

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF MEDICAL
EQUIPMENT IN UPPER WEST REGION
IN
THE REPUBLIC OF GHANA

October 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERNATIONAL TECHNO CENTER CO., LTD.

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Preface

In response to a request from the Government of the Republic of Ghana, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Medical Equipment in Upper West Region and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Ghana a study team from May 14 to June 8, 2006.

The team held discussions with the officials concerned of the Government of Ghana, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Ghana in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Ghana for their close cooperation extended to the teams.

October 2006

Masafumi Kuroki
Vice-President
Japan International Cooperation Agency

October 2006

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Medical Equipment in Upper West Region in the Republic of Ghana.

This study was conducted by International Techno Center Co., Ltd., under a contract to JICA, during the period from April 2006 to October 2006. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Ghana and formulated the most appropriate basic design for the project under Japan's Grant Aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Hiroshi Tasei
Project Manager,
Basic design study team on
the Project for Improvement of Medical
Equipment in Upper West Region
International Techno Center Co., Ltd.

Summary

Summary

Overview of the Republic of Ghana

The Republic of Ghana is situated roughly in the center of West African countries that face the Gulf of Guinea. It is surrounded by Francophone countries, bordering Togo to the east, Burkina Faso to the north, and Côte d'Ivoire to the west, with the Gulf of Guinea to the south. The shape of the country is that of a long rectangle extending from north to south. It has an area of 238,537km², which is roughly two-thirds that of Japan. The country is largely flat and has no high mountain ranges. It can be divided into four regions: the desert region along the coast, the plains extending roughly 100km inland from the coast, forestland extending about 280km from the country's western borders into the south in the Ashanti Region, and the dry savanna in the north and east.

Ghana has a population of roughly 18.4 million people. The population has increased by a factor of 2.7 since its independence (1957). The population growth rate has averaged at 2.7% per year from 1984 to 2000. Children below the age of five make up roughly 15% of the population, and children below the age of 15 make up 43% of the population, forming a typical demographic pyramid pattern often seen in developing countries.

Ghana is a multi-ethnic country and has more than 100 tribes. The largest group are the Akan tribes, constituting 49% of the population and prominent in the south. The Mole-Dagbani tribes occupy a large majority in the north. The official language is English, but tribal languages are commonly used. Christians account for 69%, Muslims for 16%, and followers of traditional religions for 9% of the population.

Concerning the economy of Ghana, the structural adjustments of the 1980s saw a certain measure of success and at one point Ghana was seen as a model nation for structural adjustments, but the GNI per capita still remains around the 320 dollar level. As for the country's own financial resources, it is dependent on traditional exports (cacao, gold, and timber).

The period from 2003 to 2004 saw healthy financial management due to an increase in cacao revenues and an increase in cash transfer from overseas, but the creation of employment, reduction in poverty, and improvements in regional disparities will be issues of priority for the current administration.

Background, history and overview of requested project

Basic health indices which indicate the health status in Ghana place it above Sub-Saharan countries but slightly below the average for developing countries. As for the makeup of illnesses, like other Sub-Saharan countries, infectious diseases account for the majority, accompanied by malnutrition and poor reproductive health. In addition, non-infectious diseases such as malignant tumors, diabetes and cardiovascular disease are also becoming a problem. There are, however, major regional disparities in health indices. In the three northern regions (Northern Region, Upper West Region, and Upper East Region) which are particularly lagging behind the rest of the nation economically, the percentages of poor people out of the total population are 69%, 84% and 88% respectively. The majority of the population can hardly have access to any form of modern medicine and thus the basic health indices of these regions are also necessarily low. The worsening tendency of the Upper West Region in particular is a matter of concern to the government and those engaged in development. Narrowing the qualitative and quantitative regional gap in healthcare service and providing more efficient and effective community health services is a major issue to tackle. Of particular urgency is providing primary health care (PHC) service. It is important to further support PHC activities, to improve the upper-tier facilities (Regional and District Hospitals) so that they can accept patients who cannot be treated with PHC, and to strengthen the ties between upper-tier facilities and Health Centers, the latter of which serve as providers of PHC.

Ghana's substantial national development plan is the Ghana Poverty Reduction Strategy (GPRS). As priority issues it lists: 1) stabilization of the nation's macroeconomy, 2) expansion of production and employment, 3) human resource training and expansion of basic social services, 4) addressing the socially disadvantaged, and 5) good governance. Based on the above, the Second National Health Five-Year Plan for 2002 - 2006 (POWII 2002 - 2006), which is the development plan in the health sector, was drafted. This strategy, aiming for the "improvement of health status and the reduction of inequalities in health", consists of five "pillars": 1) improvement in the quality of health services, 2) enhancement of access to health services, 3) improvement of the efficiency in providing health services, 4) the fostering of partnerships, and 5) the improvement of health-related finances.

One national program congruent with the demands of POWII is the Community-based Health and Planning Service (CHPS), which places clinics called CHPS Compounds in communities that do not have easy access to the existing health service facilities and stations Community Health Nurses (CHN) at them. The aim of the CHPS program is to provide easy access to

affordable basic health services. As part of the program, CHN Training Schools have been built in each Region in an effort to secure personnel for community health services.

Given these circumstances, in February of 2002, in response to a broad range of requests from the Ministry of Health of Ghana with respect to the Grant Aid Project, our nation carried out a preliminary survey regarding aid for measures against infectious diseases with the purpose of strengthening primary and secondary health services. However, in this preliminary survey, the Ghanaian government announced that it would promote assistance in a common fund format, and for this reason the more thorough survey which was to follow was put on hold. Subsequently, in May of 2005, a survey group was dispatched for the purpose of forming a good Grant Aid Project initiative targeting the three Regions in the north (Northern Region, Upper West Region, and Upper East Region), which lag behind the rest of the country economically, with emphasis on the “reinforcement of regional health services/reinforcement of the health system through infrastructure improvements including medical equipment at the Region and District levels”, in collaboration with the Technical Cooperation Project and the Japan Overseas Cooperation Volunteers program. After deliberations with this survey group, the Ghanaian government, with the aim of reinforcing the community health service system in the Upper West Region, which of the three Regions has particularly poor health indices, put in a request for the procurement of medical equipment for the Regional Hospital, District Hospitals, Health Centers, and the CHN Training School.

Overview of survey results and details of project

Our country decided to implement a basic design survey, and the Japan International Cooperation Agency (JICA) sent a basic design survey team to Ghana from May 14 to June 8 of 2006. The team held deliberations with related parties, surveyed the status and activities of healthcare facilities in the Upper West Region, studied the specific medical equipment in the request, and examined the necessity and relevance of implementing a cooperation program. After returning to Japan and conducting an analysis in Japan, explanations of the basic design overview were given in Ghana from August 27 to September 4 of 2006.

After a survey, it was decided that the hospitals among the target facilities would include one Regional Hospital, four District Hospitals under the authority of the Ministry of Health, and one mission hospital. Nandom Hospital, the mission hospital, is allotted a portion of the national budget as a public hospital in terms of health administration in the same manner as the District Hospitals. The content of medical services at Nandom Hospital is also equivalent to that of the

District Hospitals, and it serves an area that spans three Districts in the north of the Region. For these reasons and because of the large number of people that this hospital serves, it was decided that it would be included among the target facilities in this project. As for Health Centers, the initial request was for 61 facilities, but after onsite surveys of all of the facilities and a careful investigation of the activities of each, including an investigation of newly built Health Centers, it was decided that 58 facilities would be targeted for this project. The CHN Training School is a nursing/midwifery training school attached to Jirapa District Hospital that conducts a CHN training course. From among the courses, the basic medical education course was targeted for inclusion. With the purpose of contributing to the enhancement of medical services within the Region, the medical equipment decided upon consists of equipment necessary for the Regional Hospital, which is the top referral hospital in the Region, and the District Hospitals under it to carry out necessary functions, as well as equipment necessary for Health Centers to perform basic diagnoses. Plans also include ambulances and radio equipment in order to improve the cooperative referral structure between the Hospitals and Health Centers. Furthermore, the procurement of educational/hands-on training equipment for the CHN Training School will improve the personnel training educational environment as well as assist in the expansion of CHPS, which is the objective of the Technical Cooperation Project. A medical equipment procurement plan was drafted as follows with equipment content and quantity appropriate for the Grant Aid Project to meet the aforementioned objectives.

Planned medical equipment - Hospitals

Equipment/Hospital	Upper West Regional Hospital	Jirapa District Hospital	Nadowli District Hospital	Lawra District Hospital	Sissala East District Hospital	Nandom Hospital	Total
Medical refrigerator	1						1
Delivery bed for hospital	3		1				4
Medical examination lamp	2	1	1				4
Vacuum extractor	2	1	1	1	1	1	7
Fetal doppler apparatus	2	1	1	1	1	1	7
Infant incubator	1	1	1	1	1	1	6
Ultrasound apparatus		1	1	1	1		4
Operation table	1	1					2
Operation lamp, mobile	1	1					2
Suction apparatus	2	1					3
Anesthesia apparatus	1	1					2
Electric cautery	2	1	1	1		1	6
Pulse oximeter	1	1	1	1	1	1	6
Dry heat sterilizer	1	2	1	1	1	1	7
High pressure steam sterilizer	1	1	1				3
Surgical instrument set	2	1	1	1	1	1	7
Microscope	1	2	1		1	1	6
Hemoglobin meter				1	1	1	3
Spectrophotometer	1	1	1				3
Centrifuge	1	1	1	1	1	1	6
Blood bank refrigerator	1	1					2
Ambulance car (4x4)	1	1	1	1			4
Auto Voltage Regulator,2KVA	2	2	2	1	1	1	9
Auto Voltage Regulator,1KVA	9	8	7	5	5	5	39

Planned medical equipment - Health Centers

Equipment	Total
Weighing scale, infant	57
Weighing scale, adult	59
Sphygmomanometer	105
Delivery bed	47
Delivery instrument set	61
Cardio phone	40
Radio communication system	27

Planned equipment - CHN Training School

Equipment	Total
Sphygmomanometer	10
Model, each section	1
Female pelvic organ chart	1
Menstrual cycle chart	1
Intravenous injection arm simulator	10
Brest examination simulator	10
Intramuscular injection simulator	10
Childbirth simulator	1

Project schedule and estimated project costs

Were this project for cooperation to be implemented through our nation's Grant Aid Project, approximately four months would be required for implementation design, including tender-related duties, and eight months for equipment procurement, installation and procurement supervision, which means that 12 months would be required for the overall schedule. The total project costs for this project are estimated at 164 million yen (163 million yen borne by Japan, 0.01 million yen borne by Ghana).

Examination of the relevance of the project

It is thought that implementation of this project would be effective in improving qualitative and quantitative regional disparities in healthcare services, which is an issue in the field of healthcare that needs to be addressed in the relevant region. Implementing this project as one subject to cooperation through the Grant Aid Project is deemed to be relevant for the following reasons:

- (1) The percentage of the poor in the total population of the Upper West Region is 84%, making it an area in Ghana with one of the highest ratios of poor. A comparison per Region of the changes in health indices such as the infant mortality rate and mortality rate for children under five years of age also reveals large regional disparities, and in 2003 the indices for the Upper West Region were the lowest in Ghana. For such reasons, the necessity and level of priority for improving the quality of basic medical services through the implementation of a cooperation project targeting this Region are high. The population benefiting from the implementation of this project would encompass all of the residents of this Region, totaling about 600,000 people (3.0% of the overall population).
- (2) Through the implementation of this project, the medical equipment at each facility would be upgraded, the problem of disparities in the level of diagnoses and treatment among each of the facilities would be improved, and residents in the Region would gain access to basic medical services.
- (3) Through the implementation of this project, the referral system within the region would be upgraded and transportation of patients between Health Centers and Hospitals would improve, contributing to an overall improvement in the health indices in this Region.
- (4) Through improvements to the patient referral, diagnosis and treatment environment, more trust will be placed in medical facilities, leading to an increase in visits by community residents to medical institutions.

(5) The educational environment at the CHN Training School will be improved, which will effectively help expand community health services based on the CHPS (Community-based Health and Planning Service) program.

In addition, the implementation of this project will contribute to the objectives of the following health policies and to the resolution of important development issues in Ghana:

(1) The Second National Health Five-Year Plan for 2002 - 2006 (POWII 2002 - 2006), which is the development plan in the health sector, was drafted in accordance with GPRS and lists as important issues the correction of regional disparities and the improvement of health indices. One of the objectives of the strategy is the correction of disparities related to access to high-quality healthcare services, with focus on the poorest Regions, and this project contributes directly to that objective.

(2) In accordance with the development policies of the Ghanaian government, the Japanese government is proceeding forth with strategic aid to the northern region. JICA's *Program for the Improvement of Health Status of People Living in Upper West Region*, an infusion plan formulated based on this policy by combining various JICA schemes, contributes to the improvement of community health and the strengthening of measures against infectious diseases, which are priority aid areas of the Japanese government. The *Project for the Scaling Up of CHPS Implementation in the Upper West Region*, which is a Technical Cooperation Project and a constituent element of this program, would be implemented in cooperation with this project in this region within the Grant Aid Project scheme, and as result it is expected that synergistic cooperative effects will be produced.

Concerning Ghana's operation and maintenance structure, almost all of the equipment to be procured in this project is equipment that is currently being used at the target facilities, and use of the equipment does not require advanced technical skills, meaning that operation by current personnel is possible. In addition, concerning maintenance costs, the operational costs of the new equipment will account for just one percent of the overall expenses of the facilities, which is an amount that the facilities are thought capable of covering.

The direct and indirect effects as well as the level of achievement in terms of degree of improvement that are expected through the implementation of this project are as follows.

