BASIC DESIGN STUDY REPORT
ON
THE CONSTRUCTION PROJECT
FOR
NATIONAL TUBERCULOSIS CENTRE
IN
THE KINGDOM OF NEPAL

APRIL 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to the request of His Majesty's Government of Nepal, the Government of Japan has decided to conduct a basic design study on the project for the construction of National Tuberculosis Centre and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Nepal a study team headed by Dr. Masakazu Aoki, Vice Director, Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association from December 2 to 28, 1986.

The team had a series of discussions on the Project with the officials concerned of the Government of Nepal and conducted a field survey in Kathmandu and Pokhara areas. After the team returned to Japan, further studies were made, a draft report was prepared and a mission to explain and discuss it was dispatched to Nepal. As a result, the present report has been prepared.

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

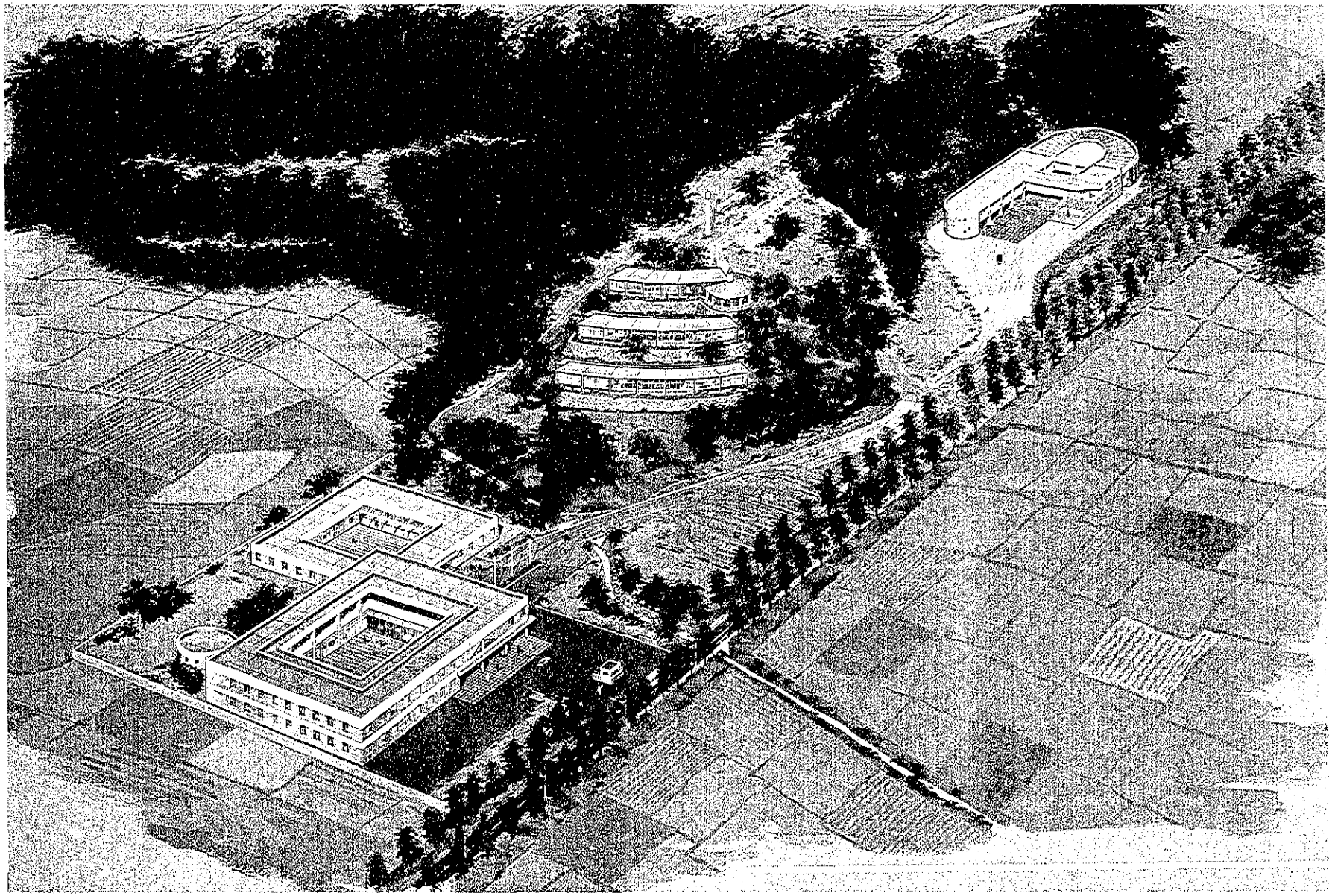
I wish to express my deep appreciation to the officials concerned of His Majesty's Government of Nepal for their close cooperation extended to the team.

April, 1987.

