

Evaluation Summary

1. Outline of the Project	
Country: The State of Eritrea	Project Title: The Project for Strengthening Medical Equipment Management System for Quality Health Services
Issue/Sector: Healthcare and medical treatment	Cooperation Scheme: Technical Cooperation Project
Division in charge: Health Division 1, Health Group 1, Human Development Department	Total Cost: 259,777,000 Japanese Yen
Period of Cooperation	(R/D): 11/May/2008 -10/May/2011
	Partner Country's Implementing Organization: The Ministry of Health, The Bio-Medical Engineering Unit (BMEU), Orotta Hospital, Halibet Hospital, Villagio Ginio Hospital
	Supporting Organization in Japan: TA Networking Corp.
	Other Related Projects: AAKCP(Asia-Africa Knowledge Co-creation Program)The Program of Quality Improvement of Health Services by 5S-KAIZEN-TQM” (2006 -), “The Project for Improvement of Community Health Service in the State of Eritrea” (Grant Aid) (2007)
1-1 Background of the Project	
<p>As a result of the 30-year conflict over the independence from Ethiopia, the State of Eritrea (hereinafter referred to as “<i>Eritrea</i>”) has borne a severe socio-economic burden. Gross National Income (GNI) per capita is estimated to be 300 USD in 2008, remaining the lowest level in post-conflict period. However, the Eritrean government has made a great effort to improve its national health status, resulting in significant progress in improving under-5 mortality rate of 58 per 1,000 live births in 2008, as well as adjusted maternal mortality ratio of 450 per 100,000 live births in 2005, of which are below the average in African countries.</p> <p>In order to maintain this progress, the Ministry of Health (hereinafter referred to as “<i>MOH</i>”) has adopted a plan to improve health service delivery system in secondary referral hospitals by developing human resource and recognizing actual status of the referral system of the hospitals in Eritrea. Particularly, the MOH has sought internal and external resources for installation of medical equipment (hereinafter referred to as “<i>ME</i>”) for hospitals. However, number and quality of ME, in general, were insufficient to sustain required functions as secondary referral hospitals. Therefore, it came to one of the reasonable conclusion that proper maintenance and management of ME should be focused to address the issue under the limited financial resource for health sector in Eritrea.</p> <p>The ME management system in Eritrea has been centralized to the Bio-Medical Engineering Unit (hereinafter referred to as “<i>BMEU</i>”), a subordinate body to the Service Control and Quality Assurance Division of the MOH. And, The BMEU is independently organizing ME workshops in</p>	

Asmara, the capital city of Eritrea. Although the BMEU had achieved a certain level of performance in ME maintenance, there was some room for improvement in its management system to fully utilize the existing and in-coming ME in hospitals in Eritrea.

Under these circumstances Japan expressed the provision of grant aid for procurement of ME to BMEU and four (4) secondary hospitals bearing regional medical services, as one of Japan's ODA performances. In the process of dialog for ME provision, the Ministry of National Development of Eritrea submitted an application for technical cooperation on the "*Project for Strengthening Medical Equipment Management System for Quality Health Services*" (hereinafter referred to as "*the Project*") to the Government of Japan in 2006. In response to the application from Eritrea, the Japan International Cooperation Agency (hereinafter referred to as "*JICA*") launched the three-year Project from May 2008, with the Project Purpose of the improvement of ME management practice (including maintenance) at target hospitals.

1-2 Project Overview

(1) Super Goal

Quality of health services in referral and zonal hospitals is improved (in Asmara and regional hospitals)

(2) Overall Goal

Improved management practice for ME is disseminated to other referral and zonal hospitals.

(3) Project Purpose

Management practice (incl. maintenance) for ME at target hospitals is improved.

(4) Outputs

- 1) National guideline for the ME management is adopted.
- 2) Capacity and performance of BMEU is further improved.
- 3) Work environment in relation to ME at the target hospitals is further improved.
- 4) Preventive maintenance practice is routinely conducted by ME end-users at the target hospitals.

