MINISTRY OF HEALTH
THE REPUBLIC OF IRAQ

PREPARATORY SURVEY REPORT

ON

THE HEALTH SECTOR

RECONSTRUCTION PROJECT

IN

THE REPUBLIC OF IRAQ

OCTOBER, 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERNATIONAL TOTAL ENGINEERING CORPORATION

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Health Sector Reconstruction Project in the Republic of Iraq and entrusted the survey to International Total Engineering Corporation.

The survey team held a series of discussions with the officials concerned of the Government of the Republic of Iraq, and conducted a field investigation. As a result of further studies in Japan, the present report was finalized.

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

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

September, 2011

Nobuko KAYASHIMA
Director General,
Human Development Department
Japan International Cooperation Agency

Summary

1. Background of the Project

Hospital-centered healthcare system had been developed in all over Iraq from 1970s to the beginning of 1980s. The system was the greatest in the Middle East, covering 97% of population in urban area and 71% in rural area. Health status was improved significantly in that term, for example, infant mortality rate (per 1,000 birth) decreased by half from 80 in 1979 to 40 in 1989, and under 5 year old mortality rate (per 1,000 birth) from 120 to 60.

However, since 1980s the healthcare system in Iraq has been going to ruin because of the wars, economic sanction and political disorder. Medical facilities in Iraq haven't been rehabilitated nor newly constructed sufficiently after 1980s. In addition to this, the fact that a lot of doctors left Iraq due to the wars caused serious shortages of medical personnel. As the result of those situations, it is hard to provide sufficient healthcare services both in quality and quantity in Iraq.

"National Development Plan 2010-2014" prepared by the Ministry of Planning shows medium to long-term development policy and investment plan consisting of 11 sectors including "Population and Work", "Industry and Energy", "Good Governance" and others. In this plan, "Healthcare sector" along with "Education Sector" etc. is categorized as "Public Services" which aims at "providing health services in accordance with international standards that satisfy all residents" and promoting a full reconstruction of the healthcare delivery system.

The Iraqi Ministry of Health has presented its "Strategic Plan of the Iraqi Ministry of Health 2009-2013". This plan emphasizes priority issues and promotes healthcare activities to achieve its objectives by 2013. Objectives given in the plan include improvement of healthcare facilities such as enhancing the quality of healthcare services, establishing a referral system and improving specialized healthcare facilities up to international standards.

The requested project is aiming at establishment of 200-bed secondary hospitals (including hospitals, staff accommodations and medical equipment) at the 7 sites in Iraq. The request for the project was submitted by the Government of Iraq to the Government of Japan in January 2010. The 7 sites requested in this project are as shown below. The targeted sites of yen-loan project will be decided according to a result of appraisal by the governments of Iraq and Japan, which will be organized separately from this survey.

General information of targeted sites

Site location	Population of the targeted area (Direct beneficiary population)
1) Salaheddin governorate (Al Ashurqat)	160,000
2) Kirkuk governorate (Kirkuk City)	Governorate: 1,200,000 Kirkuk City: 890,000 (targeted site is inside the city)
3) Diyala governorate (Balad Ros)	122,000
4) Babil governorate (Al Musaab)	300,000
5) Karbalaa governorate (Hindia)	210,000
6) Theeqar governorate (Al Ashatra)	400,000
7) Basra governorate (Al Mdaina)	240,000

2. Overview of the result of the survey and contents of the project

Responding to the above request, Japanese government decided to implement the preparatory survey. JICA dispatched the first field survey team for 16 days from 13th January, 2011 to 28th January, 2011. The member prepared the interim report based on the internal analysis after returning to Japan, and JICA dispatched the second field survey team for additional survey and discussions for 13 days from 9th April, 2011 to 21st April, 2011. The targeted sites of yen-loan project will be decided according to the result of appraisal by the governments of Iraq and Japan which will be organized separately from this survey.

2-1. Basic policy

The design of hospital construction in Iraq is required to be based on the standards issued by the Ministry of Health, which set the number of beds, clinical function, medical equipment, etc. Necessity and relevance of this project is reviewed based on the standard for a 200-bed general hospital issued by the Ministry of Health and the basic policy as follows.

a) Prioritize shortages of beds and urgency of hospital reconstructions at the targeted sites.
b) Take security situation into consideration.
c) Consider environmental issues resulting from improvement and construction of building and facilities.

2-2. Review of the contents of the project

(1) Needs of hospital beds in a population ratio

In 2010, there are 40,912 beds in Iraq for a total population of 32.3 million, meaning 1.3 beds per 1,000 populations. This is well below the international standard of 3 to 3.3 beds. With the Iraqi population expected to reach 35.7 million by 2013 (assuming that the population growth rate is set at 2.5%), a total of 107,070 beds will be needed to fulfill international standards of 3 beds per 1,000 populations. This necessitates additional 66,158 beds if 2013 is the target year.

Regarding the 7 targeted sites, the local populations are in the range from 122,000 to 890,000. When the current population applied to the development target which of 2.5 beds per 1,000 populations, 305 beds are at least necessary for 122,000 populations. 10 years later, the population will be 159,000, about 1.3 times as many as the current population where the population growth rate is set at 2.5%. In this case, the necessary number of beds totals 396. According to these calculations, it can be concluded that there will be sufficient needs for the demand.

Although a review should be done in a normal procedure with parameter of average incidence per capita, consultation rate each disease and average length of hospital stay etc., it was difficult to boost enough data and information from Iraqi medical statistics. In this survey, therefore, the necessity of requested each hospital was verified with using the number of beds in a population ratio.

(2) Priority in targeted sites

The priority order for the 7 targeted sites is examined based on the conditions below.

1) Medical Indices, etc. of Targeted Governorates

i. The source is the MOH Annual Report 2009

ii. The beneficiary population (the number of the direct beneficiaries) is the number of residents in the catchment area of the planned construction site

2) Number of Insufficient Beds

i. Number of necessary beds (2.5 beds) in the governorate: The number of necessary beds calculated in accordance with the development objective of MOH, 2.5 beds/1,000 populations and the population ratio of each governorate

ii. Number of existing beds in the governorate: Sum of the number of existing beds in the targeted governorates (source: MOH Annual Report 2009)

iii. Number of insufficient beds in the governorate: No. of necessary beds – No. of existing beds

iv. Number of necessary beds (2.5 beds) for the direct beneficiary: No. of necessary beds calculated in accordance with the development objective of MOH, 2.5 beds/1,000 populations and the ratio of direct beneficiary population

v. Number of existing beds on site for the direct beneficiaries: No. of beds in the existing hospitals on the planned construction sites

vi. Number of insufficient beds for the direct beneficiaries: No. of necessary beds (2.5 beds) for the direct beneficiaries – No. of existing beds on the sites

vii. Plan to increase the number of beds: the plan in progress to increase the number of beds in accordance with the new healthcare facility development project referred to in Chapter 2, 2-1 (3) Overview of future new healthcare facility development projects and current projects.

viii. Total number of beds after the planned increase in the governorate: the number of beds in each governorate after the foregoing plan is completed

ix. Number of insufficient beds after the planned increase in the governorate: [No. of necessary beds (2.5 beds) in the governorate] – [total No. of beds after the planned increase in the governorate]

x. Number of insufficient beds after the planned increase for the direct beneficiaries: the same as the number of insufficient beds for the direct beneficiaries (As for Kirkuk, the value is less than the number of insufficient beds for the direct beneficiaries due to increasing beds by MOH plan to build 11 hospital within the same area as this project.)

3) Present state of the existing hospitals

i. In accordance with the answers to the questionnaires from each existing hospital

The priority in the 7 targeted sites is determined as follows in consideration of the necessity of new construction due to the number of hospital beds in a population ratio and flood, etc.

Priority of the 7 targeted sites

Priority	Targeted site
A	Theeqar
B	Basra
C	Kirkuk and Babil
D	Salaheddin, Diyala and Karbalaa

General information of targeted sites

Item	Governorate where the site is located	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
Medical indices, etc. of subject governorate	Governorate population	1,253,539	1,223,177	1,361,149	1,715,748	993,903	1,839,640	2,608,601
	Beneficiary population	160,000	890,000	122,000	300,000	210,000	400,000	240,000
	No. of (public) hospitals	9	7	9	14	5	8	12
	No. of (private) hospitals	1	2	3	3	2	2	5
	Ratio of beds in private hospitals	2.2%	4.4%	4.9%	3.3%	6.4%	3.3%	5.5%
	Governorate populations/ (public) hospitals	139,282	174,740	151,239	122,553	198,781	229,955	217,383
	No. of beds/ 1,000 pop.	1.0	1.0	0.9	1.1	1.1	0.9	1.3
	No. of beds in the governorate	1,220	1,239	1,281	1,837	1,128	1,600	3,278
	Medical personnel/ 10,000 pop.	6.1	5.7	4.5	7.1	8.7	3.9	7.3
No. of insufficient beds	No. of necessary beds (2.5 beds) in the governorate	3,134	3,058	3,403	4,289	2,485	4,599	6,522
	No. of existing beds in the governorate	1,220	1,239	1,281	1,837	1,128	1,600	3,278
	No. of insufficient beds in the governorate	-1,914	-1,819	-2,122	-2,452	-1,357	-2,999	-3,244
	No. of necessary beds (2.5 beds) for the direct beneficiaries	400	2,225	305	750	525	1,000	600
	No. of existing beds for the direct beneficiaries	50	425	72	171	206	109	173
	No. of insufficient beds for the direct beneficiaries	-350	-1,800	-233	-579	-319	-891	-427
	Plan to increase No. of beds (MOH plan to build 11 hospitals)	488	492			361		
	Plan to increase No. of beds (MOH plan to build 10 hospitals)			492	492	492	492	492
	Plan to increase No. of beds (MOH regional development plan)						100	74
	Plan to increase No. of beds (other donors)				50			94
	Total No. of beds after planned increase	1,708	1,731	1,773	2,379	1,981	2,192	3,938
	No. of insufficient beds after planned increase	-1,426	-1,327	-1,630	-1,910	-504	-2,407	-2,584
	No. of beds/ 1,000 pop. after planned increase	1.4	1.4	1.3	1.4	2.0	1.2	1.5
	No. of insufficient beds after planned increase	-350	-1,308	-233	-579	-319	-891	-427
Current state of existing hospitals	No. of beds	50	425	72	171	206	109	173
	Bed occupancy rate (stated in questionnaires)	51.7%	44.0%	42.8%	(56.6%)	-	116.0%	85.0%
	Bed occupancy rate (calculated from total No. of inpatients)	96.0%	21.9%	37.3%	56.9%	25.2%	44.0%	37.4%
	No. of staffs	Transfer	Newly built	Transfer	Transfer	Transfer	Transfer	Transfer
	Medical doctors	42	0	15	65	44	38	13
	Nurses	155	0	20	139	166	205	124
	Healthcare professionals	57	0	25	44	269	144	94
	Other workers	42	0	73	159	181	101	258
	Total	296	0	133	407	660	488	489
	No. of standard staffs							
	Medical doctors	40	40	40	40	40	40	40
	Nurses	120	120	120	120	120	120	120
	Healthcare professionals	30	30	30	30	30	30	30
	Other workers	30	30	30	30	30	30	30
	Total	220	220	220	220	220	220	220
	No. of over and short staffs							
	Medical doctors	2	-40	-25	25	4	-2	-27
	Nurses	35	-120	-100	19	46	85	4
	Healthcare professionals	27	-30	-5	14	239	114	64
	Other workers	12	-30	43	129	151	71	228
	Total	76	-220	-87	187	440	268	269
	No. of outpatients (annual)	185,640	30,993	32,115	168,895	144,664	330,992	54,190
	Average No. of outpatients (per day)	595	99	88	463	440	907	225
	Total No. of inpatients	17,520	33,945	9,808	24,952	18,980	17,516	21,900
	Average stay in hospital (day)	4.5	2	-	2.4	2	4	2
Civil order	No. of injuries due to terrorism in 2009	209	1,028	953	831	243	98	301
	No. of casualties due to terrorism in 2009	476	342	370	178	42	23	197
	Accessibility	2	3	3	1	1	1	1
	Safety information from Ministry of Foreign Affairs Japan	4	4	4	4	4	4-	4-
Result of technical survey on site	Securing of land	Unused land	Unused land	Unused land	Unused land	Unused land	Unused land	Unused land
	Form, etc. of land	No problem	Existing demolished hospital	No problem	No problem	Difference with road level needs to be developed in front of the hospital	Moor needs to be developed	Moor needs to be developed
	Present state of infrastructure	None	Electricity available	Electricity and water available	Electricity and water available	Electricity and water available	None	None
	Presence of access to site (arterial roads)	No	Yes	Yes	Yes	Yes	Yes	Yes
	Distance from the capital of governorate	140km	8km	40km	40km	35km	40km	70km
	Site size	Approx.30,000m2	Approx.60,000m2	Approx.50,000m2	Approx.40,000m2	Approx.50,000m2	Approx.63,000m2	Approx.74,300m2
Environmental and social consciousness	Problem related to environmental and social consciousness	None	None	None	None	None	None	None
Others	Site location (arterial roads, neighboring governorates, cities, etc.)	Fairly distant from cities with 400-bed hospital including the other governorates.	Located in suburb of a city in the governorate. Two 400-bed hospitals are within the city.	Approx. 90km from Baghdad via Baqubah, the governorate capital.	Approx. 60km to Baghdad. Approx. 30km to Karbalaa.	Approx. 25km to Al hillah, the capital of a neighboring governorate.	Access to other governorate only via Nassiriyah, the governorate capital.	Access to other governorate only via Basra, the governorate capital.
	Geographical problems, etc. of existing hospital (Sites to which MOH puts high priority for improvement)	-	-	-	-	-	The surrounding area and premises of hospital are flooded in rainy season, interfering with access and medical activities.	The surrounding area and premises of hospital are flooded in rainy season, interfering with access and medical activities.

(3) Review of the hospital capacity

The requested number of beds is 200 (246 beds with specialized beds for ICU etc. included). The statistics of the Iraqi Ministry of Health shows that the national average bed occupancy rate was 50.4% (Annual Report of Ministry of Health, 2009).

According to the National Development Plan of Iraq, the bed occupancy rate should be improved up to 70% by 2014. This improvement should include securement of beds at the time of disaster and emergency.

This low bed occupancy rate is attributable to the following factors:

- The existing hospitals have passed 40 to 50 years since their construction, many of which are unable to provide satisfactory environments for inpatients due to their aging facilities. Quite a few patients reportedly refuse to be admitted to these hospitals because of their poor conditions. In fact, those who seriously need to be admitted are transferred to private well-equipped hospitals, though the number of such patients is still small. Thus, the number of inpatient may well increase if the new hospitals have been constructed. For example, the number of inpatient of new Fallujah general hospital (total of 151 beds) which established in 2009 has increased from 1,501 in January 2010, through 2,256 in January 2011, to 2,281 in May 2011. Although bed occupancy rate is different among departments, that of surgery department increased as 39% in January 2010, 64% in January 2011, and 76% in May 2011.
- The percentage “50.4%” is the average figure for all medical facilities. Some targeted hospitals and their departments (in particular, for maternity and children) are forced to place temporary beds in corridors and elsewhere since they cannot accept all patients in their proper rooms.
- In Japan, specialized beds such as ICU etc., are not counted in the number of beds. In Iraq, however, the number of these specialized beds is counted, so that the bed occupancy rate tends to be lower. As for requested 200-bed hospital, the number of beds is 246 including specialized beds. Given that 50.4% of bed occupancy rate is plugged in 200 beds, as shown below, the bed occupancy rate is calculated as 62%.

Annual total No. of beds (246 beds)	:	246 beds x 365 days = 89,790 beds
No. of occupancy beds	:	89,790 beds x 50.4% = 45,254 beds
Annual total No. of beds (200 beds)	:	200 beds x 365 days = 73,000 beds
Estimated occupancy rate (200 beds)	:	45,254 beds / 73,000 = 62 %

- Currently, the shortage of anesthetists among medical technicians, who play a vital role in surgeries, is a serious problem. Some hospitals have difficulty in conducting surgeries, where there are sufficient number of surgeons but short of anesthetists. It is expected that an increase in the number of anesthetists will result in an increase in the number of surgeries, which will lead to increased inpatients. Currently MOH of Iraq is under discussion with Egyptian government on recruitment of Egyptian anesthetists. In addition to that, it is expected that anesthetists who evacuated abroad will return due to improvement of security and hospital environment.

Taking into account the factors described above, it is estimated that beds in new hospitals will be substantially occupied, although the current national average of bed occupancy rate remains 50.4%. Therefore, it can be concluded that the hospital capacity to be constructed – those with 200 beds – is appropriate.

(4) Securing the human resources

1) Allocation of hospital staff

According to the plan drawn up by the Iraqi government, the number of staff to be allocated to a new 200-bed hospital is approximately 220 – that is, a total of 1,540 staff will be necessary for 7 hospitals.

Number of staff for new 200-bed hospital

#	Type of staff	No.	Notes
1	Doctors	40	
2	Nurses	120	Assistant nurses included
3	Paramedics	30	Pharmacists, laboratory technicians, radiographic technicians, physical therapists, and nutritionists
4	Office workers, technicians	30	Office work, reception, maintenance, cleaning, security guard, telephone switching, etc.
Total		220	

(Source: the Document for request)

The number of nurses is determined in accordance with the number of doctors, rather than a nurse unit: the standard number is 3 nurses per doctor.

2) Allocation plan of health staff at each hospital

The survey has confirmed that the new 200-bed hospitals will be all replacements of the existing hospitals, except for Kirkuk governorate. Thus, the staff at the existing facilities will be transferred to the new hospitals, except for Kirkuk. On the other hand, because the manpower of the existing hospitals is not necessarily sufficient, and the number of beds at the new hospitals is larger than that of the existing ones, it is necessary to increase the number of staff. Even so, new recruitment and reallocation of staff is likely to be minimal since a certain number of staff from the existing will be transferred to the new hospitals.

Currently, the Ministry of Health is promoting various projects to construct new hospitals, other than the plan to construct new 200-bed hospitals. When all these ongoing projects, including the one for the new 200-bed hospitals, have been completed, about 10,000 beds will be newly available.

In consideration of a plan for human resource allocations as a whole, the Ministry of health submitted a letter to the survey team, expressing its intention to give priority to the new 200-bed hospitals, and requesting the Government of Japan for assistance of hospital establishment.

(5) Security situation of the site and its surrounding area

The number of injuries and casualties due to terrorism is reduced steadily from 2006 to 2009. In the 7 governorates for the project, Theeqar had the least number of cases of injuries and casualties in 2009, followed by Karbalaa, and Basra.

(6) Validation of relevance related to development of facilities

1) Relevance of project scope and scale of facilities from the technical viewpoint

The profitability of each hospital is not reviewed since medical services are free of charge in Iraq. Relevance of technology is reviewed as follows.

The standards of hospital establishment developed by the Ministry of Health specify the required departments and functions of a hospital according to its size.

The standard for a 200-bed general hospital is shown as follows. The hospitals planned in this project are required to be designed based on this standard.

a) Planned departments (type and quality of medical services)

Planned departments and operational function

No.	Medical services
1	Surgery
2	Internal Medicine
3	Orthopedics
4	Obs. & Gyn.
5	Pediatrics
6	Ophthalmology
7	E.N.T
8	Urology
9	Dermatology
10	Dental
11	Psychiatry

No.	Operational function
1	Out Patient Department
2	Inpatient (Ward)
3	Emergency
4	Delivery
5	Diagnostics Imaging
6	Clinical Laboratory
7	Endoscope
8	Central Operation Theater and CSSD
9	Dialysis
10	Pharmacy
11	Physiotherapy
12	Maintenance（incl. SPD）
13	Nutrition

b) Scale of facilities

Scale of facilities is as below.