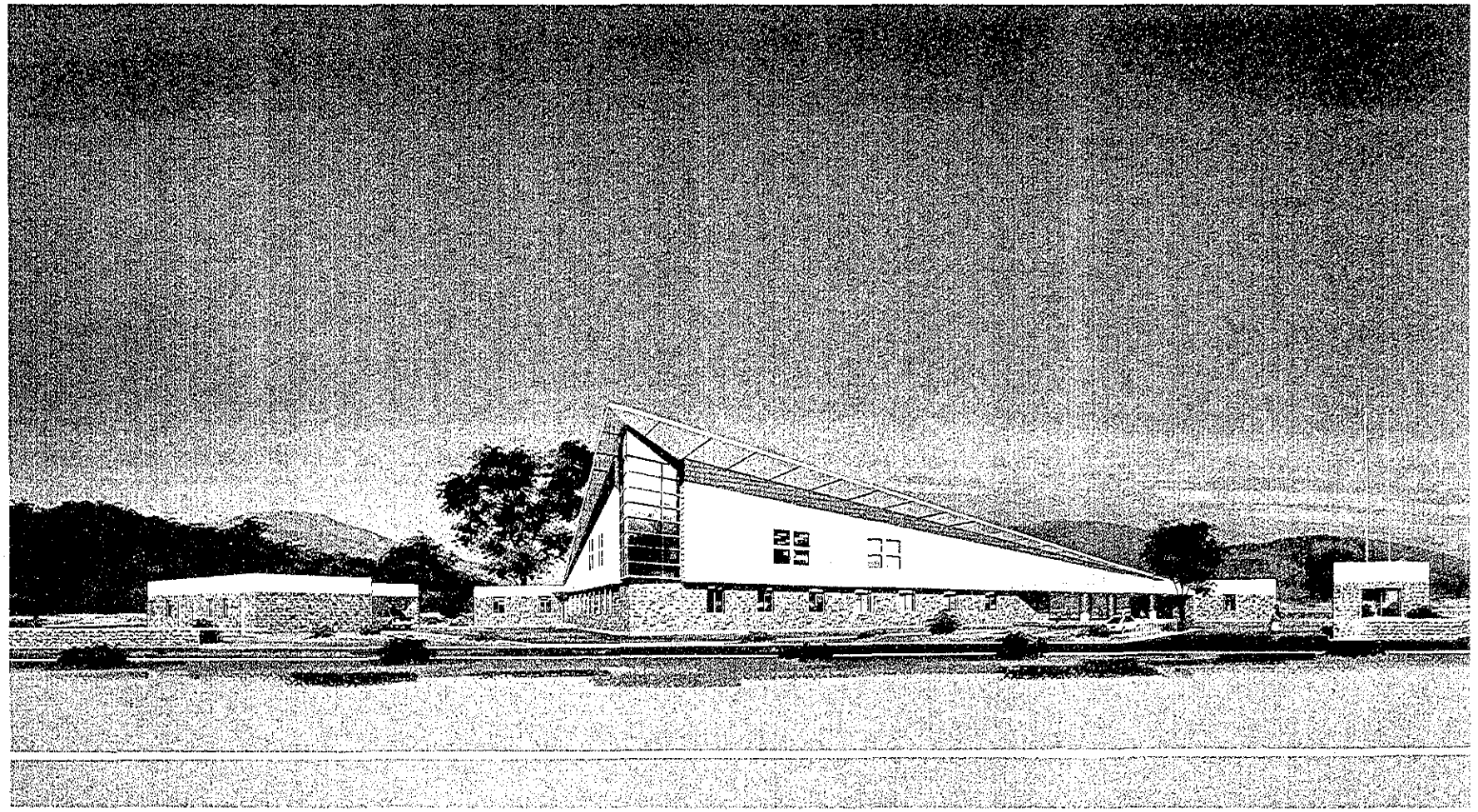
Keisuke Arita

Keisuke Arita

President
Japan International Cooperation Agency

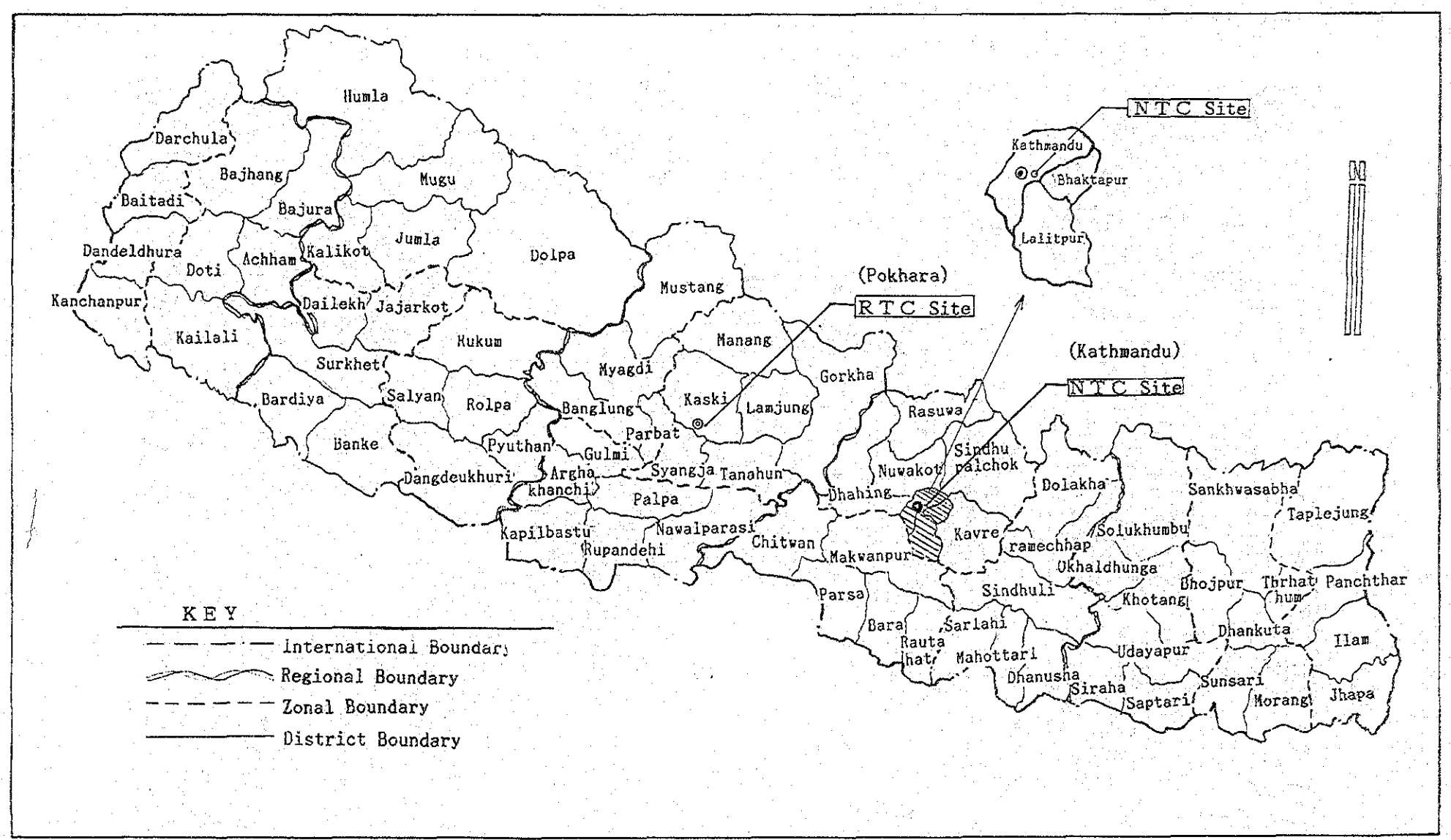


PERSPECTIVE DRAWING NTC (Kathmandu)



PERSPECTIVE DRAWING

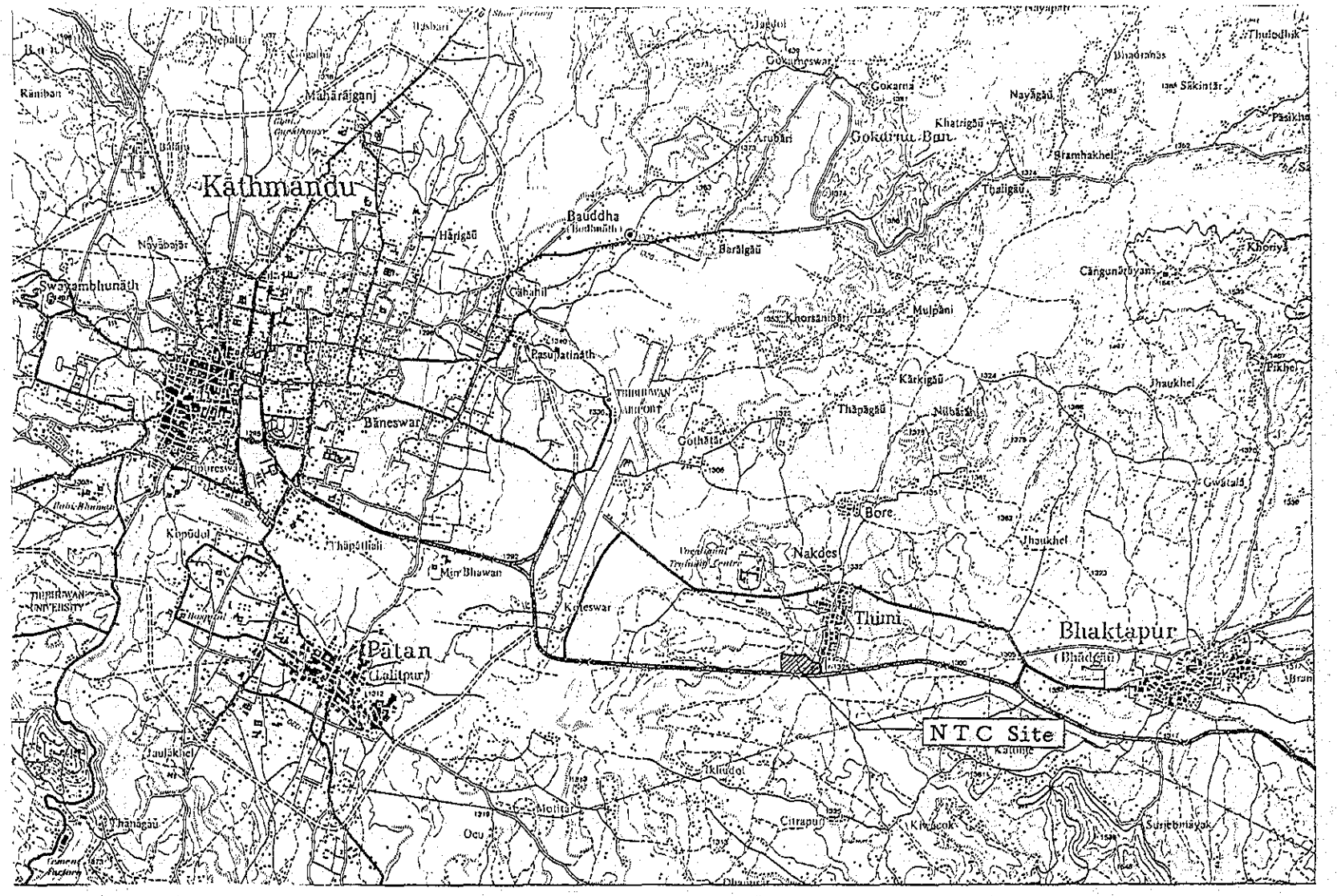
RTC (Pokhara)



NTC(National TB Centre)

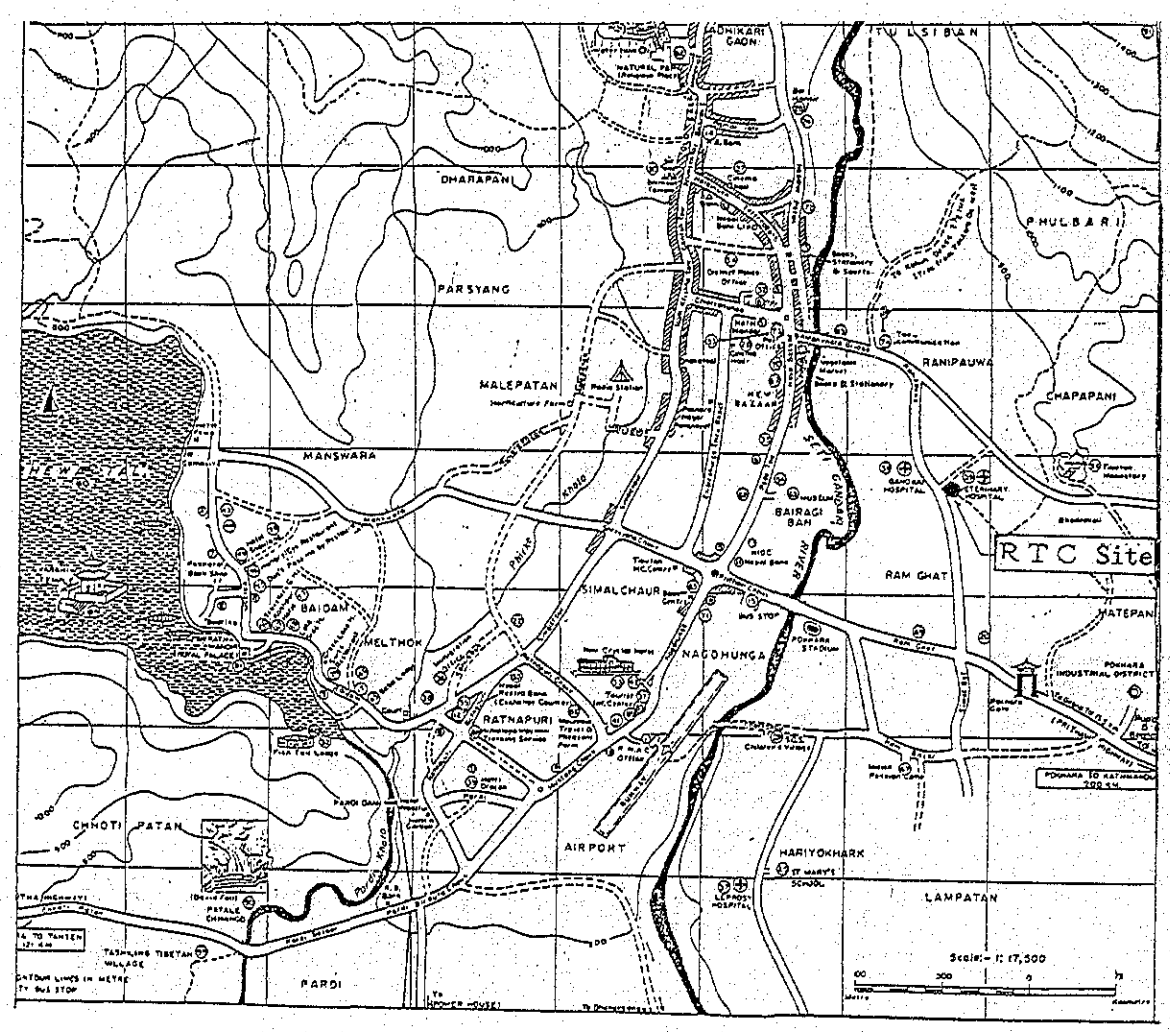
RTC(Regional TB Centre)