(5) Input (as of the evaluation)

【Japanese Side】

Dispatch of Experts: Eight(8) Experts

Provided Equipment: 17,491,000 Japanese Yen

Local Cost: 37,041,000 Japanese Yen

Training in Japan: Seven(7) personnel

【Eritrean Side】

Counterparts: Twelve(12) personnel

Land and Facilities: Project office spaces in the MOH and the BMEU			
Local Cost : Utility costs of the Project Office			
2. Terminal Evaluation Team			
Members	Team Leader:	Mr. Taro KIKUCHI	Deputy Director, Health Division 1, Health Group 1, Human Development Department, JICA
	Technical Advisor for ME Management	Dr. Takuji DATE	Professor, Department of Healthcare Management, College of Healthcare Management
	Evaluation and Analysis:	Dr. Yoichi INOUE	Consulting Division, Japan Development Service Co., Ltd.
Period of Evaluation	February 3, 2011 – February 14, 2011		Study Type: Terminal Evaluation
3. Summary of Evaluation Results			
3-1 Achievements			
(1) Output 1			
<p>The Objectively Verifiable Indicators (OVIs) for Output 1 are generally achieved at the time of the Terminal Evaluation.</p> <p>The first edition of the National guideline for the ME management was issued in September 2009, and the Guideline was distributed to the eligible health facilities. The manuals and forms for ME maintenance for the MOH, the BMEU and the national and referral hospitals were redeveloped at the initiative of the Taskforce Team under the Committee for ME Management Guideline Development.</p> <p>Since this is a national guideline, introduction is required at health facilities throughout the country. This issue is treated as the overall goal in the framework of the Project. And, it is clearly stated in the endorsement letter for the National Guideline and the Manuals including forms as follows: <i>“the Guidelines will be implemented initially in the three (3) project target hospitals; and after making sure that they best fit our situation through occasional revision of their contents, will be extended to all public health facilities”</i>. Currently, work operations using the forms designated in the Manuals has already been started in the MOH, BMEU and the target hospitals, and revisions are also implemented. Therefore, it is deemed that the Output 1 anticipated in the Project has generally been attained.</p>			
(2) Output 2			
<p>Regarding achievement of OVIs concerning Output 2, since problems have been found concerning appropriateness of the indicator, comparison of before and after project intervention and reliability of the data, it was decided to judge the achievement of Output 2 principally based on the results of activities, interviews and direct observations from the viewpoint of “Capacity and performance of BMEU is further improved” while referring to the achievement of OVIs.</p>			

Concerning the work performance of the BMEU, basic technical training is being implemented by JICA Experts and Kenyan engineers with a view to nurturing human resources who can function as trainers in BMEU. Moreover, BMEU trainers are implementing trainings for technicians in satellite workshops, and the technicians have gradually started implementing trainings for technicians and ME end-users in hospitals. However, a certain amount of time is needed in order to acquire relatively sophisticated digital know-how and technology; moreover, there are limitations to obtaining the technology that is required in order to handle all the various used equipment that is provided by other aid agencies.

It was initially anticipated that the function of the BMEU could be upgraded from “repairing agency” to “preventive maintenance guidance agency” and a foothold has been established toward this goal. From the viewpoint of management capacity too, work management based on the National Guideline and the Manuals has only just been introduced and it hasn’t yet reached the level of routine work.

Meanwhile, the contents of the project activities have shifted from basic technical training in the first half to preventive maintenance in the second half of the project period. A certain amount of time will be required in order to confirm the embeddedness of preventive maintenance in the BMEU and the target hospitals; however, the awareness of preventive maintenance is anticipated to be well recognized amongst ME end-users. The fact that the preventive maintenance concept, which until now wasn’t fully understood in Eritrea, has been introduced is a significant achievement.

(3) Output 3

There are some problems regarding the appropriateness of OVIs as a tool for measuring the degree of achievement for Output 3, however, indicators on the whole are being achieved.

