a month | 10 | 25.0% | Normal | 3 | 12.5% |
| 1-5 times a month | 3 | 7.5% | Bad | 9 | 37.5% |
| Not used | 10 | 25.0% | Total | 24 | 100.0% |
| Clinical equipment (Electric scalpel, cardiography equipment, respiratory apparatus, etc) | | | | | |
| Types | 6 | | | | |
| Units | 559 | | | | |
| Units given in response | 540 | | Situation of maintenance | | |

| | | | | | |
|---|---|---|---|---|---|
| Everyday | 408 | 75.6% | Good | 251 | 48.9% |
| 5-10 times a month | 52 | 9.6% | Normal | 177 | 34.5% |
| 1-5 times a month | 40 | 7.4% | Bad | 85 | 16.6% |
| Not used | 40 | 7.4% | Total | 513 | 100.0% |
| Dialysis equipment | | | | | |
| Types | 2 | | | | |
| Units | 36 | | | | |
| Units given in response | 36 | | Situation of maintenance | | |
| Everyday | 35 | 97.2% | Good | 22 | 71.0% |
| 5-10 times a month | 0 | 0.0% | Normal | 8 | 25.8% |
| 1-5 times a month | 0 | 0.0% | Bad | 1 | 3.2% |
| Not used | 1 | 2.8% | Total | 31 | 100.0% |

Source: Responses to questionnaires

2.4 Impact[6]

The hospitals, which were provided with the medical equipment by the project, were asked about the impact from the provided equipment. The question asked the hospitals what kind of impact was recognized at each hospital. Answers were to be chosen from five choices and multiple answers were allowed. The results were as follows.

Table 4. Impact to medical care of the offered equipment

| Choices | Answers |
|---|---|
| Effective diagnoses | 23 |
| Shorter hospitalization | 21 |
| Improvement of regional health care | 17 |
| Cost savings | 11 |
| Less pain of patients | 5 |
| Others | 15 |

Source: Responses to questionnaires

[6] For this project, the research of "the impact and sustainability evaluation" by experts (Thailand "Rural Health Infrastructure Strengthening Project") was carried out by the International University of Health and Welfare at the same time as this evaluation study. It has been reported based on site investigations to four hospitals, to which the medical equipment was offered in the above research that the improvement of diagnosis accuracy and the establishment of industrial health/medical care continued as an effect of the project. Please refer to the research for details.

"Satisfaction of patients" and "Decrease in treatment" are mentioned as "others." According to the results of answers, it can be seen that the medical equipment contributed to effective diagnosis, shortening of the hospitalization period, improvement of local health care. For a specific example, there are many patients who suffer from kidney stones and visit hospitals in the northeast of Thailand. In the region, many hospitals considered that the endoscopes were useful for such diagnosis.

According to answers from the hospitals with the equipment provided by the project, the number of outpatients increased by about 7% every year from 1999 through 2004 and the number of inpatients has increased at a pace of 6% every year[7]. The patients' beds' occupancy rate has exceeded 80% on average, and that the access to medical facilities in rural areas has been improved. It is judged that the equipment by the project is useful for the improvement of medical care services to sick and injured people in the rural provinces of Thailand, and can contribute to the improvement of resident health.

Photograph 2. A hospital which is crowded

2.5 Sustainability

2.5.1 Executing agencies

While the executing agency of the project is the Office of the Permanent Secretary for Public Health, Ministry of Public Health (OPSPH), OPSPH does not directly engage with maintenance. Maintenance after the distribution of equipment to hospitals is transferred to the hospitals with the equipment furnished.

2.5.1.1 Technical capacity

The medical equipment, which were planned to be procured at the time of appraisal, was those that had been already installed or were improved versions of existing models. The selection of equipment paid good attention to the convenience of the hospitals. Also, at the time of procurement, the selection of medical equipment, which was to be procured, was modified to be in line with hospitals' needs. Difficult repairs are carried

[7] The number of outpatients and inpatients constitutes the mean value of the data offered by 54 hospitals. The total number of outpatients and inpatients in 54 hospitals in 2004 is 15,540,000 and 1,650,000, respectively.

out through the sales agents, which sold the medical equipment. As the provided equipment meets the demand and ability of hospitals, there are basically no technical problems in use and maintenance.

#### 2.5.1.2 Operation and maintenance system

The maintenance system for the equipment depends on each hospital. While some hospitals perform centralized management systems, other hospitals manage equipment ward by ward. Committees which perform centralized procurement and maintenance of equipment are established in several hospitals and consist of a wide range of members (physicians, nurses, personnel in charge of maintenance).