The Map of the Kingdom of Nepal



Kathmandu City Map

[National TB Centre (NTC) Location Map]



Pokhara city map

[Regional TB Centre (RTC) location map]

PHOTOGRAPHS OF THE SITES

NTC (Kathmandu)

RTC (Pokhara)

SUMMARY

It is estimated that the average life span in the Kingdom of Nepal is less than 50 years. Because of bad water supply and the sanitation situation, contagious diseases, infections of digestive and respiratory organs, undernourishment and the likes are prevalent. 25% of newborn babies die before 5 years of age. Although there are no accurate data, the annual risk of tuberculosis infection and the incidence of smear positive T.B. are estimated as 1% to 3% and 0.12% to 0.30% respectively; these rates are about 20 times higher than those of Japan. This means that the Kingdom of Nepal has one of the highest incidences of tuberculosis in the world.

The first effort in Nepal to control tuberculosis was to establish the Tokha sanatorium with 50 beds in the suburb of Kathmandu in 1934. In 1951, the Central Chest Clinic was established in the Bir Hospital and it became an independent institution in 1961. Currently, the Central Chest Clinic (C.C.C.), is serving as a centre for the diagnosis and treatment of tuberculosis patients in the city of Kathmandu and is playing a role as a centre of tuberculosis control in the country. In 1965, the Tuberculosis Control Project (TBCP) was organized in cooperation with WHO. Since then TBCP has carried out tuberculosis control measures including B.C.G. vaccination, case detection and treatment for the tuberculosis patients. At the same time, TBCP has worked as a centre for the supply of anti-tuberculosis drugs all over the country. In 1978 and 1980, tuberculosis seminars were held in Nepal with specialists from WHO and IUAT participating.

Based on the results obtained from the seminars, establishment of the National TB Programme (NTP) and its implementation through an integrated health service system was strongly recommended, because the existing door-to-door campaign method was not able to cover the entire country. The Government decided to establish the National Tuberculosis Centre (NTC) through the unification of CCC and TBCP and to strengthen its tuberculosis control programme. To this end, the Government of Nepal requested the Government of Japan to extend grant aid and technical cooperation in August 1985, in view of Japanese past performance of grant aid and technical cooperation in this field.

In response to the request by the Government of Nepal, the Government of Japan sent a preliminary study team to Nepal in July 1986 and confirmed the necessity of the project, and the need for establishment of the facilities. It was decided to carry out a basic design study on the construction of such facilities as would be necessary for smooth implementation of the project. The Japan International Cooperation Agency dispatched a survey team to perform the basic design study from Dec. 2 to Dec. 28, 1986. The survey team discussed contents of the request, with the concerned authorities of the Government of Nepal and performed field surveys regarding candidate construction sites, related facilities and construction conditions, and also collected other data related to the project. On the basis of the field survey and various discussions in Nepal, a fundamental design draft final report was drawn up on the following items upon returning to Japan: basic design of facilities, selection of equipment and instruments and maintenance management planning. After reviewing the report, the Japan International Cooperation Agency sent a survey team back to Nepal from March. 8 to March 15, 1987 to explain the final draft report of the basic design study to the authorities of the Government of Nepal.

According to the basic design study, a National Tuberculosis Centre (NTC) and a Regional Tuberculosis Centre (RTC) would be constructed in Kathmandu and Pokhara respectively. The NTC will be managed under the Secretary, Ministry of Health and the RTC will be managed by the Regional Director of Health under the Secretary, Ministry of Health. The activities of the two centres would play important roles in T.B. control, such as serving as research centres on epidemiology, bacteriology and clinical research, as education centres for manpower training, supply centres for drug and medical supplies for the entire country and as model T.B. clinics, among other functions.

In view of the importance of these activities, it was concluded that it was indispensable to construct tuberculosis centres in the Kingdom of Nepal.

The project includes the following items.

i) Facilities

NTC

The centre will consist of three buildings with a total floor area of 4,750 m^2, containg annexes

1) Main building (two-storied, including a one story section with a total floor area of 2,550 m^2)
The building will consist of three departments: administration department, outpatient department, research and supervision department.

2) Training building (two-storied: 1,375 m^2)
The building will consist of two departments: a training department and drug supply department.
Training department: Where trainees from through out the country will be trained to understand tuberculosis and to review techniques for administering tuberculosis treatment.
Drug supply department: The department will supply anti-TB drugs and medical materials to the suborganizations of NTC and RTC.

3) Dormitories (one story, 795 m^2)
Dormitories will consist of two buildings for trainees housing 26 persons, and one for lecturers housing 4 persons. One trainee building will be 285 m^2 for 14 trainees and the other will be 250 m^2 for 12 trainees; the dormitory for lecturers will be 260 m^2.

RTC

The centre will consist of two buildings with a total floor area of 1,815 m^2, containing annexes

1) Main building (one story, including two storied section with total area of 1,560 m^2)
Ground floor: administration and outpatient department
First floor : research, supervision and training

2) Guest House (one story, 165 m^2)

Guest House for visiting experts and lecturers who stay for short periods of time.

ii) Equipment

NTC and RTC are equipped with the necessary equipment for effective operation of the centres.

1) NTC

Radio photograph apparatus
X-ray apparatus for full size film and tomograph
Apparatus for lung function test
Apparatus for blood biochemistry examination
Apparatus for bacteriological examination
Fluorescent microscope
Washing sterilizer
Personal computer
Apparatus for medical examination
Slide processor
Film and slide projectors
VTR sets
etc.

2) RTC

Radio photograph apparatus
Apparatus for blood biochemistry examination
Apparatus for bacteriological examination
Washing sterilizer
Apparatus for medical examination
Film and slide projectors
etc.

iii) Organization implementing the Plan (on the Nepalese side)

The Ministry of Health of Nepal

iv) Expenses

Expenses which the Government of Nepal is to bear are as follows: Management of the project, operation after completion of construction, maintaining the required number of personnel and their expenses, construction and material supply (excluding that covered under grant aid by the Government of Japan) and expenses and measures required for implementation of the grant aid. Estimated expenses for the Nepalese side are Rs. 5,361,000.

v) Schedule of construction

After the Exchange of Notes (E/N), the approximate period required for construction is as follows:

Detail design: about 3 months
Tendering : about 2 months
Construction : about 12 months
Total : about 17 months

vi) Proposed construction sites

Proposed construction sites are as follows:

NTC: Thimi village, suburbs of Kathmandu
RTC: in the city of Pokhara

vii) Operation and maintenance costs

The estimated cost of the operation and maintenance costs are as follows (these include the total of facility operation costs, maintenance costs and personnel expenses)

NTC (one year): 1,570,000 Rs.
RTC (one year): 750,000 Rs.
Total : 2,320,000 Rs.

(The Government of Nepal is to cover these expenses.)

Once the centres are completed, the National Tuberculosis Programme (NTP) in Nepal will be established as a network system extending throughout the country. By carrying out activities through this system, more detailed data can be obtained in the fight against

tuberculosis and greater progress can be made in implementing the tuberculosis control programme.

Thus, it is deemed appropriate to implement this project under Japanese Grant Aid. In addition, Japan's technical cooperation is thought to be essential to ensure smooth implementation of the project, while responsibility of the Nepali Government for the following three crucial points needs to be cited in order to realize even smoother carrying out of the project.

1) Securing of the running costs for medical equipment and facilities.
2) Securing the necessary medical staff for the operation of facilities, not only for the NTC in Kathmandu but also for the RTC in Pokhara.
3) Designating people responsible for checking, maintenance and supervision of the research and training equipment, and to establish an efficient system for operating the equipment.

TABLE OF CONTENTS

ABBREVIATION

NTC : National Tuberculosis Centre

RTC : Regional Tuberculosis Centre

CCC : Central Chest Clinic

TBCP : Tuberculosis Control Project

IUAT : International Union Against Tuberculosis

NTP : National Tuberculosis Programme

EPI : Expanded Programme of Immunization

NATA : Nepal Anti-Tubeculosis Association

BNMT : British Nepal Medical Trust

WHO : World Health Organization

JOCV : Japan Overseas Cooperation Volunteers

SAARC : South Asia Association for Regional Conference

UNICEF : United National Children's Fund

OTCA : Overseas Technical Cooperation Agency

CHAPTER 1 INTRODUCTION

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In 1978 the Japanese government and the Japan International Cooperation Agency offered a public health grant aid for the Western region of the kindom of Nepal. Since then, technical cooperation has continued over a period of 7 years. The project included cooperation for tuberculosis control measures, and through the experiences during this period, a basis was set for mutual understanding and a cooperative relationship between Japan and Nepal regarding tuberculosis control measures.