Regarding the more general 5S activities not just limited to ME, significant improvements were observed in hygienic and working environments through the 5S practice at all target hospitals. As for the ME-related 5S activities, a certain degree of progress has been confirmed following the Mid-term Review, and identification of the equipment in need of disposal has been completed in line with the implementation of inventory management of ME at all target hospitals. Since the equipment and furnishings of public agencies are national property, a certain amount of time is required for the procedure to conduct actual disposal, however, procedures for final disposal are progressing in the BMEU and the target Hospitals and final disposal is expected to be finished within the project period. Meanwhile, 5S activities are not the objective but rather the means for improving the work environment. It is a major step forward that activities geared to ME management have been started, however, in order for these activities to become established as daily practice, it will be necessary to fully utilize the monitoring system introduced in the Project and to discuss about efficient utilization of ongoing supports amongst relevant parties.

(4) Output 4

As was indicated in Output 2, the contents of trainings have shifted from basic technical training to preventive maintenance in the latter part of the Project, and the BMEU engineers and satellite workshop technicians are becoming more and more capable of creating training materials, planning

and implementing preventive maintenance. However, preventive maintenance by ME end-users has only just got underway, and preventive inspections are still not fully conducted or established even on selected 4 ME. The preventive maintenance of other ME can be recognized as future challenges. From the viewpoint of achievement of the OVIs, it is thought that a certain amount of time will be required in order for effects to be realized.

Meanwhile, ME monitoring based on the Manuals has so far been implemented two times, and BMEU has the capacity to conduct preventive maintenance technical guidance to ME end-users. In line with this, the end-users have started to realize the necessity and effectiveness of preventive maintenance.

However, since problems still remain regarding budget steps for training implementation by the BMEU, further support will be required by the MOH, etc. Moreover, since preventive maintenance training materials have only been compiled for four types of ME, it will be necessary to make preparations so that teaching materials, etc. can be autonomously developed from now on.

(5) Project Purpose

The OVIs of the Project Purpose have generally been achieved, however, it will take a certain amount of time for ME management work to reach the level anticipated in the Project.

Through project implementation, the National Guideline and the Manuals have been introduced and the database necessary for ME management in Eritrea has been developed. Moreover, a number of technical training has been conducted with cooperation from Kenyan engineers, and human resources capable of working as trainers have been nurtured in the BMEU. Concerning the anticipated role of the BMEU as a guidance agency, the concept of preventive maintenance, which until now is inadequate, has been introduced and teaching materials have been developed. Although the originally intended level has not yet been attained, the necessary foundation has been formed and will likely make a major contribution to ME management in Eritrea in the future.

However, concerning whether ME management work and work environment improvement linked to ME (ME-related 5S practice) based on the National Guideline and the Manuals has become established as routine work, it is difficult to measure effects within the project period due to the delay in overall activities arising from construction of the ME management system, etc.

3-2 Summary of Evaluation Results

(1) Relevance

Although the importance of ME management has until now been recognized, there have been no national guidelines or policy documents to clarify this until the commencement of the Project, and there were no manuals, etc. including uniform formats, etc. for conducting uniform management. Accordingly, the MOH and the BMEU, which is responsible for managing ME, were unable to gauge the state of ME in the country or conduct the systematic and efficient management and monitoring of ME.

Moreover, when ME broke down, because health personnel on the ground (ME end-users) only

consigned repairs to the BMEU, it was difficult for preventive maintenance awareness to take root in workplaces using various kinds of ME.

Under these circumstances, the MOH presented the Basic Health Care Package (BHCP) under National Health Policy (NHP) issued on March 2010 and the more specific Health Sector Strategic Development Plan (HSSDP) 2010-2014 to make a major contribution towards providing quality public health services through fully utilizing existing resources.

