No. 4

THE EXPANSION PROJECT OF THE NATIONAL TUBERCULOSIS CENTRE IN THE YEMEN ARAB REPUBLIC

June 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

THE EXPANSION PROJECT

OF

THE NATIONAL TUBERCULOSIS CENTRE

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PREFACE

In response to the request of the Government of the Yemen Arab Republic, the Government of Japan decided to conduct a survey on the Expansion Project of the National Tuberculosis Centre and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Yemen a survey team headed by Dr. Toru Mori, Chief of Epidemiology Section, Research Institute Tuberculosis from 29th January to 22nd February, 1984.

The team had discussions with the officials concerned of the Government of the Yemen on the project and conducted a field survey. After the team returned to Japan, further studies were made and 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.

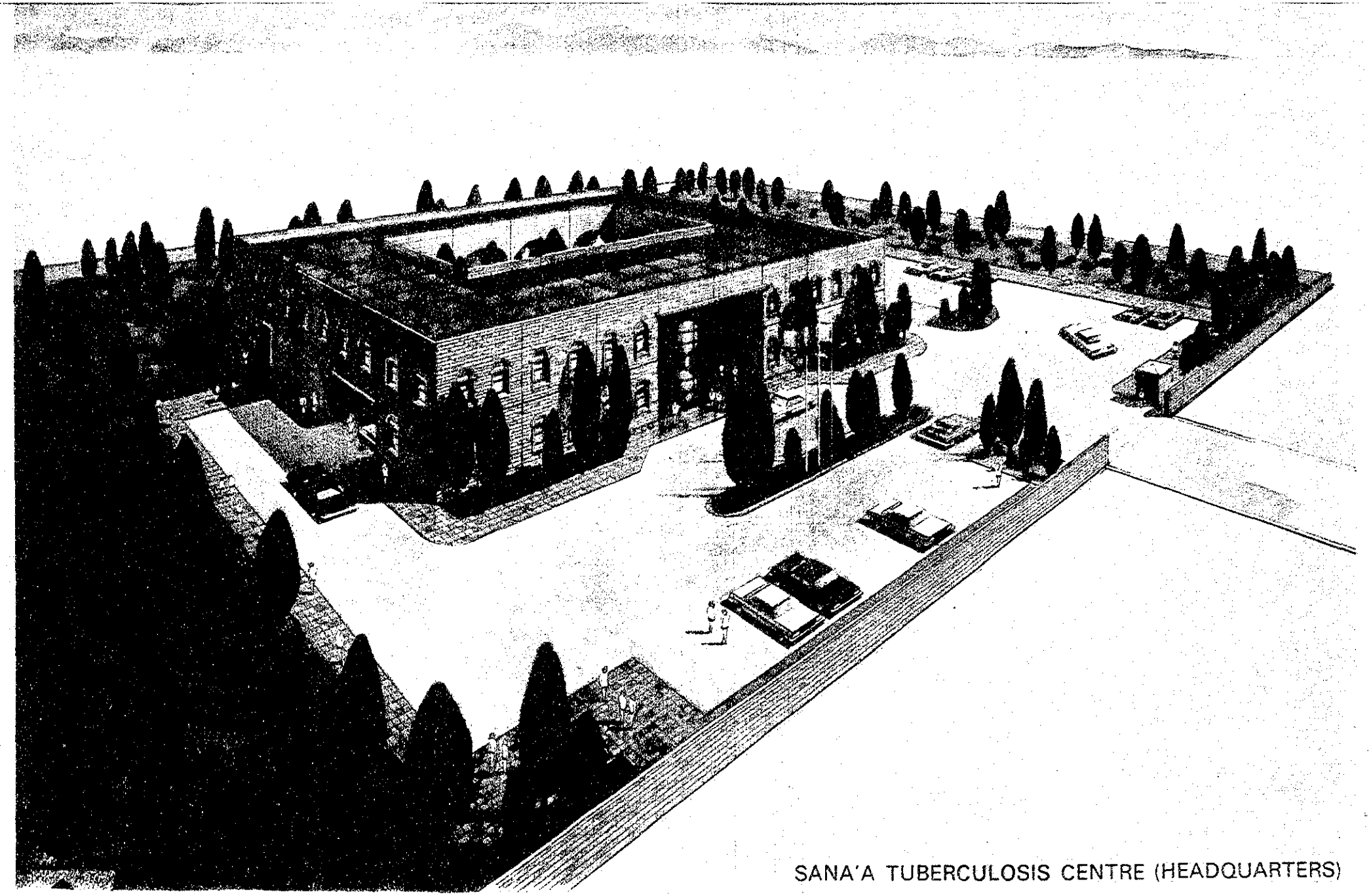
I wish to express my deep appreciation to the officials concerned of the Government of the Yemen Arab Republic for their close cooperation extended to the team.