On the other hand, there are two bases undertaking tuberculosis control activities in Nepal, namely, CCC (Central Chest Clinic) which has been specially active in treatment for tuberculosis patients since 1965 and TBCP (TB Control Project) organized under the cooperation between WHO and UNICEF. However, these tuberculosis control activities have been limited to particular areas because their mutual cooperative relationship cannot be said to be completely satisfactory, and further, the measures being taken are of a campaign nature. In response to strong demand for more active and more powerful tuberculosis control measures, the Nepalese government decided to establish a National TB Centre, in the nation's 7th five-year plan, by amalgamation of the above two organizations. For this purpose, the Nepalese government requested grant aid and technical cooperation in August, 1985 from the Japanese government, whose activities bore fruit in Nepal.

As a result of a preliminary study in July, 1986, the Japanese government confirmed the nature of the plan as well as necessities for facilities and equipment to fulfill the plan, and decided to launch a basic design study on the potential facilities required for smooth execution of the plan in response to the request for grant aid. Based on this decision, the Japan International Cooperation Agency decided to dispatch a basic design study team, headed by Dr. Masakazu Aoki, Vice President of the Tuberculosis Research Institute of Japan Anti-Tuberculosis Association.

The study was conducted for 27 days from December 2 to 28, 1986 during which confirmation of the nature of the request, study on the necessities required and decision on location for the National TB Centre were made. The basic agreements reached with concerned Nepalese government officials were arranged in "minutes" form which were signed jointly by Mr. Aoki, head of

the study team and Mr. Pradan, Acting Secretary, Ministry of Health on December 12.

Following this, the members of the team carried out further investigation on the circumstances involved in the intended construction, inspection of similar facilities and made a secondary study on the intended construction site. Based on these results, a supplementary note was prepared and jointly signed by Mr. Ono, Resident Representative, JICA Nepal Office, and Mrs. Kiran, Secretary, Ministry of Health Nepal, on December 24.

After the team returned to Japan, the feasibility of the plan was examined based on the result of the study, the basic design of the facilities, the selection of medical equipment and training equipment, estimation of the expenses required for the plan, and planning of maintenance and control proposal were carried out. The Japan International Cooperation Agency summarized the these results in a draft final report of the basic design study. From March 8 to 15, 1987 the study team was sent to Nepal to explain the report to concerned officials of the Nepalese government so that the contents of the plan could be confirmed and discussions were held. The basic agreements acquired in the discussions were summarized in the "minutes" of the discussion. On March 13, with Mr. Prasai, Secretary of Ministry of Health of the Kingdom of Nepal as interemediary, Dr. Masakazu Aoki, Vice President of Tuberculosis Research Institute of Japan Anti-Tuberculosis Association, and Dr. Maskay, Director of CCC, signed and exchanged the "minutes". The structure of the study team, the study schedule, the list of interviewed officials in the Nepalese government and minutes of the discussions are indicated by attached papers.

This report includes the results of the basic design study described above.

CHAPTER 2 BACK GROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Health Situation in Nepal

2-1-1 Structure of Diseases

The Kingdom of Nepal is about twice as large as Hokkaido of Japan and runs 880 km from east to west and 240 km from north to south. The population was estimated at 15,020,000 in 1981, of which 96.4% live in rural communities and only 3.6% in 16 small urban areas. The precise population, birth rate and death rate is not known as there is no established census system of a birth/death registration system, but a special census performed in 1971 and various subsequent investigations reveal the population dynamics in Nepal as shown in Table 1. (Statistics in Japan are shown for reference.) Both the birth rate and death rate are three times as high as their counterparts in Japan and the death rate could be said to be even higher when difference by age structure of the population between Japan and Nepal is taken into consideration. The actual circumstances can be grasped if a comparison is made based on the infantile death rate. The average life span in 1965 and 1976 was estimated as 40.6 and 45.0, years respectively.

Table 1 Population dynamics in Nepal

	Corrected by census in 1971	Dynamic census		Countrywide birthrate investigation	Japan
		1974	1976	1977	1979
Rough birthrate	42.9 ‰	44.7	46.8	43.6	14.2
Rough death rate	23 ‰	19.5	22.2	-	6.0
Infantile death rate (vs birth 1,000)	172 ‰	132.5	133.6	152.0	7.9
Population increase rate	1.99%	2.52%	2.46%	-	0.63%

The Turberculosis situation and Efforts of Turberculosis Control measures in the Western Region of Nepal (from JICA, March 1981)

Because of lack of widespread sewerage systems and unsatisfactory environmental conditions in Nepal the major diseases in are acute infectious diseases, respiratory infections and malnutrition. Twenty-five percent of newborn babies die before they reach the age of five, and 80% of the deaths are caused by dysentery, respiratory infections, malnutrition, measles, etc. The causes of death of newborn babies and other infants in the ten major national hospitals in Nepal between 1974 and 1975 are as shown in Table 2.

Table 2 Causes of Death of Infantile Patients in 10 National Hospitals in 1974/75 (from JICA, March 1981)

Age less than 1		Ages 1 - 4	
Pneumonia	27.2%	Diarrhea and enteritis	21.6%
Diarrhea and enteritis	22.2	Pneumonis	11.2
Malnutrition and vitamin deficiency	6.2	Meningitis	8.0
Meningitis	6.2	Measles	4.8
Acute respiratory infections	4.9	Tetanus	3.2
Bronchitis and bronchial asthma	3.7	Disease unknown only with symptoms	16.8
Others	29.6	Others	34.4

The kinds of diseases of adult patients admitted to 10 major National hospitals are as shown in Table 3. (from JICA, March 1981)

Table 3 Diseases of in-patients in Nepal

	1974/75*		1975/76**	
	No. of patient	%	No of patient	%
Infectious diseases and parasitic diseases	2,171	32.0	2,658	28.9
Respiratory diseases	1,690	24.9	2,630	28.6
Diagnosis unknown only with symptoms	627	9.3	1,002	10.9
Accident, intoxication and violence	623	9.2	799	8.7
Urinary diseases	411	6.0	564	6.1
Diseases of blood hematogenous organs	281	4.2	-	-
Circulatory diseases	252	3.7	336	3.7
Complications with pregnancy and childbirth	242	3.6	289	3.2
Diseases of digestive tracts	242	3.6	389	4.2
Neurotic and sensory diseases	237	3.5	279	3.0
Endocrinal and metabolic abnormalities	-	-	245	2.7
Total	6,776	100.0	9,188	100.0

* Statistics of 10 major hospitals
** Statistics of 9 large hospitals (normal childbirths are not included).

These statistics help us to understand that the main diseases in Nepal are obviously showing a pattern of infections and parasitic diseases. Tuberculosis is included in the categories of respiratory diseases and meningitis, and it is one of the major diseases prevailing in the country, though the statistics are not given in either Table 1 or 2.

2-1-2 Health Organizations

The Ministry of Health was established as one of 15 ministries in the Nepalese government, and its portfolio is concurrently held by a Minister of State. Under the direct control of the Secretary, Ministey of Health, there is a Family Planning Committee and Malaria Eradication Committee, and so on. The National Tuberculosis Centre (NTC) which is the recipient the grant aid of this study is also under the direct control of the Secretary, Ministry of Health, but most sections of its health and medical administrations are entrusted to local organizations based on the nation's policy of decentralization.

Nepal is divided into 5 regions, 14 zones, 75 districts and approximately 30,000 towns or village (panchayats). In each region, a regional directorate is assigned who is the highest responsible official for local health and medical administrations. Under these organizations, there are zonal hospitals (9 at present), district hospitals (39 at present) and health centres (26 at present, to be reorganized in future by being upgraded to district hospital or downgraded to health post). There are also 745 health posts established countrywide as basic health organizations.

As the health posts are in the forefront of the health and medical administrations in Nepal; their being well-equipped is one of the important objectives of the health policy. Health posts have no beds nor physicians but are controlled by Health Assistants (as the responsible official under technical guidance provided by district hospitals). Health posts are scheduled to be established in the ratios of one per 10,000 - 15,000 inhabitants in mountainous districts and one per 20,000 - 25,000 inhabitants in the flatlands. The health posts are divided according to their sizes and activities, into Integrated Health Post[*1], Partial integrated Health Post (P) and Non-integrated Health Post (O), and there are 74, 376 and 294 facilities, respectively. Integrated Health Posts keep a health assistant, 2 auxiliary health workers, 2 auxiliary nurse-and-midwives, 6 village health workers, 1 Mukhiya[*2] and 3 Peon[*3], totalling 15 staff members. On the other hand, the Non-integrated Health Post has one health assistant and laborer

each. Health consultations and first aid are given in a room of a private house. A Partially-integrated Health Post is an intermediate organization between the above two.

Note 1:

Integrated Health Posts are referred to as such. However, this term does not simply refer to posts offering emergency treatment and health care, but refers to the type of health posts which administer health services in the broad sense of the word, to include family planning, malaria control measures, diagnosis and treatment of turberculous patients, diagnosis and treatment of leprosy, vaccinations and nurtritional guidance, etc. A Partially integrated Health Post is a health post which keeps staff on hand to deal with specific illnesses, while a Non-integrated Health Post administers only emergency treatment.

Note 2:

Staff with the lowest position who can provide limited health services and handle clerical matters.

Note 3:

Performs miscellaneous duties.

2-1-3 Health Manpower

There had been no medical school in Nepal until the Teaching Hospital attached to the Medical Faculty of Tribuhvan University was established with the cooperation of Japan. Thus, to become a physician it was necessary to study abroad in a country such as India. The existing number of physicians is 573 (in addition to a small number who are of other nationalities), which means that the ratio of physicians is one per approximately 25,000 inhabitants, indicating that Nepal has one of the lowest ratios of physicians in the world. (There is one physician per approximately 750 inhabitants in Japan.)