As the Project Purpose of improving the ME management system, together with capacity development in health personnel, procurement of medical supplies and its regulation and control, and providing laboratory and diagnosis services, is regarded as one of the measures for effectively and efficiently implementing the BHCP as ME engineering, these objectives have been raised as a result of the MOH recognizing the need and importance of ME management in enhancing healthcare services in the course of the Project.

Accordingly, the Project is consistent with the respective needs of the MOH, the BMEU and health facilities especially for hospitals, and it was confirmed that the high relevance of the Project Purpose was being sustained at the time of the Terminal Evaluation too.

(2) Effectiveness

Although outputs couldn't be fully confirmed during the Project period, a start was effected in basic operation regarding the four outputs, i.e. Output 1: National guideline for the ME management is adopted, Output 2: National guideline for the ME management is adopted, Output 3: Work environment in relation to ME at the target hospitals is further improved, and Output 4: Preventive maintenance practice is routinely conducted by ME end-users at the target hospitals. Also, the fact that a system for sharing information and smoothing cooperation between and within organizations via the implementation of supervision and guidance from superior agencies based on reports, etc. and the establishment of committees, etc. contributed greatly towards the Project effectiveness. Moreover, the trainings for basic technical skill for ME maintenance provided by JICA Experts and the Kenyan engineer during the first half of the project period substantially contributed to capacity their building. Through these activities, it is considered that the capacity of BMEU counterpart personnel is further enhanced in terms of technical skills. Accordingly, although some of the contents have not yet become established on the level of daily routine work, the foundation for ME management in Eritrea has been prepared and Project effectiveness has generally been high.

(3) Efficiency

Several factors affected progress though the Project activities have been implemented in accordance with the Plan of Operation (PO). It is particularly worth noting that compilation of the National Guideline took longer than expected up to completion of the first edition because of the sheer amount of work involved and the transfer of the MOH staff involved. Moreover, development of the ME management system (including database) was advanced in view of the priority and necessity of improving ME management upon assuming that it will require more time than expected. As a result, delays arose in the subsequent work. Although operations at each target site have been started

regarding ME-related 5S and preventive maintenance on ME, activities have not yet become embedded.

However, since revision of the National Guideline will be finalized by the end of the project period and it is scheduled for these to be distributed to referral hospitals throughout the country, Output 1 will be achieved on time. Moreover, concerning integration of ME management with 5S, since creation of the ME inventory is closely linked to the above database system; this should be implemented when the database is finished. Accordingly, it can be explained that the 5S activities linked to ME that were pointed out in the Mid-term Review came to be implemented in earnest after the Review.

Summing up, in terms of the progress of the project activities, efficiency was generally maintained.

(4) Impact

Although Outputs could not be fully confirmed during the project period, the base for the ME management system in Eritrea has been formed as noted above. Concerning the National Guideline and the Manuals, it is scheduled to distribute them to referral hospitals across the country by the end of the Project and a certain degree of diffusion can be expected, however the MOH and other related agencies will need to display an even greater level of commitment and secure human and financial resources. Even though supervisory and guidance personnel have been nurtured in the MOH and the BMEU as a result of the Project, it will not be easy to continuously implement on the nationwide scale workshops, monitoring activities and follow-up guidance geared to serving facilities (hospitals) and regions with differing needs. Moreover, since it will also be necessary to secure budget to pay for the travel expenses, venue costs and materials printing expenses required for such workshops and guidance, it is desirable to estimate the human resources and budget that will be needed for full-scale nationwide deployment. Meanwhile, concerning the Project target hospitals, since ME work environment improvement and preventive maintenance have only just been introduced, there will clearly be a strong need to establish operations at these hospitals ahead of national deployment.

Moreover, though there is no error of logical composition and/or logical discrepancy between the Overall Goal and Super Goal, since strengthening of the ME management system plays a basic role in providing other services (medical examination and treatment services, medical supplies procurement, EPI, medical facilities infrastructure construction, etc.), it is extremely important in improving health services, however, it needs to be considered as an indirect contribution. Therefore, in order to realize the Super Goal of improving health services, it will be absolutely essential for the other external conditions described above to be met.