June, 1984

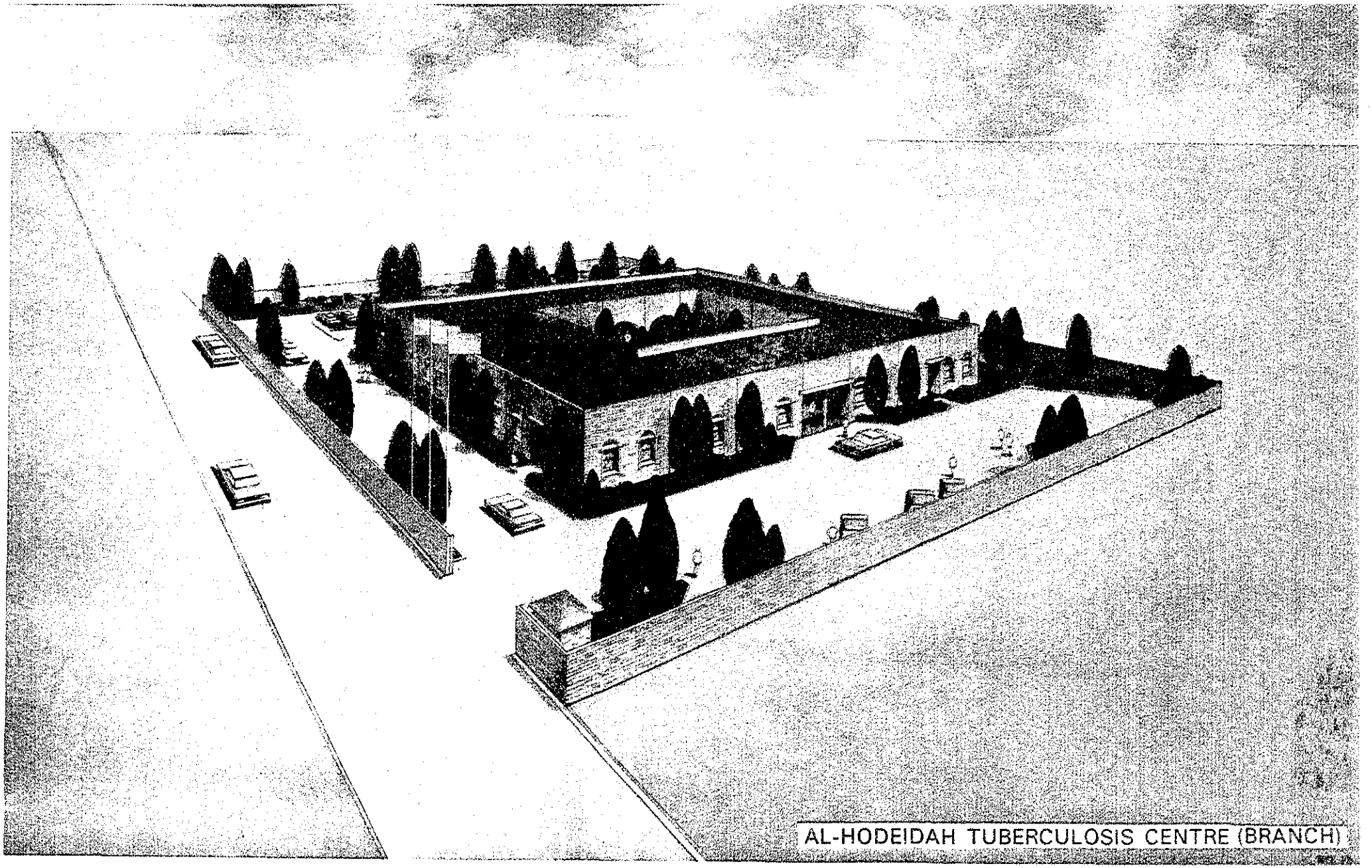
Keisuke Arita

President

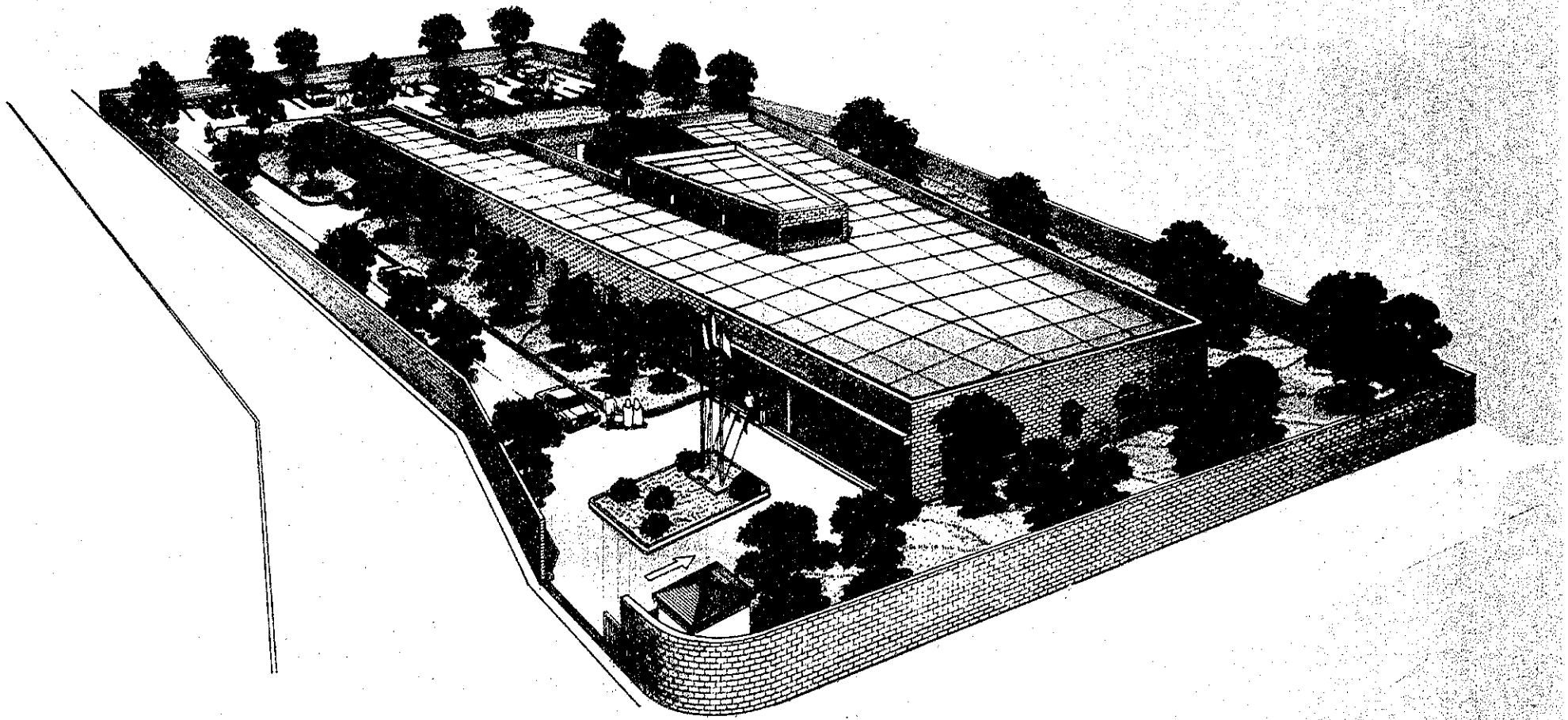
Japan International Cooperation Agency



SANA'A TUBERCULOSIS CENTRE (HEADQUARTERS)



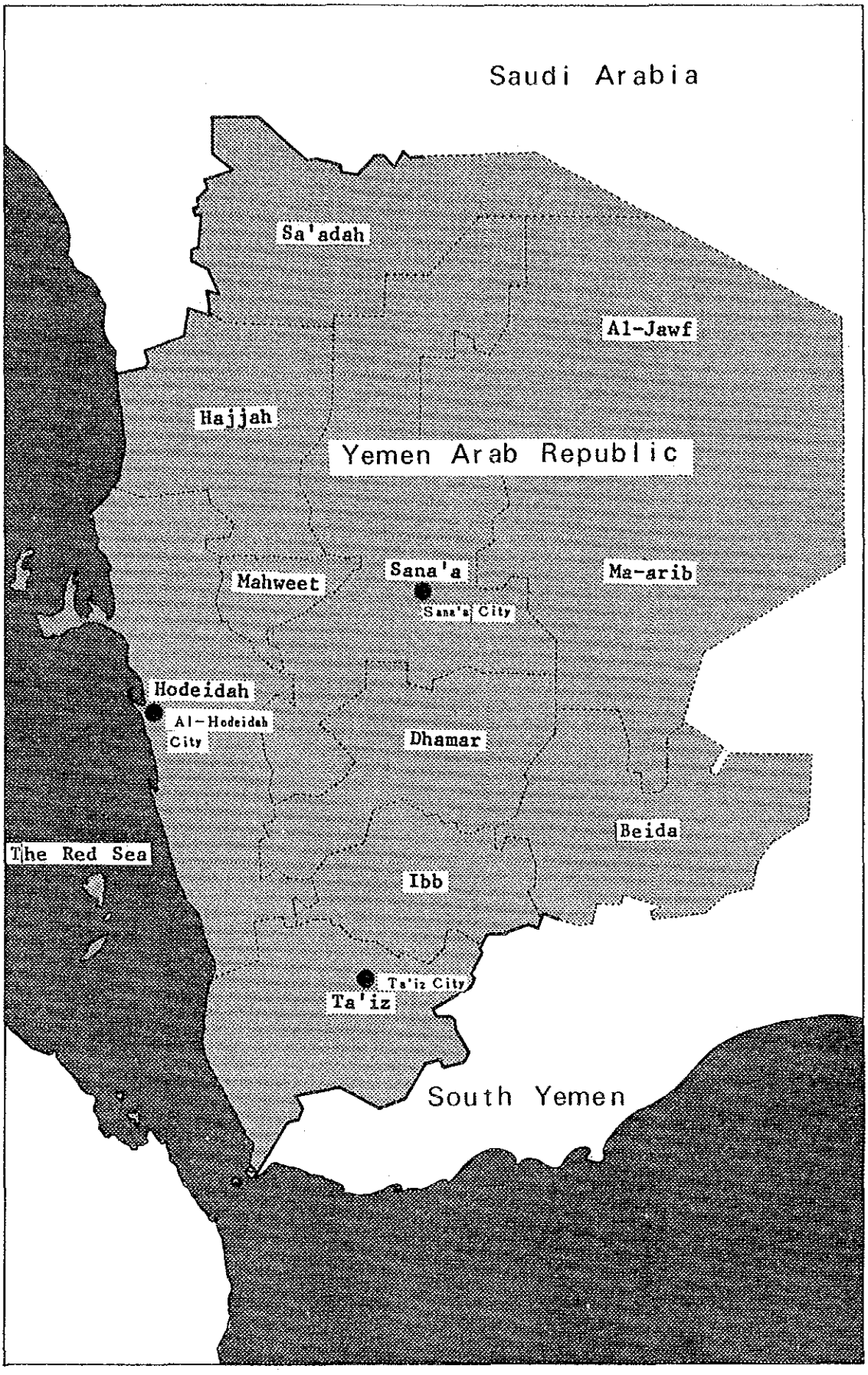
AL-HODEIDAH TUBERCULOSIS CENTRE (BRANCH)



TA'IZ TUBERCULOSIS CENTRE (BRANCH)


THE YEMEN ARAB REPUBLIC
Yemen Arab Republic
SAUDI ARABIA
IRAQ
IRAN
OMAN
ETHIOPIA
SOMALIA
YEMEN

THE 11 GOVERNORATES OF THE YAR



I. THE TEXT

CONTENTS

SUMMARY

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The Yemen Arab Republic (hereinafter referred to as the YAR) is suffering from many types of endemic and infectious diseases; therefore, the control of these diseases is regarded by the YAR as an urgent national necessity. In efforts to control the health problems, in particular tuberculosis, the country has been giving top priority, together with diarrheal diseases, malaria and schistosomiasis. However, there are many aspects on tuberculosis in the country which have yet to be clarified, but with an estimated rate of incidence of 2.4/1000 - 3.6/1000, there can be no denying that the health problem resulting from tuberculosis in the YAR is very serious.

Recently, the Government of the YAR has vigorously pursued measures for the control of tuberculosis particularly during the 1st Five Year Plan (1976/77 - 1980/81), the 2nd Five Year Plan (1982 - 1986) and within the framework of the National Health Programme conducted in parallel with these Plans, but the lack of financial resources available in the country, and the inability to attain the sufficient in number of medical personnel, facilities, equipment and supplies, coupled with such direct causes as insufficient nourishment due to poverty, close contact within the family due to crowded living conditions and the difficulty of pursuing medical care to the very end and in instilling the necessity of vaccination due to the low level of education, have all contributed to prevent these efforts from attaining an appreciable success.

With this in view, the direct effects of the present project on the tuberculosis control programme of the YAR will be considerable, but it is also expected to be a significant incentive towards improvements in the levels of medical services public health, living environment and in the saving of human lives. The significance of this project also lies in the fact that in the absence of systematized aid from other foreign countries in the past, it will be a great contribution in developing friendly relations between the YAR and Japan. Moreover, the YAR is not a petroleum producing developing country and must depend on overseas' assistance in

financing her social and economical development plans, and in view of the present trends towards deterioration of the international balance of payment in the petroleum producing countries, coupled with the lagging rate of expansion of remittances from labourers working outside the country, and its own declining situation on the balance of payment, the expectations placed on Japan are considerable, so that the present can be expected to be an opportune moment for the implementation of this project.

As regards to the constructions required for the project, in outline, the building for the Sana'a Headquarters will be of 2 stories of RC type with a total floor area of 2,600 m^2, while those for the Al-Hodeidah and Ta'iz Branches will be single-storied buildings with floor areas of 1,440 m^2 and 1,455 m^2, respectively.