Number of beds and its breakdown

Services		No. of beds	Notes
General Ward	Internal med	70	
	Surgery	60	
	Obs. & Gyn.	30	incl. NICU(4 beds)
	Pediatric	40	
Sub Total		200	
Special Unit	Emergency Observation	24	
	ICU	10	incl. isolation unit
	CCU	6	incl. isolation unit
	PICU	6	incl. isolation unit
Total		246	

Number of operation rooms

Classification		Qty
Emergency		1
Day Surgery		1
Obstetrics		2
COT		4
	General	2
	Ophthalmology	1
	Orthopedics	1
Total		8

The standard for the scale of hospital in Iraq prescribes 120 m2 per bed as the minimum. This standard capacity does not include ICU and other specialized beds.

A survey on 143 general hospitals which have 200 or more beds and were built in the last 10 years in Japan shows that the average floor area per bed is 70 – 80 m2. However, the scale varies from the smallest, 50 m2, to the largest, over 120 m2. Since there are various kinds of hospitals among what is called “general hospital”, it should not be discussed in terms of the average floor area only.

Since the floor area of 120 m2 in Iraq does not include specialized beds, it is necessary to calculate the figure including those beds at comparison with the figure for Japan.

The request of 200-bed hospitals totals 246 beds at each hospital including specialized beds. Thus, the floor area will be 100 m2, which is greater than the average of Japan by 20% and more. However, this scale is reasonable if the following factors are taken into account.

a. Since masonry construction is adopted for the hospitals requested, partition walls are approximately 240mm, twice or so as thick as those of the Japanese hospitals.
b. A standard hospital ward in Japan accommodates 4 beds, while that in Iraq accommodates 1 or 2 beds only.
c. Due to the sociocultural background in Iraq, a larger number of partitions are required to separate males and females.
d. Due to social habits, it is necessary to consider a large number of private rooms for administration offices.
e. Various machines and building facilities are larger than those in Japan.
f. It is common in Japan to outsource laundry, meal services, repair of medical equipment, etc., while it is common in Iraq to deal with these services within hospitals.
g. Unlike in hospitals in Japan, where medicines and consumables are timely supplied, those in Iraq cannot expect such deliveries and need to have a large amount in stock.
h. Because of unstable infrastructures, including electricity, water supply and sewage, it is necessary for each hospital to be equipped with power generators, water purification systems and other plant facilities.

The hospitals construction project, which includes 10 (400-bed) hospitals each on the initiative of the Ministry of Health, is under construction by 3 different contractors. The floor areas per bed of each contractor are as follows.

Item	A	B	C
Total floor area of hospital	54,669 m2	62,223 m2	58,656 m2
Floor area per bed	137 m2/ bed	156 m2/ bed	147 m2/ bed
Floor area of accommodation facility for doctors	4,760 m2	8,046 m2	8,071 m2

As shown above, these hospitals are designed to be fairly larger than the minimum standard of 120 m2. These 400-bed hospitals include some diagnosis and treatment departments which are not planned in the 200-bed hospitals in this project.

In line with this, this project plans to make the scale at 120 m2 per bed. Accordingly, the total floor area of the hospital will be 200 beds x 120 m2 = 24,000 m2. Meanwhile, where infrastructures – power generations – are concerned, plant facilities including water purification and sewage treatment will be constructed in accordance with the request from the Ministry of Health, which says that, because of frequent electric outages, it is necessary to have power generators which can supply all the necessary electricity for several days.

Accommodation facility for doctors will be constructed separately. It will be designed to accommodate 50 people with considering the number of doctors for a 200-bed hospital. The proportion of single doctors and those with families is set at 1:1, and the floor area will be designed at 60 m2 for the former and 150 m2 for the latter. Therefore, the scale of the accommodation facility will be 5,000 m2.

2) Consistency with the domestic design standard

Clear standards related to architecture and construction in Iraq are still undeveloped, therefore design/constructions are based on the standards that are considered to be adequate by the designer/constructor (standard of their own country if the designer/constructors are in foreign companies).

The standard of the U.S., International Building Code (hereafter referred to as “IBC”), and the design standard of Japan, Building Standards Act, are compared in this section, in order to validate the relevance of the legal aspects related to the development of facilities.

According to the engineers of the Ministry of Health and local consultants, in Iraq, IBC is applied for the design and construction in the project for 10 (400-bed) hospitals currently under construction, and is also often applied in design/construction of facilities.

However, this project is related to the construction of 200-bed hospitals, therefore this validation is focusing on the architectural standard related to the same function.

Comparison between the Building Standards Act of Japan and IBC

Item	Building Standards Act of Japan	IBC		
Fireproof Quasi-fireproof	Fireproof shall be provided for openings on a firewall.	706 707	Fire Walls Fire Barriers	Each opening shall not exceed 15 m2. The aggregate width shall not exceed 25% of the length of the wall.
Fire Compartment	Shaft enclosures shall have a fire-resistance rating of not less than 45 min.	708	Shaft Enclosures	Fire-resistance rating of not less than 2 hours (4 stories or more), and not less than 1 hour (less than 4 stories)
	An enclosed EV lobby is not required.	708	Shaft Enclosures	An enclosed EV lobby shall be provided at each floor, connecting more than 3 stories.
	Stories shall be divided into fire compartments of not more than 1,500 m2.	407.4	Smoke Barriers	Stories shall be divided into smoke compartments of not more than 2,000 m2 (hospitals)
Building Construction	Min. area of exterior wall openings shall be based on effective daylight rate.	705	Exterior Walls	Max. area of exterior wall openings shall be based on fire separation distance and degree of opening protection.
Structural Calculation	Thickness of protection for reinforcement shall be measured to the outside of the reinforcement.	704	Fire Resistance -rating of Structural Members	Thickness of protection for reinforcement shall be measured to the outside except stirrups or spiral reinforcement ties projecting not more than 12.7mm into the protection.
Interior Finishes	The allowable fire performance and smoke development of interior finishes shall be limited based on building functions, numbers of floors and building areas.	800	Interior Finishes	The allowable fire performance and smoke development of interior finishes shall be limited based on occupancy classification.
		803	Thickness exemption	Materials of less than 0.9mm applied directly to the surface of walls or ceilings shall not be required to be tested.
Means of Egress	Limitation of a ceiling height is not specified.	1003	Ceiling Height	A ceiling height shall be not less than 2,286mm.
	The means of egress width and numbers are not specified.	1005	Egress Width	The means of egress width and number shall be based on total occupant load.
	Means of egress doors in hospitals are not specified.	1008	Doors, Gates and Turnstiles	Means of egress doors used for the movement of beds shall provide a clear width not less than 1,054mm and height not less than 2,032mm. (Hospitals)
	A height of stairways headroom is not specified.	1009	Stairways	Stairways shall have a min. headroom clearance of 2,032mm.
	Stair riser heights shall be max.200mm and treads shall be min. 240mm. (hospital with living rooms on the upper floor totally over 200 m2)			Stair riser heights shall be 178mm max. and 102mm min. Winder treads shall have a min. depth of 279mm.
	Stairway landings shall be installed at every 4m height. (hospital with living rooms on the upper floor totally over 200 m2)			Unspecified.
	The common path of egress shall not exceed 25m. The travel distance to the exit access stairway door shall not exceed 50m.	1014	Exit Access	The common path of egress travel shall not exceed 22,860mm. The travel distance to the exit access stairway doors shall not exceed 60,960mm.
				A suite of sleeping rooms of not less than 93 m2 shall have not less than 2 exit doors, and the travel distance between any point in the suite and an exit access door shall not exceed 30,840mm.
Road				Unspecified
Use Zoning	Restriction shall be based on use zones Height shall be based on oblique line. Aare shall be based on building coverage ration/floor area ratio and fire-resistance rating			Unspecified
Building Coverage Ratio/Floor Area Ratio		5	General Building Heights and Areas	Height and area shall be based on fire-resistance rating. No restriction based on zoning No restriction if the fire-resistance ratings of primary structure is 3 hours and etc.
Restriction of height/shadow				
Fire Zone Semi-fire zone				Unspecified

The above table shows the typical differences between the Building Standards Act of Japan and IBC, based on the former.

Many of the items in IBC are related to prevention of fire accidents or prevention of the damages spreading in the event of fire. The items for “evacuation equipment” are especially detailed and strictly regulated compared to the Building Standards Act of Japan, specifying the width of evacuation routes or sizes of fittings on the route. On the other hand, it does not have regulations that specify the area of usage, fire prevention area, and is a standard that is not specific to a limited area.

Detailed comparison of fire resistant performance or structural strength, etc. has not been carried out. However, it can be considered that the basic principle or regulations are both similar.

Although slight differences can be observed between the two overall, if the IBC is satisfied, then the Building Standards Act of Japan is basically satisfied. However, attention must be paid to the differences if design and construction are conducted in Iraq based on the IBC, as described in the above table.

3) Relevance of technical level related to the planned facilities

When construction of hospitals and general buildings compared, special technologies as shown below are required for construction of hospitals.

Special technologies required for hospitals

Item	Details	Iraqi techniques	
		Design	Construction
Seismic Isolation/Damping Structure	In areas of earthquake occurrence Standard buildings with earthquake resistance are secured, the inside of which is quaked heavily. It is proved by earthquakes all over the world that hospitals with earthquake resistance are no longer functioned.	N/A	N/A
Radiation Shield Technology	Doors and glasses are made of particular kind of material, ex. lead, but construction technology is not so particular.	X	X
Electromagnetic Shield Technology	Electromagnetic shield is necessary for electroencephalography rooms and MRI rooms, which is higher technology than radiation and requires special contractor technique.	N/A	N/A
Soundproofing Technology	Soundproofing is necessary for hearing test rooms and etc., which doesn’t demand so high technology as broadcasting facilities and musical halls and its technology isn’t so particular.	N/A	X
Air Cleaning Technology	Particular technology of design and construction, such as HEPA-filters and pressure control is required.	N/A	N/A
Medical Gas System	Installation by special contractor is required.	N/A	N/A
Steam Supply System	Installation by special contractor is required.	N/A	N/A
Building Control Technology	This technology manages air conditioning and electric equipment etc. uniformly and implements reduction of operation cost by energy saving etc.	N/A	N/A
Water purifying System	Particular equipment purifying water are required, but design and construction are not particular.	X	X

N/A : Not Applicable, X : Applicable

Hospitals are functional facilities where departments are mutually linked in a complex system. Medical services could be supplied in the past in a pavilion-type layout where departments were placed individually. However, a highly integrated facility layout is required for a modern medical service, and therefore, an experienced design team is essential for the design.

(7) Relevance of technical level related to planning of equipment

The standard equipment list is presented in the hospital establishment standard issued by the Ministry of Health. The listed items meet the above-mentioned planned departments and those are necessary in general hospitals.

The pieces of medical equipment being requested are not high-level medical equipment used in specialized hospitals. It is necessary, however, to implement operation training for the latest equipment at the time of installation.

Major equipment at each department is as follows;

- Diagnostics Imaging Dept.

  General X-ray, Fluoroscopic X-ray, CT devices, Mammography, Mobile X-ray, etc.

  CT devices have been already adopted in 200-bed hospitals, and are now considered to be common equipment in Iraq. On the other hand, some hospitals, such as educational hospitals and hospitals in the capital of governorates, are equipped with MRI devices, but those at a lower level located in urban areas, are beginning to adopt the devices.

- Wards (internal medicine, surgery, pediatrics, Obs. & Gyn., ICU, CCU, and PCU)

  Basically, electric beds are adopted. A standard set of equipment is supplied, including patient monitors, ventilators, ECG, defibrillators, infusion pumps, syringe pumps, and infant incubators.

- Outpatient (internal medicine, surgery, dermatology, urology, neurology, dentistry, pulmonology, Obs. & Gyn., pediatrics, ophthalmology, ENT, and orthopedics)

  Together with examination tables, equipment unique to each department is supplied, which includes ultrasound apparatus, ECG, EEG, audiometers, dental units, slit lamps, ophthalmology lasers, ENT treatment units, and dermatological lasers. Some hospitals in the capital of governorates are equipped with calculus lithotripsy devices, but not so many hospitals at a lower level in urban areas are equipped with them.

- Central Operation Theater

  A standard set of equipment is supplied, including shadow-less lamps ceiling type, operation tables, anesthesia apparatus, electric cautery, patient monitors, C-arm X-ray, mobile X-ray, surgical microscopes, and sets of surgical

instruments.

- Central Sterilization Supply Department

  A standard set of equipment is supplied, including steam sterilizers, plasma sterilizers, ultrasonic cleaning machines, automatic jet washing machines, drying machines, and bag sealers.

- Emergency Department

  Operation tables, anesthesia apparatus, electric cautery, patient monitor, C-arm X-ray, etc.

- Delivery Department

  Delivery beds, delivery monitoring devices, and aspirators for delivery.

- Endoscope Department

  Gastrovideoscopes, duodenovideoscopes, bronchovideoscopes, etc.

- Dialysis Department

  Dialysis machines, beds, reverse osmosis water purification system, etc.

- Clinical Laboratory Department

  (Biochemistry, hematology, blood bank, pathology, microbiology and autopsy)

  Automatic analyzers, automated urine analyzers, blood gas analyzers, spectrophotometers, centrifuges, automated blood cell analyzers, blood refrigerators, microscopes, ELISA, automated staining apparatus, etc.

- Rehabilitation Department

  Equipment related to exercise therapy, equipment related to physical therapy, equipment related to occupational therapy, etc.

- Pharmaceutical Department

  Tablet packaging machines, power packaging machines, dispensing counters, clean benches, etc.

- Kitchen and catering

  Cooking utensils, a set of dish washing apparatus, plateware, thermal/refrigerated serving wagons, etc.

- Laundry

  Washing machines, dryers, flat ironers, etc.

3. Implementation Schedule and Estimated Project Cost

The schedule after signing the L/A is shown below, and it is estimated that roughly 68 months are required for the completion of the construction. The project term is expected to be a total of 80 months (after the selection of a consultant) if warranty period of 24 months are included.

(Proposed) implementation schedule

Process	Period
1. Selection of consultant	12 months
2. Detail design	16 months
3. Bidding Preparation of Bidding documents, PQ, PQ evaluation, consent of JICA, bidding, evaluation, consent of JICA, contract negotiation, concurrence of JICA, establishment of L/C	Construction 16 months Equipment 16 months
4. Construction	24 months
5. Training for operation and maintenance of facilities and equipment	3 months
6. Procurement of equipment, installation, training for operation and maintenance	25 months
7. Warranty period	24 months
MOH's site preparation	14 months

The estimated project cost will be disclosed after the completion of the tendering procedure of the project.

Additional cost for maintenance after implementation of this project is estimated as below. The increase rate of the cost for operation and maintenance is 1.09% compared with the existing budget for operation and maintenance of the Ministry of Health, and 0.46% compared with the total budget of the Ministry of Health. Therefore it can be concluded that the Ministry of Health can secure the budget for the costs.

Maintenance cost

Item	Cost (Million ID)	Notes
Maintenance of Facilities	1,042.7	2% of construction cost
Utility Cost	2,987.5	refer to the below table
Maintenance of Medical Equipment	702.1	2% of equipment cost
Total	4,732.2	

Utility cost

Item	Cost (Million ID)	Condition of Estimation	
Electricity (rating: 5MW)	2,601.7	Consumed Amount per 1 hour (kWh)	4,000
		Power Distributing Hours per day (hours)	22
		A year (days)	365
		Consuming Rate (Load Rate)	0.6
		Unit Price (ID/kWh)	135
Fuel (generator: 1,000KVA)	226.5	Consumed Amount (L per hour) (0.6 load)	194
		Generating Hours (hours per day)	2
		A year (days)	365
		Unit Price (ID/L)	400
		Number of Generators	4
Water	13.7	Consumed Amount (ton/day)	500
		A year (days)	365
		Unit Price (ID/ton)	75
LPG	14.1	Consumed Amount per day (kg)	250
		A year (days)	365
		Unit Price (ID /kg)	155
Medical gas	131.4	O_2 (ID per year)	129,600,000
		N_2O (ID per year)	1,800,000
Total	2,987.5		

4. Evaluation of the Project

4-1. Precondition and external condition for achievement of the project

4-1-1. Precondition

a) Current medical personnel working at the existing hospitals, which are located in 6 governorates, except Kirkuk, are scheduled to be reallocated to the new hospitals which will be reconstructed from the existing hospitals. As for new Kirkuk hospital, there is a need of new staff employment. It is assumed that other new 6 hospitals also need additional employment due to expansion of the hospitals. Therefore, the Ministry of Health secures necessary personnel to manage the new hospitals.

b) In addition to that, it is indispensable for hospital operation to regularly keep and procure medical drugs and consumables, etc., necessary for providing healthcare service. The Ministry of Health manages stock and procures them appropriately.

c) The Ministry of Health makes appropriate operation and maintenance of facilities and equipment to be supplied in the project not to make obstacles in healthcare service provision.

d) The Ministry of Health takes sufficient budgetary measure to secure personnel, medical drugs, materials and spare parts.

4-1-2. External condition

a) The security situation in Iraq remains in the balance. During hospital constructions and after hospital openings, the security situation does not deteriorate.

4-2. Evaluation of the project

4-2-1. Relevance

The project is judged as valid from the reasons below.

(1) Healthcare policy

The project is based on the “National Development Plan 2010-2014”, and “Strategic Plan of the Iraqi Ministry of Health 2009-2013” which aim at “improvement of health status; for its realization, improvement of primary, secondary, and tertiary level healthcare services; reduction of the disparity between urban and rural areas; and, training/reeducation of human resource, etc.” Through improvement of aging and lacking healthcare facilities, the project provides healthcare services to the regions appropriately in terms of both quality and quantity.

(2) Beneficiaries

The population of the 7 targeted sites in the project is 2.3 million in total. It is estimated that the hospital beds per capita in the regions would be increased and the healthcare services of secondary level would be improved by this project. It is also expected that the patient acceptance situation of each governorate would be improved by reallocation of patients in the regions by improvement of secondary healthcare facilities.

4-2-2. Effectiveness

(1) Feasibility of the project

As to review of qualitative effect and quantitative effect (FIRR (Financial Internal Rate of Return) and EIRR (Economic Internal Rate of Return)) of the project, in Iraq the cost of healthcare services is hardly calculable since the healthcare services are free of charge, and the data for the labor costs and material costs of each hospital is inadequate due to the situation that the healthcare provision system is still on the process of development. Additionally, several data needed for other cost-benefit analysis are also very limited. Due to the above, the internal rate of return is not calculated in this project.

(2) Setting of operational effect indicator (baseline of indicator)

In consideration of the nature and the current situation of the healthcare sector in Iraq, the feasibility of the project will be assessed by operational effect indicator measured by comparing the situation prior to and after implementation of the project.

2 types of operational effect indicators, “structure indicators” and “process indicators” are to be adopted.