#### 2.5.1.3 Financial status

Although the capital expenditure (for construction of buildings and facilities and for procurement of large medical equipment) of the hospitals is financed through funds from the central government, hospitals cover the expense of routine operation and maintenance with income from patients and social insurance, but at on-site surveys, some hospitals stated that their budgets were inadequate.

### 2.5.2 Operation and maintenance

As mentioned above, the maintenance of equipment is conducted in each hospital. The operation, records of usage, records of storage, implementation and records of maintenance of equipment are generally well performed. While medical workers said that it is hard to maintain equipment because of the high cost of repairs and a lack of funds, 80-90% of answers to questionnaires on the state of equipment maintenance answered “good” or “normal” except ophthalmology treatment equipment. It is judged that there is generally no problem about the maintenance of equipment (see Table 3).

## 3. Feedback

### 3.1 Lessons learned

(Enhancement of the management ability of the target hospitals)

For most of the hospitals that we visited, it was seen that there were no serious issue in the operation and maintenance of procured equipment, though a few hospitals had problems. In the project which provides equipment to a number of different sites, it should be taken account that the managerial capabilities vary among project sites. Adding T/A such as personnel training and working to strengthen capabilities to hospitals where management capabilities are insufficient, so as to lead to the effective utilization of the equipment, may be considered to be useful in terms of creating a high level of management ability in hospitals.

(Involvement in hospitals' equipment selection)
It is desirable for a hospital to be involved with the selection of medical care equipment where the hospital's managerial capability is considered to be sufficient. In this project, medical equipment was selected by listening to the demands and needs of hospitals. However, needs of hospitals were very specific, for example, they wanted to use the endoscope or X-ray equipment of a specific company, because they knew from the past experiences, that the certain equipments were much useful than others. Utilization rate of equipment would become higher if the equipment needs of the hospitals had been reflected more specifically in the selection procedure. Specifically, there are high levels of trust and expectation in the medical equipment from Japanese manufactures, and almost all the hospitals wanted to receive Japan-made equipment.

3.2 Recommendations

None

**Comparison of Original and Actual Scope**

| Item | Plan | Actual |
|---|---|---|
| (1) Outputs<br>Medical equipment offering to hospitals | Target hospitals: 93 hospitals<br>Medical equipment: 2,427 units (39 types)<br>(Breakdown)<br>1) Radiation equipment: 266 units (9 types)<br>2) Endoscopes: 266 units (11 types)<br>3) Lab/Pharmacy equipment: 250 units (6 types)<br>4) Ophthalmology treatment equipment: 30 units (3 types)<br>5) Clinical equipment: 1070 units (6 types)<br>6) Dialysis equipment: 45 units (2 types)<br>7) Others: 500 units (2 types) | Target hospitals: 93 hospitals<br>Medical equipment: 1,867 units (31 types)<br>(Breakdown)<br>1) Radiation equipment: 217 units (8 types)<br>2) Endoscopes: 312 units (10 types)<br>3) Lab/Pharmacy equipment: 63 units (2 types)<br>4) Ophthalmology treatment equipment: 61 units (3 types)<br>5) Clinical equipment: 1147 units (6 types)<br>6) Dialysis equipment: 67 units (2 types)<br>7) Others: None |
| Consulting services | Conducting the project management and maintenance training for medical equipment | Project management |
| (2) Project Period<br>L/A<br>Procurement of equipment<br>Distribution of equipment to hospitals<br>Project Completion | <br>June 1996<br>January 1997-December 1998<br>January 1998-December 1998<br><br>February 1999 | <br>June 1996<br>January 1999-Decmber 2001<br>May 2000-December 2001<br><br>August 2002 |
| (3) Project Cost<br>Foreign currency<br>Local currency<br><br>Total<br>ODA Loan Portion<br>Exchange rate | <br>4,959 million yen<br>61 million yen<br>(11 million baht)<br>5,020 million yen<br>4,959 million yen<br>1 baht = 4.20 yen | <br>3,252 million yen<br>3 million yen<br>（1 million baht）*<br>3,255 million yen<br>3,255 million yen<br>1 baht = 2.80 yen* |

The conversion rate of the performance was calculated using 114.40 yen/dollar and 40.83 baht/dollar of the average exchange rate from 1999 to 2001.