Present situation and problems	Relevant measures to be taken in the project	Direct effect and extent of improvement	Indirect effect and extent of improvement
<p>The field of healthcare is plagued by the problem of regional disparities in the quality of service as well as the problem of poverty. In the Upper West Region in particular, impoverished people account for 84% of the overall population of the Region, and the vast majority of people have no opportunities for access to any form of modern medicine, and thus the health indices are necessarily low. Accordingly, as a state initiative, efforts are underway to improve access to high-quality basic healthcare services through expansion of CHPS. However, the District Hospitals and Health Centers, which are the recipients of these CHPS activities, suffer from a lack or aging of medical equipment that is necessary to carry out healthcare services. In addition, due to a sharp rise in the number of students at the training school that trains the Community Health Nurses to work at health posts, there is a lack of educational equipment.</p>	<ul style="list-style-type: none"> • Upgrading of medical equipment used in the outpatient, surgery, obstetrics, and laboratory departments, and patient transport vehicles at the Regional Hospital (one facility) and five District Hospitals. • Upgrading of medical equipment at 58 Health Centers • Upgrading of educational/hands-on training equipment for the CHN Training School. 	<p>Target hospitals</p> <ul style="list-style-type: none"> • The number of outpatients will increase from the current number of 128,000 people per annum. • The number of perinatal checkups will increase from the current number of 10,800 cases per annum. • The number of childbirth deliveries will increase from the current number of 5,100 cases per annum. • The number of Caesarian sections will increase from the current number of 603 cases per annum. • The number of diagnoses by ultrasound will increase from the current number of 171 cases per annum. • The number of clinical tests done will increase from the current number of 116,300 cases per annum. • The number of referrals from lower-tier facilities will increase from the current number of 245 cases per annum. <p>Health Centers</p> <ul style="list-style-type: none"> • The number of normal childbirth deliveries will increase from the current number of 689 cases per annum. • The number of perinatal checkups will increase from the current number of 2,300 cases per annum. <p>CHN Training School</p> <ul style="list-style-type: none"> • It will become possible to conduct classes using educational/hands-on training equipment. 	<p>(1) Each facility will be able to fulfill the functions required of it, and improvements will be made to the overall healthcare service system as well as to the educational environment.</p> <p>(2) The upgrading of radios and vehicles will contribute to the strengthening of the referral system.</p> <p>(3) Together with collaborations with the Technical Cooperation Project and volunteer programs, this project will contribute to reinforcing the community healthcare service system in the Upper West Region.</p>

Issues and recommendations

Issues and recommendations at which the government of Ghana should work so that this project can be implemented smoothly and its effects can be sustainable are as follows:

- Promotion of the *Program for the Improvement of Health Status of People Living in Upper West Region*

This Grant Aid Project is a cooperative project considered to be one constituent element of the above JICA program. This program is meant to effectively improve the basic healthcare services that may be enjoyed by the residents of the community through the synergistic effects brought about by the reinforcing of the healthcare systems provided by the software portion of the Technical Cooperation Project, the enhancement of the environment of medical facilities through the procurement of necessary medical equipment from the Grant Aid Project, etc. One element of this project that will have a significant effect on the program is the strengthening of the referral system within the Region. It is thought to be difficult to realize the full effects of the program in an environment where the existing wireless network system is insufficient in providing patient transport functions. Since this project seeks to supplement the current system, it is first necessary to make improvements to and review the operational methods of the contact system between facilities as well as to rebuild the existing system before the implementation of this project.

- Devising ways to increase the allotted budget to health services

In order to improve the efficiency of financial resources, POWII seeks to reduce the ratio of personnel costs and increase the ratio of the budget distributed at and below the District level, and holds as important the procurement of a sufficient portion of the budget for health services at the District level. When looking at the Upper West Region, however, salaries make up for 64.5% of overall expenses, which is a considerably large ratio, while the portion for health services is limited to 3.8%. It is hoped that methods can be devised for budget distribution and budget increase so that a larger portion of the budget is distributed to health services.

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Republic of Ghana



Capital: Accra
Port of Discharge: Tema
Regional Capital of Target Region: Wa

Location Map



- | | |
|---------------------------|-------------------------|
| ● : Jirapa District | □ : Hospital |
| ● : Lawra District | ○ : Health Center |
| ● : Nadowli District | △ : CHN Training School |
| ● : Sissala East District | |
| ● : Sissala West District | |
| ● : Wa East District | |
| ● : Wa Municipal | |
| ○ : Wa West District | |

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Abbreviations

A/P	Authorization to Pay
B/A	Banking Arrangement
BHN	Basic Human Needs
BMC	Budget Management Center
CHPS	Community-based Health Planning and Services
CHN	Community Health Nurse
CHO	Community Health Officer
DANIDA	Danish International Development Agency
DRG	Diagnosis Related Group
E/N	Exchange of Notes
GDP	Gross Domestic Product
GHS	Ghana Health Service
GPRS	Ghana Poverty Reduction Strategy
HC	Health Center
HIPC	Heavily Indebted Poor Country
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
MCH	Mother and Child Health
MDBS	Multi-Donor Budget Support
MTEF	Mid-Term Expenditure Framework
NGO	Non-Governmental Organization
NSPR	National Strategy for Poverty Reduction
ODA	Official Development Assistance
PHC	Primary Health Care
PRSP	Poverty Reduction Strategic Paper
SWAp	Sector Wide Approach
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAT	Value Added Tax
WHO	World Health Organization

Chapter 1 Background of the Project

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In response to a broad range of requests from the Ministry of Health of Ghana with respect to the Grant Aid Project, in February of 2002, our nation carried out a preliminary survey regarding aid for measures against infectious diseases with the purpose of strengthening primary and secondary health services in Ghana. However, in this preliminary survey, the Ghanaian government announced that it would promote assistance in a common fund format, and for this reason the more thorough survey which was to follow was put on hold.

Subsequently, there was an announcement to the effect that bilateral assistance would be welcome, and in May of 2005 a survey team was dispatched for the purpose of forming a good Grant Aid Project initiative targeting the three Regions in the north (Northern Region, Upper West Region, and Upper East Region), which lag behind the rest of the country economically, with emphasis on the “reinforcement of regional health services/reinforcement of the health system through infrastructure improvements including medical equipment at the Region and District levels”, in collaboration with the Technical Cooperation Project and the Japan Overseas Cooperation Volunteers program. Through deliberations it was decided that the project would have the status of aid to the “Basic Healthcare Improvement” program in “Revitalization of Rural Agricultural Areas”, which is a priority development area, and that aid would be given with a focus on the Upper West Region because, of the three Regions, its health indices are low, and because it has less cooperation from other donors than the other two Regions.

The purpose of the Technical Cooperation Project mentioned above is the implementation and expansion of CHPS, which the Ghanaian government is attempting to expand around the country as a national effort. However, the district hospitals and health centers, which are the recipients of these CHPS activities, suffer from a lack or aging of medical equipment that is necessary to carry out healthcare services. In addition, due to a sharp rise in the number of students at the training school that trains the Community Health Nurses (CHN) who work full-time at health posts, there is insufficient educational equipment. As a result of the survey, the necessity for upgrading medical equipment was recognized for: medical equipment necessary for performing basic abdominal surgeries (Caesarian sections) at District Hospitals, medical equipment necessary for normal childbirth deliveries at Health Centers, and educational/hands-on training-related equipment at the CHN Training School.

Based on the above, our country decided to implement a basic design survey and sent a basic design survey team to Ghana from May 14 to June 8 of 2006. After their returning to Japan and

performing necessary duties within Japan, the basic design overview was presented in Ghana from August 27 to September 4 of 2006. It was decided that this project, with the purpose of reinforcing the community healthcare service system in the Upper West Region, would procure medical equipment for the Regional Hospital, five District Hospitals, 58 Health Centers and the CHN Training School.

1-1 Natural Conditions

Ghana is situated roughly in the center of West African countries that face the Gulf of Guinea. It is surrounded by Francophone countries, bordering Togo to the east, Burkina Faso to the north, and Côte d'Ivoire to the west, with the Gulf of Guinea to the south. The shape of the country is that of a long rectangle extending from north to south. It has an area of 238,537km², which is roughly two-thirds that of Japan. Overall the country is flat and has no high mountains. The country is almost bisected by Volta River.

Topographically, the country can be divided into four regions: 1) the desert region along the coast, 2) the plains extending roughly 100km inland from the coast, 3) forestland extending about 280km from the country's western borders into the south in the Ashanti Region, 4) and the dry savanna in the north and east.

The climate is tropical. The average temperature in Accra is 24-29°C, and it gets about 700mm of rainfall per year. In the west, rainfall exceeds 2,000mm, while in contrast the north is generally dry, getting about 1,000mm of rainfall a year. The country gets the hot, dry northeasterly wind called the Harmattan that blows from the Sahara from December to February, as well as southwesterly trade winds containing moisture brought in from the sea to the south. The temperature is hottest in March and coolest in August. There are two rainy seasons (April to June and September to November) in the year for most of the country, but the north has one long rainy season that lasts from March to September.

The Upper West Region belongs to the dry savanna region, the fourth mentioned above. It has an average low temperature of 22.6°C and an average high temperature of 40°C. Its rainy season lasts from May to October, with a yearly rainfall of 1,000mm to 1,150mm. Humidity is 70% to 90%, but during the dry season humidity is 20%. Facilities subject to this project are scattered in the Upper West Region, but it is not necessary to change the types or specifications of medical equipment in this project due to the climate described above. Additionally, the climate does not effect delivery periods or other elements of the implementation schedule of this project.

1-2 Consideration for the Environment and Local Community

Generally speaking, the most important matters of concern with medical facilities with regard to consideration for the environment and community are disposal of medical waste and protection from radiation.

With regard to the disposal of medical waste at each target facility, onsite surveys for this project have made clear that waste is separated within each facility and disposed of by incineration within each facility.

Concerning the medical equipment scheduled for procurement in this project, since most of the items have been selected as upgrades of medical equipment that is currently being used at the facilities, there will be no additional impact on the environment as a result of the implementation of this project. Accordingly, since there is no impact on the environment or communities surrounding the target facilities of this project, it has been judged to be in the Category C. There is also no relevant medical equipment in this project with regard to protection from radiation.

Chapter 2 Contents of the Project

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2-1 Basic Concept of the Project

Ever since the transition to a civil government in 1993, Ghana has been steadily moving ahead with its democratization process and a change of government was accomplished in the democratic elections of 2000. It is also making efforts to rebuild the economy through measures such as correcting its former macro-economic policies. However, since the nation's economy is dependent on the export of gold and cacao, it is plagued with a host of problems such as a frail economic structure that is vulnerable to the fluctuations of international trade, poverty and regional gaps.

In the field of healthcare, also, massive gaps exist between the urban areas and the farming areas in terms of accessibility to healthcare services; in the three northern regions (Northern Region, Upper West Region, Upper East Region) which are particularly lagging behind the rest of the nation economically, the percentages of poor people out of the total population are 69%, 84% and 88% respectively. The majority of the population will never have access to any form of modern medicine and thus the basic health indices of these regions are also necessarily low. Consequently in the Health Sector's Second Five-Year Plan (2002-2006), "the correction of the gaps in the access to high-quality healthcare services, with a focus on the poorest regions," was mentioned as one of the major strategic targets.

Our nation has been reinforcing its support of the northern regions according to Ghana's development plan. Along this policy, JICA has consolidated the Technical Cooperation Project, Grand Aid Project and the Japan Overseas Cooperation Volunteers into its program, "Program for the Improvement of Health Status of the People Living in Upper West Region". Thus, this project is positioned as a component of the said program.

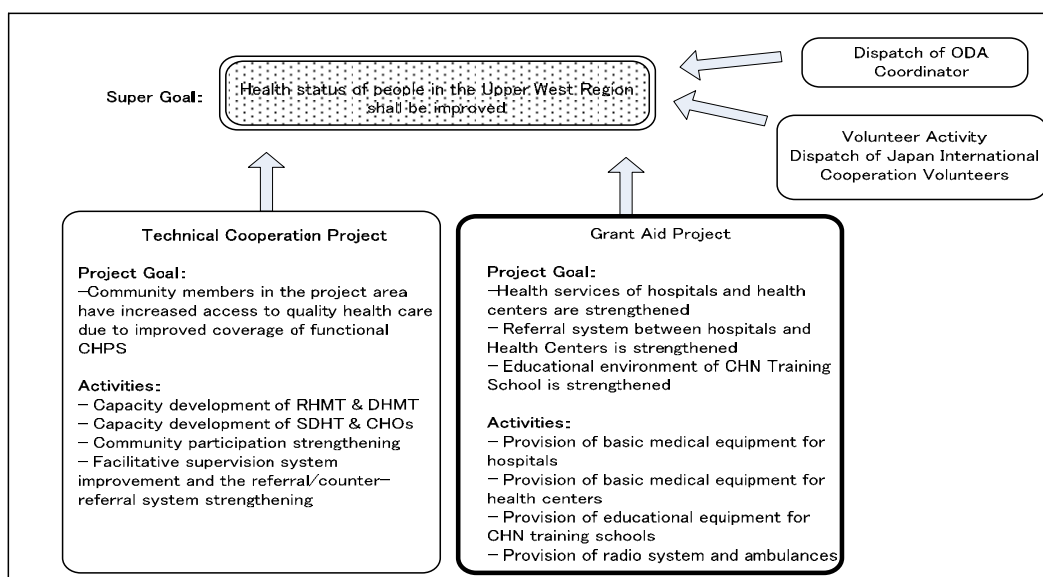


Figure2-1 Concept of “Program for the Improvement of Health Status of People Living in Upper West Region”

Specifically, the Technical Cooperation Project, “The Project for the Scaling Up of CHPS Implementation in the Upper West Region” began in March of 2006 for a scheduled duration of four years, in which activities related to the expansion of CHPS, including the improvement of the abilities of Ghanaian health services workers, the promotion of civic participation, improvements of the referral and supervisory systems and the sharing of good practices, are being implemented. The Japan Overseas Corporation Volunteers will be dispatched in order to participate in community health activities. Concurrently the present project will procure necessary equipment for out-patient, obstetrics, surgery and laboratory departments of the Regional Hospital and District Hospital in order to provide adequate medical services as top referral hospitals in Upper West Region. The health centers, which cover primary health care in the region, will be provided with the equipment necessary for making basic diagnoses. Ambulances and radio communication system will also be provided in order to improve the referral system among the hospitals, health centers and CHPS compounds, and to establish reference and transportation system of serious patients. Furthermore, equipment will also be sent to the CHN Training School in order to enhance training environment to educate candidates of community health nurses (CHN), who will be dispatched to the CHPS compounds.

“The Program for the Improving the Health Status of People Living in Upper West Region” is meant to effectively improve the basic healthcare services that may be enjoyed by the residents of the region through the synergistic effects brought about by the reinforcing of the systems

provided by the software portion of the Technical Cooperation Project, the enhancement of the environment of medical facilities through the provision of necessary medical equipment from the Grand Aid Project, as well as the implementation of other projects. Especially, since CHPS, which is generally the first point of contact for the inhabitants, deals many obstetric diseases, it is expected that maternal and child health will improve through the referral network of healthcare services.