Current values of structure indicators

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	Provision of emergency medical services	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○
2	Provision of maternal and child medical services	○	○	○	○	○	○	○
3	Number of medical departments	7	19	11	16	15	9	8
	01 Internal medicine	○	○	○	○	○	○	○
	02 General surgery	○	○	○	○	○	○	○
	03 Respiratory				○	○		
	04 Cardiology		○		○	○		
	05 Gastroenterology		○		○	○		
	06 Nephrology and Diabetes				○	○		
	07 Neurology		○					
	08 Oncology		○					
	09 Dermatology	○	○	○	○	○	○	○
	10 Pediatrics	○	○	○	○	○	○	○
	11 Psychiatry		○		○			
	12 Orthopedics		○	○		○	○	○
	13 Plastic surgery		○					
	14 E.N.T.		○	○	○	○		
	15 Urology		○		○			
	16 Neurosurgery		○					
	17 Ophthalmology		○	○	○	○	○	
	18 Obs. and Gyn.	○	○	○	○	○	○	○
	19 Dental		○	○	○	○	○	
	20 Anesthesiology	○	○	○	○	○		○
	21 Radiology	○	○	○	○	○	○	○
4	Total number of beds	50	425	72	171	206	109	173
	General patients	44	342	56	122	170	89	133
	Internal medicine	10	82	12	20	32	18	30
	General surgery	10	60	12	12	16	16	35
	Pediatrics	10	40	17	40	63	37	40
	Obs. & Gyn. (except for NICU)	10	74	9	32	35	18	28
	Special units	6	12	16	49	36	20	40
	ICU	0	4	0	0	0	0	0
	CCU	0	8	0	0	12	0	0
	NICU	0	0	0	14	8	0	0
	PICU	0	0	0	0	0	0	0
	Emergency beds	6	0	16	29	16	20	40
5	No. of doctors	42	N/A	15	65	44	38	13

Values of structure indicators after completion of the project

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	Provision of emergency medical services	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○
2	Provision of maternal and child medical services	○	○	○	○	○	○	○
3	No. of medical departments	11	11	11	11	11	11	11
	01 Internal medicine	●	●	●	●	●	●	●
	02 General surgery	●	●	●	●	●	●	●
	03 Respiratory							
	04 Cardiology							
	05 Gastroenterology							
	06 Nephrology and Diabetes							
	07 Neurology							
	08 Oncology							
	09 Dermatology	●	●	●	●	●	●	●
	10 Pediatrics	●	●	●	●	●	●	●
	11 Psychiatry	●	●	●	●	●	●	●
	12 Orthopedics	●	●	●	●	●	●	●
	13 Plastic surgery							
	14 E.N.T.	●	●	●	●	●	●	●
	15 Urology	●	●	●	●	●	●	●
	16 Neurosurgery							
	17 Ophthalmology	●	●	●	●	●	●	●
	18 Obs. and Gyn.	●	●	●	●	●	●	●
	19 Dental	●	●	●	●	●	●	●
	20 Anesthesiology	○	○	○	○	○	○	○
	21 Radiology	○	○	○	○	○	○	○
4	Total No. of beds	246	246	246	246	246	246	246
	General patients	196	196	196	196	196	196	196
	Internal medicine	70	70	70	70	70	70	70
	General surgery	60	60	60	60	60	60	60
	Pediatrics	40	40	40	40	40	40	40
	Obs.& Gyn. (except for NICU)	26	26	26	26	26	26	26
	Special units[*1]	50	50	50	50	50	50	50
	ICU	10	10	10	10	10	10	10
	CCU	6	6	6	6	6	6	6
	NICU	4	4	4	4	4	4	4
	PICU	6	6	6	6	6	6	6
	Emergency beds	24	24	24	24	24	24	24
5	No. of doctors	42	40	40	65	44	40	40

Current values of the process indicators

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	No. of inpatients							
	Annual total No. of inpatients	17,520	33,945	9,808	24,952	18,980	17,516	21,900
	No. of inpatients per day	48.0	93.0	26.9	68.4	52.0	48.0	60.0
2	Annual No. of deliveries	2,400	9,152	3,099	1,317	6,267	7,612	4,035

Values of process indicators after completion of the project

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	No. of inpatients							
	Annual total No. of inpatients	89,790	48,839	41,850	44,829	28,306	49,369	38,891
	No. of inpatients per day	246.0	133.8	114.7	122.8	77.6	135.3	106.6
	(Rate of increased No. of beds)	492.0%	-	341.7%	143.9%	119.4%	225.7%	142.2%
	(Population growth rate)	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%
2	Annual No. of deliveries	2,998	5,148	3,871	1,645	7,827	9,507	5,040
	(Population growth rate)	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%

(3) Assessment of the operational effects

The measure of improvement is assessed by subtracting the value of each current operational effect indicator from the value of each operational effect indicators after completion of project.

Regarding the improvement of the structure indicators, provision of emergency medical services and maternal and child medical services becomes same as the current condition through preservation of the functions of ability to admit emergency patients and establishment of obstetrics and pediatrics department as secondary medical care facilities.

As for medical departments, improvement will be accomplished through establishment of kinds of departments which are not provided in the existing hospitals. By sites, greater improvement in the order is the 11 departments of improvement in the new hospital in Kirkuk, 6 departments in Salahhedin, and 5 departments in Basra.

As for hospitalization function, in general hospital beds, improvement is greater in 196 beds in Kirkuk, 152 beds in Salahhedin, and 140 beds in Diyala, which is the similar order to special units such as ICU and CCU.

As for number of medical doctors allocated, greater improvement in the order as 40 in Kirkuk, 27 in Basra, and 25 in Diyala. However, in Salahhedin, Babil, and Karbalaa, the number of medical doctors allocated exceeds 40 of baseline even as the same as the current condition.

Regarding the improvement of the process indicators, improvement in the number of inpatients is greater, and the number of patients per day is more than 80 in the more than half of the sites. This improvement will be expected and ensured not only by increase of beds but also by the operational support such as the expansion of placement

department and the number of doctors allocated.

Then, number of deliveries is expected to improve in all sites from 300 to 5,000 cases because of the increase in demand due to population growth, and so on. The biggest improvement is more than 5,000 in Kirkuk, with new hospital construction, and then, more than 1,800 of Theeqar, more than 1,500 in Karbalaa are greater improvement.

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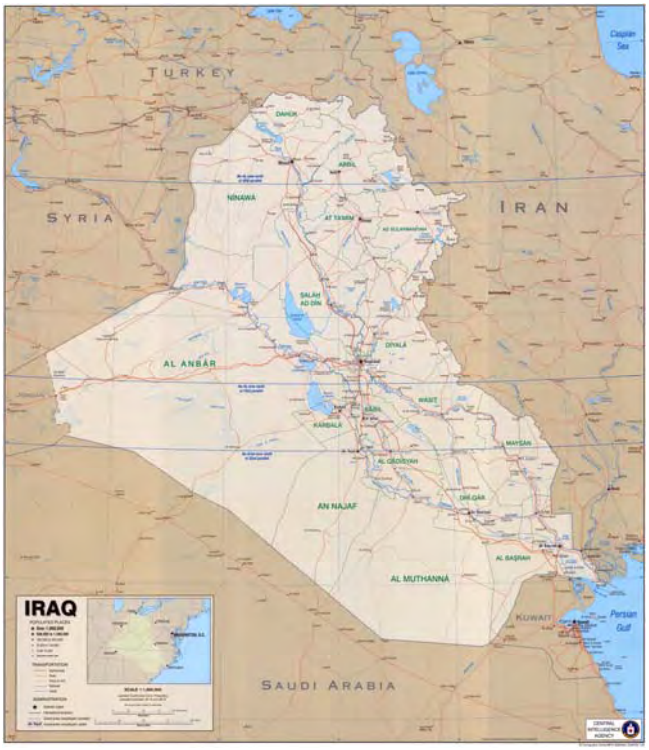
Location Map



The Republic of Iraq (Source: Central Intelligence Agency)

The capital of the governorate Project site

Targeted Sites (Source : Google Maps 2011)

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Abbreviations

Abbreviation	Original Name
AIDS	Acquired Immune Deficiency Syndrome
BMS	Building Management System
CCU	Coronary Care Unit
COT	Central Operation Theater
CSSD	Central Sterilization Supply Department
DOTS	Directly Observed Therapy Short-course
EIA	Environmental Impact Assessment
IBC	International Building Code
ICU	Intensive Care Unit
ID	Iraqi Dinar
IMF	International Monetary Fund
IMR	Infant Mortality Rate
L/A	Loan Agreement
L/C	Letter of Credit
MMR	Maternal Mortality Ratio
MOE	Ministry of Higher Education and Scientific Research
MOH	Ministry of Health
NDP	National Development Plan Years 2010-2014
NICU	Neonatal Intensive Care Unit
Obs. & Gyn.	Obstetrics & Gynecology
PICU	Pediatric Intensive Care Unit
RO	Reverse Osmosis
SPD	Supply processing Distribution
PQ	Preliminary Qualification
WHO	World Health Organization

Chapter 1. Background of the Project

Chapter 1 Background of the Project

1-1. Current situation and problems of the sector

1-1-1. Situation and problems

Hospital-centered healthcare system had been developed in all over Iraq from 1970s to the beginning of 1980s. The system was the greatest in the Middle East,[1] covering 97% of population in urban area and 71% in rural area. Health status was improved significantly in that term, for example, infant mortality rate (per 1,000 birth) decreased by half from 80 in 1979 to 40 in 1989, and under 5 year old mortality rate (per 1,000 birth) from 120 to 60.[2]

However, since 1980s the healthcare system in Iraq has been going to ruin because of the wars, economic sanction and political disorder. Medical facilities in Iraq haven't been rehabilitated or newly constructed sufficiently after 1980s. In addition to this, the fact that a lot of doctors left Iraq due to the wars caused serious shortages of medical personnel. As the result of those situations, it is hard to provide sufficient healthcare services both in quality and quantity in Iraq. Following is the main health indices of Iraq in comparison with other middle-east countries, demonstrating the current situation in Iraq.

Table 1-1-1: Health indices of Iraq and neighboring countries (2009)

	Life expectancy at birth	Newborn mortality rate (/1,000 births)	Infant mortality rate (/1,000 births)	Under 5 year old mortality rate (/1,000 births)	Maternal mortality rate (/100,000 pop.)
Iraq (*1)	66	23	36	44	75
Egypt	71	11	18	21	82
Iran	73	17	26	31	24
Jordan	71	15	22	25	59
Saudi Arabia	72	11	18	21	24
Syria	74	8	14	16	46
Turkey	75	12	18	20	23
Oman	74	6	9	12	20
Japan	83	1	2	3	6

*1 Estimated values of WHO (Source: WHO World Health Statistics 2011)

In recent years, medical personnel have been coming back to Iraq together with stabilization of security situation, and training of medical personnel has also been promoted. But old medical facilities and medical equipment haven't been renewed sufficiently yet. Improvement of healthcare system in Iraq such as securing medical personnel, rehabilitation of existing hospitals, construction of new hospitals and improvement of medical equipment is necessary and required.

[1] IRAQ WATCHING BRIEFS Health and Nutrition (WHO, UNICEF; Jul 2003)
[2] Health System Profile, Country: Iraq (WHO; Jun 2005)

1-1-2. Development plan

A. National Development Plan 2010-2014

"National Development Plan 2010-2014" prepared by the Ministry of Planning shows medium to long-term development policy and investment plan consisting of 11 sectors including "Population and Work", "Industry and Energy", "Good Governance" and others. In this plan, "Healthcare sector" along with "Education Sector" etc. is categorized as "Public Service".

(1) Problems in the healthcare sector

Up until 2003, healthcare sector projects were carried out by the central government based on previous policies formed decades before. These plans no longer meet the current medical needs, due to recent changes in disease structure and repeated war tribulation. The entire healthcare system needed to be rebuilt. Healthcare facilities have hardly been updated in spite of continued population increases in recent years. The National Development Plan points out the following problems in the healthcare sector:

1) Limitation of national budget allocations to the health sector.[3]
2) Difficulty of maintenance and development of medical supplies and medical care capacity.
3) Shortage of health organizations (hospital, main and subsidiary health centers, and so on).
4) Shortage of health and medical staff, and of organizations that provide health services.
5) Destruction of health sector infrastructure.
6) Distribution inequality of health services among governorates and between urban and rural areas.
7) Demographic changes in regions due to migration, a serious challenge to the practice of health policies.
8) Lack of a clear and approved demographic policy. Unstable and unplanned increases in population that strain medical services.
9) Problems related to water, electricity, sewage, discharge of medical and nonmedical waste and pollution of the environment.
10) Low accessibility to basic health services.[4]
11) Applicable legislations and laws are old and not oriented toward health care reform.
12) Weakness in legislations and laws that are related to environmental care.
13) Weak citizen participation resulting from dissatisfaction with services provided.
14) Limited role of the private sector in providing health services.

[3] The healthcare sector budget in the national budgets in 2002-2006 fell to 4.9%. Approx. 34 USD per capita of healthcare sector budget is lower than developing countries. (This figure is growing up to 127 USD/capita as of 2010)

[4] One fifth of families still cannot receive basic healthcare services. This trend is more prevalent in rural areas than in urban areas.

(2) Development objectives

With regards to the situations in healthcare sector listed above, the National Development Plan aims to provide “health services to satisfy individuals’ needs according to international health standards” and promote a full reconstruction of the healthcare system. It sets the following 5 concrete development objectives:

1) Reducing the patient/doctor ratio, increasing the number of beds according to the population, seeking justice in the distribution of health organizations between rural and urban areas, and increasing the number of organizations performing specialized medical tasks and providing them with necessary equipment and supplies.
2) Expanding and developing current health organizations by 50%.
3) Establishing advanced health organizations in all governorates to increase the number of beds in health department by 41%.
4) Expanding primary healthcare services by increasing the numbers of health centers to cover the needs of health departments in Baghdad and other governorates by 20%.
5) Increasing the number of specialized health centers to cover the needs of governorates for specialized services (specialized surgeries - preventive diagnosis) by 50%.

(3) Action Plan

The following 18 items are given as a specific action plan to achieve the objectives:

1) Developing high-quality infrastructure and services.
2) Building partnerships between the private and public sectors, supporting integration between them at all levels of construction, continuity, and efficiency.
3) Controlling contagious diseases, controlling hepatitis, and eradicating neonatal tetanus.
4) Expanding the range of available health services by establishing new organizations, especially in rural areas, implementing substitute projects, roving health centers, environmental study teams, commissions for evaluating the health of local societies, and so on.
5) Integrating activities of formal health organizations and informal organizations and societies such as the Society of Prenatal health, Protecting the Family, women’s organizations, and municipality councils to specify realistic needs and the possibilities of finance and participation.
6) Developing nursing institutions and colleges, encouraging enrollment, developing medical institutions and increasing the number of graduates in addition to establishing more medical colleges, developing their courses, and modernizing them.
7) Using all publicity media to deepen citizens’ health awareness.
8) Advancing health education provided by educational organizations, civil society organizations, and municipality councils through courses, symposiums, and publications.

9) Developing national pharmaceutical industries, protecting them, and providing technical and scientific supplies in cooperation with all related formal and informal departments and organizations.
10) Strengthening the capabilities of the health practitioners such as doctors, assistants, and managers, by providing specialized training and expertise to help improve the system.
11) Developing a health care system to make it part of comprehensive insurance for citizens.
12) Attracting migrated professionals who can participate in developing the system.
13) Providing advance technology for diagnosis and treatment.
14) Developing a system for health insurance in the context of a comprehensive system of social insurance.
15) Adopting a system of comprehensive quality management that guarantees effective planning, performance measures, and continuous improvement of performance.
16) Finding a research and study system suited to health and environmental problems and giving an effective role to the private sector to integrate with the public sector in providing health for all.
17) Caring for school health and environments and supporting coordination with educational organizations to promote school health.
18) Guaranteeing the safety of food, health, and the workplace.

In accordance with the development objectives in the above specific action plans, the National Development Plan presented numerical goals as shown in Table 1-1-2. They also position construction and expansion of healthcare facilities as priority issue.

Table 1-1-2: Development objectives in the healthcare sector

	2008	2009	2010	2011	2012	2013	2014	Objective
Health center (Rural Area)	-	-	100	200	300	400	500	500 health centers for those which have no health center
General doctors/ 2,000 pop.	0.8	0.8	1.0	1.0	1.0	1.0	1.0	
No. of General doctors	11,512	12,788	14,000	15,000	16,000	17,000	18,000	18,000
Specialized bed/ special doctor	6.1	6.1	6.3	6.5	6.6	6.8	7.0	7 specialized beds/ special doctor
No. of Dentists	3,859	3,859	4,154	4,654	5,272	5,980	6,508	
Dentists/ 5,000 pop.	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1/ 5,000 pop.
No. of Pharmacists	4,399	4,399	4,610	50	5,523	6,015	5,607	
Pharmacists/ 5,000 pop.	0.8	0.8	0.84	0.88	0.92	0.96	1.0	1/ 5,000 pop.
Health professionals/ 1,000 pop.	1.4	1.4	1.8	2.2	2.6	3.1	4.0	4/ 1,000 pop.
Nursing staff/ bed	1.1	1.1	1.2	1.5	1.6	1.8	2	2 staff / bed
Beds/ 1,000 pop.	1.1	1.2	1.3	1.3	1.4	1.4	1.5	2.5 beds/ 1,000 pop.
Bed occupancy rate (%)	47.5	47.5	52.0	56.5	61.0	65.5	70.0	70
Infant mortality rate (1,000 births)	35.0	35.0	34.3	-	33.8	33.2	32.6	32/ 1,000 births
Children aged under five years underweight (%)	9.1	9.1	8.7	8.3	8.0	7.6	7.2	7.2

Maternal mortality rate (100,000 births)	84.0	84.0	82.8	81.6	80.4	79.2	78.0	1/ 100,000 births
Measles immunization coverage among 1-year-old (%)	80.0	80.0	82.0	84.0	86.0	88.0	90.0	100
Births attended by skilled health personnel (%)	89.0	89.0	90.2	91.4	92.6	93.5	90.0	
Infection with malaria/ 100,000 pop.	0.03	0.03	0.02	0.02	0.01	0.01	0.0	
Incidence of tuberculosis/ 100,000 pop.	78.0	78.0	70.6	62.8	55.0	57.6	40.0	
DOTS[5] treatment-success rate (%)	87.0	87.0	87.6	88.2	88.8	89.4	90.0	
Percentage of coverage with the fifth visit of the pregnant mother for the primary healthcare (%)	30.0	32.0	40.7	53.0	65.3	77.6	90.0	90
Average of AIDS[6] among women aged 15-24/ 100,000 pop.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1/ 100,000 pop.

(Source: NDP2010-2014)

B. Strategic Plan of the Iraqi Ministry of Health for the years 2009-2013

(1) Budget for the Iraqi Ministry of Health in 2009

The Iraq Ministry of Health has presented its "Strategic Plan of the Iraqi Ministry of Health for the years 2009-2013". This plan emphasizes priority issues and promotes healthcare activities to achieve its objectives by 2013. In 2009, Iraq posted the budget for the Ministry of Health of approximately 4 billion USD as necessary for these activities.

(2) Goals and objectives in Strategic Plan of the Iraqi Ministry of Health

The 26 goals and objectives given in the plan are as follows:

1) Reduce under 5 year old mortality and morbidity rates by 5% from their 2007 levels (infant mortality rate (IMR): 35.5 per 1,000 births) within 2009-2013.
2) Provide citizens with healthy, safe food by 2013.
3) Eradication of neonatal tetanus.
4) Curtail infection rates of various infectious diseases to targeted values by 2013.
5) Fully suppress viral hepatitis by 2013.
6) Reduce maternal mortality rate (MMR) by 3% from its 2007 level (MMR: 19.4 per 10,000 births) by 2013.
7) Reduce the number of malnourished children under 5 year old 7% by 2013.
8) Control government corruption in the healthcare system by implementing fair policies.
9) As general rules for recruitment, develop a system to evaluate the skills necessary in prevention, treatment, diagnosis, emergency response, and special surgery using medicine and medical equipment in addition to expertise, ability and fairness.
10) Improve healthcare facility infrastructures and healthcare service levels by 2013 for high-quality services.