Under such circumstances, the key figures who are engaged in practical medical treatment and health services are intermediate health personnel. As shown in Table 4, health service personnel are qualified after receiving the prescribed education after graduating from a junior high school and passing the test for a School Leaver Certificate.* The Auxiliary Health Workers School is located in Kathmandu and provides health education, while all the Health Assistants and nurses are educated at the facilities annexed to the Institute of Medicine in Tribhuvan University.

* A type of graduation certificate serves as a qualification to apply for Auxiliary Health Workers School which can be applied for after high school graduation.

Table 4 Compulsory education periods for various medical personnel and their numbers between 1972 and 1977

	Compulsory educational period	1972	1973	1974	1975	1976	1977	Total
Pharmacist	2.5 years	-	-	-	-	-	6	6
Health Assistant	2.5 years	-	-	-	50	75	81	206
Senior Auxiliary Health Worker	Intensified training for 3 months at AHW	-	43	117	65	65	70	360
Auxiliary Health Worker	2 years	78	80	103	111	-	-	372
Community Medicine Auxiliaries	1 years	-	-	-	-	40	53	93
Nurse	3 years	-	-	42	50	52	54	198
Assistant Nurse Midwife	2 years	-	-	62	181	123	203	571
X-ray technician	2.5 years	-	-	-	-	3	3	6
Clinical test technician	2.5 years	-	-	-	6	2	6	14

2-1-4 Health and Medical Plans

The Nepalese government mapped out its first five-year plan in 1956 and is now executing the 7th five-year plan (1986-1990). It was in the 4th five-year plan (1971-1975) that health and medical services in Nepal began to become substantial. In this plan, emphasis was placed on (1) preventive measures, (2) strengthening of the existing facilities and (3) education of middle class health personnel. This served as an opportunity to establish a policy to the effect that the measures against various diseases which had so far been offered under an individually divided system of authority would be developed by building them into a system of unified regional health measures.

King Birendra of Nepal, who ascended to the throne in 1972, is at grips with modernization of the nation and endeavouring for its development by placing emphasis on the four points of agricultural development, road construction, education and health and hygiene according to a 'Comprehensive Local Development Programme.' This attaches importance to the development not only of the central regions but of the mountainous regions as well. That is the reason why decentralization is vigorously pursued.

The following 12 items are defined as important points in the long-term health programme running from 1976 to 1990.

1 A health post network will be established so that treatment and prevention can be practiced at farming regions where 96% of the population live.

2 Family planning is promoted upon checking increases in the population.

3 Hospitals with a minimum of 15 beds will be built in all the districts by 1985.

4 Disease control measures which are taken by the central authorities will be built into integrated local health measures.

5 Research of traditional medicine will be promoted for utilization in the prevention of diseases and family planning.

6 Efforts will be exerted for the upbringing of new personnel and also for prevention of personnel dropout, so as to secure the formation of the personnel structure for health measures.

7 The administrative system will be changed by dividing the nation into five regions so that measures taken regionally will be facilitated.

8 Mission hospitals will be placed under the supervision of the government by 1990.

9 Committees participated in by inhabitants will be set up in hospitals so that citizens can participate in health measures.

10 Health and hygiene education will be promoted.

11 Increase in pharmaceutical production will be planned.

12 The medical services which are provided free of charge at present will be charged for from certain stages.

Of these, the points which are deemed particularly important are:

1 Establishment of a health service network in underdeveloped areas such as farming and mountainous regions.

2 Countermeasures against population increase.

3 Measures against infectious diseases.

4 Repletion and improvement of hospital services.

Based on these principles, the policies for promoting the development of remote underdeveloped regions are being carried out on a regional basis by dividing the whole land of Nepal vertically into the five regions (east, central, west, middle west and western-most). NTC and RTC are expected to serve as active bases to advance the various measures against turberculosis.

2-2 Tuberculosis Control in the Kingdom of Nepal

2-2-1 Short history of tuberculosis in Nepal

The first step in enacting tuberculosis control measures in Nepal was taken when the Tokha Sanatrium with 50 beds was built at a point halfway up a mountain in the outskirts of Kathmandu in 1934. A Chest Clinic was established in Bir Hospital in 1951 and reorganized as the Central Chest Clinic (CCC) which was to become the diagnostic and therapeutic centre for tuberculosis patients in Kathmandu.

The Nepal Anti-Tuberculosis Association (NATA) was established in 1953, and outpatient treatment commenced at Kalimati in Kathmandu in 1955. In 1970, the Kalimati Hospital with 25 beds was additionally set up. A patient lodging house with 20 beds was subsequently annexed to this. This complex is now a therapeutic facility equipped with 37 beds for tuberculosis patients and a patients lodging house with 20 beds. Since 1978, activities have been assumed at districts by setting up subdivisions at Biratonagah, Birganji, Tansen, etc.

The Tuberculosis Control Project (TBCP) was organized in 1965 with WHO's cooperation, and active tuberculosis control measures such as BCG vaccination and detection of patients were initiated. It was about this time when a Japanese specialist team sent by OTCA (presently JICA) provided guidance for tuberculosis examination at Bhaktapur (November 1965 - March 1966).

In 1970, the concept that tuberculosis control measures should be taken at health posts as a part of Integrated Community Health Care[1] was advocated by WHO, according to an Integrated Community Health Pilot Project. The project was started at Kasuki Zone in the Western Region and Bara Zone in the Central Region. Tuberculosis control measures were discussed with participation of the specialists of WHO and IUAT (International Union Against Tuberculosis) at the 1st and 2nd tuberculosis seminars held in 1978 and 1980, respectively. It was strongly recommended that the campaign type activities which were conventionally assumed by TBCP would be re-organized into a system of constant and integrated tuberculosis control activities to be undertaken at health posts.

1 Integrated Community Health Care does not refer to administration of health care divided in a vertical chain of command as such, but refers to the overall total administration of health care, centering on regional

health posts as a part of regional health care, which includes family planning, malaria control measures, nurtritional guidance, leprosy control measures, etc.

Under such circumstances, investigations from various aspects were made as to how the nation's tuberculosis control measures (the National Tuberculosis Programme, or NTP) should be organized. As a result, it was decided that CCC and TBCP were to be integrated to establish a National Tuberculosis Centre (NTC) and that the organization would function as the centre to execute a newly established NTP. Then, a construction programme for the NTC was to be put into practice based on this principle.

2-2-2 Present Situation of Tuberculosis

The present situation of tuberculosis can only be surmised from the results of surveys carried out at certain areas, because statistics regarding mortality or incidence of tuberculosis have never been collected and tuberculosis prevalence surveys have not been carried out.

(1) Risk of tuberculosis infection

The annual risk of tuberculosis infection is regarded as the most reliable index for estimating the actual situation of tuberculosis and is in world-wide use. Risk of infection is calculated from the prevalence of positive reactions to tuberculin test among the people who have not received BCG vaccination, but since no tuberculin test results which represent the whole of Nepal are available, the risk of infection is estimated from the results of tuberculin tests performed in a specific region.

The results of tuberculin tests performed on children who have never received BCG vaccination reported so far are as shown in Table 5.

The results of tuberculin tests on the children aged 0 - 4 varied widely from 6.1 - 20.8%. The large variances are ascribed to the fact that the results were from tests on relatively small numbers of subjects in small areas of each region.

Table 5 Positive Reaction Based on Age Groupings in Nepal

Year and Area / Age	Kathmandu 1973	Bhaktapur 1965	Patan 1966	Palpa 1062+66	Bhaktapuch 1976/77	Gorkha 1968	Jajarkot 1979
0-4-years		20.8%	17%	19.3%	~1,4.76% ~4,6.66%	17.5%	6.1%
5-9		35.3	37	37.6		49.3	20.1
10-14	14-years 91.3%		56		33.37	51.3	34.6
15-19		48.2	85	52.6		51.3	-
Researcher	Giri	Japan team	Malla	Iwamura	Giri	Iwamura	ITSC

(JICA, March 1981)

Calculations made from these result yield an extremely high (approximately 3% to 7%) tuberculosis infection risk in Nepal. However, in reference to the estimate that the incidences of smear-positive tuberculosis patients are 0.12% - 0.3% as mentioned below, it may be reasonable to presume that the risk of tuberculosis infection in Nepal is 1%~3%, being relatively low in mountainous regions and considerably high in the flatlands and urban areas.

Supposing the risk is 1%, the rate is 20 times as high as that in Japan which is about 0.05%. It is desirable that more exact figures on risk of infection in Nepal will be provided by the parties involved with the NTC by selecting adequate regions properly with low rates of BCG vaccination.

(2) Prevalence of tuberculosis

The prevalence of smear-positive patients detected in surveys made by TBCP or Japanese teams are as shown in Table 6. The incidence of smear-positive patients aged above 15 can be said to be between 0.2% and 0.5%. The values seen for all the ages should be 0.12% or 0.3%.

In Japan, prevalence of bacteriologically positive tuberculosis patients including culture positive within a year is reported annually, but prevalence of smear-positive patients is not reported. Therefore, this is no more than an estimate, but the risk of smear-positive patients could be a maximum 0.015%. The prevalence of tuberculosis in Nepal is presumed to be about 20 times as high.

Table 6 Active Case Finding Ratio of Smear Positive T.B. Patients in Nepal

Report Group	Region	Population (A)	Susceptable Population (B)	Smear Positive (C)	Smear Positive Infection Rate C/B
1975-79 TBCP	Total No.	2,039,854	975,157	2,353	0.24%
	Mountainous regions	180,932	63,476	164	0.26
	Mid-mountain regions	1,280,179	625,676	1,153	0.18
	Flat terrain	578,743	286,005	1,036	0.36
1980-85 TBCP	Total No.	-	3,091,000	15,002	0.49
1976/77 Japan team	Synja	-	52,482	137*	0.26
1965 Japan team	Bhaktapur	6,953	6,953	72	1.04

(JICA, March 1981)

* This period also includes passive case patients.