Based on the concept of the integrated program mentioned above, this Grant Aid Project will aim to achieve the program's goal of improving the accessibility and the quality of the healthcare services of the entire region through reforms of the medical services system and the education environment by providing equipment to six hospitals, 58 health centers and one CHN Training School in Upper West Region.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

This project will cover the Upper West Regional Hospital, the only hospital in the Upper West Region offering secondary medical services, the five district hospitals, the 58 healthcare centers located in the sub-districts and one CHN Training School.

1) Hospitals

Upper West Regional Hospital (Wa Municipal), Jirapa District Hospital (Jirapa District), Lawra District Hospital (Lawra District), Nandom Hospital (Lawra District), Nadowli District Hospital (Nadowli District), Sissala East District Hospital (Sissala East District) will be covered in this project.

Currently the Lawra district has the Lawra District Hospital (68 beds) and the missionary-run Nandom Hospital (162 beds). Although the Nandom Hospital is a missionary-run hospital, in terms of health administration, it receives a budget from the government as do the district hospitals, and the medical services offered are also on a par with the district hospitals. Further, the areas which are served by the hospital include three populous northern districts of the region, so that the Nandom Hospital was targeted by this project.

The region is divided into eight districts. Even though health administration policy stipulates the installation of one hospital in each district, there are no hospitals operating as secondary health facility in Sissala West District, Wa East District and Wa West District, which had just upgraded to District in 2005. Requests were originally made to deal certain health centers as

district hospitals because of a plan of upgrade. However, the necessary allocation for construction of facilities and personnel were not met yet. Consequently this project will procure equipment as health centers for those facilities.

2) Health Centers

Initially requests were made to include 61 health centers in the project. However upon onsite investigation, three new health centers were added, and five health centers located inside of hospitals were not recognized as independent facilities, but were instead treated as a division of the hospital. A health center run by a missionary NGO was found to be engaged in activities outside the organizational structure of the RHA and not cooperating in the referral system, so that it was excluded from the project. Table 2-1 shows targeting health centers based on the survey.

Table 2-1 Health Center List

Jirapa District			Sissala East District		
No.	Health Center	Remarks	No.	Health Center	Remarks
1	1	Billaw	33	1	Kulfuo
2	2	Duori	34	2	Kunchogu
3	3	Hamile	35	3	Nabulo
4	4	Han	36	4	Nabugbelle
		Jirapa Sub			Tumu
		Not targeted due to the integration with hospital			Not targeted due to the integration with hospital
5	5	Karni	37	5	Wellembelle
6	6	Lambssie	38	6	Bawiesebelle
7	7	Piina			Newly registered
8	8	Sabuli			
9	9	Samoa			
10	10	Tuggo			
11	11	Ullo			
12	12	Yagha			

Sissala West District		
No.	Health Center	Remarks
39	1	Gwollu
40	2	Jeffisi
41	3	Zini
42	4	Fielmoa

Lawra District		
No.	Health Center	Remarks
13	1	Babilie
14	2	Piiri
15	3	Domwini
16	4	Eremon
17	5	Gengenkpe
18	6	Ko
		Lawra MCH
		Not targeted due to the integration with hospital
		Nandom MCH
		Not targeted due to the integration with hospital
19	7	Ketuo
20	8	Zambo

Wa East District		
No.	Health Center	Remarks
43	1	Bulenga
44	2	Funsi
45	3	Loggu
		Cheringu/Bayiri
		Not targeted due to the attribution to NGO
46	4	Holimuni
47	5	Kundugu
48	6	Yala

Wa Municipal		
No.	Health Center	Remarks
49	1	Busa
50	2	Charia
51	3	Wa Sub
52	4	Charingu
		Newly registered, ransferred from Wa East
53	5	Bamahu
		Newly registered

Nadowli District		
No.	Health Center	Remarks
21	1	Bussie
22	2	Charikpong
23	3	Daffiama
24	4	Dapouri
25	5	Fian
26	6	Issa
27	7	Jang
28	8	Kaleo
29	9	Kojokpere
		Nadowli RCH
		Not targeted due to the integration with hospital
30	10	Nanville
31	11	Sombo
32	12	Takpo

Wa West District		
No.	Health Center	Remarks
54	1	Dorimon
55	2	Lassia Tuoli
56	3	Gurungu
57	4	Poyentanga
58	5	Wecheau

(2) Policy on Equipment Planning

From the findings of the investigation on all the facilities requesting equipment, based on the three standard equipment lists for hospitals, health centers and training schools, which had been agreed upon in the preliminary investigation of the project, it was decided that in view of the goals of the program and the project, priority should be given to equipment used in the outpatient, obstetrics, surgery and laboratory departments, patient transport vehicles at hospitals, equipment used in obstetric care at the health centers, and teaching and training materials at the training school. Moreover it was decided to exclude the equipment falling under the following conditions: (1) equipment not necessary for the activities of the facility in question, (2) equipment that may be procured through the efforts of the facility itself, (3) equipment where existing equipment will suffice.

(3) Consideration of Natural Environmental Conditions

The region covered by the project is plagued by unstable power supplies and frequent power outages. Moreover during the rainy season, the region is subject to severe thunderstorms, resulting in constant power outages and over-voltage conditions are common when the power is restored. Therefore, in order to lessen the burden on the electrical appliances, the medical equipment requiring electrical power will need to be outfitted with automatic voltage regulators.

(4) Consideration of Socio-Economic Conditions

According to the National Health Insurance System launched in 2004, the Internal Generated Funds (IGF) generated from the medical fees paid by insurance beneficiaries will be used for the purchase of medical supplies and the payment of maintenance costs. However the proportion of the population covered by the insurance is still minimal and the source of revenue for the insurance is still far from sufficient. Thus the planned equipment must be the type of equipment that will not entail the burden of supply expenses on the facilities.

(5) Management and Maintenance Capabilities of the Executing Agency

Since the equipment scheduled to be procured under this project is basic medical equipment currently used at facilities, we do not foresee any technical problems arising with the health workers at the facilities handling this equipment immediately after procurement. However in order to avoid malfunctions resulting from erroneous operations in the early stages of equipment use and to ensure the longest possible use of the equipment, we will instruct the operators of the

equipment on the methods of use and daily inspections at the time of installation of the equipment at each facility.

(6) Grades and Specifications of the Equipment

This project is considered to be one of projects comprising the above-mentioned “Program for the Improvement of Health Status of People Living in Upper West Region” and aims to improve the medical services for the entire region. Thus in order to avoid disparities in the services offered at each facility, equipment specification will be the same for all facilities and in order to ensure the smooth operations by the health workers at each facility, equipment similar to that already in use will be procured.

(7) Implementation Schedule

This project will be implemented during a single year. Since the facilities covered under the project are mostly health centers that are dispersed throughout the region, before the shipment is made, equipment will be sorted for each facility and plans will be made for effective transport. Moreover, since road conditions are bad in this area, special care will be taken in the packing of the equipment.

(8) Training/Retraining at installation

During the installation, the supplier shall give routine inspection of equipment and training for proper use of equipment. The equipment that is planned to be procured in this project is basic medical equipment mostly so that Soft component programme shall not be included the project.

2-2-2 Basic Plan (Equipment Plan)

(1) Equipment planning for hospitals

In response to the findings of the Basic Design Study for this project, a standard equipment list, agreed upon in the preliminary investigation, has been updated according to the situation of each hospital, and has been compiled in Table 1. The equipment for each hospital should be considered on the basis of this list.

1) Outpatient Department

Equipment provided will mainly consist of the basic equipment needed for prenatal medical examination, such as weighting scales and sphygmomanometers. However, if existing

equipment suffices for the department, no equipment will be procured.

Since the sterilization of equipment in this region is done in the sterilization room of the operating theater, dry heat sterilizers will not be provided to the outpatient departments and mother and child centers.

2) Obstetrics Department

Basic equipment required for safe delivery and neonatal care will be provided.

As far as vacuum extractors are concerned, the pedal-operated models currently used will be replaced by electrical pump models, since it is difficult to maintain stable suction pressure with the existing models and this could cause trouble in deliveries. Fetal Doppler apparatus equipped with a speaker to enable fetal heartbeats to be heard by multiple nurses during training will be provided. Since infant incubators are currently only owned in the Regional Hospital, incubators will be provided to each of the six hospitals in the project. Ultrasonic apparatus will be provided for hospitals with trained doctors. Bilirubin meters will be omitted since there have been no cases of examinations using this apparatus. Dry heat sterilizers will also be omitted for reasons stated above.

3) Surgery Department

Basic equipment such as operation tables, operation lights, suction units and electric cauteries used in the existing operating rooms of each facility will be procured.

Since anesthesiologists are stationed at each facility and no technical problems are anticipated, anesthesia apparatus will also be provided. Moreover, since steam sterilization of all medical equipment is preferable and requests for sterilization are made by neighboring health care centers, it will be necessary to ensure a stable sterilization system. Thus a high pressure steam sterilizer with the minimum amount of ancillary equipment will be provided. As for desk-top high pressure steam sterilizers, since sterilization is already being handled sufficiently at the central sterilization room, they will be omitted.

4) Laboratory Department

Equipment needed for clinical tests will be procured because clinical tests are being carried out at all hospitals.

Since the equipment currently being used has not been updated for a long time they are considered to be outdated and causing problems in the accuracy of the tests. In order to ensure

the accuracy of clinical tests, basic testing equipment capable of normal operations will be installed at each laboratory department. Since sterilization is done using a dry heat sterilizer, a high pressure steam sterilizer will be omitted.


5) Ambulance and Radio Communication System

Equipment and vehicles needed to transmit information between the facilities within the region and to transport patients from the lower level institutions to the upper level institutions will be procured.

As far as radio communication systems are concerned, the deterioration of batteries has caused malfunctions in some facilities. However the systems in question can be repaired at the facilities' expense and hence will not be included. Five facilities own ambulances but only two are in operation. Motorbikes, hospital-owned pick-up trucks and other vehicles in the region are being used as substitutes. However in view of the poor road conditions of the region and the small number of vehicles owned, the securing of a safe and speedy means of patient transport has become a number one priority. Four-wheel drive ambulances that can carry fixable stretchers on which patients can lie horizontally are planned.

Table 2-2 Equipment List for Hospital

Department	CodeNo.	Equipment	Department	CodeNo.	Equipment
Outpatient	1	Weighing scale,infant	Surgery	11	Operation table
	2	Weighing scale,adult		12	Operation lamp, mobile
	3	Sphygmomanometer, stand type		13	Suction apparatus
		Dry heat sterilizer		14	Anesthesia apparatus
Obstetrics	4	Medical refrigerator		15	Electric cautery
	5	Delivery bed for hospital		16	Pulse oximeter
	6	Medical examination lamp		17	Dry heat sterilizer
	7	Vacuum extractor			High pressure steam sterilizer (desk top)
	8	Fetal doppler apparatus		18	High pressure steam sterilizer
		Bilirubin meter	19	Surgical instrument set	
	1	Weighing scale,infant	Laboratory	20	Microscope
	9	Infant incubator		21	Hemoglobin meter
	10	Ultrasound apparatus		22	Spectrophotometer
		Dry heat sterilizer		23	Centrifuge
		24		Blood bank refrigerator	
		17		Dry heat sterilizer	
			High pressure steam sterilizer		
		Other	25	Ambulance car (4x4)	
				Radio communication system	

 will not be procured

6) Consideration of the Number of Equipment to be Provided to Each Hospital

Based on the updated hospital standard equipment list, we took into account the activities of each hospital and the current situation, devised an equipment selection policy and planned the types and numbers of equipment to be procured accordingly.

i) Upper West Regional Hospital (189 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The number of outpatients is about 40,000 per year. Five examination rooms and an emergency room are available. MCH conducts medical examination, vaccination, etc. for about 2,800 pregnant women per year.			
1	Weighing scale, infant	Procurable by self-effort	0
2	Weighing scale, adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	One for the outpatient department	1
Obstetrics: Three delivery beds and three labor beds are available in a delivery room. The number of deliveries is 2,400 per year. Most equipment is older than 10 years and needs replacement.			
5	Delivery bed for hospital	Three as replacements of three old delivery beds	3
6	Medical examination lamp	Two are planned for three delivery beds	2
7	Vacuum extractor	Two as replacements of malfunctioning instruments	2
8	Fetal doppler apparatus	One each for labor room and obstetric ward	2
1	Weighing scale, infant	Procurable by self-effort	0
9	Infant incubator	One as a supplement	1
10	Ultrasound apparatus	An existing instrument is available	0
Surgery: The number of operations and caesarean sections are about 780 and 290 per year, respectively. Operation is held almost everyday. Most existing instruments need replacement because of its decrepitude. Quality of dry heat sterilizer is not sufficient.			
11	Operation table	One as a replacement of one malfunctioning instrument among two	1
12	Operation lamp, mobile	One for the second operating theater	1
13	Suction apparatus	Two as replacements of two decrepit instruments	2
14	Anesthesia apparatus	One for the second operating theater	1
15	Electric cautery	Two as a replacement of two decrepit instruments	2
16	Pulse oximeter	One instrument is planned	1
17	Dry heat sterilizer	One instrument is planned	1
18	High pressure steam sterilizer	One as a replacement of a malfunctioning instrument of a dry heat type	1
19	Surgical instrument set	Two sets are planned as supplements	2
Laboratory: The examination system is not sufficient from a viewpoint of the scale of hospital. Malaria diagnosis and blood examination are the main items for examination. Equipment for biochemical diagnosis is not installed.			
20	Microscope	One as a replacement of a decrepit instrument	1
21	Hemoglobin meter	An existing instrument is available	0
22	Spectrophotometer	One as a new instrument	1
23	Centrifuge	One as a replacement of a decrepit instrument	1
24	Blood bank refrigerator	One as a replacement of a decrepit instrument	1
17	Dry heat sterilizer	An existing instrument is available	0
Other: An ambulance made in the U.S. (model of year 1996) had been left without repair, which was a secondhand vehicle and donated two years ago. It was working before, but not utilized for long distance transportation owing to its low mileage. It is impossible to procure spare parts, so that it was left without repair. One pick-up truck is working among three.			
25	Ambulance car (4x4)	One as a replacement of a malfunctioning ambulance, which was donated in the condition of secondhand car (model of year 1996)	1

