Internal Ex-Post Evaluation for Grant Aid Project

conducted by Nepal Office: March 2023

Country Name	The Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital
Nepal	

I. Project Outline

Background	In Nepal, non-communicable diseases such as cardiovascular diseases and cancers had been on the rise, and there was a need for more advanced medical services. Through the grant-aid assistance, "Teaching Hospital Project for Tribhuvan University (1982)" and "The Project for the expansion of Tribhuvan University, Institute of Medicine and the Teaching Hospital (1990-1992)", Japan assisted to improve facilities and supply of medical equipment to the Tribhuvan University Teaching Hospital (TUTH), a tertiary care medical institution. However, both the facilities and equipment were deteriorating, and with the increase in the number of patients due to the population growth in Kathmandu, the waiting time for the examination became long and necessary examinations were not sufficiently conducted. In addition, TUTH was the only national hospital in Kathmandu that provides clinical education to doctors, nurses, and other in-service medical personnel, but due to a lack of equipment and aging, the content of clinical education at TUTH was not sufficient.					
Objectives of the Project	This project aimed to improve the healthcare services provided by and to strengthen the clinical education function for medical personnel of TUTH in Kathmandu City, by improving medical equipment, thereby contributing to the improvement of the quality of national healthcare services and the development of human resources for health.					
Contents of the Project	1. Project Site: Kathmandu City 2. Japanese side: (1) Provision of grant necessary for the procurement of medical equipment (24 items) - Magnetic Resonance Imaging (MRI), Digital Mammograph, C-Arm X-ray Machine, Video Arthroscope Set, Laparoscopic Set for Gynecology, Laparoscopic Set for Gastrointestinal Surgery (adults), Laparoscopic Set for Gastrointestinal Surgery (pediatrics), Micromotor Drill for Craniofacial Surgery, Immunohistochemistry Stainer, etc. (2) Facility Rehabilitation - Structure rehabilitation and interior work, reinforcement of the floor of Central Sterilization Supply Department, and waterproofing work for Intensive Care Unit (ICU) and Block A (3) Soft Component: User training for learning appropriate operating procedures of medical equipment 3. Nepalese side: - Securing space for delivering procured equipment and arrangement of receiving system - Setting up facilities and purchasing equipment and consumables that are not to be procured under the project - Doing necessary repair work of the rooms into which procured equipment, such as MRI which is required for the renovation work to protect against radiation leakage, is placed upon delivery					
Project Period	E/N Date	December 28, 2016	Completion Date (ex-ante)	March 2019	Completion Date (actual)	March 2019 (Hand over)
	G/A Date	December 28, 2016				
Project Cost	E/N Grant Limit / G/A Grant Limit: : 754 million yen, Actual Grant Amount: 648 million yen					
Executing Agency	Tribhuvan University Teaching Hospital (TUTH) under the Ministry of Education (MOE) ＊Ministry of Education (MOE) was renamed as Ministry of Education, Science and Technology (MOEST) at the inauguration of the renewal of the Cabinet in 2018.					
Contracted Agencies	Main Contractor(s): Tokyo Sangyo Co., Ltd., Main Consultant(s): Binko international limited, Koei Research & Consulting Inc.					

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

[Use of Supplementary Information]

・In addition to the four indicators set at the ex-ante evaluation, this evaluation uses the following three supplementary information to examine the effectiveness/impacts, such as (1) Utilization of procured equipment, (2) Utilization of rehabilitated facilities, and (3) Effects of the soft component. In evaluation judgment, lower weights are given to this supplementary information than the original indicators.

[Target year for the effectiveness]

・Due to the delay in project implementation, the target year was deferred by one year later than that stated in the ex-ante evaluation sheet which is "three years after the project completion". Accordingly, the target year should be 2022 since the project was completed in 2019 when the procurement of equipment followed by the soft components was completed.

・Since Indicators 1 to 3 are annual numbers and the actual values for 2022 are not yet known at the time of the ex-post evaluation, the evaluation judgment is based on the actual values for 2021 and the forecast for 2022.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Nepal at the Time of Ex-Ante Evaluation >

The project was consistent with the development policy of Nepal at the time of the ex-ante evaluation. The Government of Nepal (GON) adopted the "Nepal Health Sector Programme Implementation Plan 2 (2010-2015)" (NHSP-IP2) which set a goal that all people should have access to necessary healthcare services at an affordable cost. This project contributes to several programs in the plan because the provision of the relative equipment is necessary for programs, such as the program of "Essential Health Care Services Package" and "Humanitarian Response and Emergency and Disaster Management". Furthermore, the country's development plan, "the Thirteenth Plan" (2013/14-2015/16), prioritized the improvement of the health sector with the objective of ensuring that all citizens have equitable access to basic and good-quality

health services, to emerge from the least developed countries by 2022. This grant aid project contributed not only to the area of health service improvement but also to the human resource development of the health sector as prioritized in the government plan. The multifaceted approach of this project to the realization of development policies has implications for other projects.