(3) Incidence of tuberculosis

Since even the prevalence of tuberculosis can not be known, it is no more evident how many cases occur during a year. However, judging from the above estimate and the number of tuberculosis patients detected actually by TBCP, the smear-positive patients which occur in a year for all of Nepal are presumed to be 4,000 to 7,000. In addition, the figure would be larger if relapse cases and tubercle bacilli discharges who continue to discharge tubercle bacillus as a result of failed treatment and recurrent patients are included. As smear-positive patients amount to a considerably large number; many infants, children and young people, are being infected with tubercle bacilli in Nepal even today.

(4) Summary: Tuberculosis situation in Nepal

A nation with a prevalence of tuberculosis higher than 1% is defined as a highly prevalent area. There are many nations with a prevalence higher than 3% in Africa, but there are a few in Asia in addition to Nepal. Nepal

is not only a highly prevalent area for tuberculosis in general but appears to be presenting complicated aspects, such as: (1) variances of prevalence of tuberculosis are large by region, (2) the prevalence of chronic bacilli-dischargers and recurrent patients is high and (3) there are many cases which are difficult to treat. Also, (4) the ratio of extra-pulmonary tuberculosis is considerably high. Furthermore, (5) no sign of improvement is seen in spite of these circumstances and attention must be paid to the possibility of the prevalence of tuberculosis increasing ever further due to modernization, industrialization and urbanization in the future.

2-2-3 Existing Tuberculosis Programme

(1) Existing tuberculosis control organizations

There are many organizations engaged in tuberculosis control in Nepal such as 1) CCC, 2) TBCP, 3) EPI, 4) NATA, 5) BNMT and 6) countrywide health posts, but liaison and cooperation among these organizations are not always sufficient. The major roles of these organizations are as follows:

1 CCC (Central Chest Clinic):

This is an outpatient treatment facility located in Kathmandu. It is the centre for diagnosis and treatment of tuberculosis in Nepal and also the centre of tuberculosis control where many specialists assemble.

2 TBCP (Tuberculosis Control Project):

TBCP keeps its headquarters in Kathmandu and has 10 branches in Janakapur, etc. It has promoted tuberculosis control measures in 25 nationwide districts. TBCP is responsible for supply of anti-tuberculosis drugs to the countrywide health posts.

3 EPI (Expanded Programme of Immunization):

Is performing BCG and other vaccinations nationwide.

4 NATA (Nepal Anti-Tuberculosis Association):

A civil organization taking tuberculosis control measures in various regions through its 18 nationwide branches in addition to the Kalimati Hospital and an outpatient department in Kathmandu.

5 BNMT (British Nepal Medical Trust):

Participates in active tuberculosis control measures in the eastern regions of Nepal.

6 Health posts:

Diagnosis and treatment of tuberculosis patients are being undertaken at 74 Integrated Health Posts. A policy to increase the number of Integrated Health Posts is being promoted so that diagnosis and treatment of tuberculosis patients can be performed at the nationwide health posts.

The participation of so many organizations in tuberculosis control measures does not always ensure smooth mutual cooperation and the need for adjustments in this situation was considered to be a matter requiring immediate attention. For this reason, the TB Coordinating Committee was established, but it did not actually achieve a functional role due to a lack of headquarters and working staff. Thus, establishment of a powerful organization was desired and CCC and TBCP, the most powerful among the above-described six organizations, were to be unified into the NTC. Accordingly, unified tuberculosis control activities could be promoted by the establishment of the National Tuberculosis Programme (NTP) through training of personnel engaged in NTP, and so on.

(2) BCG Vaccination

Since it was organized in 1965, the TBCP has been actively engaged in BCG vaccination by a campaign system of house-to-house visits with all children aged 14 and less as the subjects. It is reported that BCG vaccination was performed on 3.82 million children by the TBCP and 1.4 million by other organizations for a period of 19 years from 1965 to 1986. BCG vaccination is now out of TBCP's hands because the Expanded Programme of Immunization (EPI) had begun to engage in the work. At present, BCG is vaccinated down to neonatal age 0 and it is reported that vaccination was achieved for 82% of the subjects in 60 out of the 75 districts in 1984 and 1985. It is also reported that vaccinations are scheduled to be extended to all districts in 1987 and 1988.

(3) Detection of patients

The active case-finding by a system of house-to-house visits which has been undertaken by TBCP since 1965 achieved only a rather low therapeutic effect because of the manpower it required and due to the wide subject area. Thus, these activities were discontinued in 1983, when the system was switched over to passive case-finding such as by diagnosis through

sputum-smear examination of patients visiting health posts who had complaints of respiratory symptoms such as coughing and expectoration. TBCP has 10 branches and passive case-finding efforts are made for patients complaining of respiratory symptoms in each district. The recent transition in detection of patients is shown in Table 7.

Table 7 Number of Newly Registrated TB Patients

F/Year	TOTAL NEW PATIEINT (A)	SMEAR(+) TB				SMEAR(-) X-RAY(+)	EXTRA PULMONARY TB
		TOTAL (B)	B/A(%)	Detected by TBCP (C)	C/B(%)		
1978/79	5,032	2,100	41.7	751	35.8	2,176	756
1979/80	7,373	3,888	52.7	499	12.8	2,798	687
1980/81	6,885	3,553	51.6	1,665	46.9	2,408	924
1981/82	5,481	2,800	51.1	1,735	62.0	1,878	803
1982/83	5,326	2,811	52.8	1,006	35.8	1,817	698
1983/84	4,961	2,838	57.2	1,190	41.9	1,663	450
1984/85	5,700	4,128	72.4	3,019	73.1	1,123	449

(T. Shimao: quoted from WHO Assignment Report)

Great progress in the diagnosis and treatment of tuberculosis patients has been made at health posts as a result of changing TBCP's policy from a conventional campaign system to a regular unified system. However, in actual circumstances the personnel at health posts do not seem to be very eager about case-finding and treatment of tuberculosis patients; these activities are mainly undertaken by the staff of the TBCP branches. In addition, the districts covered by TBCP and BNMT (British Nepal Medical Trust) are 38 out of 75 nationwide, being 50.7% by districts and 62.5% by population as seen in Table 8. As also seen in Table 8, fully Integrated Health Posts (I) positively engaged in diagnosis and treatment of tuberculosis patients are only 74, or 10% out of the 745 nationwide health posts. Partially-integrated Health Posts (P) are 376 or approx. 50%, and the Non-integrated Health Posts (O) amount to 295, approx. 40%. The health posts which are not in integrated service maintain only a post head and two odd-jobbers; also, no tuberculosis control service is undertaken at these posts. Improvement of the functions of health posts so that perfectly integrated services can be undertaken even by these posts is an important

Table 8 Present Coverage of TBCP

	District	Population (in 1981)	Health Post			
			Total	I	E	O
Total	75 100%	thousand 15,023 100%	745 100%	74 100%	376 100%	295 100%
Covered by TBCP	38 50.7	9,393 62.5	424 56.9	62 83.2	295 78.5	67 22.7
Uncovered by TBCP	37 49.3	5,630 37.5	321 43.1	12 16.2	81 21.5	228 77.3

(T. Shimao: quoted from WHO Assignment Report)

subject awaiting realization. In this regard, such improvements should largely be attained by practicing itinerant and surveillance guidance, which is one of NTC's important functions.

The districts where TBCP has branches and is engaged in tuberculosis control measures at present (including BNMT's active districts) are as shown in Fig. 1. The districts in which NATA is active are as shown in Fig. 2. It is considered that activities for tuberculosis control can be diffused rather easily to the health posts in these districts.

(4) Treatment of tuberculosis patients

The standard treatment method for tuberculosis in Nepal at present is 2SHTb1 - 10HTb1 (S or SM: streptomycin; H or INH: hydrazid, Tb1; Tibion 2SHTb1; "2" means two months treatment by three drugs combining SM, INH and Tb1, and 10HTb1 means subsequent combined administration of INH and Tb1 for 10 months, refer to the same abbreviations hereafter) or 18HTb1 to be given at outpatient facilities. These drugs are distributed by TBCP headquarters in Kathmandu to the health posts through the branch in each district. Today, the Nepalese government is obliged to purchase all drugs on its own as UNICEF discontinued supply of anti-tuberculosis drugs as of 1984.

