Ministry of Health
The Kingdom of Bhutan

PREPARATORY SURVEY REPORT
ON
THE PROJECT
FOR
REPLACEMENT OF AMBULANCES
IN
THE KINGDOM OF BHUTAN

January 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERNATIONAL TECHNO CENTER CO., LTD.

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Preface

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for Replacement of Ambulances in the Kingdom of Bhutan, and entrusted the survey to International Techno Center Co., Ltd.

The survey team conducted the field reconnaissance in the project target areas, and held a series of discussions with the officials concerned of the Royal Government of Bhutan from May 2010 to January 2011. As a result of further studies in Japan, 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.

Finally, I wish to express my sincere appreciation to the officials concerned of the Royal Government of Bhutan for their close cooperation extended to the survey team.

January, 2011

Nobuko Kayashima

Director General
Human Development Department
Japan International Cooperation Agency

Summary

Summary

Overview of the country

The Kingdom of Bhutan (hereinafter "Bhutan") is a landlocked country bordering India on the west, south and east and China (Tibet) on the north. Its land which has an area of 46,500 km^2 (comparable to that of Kyushu Island in Japan) includes the lowland along the border with India in the south to the Himalayan Mountains at the altitude as much as 7,000 m. Because of this huge difference in altitude, large varieties of climates and vegetations are found in the country. Tall deciduous trees grow in thick tropical forests in the lowland. As altitude increases, more coniferous trees are found. Valleys created by glaciers are found at various places in the mountains of Himalayas.

The population of Bhutan was estimated to be 698,000 in 2000. Seventy-nine percent of the total population lives in rural areas. The populations under the age of 15 years and over the age of 60 years are estimated to account for 42.1 % and 7.2 %, respectively, of the total population. The main ethnic group is Drukpas, or "people of the thunder dragons," Mongoloid Buddhists, who account for about 80 % of the population, and the rest are Indo-Aryan Hindus who have migrated from Nepal.

The Statistic Yearbook 2009 shows that, while the primary sector of the economy had been the main industry until the 1990's, the contribution of the other industries to the economy has increased since then. (The primary, secondary and tertiary sectors of the economy accounted for 21.0 %, 39.2 % and 39.8 %, respectively, of GDP in 2009.) The main export commodities are electric power, silicon iron, non-ferrous metal, metalware, and cement, and the main import commodities are high-speed diesel engines, polymers, petroleum, and rice. The largest export commodity is electric power generated with the rich hydraulic power on the slopes of the Himalayas whose sale to India brings foreign currency to Bhutan. The statistics of 2007 show that the total amount of trade both export and import was approximately US$ one billion with exports slightly larger than imports. The *per capita* GNI was US$1,800 and the economic growth rate was 19% in 2007. (The *per capita* GNI was US$2,020 in 2009.) The profit from the export of electric power to India accounts for most of the revenue of the country, and health care and education is virtually free for citizens.

Background and outline of the requested assistance

The stable economic growth in recent years (the economy has grown at an average annual rate of 6 - 7 % since the late 1990's) has contributed to improvement of the health indicators in Bhutan through development of infrastructure including hospitals

and Basic Health Units (BHUs). However, there still remain significant problems in the health sector such as shortage of medical personnel and lack of access to health care services restricted by topographic conditions.

The Royal Government of Bhutan is engaged in development of a nationwide emergency medical service network, as well as development of human resources and organizational capacity and improvement of facilities and equipment, aiming at extension of health care services, under the 10th Five-year Plan. With cooperation of JICA, the Royal Government of Bhutan has launched construction of new roads in rural areas, as improving access in rural areas has been one of the priority issues in Bhutan. 3,264 km of new roads are expected to be constructed by 2013.

Progress of the road construction is expected to increase demands for transport of patients with ambulances drastically. There is an urgent need to replace many of the present ambulances which have become old and more likely to be outlived soon, as they sometimes break down while transporting patients. Although the Royal Government of Bhutan has procured ambulances one by one with its own budget and assistance from the Government of India, it has been unable to meet the urgent need sufficiently.

Under such circumstance, the Royal Government of Bhutan, to improve access to health care institutions by replacing the old ambulances with new ones, requested the Government of Japan for grant aid to procure 21 four-wheel-drive (4WD) ambulances and sets of on-board medical equipment in 2009. The Government of Japan conducted a preliminary survey in February 2010, in order to grasp the current state of the health care services in Bhutan, evaluate the relevance of the request as a grant aid project and establish the policies for and scope of the preparatory survey. The preliminary survey found that the ambulances were used not only for ambulance services but also for transferring patients from local hospitals and clinics to higher-level health care institutions, and that the ambulance service played a significant part in the referral system.

In response to the request, the Government of Japan dispatched a survey team to Bhutan for the Preparatory Survey (Outline Design) for the Project for Replacement of Ambulances from May 30th to July 3rd, 2010. After returning to Japan, the team carried out the work in Japan. The team visited Bhutan again to explain the Summary of the Outline Design to the Bhutanese side from October 9th to 17th, 2010. The overworked old ambulances and the medical equipment inside will be replaced by this project in accordance with the findings of the preparatory survey (outline design), for strengthening the patient transport service and improving access to emergency health care in Bhutan.

Summary of the survey results and contents of the project

1） Summary of the results of the field survey

There are 69 ambulances in Bhutan. They are stationed at hospitals and BHU-1s in every district, transporting patients. Studying the conditions of ambulances in each health care facility, there are 26 out of 69 ambulances have been in use for about ten years and driven for around 200,000 km. The survey confirmed that these vehicles were old and used enough and valid for replacement.

2） Contents of the project

The purpose of this project is to replace the old, overworked ambulances with new ones. Criteria for replacement are whether a vehicle went through ten years of use or more and a cumulative mileage of around 200,000 km or more. The Bhutanese side has strongly requested procurement of ambulances of the same model as those currently in use in Bhutan, Japanese 4WD ambulances, which have enough space for a stretcher and seats for two to three people. Since the Grant Aid Cooperation scheme of Japan does not take specific request for brands, 1) station-wagon-type 4WD vehicles and 2) one-box-type vehicles will be included in the project design, for 1) the emergent transport of patient along the rough roads in each facility's catchment areas, and 2) the transfer of referral patients to higher-level health care institutions, respectively.

Because of the poor road conditions, ambulances jolt so much that it is almost impossible to provide any treatment for a patient in the ambulance while it is running. Bhutan does not have a system of paramedics aboard the ambulances because of the shortage of medical personnel. Instead, the nurse on duty may accompany the patient in the ambulance only when the patient is in serious condition. For these reasons, medical equipment to be installed in the ambulances was limited to stretchers, apparatus for resuscitation and oxygen inhalation equipment.

Tables 1 and 2 show the details of the equipment to be procured in this project and allocation of the equipment, respectively.

Table 1 Equipment specification and Quantity

Item	Description	Specification	Q'ty
01	Ambulance A	Station wagon type,4WD, diesel engine	18
02	Ambulance B	One box type,2WD, diesel engine	8

Table 2 Allocation of ambulances

	Item No	01	02
	Description / Facility Name	Ambulance A	Ambulance B
1	San drop Johnkar Hospital	1	
2	Deothang Hospital	1	
3	Riserboo Hospital	1	
4	Mongar (ERR) Hospital	2	1
5	Pema gatshel Hospital	1	
6	Yebilaptsa Hospital	1	
7	Bajo BHU 1		1
8	Samtse Hospital	2	
9	Trashigang Hospital	1	
10	Punakha Hospital	1	
11	JDW/NRH		2
12	Trashiyangtse Hospital	1	
13	Paro Hospital	1	1
14	Gomtu Hospital		1
15	Sandrop choeling BHU-I	1	
16	Phuentsholing Hospital	1	1
17	Bumutan Hospital		1
18	Dagana BHU-I	1	
19	Lhamoizingkha BHUI	1	
20	Lhuntse Hospital	1	
	Total	18	8

Implementation period and estimated project costs

Implementation of this project is expected to take 12 months, four months for the tender-related work and eight months for supervision. Project cost is estimated to be 163 million yen (162 million yen borne by the Japanese side and one million yen by the Bhutanese side).

Evaluation of the project

1) Relevance

The Government of Bhutan has adopted Gross National Happiness (GNH), whose ultimate goal is to realize a society where the people of Bhutan can live with happiness, as the basic ideology of development. On the basis of this ideology, the government aims at reducing the proportion of the poor in the entire population to 15% by 2013 in its efforts for poverty reduction, which is the main task in the national development plan. The Government of Japan has provided ODA along with Bhutan's unique development ideology, instead of applying experiences in other countries. The relevance of this project is high because its implementation will enable treatment of trauma patients, transfer of patients between hospitals, and precautionary transport of women with high-risk pregnancy to higher-level health care institutions in the country, which is located in a sparsely populated mountainous area and where local residents have poor access to health care services and, thus, contribute to the guarantee of good health and safety to all its people.

In addition, it is considered that the following reasons justify the relevance of implementing this project under the Japanese Grant Aid:

(1) Approximately 550,000 people living in 15 districts, Bumtan, Chukha, Dagana, Lhuntse, Mongar, Paro, Pemagatshel, Punaka, Samdrup Jhongkhar, Samtse, Thimphu, Trashigang, Trashiyangtse, Wangdue Phodrang and Zemgang Districts, or 86 % of the total population of Bhutan of 630,000 (in a total of 20 districts), will benefit from this project.

Table 3 District and those population that covered by the Project

No.	District	Population（2005）	No.	District	Population（2005）
1	Bumtan	16,116	9	Samdrup・Jhongkhar	39,961
2	Chukha	74,387	10	Samtse	60,100
3	Dagana	18,222	11	Thimphu	98,676
4	Lhuntse	15,395	12	Trashigang	51,134
5	Mongar	37,069	13	Trashiyangtse	17,740
6	Paro	36,433	14	Wangdue・Phodrang	31,135
7	Pemagatshel	13,864	15	Zemgang	18,636
8	Punaka	17,715		Total	588,132

Source: The Ministry of Health

(2) In this project, the overworked old ambulances at BHUs and hospitals in areas where sufficient patient transport service has not been provided because of breakdowns and repair of the ambulances will be replaced. This replacement will improve the emergency patient transport service and establish an environment in which the residents can live with peace of mind.