<Consistency with the Development Needs of Nepal at the Time of Ex-Ante Evaluation >

The project was consistent with the Nepalese development needs of improvement of the quality of national healthcare services and the development of human resources for health at the time of ex-ante evaluation as described in "Background" above.

<Appropriateness of Project Design/Approach>

The project design/approach was highly appropriate. Some of the equipment meets the specific needs of women, such as mammography, which is classified as a "gender activity integration project", considering vulnerable people. While TUTH provided medical services to all patients, it also exempted patients who were recognized as indigent from treatment and hospitalization fees. In the project, attention was paid to the beneficiaries to ensure that benefits reach the vulnerable. No problem attributed to the project design/approach was confirmed.

<Evaluation Result>

In light of the above, the relevance of the project is ③[1].

[Coherence]

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with Japan's ODA policy to Nepal at the time of ex-ante evaluation. In the "Country Assistance Policy for Nepal(2012)" and "Cabinet Decision on the Development Cooperation Charter(2015), Japan's policy stated with respect to South Asia which includes Nepal, that Japan will also extend cooperation on basic human needs such as health care, sanitation, education, and on socio-economic infrastructure development for narrowing the gap between the rich and the poor. <Collaboration/Coordination with other JICA's interventions>

Any collaboration/coordination between the project and other JICA interventions was not clearly planned at the time of ex-ante evaluation.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with donor agencies, NGOs, and other institutions was not clearly planned at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Effectiveness>

The project objectives to improve the healthcare services provided by and to strengthen the clinical education function for medical personnel of TUTH by improving medical equipment were mostly achieved as planned. In terms of the improvement of healthcare services, three out of four quantitative indicators achieved the targets. The number of examinations conducted with MRI (1.5T)[2] per year (Indicator 1), the number of examinations conducted with Digital Mammograph per year (Indicator 2), and the number of examinations conducted with ultrasonograph per year (Indicator 3) achieved the target by 2021. In 2022, Indicator 1 and Indicator 3 have already exceeded the target in the first five to six months, and Indicator 2 has already achieved 93% of the target. Judging by the annualized figures for these three indicators based on the data for the first five to six months of the year, the annual number of cases is expected to be sufficient to meet the target.[3] The data for Indicator 4, the duration of pathological diagnosis by using the Immunohistochemical Stainer was not available because the Immunohistochemical Stainer has not been used since March, 2020 due to the lack of affordable reagent. According to the Executive Director and Administration Chief, TUTH has successfully negotiated the price reduction with the distributor, and the internal administrative process was finally completed, it is expected that the services will be resumed soon.[4]

As for the qualitative effects, it was confirmed by many medical professionals interviewed that an increased number of high-quality examinations has helped them to make reliable diagnoses for more patients. The Chief of Emergency Department mentioned that with procured equipment, the capacity of diagnosing critical cases, such as breast diseases is also made possible. Furthermore, the equipment contributed patients to reducing waiting time. Some of the outpatients interviewed informed that they used to go to private hospitals to receive advanced medical services at high costs and now they are getting the same level of services with limited charges in a shorter time and with more quality reports.

In terms of strengthening of clinical education function for medical personnel at TUTH, it was confirmed by many of the medical professionals interviewed that the medical and nursing students have been getting direct benefits from acquiring practical skills by using the new equipment. For example, the high-resolution images of MRIs have made it possible for them to handle many cases in the training with better quality. Another example is the Digital Mammograph which they have provided imaging-based training in the examination and diagnosis of breast diseases. Medical students interviewed responded that they have received clear explanations from their professors based on the clear images of MRIs as well as the imaging-based training for the Digital Mammograph.