(5) Sustainability

As was described in the section on Impacts, the Project Purpose of improving ME management including maintenance is clearly cited in the NHP and the HSSDP, which prescribes the concrete measures and policies for achieving this. As the outcomes of this, the Outputs are clearly given. This shows that the Government of Eritrea and the MOH strongly recognize the necessity and

importance of strengthening the ME management system in order to improve health services in the country; moreover, since this represents political backing for the extension of ME management in line with the National Guideline to medical facilities in Eritrea following completion of the Project, the political self-sustainability of the benefits is guaranteed to an extent. Actually, it is scheduled for the revised edition of the National Guideline to be completed and distributed to referral hospitals throughout the country by the end of the Project, and the strong commitment of the MOH towards sustaining and extending the Project benefits can be gathered from this. Moreover, preparations are underway to raise the BMEU in status from a single unit under the MOH to a division, and it is anticipated that the BMEU will play a more important role in improving ME management throughout the country.

It has been seen how the MOH is actively working to improve the health sector through distributing the National Guideline throughout the country and establishing satellite workshops in each region and so on. Against the current harsh economic backdrop and difficult domestic situation, this commitment by the MOH including its policy approach is praiseworthy, however, simply distributing the Guidelines and the Manuals is not enough to ensure the nationwide implementation of proper ME management; it is also necessary to implement training and workshops geared to introduction on a national scale. The expenses for training and workshops, etc. staged in the Project have so far been paid out of the project budget, however, it will be necessary to secure additional budget and plan expenditure when deploying such activities all over the country.

From the technical viewpoint, project implementation has resulted in construction of a medical equipment management system including database and a setup where ME management in Eritrea can be implemented both effectively and efficiently. Moreover, various types of forms have been prepared under uniform formats and operations based on the Manuals have been commenced, thereby creating the foundations for management technology. However, as was stated in the section on “*Impacts*”, since only a start has been made in improvement of the ME-related work environment and introduction of preventive maintenance, the Eritrean side will need to continuously implement activities geared to firm establishment in order to secure self-sustainability from the technical viewpoint.

3-3 Factors that promoted the attainment of the Project

(1) Concerning the project design

The Project aims to achieve the following outputs in order to realize strengthening of the ME management system in Eritrea.

1. System building and verification (central level)
2. Strengthening of organizational capacity and technical capacity of the agency that supervises equipment management (responsible agency for practical ME management)
3. Work environment improvement via 5S-KAIZEN-TQM, etc. (the said responsible agency and medical work settings)

4. Basic technical guidance and preventive maintenance guidance in medical work settings.

These outputs not only cover activities at each level on the vertical line through ME in Eritrea, but through building a monitoring setup, they bolster linkage from vertical line to vertical relationships. Accordingly, the Project comprises an appropriate design for building the foundation of ME management work (the Project Purpose), and the relationship between means and objectives in the Project Purpose and Outputs is sustained without any logical discrepancy.

(2) Concerning the implementation process of the Project

Soft component as a part of the Grant Aid Project was started at almost the same time as the Project and was planned in collaboration with this technical cooperation. The soft component has been implemented with the aims of establishing an equipment registration ledger, preparing documents necessary for maintenance, building the maintenance system, staging workshops for hospital personnel and distributing routine inspection sheets, etc., and activities have been continued in a mutually complementary manner with the Project. If the ME management system developed in the Project continues to be operated, this will facilitate confirmation of the operability and condition of the supplied equipment and make a major contribution to the follow-up of equipment.

Under the AAKCP, introduction of 5S activities at Orotta Hospital was started before the Project, and support for the introduction of 5S has subsequently been voluntarily conducted at Halibet Hospital. Accordingly, the foundation for 5S activities had already been formed at the beginning of the Project. The administrator of Orotta Hospital is especially enthusiastic about promoting the 5S activities. Following the start of the Project too, opportunities for information sharing and discussing policies and roles with the AAKCP have continued to be provided, and the partial assistances of expenses for 5S workshops and study tours, etc. has greatly contributed to efficient project operation.