[5] DOTS : Directly Observed Therapy Short-course
[6] AIDS : Acquired Immune Deficiency Syndrome

11) Expand rehabilitation programs for the physically and mentally disabled 50% by 2013.
12) Improve and expand specialized healthcare facilities up to international standards in order to meet each administrative district's demands for specialized surgical services.
13) Establish high-level healthcare facilities all over Iraq by 2013.
14) By 2013, provide drugs and medical equipment in support of private Iraqi pharmaceutical companies, and increase their roles in assisting public institutions.
15) Formulate drug-related legislations for assured importing, storage, distribution and other drug management tasks.
16) Revise the current health and welfare legislation and enact new laws to achieve the vision, mission and priority issues set forth by the Ministry of Health.
17) Develop the primary, secondary and tertiary healthcare services needed in each city to establish a referral system by 2013.
18) Increase the Ministry of Health's budget from the national budget by 10% annually, and increase the budget from each administrative district by 15% annually.
19) Establish or redevelop emergency departments in public hospitals.
20) Improve emergency transport services.
21) Implement 30% of blood transfusion services in Iraq fully handled by blood bank equipment and staff by 2013.
22) Hire additional human resources throughout the entire Ministry of Health organization by 2013 in anticipation of future needs and continuing development.
23) Improve IT systems of all Ministry of Health facilities, and expand and update the database of health and welfare information.
24) In line with the Ministry of Health vision, fully revise government regulations and reform work assignments and organization by 2013.
25) Establish institutions in all administrative districts to handle disasters and crisis management.
26) Strengthen the system to eradicate narcotics and psychotropic substances, and suppress their distribution.

1-2. Background and outline of Yen loan request

The request for this project is aiming at establishment of 200-bed secondary hospitals (including hospitals, staff accommodations and medical equipment) at the 7 sites in Iraq. The request for the project was submitted by the Government of Iraq to the Government of Japan in January 2010.

The 7 sites requested in this project are as shown below. It was found that these are planned for transfer and new construction due to aging of existing hospitals, excluding Kirkuk. The existing facilities are not in the capitals of the governorates (except for Kirkuk) but are in the rural areas. The targeted sites of yen-loan project will be decided according to a result of appraisal by the governments of Iraq and Japan, which will be organized separately from this survey.

Table 1-2-1: General information of targeted sites

Site location	Population of the targeted area (Direct beneficiary population)
1) Salaheddin governorate (Al Ashurqat)	160,000
2) Kirkuk governorate (Kirkuk City)	Governorate: 1,200,000 Kirkuk City: 890,000 (targeted site is inside the city)
3) Diyala governorate (Balad Ros)	122,000
4) Babil governorate (Al Musaab)	300,000
5) Karbalaa governorate (Hindia)	210,000
6) Theeqar governorate (Al Ashatra)	400,000
7) Basra governorate (Al Mdaina)	240,000

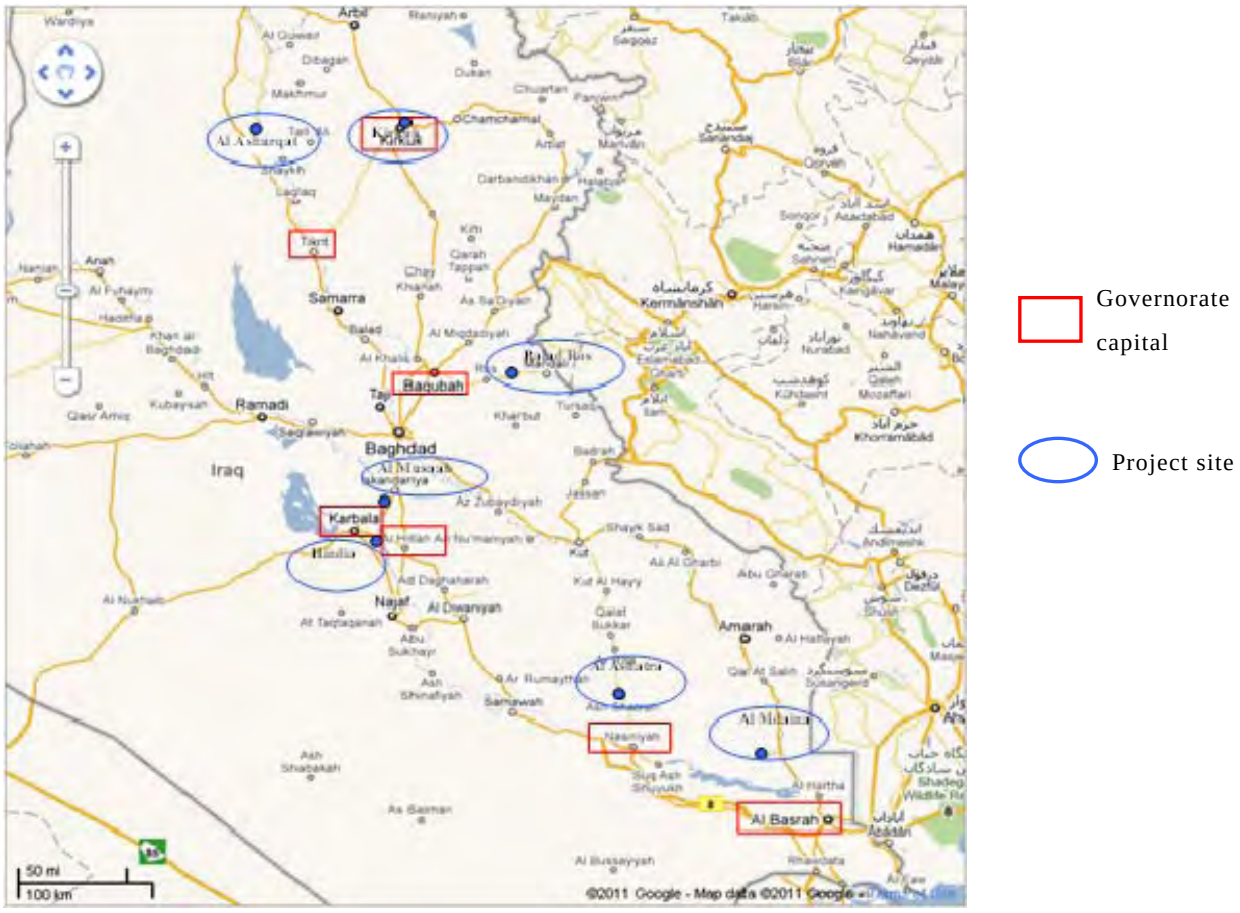


Figure 1-2-1: Targeted sites

1-3. Trend of aid by Japan

Japanese government and JICA position “Improvement of the Quality of Healthcare Services” as a main development agenda in the sector of “Improvement of Life-related Infrastructure” which is one of the prioritized aid sectors for Iraq.

The past aid in healthcare sector by Japan are “Provision of Medical Equipment to Al Samawah Maternity & Children Hospital” in 2003, “Procurement of Ambulances” in 2004 (emergency grant aid), “Provision of equipment to primary health centers in the Governorate of Al Muthanna” in 2004 (emergency grant aid).

Other than that, Japan extended emergency grant aids for supply of medical equipment and rehabilitation of facilities for the hospitals, which were constructed by “Construction Project for Five (400-bed) General Hospitals” and “Construction Project for Eight (400-bed) General Hospitals” using the mixed loan with governmental budget of Iraq and former Export-Import Bank of Japan in 1982-1983

Moreover, JICA’s technical cooperation provided training sessions in healthcare sector, especially in hospital management training, nursing leader training, etc., with 755 people, which covered 17% of the overall training performances targeting Iraq in the years 2003-2010.

1-4. Trend of aid by other donors

Aid in Iraq by each country and aid agency is mostly for maintenance of security, food aid and refugee aid, etc. Following is the main aid in healthcare sector in 2009.

Table 1-4-1: Aid in the healthcare sector (2009)

Donor	Implementing organization	Description	Funding USD
Brazil	UNICEF	Health and Nutrition-related activities	100,000
Emergency Response Fund (OCHA)	ERF Recipients	Health and nutrition activities	77,717
Germany	Diakonie Emergency Aid	Reduction of mortality and morbidity rate	136,054
Luxembourg	CARE International	Fight against the malnutrition of the children and the maternal mortality	157,213
Luxembourg	CARE International	Reduction of illness and death caused by malnutrition among pregnant woman, lactating mothers and children	157,213
Norway	TMC	Health personnel development	733,687
Sweden	UNICEF	Health and Nutrition	351,680
UNDG Iraq Trust Fund	WHO	HIV/AIDS Policy Support and Capacity Building Programme	1,000,000
UNDG Iraq Trust Fund	WHO	Iraq Public Sector Modernisation Programme	2,000,000
UNDG Iraq Trust Fund	WHO	Support to the Government of Iraq's National Measles and Polio Vaccination Campaign	1,488,748
UNDG Iraq Trust Fund	WHO	Strengthening of the Primary Health Care System in Iraq-Phase II	50,000
UNDG Iraq Trust Fund	WHO	Support to Improving Management and Safe Use of Medical Equipment	2,540,683
United Kingdom	UNICEF	Health and nutrition	1,104,956

(Source: Donor Information of each Country by United Nations Office for Coordination of Humanitarian Affairs)

Due to the current security situation, aid by each donor is implemented through international organizations such as UNICEF or WHO, etc.

Chapter 2. Outline of the Healthcare sector in the Republic of Iraq

Chapter 2 Outline of the Healthcare sector in the Republic of Iraq

2-1. Iraq healthcare administration

(1) Health administration system

The health administration system in Iraq is run by the Ministry of Health as its central agency, and 18 governorate health departments underneath it, including Baghdad municipality. There is also a separate Ministry of Health for the Kurdistan Regional Government in the 3 Kurdish governorates of Duhok, Erbil and Sulaymaniyah which controls health administration in these 3 governorates. 17 % of the national budget is allocated to the Kurdistan National Government, which independently allocates the healthcare budget for these 3 Kurdish governorates.

(2) Health financial system and healthcare sector budget

Aside from a few specific drugs, all medical services in Iraq are basically free of charge. Medical institutions provide medical examinations, hospitalization and drugs for free of charge. There is therefore no beneficiary payment system for health costs as they are all covered by the national budget in principle.

The National Development Plan, prepared based on data from 2008, reports that Iraq's healthcare budget was only 34 USD per capita between 2002 and 2006. As shown in the table below, however, this budget has steadily increased. In 2010, the latest figure has increased to 127 USD per capita.

Table 2-1-1: Trend of healthcare budget per capita (2002-2009)

Year	Operation and Investment Budget		Operation Budget (except for Drug Medicine)		Expense of Drug and Medicine		Investment Budget	
	USD/capita	Total Amount (million USD)	USD/capita	Total Amount (million USD)	USD/capita	Total Amount (million USD)	USD/capita	Total Amount (million USD)
2002 (population=22,207,864) (USD = 2,000 ID)	23.75	528	1.64	36	22.12	491		
2004 (population=23,559,669) (USD = 1,500 ID)	39.21	924	18.85	444	20.36	480		
2005 (population=24,266,172) (USD = 1,500 ID)	36.03	886	16.76	407	19.77	480		
2006 (population=24,266,172) (USD= 1,500 ID)	38.21	927	18.44	448	19.77	480		
2007 (population=25,740,552) (USD= 1,260 ID)	53.50	1,379	34.92	899	18.64	480		
2008 (population=27,696,606) (USD= 1,200 ID)	91.00	2,510	62.76	1,738	24.86	689	3.01	83
2009 (population=28,100,011) (USD = 1,180 ID)	125.00	3,502	72.20	2,029	37.91	1,065	14.52	408

(Source: MOH Annual report 2009)

The following compares these figures with neighboring countries. As shown below, figures are still well below the levels of other neighboring oil-producing countries.

Table 2-1-2: Healthcare budget per capita in neighboring oil-producing countries

Country	2009 Government Budget Per Person (USD)	Country	2009 Government Budget Per Person (USD)
Bahrain	761	Oman	391
Egypt	46	Qatar	1,361
Jordan	217	Saudi Arabia	478
Kuwait	1,189	UAE	1,053
Syria	22	Yemen	18

(Source: WHO http://apps.who.int/ghodata/?vid=1901)

(3) Overview of future new healthcare facility development projects and current projects

1) Construction project for 10 (400-bed) educational hospitals, financed by the budget of the Ministry of Health

In order to improve healthcare services and increase the number of beds, the Ministry of Health plans to build 10 (400-bed) educational hospitals. Goals of the project are to reduce mortality and morbidity rates, and expand medical employment. The ministry decided on construction companies through international competitive bidding in 2009. Buildings are now under construction, and are expected to be completed at the end of 2013. The contractors and their respective sites are shown as below.

Table 2-1-3: Contractors and their respective sites for the construction of 10 educational hospitals

Contractor	Nationality	No. of sites in charge	Site	Contract Amount for 1 site
Universal Acarsan	Turkey	5	Basra, Theeqar, Missan, Karbalaa, Babil	150 million USD
A.C.A Alliance	Australia	3	Risafah (Baghdad), Diwania, Diyala	135 million USD
German Medical Services	Germany	2	Najaf, Naynawa	148.5 million USD

The project is mainly implemented by the Department of Project and Engineering Services of the Ministry of Health.

2) Other hospital construction projects, funded by the budget of the Ministry of Health

Construction projects for 11 general hospitals in total were approved in the

Ministry of Health's 2009 investment plan as full turn-key projects[7].

Projects initially planned to build 4 (400-bed) general hospitals in Kirkuk, Salaheddin, Wasit and Muthanna, and 2 (200-bed) general hospitals in Haditha and Heet in Anbar, but have been expanded based on regional needs to the 11 hospitals given below. As of May 2011, the Ministry of Health was currently selecting construction companies by bid.

Table 2-1-4: Construction project for 11 new hospitals

No.	Beds	Category	Site
1	400	General Hospital	Kirkuk, Kirkuk
2	400	General Hospital	Wasit, Kut
3	400	General Hospital	Muthanna, Samawa
4	300	Maternity and Children Hospital	Karbalaa, Karbalaa
5	200	General Hospital	Anbar, Al Qhin
6	200	General Hospital	Anbar, Heet
7	200	General Hospital	Anbar, Haditha
8	100	General Hospital	Salaheddin, El Dor
9	100	General Hospital	Salaheddin, Samara
10	100	General Hospital	Salaheddin, Al Touse
11	100	General Hospital	Salaheddin, Degel

3) Hospital construction projects funded by other organizations

In addition to the projects being funded by the Ministry of Health, other hospital construction projects are in process with funded by the city of Baghdad, bilateral aid and other sources. An overview of these projects is given below.

Table 2-1-5: Hospital construction project funded by Baghdad Governorate Council

No.	Beds	Category	Site
1	200	General Hospital	Baghdad, Kharkh, Baya'a Distict
2	200	General Hospital	Baghdad, Risafah, Al Sha'ab District
3	200	General Hospital	Baghdad, Risafah, Al Nahrawan District
4	200	Special Hospital (Organ Transportation)	Baghdad, Medical City Complex
5	120	Special Hospital (Cardiovascular)	Baghdad, Medical City Complex
6	50	Special Hospital (Oncology and Nuclear Medicine)	Baghdad, Medical City Complex
7	1,000	Medical City Complex	Baghdad, Risafah, Al Rashid Ascari Camp

[7] This is one type of contract which includes design and construction of facilities as well as supply, installation and training of equipment.

Table 2-1-6: Hospital construction project funded by RDP (Regions Development Plan)

No.	Beds	Category	Site	Situation
1	50	General Hospital	Babil, Kifil	Complete
2	50	General Hospital	Babil, Al Mashro'a	Complete
3	50	General Hospital	Babil, Al Shomali	Complete
4	50	General Hospital	Babil, Al Kasim	Complete
5	100	General Hospital	Theeqar, Al Chibayash	Under Construction
6	24	Diabetes Center	Basra	Under Construction
7	50	Special Hospital (Cardiovascular)	Basra	Not Groundbreaking

Table 2-1-7: Hospital construction project funded by other sources

No.	Investor	Amount (USD)	Beds	Category	Site	Situation
1	Korea	8 million	120	Surgical Hospital	Baghdad, Al Karama Teaching Hospital	Complete
2	The United States	163 million	94	Pediatric Hospital	Basra	Under Construction
3	The United States	-	50	Obstetric and Pediatric Hospital	Babil, Musaab	Under Construction
4	The United States	-	100	Surgical Hospital	Maysan	Under Construction
5	Fallujah Hospital Construction Budget	45 million	240	General Hospital	Fallujah	Under Construction

Table 2-1-8: Hospital construction project funded by Japanese Loan (requested)

No.	Beds	Category	Site
1	200	General Hospital	Babil, Musaab
2	200	General Hospital	Diyala, Balad Ros
3	200	General Hospital	Salaheddin, Al Ashurqat
4	200	General Hospital	Karbalaa, Hindia
5	200	General Hospital	Basra, Al Mdaina
6	200	General Hospital	Theeqar, Al Ashatra
7	200	General Hospital	Kirkuk, Kirkuk

4) Primary healthcare facility construction projects

The Ministry of Health and other organizations have funded construction of 250 primary healthcare facilities. Construction for each facility costs approximately 10,000 USD.

Although 18 of the 133 facilities funded by the United States were still installing equipment as of 2009, almost all the other facilities have been completed and already started their activities.

Table 2-1-9: Source of fund and number of facilities in primary healthcare center construction project

Funds	No.
The United States	133
RDP (Regions Development Plan)	78
MOH	39
Total	250

2-2. Healthcare system

Medical services provided in Iraq can be divided formally into the following three categories:

- Primary healthcare: preventive care at health centers
- Secondary healthcare: general care at hospitals with beds
- Tertiary healthcare: advanced special care by specialized institutions

The primary level is basically health centers with no beds, the secondary level is general hospitals with beds (at 50-bed, 100-bed, 200-bed and 400-bed capacities), and the tertiary level is comprised of cancer centers, cardiovascular centers and other specialized hospitals.

However, patients of hospitals at lower level are not necessarily required to submit a medical reference to go to hospitals at higher level. In reality, many patients directly go to hospitals at the secondary and tertiary levels. Thus, in Baghdad, where most of the specialized hospitals are located, a referral system has been recently introduced to systematically accept patients from lower-leveled hospital.