The main constructions will be carried out by a construction firm, incorporated in Japan, the period required for construction being 16 months for the Sana'a Headquarters, and 14 months for the Al-Hodeidah and Ta'iz Branches. With regard to the distribution of the constructional work, the forementioned buildings and the supply of the medical equipments will be borne by the Japanese Government, while the Government of the YAR will secure and perform preliminary site works, carry out fencing and landscaping work, the construction of electric, water supply and drainage systems to the site, and the maintenance and supervision of the facilities after their completion.

Chapter 1: INTRODUCTION

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For some time now, the Government of the YAR has not only been planning the renovation of the system for medical services and facilities to improve their lagging health and medical care, but has also been strenuously endeavoring to eradicate the numerous contagious and endemic diseases prevalent in the country.

Tuberculosis, with its high incidence and mortality, especially among the younger generation, is a subject of particular concern, together with diarrheal diseases, malaria and schistosomiasis. However, the limitations in both financial and technical resources will not enable the YAR, to proceed with a plan for a country-wide system to control tuberculosis by herself, and the implementation of a more integrated system necessitates economical and technical cooperation from foreign countries.

In reference to this background information, in November, 1983, the Government of the YAR requested the Government of Japan for a gratuitous contribution towards the expansion of the YAR's Tuberculosis Control Project by constructing the Sana'a Tuberculosis Centre and its Branches, and to provide with medical supplies and equipment. The Government of Japan decided to study this request as a part of the Japanese Grant Aid Programme and as a step towards its implementation, a survey team, headed by Dr. Toru Mori of Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association, was dispatched through the Japan International Cooperation Agency for conducting investigations at sites, from January 28 to February 23, 1984, with the objective of compiling a Basic Investigation Report after considering the technical and economical compatibility of this project together with its appropriateness and effectiveness. The survey team discussed about this project with the YAR official and a basic agreement was reached. The organization of the team, schedule of the survey and minutes of the discussion are attached on the Appendix of this report.

Chapter 2: BACKGROUND OF THE PROJECT

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2-1 Outline of the Country

(1) Geography

The YAR, one of Islamic countries of the Arabian Peninsula, extends from Long.42°32'E. to near 46°, and from Lat.12°35'N. to 17°33'N, at the south western edge of the peninsula. It has a common border with Saudi Arabia on the north and east, with the People's Democratic Republic of Yemen on the south, and faces the Red Sea to the west. The opposite shore belongs to Ethiopia. The total area of the country is about 195,000 km^2, or approximately half of that of Japan (Japan: 372,000 km^2).

The topographical features of the YAR is the continuous steep mountains and hills running between plains with rugged projections and depressions, and the existence of arable land dispersed among the innumerable valleys thus formed. There are no rivers in the YAR, and dependance must be solely placed on rainwater for cultivation.

Mountains ranging from 1,600 - 3,600m cut across the centre of the country, dividing it into the east and west or the Red Sea shore and desert districts, forming tropical - subtropical - temperate areas from the west. Consequently, the average annual precipitation differs in each area, and it is abundant in the area so called the Western Piedmont district and the Central Highlands attaining 200 - 600 mm for the former, and from 200 - 1800 mm for the latter. Rainfall is concentrated in the biannual rainy seasons (March - April, September - November). In the remaining Western Coastal Plain (Tihama) and the area from The Eastern Mountain to the desert rainfall throughout the year is scarce.

These features of weather and geography greatly affect agriculture, the main industry of the YAR in which a few local companies have progressed. Although it is said that 18% of the entire country or 350,000 ha^2 is said to be arable indeed, only about 160,000 ha^2 is being

actually cultivated, the remaining 190,000 ha^2 being utilized at the rate of only about once in five years, as the agriculture heavily depends on the annual precipitation. The total area of forests or shrubs is about 160,000 ha^2 or 8% of the total area of the country. The remaining 74% are mountains or reefs with the exposed base rock and desert.

(2) Demography

The YAR has a total population of about 8,540,000 (according to CYDA census of 1981), but 1,400,000 or 16.4% of the total population are expatriates to neighboring countries, particularly to Arabian oil producing countries such as Saudi Arabia.

Of the 6,440,000 registered population, those living in urban areas in the various Governorates number 500,000. The distribution of this population is 211,000 (42.2%) in Sana'a, 96,000 (19.1%) in Al-Hodeidah, and 88,000 (17.5%) in Ta'iz. These three cities can be acknowledged as the major cities in the YAR.

Although, the average growth rate of the population is 2.62%/year (same census), as against the birth rate of 45.8/1000, the average death rate and infant death rate are estimated to be 26.9/1000 and 159/1000, and an average life expentancy is estimated as 43 years. In accordance with the estimation by the World Bank, in the mid-1980's, over 46% of the total population will be composed of juveniles (less than 14 years of age).

Per capita income is US$442 per annum (in 1981). This is higher than Haiti's US$272, but lower than the US$570 for the Republic of Bolivia. Thus, the YAR is called as a LLDC (Least Less-developed Country) and MSAC (Most Seriously Affected Country). Also, the educational level is relatively low, with a high illiterate rate amounting to 87% (over 95% for women). Moreover, as will be described in the following chapters, the level of health is significantly low. For example in 1983, the number of hospital beds per population 1000 was 0.63 (Japan: 1 per 65), with only 1 doctor per 13,000 (Japan: 1 for 690).

As regards to the supporting infrastructure such as city water, although a figure of 80% as the prevailing rate, is given for urban districts of the major cities such as Sana'a, Al-Hodeidah, Ta'iz (Ministry of Municipalities and Housing); in other cities and districts, the source of water is on wells, rainwater, and springwater. As for sewage and drainage, in Sana'a and Ta'iz, a primary treatment facility is functioning for part of the districts, but in other areas, disposal into the ground or direct discharge into wadis are common.

As mentioned above, due to an economy based on agriculture significantly affected by the weather and climatic conditions, the low per capita income, and insufficient nutrition, combined with the low level of social and public service are causing the spread of various contagious and endemic diseases acknowledged as a serious social problem. The Government of the YAR regards the eradication of these diseases as a national problem, and is giving high priority to tuberculosis together with diarrheal diseases, malaria and scistosomiasis.

2-2 Socio-Economic Development

(1) Course of Socio-Economic Development

Until the revolution established in 1962 by the Republicans, the YAR had been ruled by a feudalistic and autocratic government since the middle ages, but even after the revolution, internal strife continued between the Republicans and the Royalists, and was only finalized in 1972. During this period, not only was the country devastated and human resources lost, but serious delays or forming political and institutional structure, economic base and basic supporting infrastructure have perpetuated, and the influences are still evident today.

It was in 1972 when the YAR had actually started for emerging from the political and modernizing the nation through comprehensive efforts in national socio-economic development by establishing a Central Planning Organization (CPO).

The Three-Year Economic Development Plan executed in 1973/74 - 1975/75 was planned and implemented by the Central Planning Organization, the Plan was the pioneering efforts of the YAR towards her socio-economic development.

The major objectives of the Plan were aimed to attain self-sufficiency in food by facililtating the development of the agricultural sector, expansion of the basic infrastructures such as transportation and communications systems, upgrading the level of education, human resources development, etc. A total of about YR 1.3742 billion was invested in the Plan, and as a result, the GDP doubled from YR2.514 billion in the initial year (1972/73) to YR5.181 billion in the final year (1975/76). [1 YR = ¥50, 5 YR = 1 US$]

Following the Three-Year Economic Development Plan, the First Five-Year Plan (1976/77 - 1980/81) was carried out. The actual investment for this plan and the growth in GDP achieved during this period, as classified by sectors, are shown in Table 1 and Table 2.

Table-1 Actual Resources and Users During The First Five-Year Plan 19786/77 - 1980/81
(at 1975/76 constant prices in millions of rials)

(Unit: 100 million YR)

Item	Base Year 1975/76	First 5 Year Plan Period					Annual Growth Rate Achieved (%)	Planned Average Annual Growth (%)
		76/77	77/78	78/79	79/80	80/81		
Accumulated								
GDP	4,935	5,186	5,615	5,978	6,318	6,555	5.9	8.2
Import of commodities and services	1,866	2,785	3,050	3,784	4,275	4,352	18.4	27.2
Total	6,801	7,971	8,665	9,762	10,593	10,907	9.9	14.5
Private consumption expenses	4,902	5,917	5,182	5,805	6,209	6,452	5.7	5.9
Governmental consumption expenses	681	685	846	997	1,106	1,218	12.3	10.0
Fixed capital formation	849	1,224	2,190	2,667	2,681	2,796	26.9	38.6
Inventory fluctuations	155	77	282	28	191	55	-	-
Export of commodities and services	214	222	165	265	406	388	12.5	14.3
Total	6,801	7,971	8,665	9,762	10,593	10,907	9.9	14.5

(CPO : Second Five-Year Plan 1982-1986)

Table 2 Growth of The Gross Domestic Product by Sectors During The First Five-Year Plan 1976/77 - 1980/81 (At constant base year prices for 1975)

(Unit: 100 million YR)

Economic Activities	Base Year 75/76	First Five-Yar Plan Period					Annual Growth Rate Achieved %	Planned Average Annual Growth %	Ratio of Achieve-ment %
		76/77	77/78	78/79	79/80	80/81			
	(in millions of rials)								
Agriculture, forestry and fisheries	2,011	1,850	1,653	1,926	2,008	2,111	1.0	5.5	18.1
Mining and quarries	32	42	46	74	78	74	18.2	12.6	144.4
Manufacturing	257	274	309	361	416	448	11.7	11.0	106.4
Electricity and water	17	17	22	28	37	43	20.4	20.4	100.0
Construction	283	373	511	581	480	469	10.6	14.4	73.6
Wholesale and retail trade	948	944	987	963	1,063	1,059	2.3	10.1	21.8
Catering	64	68	72	76	81	83	5.3	10.1	52.5
Transportation and communications	150	160	200	208	211	217	7.7	11.3	68.1
Financial institutions	141	227	338	380	421	448	25.9	9.5	272.6
Real estate and business services	207	193	221	226	2418	265	5.1	3.6	141.7
Personal and social services	42	44	52	58	61	63	8.5	7.5	113.3
Minus imputed services	134	211	305	360	405	41	....	....	....
Total of business sector	4,018	3,981	4,124	4,521	4,692	4,862	3.9	8.0	48.8
Government services	509	451	585	672	760	833	10.4	10.0	104.0
Non-Profit private organizations	14	17	19	21	23	24	10.4	7.5	138.7
Customs duties	394	737	887	774	843	836	16.2	....	....
Gross domestic product	4,935	5,186	5,615	5,988	6,318	6,555	5.9	8.2	72.0

(CPO : The Second Five-Year Plan 1982 - 1986)

Consequently, the First Five-Year Plan aimed at an annual growth rate of 8.2% of GDP (at 1975/76 constant prices), in fact, achieved a rate of about 5.9% over the Plan period; and in the agricultural sector, in particular, the actual contribution rate to GDP was 1% as compared with the estimated rate of 5.5%.