Figl Project Area of TBCP(BNMT)

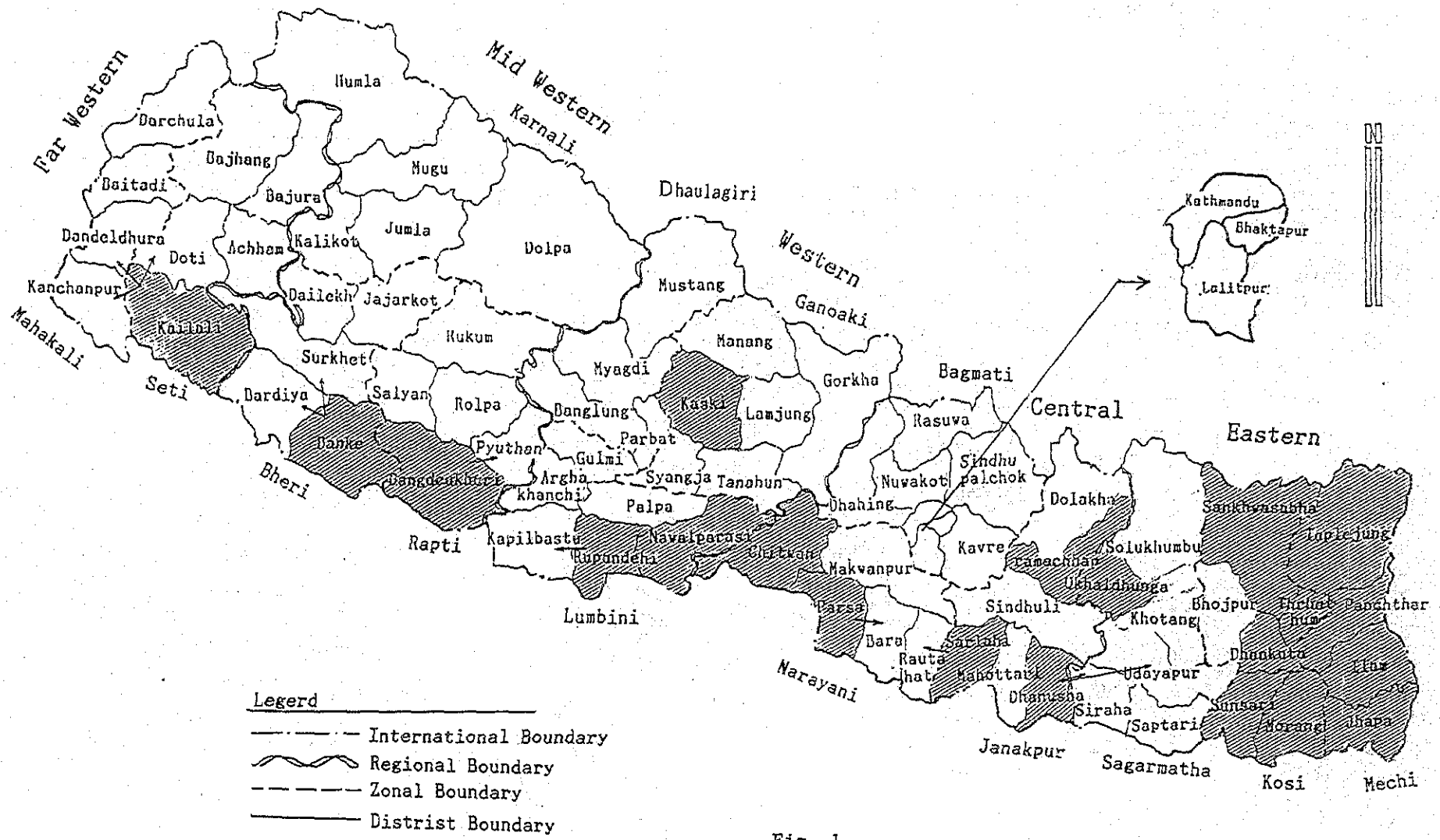

Fig. 1

NEPAL

Project Area of TBCP (World Assignment Report; Tadao Shimao)

Fig2 Project Area of NATA

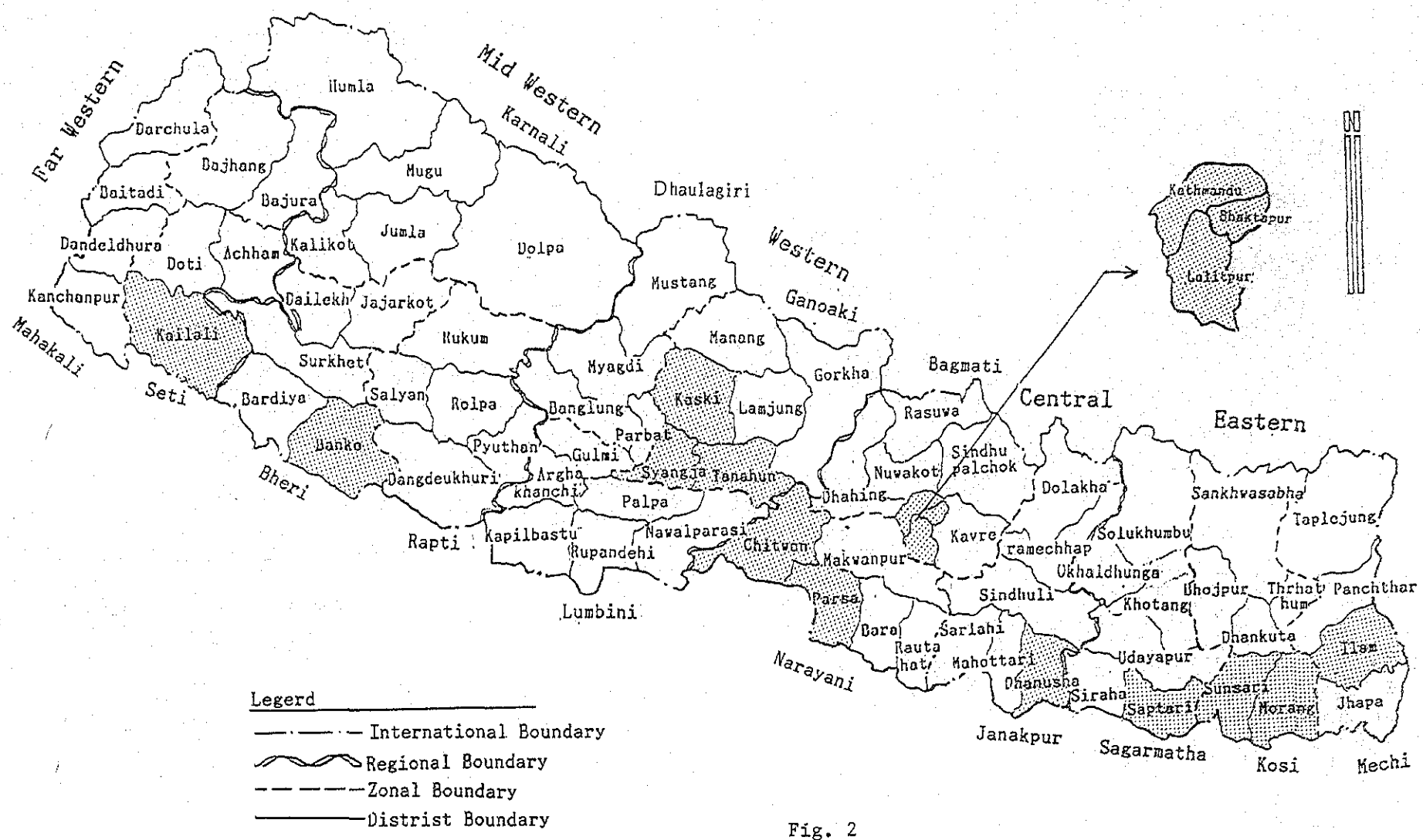

Fig. 2

Project Area of NATA (World Assignment Report; Tadao Shimao)

The largest problem in tuberculosis treatment in Nepal is the remarkably high rate of dropouts from treatment. Fig. 3 shows the results of observations made on the situation of dropouts from treatment of 376 smear-positive patients who were newly registered at CCC during one year from April 1978 to March 1979. This survey was made by Miss S. Bannba, a member of JOCV, who was then involved in CCC activities.

As evident in the figure, the patients who received treatment continually up to 3 and 6 months were 58.2% and 40.7%, respectively, and the patients who completed treatment for one year amounted to only 17%.

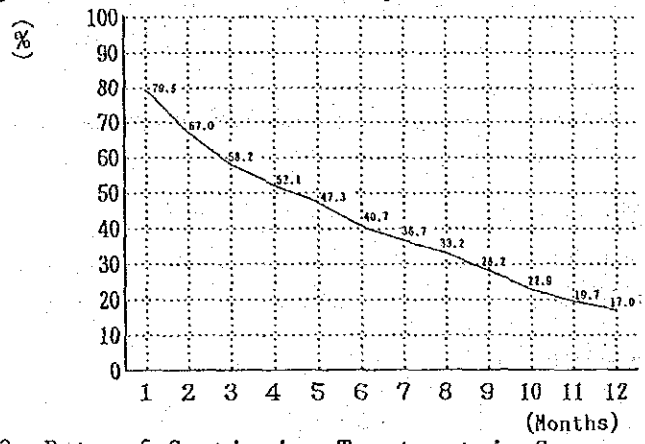

Fig. 3 Rate of Continuing Treatment in Smear-positive Patients

As seen in the respective figures, the rate of dropouts from treatment did not differ much between patients living near or far from the treatment facilities (Fig. 4) or between newly detected and recurrent patients (Fig. 5). It also did not differ based on whether patients received SM (streptomycin) injection or not (Fig. 6) .