ii) Jirapa District Hospital (174 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The numbers of outpatients, inpatients and medical examinations for pregnant women are about 28,000, 6,000 and 1,100 per year, respectively. Most instruments are decrepit and essential instruments are not installed sufficiently. General and obstetric outpatients are separated. Jirapa sub MCH is located in the premise.			
1	Weighing scale, infant	Procurable by self-effort	0
2	Weighing scale, adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	An existing instrument is available	0
Obstetrics: Two delivery beds are placed in a delivery room. Since the breadth is wide enough and up and down function is available for the delivery bed, it is not necessary to replace them. Some other instruments need replacement because of their decrepitude.			
5	Delivery bed for hospital	An existing instrument is available	0
6	Medical examination lamp	One for a delivery room	1
7	Vacuum extractor	One as a replacement of a malfunctioning instrument	1
8	Fetal doppler apparatus	One for a labor room	1
1	Weighing scale, infant	Procurable by self-effort	0
9	Infant incubator	One as a supplement	1
10	Ultrasound apparatus	One instrument is planned	1
Surgery: The first and the second operating theaters (large and small) are available. The number of major operations, small operations and caesarean sections are 450, 430 and 170 per year, respectively. Since most instruments in the second operating theater are older than ten years, they need replacement.			
11	Operation table	One as a replacement among two	1
12	Operation lamp, mobile	One for the second operating theater	1
13	Suction apparatus	One as a replacement of a decrepit instrument	1
14	Anesthesia apparatus	One for the second operating theater	1
15	Electric cautery	One as a new instrument	1
16	Pulse oximeter	One as a new instrument	1
17	Dry heat sterilizer	One as a new instrument	1
18	High pressure steam sterilizer	One as a replacement of a malfunctioning instrument	1
19	Surgical instrument set	One set is planned as a supplement	1
Laboratory: Malaria diagnosis, screening for transfusion and blood examination are conducted mainly. Equipment for biochemical diagnosis had not been installed sufficiently. Decrepit instruments are targeted for replacement.			
20	Microscope	One each for biological examination and blood examination	2
21	Hemoglobin meter	An existing instrument is available	0
22	Spectrophotometer	One instrument is planned	1
23	Centrifuge	One as a replacement of a decrepit instrument	1
24	Blood bank refrigerator	One as a replacement of a decrepit instrument	1
17	Dry heat sterilizer	One as a supplement for biological examination	1
Other: An ambulance (Land Cruiser, model of year 1987) is available, but it breaks down frequently and the rate of operation is low. A pick-up truck is used for transportation of patient.			
25	Ambulance car (4x4)	One as a replacement of the broken ambulance (1987 model)	1

iii) Nadowli District Hospital (46 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The number of outpatients is about 11,000 per year. One examination room is available. MCH is conducted in another building inside the premises. The number of medical examinations of pregnant women is about 400 per year. Basic equipment will be procured. The facility is being expanded because of the increment of population and the number of visitors to the hospital.			
1	Weighing scale, infant	Procurable by self-effort	0
2	Weighing scale, adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	An existing instrument is available	0
Obstetrics: One delivery room is available. The number of deliveries is 170 per year. Since a current facility is small, only a small number of deliveries is conducted. However, after the construction of a new obstetric department, the number is expected to increase. Decrepit instruments are targeted for replacement.			
5	Delivery bed for hospital	One as a replacement of a decrepit instrument	1
6	Medical examination lamp	One for the delivery room	1
7	Vacuum extractor	One as a replacement of a malfunctioning instrument	1
8	Fetal doppler apparatus	One for the obstetric ward	1
1	Weighing scale, infant	Procurable by self-effort	0
9	Infant incubator	One as a supplement	1
10	Ultrasound apparatus	One instrument is planned	1
Surgery: An operating theater had been retained two years before, and most equipment had been procured. The number of operations is 270 per year. Operations are conducted three days a week. Insufficient instruments are targeted for procurement.			
11	Operation table	An existing instrument is available	0
12	Operation lamp, mobile	An existing instrument is available	0
13	Suction apparatus	An existing instrument is available	0
14	Anesthesia apparatus	An existing instrument is available	0
15	Electric cautery	One instrument is planned	1
16	Pulse oximeter	One instrument is planned	1
17	Dry heat sterilizer	An existing instrument is available	0
18	High pressure steam sterilizer	One as a replacement of a malfunctioning instrument	1
19	Surgical instrument set	One set is planned as a supplement	1
Laboratory: The numbers of malaria diagnosis, hepatitis diagnosis and blood examination are 120, 20 and 20 per month, respectively. A new building for laboratory is under construction.			
20	Microscope	One as a supplement	1
21	Hemoglobin meter	An existing instrument is available	0
22	Spectrophotometer	One instrument is planned	1
23	Centrifuge	One as a supplement	1
24	Blood bank refrigerator	An existing instrument is available	0
17	Dry heat sterilizer	One for a biological examination	1
Other: There is no ambulance. Two pick-up trucks are available instead for transportation of goods and patients. Since this hospital is located along a causeway, the improvement of ambulance is supposed to result in more demands of referral.			
25	Ambulance car (4x4)	No ambulance is available	1

iv) Lawra District Hospital (68 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The numbers of outpatients and medical examinations for pregnant women conducted in another building are about 11,000 and 455 per year, respectively. Decrepit instruments are targeted for replacement.			
1	Weighing scale, infant	Procurable by self-effort	0
2	Weighing scale, adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	An existing instrument is available	0
Obstetrics: The number of deliveries is 420 per year. Since some of essential instruments are decrepit, they need replacement. The delivery bed is in good condition and not necessary to replace.			
5	Delivery bed for hospital	An existing instrument is available	0
6	Medical examination lamp	An existing instrument is available	0
7	Vacuum extractor	One instrument is planned	1
8	Fetal Doppler apparatus	One instrument is planned	1
1	Weighing scale, infant	Procurable by self-effort	0
9	Infant incubator	One instrument is planned	1
10	Ultrasound apparatus	One instrument is planned	1
Surgery: The number of major operations, small operations and caesarean sections are 150, 190 and 50 per year, respectively. Though most instruments had been installed, some need replacement.			
11	Operation table	An existing instrument is available	0
12	Operation lamp, mobile	An existing instrument is available	0
13	Suction apparatus	An existing instrument is available	0
14	Anesthesia apparatus	An existing instrument is available	0
15	Electric cautery	One instrument is planned	1
16	Pulse oximeter	One instrument is planned	1
17	Dry heat sterilizer	An existing instrument is available	0
18	High pressure steam sterilizer	An existing instrument is available	0
19	Surgical instrument set	One set is planned as a supplement	1
Laboratory: The number of biochemical examinations, blood examinations and biological examinations are 11,000 each. Though essential instruments had been installed, some need replacement due to its decrepitude.			
20	Microscope	One as a supplement	1
21	Hemoglobin meter	An existing instrument is available	0
22	Spectrophotometer	An existing instrument is available	0
23	Centrifuge	One as a supplement	1
24	Blood bank refrigerator	An existing instrument is available	0
17	Dry heat sterilizer	One for a biological examination	1
Other: There is an ambulance (one-box type, made in Korea, model of year 1992), which is left without repair. A pick-up truck is utilized instead for transportation of goods and patients.			
25	Ambulance car (4x4)	No ambulance is available	1

v) Nandom Hospital(162 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The number of outpatients is about 22,000. The number of medical examinations for pregnant women conducted in another building is about 400 per year. Weighing scale and sphygmomanometer will be procured for each department.			
1	Weighing scale,infant	Procurable by self-effort	0
2	Weighing scale,adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	An existing instrument is available	0
Obstetrics: The number of deliveries is 700 per year. Some instruments will be replaced.			
5	Delivery bed for hospital	An existing instrument is available	0
6	Medical examination lamp	An existing instrument is available	0
7	Vacuum extractor	One instrument is planned	1
8	Fetal doppler apparatus	One instrument is planned	1
1	Weighing scale,infant	Procurable by self-effort	0
9	Infant incubator	One instrument is planned	1
10	Ultrasound apparatus	An existing instrument is available	0
Surgery: The numbers of major operations, small operations and caesarean sections are 800, 600 and 50 per year, respectively. Since existing instruments doesn't have problems, it is not necessary to replace them.			
11	Operation table	An existing instrument is available	0
12	Operation lamp, mobile	An existing instrument is available	0
13	Suction apparatus	An existing instrument is available	0
14	Anesthesia apparatus	An existing instrument is available	0
15	Electric cautery	One instrument is planned	1
16	Pulse oximeter	One instrument is planned	1
17	Dry heat sterilizer	An existing instrument is available	0
18	High pressure steam sterilizer	An existing instrument is available	0
19	Surgical instrument set	One set is planned as a supplement	1
Laboratory: The numbers of HIV screening, screening of antibody of hepatitis and transfusion, blood examination and biological examination are 20,000 each. Some decrepit instruments will be replaced.			
20	Microscope	One for a blood examination	1
21	Hemoglobin meter	One instrument is planned	1
22	Spectrophotometer	An existing instrument is available	0
23	Centrifuge	One as a supplement	1
24	Blood bank refrigerator	An existing instrument is available	0
17	Dry heat sterilizer	One for a biological examination	1
Other: It is not necessary to procure ambulance because there exists a Land Cruiser (model of year 2002)			
25	Ambulance car (4x4)	An existing ambulance is available	0

vi) Sissala East District Hospital (52 beds)

Code No.	Name of equipment	Plan for procurement	Q'ty
Outpatient: The number of outpatients is 16,000. The number of medical examination for pregnant women conducted in another building is 800 per year. Most instruments had been installed already.			
1	Weighing scale,infant	Procurable by self-effort	0
2	Weighing scale,adult		0
3	Sphygmomanometer, stand type		0
4	Medical refrigerator	An existing instrument is available	0
Obstetrics: The number of deliveries is about 370 per year. Part of instrument will be replaced.			
5	Delivery bed for hospital	An existing instrument is available	0
6	Medical examination lamp	An existing instrument is available	0
7	Vacuum extractor	One instrument is planned	1
8	Fetal doppler apparatus	One as a new instrument	1
1	Weighing scale,infant	Procurable by self-effort	0
9	Infant incubator	One as a new instrument	1
10	Ultrasound apparatus	One as a new instrument	1
Surgery: The numbers of major operations, small operations and caesarean sections are 130, 320 and 40, respectively. Since existing instruments doesn't have problems, it is not necessary to replace them.			
11	Operation table	An existing instrument is available	0
12	Operation lamp, mobile	An existing instrument is available	0
13	Suction apparatus	An existing instrument is available	0
14	Anesthesia apparatus	An existing instrument is available	0
15	Electric cautery	An existing instrument is available	0
16	Pulse oximeter	One as a new instrument	1
17	Dry heat sterilizer	An existing instrument is available	0
18	High pressure steam sterilizer	An existing instrument is available	0
19	Surgical instrument set	One set as a supplement	1
Laboratory: The numbers of HIV screening, screening of antibody of hepatitis and transfusion, blood examination and biological examination are 20,000 each. Some decrepit instruments will be replaced.			
20	Microscope	One for a blood examination	1
21	Hemoglobin meter	One instrument is planned	1
22	Spectrophotometer	An existing instrument is available	0
23	Centrifuge	One as a supplement	1
24	Blood bank refrigerator	An existing instrument is available	0
17	Dry heat sterilizer	One for a biological examination	1
Other: It is not necessary to procure ambulance because there exists a Land Cruiser (model of year 1999)			
25	Ambulance car (4x4)	An existing instrument is available	0

In procuring the equipment, we are planning to install automatic voltage regulators in each of the following rooms to deal with the changes in power voltage.

Table 2-3 Plan for Automatic Voltage Regulator

Name of Equipment	Department	Equipment to be attached	Upper West Regional Hospital	Jirapa District Hospital	Nadowli District Hospital	Lawra District Hospital	Nandom Hospital	Sissala East Regional Hospital
Auto Voltage Regulator, 1KVA	Outpatient	Medical refrigerator	1	-	-	-	-	-
	Obstetric Outpatient	Ultrasound apparatus	1	1	1	1	-	-
	Delivery Room	Fetal doppler apparatus	1	1	1	1	1	1
	Obstetric Ward	Infant incubator	1	1	1	1	1	1
	Operating Theater	Suction apparatus, Anesthesia apparatus, Electric cautery, Pulse oximeter, etc.	2	2	1	1	1	-
	Laboratory for microbiological examination	Microscope	1	1	1	-	1	1
	Laboratory for blood examination	Sphygmomanometer, Centrifuge, Hemoglobin meter, etc.	1	1	1	1	1	1
	Blood Bank	Blood bank refrigerator	1	1	1	-	-	-
Auto Voltage Regulator, 2KVA	Sterilizing Room for Operating Theater	High pressure steam sterilizer	1	1	1	-	1	1
	Laboratory for microbiological examination	Dry heat sterilizer	1	1	1	1	-	-

(2) Equipment planning for health centers

In response to the findings of the Basic Design Study of this project, the list of equipment to be procured was updated to the current situation is shown in Table 2-4. The equipment needed for each health center will be considered on the basis of this list.

Currently the main activities for health centers in the Upper West Region comprise outpatient care, inoculations and obstetrics care and thus in light of these circumstances, equipment needed for obstetrics will be given priority. Moreover, it is believed that updating the radio systems of the health centers will contribute greatly to the achievement of goals not only of this project but also the whole program. The Basic Design Study revealed that with the support of DANIDA, radio systems had been installed in the six hospitals and 31 health centers covered by this project, but currently only ten facilities are actually using the system. The major cause for the

malfunctions is the deterioration of the batteries. Upon consultation we have decided to have Ghana take the responsibility for fixing the out-of-use radio systems in advance, while Japan will provide radio systems to health centers that did not have them before.

Table 2-4 Standard Equipment List for Health Center

Code No.	Name of Equipment	Plan for procurement
1	Weighing scale,infant	Addition due to shortage
2	Weighing scale,adult	Addition due to shortage
26	Sphygmomanometer	Addition for outreach activities
	Boiling sterilizer (gas type)	Not targeted because different methods are practiced.
27	Delivery bed	Renewal due to decrepitude
28	Delivery instrument set	Addition due to shortage
	Bed	Not targeted because existing beds are sufficient
29	Cardio phone	Addition due to shortage
	Gas lamp	Not targeted because existing instruments are sufficient
	Cabinet for drugs	Not targeted because existing instruments are sufficient
	Kit for community visit	Not targeted because existing instruments are sufficient
30	Radio communication system	Addition to facilities that doesn't have radio communication system
	Water supply/storage facilities	Not targeted because water from borehole is used

Based on the table 2-4, we took into account the activities of each health center and the current situation, devised an equipment selection policy and planned the types and numbers of equipment to be procured accordingly.