(3) The ambulances and the equipment in them to be procured in this project will be of the specifications similar to those currently being used in Bhutan. Therefore, the Bhutanese side will be able to operate and maintain them.

(4) The target of the Health Help Line[1] of Bhutan is to create an environment in which 90 % of its citizens can receive professional health care services within an hour wherever they are. The replacement of the ambulances in this project will play a significant role in this Health Help Line.

[1] The Government of Bhutan recognized improving access to health care services, which was poor because of the topographical constraints and shortage of doctors, as the highest-priority task and developed a concept of Health Help Line which aimed at improving access to health care services by increasing the number of doctors and improving health care institutions and with prompt and efficient use of the patient transport service. Health Help Line is a call center to be operated by a private contractor for improving efficiency of service provision at the level from the primary to the emergency health care. The call center will 1) provide advice on preventive care, 2) provide information on the nearest health care institution (a BHU or a hospital) and 3) respond promptly to requests for emergency patient transport via telephone. At the time of the survey in October 2010, the contractor to operate the call center had been selected and the work of establishing the call center in the premises of JDWNRH and the training of staff for 24-hours-a-day operation of the call center were in progress for the opening of the center scheduled in early 2011.

2) Effectiveness

The replacement of overworked old ambulances through the implementation of this project will ensure that the current level of patient transport service provided by the existing ambulances will be maintained. In addition, the replacement is expected to have the following effects.

1) Quantitative effect

The new ambulances to be procured will have better performance than the present overworked old ambulances to be replaced by them. The provision of the new ambulances is also expected to improve the service environment (alleviation of stress on patients and pregnant women during long-distance transport etc.).

(The output indicators for the achievement of the overall project design)

Output indicator	Current figure (2010)	Design figure (2015)
Number of vehicles in use unsuitable for transporting patients [1] (number of vehicles) [1] Vehicles which have been in use for ten years or more and are prone to cause delay because of breakdowns and accidents	26 (38 % of the entire ambulances)	0 (The figure at the time when the ambulances to be procured in this project are provided)
Reduction of proportion of the spare parts cost in the maintenance cost of ambulance (%)	40	40 or less
The average number of dispatches of ambulances per month (dispatches)	633	An increase

2) Qualitative effects

- Improvement in the quality of the transport service with the replacement of the vehicles and their equipment
- Establishment of an appropriate maintenance system and prevention of breakdowns and accidents by renewing the Operation and Maintenance Register ("log book")
- Upgrading of the quality of the emergency medical services in Bhutan through confirmation of the details of treatment provided in ambulances with the entries in logbooks
- Strengthening of the system to transport emergency patients such as women with high-risk pregnancies, by combining the project with the Health Help Line which has been developed by the Royal Government of Bhutan

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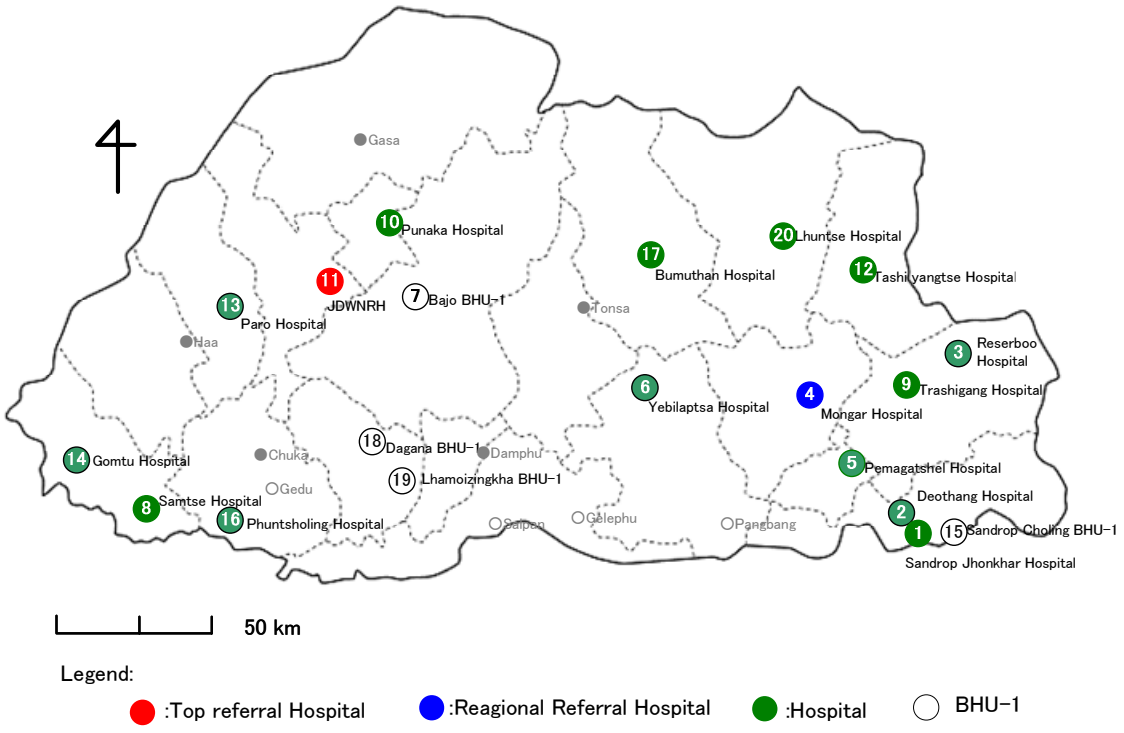
Location map



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Abbreviations

4WD	**4 Wheel Drive**
2WD	**2 Wheel Drive**
BHU	**Basic Health Unit**
BHU-1	**Basic Health Unit grade one**
BHU-2	**Basic Health Unit grade two**
BS	**British Standards**
DIN	**Deutsche Industries Norman**
DANIDA	**Danish International Development Assistance**
EPI	**Expanded Program on Immunization**
E/N	**Exchange of Notes**
FDA	**Food and Drug Administration**
GDP	**Gross Domestic Product**
GFATM	**Global Fund to Fight AIDS, Tuberculosis and Malaria**
GNI	**Gross National Income**
GNH	**Gross National Happiness**
ISO	**International Organization for Standardization**
JDWNRH	**Jigme Dorgi Wnchuku National Referral Hospital**
JIS	**Japan Industrial Standards**
Nu	**Ngultrum**
ORC	**Out Reach Clinic**
UNICEF	**United Nations International Children's Fund**
UNFPA	**United Nations Population Fund**
WHO	**World Health Organization**

Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Background of the Project

Problems in the health care services in Bhutan include 1) a shortage in the absolute number of medical personnel, which has created another problem, 2) difficulty in increasing the number and improving the quality of health care institutions. The shortage in the number of health care institutions resulting from these two problems has created yet another problem, 3) the long time required for those requiring medical attention to reach health care institutions and to have medical consultations. The 10th Five-Year Plan of the Government of Bhutan mentions the construction of roads for improved access in rural areas as one of the highest priority issues and the government intends to construct 3,264 km of new roads in rural areas by 2013. Because the progress in road construction will enable transport by car in areas where walking has hitherto been the only means of movement, an increase in the demand for transport of patients by ambulance is expected. In order to meet this increasing demand, the Ministry of Health (MOH) has already commenced development of a nationwide health care service network (Health Help Line), in addition to human resource development, strengthening of organizational capacity and improvement of facilities and equipment. With the establishment of the network, MOH intends to achieve a situation in which 90% of the population in the country can receive professional health care services within an hour. In order to realize such a situation, MOH proposed the following as the targets to be achieved:

1: Strengthening of health care services (treatment, prevention and emergency services),
2: Improvement in the technical capacity of individual medical personnel by utilizing existing valuable medical personnel effectively,
3: Extension and improvement of the communication networks for mobile and fixed telephones and improvement in access to health care institutions,
4: Provision of 24-hour-a-day access to health care services
5: Universal access to health care services, including service provision via telephone, and
6: Strive to achieve that 90% of the population in the country can receive health care services within an hour by 2013.

The Ministry of Health is engaged in quantitative and qualitative improvement of the

ambulance service as a mean to improve people's access to health care institutions. Thanks to the purchase of 16 ambulances with the budget of the Government and donation of ten and three ambulances from the Government of India and WHO, respectively, in 2009, 69 ambulances are in use nationwide in Bhutan. The Ministry of Health established the guidelines on Establishment of Ambulance Service for hospitals and BHU-1s in the entire nation in 2010 (table 1-1) and aims at quantitative and qualitative improvement of the ambulance service in accordance with the guidelines. The number of existing ambulances of 69 corresponds to approx. 80 % of the target set for the number of ambulances in the Guidelines for Establishment of Ambulance Service.

However, as the conditions of the existing ambulances in Table 1-2 show, half of them are dilapidated old ones which have been in use for at least 10 years. The dilapidation and old age often cause breakdowns of the vehicles while transporting patients. Although the Ministry of Health of Bhutan is aware of the need to replace these vehicles with new ones, it has not been able to do so because of the financial constraints.

Table 1-1 Guidelines on establishment of ambulance services

	Requirement (for 1 facility)	Total
Jigme Dorji Wangchuk National Referral Hospital	5	5
Eastern RRH (Mongar Hospital)	4	4
Central RRH (Gelephu Hospital)	4	4
Western RRH (Paro Hospital)	3	3
Hospitals (27)	2	54
BHU-1s (15)	1	15
Total		85

Source: Ministry of Health

Table 1-2 Age of existing ambulances

Model	1996	1998	1999	2000	2001	2002	2003	2004	2008	2009	Total
Number of Ambulances	1	3	4	10	8	2	2	5	3	31	69

Source: Ministry of Health

Under such circumstances, the Government of Bhutan, with the intention of improving access to health care institutions by replacing the old ambulances with new ones, requested the Government of Japan to provide grant aid for the procurement of 21 four-wheel-drive (4WD) ambulances and sets of on-board medical equipment in 2009.