The constraints caused the stagnations in achieving and implementating the Plan were:

a. Lack of labourforce, especially in skilled labourers and experienced administrative staff.
b. Insufficient and weak foundation for the industrial development
c. Delay in land acquisition and preparation for industry
d. Improper financial arrangement policy
e. Delays or suspension of planned projects

Thus, the First Five-Year Plan had attained relatively low economic growth was followed by the Second Five-Year Plan (1982/3 -1987/88).

(2) The Second Five-Year Plan

This Plan, still being in operation, the overall targets and major strategies for development are specified as follows:

① Overall Targets:

a. Increasing in per capita income through the growth of GDP

b. Improving the levels and means of educational and eradication of illiteracy

c. Increasing people's contribution towards the growth of GDP through the development of natural resources and re-organization of the production sectors

d. Generating the well-balanced overall regional development

e. Rapidly and extensively developing the agricultural sector over a wide area, and improving the basic state of health, social and economic conditions of the rural districts

f. Improving economic development the registrative and administrative capabilities for the public and mixed sectors

g. Modernizing the local administrative system and repletion of public service

h. Rationalizing public and private consumption expenditures for securing the expansion of capital investment

② Principal Development Strategies:

a. Optional use of available human and material resources

b. Emphasis on educational, health and social services

c. Development of the agricultural sector

d. Dam construction and better use of water resources

e. Enforcement of research and development for generating economic activities

f. Increasing the production of cereals and developing the industries related to agriculture

g. Improvement in productivity and control the restriction in the expenditure of revenue

h. Encouragement of savings and rationalization of expenses

i. Increase the allocation of profits acquired through the development to the rural districts

j. Development of mineral resources

k. Establishment of a self-supporting structure

The estimated amount of investments to the sectors during the period of the Second Five-Year Plan and the classifications of the domestic and foreign capital are indicated in the Table 3.

Table 3 Total Capital Investment for the Second Five-Year Plan

(Unit: 1,000 YR)

Name	Public		Private		Total	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
Agriculture	1,412,218	1,662,782	430,900	924,100	1,843,118	2,586,882
Mining	111,000	566,000	68,000	160,000	179,000	726,000
Manufacturing industry	793,965	1,188,448	530,813	996,774	1,324,778	2,185,222
Electricity and water	558,900	1,741,100	9,000	31,000	567,900	1,772,100
Construction	32,000	288,000	32,000	288,000	64,000	526,000
Commerce, daily commodities	217,600	646,500	401,200	1,604,700	618,800	2,251,200
Transportation, Communications	844,400	3,104,600	69,100	621,900	913,500	3,726,500
Banks	14,000	36,000	-	-	14,000	36,000
Housing, real estate	260,000	-	3,485,000	-	3,745,000	-
Government organization	1,663,120	2,986,880	-	-	1,663,120	2,986,880
Sub-total	5,907,203	12,220,310	5,026,013	4,626,474	10,933,216	16,846,784
Total	18,127,513		9,652,487		27,780,000	

(CPO. The Second Five-Year Plan 1982 - 1986)

On the other hand, the targets to be achieved and strategies for the development of the health sector within the framework of the Second Five-Year Plan are described below.

① Development Objectives:

a. Provide basic and preventive health services to the maximum number of Yemenis throughout the country

b. Take measures to prevent the spread of contagious diseases, eradicate endemic ones, and increase the number of mobile health units to provide better health care in remote areas

c. Provide all medicines and pharmaceuticals and control their import and circulation

d. Promote health and nutrition education

2 Development Strategies:

a. Reorganize and develop existing health centres and institutions

b. Provide incentives for students to join health institutions services

c. Provide specialized training for health workers

d. Improve the administration of hospitals and health centres

e. Ensure the hospitals and health centres are open all day

f. Increase the number of hospitals and health centres and provide them with the necessary equipment and staff

g. Provide medicines and pharmaceuticals at low prices

These targets and strategies are the concrete projection of the overall objectives 'e and g' and 'b' in strategies for the Second Five-Year Plan; and for accomplishing this objective, the Government of the YAR estimated that total investment of YR754.5 million for the health sector should be allocated. Of this amount YR366 million or 48.6% will be borne by the YAR, and remaining of YR384.8 million or 51.4% is estimated to be replenished by foreign capital. The details are given in the Table 4. The serious insufficient condition of health and medical facilities exist describing the reasons for such a huge amount to be invested. The more in detail are described in the following sections.

Table 4 The Estimated Amount of Investment for the Health Services in the Second Five Years Plan

(Unit: 1,000 YR)

Project and Executing Agency	Type	Investments during Plan Years		
		Local	Foreign	Total
Health Services:				
Basic health service	ongoing	243,044	26,900	269,944
Preventive medicine projects	ongoing	8,992	8,992	17,784
Health education	ongoing	6,135	680	6,815
Health training	ongoing	23,200	23,200	46,400
Institutional support for Ministry of Health	ongoing	36,777	36,777	73,554
Improving hospitals	new	18,780	106,401	125,200
Imrovement and expansion of the Revolution Hospital in Sana'a	new	3,600	86,400	90,000
Artificial limb centre	ongoing	5,300	21,200	26,500
Health laboratories	ongoing	19,226	76,900	96,126
Balanced nutrition program	ongoing	1,488	372	1,860
Total for Health Sevices		366,542	387,841	754,383

(CPO: Second Five-Year Plan 1982 - 1986)

2-3 Health Care and Medical Conditions of North Yemen

(1) Existing Conditions of Diseases and Countermeasures in Priority

Hospital statistics are the only sources of information regarding the existing conditions of diseases, and at present, there is no system for disease registration or notification. The following Table 5 gives the informations, though limited, concerning the present health probelms of the country.

Table 5 Infectious Diseases Reported during 1976 - 1982

Diseases	1976	1977	1978	1979	1980	1981	1982
Cholera	-	-	943	286	-	-	-
Typhoid	253	1094	3909	1766	4246	2352	3111
Infectious Hepatitis	1988	2369	3288	5435	6652	5308	7779
C.S. Meningitis	27	117	91	163	527	532	180
Measles	2654	9983	6531	18692	14254	10355	20045
Chickenpox	88	112	18	214	702	1337	936
Polio	32	18	74	76	664	410	211
Diphtheria	1	2	2	22	522	266	506
Mumps	358	1257	1179	2882	2902	3780	5131
Whooping Cough	2904	5971	5854	11587	13488	13533	25490
Tetanus	13	40	119	229	318	170	182
Puerperal fever	24	6	109	340	1468	787	1330
Malaria	15078	22542	30907	74508	45079	59980	152025
Tuberculosis	4540	7714	7604	10895	17078	16060	18561
Leprosy	161	179	147	480	381	346	371
Dysentery (including Amebic)	3053	2512	6208	26410	35155	30417	71828
Gastroenteritis	29028	33226	31574	112170	123174	104721	169978
Leishmaniasis	17	57	74	295	304	165	264
Hydrophobia	5	21	37	137	125	91	147
Birharziasis	4706	4245	11733	14561	35427	37924	3468
Syphilis	127	165	162	267	704	230	229
Gonorrhea	37	15	3	337	473	308	427

(CPO: Statistical Year Book 1982)

In the First Five-Year Plan, the order of priority for counter-measures was based on such criteria as morbidity, mortality, effect of labour on production, relations with other diseases, degree of public interest, cost of the counter-measures and effectiveness of technique, etc. The sequence thus established was as follows:

Order in priority	Name of Disease
1.	Diarrheal diseases
2.	Tuberculosis
3.	Malaria, Schistosomiasis
4.	Maternal diseases, Measles, Respiratory diseases
5.	Inflammatory eye diseases
6.	Intestinal parasitic diseases
7.	Whooping cough
8.	PCM, Vitamin deficiency
9.	Traffic accident
10.	Dysentery, Anemia

The epidemiological analysis on the tuberculosis problem in the YAR can be hardly made with precision due to insufficient hospital statistics. According to the estimation by Dr. T. Shimao of the Research Institute of Tuberculosis, Japan, based on the results of the tuberculin servey conducted in 1982 under the initiation of WHO, the annual infection rate is probably around 1.6 - 1.7%.