Table 2-5 Equipment List for Health Center

Code No.	1	2	26	27	28	29	30	
No.	Name of equipment	Weighing scale, infant	Weighing scale, adult	Sphygmomanometer	Delivery bed	Delivery instruments set	Cardio phone	Radio communication system
Health Center								
1	Billaw	1	1	2	1	1	0	0
2	Duori	2	1	2	1	1	1	0
3	Hamile	1	1	2	0	0	1	0
4	Han	1	1	2	0	1	0	0
5	Karni	1	1	2	1	2	0	1
6	Lambssie	1	1	2	1	1	1	1
7	Piina	1	1	2	1	1	1	1
8	Sabuli	1	1	2	0	1	0	0
9	Samoa	1	1	2	1	1	1	0
10	Tuggo	1	1	2	1	1	1	1
11	Ullo	1	0	2	1	1	0	1
12	Yagha	0	1	1	1	1	1	0
13	Babilie	1	1	2	1	1	0	0
14	Piira	1	1	2	1	1	1	1
15	Domwini	1	1	2	1	1	1	0
16	Eremon	1	1	2	1	1	1	1
17	Gengenkpe	2	2	1	1	1	1	1
18	Ko	1	1	2	0	1	1	0
19	Ketuo	1	1	2	1	1	1	1
20	Zambo	1	1	2	1	1	1	1
21	Bussie	1	1	1	0	2	1	1
22	Charikpong	0	1	1	0	1	1	0
23	Daffiama	1	1	2	0	2	0	0
24	Dapouri	1	1	1	1	2	0	1
25	Fian	1	1	2	1	1	0	0
26	Issa	2	2	2	0	1	1	0
27	Jang	1	1	2	1	1	0	1
28	Kaleo	1	1	2	0	1	0	1
29	Kojokpere	1	1	2	1	1	1	1
30	Nanville	1	1	2	1	1	1	1
31	Sombo	1	1	2	0	1	0	1
32	Takpo	1	1	2	1	1	1	0
33	Kulfuo	1	1	1	1	1	1	0
34	Kunchogu	1	1	1	1	1	0	0
35	Nabulo	1	1	2	1	1	1	0
36	Nabugbelle	1	1	2	1	1	1	0
37	Wellembelle	1	2	1	1	1	1	0
38	Bawieseabelle	1	1	2	1	1	1	1
39	Gwollu	1	1	2	1	1	1	0
40	Jeffisi	1	1	2	1	1	1	0
41	Zini	1	1	2	1	1	1	0
42	Fielmoa	1	1	2	1	1	1	0
43	Bulenga	1	1	2	1	1	1	0
44	Funsi	1	1	2	1	1	1	1
45	Loggu	0	1	2	0	1	1	0
46	Holimuni	1	1	2	1	1	1	0
47	Kundugu	1	2	2	1	1	0	1
48	Yala	1	1	2	1	1	0	0
49	Busa	1	1	2	1	0	1	1
50	Charia	1	1	1	1	1	1	1
51	Wa Sub	1	1	2	1	2	1	1
52	Charingu	1	1	2	1	1	1	0
53	Bamahu	1	1	1	1	1	1	1
54	Dorimon	1	1	2	1	1	1	1
55	Lassia Tuoli	1	1	2	1	1	0	1
56	Gurungu	1	1	2	1	1	1	0
57	Poyentanga	1	0	2	1	1	0	1
58	Wecheau	0	0	1	1	1	0	0
	Total	57	59	105	47	61	40	27

(3) Equipment Planning for CHN Training School

The CHN Training School has been conducting classes by renting classrooms and dormitories at the nursing and midwives school located next to the Jirapa District Hospital. Currently the school is constructing a new school building at a surrounding. The classrooms and the faculty

room are nearing completion and only the construction of the dormitory and the electrical/water supply work needs to be done. This project will provide the human phantoms used in the teaching of basic medicine, pregnancy models used in the teaching of obstetrics and models used in the training of various manual procedures.

The following list has been compiled using the equipment in the standard equipment list without altering the objectives and description of equipment.

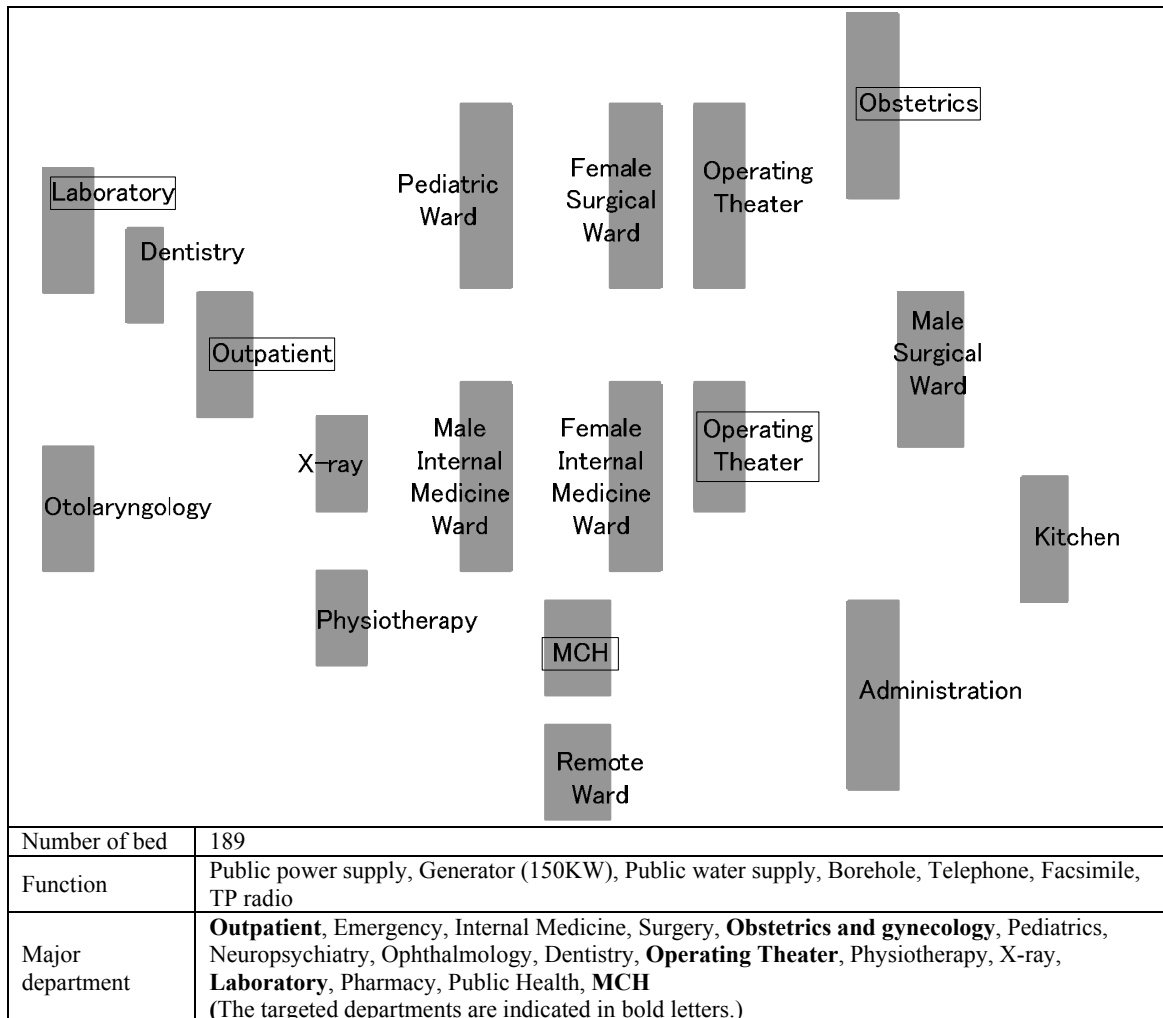
Table 2-6 Equipment List for CHN Training School

Category	No.	Equipment	Plan for procurement	Revised No.	Revised name of equipment	Q'ty
Equipment for teaching	1	Human phantom (boy)	Integrate human phantoms (boy and girl) to a torso dual-sex model	31	Torso dual-sex	1
	2	Human phantom (girl)				
	3	Brain/nerve model	Separate a brain/nerve model to a head model and a nerve system model	32	Head model	1
				33	Nerve system model	1
	4	Respiration apparatus model	Modify a respiration apparatus to a lung model which include bronchus and lung	34	Lung model	1
	5	Circulatory organ model	Separate a circulatory model to a heart model and a circulatory system model	35	Heart model	1
				36	Circulatory system model	1
	6	Digestive apparatus (liver/pancreas/kidney) model	Integrate digestive apparatus (liver/pancreas/kidney and digestive system) models to a digestive system model	37	Digestive system model	1
	7	Digestive apparatus (digestive system) model				
	8	Urinary organs/generative organ model (boy)	Plan a dual-sex urinary system model. Plan a female pelvis model and a female pelvis model with pelvic floor which show functions of a female pelvis in order to understand delivery system. Further plan a male pelvis model.	38	Urinary system model	1
				39	Female pelvis model	1
	9	Urinary organs/generative organ model (girl)		40	Female pelvis model with pelvic floor	1
				41	Male pelvis model	1
	10	Pregnancy model		42	Pregnancy model	1
		Add a female pelvic organ chart	43	Female pelvic organ chart	1	
		Add a instruction chart of function of menstruation and ovum	44	Menstrual cycle chart	1	
Equipment for practice	1	Procedure for collection of blood and intravenous injection	45	Intravenous injection arm simulator	10	
			46	Breast examination simulator	10	
	2	Simulator for injection into a muscle of upper arm	Plan an intramuscular injection simulator	47	Intramuscular injection simulator	10
	3	Conduct of labor simulator	Change the name of equipment	48	Childbirth simulator	1
4	Blood pressure meter		26	Sphygmomanometer	10	

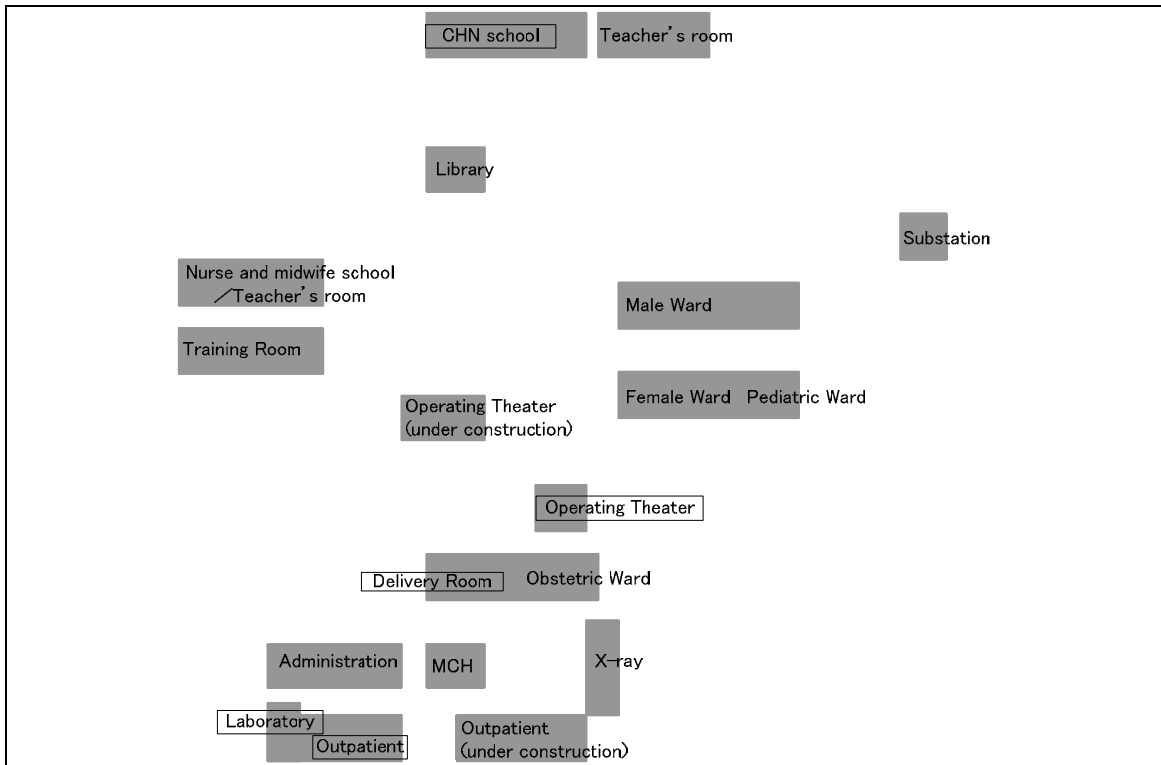
2-2-3 Basic Design Drawing

The following drawings show the allocation of buildings. Location of health centers covered by the project can be referred in the location map in the opening page.

1) Upper West Regional Hospital



2) Jirapa District Hospital, CHN Training School

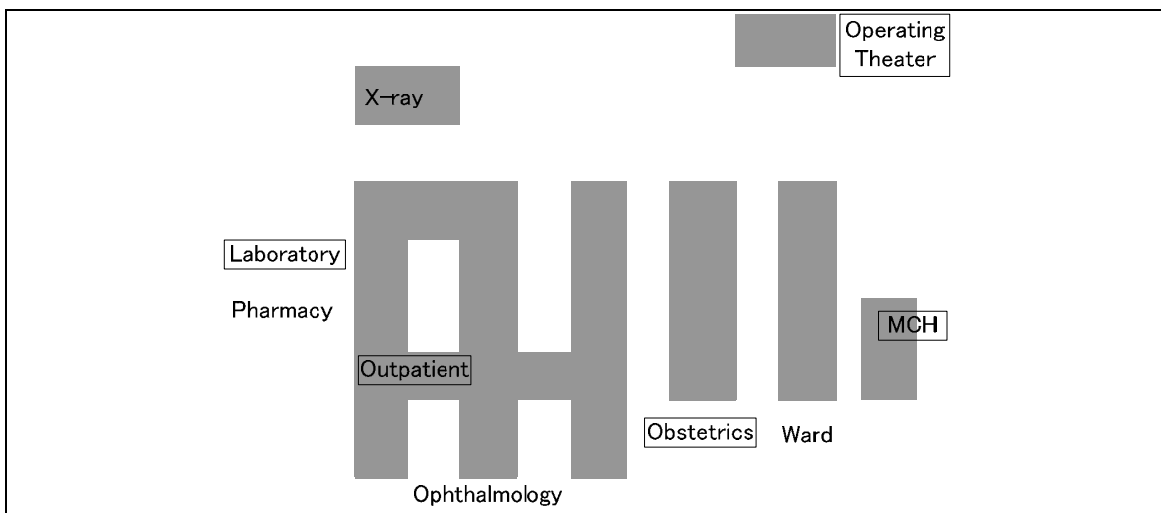


The site plan for Jirapa District Hospital includes the following departments and facilities:

- CHN school
- Teacher's room
- Library
- Substation
- Nurse and midwife school
- Teacher's room
- Male Ward
- Training Room
- Female Ward
- Pediatric Ward
- Operating Theater (under construction)
- Operating Theater
- Delivery Room
- Obstetric Ward
- Administration
- MCH
- X-ray
- Laboratory
- Outpatient
- Outpatient (under construction)

Number of bed	174
Function	Public power supply, Generator (150KW), Public water supply, Borehole, Telephone, TP radio
Major department	Outpatient , Internal Medicine, Surgery, Obstetrics and gynecology , Pediatrics, Respiratory department, Ophthalmology, Operating Theater , X-ray, Laboratory , Pharmacy, Public Health, MCH (The targeted departments are indicated in bold letters.)