The Government of Japan conducted a preliminary survey in February 2010, in order to grasp the current state of the health care services in Bhutan, evaluate the relevance of the request as a grant aid project and establish the policies for and scope of the preparatory survey. The preliminary survey revealed that the ambulances were used not only for transporting patients within the catchment areas of the respective health care institutions but also for transferring patients from local hospitals and clinics to higher-level health care institutions and confirmed the urgent need for the replacement of the old, dilapidated ambulances with new ones as a means of improving access to health care institutions.

On the basis of the results of the preliminary survey, the Government of Japan dispatched a survey team for the Preparatory Survey (Outline Design) for the Project for Replacement of Ambulances from May 30th to July 3rd, 2010. After completing the Work in Japan after returning to Japan, the team explained the Summary of the Outline Design to the Bhutanese side in Bhutan from October 9th to 16th, 2010. In accordance with the outcomes of the explanation, it was decided that dilapidated old ambulances and their equipment should be replaced in this project with the aims of strengthening the emergency patient transport system and improving people's access to health care institutions in Bhutan.

1-2 The current state of the patient transport service

1) The current state of patient transport:

Improvement of roads is being implemented at a very fast pace and widening and paving works of trunk roads are being implemented in various places. However, because of the underdeveloped traffic networks and poorly maintained rural roads which forces people to spend seven to eight hours to drive through a distance of 200 km or so, travelling requires long hours. Because villages are scattered in mountainous areas, there are many places where only limited space is available for road construction and where landslides occur, roads connecting villages have not been developed and there are many areas which cannot be reached even with a four-wheel-drive ambulance. Because ambulances jolt so badly while they are moving that it is impossible to provide any treatment to patients in them, they can be used only for transporting patients. For example, although the distance from Mongar Hospital to Jigme Dorji Wangchuk National Referral Hospital (hereinafter "JDWNRH") is only 268 km, it takes at least 10 hours to drive directly because a vehicle has to go through several mountain passes at an altitude as much as 3,000 m on the way from Mongar to Thimphu. Patients usually

stay overnight somewhere on the way in order to reduce stress on them when they are transported from Mongar Hospital to JDWNRH in the capital. Since it takes two days to travel one way, almost a week is required to transport a patient to JDWNRH in the capital. As a consequence, one of the ambulances at each hospital is used specifically for continuous transport of patients to the capital.

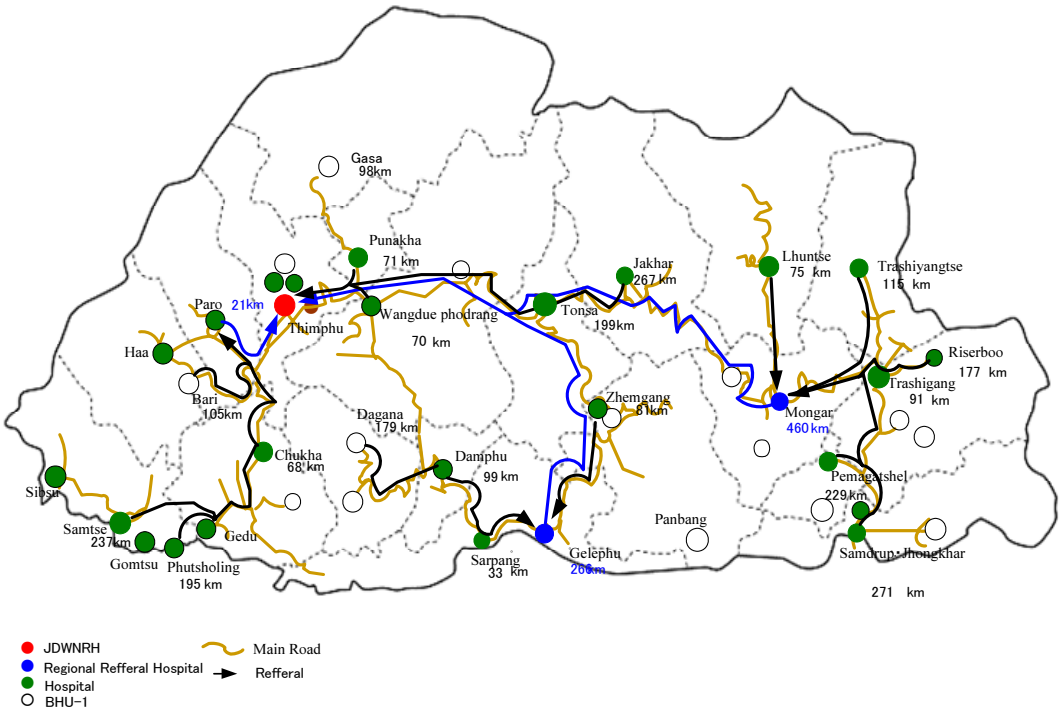


Figure 1-1 Referral Network and Health facilities map

2) The current state of ambulance operation:

Ambulances are operated independently by health care institutions. Individual hospitals and BHU-1s treat emergency patients suffering from sudden diseases and accidents, transport patients to health care institutions and transport referred patients whose conditions have been stabilized to higher-level hospitals. There is no organized activity in the emergency medical services. The Ministry of Health and the district health departments consider the transport of patients with ambulances as part of the health care services, instead of having a section responsible for supervising the emergency medical services. The operation and management of the emergency medical services is left to individual hospitals and BHU-1s where ambulances have been provided. The telephone number for an ambulance is 112. At all the surveyed hospitals and BHU-1s, a call for emergency request to this number is directed to the nurse station in the ward and an order to dispatch an ambulance is issued to the driver

by a doctor or the chief administrator of the institution who has been informed of the request by a nurse.

Health care institutions are open for ordinary outpatients from 09:00 am to 03:00 pm and accept patients only at the emergency outpatient departments from 03:00 pm to the next morning. Therefore, all those who visit the emergency outpatient departments are registered as emergency patients. Since there is no system to take records of medical conditions of patients who have been transported to the institutions with ambulances, it is impossible to know how many of the patients who visit the emergency outpatient departments are brought there by ambulances.

The table below shows the findings made during the survey of the activities of ambulances at the health care institutions which have 10 years old ambulances in order to verify how ambulances transport patients in Bhutan.

Table 1-3 Ambulance activities at 20 facilities

	Facility	No. of ambulances	Activity per month			Traveling Time, One way		Distance
			No. of tel. call	No. of dispatches	No. of pregnant women	Within local	To referral hospital	To referral
1	San drop Johnkar Hospital	3	30-40	25	-	30min.to 2hrs	Mongar Hospital 10-12hrs, Deothang Hospital, 11hrs, Guhati, (India), 13 hrs	Mongar Hospital, 268 km Deothang Hospital, 18 km Guhati, (India), 120 km
2	Deothang Hospital	1	15-20	20-40	8 - 10	2hrs	Mongar Hospital, 11hrs	Mongar Hospital, 200km
3	Riserboo Hospital	2	30-40	25	5 - 6	30min.to 2hrs	Mongar Hospital, 16hrs Trashigang Hospital, 13hrs Deothang Hospital, 14 hrs	Mongar Hospital, 177 km Trashigang Hospital, 87 km Deothang Hospital, 100 km
4	Mongar Hospital	5	N.A.	N.A.	N.A.	0.5.to 3hrs	JDWNRH, 10-12hrs,	JDWNRH (Timphu) 268 km,
5	Pema gatshel Hospital	2	30-40	30-40	N.A.	15min.to 2hrs	Mongar Hospital,8-9hrs Deothang Hospital, 3hrs Trashigang Hospital, 5hrs	Mongar Hospital, 220 km Deothang Hospital, 81 km Trashigang Hospital, 130 km
6	Yebilaptsa Hospital	2	20-30	20-30	23	2 to 5hrs	JDWNRH, 17.5hrs	JDWNRH, 230 km
7	Bajo BHU 1	2	12 - 13	12-13	15-16	4 to 6hrs	JDWNRH, 2－3hrs	JDWNRH, 70 km
8	Samtse Hospital	3	43-57	43-57	N.A.	0.5 to 6hrs	JDWNRH, 8hrs	JDWNRH, 246 km
9	Trashigang Hospital	2	60-70	20-25	N.A.	0.1 to 3hrs	Mongar Hospital, 3 hrs	Mongar Hospital, 90 km
10	Punakha Hospital	2	30－120	20-30	N.A.	0.1.to 2hrs	JDWNRH, 2 hrs	Mongar Hospital, 60 km
11	JDWNRH	4	30-40	30-40	N.A.	0.2.to 1hrs	N.A.	N.A.
12	Trashiyangtse Hospital	2	20-30	15-20	N.A.	0.1 to 2hrs	Mongar Hospital, 5hrs Trashigang Hospital, 2hrs	Mongar Hospital, 125 km Trashigang Hospital, 55 km
13	Paro Hospital	3	15-20	22-28	N.A.	0.1.to 2hrs	JDWNRH, 1.5hrs	JDWNRH, 45 km
14	Gomtu Hospital	2	30-32	30-32	N.A.	25min.	Phuentsholing Hospital,1hrs Samtse Hospital, 30min. JDWNRH, 8hrs Siligur (India), 3hrs	Phuentsholing Hospital, 54 km Samtse Hospital, 35 km JDWNRH, 225 km Siliguri (India), 125 km
15	Sandrop choeling BHU-I	1	20-40	10	N.A.	0.5.to 2hrs	Deothang Hospital, 2hrs San drop Johnkar Hospital, 2.5 － 3hrs	Deothang Hospital, 55 km San drop Johnkar Hospital, 73 km

16	Phuentsholing Hospital	2	60-90	9 - 21	N.A.	0.2.to 1hrs	JDWNRH, 6hrs	JDWNRH, 172 km
17	Bumthang Hospital	2	90-120	6-25	N.A.	0.5.to 2hrs	JDWNRH, 9hrs	JDWNRH, 270 km
18	Dagana BHU-I	1	90-120	90-120	N.A.	30min.to 4hrs	JDWNRH, 6hrs	JDWNRH, 142 km
19	Lhamoizingkha BHUI	1	1015	10-15	N.A.	0.5.to 2hrs	JDWNRH, 6hrs	JDWNRH, 192 km
20	Lhuntse Hospital	2	36-40	36-40	N.A.	0.5.to 2hrs	Mongar Hospital,3hrs	Mongar Hospital, 75 km

Source: Ministry of Health

The table shows that the ambulances are used for transporting patient everyday. The same ambulances are being used for both transporting patients from the sites of emergencies to health care institutions and transporting referred patients from the institutions which own the ambulances to higher-level or specialized hospitals, since the Bhutanese system makes no distinction between these two uses. In addition, the same ambulances are used for transporting patient from BHU-1s to hospitals, from hospitals to regional referral hospitals and from regional referral hospitals to the top-level referral hospital in the capital, JDWNRH.