From this estimation of the annual risk of infection, the number of smear-positive patients will be 80 - 100 for every 100,000 person, and if the present population is 7 million, the new smear-positive cases will number 5600 - 7000 annually.

According to the statistical data collection started in 1981, by the Sana'a Tuberculosis Control Centre, the morbidity rate of the radiologically active cases is 164 and a morbidity rate for smear-positive cases is 36 for the population of 125,000 inhabitants in and around Sana'a city. Both rates are considerably high.

Moreover, from hospital statistics of the out-patients, tuberculosis, together with malaria and schistosomiasis are regarded as very common diseases in the YAR.

(Note: According to the description written in the National Health Programme 1976/77 - 1981/1982 arranged by the Ministry of Health, the result of the tuberculin tests carried out in 1969/70 indicated prevalence of infection of 15 - 18% for children aged 5 - 9, and 40 - 69% for those of 10 - 14 years of age.)

(2) Existing Conditions of Medical Measures

① Manpower Engaged in Health and Medical Care

One of the specific characteristics concerned with the existing medical service conditions in the YAR is that of dependency towards foreigners to close the gap in the relative insufficiency of manpower engaged in health and medical care. The Government of the YAR has been taking a serious account of this matter, so that considerable efforts were made towards the education of these personnel throughout the periods of the First and Second Five-Year Plans. In spite of these efforts, the medical manpower is still seriouslly insufficient, relative to the overall population size as shwon in the Table 6 and 7, as well as to the magnitude of health problem.

Table 6 Specialized Manpower in the Ministry of Health during 1978-1982 and Distributions by Governorate in 1982

Governorate	Laboratory Technicians			Nutritionists			Pharmacists			Dentists			Doctors		
	Total	Exp.	Yem.	Total	Exp.	Yem.	Total	Exp.	Yem.	Total	Exp.	Yem.	Total	Exp.	Yem.
1978	71	24	47	7	7	-	56	33	23	21	9	12	448	170	278
1979	99	46	53	9	9	-	72	44	28	22	9	13	513	231	282
1980	115	58	57	9	9	-	50	19	31	23	9	14	603	303	300
1981	124	64	60	14	14	1	62	22	40	26	11	15	716	388	328
1982	142	74	68	17	16	1	79	29	50	34	18	16	920	542	378
Sana'a	73	32	41	9	8	1	45	15	30	18	7	11	350	173	177
Ta'iz	23	7	16	1	1	-	15	4	11	4	2	2	209	95	114
Ibb	8	6	2	3	3	-	5	2	3	3	2	1	65	51	14
Hodeidah	17	9	8	3	3	-	8	2	6	5	3	2	98	55	43
Hajjah	2	2	-	-	-	-	1	1	-	2	2	-	43	39	4
Dhamar	5	5	-	1	1	-	2	2	-	1	1	-	55	44	11
Sa'adah	8	7	1	1	1	-	3	3	-	1	1	-	25	24	1
Beidah	3	3	-	1	1	-	-	-	-	-	-	-	16	5	11
Mahweet	1	1	-	-	-	-	-	-	-	-	-	-	14	11	3
Ma'arib	1	1	-	-	-	-	-	-	-	-	-	-	23	23	-
Al-Jawf	1	1	-	-	-	-	-	-	-	-	-	-	22	22	-

(CPO: Statistical Year Book 1982)

Table 7 Number of Medical Personnel (1980 - 1982)

	1980				1981				1982			
	Exp.	Yem.	Total	The Ratio per Population (per 10,000)	Exp.	Yem.	Total	The Ratio per Population (per 10,000)	Exp.	Yem.	Total	The Ratio per Population (per 10,000)
Doctors	303	300	603	0.060	388	328	716	0.072	542	378	920	0.092
Dentists	9	14	23	0.002	11	15	26	0.003	18	16	34	0.003
Phamacist	46	33	79	0.008	22	40	62	0.006	29	50	79	0.008
Nurse	489	282	771	0.077	601	295	896	0.090	719	324	1,043	0.104
Assistant Nurse	33	718	751	0.075	33	736	769	0.077	44	785	829	0.083
X-ray Technician	36	19	55	0.006	42	19	61	0.006	44	19	63	0.006
Inspection Technician	58	57	115	0.012	64	60	124	0.012	74	68	142	0.014
Assistant Medical Personnel	7	24	31	0.003	7	29	36	0.004	15	31	41	0.005
Nutritionists	9	108	117	0.018	10	112	122	0.012	8	124	132	0.013

(CPO: Statistical Year Book 1982)

The existing institutions or organizations providing the programmes of medical education/training to cultivate the manpower for health and medical care are:

a. The Health Manpower Institute at Sana'a (3 year course, 140 persons; Education for Nurses, Medical Assistants, Sanitarians, Laboratory Technicians, Pharmacy Assistants)

b. Sana'a University's Department of Medicine and Nursing (Established in 1982, no graduates as yet)

c. Para-medical Training School at the Central Laboratory Hospital at Al-Hodeidah and Ta'iz.

Another problem of medical manpower is that those who were educated abroad remain overseas, and as to those within the country, they do not stay at one medical institution for pursuing the better working conditions (especially in public institutions). As far as the physicians are concerned, the trend is towards opening private clinics rather than working in a public institution.

Many Yemenite doctors working in the public institutions received their education or practical training in foreign countries such as Egypt, USSR, and the countries in Eastern Europe when the medical and educational system in the nation have not developed as much as today, therefore, there exist some difference in opinions on the social medical care and public health among these doctors. In addition overall adjustment or smooth communication concerned with these ideas seem to hardly be realized among those doctors.

② Health and Medical Facilities

Health and medical facilities are not adequate for the number of occurrences of diseases; the number of medical manpower is short as well [Refer to the item 2-(3), Table 5]. The number of hospitals and beds in each governorate, and the number of beds per population are shown in the following Table 9, Table 10.

According to the Second Five-Year Plan, YR125 million was scheduled to be allocated for the improvement of the hospitals, YR90 million for Revolution Hospital (Sana'a City), YR96,000,000 for the establishing health laboratory. (Refer to Table 4).

The number of health centres and primary health care units which are considered as the important health/medical facilities for improving the present situation of public health in the peripheries, is shown in the Table 8.

Table 8 Health Service Units classified by Governorate

Governorate	Number of Health Centre		Total Number of Health Centre	Number of Primary Health Care Units
	With (Sick) Bed	Without (Sick) Beds		
Sana'a	24	8	32	54
Ta'iz	32	4	36	41
Ibb	19	4	23	18
Hodeidah	21	6	27	34
Hajjah	5	4	9	17
Dhamar	10	3	13	17
Sa'adah	3	2	5	6
Beidah	6	-	6	5
Mahweet	6	3	9	12
Ma'arib	11	4	15	4
Al-Jawf	13	-	13	13
Total	150	38	188	221

(February, 1984, Investigation by the Ministry of Health)

Table 9 Number of Hopitals and Beds by Governorate (1983)

Governorate \ Type	General and Military Hospital		Special Hospital		Distict Hospital		Total	
	Number of Hospitals	Number of Beds	Number of Hospitals	Number of Beds	Number of Hospitals	Number of Beds	Number of Hospitals	Number of Beds
Sana'a	5	924	-	-	2	60	7	984
Ta'iz	4	937	1	300	2	90	7	1,327
Ibb	1	65	-	-	3	132	4	197
Hodeidah	3	789	-	-	-	-	3	789
Hajjah	1	85	-	-	1	30	2	115
Dhamar	2	185	-	-	-	-	2	185
Sa'adah	2	78	-	-	-	-	2	78
Beidah	1	53	-	-	1	35	2	88
Mahweet	1	40	-	-	-	-	1	40
Ma'arib	-	-	-	-	-	-	-	-
Al-Jawf	-	-	-	-	-	-	-	-
Total	20	3,158	1	300	9	347	30	3,803

(February, 1984, Investigation by the Ministry of Health)

Table 10 Number of Hospital Beds per Population (As of January 1, 1983)

Governorate	Population (As of Mid-1983)	Percentage per Total Population of the Country (%)	Usable Number of Beds	Percentage per Total Number of Beds (%)	Beds/Persons
Sana'a	1,548,252	20.4	1,159	24.1	1,336
Ta'iz	1,384,506	18.2	1,427	29.6	970
Ibb	1,204,230	15.8	157	3.3	7,670
Hodeidah	966,491	12.7	1,139	23.6	849
Hajjah	782,990	10.3	275	5.7	2,847
Dhamar	700,173	9.2	245	5.1	2,858
Sa'adah	295,380	3.9	118	2.4	2,503
Beidah	293,202	3.8	88	1.8	3,332
Mahweet	260,702	3.4	110	2.3	2,370
Ma'arib	96,813	1.3	100	2.1	968
Al-Jawf	73,566	1.0	-	-	-
Total	7,606,305 Persons	100 %	4,818 Beds	100 %	1,579 Bed/Persons

(February, 1984, Investigation by the Ministry of Health)

2-4 National Health Programme

The Government of the YAR is aware that the socio-economic development of the country is connected with people's health very closely. The government's goal is to improve its inherent social and economic conditions (living circumstances, supporting infrastructure, education and the national income), and expand the quality and quantity of medical services achieved keeping the harmonious balance with the development aims of other sectors. In the First and Second Five-Years Plan, the government made efforts to secure the social and economic development in each sector to have a good relationship with each other. An example of the health sector is the enactment (1976) of basic guide-line of national comprehensive policy for the health and medical care called National Health Programme (NHP). This NHP is closely connected with First and Second Five-Years Plan and is the programme for implementing the development strategy of the health sector.