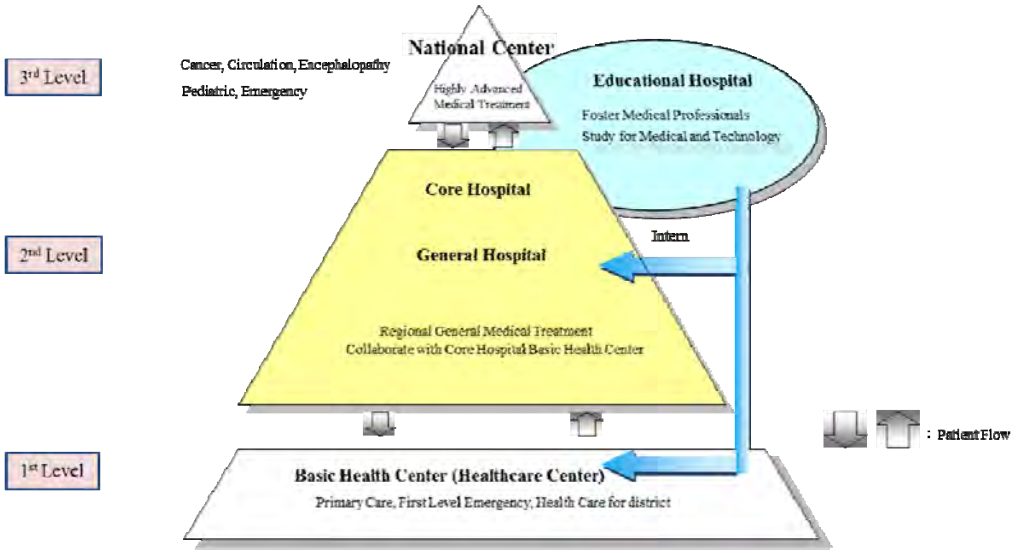


Figure 2-2-1: Healthcare delivery system

2-3. Healthcare facility development

(1) Development and activity of various facilities

1) Number of hospitals

In 2009, there were 220 government hospitals and 100 private hospitals.

Table 2-3-1: Number of hospitals by governorate

Governorate	Government hospital			Private hospital	Population/ Government hospital	Government hospital/ 100,000 populations
	Educational	Non Educational	Total			
Baghdad	20	25	45	38	163,139	0.6
Basra	4	8	12	5	217,383	0.5
Nineveh	5	9	14	3	217,700	0.5
Maysan	0	6	6	0	171,718	0.6
Diwaniyah	2	3	5	3	224,903	0.4
Diyala	2	7	9	3	151,239	0.7
Anbar	2	9	11	2	134,384	0.7
Babil	3	11	14	3	122,553	0.8
Karbalaa	1	4	5	2	198,781	0.5
Kirkuk	1	6	7	2	174,740	0.6
Wasit	0	9	9	1	128,411	0.8
Theeqar	1	7	8	2	229,955	0.4
Muthanna	0	4	4	1	177,675	0.6
Salaheddin	1	8	9	1	139,282	0.7
Najaf	2	5	7	3	173,705	0.6
Erbil	2	18	20	8	76,868	1.3
Duhok	1	8	9	5	109,489	0.9
Sulaymaniyah	2	24	26	18	65,502	1.5
Total	49	171	220	100	146,936	0.7

(Source: MOH Annual report 2009)

Table 2-3-2: Classification of hospitals

Governorate	Government hospital 2008				Government hospital 2009			
	General	Specialized	Total	% of total hospitals	General	Specialized	Total	% of total hospitals
Baghdad	16	26	42	20	18	27	45	21
Basra	11	1	12	6	11	1	12	6
Nineveh	8	6	14	7	8	6	14	7
Maysan	5	1	6	3	5	1	6	3
Diwaniyah	4	1	5	2	4	1	5	2
Diyala	6	3	9	4	7	2	9	4
Anbar	10	1	11	5	10	1	11	5
Babil	9	4	13	6	9	5	14	7
Karbalaa	3	2	5	2	3	2	5	2
Kirkuk	5	1	6	3	6	1	7	3
Wasit	6	3	9	4	6	3	9	4
Theeqar	6	2	8	4	6	2	8	4
Muthanna	3	1	4	2	3	1	4	2
Salaheddin	8	1	9	4	8	1	9	4
Najaf	4	2	6	3	5	2	7	3
Erbil	13	6	19	9	14	6	20	9
Duhok	5	4	9	4	5	4	9	4
Sulaymaniyah	17	4	21	10	19	7	26	12
Total	139	69	208	100	147	73	220	100

*1. Specialized Hospital consists of tertiary hospitals such as cancer hospitals and secondary specialized hospitals such as maternity hospitals and pediatric hospitals.

(Source: MOH Annual report 2009)

2) Number of beds

Looking at beds by governorate, around 90% of declared beds are usable. Average bed occupancy rate is around 50%. Bed occupancy rates are low because almost all hospitals countrywide are at least 25 years old and do not sufficiently function as medical facilities. According to the Ministry of Health, some patients, who need hospitalization, are not admitted due to failures and/or shortages of medical equipment. Additionally, facilities in hospital wards are not sufficiently maintained; the ministry says that there are some cases where patients are treated at home and/or see doctors regularly although they need hospitalizations.

Table 2-3-3: Number of beds by governorate (government hospitals)

Governorate	Number of beds		Bed occupancy rate	Rate of bed /1,000 populations
	Total	Usable		
Baghdad	11,304	9,617	50	1.5
Basra	3,780	3,106	55	1.4
Nineveh	3,470	3,159	46.2	1.1
Maysan	1,118	1,049	50.3	1.1
Diwaniyah	1,151	1,151	62.2	1.0
Diyala	1,223	1,221	44.7	0.9
Anbar	1,509	1,309	59.3	1.0
Babil	1,778	1,778	66.5	1.0
Karbalaa	1,060	1,060	58.1	1.1
Kirkuk	1,239	1,187	46	1.0
Wasit	1,570	1,429	50.5	1.4
Theeqar	1,615	1,549	49.3	0.9
Muthanna	1,052	1,036	53	1.5
Salaheddin	1,487	1,194	38.2	1.2
Najaf	1,562	1,350	54.6	1.3
Erbil	2,313	2,285	39.3	1.5
Duhok	1,251	1,251	53.7	1.3
Sulaymaniyah	2,430	2,188	41.6	1.4
Total and average	40,912	36,919	50.4	1.3

(Source: MOH Annual report 2009)

Table 2-3-4: Number of beds by governorate (government hospitals and private hospitals)

Governorate	Number of usable beds			Rate of private compared with government
	Government	Private	Total	
Baghdad	9,617	1,339	10,956	13.9
Basra	3,106	172	3,278	5.5
Nineveh	3,159	116	3,275	3.7
Maysan	1,049	0	1,049	0
Diwaniyah	1,151	60	1,211	5.2
Diyala	1,221	60	1,281	4.9
Anbar	1,309	59	1,368	4.5
Babil	1,778	59	1,837	3.3
Karbalaa	1,060	68	1,128	6.4
Kirkuk	1,187	52	1,239	4.4
Wasit	1,429	20	1,449	1.4
Theeqar	1,549	51	1,600	3.3
Muthanna	1,036	20	1,056	1.9
Salaheddin	1,194	26	1,220	2.2
Najaf	1,350	83	1,433	6.1
Erbil	2,285	225	2,510	9.8
Duhok	1,251	63	1,314	5.0
Sulaymaniyah	2,188	138	2,326	6.3
Total and rate	36,919	2,611	39,530	7.1

(Source: MOH Annual report 2009)

3) Number of health centers

The number of health centers is shown below. There are two types of health centers. One is staffed with medical doctors, and another is managed by medical personnel other than medical doctors.

Table 2-3-5: Number of health centers (2008-2009)

Governorate	Administrated by doctors				Administrated by medical personel other than doctors				Total		Population/ health center	
	2008		2009		2008		2009					
	No.	% of total health centers	No.	% of total health centers	No.	% of total health centers	No.	% of total health centers	2008	2009	2008	2009
Baghdad	164	16.4	169	15.8	7	0.7	8	0.7	171	177	41,741	41,476
Basra	84	8.4	85	7.9	9	0.9	17	1.5	93	102	27,504	25,575
Nineveh	100	10.0	100	9.3	45	4.6	46	4.2	145	146	20,870	20,875
Maysan	28	2.8	27	2.5	31	3.1	40	3.6	59	67	17,290	15,378
Diwaniyah	29	2.9	34	3.2	15	1.5	20	1.8	44	54	25,338	20,824
Diyala	45	4.5	55	5.1	34	3.4	28	2.6	79	83	16,688	16,399
Anbar	50	5.0	58	5.4	78	7.9	77	7.0	128	135	11,298	10,950
Babil	49	4.9	48	4.5	43	4.4	49	4.5	92	97	18,630	17,688
Karbalaa	25	2.5	26	2.4	14	1.4	14	1.3	39	40	25,800	24,848
Kirkuk	41	4.1	43	4.0	37	3.8	37	3.4	78	80	15,332	15,290
Wasit	33	3.3	33	3.1	8	0.8	11	1.0	41	44	28,123	26,266
Theeqar	45	4.5	55	5.1	64	6.5	65	5.9	109	120	16,812	15,330
Muthanna	26	2.6	24	2.2	18	1.8	20	1.8	44	44	16,177	16,152
Salaheddin	35	3.5	35	3.3	36	3.7	36	3.3	71	71	17,557	17,655
Najaf	28	2.8	29	2.7	28	2.8	32	2.9	56	61	21,706	19,933
Erbil	84	8.4	93	8.7	144	14.6	165	15.0	228	258	7,400	5,959
Duhok	60	6.0	61	5.7	65	6.6	69	6.3	125	130	12,217	7,580
Sulaymaniyah	77	7.7	95	8.9	310	31.4	364	33.2	387	459	2,544	3,710
Total and rate	1,003	100	1,070	100	986	100	1,098	100	1,989	2,168	16,036	14,911

(Source: MOH Annual report 2009)

(2) Number of patients

The number of inpatients, outpatients and emergency patients for each governorate is shown as below.

Table 2-3-6: Number of inpatients, outpatients and emergency patients by governorate (government hospitals)

Govenorate	Inpatient		Outpatient		Emergency patient
	Number	/1,000 populations	Number	/1,000 populations	Number
Baghdad	441,440	60	5,858,757	798	1,085,345
Basra	220,977	85	1,676,777	643	959,741
Nineveh	267,154	88	2,168,867	712	432,590
Maysan	82,929	81	801,265	778	173,841
Diwaniyah	97,138	86	772,466	687	358,744
Diyala	93,414	69	638,707	469	175,201
Anbar	107,568	73	763,196	516	201,850
Babil	185,785	108	1,396,039	814	379,087
Karbalaa	88,708	89	650,595	655	197,031
Kirkuk	89,110	73	487,803	399	185,913
Wasit	112,866	98	1,161,715	1,005	458,633
Theeqar	115,608	63	1,148,194	624	397,867
Muthanna	75,694	107	948,898	1,335	385,252
Salaheddin	71,259	57	1,223,303	976	280,290
Najaf	106,939	88	1,030,391	847	242,835
Erbil	169,601	110	1,351,451	879	344,744
Duhok	119,729	122	1,169,089	1,186	248,676
Sulaymaniyah	292,033	172	1,584,051	930	507,470
Total	2,737,952	80	24,831,564	768	7,015,110

(Source: MOH Annual report 2009)

The emergency transport system in Iraq is fairly different from that in Japan: most of patients, even in case of emergency, visit hospitals by walk or ordinary vehicles. Although ambulances are basically stationed in most hospitals, no emergency control system, as in Japan, exists. All the patients outside the normal clinic hours (from the morning to 2 p.m. or so) are treated in emergency departments. Additionally, patients who visit to emergency departments even within the normal clinic hours are registered as emergency patients regardless of their illness and injury.

2-4. Medical personnel

2-4-1. Allocation of medical personnel

WHO statistics for 2010 show that the number of medical doctors per 10,000 populations in Iraq was approximately 6.9 and that of nurses and midwives was 13.8. Both figures were lower than any neighboring country, suggesting that human resource development of special doctors is an urgent task. Facing with the shortage of human resourses, the Ministries are focusing on education and take various steps; the Ministry of Health formulated the human resource development plan; the Ministry of Higher Education and Scientific Research established new faculties of medicines and nursing schools as well as securing a stable number of students.

Table 2-4-1: Numbers of medical personnel and beds per 10,000 populations, by country (2010)

Indices / Country	No. of doctors	No. of dentists	No. of pharmacists	No. of nurses and midwives	No. of beds (2009)
	(per 10,000 pop.)				
Iraq	6.9	1.5	1.7	13.8	13
Egypt	28.3	4.2	16.7	35.2	17
Iran	8.9	1.9	2.0	16.0	14
Jordan	24.5	7.3	14.1	40.3	18
Saudi Arabia	9.4	2.3	0.6	21.0	22
Syria	15.0	7.9	8.1	18.6	15
Turkey	14.5	2.4	3.3	18.9	24
Oman	19.0	2.0	8.1	41.1	19
Japan	20.6	7.4	13.6	41.4	138

(Source: WHO World Health Statistics 2011)

(1) Medical doctors, dentists and pharmacists

The numbers of medical doctors, dentists and pharmacists allocated in each governorate are as follows.

The majority of special doctors is allocated in Baghdad since there are a lot of specialized hospitals. Doctors belonging to the Ministry of Higher Education and Scientific Research are mostly distributed into the governorates, where universities with a faculty of medicine are located.

Table 2-4-2: Number of doctors, by governorate (2009)

Governorate	MOH					MOHE	MOH and MOHE	
	Number of Special Doctor	Number of Special Doctor per 10,000 populations	Number of General Doctor	Number of General Doctor per 10,000 populations	Number of Doctor Total	Total Number of Doctor	Total Number of Doctor	Total Number of Doctor per 10,000 populations
Baghdad	2,182	3.0	4,235	5.8	6,417	210	6,627	9.0
Basra	457	1.8	1,335	5.1	1,792	109	1,901	7.3
Nineveh	760	2.5	1,704	5.6	2,464	138	2,602	8.5
Maysan	106	1.0	242	2.3	348	4	352	3.4
Diwaniyah	161	1.4	446	4	607	55	662	5.9
Diyala	164	1.2	434	3.2	598	8	606	4.5
Anbar	254	1.7	676	4.6	930	29	959	6.5
Babil	307	1.8	833	4.9	1,140	78	1,218	7.1
Karbalaa	211	2.1	619	6.2	830	30	860	8.7
Kirkuk	240	2.0	434	3.5	674	20	694	5.7
Wasit	170	1.5	346	3	516	21	537	4.6
Theeqar	179	1.0	491	2.7	670	39	709	3.9
Muthanna	87	1.2	130	1.8	217	11	228	3.2
Salaheddin	172	1.4	545	4.3	717	51	768	6.1
Najaf	272	2.2	459	3.8	731	102	833	6.9
Erbil	182	1.2	917	6	1,099	0	1,099	7.1
Duhok	127	1.3	438	4.4	565	0	565	5.7
Sulaymaniyah	181	1.1	995	5.8	1,176	0	1,176	6.9
Total	6,212	1.9	15,279	4.7	21,491	905	22,396	6.9

(Source: MOH Annual report 2009)

Dentists and pharmacists are excessively concentrated in Baghdad twice to three times as many as those in rural areas.

Table 2-4-3: Number of dentists and pharmacists, by governorate (2009)

Governorate	Specialized dentists	General dentists	Total	Dentist/ 10,000 populations	Specialized pharmacists	General pharmacists	Total	Pharmacist/ 10,000 populations
Baghdad	274	1,941	2,215	3.0	75	2,003	2,078	2.8
Basra	6	102	108	0.4	4	359	363	1.4
Nineveh	62	424	486	1.6	5	486	491	1.6
Maysan	5	47	52	0.5	0	93	93	0.9
Diwaniyah	5	93	98	0.9	2	133	135	1.2
Diyala	19	134	153	1.1	3	145	148	1.1
Anbar	21	188	209	1.4	10	193	203	1.4
Babil	12	199	211	1.2	5	299	304	1.8
Karbalaa	15	182	197	2.0	4	260	264	2.7
Kirkuk	7	119	126	1.0	4	194	198	1.6
Wasit	17	112	129	1.1	5	118	123	1.1
Theeqar	10	96	106	0.6	5	175	180	1.0
Muthanna	3	35	38	0.5	1	61	62	0.9
Salaheddin	9	109	118	0.9	0	140	140	1.1
Najaf	14	143	157	1.3	4	297	301	2.5
Erbil	19	93	112	0.7	14	88	102	0.7
Duhok	0	84	84	0.9	0	61	61	0.6
Sulaymaniyah	6	259	265	1.6	7	123	130	0.8
Total	504	4,360	4,864	1.5	148	5,228	5,376	1.7

(Source: MOH Annual report 2009)

In accordance with the required personnel in each facility across the country and with the new hospital construction plan, the Ministry of Health allocates doctors, dentists and pharmacists, considering the good ratio of personnel as a whole in the country.

(2) Nurses

Table 2-4-4 shows the allocation of nurses in each governorate as of 2009.

Table 2-4-4: Allocation of nurses, by governorates (2009)

Governorate	Nurses				
	Males	Females	Total	Nurses/ doctor	Nurses/ 10,000 pop.
Baghdad	3,619	2,781	6,400	1.0	8.7
Basra	1,780	1,152	2,932	1.5	11.2
Nineveh	2,931	647	3,578	1.4	11.7
Maysan	1,460	342	1,802	5.1	17.5
Diwaniyah	2,321	199	2,520	3.8	22.4
Diyala	1,777	338	2,115	3.5	15.5
Anbar	1,597	62	1,659	1.7	11.2
Babil	2,272	552	2,824	2.3	16.5
Karbalaa	1,844	401	2,245	2.6	22.6
Kirkuk	1,321	463	1,784	2.6	14.6
Wasit	1,112	251	1,363	2.5	11.8
Theeqar	3,302	892	4,194	5.9	22.8
Muthanna	775	144	919	4.0	12.9
Salaheddin	810	151	961	1.3	7.7
Najaf	2,090	314	2,404	2.9	19.8
Erbil	1,347	1,604	2,951	2.7	19.2
Duhok	534	691	1,225	2.2	12.4
Sulaymaniyah	786	1,539	2,325	2.0	13.7
Total	31,678	12,523	44,201	2.0	12.7

(Source: MOH Annual report 2009)

The number of nurses per doctor was 2.0, and the number per 10,000 populations was 12.7. The number of male nurses was 2.5 times as many as that of female nurses: The number of female nurses was extremely small. The number of nurses in 2010 totaled 40,065, except for the Kurdish areas (Erbil, Duhok and Sulaymaniyah governorates), an increase of approximately 6% from 37,700, the number of nurses across the country in 2009 except for these 3 governorates.

(3) Specialized technicians

The allocation plan, as of 2009, of radiographic technicians, clinical laboratory technicians and other specialized technicians in each governorate is as follows. Since the number of medical facilities is large in Baghdad governorate and some of them are high-quality facilities, the demand for such technicians who play a supportive role for doctors is likely to be high.

Table 2-4-5: Allocation of specialized technicians, by governorate (2009)

Governorate	Specialized technicians			
	Males	Females	Total	Specialized technician/ 10,000 populations
Baghdad	7,370	4,624	11,994	16.3
Basra	2,208	1,370	3,578	13.7
Nineveh	2,832	751	3,583	11.8
Maysan	522	162	684	6.6
Diwaniyah	1,394	391	1,785	15.9
Diyala	1,278	502	1,780	13.1
Anbar	1,260	121	1,381	9.3
Babil	2,055	741	2,796	16.3
Karbalaa	1,293	460	1,753	17.6
Kirkuk	985	588	1,573	12.9
Wasit	1,334	670	2,004	17.3
Theeqar	2,181	826	3,007	16.3
Muthanna	646	228	874	12.3
Salaheddin	1,165	426	1,591	12.7
Najaf	1,968	892	2,860	23.5
Erbil	2,248	1,129	3,377	22.0
Duhok	468	174	642	6.5
Sulaymaniyah	2,107	1,806	3,913	23.0
Total	33,314	15,861	49,175	15.2

(Source: MOH Annual report 2009)

2-4-2. Education for medical personnel

Medical personnel in Iraq are roughly classifiable into medical doctors (general doctors and special doctors), dentists, pharmacists, nurses, and specialized technicians (radiographic technicians, clinical laboratory technicians, etc.). The certification for each category can be acquired after receiving basic education for a certain period and specialized education at the relevant educational institution.