3) The current state of human resources engaged in the emergency patient transport:

Many patients who cannot be treated at rural health care institutions because of shortage of medical personnel are transferred from there to the national hospital in the capital, Thimphu, JDWNRH. There was no hospital which had established a special emergency service team to accompany patients when they were transferred. Nurses occasionally accompany patients when they are transferred and they are the only medical personnel who do so. Ambulances are dispatched only with drivers when they are dispatched within the catchment areas of hospitals and BHU-1s. When patients are referred to higher-level health care institutions, nurses may or may not accompany the transfer.

1-3 Natural conditions

Different climates are found in Bhutan at different altitudes. The sub-tropical climate, monsoon climate and polar (alpine, tundra) climate are found in the area near the border with India (Terai Plain at an altitude of 1,200 m or below), in Central Bhutan at the altitude between 1,200 m and 3,000 m and the mountainous areas above the altitude of 3,000 m (the Northern Himalayas), respectively. There are five seasons, spring, summer, monsoon (rainy) season, autumn and winter, in a year.

Average temperatures in Paro by month

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Temperature	Max. (℃)	12.33	14.04	17.33	19.96	22.54	24.27	25.12	24.99	23.49	19.88	15.87	12.95
	Min. (℃)	1.5	3.26	6.13	9.5	12.53	14.84	16.93	16.5	14.82	10.82	6.09	2.64
Mean Total Precipitation (mm)		12.03	11.85	23.14	28.66	49.44	99.55	142.66	128.72	99.71	72.9	17.87	7.96
Mean Number of Precipitation Days		2	7	4.11	8.22	11.36	16	21.18	20.18	16	5.78	3	2.5

Average temperatures in Wangdue Phodrang by month

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Temperature	Max. (℃)	17.39	18.78	22.4	25.33	27.31	28.55	27.57	27.97	27.45	25.77	22.86	19.61
	Min. (℃)	5.49	7.83	10.9	13.76	17.2	19.82	20.47	20.33	19.5	15.86	10.11	6.41
Mean Total Precipitation (mm)		7.35	12.03	11.85	23.14	28.66	49.44	99.55	142.66	128.72	99.71	72.9	17.87
Mean Number of Precipitation Days		1.25	2	7	4.11	8.22	11.36	16	21.18	20.18	16	5.78	3

Average temperatures in Bumthang by month

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Temperature	Max. (℃)	10.79	12.18	15	17.29	19.68	21.92	22.64	22.45	21.21	18.15	15.28	12.53
	Min. (℃)	-4.33	-1.54	1.72	5.7	9.4	12.89	14.29	14.33	12.25	6.55	1.2	-3.63
Mean Total Precipitation (mm)		7.03	10.41	27.92	53.91	83.06	117.22	138.76	132.08	97.17	66.91	10.9	5.6
Mean Number of Precipitation Days		1.5	3	7.5	13.42	17.92	21.33	24.42	23.33	18.42	9.33	1.25	0.92

Average temperatures in Mongar by month

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Temperature	Max. (℃)	16.01	18.53	21.5	23.77	25.42	26.57	26.39	27.14	26.68	24.35	21.13	17.68
	Min. (℃)	6.23	7.75	11.25	13.81	15.95	18.31	18.74	18.64	17.8	14.71	10.76	8.07
Mean Total Precipitation (mm)		7.35	12.04	36.3	70.51	89.23	132.75	217.32	178.3	80.94	71.45	16.03	3.01
Mean Number of Precipitation Days		1.25	2	5.25	7.25	8.58	11.42	15.42	12.42	8.92	4.45	0.67	0.58

Source: World Weather Bhutan, the United Nations

1-4 Environmental and Social considerations

A consideration required for the operation of ambulances is measures against exhaust gas. While the survey team recommended gasoline engine vehicles as a measure against exhaust gas and for maintenance, the Bhutanese side requested diesel engine vehicles like the existing ones because of the budgetary consideration that diesel was cheaper than gasoline. In Bhutan, the National Environmental Commission has established the standards for exhaust gases. The survey revealed that euro 2 was the exhaust gas standards for diesel engines. Therefore, the specifications for the vehicles to be used as ambulances in this project shall include diesel engines which comply with this standard.

Chapter 2 Contents of the Project

Chapter 2 Content of the Project

2-1 Basic Concept of the Project

The Government of Bhutan provides free health care services to its citizens. However, poor access to health care institutions is a problem because people live scattered in the mountains and the road conditions remain poor because of the topography which is characterized by steep slopes. Shortage of medical personnel is another problem. Because of the shortage, it is impossible for health care institutions in rural areas to perform operations, such as Caesarean sections, or radiographic or other imaging diagnoses. Therefore, patients have to be transferred to regional referral hospitals or to the top-referral national hospital (JDWNRH) which has sufficient personnel and equipment for diagnosis and treatment.

The Government of Bhutan has presented the policy of focusing on construction of road and human resource development in the 10th Five-Year Plan. The Ministry of Health has been engaged in establishing medical colleges and repairing health care institutions, both of which require huge budget and time. Meanwhile, diseases create patients suffering from them every day and the rural health care institutions which cannot treat them because of shortage of human resources and facilities transfer patients to higher-level institutions using ambulances. However, they have not been able to meet the demands for the transfer of patients because of the topographic conditions and time limitations. The Ministry of Health has been engaged in expansion of the ambulance service and the number of ambulances owned by the ministry reached 69 in the first half of 2010. However, nearly 40 % of the ambulances in use have been driven for 10 years or more and for hundreds of thousand kilometers on unpaved roads and roads damaged by landslides and, thus, may break down at any time. In addition, the medical equipment in these ambulances including stretchers is in an advanced stage of dilapidation and is being used after repeated repair. Since it is expected to be difficult to use these dilapidated old vehicles as ambulances and to maintain the patient transport system which has been developed so far, if appropriate measures are not taken, this project aims at maintaining and expanding the system of emergency patient transport service by replacing these dilapidated old ambulances with new ones.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

The Ministry of Health of Bhutan is making efforts to improve people's access to health

care services. In 2009, the ministry purchased 16 ambulances with the national budget and obtained additional ten and three ambulances as donations from the Government of India and WHO, respectively. At present, the emergency patient transport service is operated with a total of 69 ambulances. This figure is not far below the 85 ambulances mentioned as the target in the (draft) Guidelines for ambulances. However, documents of the Ministry of Health and field survey revealed that 26 of them have been driven for ten years or more and approx. 200,000 km and that wear and tear on the equipment and stretchers in these ambulances were also so serious that they are being used after repeated repair. It is expected that it will be difficult to use these vehicles as ambulances, to meet the increasing demands for patient transport and to maintain the patient transport system in the near future. This project aims at maintaining the existing emergency patient transport system by replacing the dilapidated old ambulances with new ones.

(2) Policy on Natural Environment

In Bhutan, the temperature drops to -3 to -4 °C in winter and rises above 40 °C in summer. Transfer of patients to the capital is a long drive. For these reasons, the specifications for the ambulances shall include installation of air conditioners in order to reduce the burden on patients by keeping the temperature inside the ambulances within a certain range.

(3) Policy on Socio-Economic Conditions

Discussions were held with MOH of Bhutan on the exhaust gas regulations. A comparison between gasoline and diesel engines led to the conclusion that gasoline engines were more advantageous because they were easy to maintain and required simpler technology to meet the exhaust gas regulations. However, investigation into the cost of fuel, which would be consumed constantly, concluded that the use of diesel, which is cheaper than unleaded gasoline, would require smaller financial resources. For this reason, diesel engine vehicles will be procured. The vehicles shall comply with “Euro 2” which has been adopted by Bhutan as the standard for exhaust gas regulations.

(4) Policy on Procurement

The ambulances and the on-board medical equipment are not currently manufactured in Bhutan. Therefore, in accordance with the Grant Aid Scheme, products made in Japan or other countries adopted by Bhutan, are to be procured with the following conditions.

Ambulances

- The vehicles that will serve as ambulances should be mass-produced models and guaranteed to be procurable within a limited period. Spare parts and consumables should be available from a distribution agent in Bhutan.
- It is from a Manufacturer that sells their vehicles in Bhutan and that has a service center which can provide spare parts and repair services.

On-board medical equipment

- Equipment manufactured in Japan, Europe or the U.S.A. shall be procured.

(5) Policy on Operation and Maintenance

Inspection and repair of vehicles will be outsourced. None of the on-board medical equipment will require consumables or replacement parts for daily use. Therefore, it will be considered that vehicle manufacturers should have their agents in Bhutan or neighboring India.

(6) Policy on Determining the Grades and Specifications of the Equipment

For the grades and specifications of the equipment to be procured in this project, those of the ambulances and on-board medical equipment currently in use in Bhutan shall be followed.

(7) Policy on Schedule of Project

The work schedule of this project shall be completed within a year. The assumed duration of the project is a period of approx. 12 month after the conclusion of E/N.