Naturally, the main purpose of NHP is a comprehensive up-grading of the level of health and medical cares in the YAR and it is composed of the some programmes for the achievement as follows.

(1) BHS (Basic Health Service)/PHC (Primary Health Care)

The objective of this programme is the construction of Health Care Units, Dispensaries, and Health Centres to form a network of medical activities by expanding the medical service coverage and offer the residents attentive medical services.

a. Health Care Units

The Health Care Unit will be distributed per 2,500 people and it will become the most popular institution of public health in BHS and PHC service systems. The peripheral health workers trained will be engaged in this work. The simplest unit will consist of two Primary Health Care Workers and one local birth attendant.

b. Dispensary

The Dispensary will be distributed per 10,000 people and it will supervise and guide the activities of the Primary Health Care Unit (PHU), provide medical supplies, and carry out the immunization at PHU and deal with referred cases. Each of these dispensaries will be operated by two PHC workers, a midwife, a medical assistant, an apprentice nurse and a janitor.

c. Health Centre

Although the Health Centre has a preventive function, it does not completely correspond to the Japanese health centre in that the former does have a curative function. One Health Centre will be distributed per 50,000 people. In addition to the supervision and guidance of the other lower-level units, integrated medical services such as advice on family planning, care of in-patients requiring short-term observation (1 - 2 days) will be available at the Centre. The training for the primary health care workers and the laboratory assistants sent from the various rural communities will also be undertaken at the Centre. Each Centre would additionally have two medical assistants, two nurses, a midwife, a sanitarian, an inspecting engineer, a pharmacist, and a clerk. Two land rovers with drivers will also be provided.

(2) Immunization

In order to take drastic preventive measures against tuberculosis, polio, tetanus, whooping cough and measles, an immunization office will be established where personnel can be trained, with the major objective to immunize newborn babies and infants (0 - 5 year olds) throughout the country. Motorcycles and automobiles will be used for the mobile vaccination patrols.

(3) Strengthening of the Health Administration

A Department of Health Planning and a Department of Health Information will be formed in the Ministry to facilitate an effective organizational structure for medical and health administration to expedite the collection and transmission of health information and health and medical plans. Ultimately, these departments will take charge of the effective allocation of medical equipments and supplies, and carry out drug control.

(4) Consolidation and Strengthening of Hospitals

In order to correct the present deficiencies in provision for the hospitals and beds, the absence of a central hospital with specialized medical units, the lack of administrative finances, and the inadequate levels of working conditions (wages) and medical services, a hierarchial service network will be constructed through the consolidation of hospital services throughout the country, with fixed duties given to each hospital conforming to its level. Also, the standardized system of supervision and administration of the hospitals will be introduced, with each hospital engaged in the training of specialists conforming to its level; and simultaneously, the education of specialists for the supervision and administration of hospitals will be carried out.

(5) Health Manpower Development

The integration of medical and health care service activities will be planned through the qualitative and quantatative expansion of the present training and educational programmes for medical personnel by increasing the categories in order to cope with the urgent demands for both manpower and relevant technique required at all medical and health care levels.

In addition to the above-mentioned framework of the plan, the programme contains policies regarding to concrete measures against

schistomiasis, tuberculosis and malaria; and, in light of up-grading environmental health, improvements in living conditions and supporting infrastructures, and prevalence of ideas relating to the public health are set forth in the plan.

In order to perpetuate the implementation of the NHP, in addition to the expansion of hospitals in the urbanized areas, qualitative and quantitative improvements of minor medical facilities in the remote areas are regarded as important. Thus, the number of PHC units will increase from 75 to 259, and for Dispensary, it increases from 12 to 97. In addition, the Health Centre, although it decreases from 27 to 17, with being attached the function of training and supervision, will take a key-position to be the most important facilities for medical service in the peripheries.

2-5 Tuberculosis Control Programme in the NHP

In the NHP, the high prevalence of tuberculosis in the YAR is attributed to a combination of bad living conditions and insufficient nourishment. The ultimate goal of this programme is to reduce morbidity rate from 2.4 per 1,000 in 1981 to less than 2.0 in 1986 by improving the level of public health in the country. In order to accomplish this, the following targets are set forth:

① To promote the detection of the source of infection in its early stage and introduce the scientific methods to immune the patient from being causes of infection

② To provide thoroughgoing preventive measures for tuberculosis control by implementing BCG vaccination to the juvenile in particular

Moreover, in the NHP, the tuberculosis control programme is regarded as a systematic approach to minimize the tuberculosis problem in the remote districts; and as the concrete implementing methods, the following projects have been scheduled to strengthen the existing plans for tuberculosis control:

① Expansion of the Sana'a Tuberculosis Centre
② Expansion of the Ta'iz and Al-Hodeidah Tuberculosis Centres
③ Integration and improvement of the tuberculosis control activities at the peripheral health facilities
④ Establishing new tuberculosis centres at Ibb, Sa'adah, Rija and Dhamar.
⑤ Enhancing the optimal utilization of the existing hospital beds for tubercular patients.

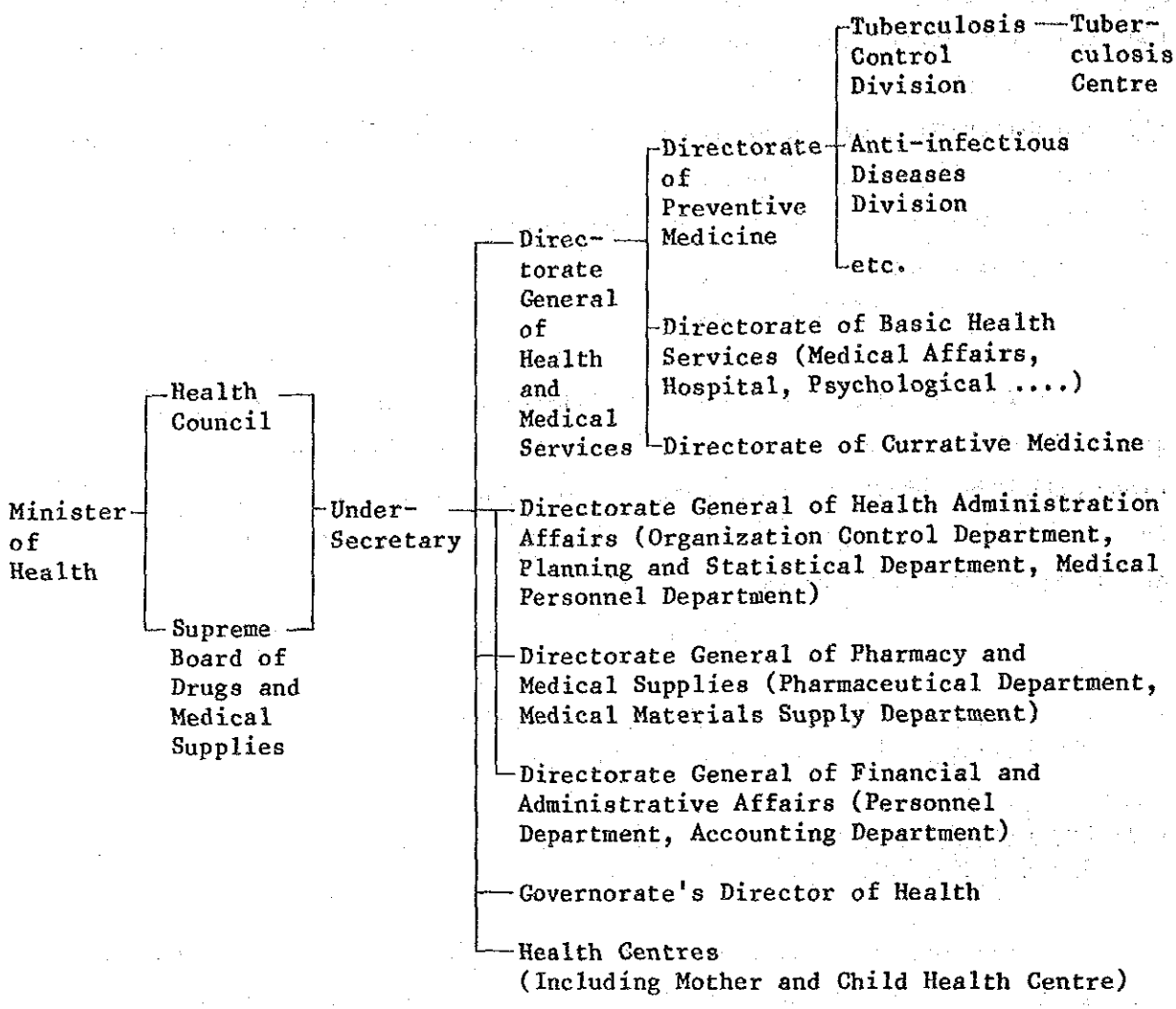
In addition, in order to facilitate the tuberculosis control programme in the remoted districts, emphasis is being placed on close cooperation with the BHS/PHC programme; and the necessity of improving basic infrastructures to support living conditions such as water supply, sewage and drainage is recommended.

2-6 Existing Situations of the Tuberculosis Control and Medical Care

(1) Organizational Framework for Tuberculosis Control and Medical Treatment

The following diagram (Fig. 1) describes the existing organizational structure of the health administration and its framework for public health and tuberculosis control in the YAR.