(1) Basic education

Basic education in Iraq comprises primary education for 6 years starting at the age of 6 and secondary education for 6 years – a total for 12 years. The Ministry of Higher Education and Scientific Research administers primary and secondary education. Education, including learning materials, is free of charge.

Table 2-4-6: Basic educational institutions and educational period

Educational level	Institution	Length
Primary education	Primary school	6 years
Secondary education	Secondary school	3 years
	High school	3 years

In 2001/02, 85.6% of primary-school-children were enrolled in school, and the ratio increased in 2007/08 to 87%. On the other hand, the ratio for secondary education fell during the same period from 56.6% to 44.3%.

(2) Specialized education

The qualification for enrolment to specialized education is granted in accordance with the period of attendance to basic education. Higher education is administered by the Ministry of Higher Education and Scientific Research, and vocational education by other ministries and agencies. Under the control of the Ministry of Health is nursing colleges, nursing schools, schools for midwife etc.

Table 2-4-7: Specialized educational institutions and educational period

Educational level	Institution	Length	Qualification for enrolment
Vocational education	Technical school	2-3 years	Basic education of 12 years
Higher education	2-year college	2 years	Basic education of 12 years
	College	4 years	Basic education of 12 years
	University	4-6 years	Basic education of 12 years

Those who fail to have completed basic education of 12 years are neither allowed to be admitted to vocational nor higher education[8].

The enrolment ratio of higher education among population aged 18 - 23 fell from 10.2% in 2001/02 to 8.3% in 2007/08.

(3) Education for medical personnel

Where educational institutions for medical training in Iraq are concerned, there are universities (medical doctors, dentists and pharmacists) and nursing colleges and 2-year nursing colleges (nurses and midwives) administered by the Ministry of Higher Education and Scientific Research, and 2-year nursing colleges and technical schools (nurses and specialized technicians) administered by the Ministry of Health.

As for the quota of each educational institution, the Ministry of Health and the Ministry of Higher Education and Scientific Research confirms the needs for medical personnel at the hospitals under the supervision of the Ministry of Health, and accept applications of students for the educational institutions.

Medical education, including learning materials, is all free of charge.

1) Medical doctors

In order to be qualified as a medical doctor, an Iraqi student is required to graduate from high school and receive medical education for 6 years at the faculty of medicine of a university or at a medical college. The curriculum is based on the British system; textbooks used in British universities are basically used; and the courses are taught in English. Universities with the faculty of medicine are located almost all parts of the country.

After graduation of a medical school, the graduate is required to receive rotation residency training, as a “house officer” (comparable to “internship” of Europe and the United States and “doctor-in-training” of Japan), for 1 year (3 months each for surgery, internal medicine, Obs. & Gyn., and another department); receive another

[8] Until last year, there had been vocational schools in Kurdish areas which accepted those who completed basic education of 9 years only. However, the system was revised and now follows the national standards.

training at local hospitals for 2 years; and becomes a “senior house officer”. After service as a senior house officer for 1 to 2 years, the person is promoted to a general doctor. In order to become a special doctor, the specialized education is required for another 4 to 5 years[9]. The specialized education in foreign countries is acceptable. Prior to the Gulf War, the government bore the cost of overseas education and training.

In 2009, a total of 1,106 medical students successfully graduated, except for the Kurdish areas, and some 7,000 medical students were in school.[10]

2) Dentists

In order to be qualified as a dentist, a student is required, after graduating from high school, to receive the relevant education for 5 years at the faculty of dentistry of a university. As of 2009, universities with the faculty of density were located in 6 governorates, except for Erbil, Duhok and Sulaymaniyah governorates. After graduating from the faculty, the person is granted the certificate as a dentist, but is required to attend additional 1 year training at dental specialized centers; after this, local hospitals for 2 years similar to medical doctors. Moreover, it is necessary to engage in the additional specialized education for 1 to 4 years in order to be qualified as a specialized dentist.

In 2009, a total of 449 students of dentistry successfully graduated, and some 2,250 students were in school[11].

3) Pharmacists

In order to be qualified as a pharmacist, a student is required, after graduating from high school, to receive the relevant education for 5 years at the faculty of pharmaceutical sciences of a university. After graduation, the person is granted the certificate as a pharmacist, but is required to engage in practical training for another several years in order to be qualified as a specialized pharmacist.

As of 2009, universities with the faculty of pharmaceutical sciences were located in 7 governorates, except for Erbil, Duhok and Sulaymaniyah governorates.

In 2009, a total of 473 students of pharmaceutical sciences successfully graduated, and some 2,400 students were in school.

4) Nurse and midwife

The qualification of nurse and midwife is obtainable at educational institutions administered by the Ministry of Health and the Ministry of Higher Education and Scientific Research.

Training schools of nurses in Iraq used to be classified into several levels by

[9] However, “senior house officer” can have a chance to acquire certification of special doctor according to one’s own ability.

[10] These figures do not include students of the faculty of medicine in Wasit and Muthanna governorates which were newly founded and had no graduated students.

[11] These figures do not include students of the faculty of dentistry in Najaf governorate, which were newly founded and thus had no graduated students.

required years of basic education. Some schools allowed students to enroll after basic education of 6 years. Some others required 9 or 12 years. This made the educational levels of nurses mixed. The current educational criteria of nursing, which accept students to have completed basic education of 9 years, consists of nursing universities, 2-year colleges and nursing schools in order to maintain a certain educational levels of nurses.

Previously, 2-year colleges were administered under the Ministry of Higher Education and Scientific Research, and a quota on the number of students was limited. To increase nurses, some 2-year colleges have been established under the Ministry of Health since 2009.

Table 2-4-8: Number of training schools for nurses and midwives

Educational institute	Ministry in charge	Term	Gender	No.	Necessary educational background
Nursing university	MHESR	4 years	Males/Females	11	high school
Nursing college	MHESR	2 years	Males/Females	13	high school
College for midwifes	MHESR	2 years	Females	1	high school
Nursing college	MOH	2 years	Females	2	high school
Nursing school	MOH	3 years	Females	53	secondary school
School for midwifes	MOH	3 years	Females	16	secondary school
Former intermediate nursing school	MOH	3 years	Males/Females	closed	primary school
Former primary nursing school	MOH	2 years	Males/Females	closed	primary school

(Source: MOH, Dept. of Staff Training, 2011)

Quite a few people who are qualified as nurses at university obtain managerial posts or work as educators, while the majority of them actually working as nurses is graduates from nursing schools, or those who graduated from former intermediate nursing schools under the training system in the past.

In 2009, approximately 2,100 students were enrolled in 4-year nursing universities administered by the Ministry of Higher Education and Scientific Research, and approximately 2,200 students in 2-year nursing colleges. The number of graduates is estimated to be some 500 from nursing universities and some 1,000 from nursing schools.

In 2009, 7,200 students were enrolled in nursing schools administered by the Ministry of Health, and 1,300 students in schools for midwives. The number of graduates are estimated to be some 3,000 and 600, respectively.

5) Specialized technicians

The qualifications for radiographic technicians, clinical laboratory technicians,

physiotherapists and other specialized technicians are granted to people who have received education for 3 years at the relevant technical schools administered by the Ministry of Health.

The number of students in 2009/10 totaled approximately 3,460, an increase of 7.6% compared to the previous academic year.

(4) Postgraduate training

The Ministry of Health has been proactively conducting postgraduate training for qualified medical personnel. The following table shows domestic and overseas training programs which the ministry conducted in 2009, and the number of participants. It aims to offer better services with minimum human resources.

Table 2-4-9: Overseas training programs conducted by MOH in 2009

No.	Training courses	No. of participants
1	For special doctors	511
2	For general doctors	345
3	For dentists (specialists)	45
4	For dentists	28
5	For pharmacists (specialists)	185
6	For pharmacists	128
7	For specialists of public health	168
8	For nurses specializing public health	145
9	Medical engineering	350
10	Administration, financing and legal affairs	200
11	Others	432
	Total	2,537

(Source: MOH Annual report 2009)

In addition, assistances in these fields have been granted from abroad. An example is a program on training of medical personnel which the United Kingdom carried out for 2 years starting in 2007.

Table 2-4-10: UK training program for Iraqi medical personnel

Summary	The program was a leadership training program, including clinical training courses where 8 weeks were counted as 1 term, and management courses.
Cooperating agencies	(i) National Health Service Trust, (ii) Medical Royal College in UK, and (iii) BMJ Learning
Fields	(i) Orthopedic surgery, (ii) Pediatric surgery, (iii) Cardiology, (iv) Vascular surgery, (v) Oral surgery, (vi) Emergency, (vii) Neurosurgery, (viii) Radiology, (ix) Otorhinolaryngology, (x) Endocrinology, (xi) Plastic surgery, (xii) oncology, (xiii) Kidney dialysis and (xiv) Kidney transplant

Achievements	The program was carried out by 14 clinical training groups and 8 groups of them completed the program by May 2007. Some 800 doctors and nurses applied for, and 194 applicants were selected for the 8 groups. The composition of the trainees in the 8 groups is shown in the following table.

Table 2-4-11: Breakdown of participants in UK training program

No.	Gender		Region of origin		
	Males	Females	Northern	Central	Southern
194	174	17	31	113	48

2-5. Drug supply system

KIMADIA, the State Co. for Marketing Drugs And Medical Appliances, comprehensively manages drugs and medical supplies for all the medical facilities under the jurisdiction of the Ministry of health, and is in charge of centralized administrative control over the process from procurement to distribution to individual healthcare facilities.

This state-run company is directly administered by the Ministry of Health, and thus, same as in the case of other directorates and departments in the ministry, headed by Director General[12].

In recent years, drug insufficiency due to financial issues is improving, but there have been problems with medical facilities facing long wait time from time of order until delivery. The Ministry of Health is currently working on a project to upgrade their drug and medical supply control center to resolve these inventory control problems and other issues.

[12] See Figure 3-1-1: “Organization chart of Ministry of Health” in Chapter 3. (http://www.kimadia-iraq.com/site/)

Chapter 3. Situation Surrounding the Project

Chapter 3 Situation Surrounding the Project

3-1. Implementation structure of the project

3-1-1. Organization and personnel

(1) Executing agency

The Ministry of Health is the executing agency of this project, and the Project & Engineering Services under the Deputy Minister for Donor & Construction is in charge. The Project & Engineering Services is responsible for all the construction projects that are in progress under the Ministry of Health. Its role includes preparation of bidding documents, holding the bid, contract for construction, and supervision of the construction.

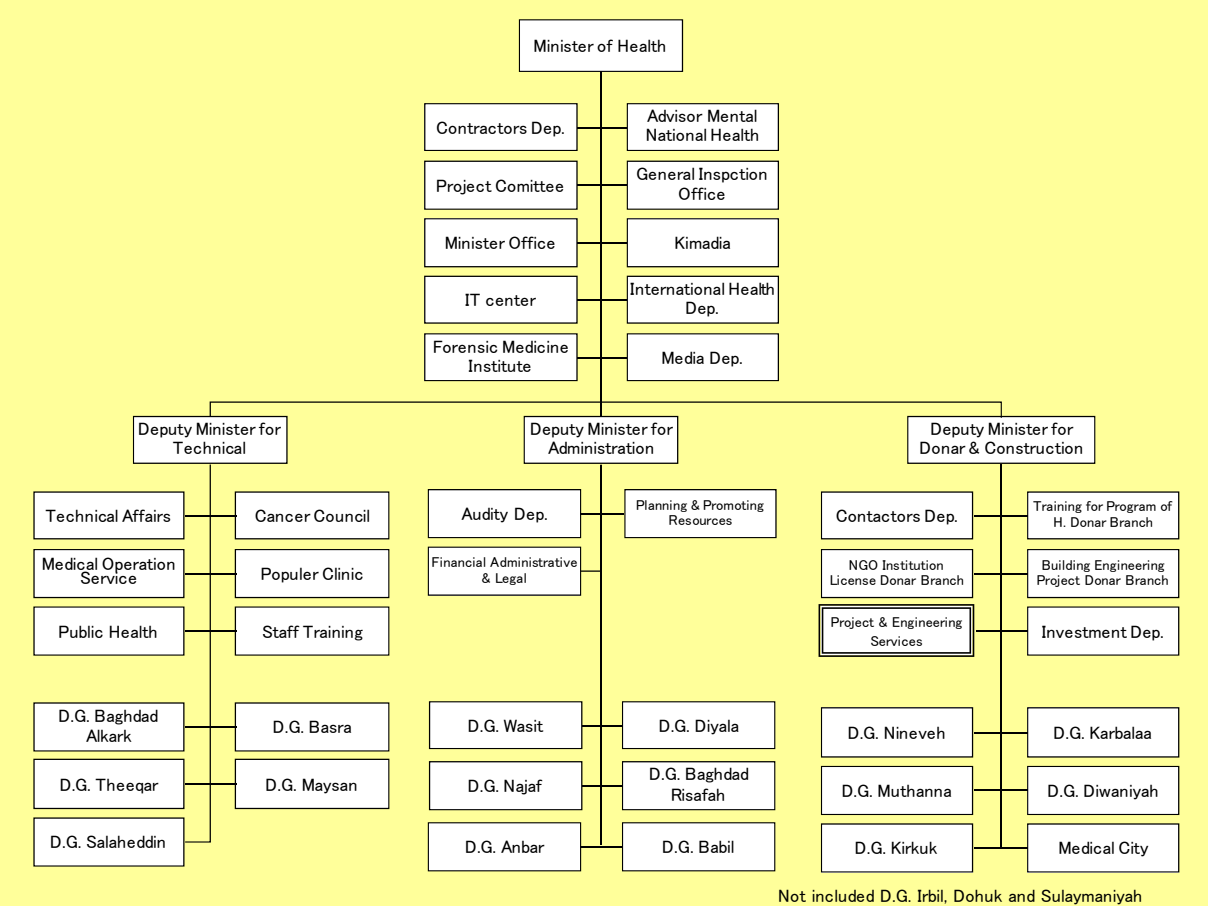
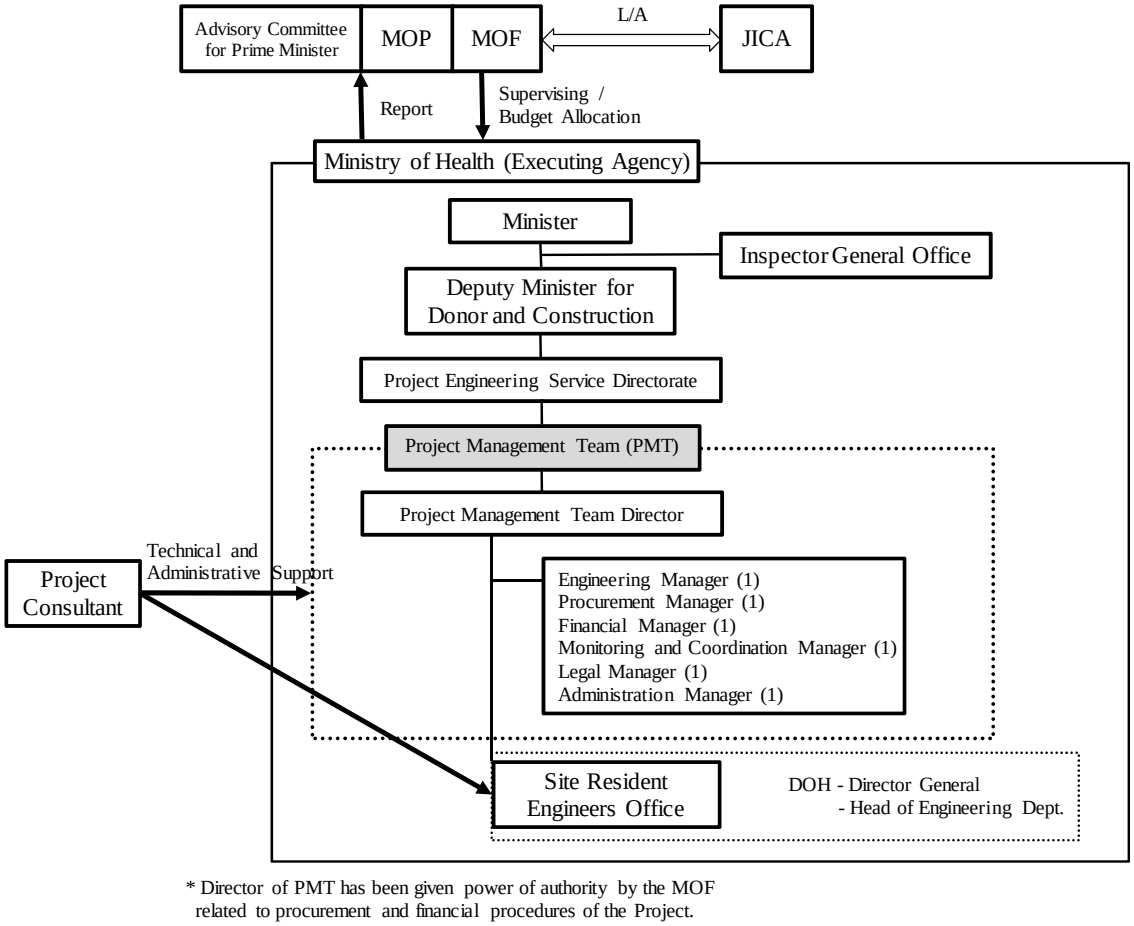


Figure 3-1-1: Organization chart of MOH

(2) Organizational structure of Iraq for the implementation of the project

The works to be carried out at each construction site after the contract for construction are supervised by the health department of each governorate.

Organization Chart of the Project



* Director of PMT has been given power of authority by the MOF related to procurement and financial procedures of the Project.

Figure 3-1-2: MOH project administrative team

3-1-2. Finance and budget

The trend in MOH budget amount from 2006 to 2011 is as below. Total budget amount is increasing every year. The proportion of investment budget to total budget is also rising by 20%.

Table 3-1-1: Trend in MOH budget amount (2006 – 2011)

Year	Total Budget (million ID)	Operation budget		Investment budget		Exchange rate
		Million ID	Million USD	Million ID	Million USD	1USD=ID
2006	1,390,901	1,390,901	927	-	-	1,500
2007	1,736,942	1,736,942	1,379	-	-	1,260
2008	3,012,194	2,912,194	2,427	100,000	85	1,200
2009	4,132,436	3,650,936	3,094	481,500	408	1,180
2010	5,759,417	4,632,417	3,926	1,127,000	955	1,180
2011	5,236,000	4,186,000	3,547	1,050,000	890	1,170

The MOH budget in 2009 and its allocation to health departments of each governorate are as follows. As shown in the table, the head office of MOH is the main actor handling investment and donation. Thus, it is obvious that the head office has responsibility of and is implementing national projects as with this project. Meanwhile, the maintenance budget which is 2.6% of the total is equally allocated to each governorate and is appropriated for maintenance fees of medical facilities and equipment.