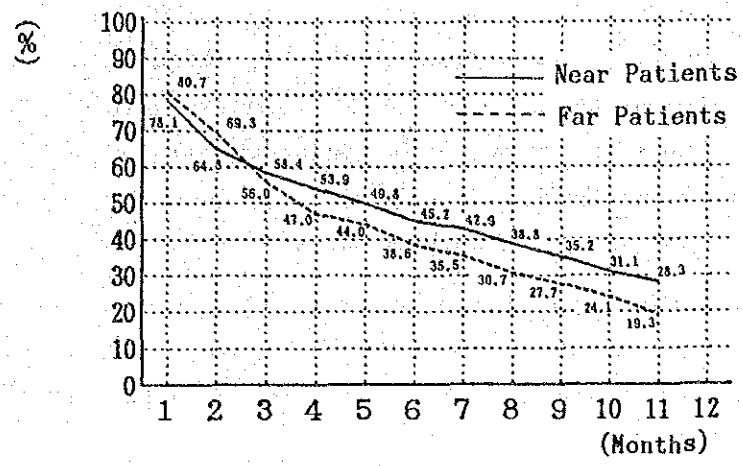

Fig. 4 Rate of Continuing Treatment of Smear-positive Patients by Dwelling Place

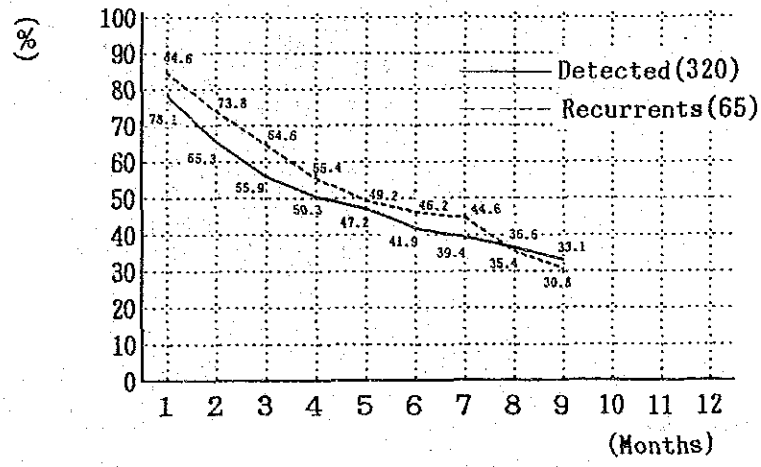

Fig. 5 Rate of Continuing Treatment of Smear-positive Patients by Initial and Repeated Treatment

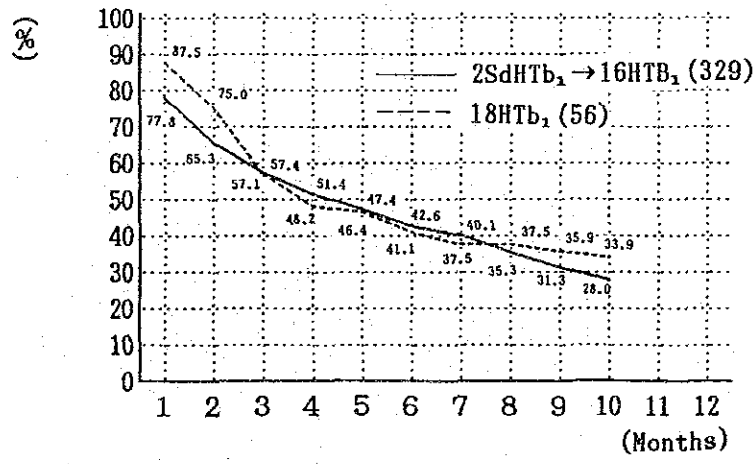

Fig. 6 Rate of Continuing Treatment of Smear-positive Patients by Type of Treatment

Therefore, therapeutic results are not at all satisfactory at present. The results of TBCP's investigation made in 1978 are as shown in Table 9. The patients who converted bacilli-negative were only 35% - 40% among the patients detected, and 18% 20% died. The survey made by NATA also did not show favorable results because the number of patients who received treatment continually for one year was only 36%, while patients who converted bacilli-negative were said to be about 35%. It can be presumed that the imminent tasks of tuberculosis control measures in Nepal are to prevent patients from droping out of treatment and to attempt to improve therapeutic results. It is also now about time that introduction of short-term treatments, including RFP are taken into consideration. It is imminent for NTC and RTC to investigate, under technical cooperation with the Japanese Medical Cooperation Team (JMCT), what are the most effective and realistic methods of treatment in the future in Nepal.

Table 9 Therapeutic Results on Tuberculosis in Nepal

District	No. observed	Followup period	Bacteria turned negative	Death	Bacteria excreted	Unknown
Mahottari	451	12 months	35%	20%	11.5%	33.5%
Ramechhap	101	9 months	40%	18%	8 %	34 %

(5) Organizations responsible for tuberculosis control

The Nepalese government is promoting decentralization of the health administration. All five regions have their own regional officers who are responsible for tuberculosis control in the respective regions. The five regions are further divided in 14 zones and 75 districts throughout the country. The minimum units of administrative structure are village (panchayats) which amount to approximately 30,000 nationwide. The forefront organizations for health control are health posts which number 745 nation wide.

Aside from this health network, NTC was organized under the direct control of the Secretary, Minister of Health and is engaged in giving practical guidance on tuberculosis control, training of health personnel and the supply and distribution of anti-tuberculosis drugs at the health posts established by NTP. Because activities of the health network were localized as a result of the decentralization policy, the role of NTC in technical

guidance and supervision has become large. It is hoped that the systematic deficiency in tuberculosis control measures in Nepal, repeatedly pointed out by WHO and IUAT will, be overcome in a stroke with the help of the NTC. This hope is entertained because almost all the tuberculosis specialists will gather here and the best policies for improvement can be taken.

RTCs are to be kept under the control of the respective regions and at the same time, under the leadership of NTC which is to be engaged in giving health posts in each region guidance on execution of tuberculosis control measures, as well as providing the personnel with the necessary education.

2-2-4 Summary

Although the CCC and TBCP have worked actively for tuberculosis control, because of lack of cooperation between these organizations, the results obtained are not as effective as they could be. In addition, the TBCC (T.B Coordinating Committee) which was established in order to overcome this problem, does not have capacity to handle the matter, nor a sufficient base and staff.

The system of case-detection and treatment of tuberculosis patients by door-to-door campaign methods of TBCP, has been comparatively ineffective because Nepal has hilly and mountainous areas with a small population density. According to the advice of WHO, the door-to-door campaign system for tuberculosis case-finding should be changed to passive case-finding at health posts. The dropout rate from treatment is very high in tuberculosis patients, and one of the urgent problems to be solved is to strengthen the measures to prevent dropout from treatment.

2-3 Existing Facilities and Equipment

2-3-1 Facilities

1) CCC (Central Chest Clinic)

The CCC is located in the Kalimati Hospital and consists of an administration building and an outpatient treatment building. CCC mainly performs the diagnosis treatment for outpatients of tuberculosis. This clinic was established temporarily here when moving from Bir Hospital. The buildings are getting old and seem too small to function as an NTC in the future. Presently, CCC averages between 80~90 outpatients a day.

2) TBCP (Tuberculosis Control Project)

The TBCP consists of 15 organizations to promote tuberculosis control measures utilizing approx. 745 health posts distributed nationwide. The buildings used by the TBCP old and they are short of facilities and storage space for materials and other equipment.

2-3-2 Medical Appliances and Office Equipment

Existing medical appliances and office equipment are as follows.

CCC	
OPD	
Centrifugal (desk type)	1 unit
Water filter (desk type)	1 unit
Scalder (desk type)	1 unit
Refrigerator (big)	1 unit
Tonometer	2 units
Case for cards (three kinds)	1 unit each
Film illuminator (desk type)	1 unit
Microscope (mono)	1 unit
Balance	1 unit
Stand for red blood sedimentation test of 10 tubes	2 units
Bed for medical examination	2 units
Cabinet for patient's chart	1 unit
medical equipment cabinet	1 unit
Others	
X-ray department	
X-ray apparatus (made in Australia bought in 1963)	1 set
Instruments for dark room	1 set
TBCP	
Slide projector	2 units
Typewriter	5 units
Projection screen	1 unit
Microscope	25 units
Land cruiser	1 unit
Bicycle	60 units
Calculator	3 units
Balance	1 unit
Cabinet for X-ray film	1 unit
Camera	1 unit
Motorcycle	13 units
Others	

The X-ray apparatus is an old type and, in addition, does not work very well. Since other equipment are old types also, smooth operation is difficult.

2-4 Background and Content of Request

2-4-1 Background of Request

The Nepalese government is aiming at reorganizaing its existing health administration system by forming health and medical networks at levels up to the zone, district and town or village panchayat. Plans are to reorganize tuberculosis control by incorporating it into the medical health network. In the future, emphasis will be placed on distributing functions to the health posts in the lower reaches as the forefront of the tuberculosis control by decentralization which is the basic principle of the 7th five-year plan. As strategic points for these networks, a plan has been made to install the NTC (National TB Centre) at Kathmandu as the centre for nationwide tuberculosis control and RTC (Regional TB Centres). For construction of the two tuberculosis centres, the Nepalese government requested grant aid and technical cooperation from Japan in August, 1985. The initial request was for the NTC and 5 RTC areas. However, after analysis of the situation on the Nepalese side and results of study of the request by the Japanese side, it was decided to have one NTC and RTC each.

2-4-2 Content of Request

The contents of the request concerning the grant aid project are for construction of the National Tuberculosis Centre (NTC) and Regional Tuberculosis Centre (RTC) and for supply of the materials required for the activities of these centres. The respective details are as follows:

(1) NTC

- o General administrative department (rooms for director and staff, etc.)
- o Training department (conference room, lecture room, library, etc.)
- o Outpatient clinic (waiting room, reception, pharmacy, medical room, test room, BCG vaccination room, sputum sampling room, etc.)
- o Research department (laboratories for bacteria, research and education, etc.)
- o Dormitories for trainees
- o X-ray room
- o Educational room for patients
- o Storage facitities

(2) RTC

- o General administrative department (rooms for director and staff, etc.)
- o Training department (conference room, lecture room, library, etc.)
- o Outpatient clinic (waiting room, reception, pharmacy, medical room, test room, BCG vaccination room, sputum sampling room, etc.)
- o Research department (laboratories for bacteria, research and education, etc.)
- o X-ray room
- o Educational room for patients
- o Storage facilities

(3) Supply of materials (for both NTC and RTC)

- o Audio-visual equipment (for training and education)
- o Diagnostic equipment for outpatients
- o Microcomputers for epidemiological research
- o Microscope, refrigerator, freezer, drier, bacilli-culturer autoclave, experimental desk (all for research purposes)
- o X-ray apparatus
- o Vehicles, etc.