Fig. 1 Organizational Structure for Health Administration (Existing)



As the chart indicates, Health Council is the policy maker for public health and supervises activities of each Directorate Generals, while Supreme Board of Drugs and Medical Supplies is responsible for the policy and supervision of clinical section. The Under-Secretary supervises the activities of Directorate General of Health and Medical Services, Health Administration Affairs, Pharmacy and Medical Supplies and of Financial and Administrative Affairs; and he connects the Minister of Health to each Directorate General and the Health Council and Supreme Board. Also the Under-Secretary supervises governorate's health department (the Director of Health) which deals with the relevant policies at governorate level, and directs or controls the activities of peripheral medical facilities such as Health Centres.

The actual flow of implementing policies concerned with tuberculosis control converge into each tuberculosis centre through the Preventive Medicine Department and the Tuberculosis Control Division via Bureau of Public Health. From this point, the existing Tuberculosis Control Centres are playing an important role in the programme for the tuberculosis control in the YAR.

At the present, however, the position of those Centres within the institutional structure is on a dual system; i.e. the Centres are managed at National and Governorate levels. Consequently, the existing Tuberculosis Control Centre at Sana'a is under the direct control of the Ministry of Health, while the other 2 facilities, the Al-Hodeidah and Ta'iz Tuberculosis Centres are under the jurisdictions of the Department of Health of each Governorate.

For these reasons, the following problems prevent the achievement of national tuberculosis control programme to be implemented through comprehensive and systematic manners:

a. There is few unified diagnosis criterion relating to the judgement for the X-ray pictures or bacilli, and medical treatment among the doctors, clinics and hospitals.

b. The statistical informations on epidemics and of tuberculosis patient at regional and national level are not collected and transmitted systematically.

Therefore, Tuberculosis Control Programme in the NHP described in the Section 2-5 should be immediately implemented to eliminate these problems.

(2) <u>The present situation of the existing tuberculosis control centres</u>

Within the framework of the Second Five-Year Plan, the expansion of the medical facility for turberculosis control is planned as for the

bases of tuberculosis control activities. However, at the present, only three control centres in the cities of Sana'a, Ta'iz and Al-Hodeidah are functioning. Other centres planned to be constructed in the cities of Ibb, Hajjah, Sa'adah and Dhamar are not established yet. As a result, all the essential activities for tuberculosis control in the YAR, are heavily depending upon those three Centres. The profiles of these centres are described as follows.

Profiles of the Existing Tuberculosis Control Centres

① The Sana'a Tuberculosis Control Centre

As mentioned in the preceding section (1), the Sana'a Tuberculosis Control Centre is under the direct jurisdiction of the Ministry of Health, and is the nucleus facility for the control and medical treatment of tuberculosis in the YAR.

The Centre was separated from the tuberculosis treatment section allocated in the Republican Hospital in 1977, and started its own activities in the present place which is a renovated school for nurses has originally been built through the assistance of the Government of Kuwait with a floor of the present facility area of 450m^2.

As it is indicated in the Fig. 2, the floor area and both numbers and arrangement of rooms of the present facility are insufficient for providing the satisfiable functions such as administrative control, medical examination, research, supervision and training all of which have to play the essential roles in promoting the national tuberculosis control programme. Because of these spatial and physical constraints, all the outpatients cannot be accepted; the same toilet is to be used by both men and women, and the office or the director's room is used for training. Therefore, routine medical examination and diagnosis are performed only with these inconveniences.

The necessary personnel allocation at the Sana'a Tuberculosis Centre is given in the Table 11. As against the full strength of 31 persons (Based on the Personnel Complementing Plan of the Second Five-Year Plan) at present, only 26 persons are actually distributed. Among those

personnel, the health advisor is an Egyptian and the X-ray technician (woman) is a volunteer from the Netherlands. With these manpower, the Centre has to perform its principal functions of diagnosing tuberculosis patients and their treatment, and the BCG vaccination to school children. In addition, outpatients number an average of 100, which sometimes numbers to 150 to 200 per day. Consequently, the Centre can hardly extend its primary duty to perform medical research and the provision of the practical to the medical staff or manpower for tuberculosis control.

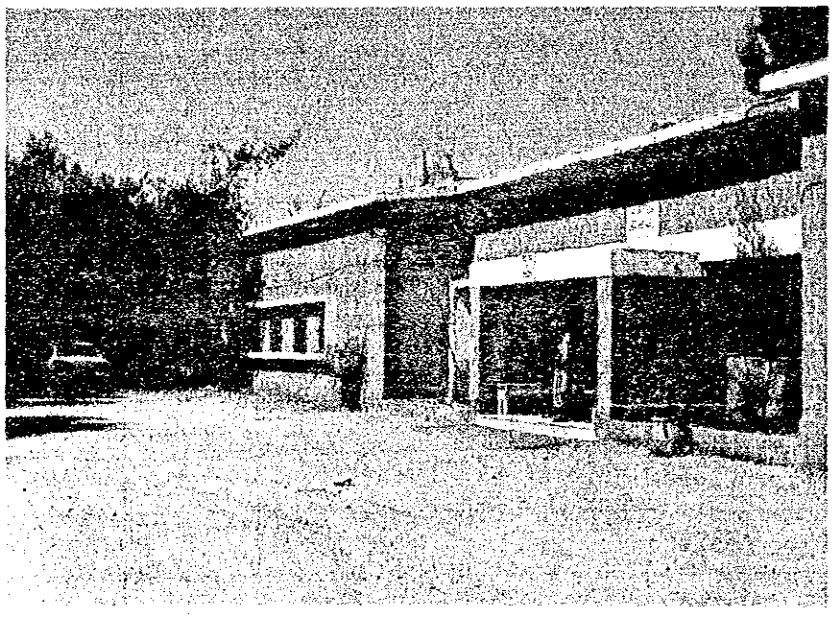
Table 11 Personnel Allocation in Sana'a T.B. Centre

Classification	Present Number	Full Number
1. Doctor	5	5
2. Public Health Nurse	1	1
3. X-Ray Technician	-	1
4. Assistant X-Ray Technician	1	1
5. Laboratory Technician	1	2
6. Assistant Laboratory Technician	1	1
7. Medical Assistant	-	2
8. Nurse	4	1
9. Pharmacist	-	1
10. Assistant Pharmacist	-	1
11. BCG Vaccinator	1	2
12. Assistnat Statistician	1	1
13. Office Clerk	1	3
14. Driver	2	4
15. Assistant	1	3
16. Guard	2	2
17. Janitor	5	-
Total	26	31

As the profiles of the facilities shown in the pictures supplemented and the inventory of medical equipments indicate, the physical and functional levels of the Centre are not satisfiable comparing to similar facility in Japan.

In this connection, the administrative budget for 1984, is YR500,000, excluding wages and medical supplies, of which YR458,000 is the share of the Sana'a Tuberculosis Control Centre, while the remaining YR42,000 is distributed for assistance to the Hodeidah and Ta'iz Tuberculosis Control Centres (YR18,000 to Al-Hodeidah and YR24,000 to Ta'iz. These amounts do not include the cost of medicines as these are supplied by WHO.)

Thus, the number of staff, administrative budget, and contents of facilities of the Centre are not sufficient enough to meet the qualifications to be a medical facility required to fulfill the central function for supporting the national tuberculosis control programme.



Sana'a Tuberculosis Control Centre (Existing)