Table 3-1-2: Investment and operation budget (2009)

(Millions of Iraqi Dinars)

Total	Investment	Donation	Other expense	Maintenance	Medical Service	Commodity	Compensation of employees	Total
MOH (except for Department of Inspector General)	364,625	20,435	23,150	11,095	12,830	1,261,328	54,533	1,747,997
Department of Health Basra	6,589	1,393	239	9,245	4,336	32,100	142,732	196,634
Department of Health Nineveh	2,549	2,409	258	10,835	5,082	38,703	166,283	226,120
Baghdad Health Directorate / Karkh	1,615	2,353	216	9,115	4,276	32,412	212,641	277,163
Department of Health Theeqar	5,101	1,633	163	6,561	3,077	23,147	110,161	149,843
Department of Health Diyala	255	1,220	115	4,771	2,238	17,327	83,925	112,147
Department of Health Babil	714	1,135	151	6,163	2,891	21,894	121,157	160,531
Department of Health Anbar	6,952	1,127	92	5,169	2,425	18,524	78,856	113,144
Department of Health Maysan	7,649	1,001	78	3,678	1,725	12,771	61,799	88,701
Department of Health Wasit	3,400	842	93	4,175	1,958	14,846	67,195	92,508
Department of Kirkuk	850	1,163	104	4,573	2,145	15,709	69,442	93,985
Department of Health Najaf	11,051	808	96	4,274	2,005	15,194	89,584	123,012
Department of Health Qadisiya	5,950	916	117	3,976	1,865	14,122	82,562	109,508
Department of Muthanna	5,099	361	76	2,585	1,212	9,227	36,265	54,824
Department of Health Karbalaa	4,395	752	105	3,579	1,679	12,729	71,407	94,646
Department of Health Salaheddin	3,400	693	132	4,473	2,098	15,947	61,048	87,791
Department of Medical City	11,900	721	78	3,748	1,758	13,497	64,903	96,604
Department of Baghdad / Rusafa	16,150	2,729	299	12,485	5,856	44,274	218,654	300,447
Department of Inspector General	0	323	16	452	844	543	4,653	6,832
Total	431,500	42,103	25,577	110,952	60,300	1,614,294	1,797,801	4,132,436

*1. Department of Inspector General exercises jurisdiction over the country as the Ministry of Health does.

(Source: MOH Annual report 2009)

3-1-3. Technical standard

The ongoing projects by the own budget of the Ministry of Health are supervised by consultants from foreign companies. It is difficult to carry out supervisory works from design to construction of hospitals, solely by the staff of the Ministry of Health. For this reason, it is judged that a consultant must be hired in this project for the supervisory works from design to construction phases.

3-2. Project site and surrounding situation

3-2-1. Development situation of relevant infrastructure

(1) Situation of targeted site[13]

1) Al Ashurqat, Salaheddin governorate

a) Site overview

- The site is located approximately 140km from the capital of the governorate, and can cover up to 160,000 populations.
- The land area is approximately 30,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- Currently, the site is unused.
- Since the site is not near any arterial road, it is necessary to construct an access road of 1km connecting to the nearest arterial road.

b) Present situation of the existing medical facilities

- There are only aging hospitals such as a 50-bed hospital built in the 1970s and other nearby hospitals whose all beds totals 150. There was new ME installation project which was stopped because it needed renovation of the building and extra fund.

c) Future new healthcare facility development projects and current projects

- Under MOH plan to build 11 hospitals, it is scheduled to establish a 100-bed general hospital (actual number of beds: 122beds) at El Dor, Samara, Al Touse, and Degel.

d) Present situation of urban planning

- The surrounding area of the site is unused and located outside the designated area for urban planning, so that there is no particular restriction in usage.
- There is no restriction on building coverage, floor-area ratio, nor height.
- In rainy seasons, a river runs in 3 directions on the site. There is no record of damages due to flood in the surrounding area

e) Present situation of infrastructure

- Infrastructure remains undeveloped.

2) Kirkuk, Kirkuk governorate

a) Site overview

- The site is located approximately 8km from the capital of the governorate.
- The land area is approximately 60,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- Since the site is an old factory site, old concrete slabs are left and need to be demolished.

[13] Refer to Appendix 7 “List of Surveys concerning Site Infrastructures”

b) Present situation of the existing medical facilities
- A 200-bed hospital was built earlier than 1990.
- A 400-bed hospital was built in 1984, from the first basement level to the 6th floor. Services include emergency, radiation therapy, and physical therapy.

c) Future new healthcare facility development projects and current projects
- Under MOH plan to build 11 hospitals, it is scheduled to establish a 400-bed general hospital (actual number of beds: 492beds) at Kirkuk city.

d) Present situation of urban planning
- The surrounding area of the site is unused except for the area with several residential houses located in the west of the site. The site is located outside the designated area for urban planning. Thus, there is no particular restriction in usage.
- There is no restriction on building coverage, floor-area ratio, nor height.
- There is no record of damages due to flood in the surrounding area.

e) Present situation of infrastructure
- Electricity is supplied.

3) Balad Ros, Diyala governorate

a) Site overview
- The site is located approximately 50km from the capital of the governorate, and can cover up to 122,000 populations. Local residents in a wide area, from Baqubah to the border with the Islamic Republic of Iran are included.
- The land area is approximately 50,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- The site is unused.
- The site is adjacent to an arterial road on the west.

b) Present situation of the existing medical facilities
- A 100-bed general hospital is extended in 2000. (the date of first completion of construction is unknown)

c) Future new healthcare facility development projects and current projects
- In MOH plan to build 10 (400-bed) educational hospitals, a 400-bed general hospital (actual number of beds: 492beds) is under construction.

d) Present situation of urban planning
- The surrounding area is unused and designated as an area for residential use. However, there is no particular problem with construction of a hospital.
- There is no restriction on building coverage, floor-area ratio, nor height.
- There is no record of damages due to flood in the surrounding area.

e) Present situation of infrastructure
- Electricity and water is supplied.

4) Al Musaab, Babil governorate

a) Site overview

- The site is located approximately 40km from the capital of the governorate, and can cover up to 300,000 local residents.
- The land area is approximately 40,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- A part of the site is used as farmlands and the other part unused. The site is neighboring irrigation management office, agricultural management office, industrial high school, maternity hospital and pediatric hospital. The other nearby areas are used as farmlands.
- The site is adjacent to the arterial road connecting to Al Musaab and Baghdad.

b) Present situation of the existing medical facilities

- A 78-bed general hospital was built in 1930 and extended in 1959, neighboring a 50-bed maternity hospital and a 50-bed pediatric hospital.
- The region, where the hospital is located, has one of pilgrimage destination, which accepts 8 million pilgrims per year by 6 times of pilgrimage seasons. In such seasons, the number of patients increases significantly.

c) Future new healthcare facility development projects and current projects

- In MOH plan to build 10 (400-bed) educational hospitals, a 400-bed general hospital (actual number of beds: 492beds) is under construction.
- In hospital construction project funded by the United States, a 50-bed maternity and children hospital is under construction at Musayyib.

d) Present situation of urban planning

- There is a plan to widen a road to 60m in front of the site. The areas on both sides of the road in front are designated as areas for commercial use, and there is no particular problem with construction of a hospital.
- There is no restriction on building coverage, floor-area ratio, nor height.
- There is no record of damages due to flood in the surrounding area.

e) Present situation of infrastructure

- Electricity and water is supplied.

5) Hindia, Karbalaa governorate

a) Site overview

- The site is located approximately 35km from the capital of the governorate, and can cover up to 210,000 populations.
- The land area is approximately 50,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- The site straddles both a housing planning zone and a public facilities planning zone.
- The front road is 4m in width and is about 3m higher than the site, with 2m of space between the road and a border of the site.

- The road in front leads to an arterial road (Karbalaa -Hilla Road), 1km or so away from the site.

b) Present situation of the existing medical facilities
- A 400-bed hospital is in the capital of the governorate.
- A 206-bed general hospital was built in 1950 and extended in 1986.
- The region is also a pilgrimage site, and the number of patients increases significantly in pilgrimage seasons.

c) Future new healthcare facility development projects and current projects
- In MOH plan to build 10 (400-bed) educational hospitals, a 400-bed general hospital (actual number of beds: 492beds) is under construction.
- Under MOH plan to build 11 hospitals, it is scheduled to establish a 300-bed maternity and children hospital (actual number of beds: 361beds) at Karbalaa.

d) Present situation of urban planning
- The site straddles both a housing planning zone and a public facilities planning zone. The public facilities planning zone can be used for educational facilities, commercial facilities, medical facilities and parking lots, that is, the construction of a hospital under the project is reasonable.
- There is a plan to widen a road in front of the site to 60m.
- There is no restriction on building coverage, floor-area ratio, nor height.
- There is no record of damages due to flood in the surrounding area.

e) Present situation of infrastructure
- Electricity and water is supplied.

6) Al Ashatra, Theeqar governorate

a) Site overview
- The site is located approximately 40 km from the capital of the governorate, and can cover up to 400,000 populations.
- The land area is approximately 63,000m2, therefore enough area for construction of a 200-bed general hospital is secured.
- The site is covered with reed beds, and the surrounding area is unused.
- The site is adjacent on the south to an arterial road connecting to Al Ashatra and Nasiria.

b) Present situation of the existing medical facilities
- A 120-bed general hospital was built in 1970. Due to limited land, a prefabricated hut is installed in the site.

c) Future new healthcare facility development projects and current projects
- In MOH plan to build 10 (400-bed) educational hospitals, a 400-bed general hospital (actual number of beds: 492beds) is under construction.
- In hospital construction project funded by Regions Development Plan, a 100-bed general hospital is under construction at Chebayesh.

d) Present situation of urban planning
- The site and its surroundings are located within “a residential area and an

area for parking lots", but there is no particular problem with construction of a hospital.
- There is no restriction on building coverage, floor-area ratio, nor height.
- The site and its surroundings are marshy areas, and the surroundings might be flooded in rainy seasons.

e) Present situation of infrastructure
- Electricity is supplied.

7) Al Mdaina, Basra governorate

a) Site overview
- The site is located approximately 70km from the capital of the governorate, and can cover up to 240,000 populations.
- The land area is approximately 74,300m2, therefore enough area for construction of a 200-bed general hospital is secured.
- The site is covered with reed beds, and the surrounding area is unused.
- The road in front is an arterial road connecting to Al Qama and Chebayesh Marches.

b) Present situation of the existing medical facilities
- A 173-bed General hospital was built in 1970.

c) Future new healthcare facility development projects and current projects
- In MOH plan to build 10 (400-bed) educational hospitals, a 400-bed general hospital (actual number of beds: 492beds) is under construction.
- In hospital construction project funded by Regions Development Plan, a 24-bed diabetes center is under construction and it is scheduled to establish a 50-bed Special Hospital (cardiovascular).
- In hospital construction project funded by the United States, a 94-bed pediatric hospital is under construction.

d) Present situation of urban planning
- The surrounding area of the site is unused and located outside the designated area for urban planning. Thus, there is no particular restriction in usage.
- There is no restriction on building coverage, floor-area ratio, nor height.
- The site and its surroundings are marshy areas, and the surroundings are flooded in rainy seasons due to 50cm below sea level.

e) Present situation of infrastructure
- Electricity is supplied at the roadside in south.

3-2-2. Natural condition

The country extends 870 km east to west, and 920 km north to south. With a total area of 437,072 km2, the western edge of Iraq lies within the Syrian Desert, with the Kurdistan Mountains in the northern reaches of the country. The eastern edge is along the mouth of the Persian Gulf, and the southern edge is within Al-Nafud. 2 large rivers, the Euphrates in the south and Tigris in the north, run from northwest to southeast.

Most of Iraq is classified as having a desert climate[14]. As such, the summer is arid with very little rainfall nationwide between May and October. With influence from southwest seasonal winds and the equator passing through the southern part of the country, the maximum temperatures in the months of July and August exceed 50˚C[15]. The ground has low heat capacity, however, and with nothing preventing radioactive cooling, minimum temperatures rarely exceed 30˚C. Meanwhile, it frequently snows heavily in the cold winters of the northern mountainous region, resulting in extensive flooding.[16]

3-2-3. Environmental and social consideration

(1) Issues on environmental and social consideration

1) Consideration of and impacts on the environment of the candidate sites of the project

Since this project was requested in January 2010, environmental and social consideration of the project was confirmed in accordance with the "Environmental and Social Consideration Guideline" which JICA published in April 2004.

Table 3-2-1: Checklist concerning environmental and social consideration

Item	Contents
Project name	Healthcare Sector Loan Project : Health Sector Reconstruction Project (Construction of 200-bed general hospitals)
Project sites	1) Al Ashurqat, Salaheddin governorate 2) Kirkuk city 3) Balad Ros, Diyala governorate 4) Hindia, Karbalaa governorate 5) Al Musaab, Babil governorate 6) Al Ashatra, Theeqar governorate 7) Al Mdaina, Basra governorate
Project outline	Construction of 200-bed general hospitals, staff accommodation, and nursing schools (total construction area: approx. 27,400 m2)
Categorization	Category "C" *note
Grounds for categorization	The project sites are located neither in nor near "sensitive areas" referred to in the guidelines. They do not have "potential adverse impacts on the environment and society". The sector concerned does not fall under the category of "sectors having potential adverse impacts". Accordingly, it can be considered that the adverse impacts on the environment are not serious.
Permits and approvals related to the environment	As for environmental considerations in line with this project, the Iraqi Ministry of Environment conducted environmental checks at the time of selecting project sites, and confirmed that there would be no problem with measures for pollution control, the natural environment and social consideration.

[14] The area north of the Tigris River has a steppe climate, with a Mediterranean climate in the further northern reaches.

[15] The world's highest temperature was recorded at 58.8˚C in 1921 in Basra. Average temperatures in Baghdad are 8.5˚C in January and 34.2˚C in July. Annual rainfall is 140 mm.

[16] Information about temperature and precipitation of the targeted sites is listed in Appendix 7 "List of Surveys concerning Site Infrastructures".

Measures for pollution control	The air and water qualities will be controlled to satisfy the local criteria. Since the project is construction of medical facilities, it is crucial, as environmental measures, to treat medical wastes in a proper manner. It is also necessary to consider the methods of discharging waste water containing chemicals and medicinal products which are generated as a result of medical activities, and treating infectious polluted water. Moreover, it is necessary to give careful consideration to measures against dioxin at treating medical wastes.
The natural environment	No facilities will be constructed in natural reserves under the project. There is no nearby area, which requires particular attention concerning the environmental conservation. The project sites are not inhabited by any rare species.
Social considerations	There is no matter which requires social considerations in particular on the project sites.
Others and monitoring	The project does not fall under the category requiring monitoring activities.

*Note: "Category C" means projects which are likely to have minimal or little adverse impact on the environment and society.

It is confirmed that there is no environmental items in each site which have environmental or social problems as shown in the below table, under discussions with the health department of each governorate and the representatives of the hospitals.

Table 3-2-2: Table of checklists on environmental issues for all the projects sites

		(1) Salaheddin (Al Ashurqat)	(2) Kirkuk (Kirkuk)	(3) Diyala (Balad Ros)	(4) Babil (Al Musaab)	(5) Karbalaa (Hindia)	(6) Theeqar (Al Ashatra)	(7) Basra (Al Mdaina)
1 Permits and Explanation	(1) EIA and Environmental	-	-	-	-	-	-	-
	(2) Explanation to the Local	O	O	O	O	O	O	O
2 Contamination	(1) Air Quality	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(2) Water Quality	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(3) Wastes	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(4) Soil Contamination	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(5) Noise and Vibration	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(6) Subs idence	Δ	Δ	Δ	Δ	Δ	Δ	Δ
	(7) Odor	Δ	Δ	Δ	Δ	Δ	Δ	Δ
3 Natural Environment	(1) Protected Areas	O	O	O	O	O	O	O
	(2) Eco system	O	O	O	O	O	O	O
	(3) Hydrology	O	O	O	O	O	O	O
	(4) Topography and Geology	O	O	O	O	O	O	O
4 Social Environment	(1) Resettlement	O	O	O	O	O	O	O
	(2) Living and Livelihood	O	O	O	O	O	O	O
	(3) Heritage	O	O	O	O	O	O	O
	(4) Landscape	O	O	O	O	O	O	O
	(5) Ethnic Minorities and Indigenous	O	O	O	O	O	O	O
	(6) Working Condition	O	O	O	O	O	O	O
5 Other	(1) Impacts during Construction	O	O	O	O	O	O	O
	(2) Monitoring	O	O	O	O	O	O	O

*1. Refer to Appendix 10 "Check Sheets on Environments at Each Site" for more details.

*2. It is concluded that monitoring is not required.
However, if a third party or others give some specific indications saying insufficiency of

environmental and social considerations, JICA will report those indications to the government of Iraq and encourage it to take appropriate actions. In case a project implementing actor takes an action toward indications, JICA will confirm close investigation of indications, consideration of countermeasures and readjustment of project plan in manner of transparent and accountable process.

2) Procedure for Environmental Impact Assessment (EIA) approval in Iraq

Basra governorate has already prepared their EIA report, which turned out to be insufficient. Also for the other sites, the preparation are to be started. Thus, it is necessary for the Iraqi government to prepare EIA reports for the targeted sites when the project design is conducted, and for the Ministry of Environment to confirm the reports.

(2) Impact to environment and society due to the implementation of the project

Environmental impact of medical waste treatment, infectious sewage treatment, and treatment of sewage containing chemicals and medicinal products must be considered upon implementing the project. As for noise, etc., there is no particular equipment that causes large noise in the medical facility.

(3) Overview of laws and regulations related to environmental and social consideration in Iraq, and measures for compliance

With regards to laws and regulations related to environment for medical facilities in Iraq, a guideline for medical waste treatment was notified from the Ministry of Environment to the Ministry of Health in August 2010. Below are the contents.

a) Segregation of medical waste in the facility (infectious, non-infectious)
b) Storage after segregation
c) Treatment of infectious medical waste
d) Disposal of solid waste

Segregation, treatment, and disposal method of medical waste had not been defined in Iraq, and most had been regardless disposed together with general waste. The guideline requires medical waste to be segregated in the medical facility, stored, and then disposed separately by category.

Of these, most of the infectious medical waste had been incinerated in the medical facility. However, as for measure against air pollution in the guideline, incinerators, which can generate dioxin, are no longer approved.

Therefore, facility/equipment for sterilizing the infectious medical waste, in order to let the waste to be carried out as general waste, is necessary.

Additionally, sewage must be treated appropriately in the hospital and then discharged outside.

Similar ongoing projects for constructing hospitals by the Ministry of Health are also required to comply with the above medical waste treatment guideline, as well as global warming countermeasures, therefore it is necessary to take measures on facility/equipment.

(4) Actions to be taken by Iraq (executing agency and its related organizations) for the realization of the Project

The guideline of the Ministry of Environment requires special containers for segregation of medical waste. These are generally consumables, therefore must be procured continuously.

Chapter 4. Contents of the Project

Chapter 4 Contents of the Project

4-1. Overview of the project

4-1-1. Overall goal and project purpose

The healthcare sector in Iraq was not developed much since the 1980s, and at present, is below the medical level of the neighboring countries or the level advocated by WHO. In such a situation, The National Development Plan 2010-2014, and Strategic Plan of MOH 2009-2013, are formulated for overall redevelopment in their healthcare systems.

Both plans aim at "improvement of health indices; for its realization, improvement of primary, secondary, and tertiary level healthcare services; reduction of the disparity between urban and rural areas; and, training/reeducation of medical personnel, etc."