3) Lawra District Hospital

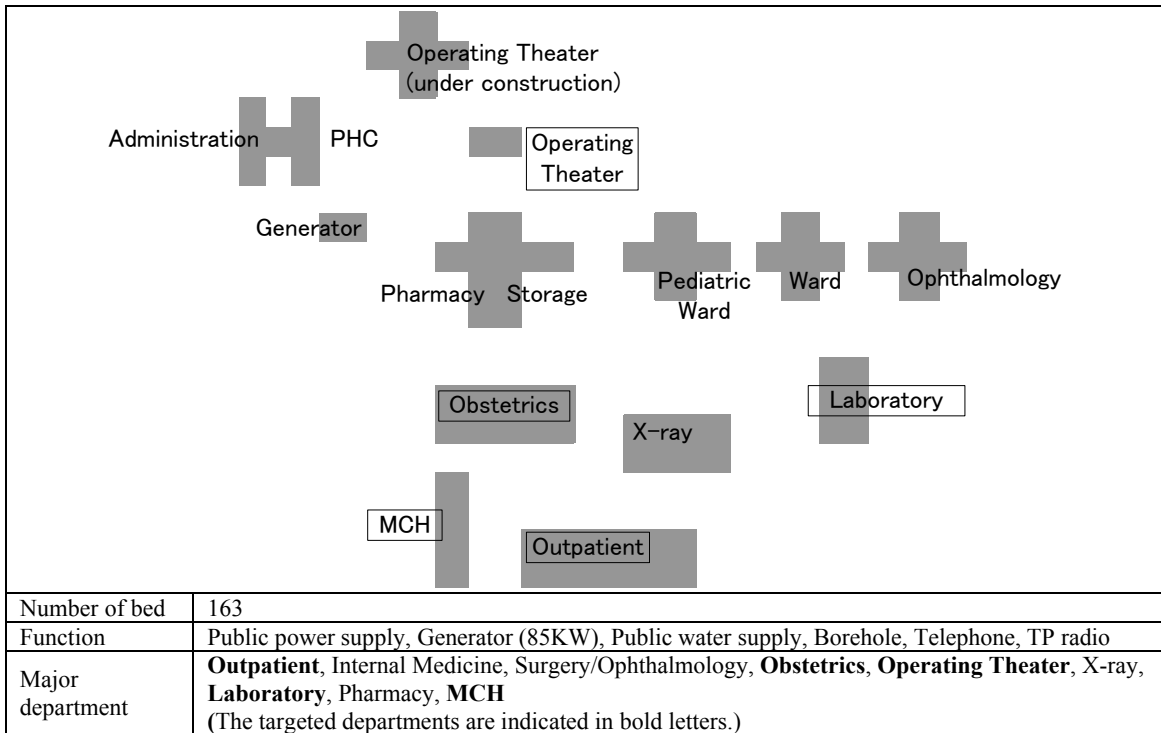


The site plan for Lawra District Hospital includes the following departments and facilities:

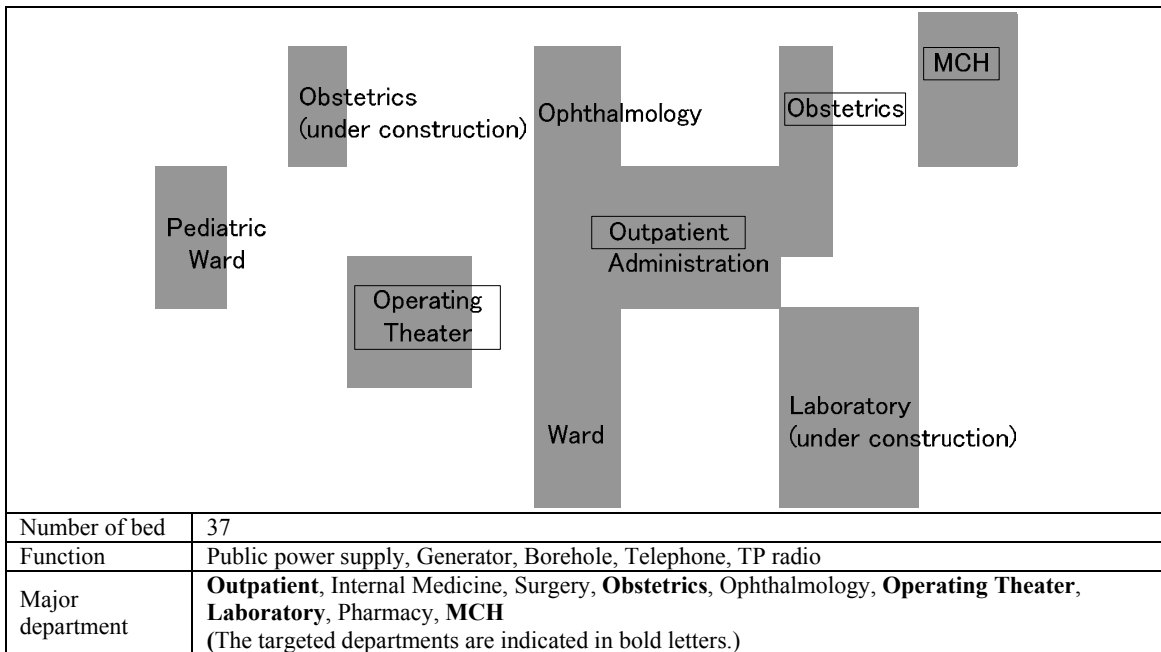
- Operating Theater
- X-ray
- Laboratory
- Pharmacy
- Outpatient
- Ophthalmology
- Obstetrics
- Ward
- MCH

Number of bed	68
Function	Public power supply, Generator (30KW), Public water supply, Telephone, TP radio
Major department	Outpatient (General/Ophthalmology), Internal Medicine, Surgery, Obstetrics , Operating Theater , X-ray, Laboratory , Pharmacy, MCH (The targeted departments are indicated in bold letters.)

4) Nandom Hospital



5) Nadowli District Hospital



6) Sissala East District Hospital

Number of bed	52
Function	Public power supply, Generator (60KW), Borehole, Telephone, TP radio
Major department	Outpatient , Internal Medicine, Surgery, Obstetrics , Operating Theater , X-ray, Laboratory , Pharmacy, MCH (The targeted departments are indicated in bold letters.)

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

This project will require approval by a cabinet meeting of the Japanese government in accordance with the framework of grant aid of the Japanese government, and will be implemented after the Exchange of Notes (E/N) regarding the project between the Japanese and the Ghanaian governments. After the conclusion of the E/N between the two governments, a Japanese consulting company recommended by JICA will conclude a consultant agreement with the Ministry of Health of Ghana in accordance with the procedures of Japanese grant aid. The agreement will come to effect upon approval of the Japanese government. The consultant will implement duties related to tender and supervision of procurement on the basis of the agreement. The procurement of equipment is implemented by Japanese corporate companies selected by tender; they will conclude agreements with the Ministry of Health of Ghana, and these agreements will also come into effect upon approval of Japanese government. The Japanese companies will be responsible for the procurement, carriage and installation of the necessary equipment; the provision of technical training concerning the operation and maintenance of individual equipment; and the drawing up of manuals and other technical documents required for the maintenance of the equipment after the procurement, together with a list of manufactures and their agents.

The Ministry of Health of Ghana will be in charge of conducting agreement on consulting services for the project, agreement on procurement of equipment and banking arrangement on the one hand, the Regional Health Administration, which is administrated by the Ghana Health Service, the executing agency of the Ministry of Health, will be in charge of the implementation of the project.

2-2-4-2 Implementation Conditions

Equipment is sorted by facility at shipment in order to avoid confusion and to install effectively at designated facilities, six hospitals and 58 health centers, dispersing in the region. Workers to distribute and install equipment will be transported by car, so that the schedule will be made to have enough margins with due consideration of their safety.

2-2-4-3 Scope of Works

(1) Japanese government

- i. Procurement of the planned equipment
- ii. Marine transportation and land transportation to the center
- iii. Installation and placement of the equipment
- iv. A trial run of the procured equipment, and technical training on operation, routine inspection and maintenance

(2) Ghanaian government

- i. Providing information and data necessary for the transportation, installation and placement of the equipment
- ii. Acquisition of approvals necessary to import the equipment (duty waiver, import license, and importing of medical equipment)
- iii. Improvement of the sites where the procured equipment is planned to be installed.
- iv. Securing the locations for unloading of the procured equipment
- v. Providing sites for the storage of the equipment prior to its installation and replacement
- vi. Securing the transportation route for the procured equipment.
- vii. Removal of existing equipment and repairs to the rooms following the equipment removal

2-2-4-4 Consultant Supervision

Following the implementation of duties related to the tender to select contractors to procure

equipment, the consultant will ensure the smooth progress of the procurement and other duties. The key components of procurement supervision include the verification of a consistency between the equipment procured and its description in the agreement, inspection of the products and packing conditions prior to shipping, confirmation of the marine and land transportation/customs clearance status, and the final inspection and receiving of the goods in Ghana. Regarding pre-shipping inspections, the consultant ensures that there is no discrepancy between the shipment contents and their descriptions in the agreement whereas a third party organization also inspects the entire shipment and packing contents. The consultant continually strives to stay informed of the progress of each process, provides the Ghanaian implementing organization and the equipment supplier with appropriate advice and guidance, and furnishes a report of the progress to the relevant organizations in both countries. The consultant performs spot checks.

2-2-4-5 Procurement Plan

(1) Procurement Sources

The equipment that is planned to be procured in this project will be chosen from among the Japanese or Ghanaian manufactures. Japanese products that require maintenance by a manufacturer's representative may be considered only on condition that their manufactures have a representative in Ghana or neighboring countries. However, the following equipment will be subject to consideration to procure from third countries, depending on the availability of maintenance and market trend in Ghana. In the event that the manufactures that are considered for procurement do not have a representative in these countries, it is necessary to prepare preventive measure such as designating contact agents by the equipment supplier.

Weighing scale, Medical examination lamp, Medical refrigerator, Infant incubator, Ultrasound apparatus, Operation lamp mobile, Anesthesia apparatus, Electric cautery, Pulse oximeter, Surgical instrument set

(2) Transportation Route

Equipment to be shipped from Japan will be packed for containers and shipped from the port of Yokohama for Tema, Ghana by ship. The equipment will be sorted out region by region at Tema port, and transported by truck to objective facilities. Ambulances will be handed over in Tema port and be transported to objective hospitals by themselves after all necessary procedures

of registration and acquisition of number plates. It will take 45 days approximately.

Table 2-7 Transportation Route and Required Days from Japan

Transportation Route	Transportation Way	Total Transportation Duration
Shipment is gathered in the designated storehouse at the port of Yokohama		Approx. 45days (including customs clearance)
Yokohama→Tema, Ghana	By ship	
Tema→Objective facilities	By truck (Ambulances will move by themselves)	

Equipment to be procured from third countries will be gathered at the port of Hamburg, Germany and the port of New York, US, and shipped for Tema, Ghana by ship. The equipment will be sorted out and transported by truck to objective facilities. It will take 25 days approximately.

Table 2-8 Transportation Route and Required Days from Third Countries

Transportation Route	Transportation Way	Total Transportation Duration
Shipment is gathered in the designated storehouse at the port of Hamburg, Germany		Approx. 25days (including customs clearance)
Hamburg→Tema, Ghana	By ship	
Tema→Objective facilities	By truck	

2-2-4-6 Quality Control Plan

The medical equipment procured in the project will be selected from the ones which have a record to be installed in medical facilities in other countries. Equipment made in Japan shall be adapted to Japan Industrial Standards (JIS). Equipment made in the US and European countries shall equip high quality for medical use by obtaining CE marking, etc. Equipment using consumables and reagents which are easily obtainable and versatile in the Ghanaian market will be more preceded than that requiring manufacturer's specified consumables.

2-2-4-7 Operation Guidance Plan

Staff in each facility will be trained how to operate equipment, replace spare parts and consumables, conduct daily inspection and deal with troubles.

The engineers/ technicians dispatched from agents for initial training of operation will be 1) three persons for general medical equipment, 2) one person for the equipment of operation theater, 3) one person for the equipment of laboratory, 4) one person for ultrasound apparatus and 5) two persons for radio communication system.

2-2-4-8 Implementation Schedule

The implementation schedule of this plan is broken down to two stages, consisting of the tender-related work and equipment procurement/installation work. The time line from the conclusion of the E/N till the completion of the project is shown in the following diagram of the implementation schedule;

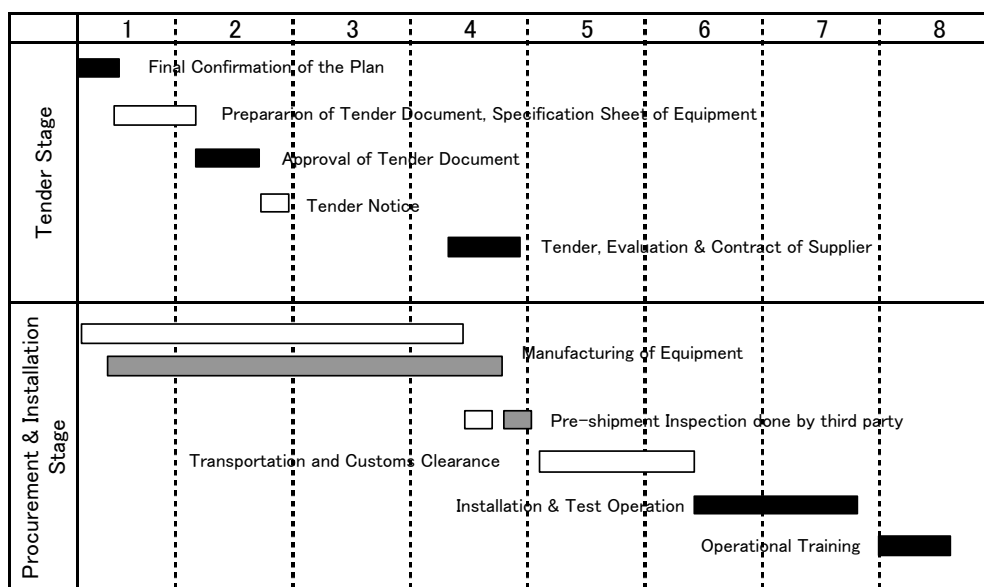


Figure 2-2 Implementation Schedule

2-3 Obligation of the Recipient Country

The responsibilities of the Ghanaian side in the implementation of this project are as shown in 2-2-4-3 Scope of Works.