(8) Policy on Consumables and Spare Parts

Procurement of consumables and spare parts for the vehicles shall not be included in this project.

2-2-2 Basic Plan (Equipment Plan)

(1) Overall Plan

The purpose of this project is to replace the old, dilapidated ambulances with new ones. Ten years or more of use and a cumulative mileage of approx. 200,000 km or more will be the criteria for replacement. The Bhutanese side has strongly requested procurement of ambulances of the same model as those currently in use in Bhutan, Japanese 4WD ambulances, which have space for a stretcher for the patient and seats

for two to three passengers. Since the Japan's Grant Aid scheme does not allow the specification of brands in the request, station-wagon-type 4WD vehicles with small accommodation capacity and one-box-type vehicles will be included in the project design for the transport of patients in the catchment areas and long-distance transfer of patients to higher-level health care institutions, respectively.

Because of the poor road conditions, ambulances jolt so much that it is almost impossible to provide any treatment to patients in the ambulances while they are moving. Bhutan does not have a system of paramedics aboard the ambulances because of the shortage of medical personnel. Instead, the nurse on duty may accompany the patient in the ambulance only when he/she considers that the patient is in serious condition. For these reasons, medical equipment to be installed in the ambulances shall be limited to stretchers, apparatus for resuscitation and oxygen inhalation equipment.

1) Confirmation of the Content of the Request

The original request was for replacement of dilapidated old ambulances with new ones. However, the Bhutanese side requested provision of new and additional ambulances, in addition to the replacement of the dilapidated old ambulances, as shown in the table below.

Table 2-1 Reasons for replacement listed in original request

No.	Facility	Request	Reason
1	San drop Johnkar Hospital	1	Replacement of 10-year-old ambulance
2	Deothang Hospital	1	Replacement of 11-year-old ambulance
3	Riserboo Hospital	1	2 ambulances required considering population size and poor access
4	Mongar Hospital	1	Replacement of 13-year-old ambulance
5	Pema gatshel Hospital	1	Replacement of 10-year-old ambulance
6	Tongsa Hospital	1	Replacement of 17-year-old ambulance
7	Yebilaptsa Hospital	1	Replacement of 10-year-old ambulance
8	Pangbang BHU-1	1	Replacement of 10-year-old ambulance
9	Bajo BHU-1	1	Replacement of 11-year-old ambulance
10	Sarpang Hospital	1	Ideal requirement for district hospital is 2 ambulances
11	Gelephu Hospital	1	Ideal requirement for regional referral hospital is 4 ambulances
12	Samtse Hospital	1	Replacement of 9-year-old ambulance
13	Chukha Hospital	2	Replacement of 11-year-old ambulance and ideal requirement for district hospital is 2 ambulances
14	Trashigang Hospital	1	Replacement of 9-year-old ambulance
15	Punaka Hospital	1	Replacement of 17-year-old ambulance
16	Gidacom Hospital	1	Replacement of 20-year-old ambulance
17	JDWNRH	1	Replacement of 16–year-old ambulance
18	Bali BHU-1	1	Ideal requirement for district hospital is 2 ambulances
19	Rangjung BHU-1	1	Standard requirement for BHU-1
20	Kanglung BHU-1	1	Standard requirement for BHU-1

Source: Request from Bhutanese side

While the original request mentioned the replacement of dilapidated old vehicles as the reason, the request list included provision of vehicles to institutions which did not have any and additional vehicles to institutions which already had some. In order to establish consistency between the reason in the request and the reasons in the list of vehicle allocation, the survey team had a discussion based on the conditions of the existing ambulances and the guidelines on establishment of ambulance service with the Ministry of Health. In the discussion, the reason for the request for the Japan's Grant Aid has been defined clearly.

In the discussion, it was decided that the ambulances driven in Bhutan for ten years or more and approx. 200,000 km were to be replaced in this project. Then, a field survey was conducted at health care institutions which owned ambulances to elucidate their conditions. Table 2-2 shows the ambulances to be replaced marked with shade by institution.

The results of this field survey and the guidelines for ambulances of the Government of Bhutan were used in deciding the number of ambulances to be replaced by subtracting the number of recently replaced ambulances from the total of the number of ambulances required at each institution.

Table 2-2 Year of manufacture and mileage of ambulances Mileage: in thousand km

No	Institution	Year of manufacture	Mileage	Year of manufacture	Mileage	Year of manufacture	Mileage	Year of manufacture	Mileage	Year of manufacture	Mileage
1	San drop Johnkar Hospital	2000	258	2009	1.8						
2	Deothang Hospital	1998	134								
3	Riserboo Hospital	2009	3	1999	214						
4	Mongar (ERR) Hospital	1998	Out of Order	2000	-	2001	284	2004	-	2009	-
5	Pema gatshel Hospital	2009	20	2000	239						
6	Yebilaptsa Hospital	1999	253	2009	16						
7	Bajo BHU 1	2009	3.9	2001	251						
8	Sarpang Hospital	2009	2.6	2009	7.5						
9	Gelephu (CRR)Hospital	2009	-	2009	-	2008	-	2000	228		
10	Samtse Hospital	2009	-	2000	279	2000	Out of Order				
11	Trashigang Hospital	2009	-	2001	-						
12	Punakha Hospital	2000	-	2009	-						
13	JDWNRH	1996	421	2004	89	2009	4.02	2009	1.4	2000	216
14	Bali BHI 1	2009	-	2003	-						
15	Trashiyangtse Hospital	2000	-	2009	15						
16	Paro Hospital	1998	320	2001	199	2009	3.9				

17	Gomtu Hospital	2009	15.9	1999	342						
18	Sandrop choeling BHU-I	2000	-								
19	Thirang(Damphu) Hospital	2001	-	2004	-						
20	Phuentsholing Hospital	2001	198	2000	260	2009	3.2				
21	Dagapera Hospital	2009	24.3								
22	Bumthang Hospital	1999	-	2004	-						
23	Dagana BHU-I	2001	131								
24	Lhamoizingkha BHUI	2001	160								
25	Lhuntse Hospital	2009	11.9	2001	170						
26	Jomotshangkga BHU I	2002	-								
27	Sibsoo Hospital	2004	133								
28	Tsimalakha Hospital	2009	-	2009	-						
29	Gedu Hospital	2003	2456								
30	Trongsa Hospital	2008	32	2009	1.7						
31	Nganglam BHU 1	2009	16.5								
32	Zhemgang BHU 1	2009	-								
33	Panbang BHU 1	2009	-								
34	Gidakom Hospital	2008	25.5	2009	1.5						
35	Ministry of Health	2004	-								

Source: MOH

2) Project Sites

As the 26 vehicles marked with gray shading in the table above have been earmarked for replacement with new ones in this project, the health care institutions to which these ambulances are allocated will be the sites for project implementation. More specifically, 16 hospitals and 4 BUH-1s (clinics) in 15 districts will be the project sites.

Table 2-3. List of project sites

No.	Facility	Beds	District	Population（2005）
1	Bumthang Hospital	50	Bumthang	16,116
2	Phuentsholing Hospital	50	Chukha	74,387
3	Dagana BHU-I	5	Dagana	18,222
4	Lhamoizingkha BHUI	10		
5	Lhuntse Hospital	20	Lhuntse	15,395
6	Mongar (ERR) Hospital	150	Mongar	37,069
7	Paro Hospital	10	Paro	36,433
8	Pema gatshel Hospital	20	Pema gatshel	13,864
9	Punakha Hospital	40	Punakha	17,715
10	San drop Johnkar Hospital	40	San drop Johnkar	39,961
11	Deothang Hospital	50		
12	Sandrop choeling BHU-I	10		
13	Samtse Hospital	60	Samtse	60,100
14	Gomtu Hospital	20		
15	JDW/NRH	350	Timphu	98,676
16	Riserboo Hospital	20	Trashigang	51,134
17	Trashigang Hospital	40		
18	Trashiyangtse Hospital	20	Trashiyangtse	17,740
19	Bajo BHU 1	20	Wandi Phodrang	31,135

20	Yebilaptsa Hospital	40	Zhemgang	18,636

Source: International Techno Center Co., Ltd.

The locations of the project sites are shown in "2-2-3 Outline Design Drawing."

(2) Equipment Plan

The list of the requested equipment in the original request includes procurement of Japanese 4WD ambulances of, the same model as those in use in Bhutan, and the specifications for the ambulances in the request are identical to those of the Japanese 4WD ambulances. It has been discovered that only one manufacturer produces station-wagon-type 4WD vehicles with a seating capacity of eight, which was included in the specifications provided in the original request.

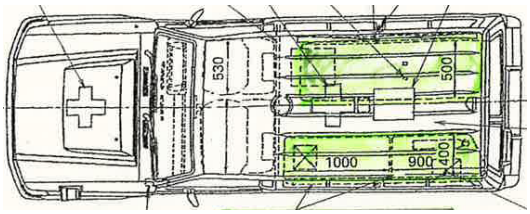
The team explained to the Bhutanese side that, because the Japan's Grant Aid scheme does not allow specification of brands in the request, the specifications for the equipment had to be specifications which more than one company could satisfy. It was agreed between the two parties that the survey team would finalize the specifications for the equipment.

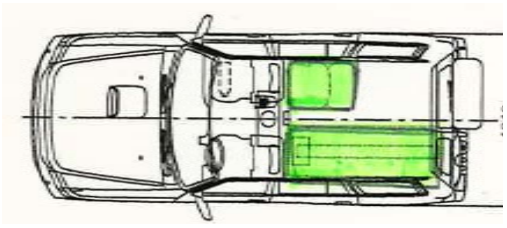
The request from the Bhutanese side also stated that the vehicles should

1) be 4WD because of the poor road conditions,
2) have space for accompanying relatives and nurses in addition to the patient,
3) have diesel engines for economic reasons and
4) be made in Japan.