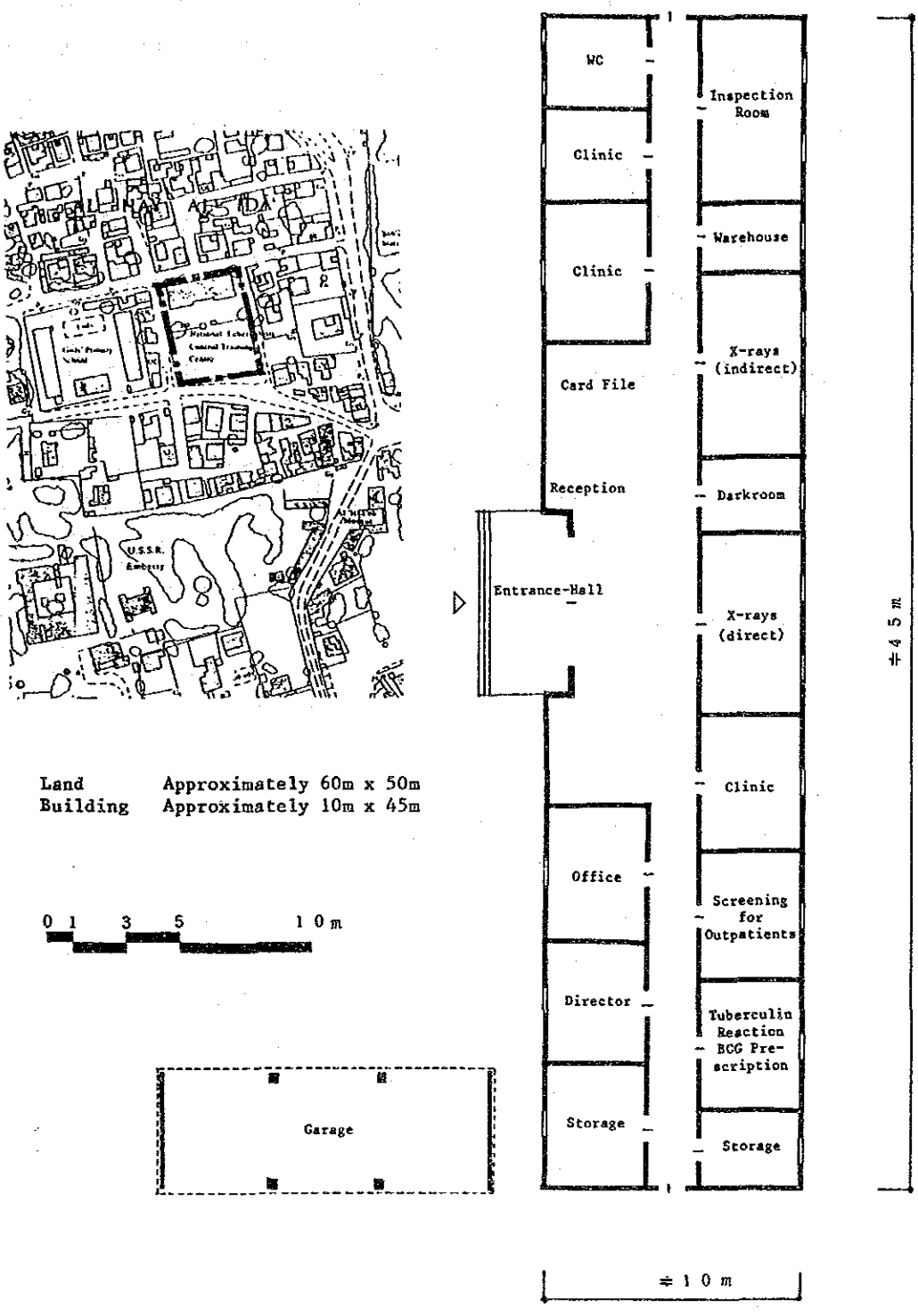


Fig. 2 The Existing Plan of
Sana'a Tuberculosis Control Centre

The inventory of the medical instruments and equipments installed at each section excluding the office (as of February, 1984) is as follows:

o Card File Room

Steel Desk (Made in India)	1
" Chair (")	1
" Shelves	2
" Cabinet, Large	2

o Pre-examination Room

Steel examination table (Made in India)	1
" Desk (")	2
" Chair (")	3
Helio 70 Contrastor (Made in Holland)	1
Film hanger (")	1
X-ray Illuminator-Medium (Made in USA)	1
" " Small (Made in Holland)	1
Steel Cabinet - 4 shelves (Made in England)	1

o Examination Room

Freezer (Made in Italy)	1
Examination stand	1
X-ray Illuminator-Medium	1
" " Small	1
Steel desk	1
" chair	3
" cabinet	1
Movable Screen	1

o BCG Vaccination Room

Desk (Made in India)	4
Chair (")	5
Cabinet - 3 shelves	1
Weight scale (Made in USA)	1
X-ray Illuminator-Medium (Made in W. Germany)	1

o BCG Preparation Room

Refrigerator (Made in Holland)	1
Steel Cabinet - Large (Made in India)	1
" desk (")	1
" chair	2
Gas Oven (Made in Italy)	1

o Examination Room

Refrigerator (Made by Philips, Holland)	1
Microbiology Safety Hood	1
Microscope-Double Eyepiece (Made in Poland)	1
" Single Eyepiece (Olympus, Japan)	1
Centrifugal separator (Made in W. Germany)	1
Autoclave-Small	1
Steel desk	1
" chair	3

o Pharmacy

Steel cabinet - Large (Made in India)	5
Oil heater (Made in W. Germany)	8
Generator - Small (Made in USA)	2
Autoclave (")	1

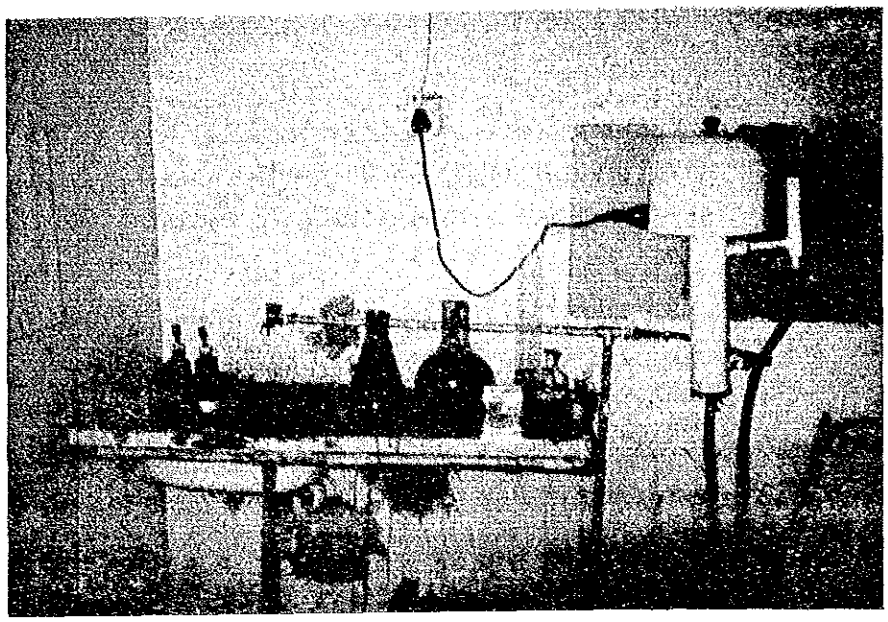
o X-Ray Room

X-Ray diagnostic unit (Made in Holland)	1
" (Siemens - West Germany)	1
X-Ray Shield Partition (Made in Italy)	1
Movable Screen (Made in India)	1
Steel desk (")	2
" chair (")	3

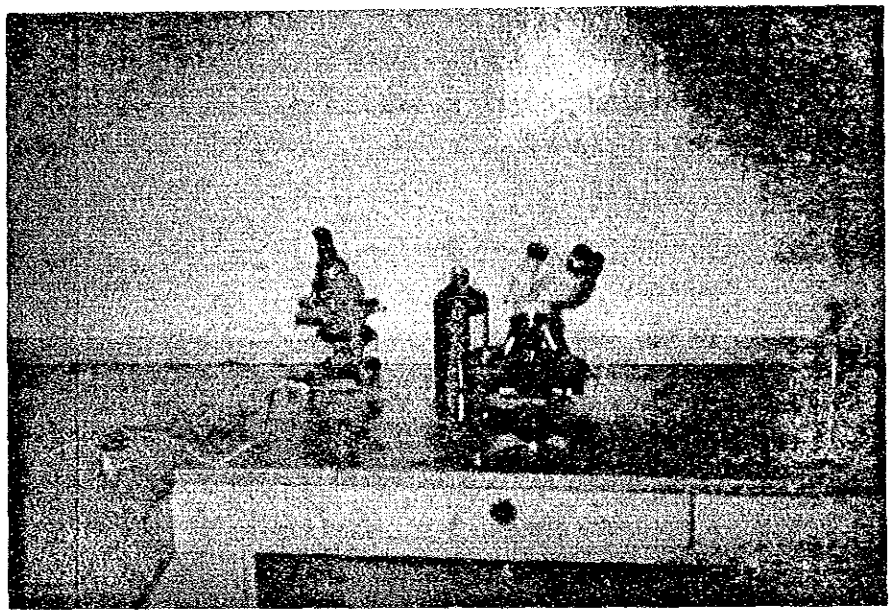
o Dark Room

Automatic Processing Unit (Made in Italy)	1
Film drier (")	1
Steel desk (Made in India)	2
Infra-red ray lamp (Made in England)	1

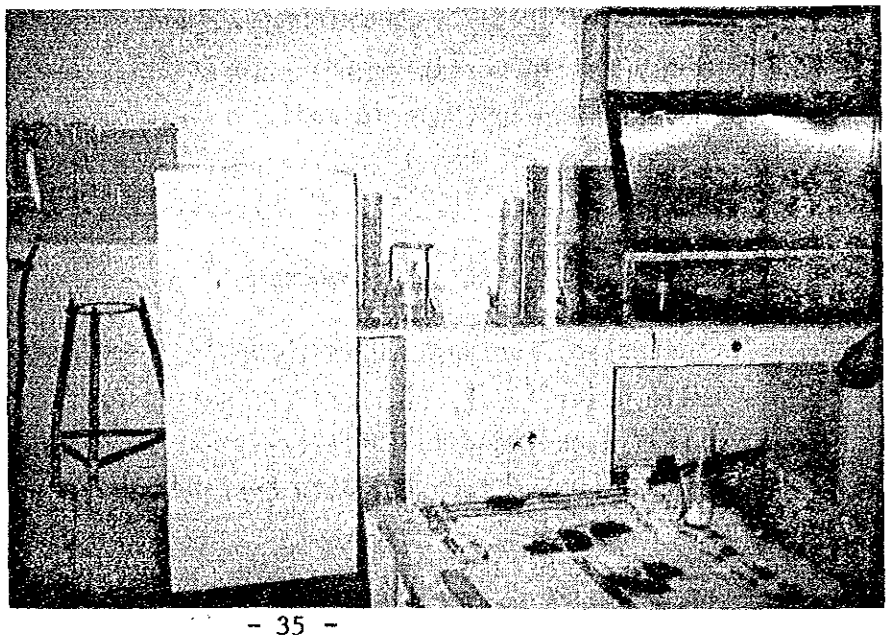
Existing Condition of Examination Room - 1



Existing Condition of Examination Room - 2



Existing Condition of Examination Room - 3



X-Ray Room

Photo Examining Room