3-4 Factors that impeded the attainment of the Project

(1) Concerning the project design

No major obstacles have been observed as far as the project plan is concerned.

(2) Concerning the implementation process of the Project

As described in the top section of “*Effectiveness*”, analysis result of the baseline survey could not be fully utilized in the monitoring of the Project performance. Thus, the issue is considered to be an inhibitory factor against the effectiveness of the Project.

3-5 Conclusions

The National Guideline and the Manuals for ME management, as well as the ME management system with high operability were developed with support from the Project as of the time of the Terminal Evaluation. Meanwhile, ME-related 5S activities and preventive maintenance activities have just started and will reach to the introductory stage by the end of the project period, though several factors affected the smooth progress of the project activities. Therefore, since it is considered that the

necessary foundation of ME management system in Eritrea is established, relevance, effectiveness and efficiency of the Project is high in general.

Furthermore, it is anticipated that the ME management system will be expanded to other regional health facilities with Eritrean self-help endeavor, since the foundation of the ME management system is on the verge of being established and political evidences from the NHP and HSSDP were obtained. Thus, from the aspects of the probability of achievement of the Overall Goal, positive impact and political sustainability would be expected in some degree.

Nevertheless, ME-related 5S activities and preventive maintenance activities are lagging behind the schedule. Thus, it is considered that feasibility and embeddedness of those activities at the target hospitals should be verified in advance of expansion to other regional health facilities.

In conclusion, the Project has almost met its objectives on the basis of the comprehensive evaluation result, of which confirmed the reinforcement of the ME management system at sufficient level.

3-6 Recommendations

<The MOH>

- 1.The MOH should continue political, financial and technical support to relevant sections necessary for maintenance and development of the ME management system, which was strengthened by the Project.
- 2.The MOH should discuss about the necessary human resources, budget allocation, implementation procedures in training courses, etc. with sections concerned for future expansion of the ME management system nationwide.
- 3.The MOH should exert efforts to establish the implementation system for the expansion of the ME management system by obtaining external resources especially for human resource development and budget allocation as needed basis.
- 4.The MOH should analyze problems by using database and reports introduced through the Project in order to maximize utilization of ME.
- 5.The MOH should discuss with organizations concerned about the efficient utilization of AAKCP assistance for 5S practice to health facilities.

<The BMEU>

- 1.The BMEU should exert continuous efforts to sustain and develop the ME management system strengthened by the Project by further enhancement of the project activities.
- 2.The BMEU should take initiative to achieve the embeddedness of non-attained activities such as ME-related 5S as well as preventive maintenance.
- 3.The BMEU should exert continuous efforts to ensure opportunities to capability raising not only for ME management but also basic engineering skills.

<Target Hospitals>

- 1.The target hospitals should exert continuous efforts for further enhancement of work environment, ME management and preventive maintenance.
- 2.The target hospitals should exert continuous efforts for further improvement of problem-solving capacity as well as information sharing of experiences such as good practices of 5S activities.

<JICA Experts>

- 1.JICA Experts should provide opportunities not only for counterpart organizations but also relevant parties in health sector, to share the experiences and achievements of the Project.
- 2.JICA Experts should put necessary activities and/or operating procedures in writings for easy reference in order to hand over the tasks and activities of JICA Experts to counterpart personnel smoothly.
- 3.JICA Experts should discuss with the MOH and the BMEU about their roles as well as implementation procedures for the embeddedness of non-attained activities such as ME-related 5S and preventive maintenance in anticipation of the termination of the Project.
- 4.JICA Experts should provide necessary advices and guidance to facilitate the problem analysis by the MOH.
- 5.JICA Experts should continue hands-on training for system maintenance of database systems introduced to the BMEU in parallel with the development of fundamental skills of database management.