The Japanese 4WD ambulance currently in use in Bhutan can accommodate 3 to 4 people in addition to the patient. Therefore, it can be used for both emergency transport within the catchment area of the health care institution and referral transfer to a higher-level institution. On the other hand, the passenger-vehicle-type 4WD station-wagon ambulance has the capacity only for a patient on a stretcher and one

accompanying person, which does not satisfy the conditions in the request.





After further discussion, the Bhutanese side agreed upon procurement of two types of ambulances for the two different purposes.

The vehicles to be included in the project design are A) passenger-vehicle-type 4WD station wagons and B) one-box-type 4WD vehicles: the former to be used for transporting patients within the catchment area of the hospital and BHU-1s, and the latter to be stationed at the hospital and to be used for long-distance transfer of patients to higher-level hospitals such as JDWNRH in the capital, Thimphu, and those in other cities (referral transfer).

A) Passenger-vehicle-type 4WD station wagon

B) One-box-type 4WD vehicle

Table 2-4 Modified equipment list

	Original request	Arrangement	Plan
1	Japan made 4WD ambulance, diesel, 6-cylinder, 3 doors, 8 seats, 5 speed manual, right-hand-drive	Ambulance, station wagon type, 4WD	13
		Ambulance, one box type 4WD	13
2	Exterior color: white、Interior color: Dark	Include vehicle specifications	—
3	Curtains	Change to 2/3 frosted glass	—
4	First aid kit plastic type	Include medical equipment specifications	—
5	Hand lamp BO & connector	Include vehicle specifications	—
6	Intravenous feeding hook, 2pcs	Include vehicle specifications	—
7	Main stretcher W/suspension bed	Delete suspension bed	—
8	Medicine Box	Include medical equipment specifications	—
9	Oxygen resuscitator automatic oxygen type + demand type including oxygen cylinder W/O oxygen	Include medical equipment specifications	—
10	Oxygen cylinder, without oxygen	Include medical equipment	—

		specifications	
11	Patient lamp, 10W, flexible type	Include vehicle specifications	—
12	Roof sign board, English	Delete	—
13	Roof ventilator W/electric fan	Include vehicle specifications	—
14	Room lamp, 10W (additional)	Include vehicle specifications	—
15	Ambulance decals, back (Red Cross)	Delete. If necessary, will be done by Bhutan side.	—
16	Ambulance decals, both sides (Red Cross)	Delete, Red Cross patent. If necessary, Bhutan side shall arrange.	—
17	Ambulance decals, front (Red Cross)	Delete, Red Cross patent. If necessary, Bhutan side shall arrange.	—
18	Ambulance decals, roof (Red Cross)	Delete, Red Cross patent. If necessary, Bhutan side shall arrange.	—
19	Beacon lamp, multi flashing, red,electric siren amp and speaker 2 tone type W/ microphone	Include vehicle specifications	—
20	Sub stretcher	Include medical equipment specifications	—
21	One year spare parts kit	Delete, done by Bhutan side	—
22	Double fuel tank	Only for station wagon type ambulance.	—

During the estimation work in Japan, the Japanese auto manufacturer informed the team that it was not possible to export right-hand-drive 4WD one-box-type vehicles. The team forwarded this information to the Bhutanese side and received approval to change the specifications of the ambulances from 4WD to 2WD one-box-type vehicles and request the change in allocation of the vehicles from the Bhutanese side. Then, the team obtained consent to proceed with the preparation of the equipment plan with the modified specifications and quantities.

Table 2-5 Modification in the specifications of the ambulances

Before modification	Q'ty	After modification	Q'ty
Ambulance, station wagon type, 4WD	**13**	Ambulance, station wagon type, 4WD	**18**
Ambulance, one box type **4WD**	**13**	Ambulance, one box type **2WD**	**8**

Tables 2-6 and 2-7 show the details and allocation of the equipment to be procured in this project, respectively.

Table 2-6. Main specifications and purpose of use of the equipment

Item	Description	Specification	Purpose	Q'ty
01	Ambulance A	Station wagon type,4WD, diesel engine	Local transportation	18
02	Ambulance B	One box type,2WD, diesel engine	Referral transportation	8

Table 2-7. Allocation of ambulances

	Item No	01	02
	Equipment name / Facility Name	Ambulance A	Ambulance B
1	San drop Johnkar Hospital	1	
2	Deothang Hospital	1	
3	Riserboo Hospital	1	
4	Mongar (ERR) Hospital	2	1
5	Pema gatshel Hospital	1	
6	Yebilaptsa Hospital	1	
7	Bajo BHU 1		1
8	Samtse Hospital	2	
9	Trashigang Hospital	1	
10	Punakha Hospital	1	
11	JDW/NRH		2
12	Trashiyangtse Hospital	1	
13	Paro Hospital	1	1
14	Gomtu Hospital		1
15	Sandrop choeling BHU-I	1	
16	Phuentsholing Hospital	1	1
17	Bumutan Hospital		1
18	Dagana BHU-I	1	
19	Lhamoizingkha BHUI	1	
20	Lhuntse Hospital	1	
	Total	18	8

2-2-3 Outline Design Drawing

The locations and the names of the institutions where this project is to be implemented are shown in Figure 2-1 and Table 2-8, respectively:

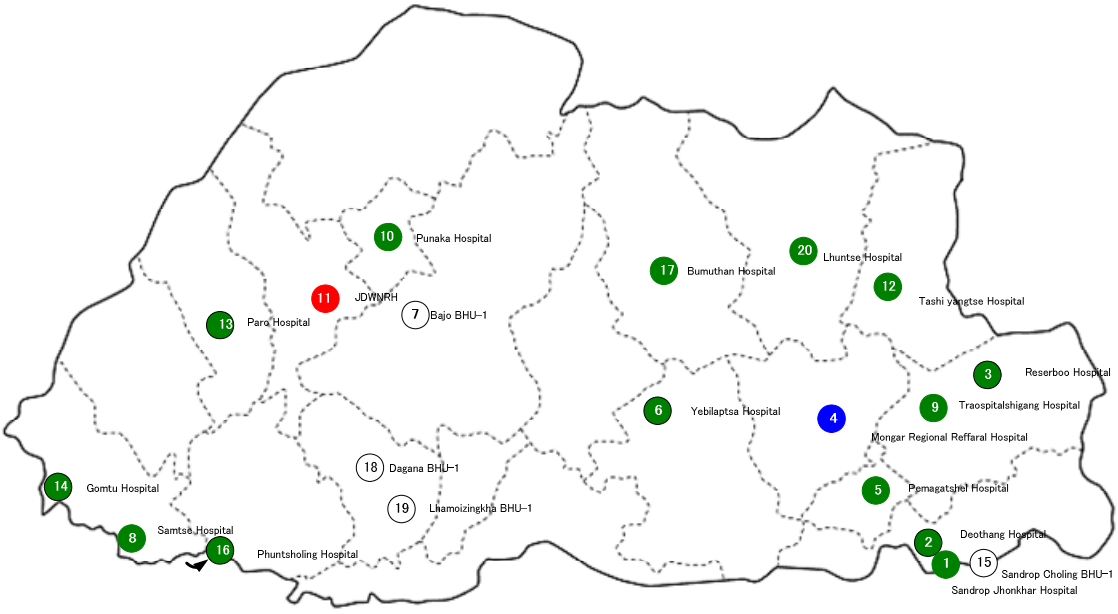


Figure 2-1 Locations of the project sites

Table 2-8. List of the project sites

1	San drop Johnkar Hospital	11	JDWNRH
2	Deothang Hospital	12	Trashiyangtse Hospital
3	Riserboo Hospital	13	Paro Hospital
4	Mongar (ERR) Hospital	14	Gomtu Hospital
5	Pema gatshel Hospital	15	Sandrop choeling BHU-1
6	Yebilaptsa Hospital	16	Phuentsholing Hospital
7	Bajo BHU-1	17	Bumthang Hospital
8	Samtse Hospital	18	Dagana BHU-1
9	Trashigang Hospital	19	Lhamoizingkha BHU-1
10	Punakha Hospital	20	Lhuntse Hospital

Source: International Techno Center Co., Ltd.

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

This project will be implemented in accordance with the framework of the Grant Aid Cooperation of the Government of Japan, with the approval of the cabinet of the Government of Japan and with the conclusion of the exchange of notes (E/N) on this

project between the Governments of Japan and Bhutan. After the conclusion of E/N between the two governments, a Japanese consultancy company recommended by JICA will conclude the consultancy service contract with the MOH of Bhutan in accordance with the procedures of the Japan's Grant Aid Cooperation. This consultancy service contract will become effective after approval by the Government of Japan. The consultant will implement tender-related works and execution supervision in accordance with this contract. The Japanese supplier selected in the tender will procure the equipment under the procurement contract concluded between the supplier and the MOH of Bhutan. The procurement contract will also become effective after approval by the Government of Japan. The Supplier will procure, transport and install the required equipment, provide technical guidance on the operation and maintenance of all the equipment and prepare technical documents, such as manuals, required for the maintenance of the equipment after the procurement and a list of the manufacturers and agents for the equipment.

2-2-4-2 Implementation Conditions

In Bhutan, a tender for regular inspection and repair of ambulances is held in each district every year and the garage which offers the lowest price in the tender is awarded the contract. Consumables and spare parts for the vehicles are obtained from the contracted garage or, if it is difficult to obtain them from the garage, from the Government's procurement agency. Therefore, the precondition that consumables and spare parts can be procured in a short period of time is an essential criterion in the selection of vehicles for ambulances and the tender must include the condition that the vehicles to serve as ambulances are the products of manufacturers which have agents in Bhutan or neighboring India.