Most of the procured equipment has been properly utilized as originally intended except for two items (Supplementary Information 1). Ultrasonography for ICU has not been used since late 2020 due to a power supply and software problem that needed repair, but a discussion is going on with the supplier company for repairing them at a reasonable cost[5]. Immunohistochemistry Stainer has not been used as described above. Facilities rehabilitated by the project have been continuously used as originally intended (Supplementary Information 2). It was confirmed by the study that the basic orientation and training conducted by the project contributed to improving the knowledge and skills of

[1] ④:very high, ③:high, ②:moderately low, ①:low * To be the same afterwards.

[2] 1.5T: Magnetic units used in MRI

[3] Considering the fact that in the COVID pandemic years (2020 to 2022) when almost all diagnostic and general services were halted and only focused on the prevention and treatment of COVID-19 and associated diseases for a long time, it should be well-noted that TUTH achieved the targets much more than the original target.

[4] Since the cost of reagent was not easily affordable either to patients or TUTH, it took time to complete the internal process. A committee for consultation was formed with all concerned and a report was submitted to the hospital management. At the time of the ex-post evaluation, it was confirmed that the hospital management agreed to use the Stainer with arranging reagent regardless of costs for the reagent.

[5] It has taken time to follow the process because TUTH needed to have a consultation with the concerned experts and users for seeking consensus and management decision on whether to explore the necessary budget for repair or replace the equipment.

different level staff (medical doctors, nurses and paramedics, and support staff) and regular maintenance, being carried out by the trained staff helped for effective utilization of equipment (Supplementary Information 3).

<Impact>

The results of interviews with the Chief of the Quality Standards and Regulations Division of the Ministry of Health and Population (MOHP) and the Division Chief of the MOEST confirmed that the improvement in the quality of medical services, as well as medical education of TUTH, has been highly appreciated by the senior officials of those upper-level ministries. In addition, many physicians from remote areas and the Kathmandu Valley are willing to refer their patients to TUTH for diagnosis and treatment. No negative impacts have been observed.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Quantitative Effects

Indicators	Baseline 2016 Baseline year	Target 2022 3 years after Completion	Actual 2019 Completion year	Actual 2020 1 year after Completion	Actual 2021 2 years after Completion	Actual Ex-post Evaluation year 2022 (As of May)	*Actual Ex-post Evaluation year 2022 (Annualized)*	Source:
Indicator 1 : Number of examinations conducted with MRI (1.5T) per year (tests/year)	0	960	3,562	1,278	4,428	1,841	*4,418*	Records of TUTH/ interview with concerned
Indicator 2: Number of examinations conducted with Digital Mammograph per year (tests/year)	0	720	1,280	466	1,059	672	*1,613*	Records of TUTH/ interview with concerned
Indicator 3: Number of examinations conducted with ultrasonograph per year (tests/year)	3,500	4,000	28,955	16,718	24,296	5,066(2)	*10,132*	Records of TUTH/ interview with concerned
Indicator 4: Duration of pathological diagnosis by using Immunohistochemical Stainer(1) (days/until diagnosis)	14	5	3	NA	NA	NA	*NA*	Records of TUTH/ interview with concerned

Source : JICA documents, interviews with each department head, and patient registration record book of TUTH

Note: (1) Immunohistochemical Stainer has not been used since March 2020 due to the unavailability of an affordable reagent.
(2) The data is as of June 2022.

3 Efficiency

Although the project cost was within the plan (the ratio against the plan: 86%), the project period exceeded the plan (the ratio against the plan: 138 %).[6] The excess of the project period is due to that some equipment such as Digital Mammograph and Laparoscopic Set for Gastrointestinal Surgery arrived later than the expected date, that it took several months to resupply the equipment which arrived with defects. Outputs were produced as planned.

In light of the above, the efficiency of the project is ③.

4 Sustainability

< Institutional/Organizational Aspect>

TUTH is a teaching hospital affiliated with the Institute of Medicine (IOM) of Tribhuvan University under the control of MOEST. At the same time, TUTH also engages in the formulation of the country's healthcare policy as Nepal's top referral hospital. TUTH assumes the overall responsibility to operate and manage the equipment and facility provided and rehabilitated under the project. The number of staff at the Operation and Maintenance (O&M) Team responsible for the O&M of equipment was 40 at the time of ex-ante evaluation (2016). There are no significant organizational changes in the last three years except for three additional staff for the O&M Team, which is now 43 staff in total, including biomedical engineers, biomedical equipment technicians, and other technicians, such as electricians, plumbers, air conditioning technicians, etc.