- (1) Various arrangements which are necessary for the smooth customs clearance and domestic transportation of the procured equipment within Ghana.
 - Acquisition of approval for waiver of customs clearance fees and levies
 - Acquisition of approval for waiver of value added tax
 - Acquisition of an import license
 - Acquisition of approval by the Ministry of Health of Ghana for importing medical equipment
- (2) Waiver of customs and other taxes for the equipment supplier and its parties.
- (3) Assurance of convenience and safety to Japanese citizens involved in this project.
- (4) Responsibility of expenses for arrangement of the Banking Arrangements (B/A) and Authorization to Pay

- (5) Offer of personnel and a budget (including a maintenance budget) necessary for the efficient implementation of this project.
- (6) Acquisition of any other approval that is necessary for the implementation of this project.
- (7) Disclosure of any other information and data needed

Prior to the installation of the equipment procured in this project, the Ghanaian side will (1) replace new batteries of the existing radio communication systems and (2) replace new batteries of the existing repeaters at its own cost.

2-4 Project Operation Plan

The number of doctors, nurses and healthcare workers at the project's target hospitals is far from satisfactory; in particular the shortage of doctors has not only become a regional problem but also countrywide one. Each hospital is compensating for the insufficient number of doctors by actively hiring foreign doctors such as Cuban. The region is also employing In-service Training at a training center with accommodation and offering regular training for public health, diagnostic treatment procedures and management, thereby making an effort to redress the regional disparities in medical services. In addition, a CHN Training School has been founded in each region by the CHPS program, aiming to strengthen CHN training in midwifery and considering the increase in the number of students. Thus, the shortage of CHN personnel is not likely to become a serious problem in the future.

The Ghana Health Service has systems established for the Management and Maintenance of Medical Equipment. The Ghana Health Service has established the Clinical Engineering Department at the headquarters and also the Regional Clinical Engineering Unit in each Regional Health Directorate. These units are responsible for the management and maintenance of medical equipment and other healthcare equipment in all the hospitals and the healthcentres in the region. Due to the lack of adequate Clinical Engineering/Biomedical Technicians in Ghana only the Regional Hospitals have a Clinical Engineering Unit within the hospital. All the other hospitals depend on the maintenance team in the hospital and where a technical fault is encountered the hospital invites the Regional Clinical Engineering Unit to rectify the problem. In some cases the Regional Clinical Engineering Unit refers the problem the Clinical Engineering Department in Accra for assistance. Besides the usual service calls to repair defective equipment, the Clinical Engineering Teams from the Region and the Accra carryout prevent maintenance on all equipment two times in a year.

In addition, certain critical equipment such as the X-Rays, Ultrasound, Anaesthesia equipment, automated laboratory equipment and physiotherapy equipment are maintained by the Manufacturers Agents in Ghana.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

The total cost for the implementation of the project is estimated 164 million yen (163 million yen borne by Japan, one million yen borne by Ghana) approximately. Based on the assumptions described in (3), the breakdown of the costs to be borne by Japan and Ghana is estimated as follows. The estimated project cost does not automatically indicate the maximum amount of the aid that is specified in the E/N.

(1) Expenses borne by Japan 163 million yen

Contents		Estimated Cost (million yen)
Equipment	Regional and District Hospitals	86.9
	Health Centers	42.7
	CHN Training Center	3.3
Implementation, Consulting,, Technical Training		30.1

(2) Expenses borne by Ghana 84,096,480 Ghana Cedi (1.033 million yen approximately)

- To change batteries for the existing radio communication systems at 27HCs
(836,880 Ghana Cedi for two batteries at one facility) 38,496,480 Ghana Cedi
- To change solar panel for existing repeater 45,600,000 Ghana Cedi

(3) Pricing Assumptions

- i. Time of calculations: June, 2006
- ii. Foreign exchange rate: \$=117.44 Yen Euro=142.99 Yen
- iii. Project period: 12 months
- iv. Method of placing orders: 1 Package
- v. Other To be implemented in accordance with the scheme of Grant Aid project of the Japanese government

2-5-2 Operation and Maintenance Cost

The minimum annual cost required in order to use the equipment procured in this project was estimated. The following table shows the estimated increment of cost for each facility based on

the calculation of expenditure. The mileage of ambulances was derived from the current number of referrals between each Health Center and each Hospital, and each District Hospital and the Regional Hospital.

Table 2-9 Test Calculation of Consumption and Cost per Year for Major Consumables
Currency: Ghana Cedi

Name of equipment	Major consumable	Local price (Cedi)	Consumption per unit	Estimated consumption rate per year (number of examination, kilometrage traveled)	Estimated cost per year
Ultrasound apparatus	Gel	360 /ml	10ml/ 1examination	200	72,000
	Recording paper	100 /roll	200 record / 1 roll	200	20,000
Ambulance car (4x4)	Fuel	7,700 /L	10 km/L	Upper West Regional Hospital 68,000km	52,360,000
				Jirapa District Hospital 37,000 k m	28,490,000
				Nadowli District Hospital 23,000km	17,710,000
				Lawra District Hospital 18,000km	13,860,000
				Nandom Hospital 23,400km	18,018,000

Table 2-10 Test Calculation of Consumption and Cost per Year for Major Spare Parts
Currency: Ghana Cedi

Name of equipment	Major spare parts	Local price (Cedi)	Estimated consumption rate per year	Estimated cost per year
Operation lamp, mobile	Halogen lamp	300,000 /pc.	4 pcs. a year (1 time a year)	1,200,000
Ambulance car (4x4)	Oil filter	20,000 /time.	Once per 5,000 km	Calculated from distance

Table 2-11 Increment of Cost for Consumables for Each Facility

Currency: Ghana Cedi

Facility	Name of equipment	Q'ty	Consumables		Spare parts		Total
			Cost per unit	Sub total	Cost per unit	Sub total	
Upper West Regional Hospital	Ambulance car (4x4)	1	52,360,000	52,360,000	Change 11 times	220,000	52,580,000
	Operation lamp, mobile	2			1,200,000	2,400,000	2,400,000
Grand total							54,980,000
Jirapa District Hospital	Ambulance car (4x4)	1	28,490,000	28,490,000	Change 7 times	140,000	28,630,000
	Ultrasound apparatus	1	192,000	192,000		0	192,000
	Operation lamp, mobile	1			1,200,000	1,200,000	1,200,000
Grand total							28,822,000
Nadowli District Hospital	Ambulance car (4x4)	1	17,710,000	17,710,000	Change 5 times	100,000	17,810,000
	Ultrasound apparatus	1	192,000	192,000			192,000
Grand total							4,260,000
Lawra District Hospital	Ambulance car (4x4)	1	13,860,000	13,860,000	Change 4 times	80,000	13,940,000
	Ultrasound apparatus	1	192,000	192,000			192,000
Grand total							14,132,000
Sissala East District Hospital	Ultrasound apparatus	1	192,000	192,000			192,000
Grand total							192,000

(Nandom Hospital is excluded because no equipment in question will be procured)

The proportion of the amount of increase incurred through the implementation of this project in the expenses that are recorded as vehicle-related and consumable medical goods expenses from the governmental fund, IGF and DPF is calculated below. The proportion of the amount of increase incurred through the implementation of this project (Table 2-11) is limited to a few percentage points over the actual maintenance cost of fiscal 2005 and its proportion to the whole budget of the hospital is also negligible. Currently the District Health Administration conducts meeting of explanation on health insurance system for people. As a result, affiliates have increased gradually. IGF would become stable financial source. The amounts of increase incurred through the implementation of this project, as shown in the table below, are considered to be bearable amounts.

Table 2-12 Ratio of Increment of Expenditure on Total Expenditure

Currency: Ghana Cedi

Item	Upper West Regional Hospital	Jirapa District Hospital	Lawra District Hospital	Nadowli District Hospital	Sissala East District Hospital
Total expenditure for each hospital (except for personnel cost) ①	5,767,187,885	2,022,933,610	1,559,087,854	1,218,210,705	2,247,465,428
Total of Item 2 (Administration)	113,368,693	150,562,490	76,456,388	76,869,617	74,301,526
Cost of maintenance for vehicles (fuel fee, etc.) ②	14,400,000	3,600,000	28,996,669	8,740,000	8,480,000
Cost of maintenance for vehicles (repair, etc.)	7,817,000	1,350,000	15,000,000	12,650,000	46,734,919
Total of Item 3 (Health services)	259,700,144	175,409,080	122,099,693	74,877,044	131,845,901
Medical consumables apart from medicines ③	158,954,600	88,984,000	58,478,882	13,906,000	31,250,000
Total of Donor Pooled Fund (DPF)	766,196,781	926,362,996	599,347,901	723,618,776	376,309,387
Cost of maintenance for vehicles (fuel fee, etc.)	83,324,500	97,566,494	3,952,075	39,352,106	25,452,719
Cost of maintenance for vehicles (repair, etc.) ④	8,475,000	85,400,000	27,250,000	69,915,405	79,414,314
Medical consumables apart from medicines	341,270,121	273,203,750	191,862,177	195,715,198	214,289,725
Total of Internal Generated Fund (IGF)	4,627,922,267	770,599,044	761,183,872	342,845,268	1,665,008,614
Cost of maintenance for vehicles (fuel fee, etc.)	168,636,885	12,647,766	52,682,390	28,688,000	105,895,600
Cost of maintenance for vehicles (repair, etc.) ⑤	83,284,108	64,825,426	24,904,079	10,920,000	18,046,360
Medical consumables apart from medicines	326,043,559	135,388,597	135,768,343	30,101,671	211,246,000
Sum of cost of maintenance for vehicles and fee for consumables ((2)+(3)+(4)+(5)) ⑥	1,192,205,773	762,966,033	538,894,615	409,988,380	740,809,637
Increment of expenditure (refer table6) ⑦	54,980,000	28,822,000	14,132,000	18,002,000	192,000
Ratio of increment on maintenance fee ((6)/(7))	4.6%	3.8%	2.6%	4.4%	0.03%
Ration of increment on total expenditure ((7)/(1))	1.0%	1.4%	0.9%	1.5%	0.001%

(Nandom Hospital is excluded because no equipment in question will be procured)

2-6 Other Relevant Issues

Ghana will bear the cost for the replacement of batteries used for the existent 27 radio communication systems in the Health Centers covered by the project. Though the tasks and financial issues were fixed during the Basic Design Study, it is indispensable to activate the existent network system when the project is implemented. Thus, the progress will be duly consulted from the implementation design till the tender and the implementation of the project.

Chapter 3 Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

Effects of implementation of the project and extent of improvements in the current situation are shown in Table 3-1, which follows.

Table 3-1 Effects of Implementation of the Project and Improvements in the Current Situation

Present situation and problems	Relevant measures to be taken in the project	Direct effect and extent of improvement	Indirect effect and extent of improvement
<p>The field of healthcare is plagued by the problem of regional disparities in the quality of service as well as the problem of poverty. In the Upper West Region in particular, impoverished people account for 84% of the overall population of the Region, and the vast majority of people have no opportunities for access to any form of modern medicine, and thus the health indices are necessarily low. Accordingly, as a state initiative, efforts are underway to improve access to high-quality basic healthcare services through expansion of CHPS. However, the District Hospitals and Health Centers, which are the recipients of these CHPS activities, suffer from a lack or aging of medical equipment that is necessary to carry out healthcare services. In addition, due to a sharp rise in the number of students at the training school that trains the Community Health Nurses to work at health posts, there is a lack of educational equipment.</p>	<ul style="list-style-type: none"> • Upgrading of medical equipment used in the outpatient, surgery, obstetrics, and laboratory departments, and patient transport vehicles at the Regional Hospital (one facility) and five District Hospitals. • Upgrading of medical equipment at 58 Health Centers • Upgrading of educational/hands-on training equipment for the CHN Training School. 	<p>Target hospitals</p> <ul style="list-style-type: none"> • The number of outpatients will increase from the current number of 128,000 people per annum. • The number of perinatal checkups will increase from the current number of 10,800 cases per annum. • The number of childbirth deliveries will increase from the current number of 5,100 cases per annum. • The number of Caesarian sections will increase from the current number of 603 cases per annum. • The number of diagnoses by ultrasound will increase from the current number of 171 cases per annum. • The number of clinical tests done will increase from the current number of 116,300 cases per annum. • The number of referrals from lower-tier facilities will increase from the current number of 245 cases per annum. <p>Health Centers</p> <ul style="list-style-type: none"> • The number of normal childbirth deliveries will increase from the current number of 689 cases per annum. • The number of perinatal checkups will increase from the current number of 2,300 cases per annum. <p>CHN Training School</p> <ul style="list-style-type: none"> • It will become possible to conduct classes using educational/hands-on training equipment. 	<p>(1) Each facility will be able to fulfill the functions required of it, and improvements will be made to the overall healthcare service system as well as to the educational environment.</p> <p>(2) The upgrading of radios and vehicles will contribute to the strengthening of the referral system.</p> <p>(3) Together with collaborations with the Technical Cooperation Project and volunteer programs, this project will contribute to reinforcing the community healthcare service system in the Upper West Region.</p>

3-2 Recommendations

3-2-1 Issues and Recommendations at which the Other Country Should Work

Issues and recommendations at which Ghana should work so that this project can be implemented smoothly and its effects can be sustainable are as follows.