2-2-4-3 Scope of Works

(1) The Government of Japan

1) Procurement of the equipment described in the project design
2) Sea and land transport of the equipment to the project sites
3) Adjustment and test operation of the ambulances and technical guidance on maintenance of the ambulances

(2) The Government of Bhutan

1) Documents required for transport of the equipment
2) Acquisition of permits required for import of the equipment

3) Provision of temporary parking space for the ambulances
4) Registration of the ambulances

2-2-4-4 Consultant Supervision

After completing the tender-related works to select a supplier of the equipment, the consultant will provide execution supervision services to facilitate equipment procurement and other works. The focus of supervision of the procurement should be on confirmation of conformity of the procured equipment to the contract documents, pre-shipment inspection of the goods and packages, confirmation of the state of sea and land transport/customs clearance and final reception of the equipment at the project sites. In the pre-shipment inspection, the consultant will confirm the absence of any discrepancy between the contents of the shipment and the provisions in the contract and employ a third party to conduct a general inspection of the shipment and packages. The consultant should always make every effort to monitor the progress of each process of the project, provide appropriate advice and instructions to the implementing agency on the Bhutanese side and the equipment supplier and inform the relevant organizations of the two countries of the progress of the work at appropriate times. The project manager and consultant's engineers for the equipment and facility plans will conduct on-the-spot supervision.

2-2-4-5 Quality Control Plan

The equipment to be procured in this project shall be selected from among equipment which has been delivered to institutions involved in emergency patient transport in various countries. Equipment which meets internationally-recognized standards, such as ISO, JIS, BS, DIN and FDA, will be procured.

2-2-4-6 Procurement Plan

Because the equipment to be procured in this project is not manufactured in Bhutan, the equipment shall be procured from Japan or other countries.

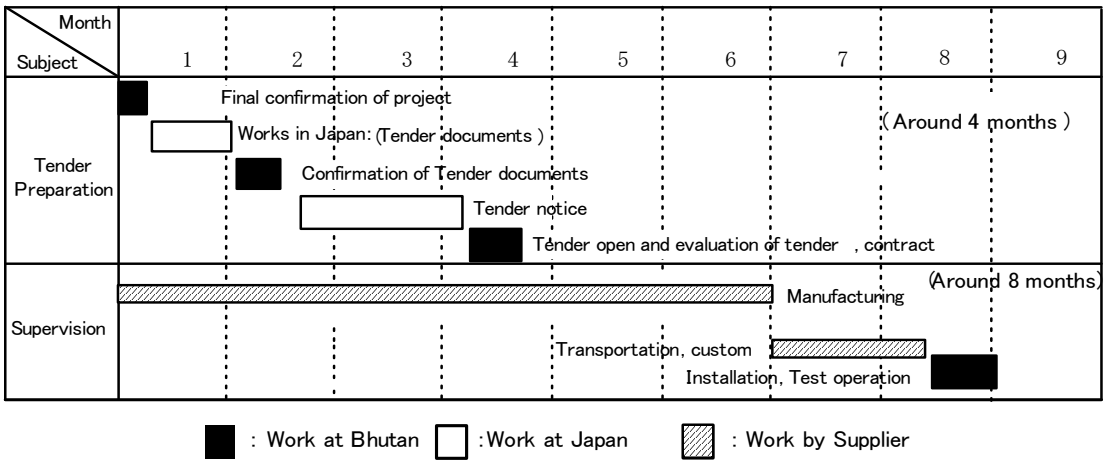
The existence of agents in Bhutan or neighboring countries is a precondition for procurement of equipment which requires the supply of consumables and spare parts and regular inspection and whose repair can be carried out only by engineering personnel from the manufacturer or their agents. The ambulances procured in Japan will be transported by sea on dedicated car and truck carriers from the Port of Yokohama or the Port of Nagoya to the Port of Kolkata in India and by land from the Port of Kolkata to Phuentsholing in Bhutan. In principle, the on-board medical

equipment will be installed in the ambulances in a warehouse near the port of lading. It takes approximately 40 days for container vessels to travel from the port in Japan to Kolkata.

2-2-4-7 Implementation Schedule

The implementation schedule of this project consists of two stages, tender-related works and equipment procurement and installation. The table below shows the processes in the project from the conclusion of E/N to completion.

Table 2-9. Project Implementation Schedule



2-3 Obligations of the Recipient Country

The obligations of the Bhutanese side in the implementation of this project are as described in "2-2-4-3 Scope of Works."

(1) Obligations related to the procurement of vehicles and equipment

- Provision of temporary parking space for the ambulances
- Vehicle registration of the ambulances

(2) Other obligations

- Procedures required for concluding banking arrangements and payment of commissions for authorization to pay, etc.
- Tax exemption and customs clearance of the goods to be procured under the Grant Aid Cooperation scheme
- Facilitation required for personnel involved in this project to enter and stay in Bhutan
- Permits, licenses and other measures required for the implementation of this

project

- Payment of all the costs required for the implementation of this project not covered by the Grant Aid project

2-4 Project Operation Plan

(1) Personnel allocation plan

As the replacement of the old, dilapidated ambulances with new ones is the focus of this project, the personnel currently employed will be utilized. There will be no need to employ new personnel.

(2) Equipment operation and maintenance plan

The Department of Health of each district will choose a garage to maintain its vehicles including the ambulances by competitive tender every year. It is expected that the ambulances to be procured in this project will be maintained by the contracted garages together with the existing ambulances.

The costs required for the maintenance of the equipment to be procured in this project are estimated in "2-5-2 Operation and maintenance costs."

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

The total project costs for the implementation of this project will be approx. 162 million yen. Tables 2-10 and 2-11 below show the breakdowns of the costs to be borne by the Japanese and Bhutanese sides, respectively, estimated in accordance with the scopes of work mentioned above and the estimation conditions mentioned in (3) below. However, the amount of the costs borne by the Japanese side should not be considered as the upper limit of the grant to be provided in the exchange of notes.

(1) Costs to be borne by the Japanese side

Table 2-10. Costs to be borne by the Japanese side

Item	Estimated costs （Million Yen）
Equipment Procurement Cost	145.0
Detail design/Supervision/Cost	16.0
Total	161.0

(2) Costs to be borne by the Bhutanese side

Table 2-11. Costs to be borne by the Bhutanese side

Item	Estimated costs	
(1) Bank commissions	362,500 Ngultrums	(approx. 730,000 yen)
Total	362,500 Ngultrums	(approx. 730,000 yen)

The exchange rate of 1 ngultrum = 2.02 yen was used.

(3) Estimation Conditions

1) Time of estimation: September 2010
2) Foreign exchange rates: US$ 1 = 92.35 yen,
3) Implementation period: Approx. 12 months
4) Other conditions: Cost is estimated within the framework of Japan's Grant Aid scheme

2-5-2 Operation and Maintenance Costs

(1) Operation and maintenance costs

In the field survey, the following information was collected on the maintenance costs of target institutions. MOH and the Department of Health of each district operate the ambulances with the operation and maintenance expenses appropriated for each ambulance from their budgets. The operation and maintenance costs consist of the cost of fuel and spare parts.

Table2-12 Operation and maintenance costs

	Facility	Existing Ambulance	Operation and maintenance costs per facility (NU) (2009-10)	Operation and maintenance costs per facility (JPY) (2009-10) 1Nu =2.4JPY	Operation and maintenance costs per ambulance (NU)	Operation and maintenance costs per ambulance (JPY) 1Nu =2.4JPY
1	San drop Johnkar Hospital	2	645,000	1,548,000	322,500	774,000
2	Deothang Hospital	1	218,000	523,200	218,000	523,200
3	Riserboo Hospital	2	511,000	1,226,400	255,500	613,200
4	Mongar (ERR) Hospital	5	N.A	N.A	N.A	N.A
5	Pema gatshel Hospital	2	404,000	969,600	202,000	484,800
6	Yebilaptsa Hospital	2	515,000	1,236,000	257,500	618,000
7	Bajo BHU-1	2	N.A	N.A	N.A	N.A
8	Samtse Hospital	3	512,961	1,231,106	170,987	410,369
9	Trashigang Hospital	2	587,000	1,408,800	293,500	704,400
10	Punakha Hospital	2	N.A	N.A	N.A	N.A
11	JDWNRH	5	N.A	N.A	N.A	N.A
12	Trashiyangtse Hospital	2	474,000	1,137,600	237,000	568,800
13	Paro Hospital	3	N.A	N.A	N.A	N.A
14	Gomtu Hospital	2	116,909	280,582	58,455	140,291
15	Sandrop choeling BHU-1	1	209,000	501,600	209,000	501,600
16	Phuentsholing Hospital	3	N.A	N.A	N.A	N.A
17	Bumthang Hospital	2	N.A	N.A	N.A	N.A
18	Dagana BHU-1	1	120,416	288,998	120,416	288,998
19	Lhamoizingkha BHU-1	1	237,000	568,800	237,000	568,800
20	Lhuntse Hospital	2	340,000	816,000	170,000	408,000
				Total	2,751,858	6,604,458

Source: Responses to the questionnaire

Each and every district in the country holds a tender and selects and concludes a contract with a private garage for the maintenance, including inspection and repair, of vehicles every year.

Health care institutions (hospitals and BHU-1s) which operate ambulances have a book in which to record the operation of individual vehicles (log books) and manage the ambulances by keeping a record of dispatches, fueling and inspection/repairs in the book. There will be no need to hire new drivers because this project is for replacement of the overworked old vehicles. There will be no need to develop a new maintenance system either, with the rule to outsource inspection and repair of vehicles to private garages.

The operation and maintenance costs will differ from one ambulance to another depending on how they are used. However, the table above summarizing the results of the survey indicates that 120,000 to 600,000 ngultrums (280,000 to 1,500,000 yen) per year will be required for the operation of ambulance(s) at each facility.

The table shows that 13 institutions out of the 20 target institutions keep the record of the maintenance costs and that the total of the maintenance costs at these 13 institutions is 2,751,858 NU (6,604,458 yen). This figure was used for the estimation of the average maintenance costs per vehicle per year.

The equation shown below gives an estimate of the average maintenance costs per vehicle per year of 211,681 NU.

(Total of the maintenance cost per vehicle per year) / (Number of institutions with the record) = (Average maintenance costs per vehicle per year)

2,751,858 NU (6,604,458 yen) / 13 institutions ＝211,681NU (508,035 yen)

Therefore, the maintenance costs of the 26 vehicles are estimated at approx. 13 million yen.