<Technical Aspect>

The O&M staff has sufficient technical skills and knowledge to conduct proper O&M for equipment. They have improved the inventory system by labeling all equipment and maintaining a computerized list of equipment. However, the interviews with concerned officials of TUTH revealed that for the maintenance of advanced equipment such as MRI, the capacity of O&M staff has not yet been sufficient, so the maintenance contracts have served well. TUTH currently has an annual maintenance contract (AMC) for their existing equipment/facilities such as a Computerized Tomography (CT- Scan) and Elevator and a comprehensive maintenance contract (CMC) for MRI. The training conducted by the project provided useful preventive measures, such as 5S which is a workplace organization method that uses the concept of "Sort", "Set in order", "Shine", "Standardize", and "Sustain". The training manual provided by the project has been utilized by the concerned

[6] Excluding the renovation work incorporated after the contract at the request of the Nepalese side and the time required for the administrative procedure. In consideration of the change in the juridical and social environment in response to the act revision that mentioned any doctor was responsible for the patient's death during his/her treatment/surgery, the project required a change in the construction method for waterproofing of the ICU ceilings where critically ill patients are admitted.

staff of TUTH.

<Financial Aspect>

According to the interviews with concerned officials, TUTH receives funds from both MOEST and MOHP. They normally secure an estimated budget for the annual cost of tests reagents, consumables, and spare parts every year. TUTH has continued the maintenance contracts for advanced equipment, such as MRI by themselves after the project completion. However, they are having difficulty in estimating maintenance costs and need to consider how to calculate their budgets for maintenance, as it may be less expensive to repair problems than to contract maintenance and pay contractors. For some other maintenance, replacement, and accessories that are difficult to include in annual activity, TUTH coordinates with MOEST and MOHP to get additional funds on an ad hock basis upon necessity.

<Environmental and Social Aspect>

No issue with environmental and social aspects has been observed and it has not been necessary to take any countermeasures.

<Current Status of Operation and Maintenance>

The biomedical engineers, biomedical equipment technicians, and other technicians are directly engaged in checking the operational status of equipment and collecting any needs or concerns related to maintenance. They compile the need and concerns, make plans, seek management's approval for securing necessary resources, and proceed with maintenance works as needed. Keeping inventory by allocating the number of all non-expendable equipment and furniture with maintaining a detailed list of the computerized list is an inbuilt system of TUTH. However, it was identified by the study that there is a need of developing a detailed procurement plan with specifications and estimated costs for each item.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the financial aspect of the implementing agency. Therefore, the sustainability of the project effects is ③.

5 Summary of the Evaluation

The project mostly achieved the project objectives as planned to improve the healthcare services provided by and to strengthen the clinical education function for medical personnel of TUTH by improving medical equipment. It was confirmed by the study that these improvements and enhancements were achieved through the use of the equipment provided by the project. Especially, the contribution of the advanced equipment, such as MRI was well-noted.

Sustainability is high. Though there are no issues in the institutional aspect and technical aspects, there are slight problems in the financial aspect. As for efficiency, the project period exceeded the plan.

Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

1. TUTH is doing periodic maintenance. However, the study revealed some difficulties in estimating maintenance costs and the need to consider how to calculate and secure additional budgets in the annual plan for that purpose in coordination with all concerned departments and higher authorities including MOEST and MOHP for ensuring regular funding. Therefore, TUTH will ensure the allocation of resources and mobilize them for proper maintenance of equipment on time and effective utilization for better medical treatment in coordination with all agencies, departments, and concerned suppliers as needed.

2. Though the O&M staff has sufficient technical skills and knowledge to conduct proper O&M for equipment, it was revealed by the study that biomedical engineers need some more skills and practical training for immediate problem-solving and preparing the response manual to fully operationalize the equipment, especially MRI. Therefore, TUTH should provide training to the concerned staff for the maintenance of advanced equipment such as MRI, so that it can save the cost of maintenance contracts of CMC and AMC in the future.

Lessons Learned for JICA:

It was revealed by the study that the Immunohistochemical Stainer, which was expected to drastically reduce the duration of pathological diagnosis from 14 to 5 days had not been used due to the lack of affordable reagents. As a result, the anticipated benefits, such as early treatment by a rapid diagnosis have not been provided to the patients.

In projects that provide medical equipment, it is important to confirm the way of procurement of consumables such as testing reagents with the implementing agency in advance, so that they can be arranged and procured in a timely manner, even after the project completion.

MRI machine is being used for diagnosis. High Pressure Stream Sterilizers, Large and Medium with AMC