1) Promotion of *the Program for the Improvement of Health Status of People Living in Upper West Region*

This Grant Aid Project is a cooperative project considered to be one constituent of the above program. This program is meant to effectively improve the basic healthcare services that may be enjoyed by the residents of the community through the synergistic effects brought about by the reinforcing of the healthcare systems provided by the software portion of the Technical Cooperation Project, the enhancement of the environment of medical facilities through the procurement of necessary medical equipment from the Grant Aid Project, as well as the implementation of other projects. One element of this project that will have a significant effect on the program is the strengthening of the referral system within the Region. It is thought to be difficult to realize the full effects of the program in an environment where the existing wireless network system is insufficient in providing patient transport functions. Since this project seeks to supplement the current system, it is first necessary to make improvements to and review the operational methods of the contact system between facilities as well as to rebuild the existing system before the implementation of this project.

2) Devising a way to reduce the ratio of personnel costs

In order to improve the efficiency of financial resources, POWII seeks to reduce the ratio of personnel costs and increase the ratio of the budget distributed at and below the District level, and holds as important the procurement of a sufficient portion of the budget for health services at the District level. When looking at the Upper West Region, however, salaries make up for 64.5% of overall expenses, which is a considerably large ratio, while the portion for health services is limited to 3.8%. It is hoped that methods can be devised for budget distribution and budget increase so that a larger portion of the budget is distributed to health services.

3-2-2 Coordination with Technical Cooperation Project and Other Donors

The *Project for the Scaling Up of CHPS implementation in the Upper West Region*, a privately run technical cooperation project which forms a constituent element of the *Program*

for the Improvement of Health Status of People Living in Upper West Region, has been underway since March of 2006. It is hoped that assistance provided to the software portion of the referral system and assistance to the hardware portion provided through the implementation of this project will have a synergistic effect in contributing to the improvement of the health of the residents of the Upper West Region, which is the desired achievement of the program.

【Appendices】

1. Member List of the Study Team
2. Study Schedule
3. List of the Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. References

1. Member List of the Study Team

(1) Basic Design Study (from May 14 to June 8, 2006)

Hiroshi MURAKAMI Resident Representative, JICA Ghana Office
Team Leader

Makoto KOBAYASHI Expert Service Division,
Technical Advisor Bureau of International Cooperation,
International Medical Center of Japan

Hiroshi TASEI International Techno Center Co., Ltd.
Project Manager/ Equipment Planner I

Shigetaka TOJO International Techno Center Co., Ltd.
Equipment Planner II

Kenji YOSHIMURA International Techno Center Co., Ltd.
Procurement and Cost Planner

(2) Explanation of Draft Report (from August 27 to September 4, 2006)

Hiroshi MURAKAMI Resident Representative, JICA Ghana Office
Team Leader

Hiroshi TASEI International Techno Center Co., Ltd.
Project Manager/ Equipment Planner I

2. Study Schedule

(1) Basic Design Study

Date			Team Leader	Technical Advisor	Project Manager/ Equipment Planner I	Equipment Planner II	Kenji YOSHIMURA
			Hiroshi MURAKAMI	Makoto KOBAYASHI	Hiroshi TASEI	Shigetaka TOJO	Procurement and Cost Planner
			8 days	14 days	29 days	29 days	27 days
1	13-May-06	Sat	Tokyo →Amsterdam				
2	14-May-06	Sun	Amsterdam→Accra				
3	15-May-06	Mon	JICA Ghana Office Japanese Embassy Ghana Health Service				
4	16-May-06	Tue	Ministry of Health DANIDA,UNICEF,USAID			Forwarders Local Agents of Medical Equipment	
5	17-May-06	Wed	Accra → Wa Jema HC, Kintampo Hospital				
6	18-May-06	Thu	Upper West Regional Health Administration, Meeting with District Health Authorities				
7	19-May-06	Fri	Jang HC, Fian HC, Issa HC, Kojokpere HC, Challa CHPS Zone	Jeffisi HC, Gwollu HC, Zini HC		Jang HC, Fian HC, Issa HC, Kojokpere HC, Challa CHPS Zone	
8	20-May-06	Sat	Sombo HC, Daffiana HC, Bussie HC, Dapouri HC	Fielmoa HC, Samoa HC, Lambussie HC		Funsi HC, Yala HC, Kundugu HC	
9	21-May-06	Sun	Internal Meeting				
10	22-May-06	Mon	Jirapa District Hospital Repeater for Radio System Workshop	Jirapa District Hospital		Jirapa Sub HC Repeater for Radio System Workshop	
11	23-May-06	Tue	Upper West Regional Hospital Wa Sub HC	Lawra District Hospital Duori HC		Charia HC, Bamahu HC, Charingu HC, Dorimon HC	
12	24-May-06	Wed	Upper West Regional Hospital		Lawra District Hospital	Bulenga HC, Holimuni HC, Busa HC, Loggu HC Repeater for Radio System	
13	25-May-06	Thu	Internal Meeting		CHN Training School Tuggo HC, Yagha HC	CHN Training School Charikpong HC, Nanville HC, Takpo HC	
14	26-May-06	Fri	Nadowli District Hospital Kaleo HC	Sissala East District Hospital Kunchogu HC		Poyentanga HC, Gurungu HC, Lassia Tuoli HC, Wecheau HC	
15	27-May-06	Sat	Tokyo →	Nadowli District Hospital Meeting with Technical Cooperation Project Team		Wellembelle HC, Bawiesabelle HC, Nabulo HC, Kulfuo HC Meeting with Technical Cooperation Project Team	
16	28-May-06	Sun	→ Accra	Wa → Accra		Internal Meeting	
17	29-May-06	Mon	JICA Ghana Office Japanese Embassy Agency for Radio Communication System			Billaw HC, Hamile HC, Ketuo HC	Babilie HC, Eremon HC
18	30-May-06	Tue	Accra → Wa			Nandom Hospital	Wa → Accra Yapei HC
19	31-May-06	Wed	Nadowli District Hospital Han HC, Sabuli HC			Ko HC, Piira HC, Gengenpe HC	Local Agents of Radio System Local Agents of Medical Equipment
20	01-Jun-06	Thu	Accra → Wa	Karni HC, Ullo HC		Zambo HC, Domwini HC	Forwarders
21	02-Jun-06	Fri	Upper West Regional Hospital Upper West Regional Health Administration			Nandom Hospital Upper West Regional Hospital	Local Agents of Medical Equipment Local Agents of Ambulance Local Agents of Radio System
22	03-Jun-06	Sat	Jirapa District Hospital CHN Training School CHPS Zone			Jirapa District Hospital CHN Training School	Local Agents of Medical Equipment
23	04-Jun-06	Sun	Wa → Accra				Classifying Data
24	05-Jun-06	Mon	Ghana Health Service Ministry of Health				Forwarders Local Agents of Radio System
25	06-Jun-06	Tue	Ghana Health Service				Forwarders Local Agents of Radio System Accra →
26	07-Jun-06	Wed	JICA Ghana Office Ministry of Health, Signing Minutes of Discussion Japanese Embassy Accra →	JICA Ghana Office Ministry of Health, Signing Minutes of Discussion Japanese Embassy Accra →	JICA Ghana Office Ministry of Health, Signing Minutes of Discussion Japanese Embassy		→Amsterdam→
27	08-Jun-06	Thu	→			Local Agents of Equipment Accra →	→ Tokyo
28	09-Jun-06	Fri	→ Tokyo			→ Amsterdam →	
29	10-Jun-06	Sat				→ Tokyo	

(2) Explanation of Draft Report

Date			Project Manager/ Equipment Planner I
			Hiroshi TASEI
			12 days
1	26-Aug-06	Sat	Tokyo →Amsterdam
2	27-Aug-06	Sun	Amsterdam → Accra
3	28-Aug-06	Mon	JICA Ghana Office Japanese Embassy
4	29-Aug-06	Tue	Ghana Health Service, Ministry of Health Local Agents of Medical Equipment
5	30-Aug-06	Wed	Clinical Engineering Department of Ghana Health Service UNFPA
6	31-Aug-06	Thu	Ghana Health Service Local Agents of Medical Equipment
7	1-Sep-06	Fri	Clinical Engineering Department of Ghana Health Service Upper West Regional Health Administration
8	2-Sep-06	Sat	Preparing Documents
9	3-Sep-06	Sun	Preparing Documents
10	4-Sep-06	Mon	Ministry of Health, Signing Minutes of Discussion Japanese Embassy Meeting with Technical Cooperation Project Team Accra →
11	5-Sep-06	Tue	→ Amsterdam →
12	6-Sep-06	Wed	→Tokyo

3. List of the Parties Concerned in the Recipient Country

Ministry of Health

Hon Sam Owusu Agyei	Deputy Minister of Health
Salamata Abdul-Salem	Chief Directro

Ghana Health Service

A.B. Akosa	Director General Ghana Health Service
Emmanuel Tidakbi	Director Health Administration&Support Service
Nicholas Adjabu	Head, Clinical Engineering Department
Yahya Khasem	Estate Management

DANIDA Health Sector Support Office

Bjarne O. Jensen	Chief Health Adviser
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UNICEF

Victor A. Ankrah	Programme Officer (Health)
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USAID

BethAnne Moskov	Health Office Chief
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Kintampo Hospital

Clement Nabre	Director
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Yapei HC

Michael Mantamia	Medical Assistnat
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Upper West Regional Health Administration

Daniel Yayemain	Deputy Director
Gergi Dsuman	Director Nursing Servise
Al-Hassan Salef	Nursing officer
Godime Pongo	Director Administratio
Martin T	Head Maintenance Unit

Upper West Regional Hospital

Abebrese Jacob	Medical Director
Faith Loggah	Chief of Nursing Service
Celine Bawa	Principal Nursing Officer

Yusef Tamko	Hospital Administrator
Abudu Karim	Principal Accountant

Wa Municipal Health Administration

Basilialia Salia	Director
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Busa HC

Hawawu Yussif	Midwife
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Charia HC

Kpesie Prudence	Midwife
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Bamahu HC

Serah Legibo	CHN
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Wa West District Health Administration

Phonbe Balagunhem	Acting Director
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Dorimon HC

Stalle Gangtale	CHN
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Lassia Tuoli HC

Jean Frances Dabuoh	Public Health Nursing Officer
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Gurungu HC

Priscilla Labul	Public Health Nursing Officer
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Poyentanga HC

Comfort Anagbey	Midwife
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Wecheau HC

Helen Guvibie	Medical Assistant
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Wa West District Health Administration

Crescentia Duopas

Basilialia Dakura

James Laar

Elias Khoury

William Sietuura

Bulenga HC

Fati Abukari

Midwife

Funsi HC

Dawuda Sulemani

CHN

Loggu HC

Grace P Baaro

Midwife

Holimuni HC

Juliana Yakuu Karbo

Midwife

Yala HC

Aabuleh Mary-Grace

Midwife

CHN Training School

Elizabeth R. Dabuoh

Ac.Principal

Victoria Doangori

Tutor-Community Health

Elizabeth Angsofinge

Tutor-Midwifery Training School

Christina Nyewala

Tutor- Nursing School

Vincent Tanye

Tutor, Nursing School

Ngsotinge Elizabeth

Tutor, Midwifery School

Jirapa Sub HC

Der K. Gladys

Senior Nursing Officer

Billaw HC

Esther A. Maaldu

Snr. Midwife Superintendent

Bamuah Portia

CHN

Alphosus Taaky Dakura

Lab. Assistant

Duori HC

Mercy Claresuurnir

Midwife

Hamile HC

David Hassan Koggoh

Medical Assistant

Lambussie HC

Fatim Basuglo

Midwife

Piina HC

Rosemond Bukani Midwife

Samoa HC

Mariam Kampara Midwife

Tuggo HC

Timbilla Cecilia Midwife

Yagha HC

Kulaah Jacqueline Midwife

Karni HC

Helen Aswicoono Midwife

Han HC

Francis Laarre Medical Assistant

Ullo HC

Dienfaa Gervase CHN

Sabuli HC

Bawongle Bridget Midwife

Lawra District Health Administration

Kuuder Virginia Sauboh Acting Director

Enphemia Gamdaa Nutrition

Lawra District Hospital

Abdulai Abukari Director of Hospital

Abu Samson Hospital administrator

Piira HC

Cesiria Tienbaare Midwife

Domwini HC

Doris•B•Migre CHN

Pulingfaai Solomon Record Assistan

Gengenkpe HC

Amina Alhassani	CHN
Kuursdong Alex	CHN
Dery Beatrice	Health Aid

Ko HC

Reverent Sr. Sieballe Marcella	Midwife, Senior Nursing Officer
Dery Mary	Midwife, Senior Midwifely Superintendent

Ketuo HC

Francis Kobekyaa	CHN
Reina Nang	Adminstrator
Segtub Mang	Clinical Assistant

Zambo HC

Ayisha Goodman	Midwife
Faustina Chapirah	CHN/CHO
Sammed Mahammed Saana	CHN
Lanbert Gbabg	CHN

Babilie HC

Georgina Depualo	Medical Assistant
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Eremon HC

Kabaru Roger	CHN
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Nadowli District Hospital

Sebstan Sandaare	Director
Gaalee Roger	Administrator

Charikpong HC

Joseph Abu Gaale	Medical Assistant
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Fian HC

Abdul Samad Shameema	CHN
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Issa HC

Dagban Alice	Midwife
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Jang HC

Ajara Abalulai Midwife

Kojokpere HC

Abdul Wahid A Dawono CHN

Nanville HC

Agatha Mininbom Midwife

Takpo HC

Alhassan Fati Midwife

Sissala East District Health Administration

Roberto Wabe Director

Sissala East District Hospital

Rita Halutie Nandzo Acting Director
Kuubetuure George Administrator
Mumuui Williams Accountant
Lawrencia Hanee Acting Director, Principal Nursing Officer
Regina Naah Hospital Matron
Peter Onyaatet Estate Officer

Kunchogu HC

Cecilia Alhassan Midwife

Nabugubelle HC

Adorata Nyimebaare Midwifery Superintendent
Adams Lun Record Assistant

Kulfo HC

Saratu Taliru Midwife

Nabulo HC

Janet Dagero Midwife

Wellembelle HC

Victoria Mumuni Midwife

Bawiesebelle HC

Helen A Mumuwi Midwife

Sissala West District Health Administration

Francisca Bagni Director, Public Health

Gwollu HC

Priscilla Abdulai Midwife

Lawrencia Bayuo Medical Assistant

Jeffisi HC

Francisca Tingan Midwife

Haruna Suleimani CHN

Zini HC

Lucy s. Kieebah Midwife

Fielmoa HC

Albana Atire Midwife