211,681 NU (508,035 yen) x 26 vehicles ＝ 5,503,706NU (13,209,910 yen)

However, the maintenance costs at each institution include costs of not only spare parts but also fuel. There is also a possibility that the maintenance costs may include costs for not only ambulances but also other official vehicles. Therefore, it seems unlikely that the implementation of this project will reduce the maintenance costs in all the target institutions at the same rate. As shown in Table 3-13, the proportion of the costs of spare parts to the maintenance costs in 2009 – 2010 was 40%, on average, among the institutions where the details of the costs of fuel and the costs of spare parts could be verified from the responses to the questionnaires used in the survey. While the implementation of this project is expected to increase the number of dispatches of ambulances and the expenses on fuel at the target institutions, it is expected to reduce the costs of spare parts and the proportion of the costs of spare parts to the operation and maintenance costs of ambulances.

Table2-13 Proportion of the costs of spare parts to the operation and maintenance costs

	Facility	Existing Ambulance	Operation and maintenance costs per ambulance (Nu)	Costs of spare parts per ambulance (Nu)	Proportion of the costs of spare parts to the operation and maintenance costs (%)
6	Yebilaptsa Hospital	2	515,000	206,000	40
8	Samtse Hospital	3	512,961	130,124	25
9	Trashigang Hospital	2	587,000	251,096	43
18	Dagana BHU-1	1	120,416	74,784	62
19	Lhamoizingkha BHU-1	2	237,000	71,100	30
20	Lhuntse Hospital	1	340,000	201,000	59
	Total / Average	11	2,312,377	934,104	40

Source: Responses to the questionnaire

Meanwhile, when this project is implemented, as the ambulances to be replaced are expected to be used for a certain period (two to three months) after the handover of the new ambulances, the costs to maintain these additional 26 ambulances for three months will have to be secured as a precautionary measure.

Average monthly cost is approx. 42,000 yen (approx. 17,600 ngultrums) per vehicle. Therefore, the operation and maintenance costs for the three-month period will be 127,000 yen (53,000 ngultrums) per vehicle. As this figure includes the cost of spare parts, the fuel cost should be lower than this figure. Once the E/N has been concluded, MOH and the Departments of Health of the 15 districts where this project is to be implemented will need to appropriate a total budget of 3.3 million yen (approx. 1.38 million ngultrums) for the supplementary operation costs for 26 vehicles for three months, during the transition period from the old to the new ambulances.

2-6 Other Relevant Issues

There is only one minor issue. Because of the poor road conditions, landslides are expected to cause road closures in the rainy seasons and the road surface is expected to become frozen in high altitude areas in winter. Therefore, the ambulances will be transported to Bhutan in another season.

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Recommendations

3-1-1 Preconditions for the project implementation

This project is designed under the assumption that the Japanese side will take responsibility for all the work up to the handover of all the equipment to the Bhutanese side in the border town of Phuntsholing and the Bhutanese side will take responsibility for all the subsequent work of delivering the ambulances to the 20 project sites in the country. Therefore, the Bhutanese side will have to prepare the following, which are to be implemented after the handover of the equipment in Phuntsholing.

1: Assistance to the equipment procurement agent so that the customs clearance of the imported equipment by the agent will be processed without delay
2: Prompt application of tax-exemption measures to the import of the equipment
3: Prompt vehicle registration or temporary vehicle registration required for the transport of the ambulances to the project sites after the customs clearance
4: Assignment of drivers required for the transport of the ambulances to the project sites after the customs clearance
5: Purchase of indemnity insurance required for the transport of the ambulances to the project sites after the customs clearance

3-1-2 Important assumptions for achieving the overall project plan

MOH of Bhutan is making an effort to extend, maintain and ensure the emergency patient transport service with the aim of extending and improving the service. The following conditions and problems have been identified with regard to the implementation of this project.

<u>Plan to renew and increase the number of ambulances</u>

This project is intended to maintain and strengthen the emergency patient transport service by the procurement of 26 ambulances for the replacement of existing ambulances which have been in use for more than 10 years. However, since nine of the ambulances currently in use will be up for replacement around 2015 because of their age, preparations will have to be made for their replacement.

Table 3-1 Years of provision of the existing ambulances

	Project target										
Model	1996	1998	1999	2000	2001	2002	2003	2004	2008	2009	Total
Number of Ambulance	1	3	4	10	8	2	2	5	3	31	69
%	1%	4%	6%	14%	12%	3%	3%	7%	4%	45%	100%

Source: M.O.H.

Meanwhile, the guidelines on establishment of the ambulance service provide target numbers for the ambulances to be allocated to individual health care institutions in accordance with their level. Therefore, it is important to prepare a plan to attain these target figures. There are 27 hospitals and 15 BHU-1s in various parts of Bhutan, in addition to the four referral hospitals. A total of 85 ambulances are required to meet the standards for establishment of the ambulance service. Since there are 69 ambulances, procurement and allocation nationwide of 16 additional ambulances is required. Therefore, MOH of Bhutan must be prepared to purchase 16 vehicles in addition to the replacement of the nine ambulances mentioned above.

3-2 Project Evaluation

3-2-1 Relevance

The Government of Bhutan has adopted Gross National Happiness (GNH), whose ultimate goal is to realize a society where the people of Bhutan can live with happiness, as the basic ideology of development. On the basis of this ideology, the government aims at reducing the proportion of the poor in the entire population to 15% by 2013 in its efforts for poverty reduction, which is the main task in the national development plan. The Government of Japan has provided ODA along with Bhutan's unique development ideology, instead of applying experiences in other countries. The relevance of this project is high because its implementation will enable treatment of trauma patients, transfer of patients between hospitals, and precautionary transport of women with high-risk pregnancy to higher-level health care institutions in the country, which is located in a sparsely populated mountainous area and where local residents have poor access to health care services and, thus, contribute to the guarantee of good health and safety to all its people.

In addition, it is considered that the following reasons justify the relevance of implementing this project under the Japanese Grant Aid:

(1) Approximately 550,000 people living in 15 districts, Bumtan, Chukha, Dagana, Lhuntse, Mongar, Paro, Pemagatshel, Punaka, Samdrup Jhongkhar, Samtse, Thimphu, Trashigang, Trashiyangtse, Wangdue Phodrang and Zemgang Districts, or 86 % of the total population of Bhutan of 630,000 (in a total of 20 districts), will benefit from this project.

Table 3-2 District and those population that covered by the Project

No.	District	Population（2005）	No.	District	Population（2005）
1	Bumtan	16,116	9	Samdrup・Jhongkhar	39,961
2	Chukha	74,387	10	Samtse	60,100
3	Dagana	18,222	11	Thimphu	98,676
4	Lhuntse	15,395	12	Trashigang	51,134
5	Mongar	37,069	13	Trashiyangtse	17,740
6	Paro	36,433	14	Wangdue・Phodrang	31,135
7	Pemagatshel	13,864	15	Zemgang	18,636
8	Punaka	17,715		Total	588,132

Source: The Ministry of Health

(2) In this project, the overworked old ambulances at BHUs and hospitals in areas where sufficient patient transport service has not been provided because of breakdowns and repair of the ambulances will be replaced. This replacement will improve the emergency patient transport service and establish an environment in which the residents can live with peace of mind.

(3) The ambulances and the equipment in them to be procured in this project will be of the specifications similar to those currently being used in Bhutan. Therefore, the Bhutanese side will be able to operate and maintain them.

(4) The target of the Health Help Line[1] of Bhutan is to create an environment in which 90 % of its citizens can receive professional health care services within an hour wherever they are. The replacement of the ambulances in this project will play a significant role in this Health Help Line.

3-2-2 Effectiveness

The replacement of overworked old ambulances through the implementation of this project will ensure that the current level of patient transport service provided by the existing ambulances will be maintained. In addition, the replacement is expected to have the following effects.

1) Quantitative effect

The new ambulances to be procured will have better performance than the present overworked old

[1] The Government of Bhutan recognized improving access to health care services, which was poor because of the topographical constraints and shortage of doctors, as the highest-priority task and developed a concept of Health Help Line which aimed at improving access to health care services by increasing the number of doctors and improving health care institutions and with prompt and efficient use of the patient transport service. Health Help Line is a call center to be operated by a private contractor for improving efficiency of service provision at the level from the primary to the emergency health care. The call center will 1) provide advice on preventive care, 2) provide information on the nearest health care institution (a BHU or a hospital) and 3) respond promptly to requests for emergency patient transport via telephone. At the time of the survey in October 2010, the contractor to operate the call center had been selected and the work of establishing the call center in the premises of JDWNRH and the training of staff for 24-hours-a-day operation of the call center were in progress for the opening of the center scheduled in early 2011.

ambulances to be replaced by them. The provision of the new ambulances is also expected to improve the service environment (alleviation of stress on patients and pregnant women during long-distance transport etc.).

(The output indicators for the achievement of the overall project design)

Output indicator	Current figure (2010)	Design figure (2015)
Number of vehicles in use unsuitable for transporting patients [1] (number of vehicles) [1] Vehicles which have been in use for ten years or more and are prone to cause delay because of breakdowns and accidents	26 (38 % of the entire ambulances)	0 (The figure at the time when the ambulances to be procured in this project are provided)
Reduction of proportion of the spare parts cost in the maintenance cost of ambulance (%)	40	40 or less
The average number of dispatches of ambulances per month (dispatches)	633	An increase

2) Qualitative effects

- Improvement in the quality of the transport service with the replacement of the vehicles and their equipment
- Establishment of an appropriate maintenance system and prevention of breakdowns and accidents by renewing the Operation and Maintenance Register ("log book")
- Upgrading of the quality of the emergency medical services in Bhutan through confirmation of the details of treatment provided in ambulances with the entries in logbooks
- Strengthening of the system to transport emergency patients such as women with high-risk pregnancies, by combining the project with the Health Help Line which has been developed by the Royal Government of Bhutan