In these plans, executed in 1980s and have hardly executed after that, establishment and construction of medical facilities, especially hospitals, is considered as one of the significant policies.[17]

The Iraqi Ministry of Health is proceeding with the plan to enhance the medical facilities according to the healthcare policy.[18] 400-bed hospitals are planned to be developed in the capitals of the governorates as core hospitals. On the other hand, hospitals with smaller capacity are general hospitals located in local cities on outskirts of governorates, but sufficient medical services both in terms of quality and quantity fail to be provide.

Thus, the project aims at improvement of healthcare services in the regions by means of construction of a 200-bed general hospital at each site of 7 cities.

4-1-2. Overview of the project

No hospitals have been built in Iraq, except for several ones after 2003, since the 1980s, when Japanese companies constructed several hospitals - that is, most of the existing hospitals were built over 40 years ago. Moreover, some facilities are converted from health centers, and thus have difficulty in adopting the current medical system or equipment. Together with aging facilities, some hospitals do not have proper air-conditioning and are unable to maintain the current number of beds in future.[19]

The Ministry of Health plans basically to demolish hospitals built over 40 years ago and construct new ones, in that the repair of aging hospitals could cost more than new

[17] The number of beds which was 1.1 beds per 1,000 populations in 2008 should be increased to 1.5 beds by 2014 and up to 2.5 beds in the following years.

[18] The Ministry of Health aims to reach 1 primary healthcare facility per 10,000 populations and 1 secondary healthcare facility per 50,000 populations. The project of construction of 400-bed hospitals in the capitals of 10 governorates is being implemented from 2008 with their own budget. Additionally, in 2010, construction projects of 400-bed hospitals in 3 governorates, as well as 200-bed hospitals in 3 locations, and 100-bed hospitals in 4 locations were commenced and now are in progress.

[19] According to the Ministry of Health, the ongoing renovation is implemented based on the very limited budget in a limited scope. Therefore it is unable to provide modern medical services. Additionally, the works are carried out to the minimum extent for providing the medical services to the local residents for the time being, since it takes several years to implement the Yen loan project.

construction in many cases, and that they after all cannot adopt the latest medical technologies and systems.[20]

The on-site survey found that, for the existing hospitals which need to be reconstructed, most drawings of architectural works, facilities and services are no longer available. The repair is necessary not only for the building itself but also various facilities (electric, sanitation and mechanical facilities) as well as the sewage treatment system. Moreover, renovation is structurally difficult. Thus, as in the policy of the Ministry of Health, the repair of the existing hospitals will cost more than construction of new hospitals.

In addition, some hospitals are built on grounds lower than the surrounding areas, and are flooded in particular in rainy season. This interferes with the treatment activities of those hospitals and has negative impact on access for outpatients. Meanwhile, in the case of Kirkuk, where the project targets a sole newly-built hospital, the number of direct beneficiary population is increasing.

Under the situation, the Ministry of Health requested the Government of Japan to extend the fund in order for reconstruction of 6 existing hospitals due to aging and shortage of beds, and for establishment of 1 new hospital.

The project makes it possible to provide high-quality healthcare services by developing secondary hospitals in the 7 targeted sites.

4-2. Schematic plan of the project

4-2-1. Basic policy

The design of hospital construction in Iraq is required to be based on the standards issued by the Ministry of Health, which set the number of beds, clinical function, medical equipment, etc. Necessity and relevance of this project is reviewed based on the standard for a 200-bed general hospital issued by the Ministry of Health and its policy is as follows.

a) Prioritize shortages of beds and urgency of hospital reconstructions at the targeted sites.
b) Take security situation into consideration.
c) Consider environmental issues resulting from improvement and construction of building and facilities.

4-2-2. Review of the contents of the project

(1) Needs of hospital beds in a population ratio

In 2010, there are 40,912 beds in Iraq for a total population of 32.3 million, meaning 1.3 beds per 1,000 populations. This is well below the international standard of 3 to 3.3 beds. With the Iraqi population expected to reach 35.7 million by 2013 (assuming that the population growth rate is set at 2.5%), a total of 107,070 beds will be needed to

[20] Existing facilities shall not function as hospitals, but shall be utilized as the management of the governorate health department or storage for medical supplies.

fulfill international standards of 3 beds per 1,000 populations. This necessitates additional 66,158 beds if 2013 is the target year.

Regarding the 7 targeted sites, the local populations are in the range from 122,000 to 890,000. When the current population is applied to the development target which of 2.5 beds per 1,000 populations, 305 beds are at least necessary for 122,000 populations. 10 years later, the population will be 159,000, about 1.3 times as many as the current population where the population growth rate is set at 2.5%. In this case, the necessary number of beds totals 396. According to these calculations, it can be concluded that there will be sufficient needs for the demand.

Although a review should be done in a normal procedure with parameter of average incidence per capita, consultation rate each disease and average length of hospital stay etc., it was difficult to boost enough data and information from Iraqi medical statistics. In this survey, therefore, the necessity of requested each hospital was verified with using the number of beds in a population ratio.

(2) Priority in targeted sites

In the 7 targeted sites, based on the conditions below, the priority order is examined as shown in table 4-2-2.

1) Medical Indices, etc. of Targeted Governorates

iii. The source is the MOH Annual Report 2009

iv. The beneficiary population (the number of the direct beneficiaries) is the number of residents in the catchment area of the planned construction site

2) Number of Insufficient Beds

xi. Number of necessary beds (2.5 beds) in the governorate: The number of necessary beds calculated in accordance with the development objective of MOH, 2.5 beds/1,000 populations and the population ratio of each governorate

xii. Number of existing beds in the governorate: Sum of the number of existing beds in the targeted governorates (source: MOH Annual Report 2009)

xiii. Number of insufficient beds in the governorate: No. of necessary beds – No. of existing beds

xiv. Number of necessary beds (2.5 beds) for the direct beneficiary: No. of necessary beds calculated in accordance with the development objective of MOH, 2.5 beds/1,000 populations and the ratio of direct beneficiary population

xv. Number of existing beds on site for the direct beneficiaries: No. of beds in the existing hospitals on the planned construction sites

xvi. Number of insufficient beds for the direct beneficiaries: No. of necessary beds (2.5 beds) for the direct beneficiaries – No. of existing beds on the sites

xvii. Plan to increase the number of beds: the plan in progress to increase the number of beds in accordance with the new healthcare facility development project referred to in Chapter 2, 2-1 (3) Overview of future new healthcare facility development projects and current projects.

xviii. Total number of beds after the planned increase in the governorate: the number of beds in each governorate after the foregoing plan is completed

xix. Number of insufficient beds after the planned increase in the governorate: [No. of necessary beds (2.5 beds) in the governorate] – [total No. of beds after the planned increase in the governorate]

xx. Number of insufficient beds after the planned increase for the direct beneficiaries: the same as the number of insufficient beds for the direct beneficiaries (As for Kirkuk, the value is less than the number of insufficient beds for the direct beneficiaries due to increasing beds by MOH plan to build 11 hospital within the same area as this project.)

3) Present state of the existing hospitals

In accordance with the answers to the questionnaires from each existing hospital

The priority in the 7 targeted sites is determined as follows in consideration of the necessity of new construction due to the number of hospital beds in a population ratio and flood, etc. The detail of each site is listed as table 4-2-2.

Table 4-2-1: Priority of the 7 targeted sites

Priority	Targeted site
A	Theeqar
B	Basra
C	Kirkuk and Babil
D	Salaheddin, Diyala and Karbalaa

Table 4-2-2: General information of targeted sites

Item	Governorate where the site is located	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
Medical indices, etc. of subject governorate	Governorate population	1,253,539	1,223,177	1,361,149	1,715,748	993,903	1,839,640	2,608,601
	Beneficiary population	160,000	890,000	122,000	300,000	210,000	400,000	240,000
	No. of (public) hospitals	9	7	9	14	5	8	12
	No. of (private) hospitals	1	2	3	3	2	2	5
	Ratio of beds in private hospitals	2.2%	4.4%	4.9%	3.3%	6.4%	3.3%	5.5%
	Governorate populations/ (public) hospitals	139,282	174,740	151,239	122,553	198,781	229,955	217,383
	No. of beds/ 1,000 pop.	1.0	1.0	0.9	1.1	1.1	0.9	1.3
	No. of beds in the governorate	1,220	1,239	1,281	1,837	1,128	1,600	3,278
	Medical personnel/ 10,000 pop.	6.1	5.7	4.5	7.1	8.7	3.9	7.3
No. of insufficient beds	No. of necessary beds (2.5 beds) in the governorate	3,134	3,058	3,403	4,289	2,485	4,599	6,522
	No. of existing beds in the governorate	1,220	1,239	1,281	1,837	1,128	1,600	3,278
	No. of insufficient beds in the governorate	-1,914	-1,819	-2,122	-2,452	-1,357	-2,999	-3,244
	No. of necessary beds (2.5 beds) for the direct beneficiaries	400	2,225	305	750	525	1,000	600
	No. of existing beds for the direct beneficiaries	50	425	72	171	206	109	173
	No. of insufficient beds for the direct beneficiaries	-350	-1,800	-233	-579	-319	-891	-427
	Plan to increase No. of beds (MOH plan to build 11 hospitals)	488	492			361		
	Plan to increase No. of beds (MOH plan to build 10 hospitals)			492	492	492	492	492
	Plan to increase No. of beds (MOH regional development plan)						100	74
	Plan to increase No. of beds (other donors)				50			94
	Total No. of beds after planned increase	1,708	1,731	1,773	2,379	1,981	2,192	3,938
	No. of insufficient beds after planned increase	-1,426	-1,327	-1,630	-1,910	-504	-2,407	-2,584
	No. of beds/ 1,000 pop. after planned increase	1.4	1.4	1.3	1.4	2.0	1.2	1.5
	No. of insufficient beds after planned increase	-350	-1,308	-233	-579	-319	-891	-427
Current state of existing hospitals	No. of beds	50	425	72	171	206	109	173
	Bed occupancy rate (stated in questionnaires)	51.7%	44.0%	42.8%	(56.6%)	-	116.0%	85.0%
	Bed occupancy rate (calculated from total No. of inpatients)	96.0%	21.9%	37.3%	56.9%	25.2%	44.0%	37.4%
	No. of staffs	Transfer	Newly built	Transfer	Transfer	Transfer	Transfer	Transfer
	Medical doctors	42	0	15	65	44	38	13
	Nurses	155	0	20	139	166	205	124
	Healthcare professionals	57	0	25	44	269	144	94
	Other workers	42	0	73	159	181	101	258
	Total	296	0	133	407	660	488	489
	No. of standard staffs							
	Medical doctors	40	40	40	40	40	40	40
	Nurses	120	120	120	120	120	120	120
	Healthcare professionals	30	30	30	30	30	30	30
	Other workers	30	30	30	30	30	30	30
	Total	220	220	220	220	220	220	220
	No. of over and short staffs							
	Medical doctors	2	-40	-25	25	4	-2	-27
	Nurses	35	-120	-100	19	46	85	4
	Healthcare professionals	27	-30	-5	14	239	114	64
	Other workers	12	-30	43	129	151	71	228
	Total	76	-220	-87	187	440	268	269
	No. of outpatients (annual)	185,640	30,993	32,115	168,895	144,664	330,992	54,190
	Average No. of outpatients (per day)	595	99	88	463	440	907	225
	Total No. of inpatients	17,520	33,945	9,808	24,952	18,980	17,516	21,900
	Average stay in hospital (day)	4.5	2	-	2.4	2	4	2
Civil order	No. of injuries due to terrorism in 2009	209	1,028	953	831	243	98	301
	No. of casualties due to terrorism in 2009	476	342	370	178	42	23	197
	Accessibility	2	3	3	1	1	1	1
	Safety information from Ministry of Foreign Affairs Japan	4	4	4	4	4	4-	4-
Result of technical survey on site	Securing of land	Unused land	Unused land	Unused land	Unused land	Unused land	Unused land	Unused land
	Form, etc. of land	No problem	Existing demolished hospital	No problem	No problem	Difference with road level needs to be developed in front of the hospital	Moor needs to be developed	Moor needs to be developed
	Present state of infrastructure	None	Electricity available	Electricity and water available	Electricity and water available	Electricity and water available	None	None
	Presence of access to site (arterial roads)	No	Yes	Yes	Yes	Yes	Yes	Yes
	Distance from the capital of governorate	140km	8km	40km	40km	35km	40km	70km
	Site size	Approx.30,000m2	Approx.60,000m2	Approx.50,000m2	Approx.40,000m2	Approx.50,000m2	Approx.63,000m2	Approx.74,300m2
Environmental and social consciousness	Problem related to environmental and social consciousness	None	None	None	None	None	None	None
Others	Site location (arterial roads, neighboring governorates, cities, etc.)	Fairly distant from cities with 400-bed hospital including the other governorates.	Located in suburb of a city in the governorate. Two 400-bed hospitals are within the city.	Approx. 90km from Baghdad via Baqubah, the governorate capital.	Approx. 60km to Baghdad. Approx. 30km to Karbalaa.	Approx. 25km to Al hillah, the capital of a neighboring governorate.	Access to other governorate only via Nassiriyah, the governorate capital.	Access to other governorate only via Basra, the governorate capital.
	Geographical problems, etc. of existing hospital (Sites to which MOH puts high priority for improvement)	-	-	-	-	-	The surrounding area and premises of hospital are flooded in rainy season, interfering with access and medical activities.	The surrounding area and premises of hospital are flooded in rainy season, interfering with access and medical activities.

*note1: Evaluation based on ease of site investigation by local consultant 1: No problem 2: A few problems 3: Many problems
*note2: The conditional governorate by safety information of the Ministry of Foreign Affairs of Japan within the southern governorates is shown as 4-.

(3) Review of the hospital capacity

The requested number of beds is 200 (246 beds with specialized beds for ICU etc. included). The statistics of the Iraqi Ministry of Health shows that the national average bed occupancy rate was 50.4% (Annual Report of Ministry of Health, 2009).

According to the National Development Plan of Iraq, the bed occupancy rate should be improved up to 70% by 2014. This improvement should include securement of beds at the time of disaster and emergency.

This low bed occupancy rate is attributable to the following factors:

- The existing hospitals have passed 40 to 50 years since their construction, many of which are unable to provide satisfactory environments for inpatients due to their aging facilities. Quite a few patients reportedly refuse to be admitted to these hospitals because of their poor conditions. In fact, those who seriously need to be admitted are transferred to private well-equipped hospitals, though the number of such patients is still small. Thus, the number of inpatient may well increase if the new hospitals have been constructed. For example, the number of inpatient of new Fallujah general hospital (total of 151 beds) which established in 2009 has increased from 1,501 on January 2010, through 2,256 on January 2011, to 2,281 on May 2011. Although bed occupancy rate is different among departments, that of surgery department increased as 39% on January 2010, 64% on January 2011, and 76% on May 2011.
- The percentage “50.4%” is the average figure for all medical facilities. Some targeted hospitals and their departments (in particular, for maternity and children) are forced to place temporary beds in corridors and elsewhere since they cannot accept all patients in their proper rooms.
- In Japan, specialized beds, such as ICU, etc., are not counted in the number of beds. In Iraq, however, the number of these specialized beds is counted, so that the bed occupancy rate tends to be lower. As for requested 200-bed hospital, the number of beds is 246 including specialized beds. Given that 50.4% of bed occupancy rate is plugged in 200 beds, as shown below, the bed occupancy rate is calculated as 62%.

Annual total No. of beds (246 beds)	: 246 beds x 365 days = 89,790 beds
No. of occupancy beds	: 89,790 beds x 50.4% = 45,254 beds
Annual total No. of beds (200 beds)	: 200 beds x 365 days = 73,000 beds
Estimated occupancy rate (200 beds)	: 45,254 beds / 73,000 = 62 %

- Currently, the shortage of anesthetists among medical technicians, who play a vital role in surgeries, is a serious problem. Some hospitals have difficulty in conducting surgeries, where there are sufficient number of surgeons but short of anesthetists. It is expected that an increase in the number of anesthetists will result in an increase in the number of surgeries, which will lead to increased inpatients. Currently MOH of Iraq is under discussion with Egyptian government on recruitment of Egyptian anesthetists. In addition to that, it is expected that anesthetists who evacuated abroad will return due to improvement of security and

hospital environment

Taking into account the factors described above, it is estimated that beds in new hospitals will be substantially occupied, although the current national average of bed occupancy rate remains 50.4%. Therefore, it can be concluded that the hospital capacity to be constructed – those with 200 beds – is appropriate.

(4) Securing the human resources

1) Allocation of hospital staff

According to the plan drawn up by the Iraqi government, the number of staff to be allocated to a new 200-bed hospital is approximately 220 – that is, a total of 1,540 staff will be necessary for 7 hospitals.

Table 4-2-3: Number of staff for new 200-bed hospital

#	Type of staff	No.	Notes
1	Doctors	40	
2	Nurses	120	Assistant nurses included
3	Paramedics	30	Pharmacists, laboratory technicians, radiographic technicians, physical therapists, and nutritionists
4	Office workers, technicians	30	Office work, reception, maintenance, cleaning, security guard, telephone switching, etc.
Total		220	

(Source: the Document for request)

The number of nurses is determined in accordance with the number of doctors, rather than a nurse unit: the standard number is 3 nurses per doctor.

2) Allocation plan of health staff at each hospital

The survey has confirmed that the new 200-bed hospitals will be all replacements of the existing hospitals, except for Kirkuk governorate. Thus, the staff at the existing facilities will be transferred to the new hospitals, except for Kirkuk. On the other hand, because the manpower of the existing hospitals is not necessarily sufficient, and because the number of beds at the new hospitals is larger than that of the existing ones, it is necessary to increase the number of staff. Even so, new recruitment and reallocation of staff is likely to be minimal since a certain number of staff from the existing will be transferred to the new hospitals.

Currently, the Ministry of Health is promoting various projects to construct new hospitals, other than the plan to construct new 200-bed hospitals. When all these ongoing projects, including the one for the new 200-bed hospitals, have been completed, about 10,000 beds will be newly available.

In consideration of a plan for human resource allocations as a whole, the Ministry of health submitted a letter to the survey team, expressing its intention to give priority to the new 200-bed hospitals, and requesting the Government of Japan for assistance of hospital establishment.

3) Tasks and countermeasures concerning medical personnel

a) Medical doctors

As for discussing the number of doctors required in the future, in addition to the current number of doctors, it is necessary to grasp the number of annual students graduated from the faculty of medicine to be doctors and the number of annual retired doctors.

According to the 2009 statistics of the Ministry of Health, the number of medical doctors totaled 22,396. Although the statistics provide no specific figures of the doctors in each age group, and no specific figure of those who retired each year, it is assumed that approximately 622 doctors retire each year if the simple arithmetic average calculated in accordance with the timing (24 years of age) of graduation from the faculty of medicine and the timing (60 years of age) of retirement is taken into account. Based on the fact that the number of graduates from the faculty of medicines in 2009 totaled 1,106, and the number of students of the faculty of medicine to be established in the 2 governorates (30 or so of the student quota each), it is expected that approximately 1,160 students will graduate and get qualified as medical doctors every year in future. Under the condition that if the annual number of retired doctors, 622 per year is deducted from the annual number of new doctors, 1,160, it is expected that the net increase in the number of doctors will be 538 every year.

If the number of doctors continues to increase at this rate, the number will increase by 2,690 in 5 years, or 5,380 in 10 years.

Meanwhile, if the Ministry of Health completes the ongoing projects to construct new hospitals, and, at the same time, this Project is put into practice and completed, approximately 10,000 beds will be newly available.

For the 10,000 beds to be prepared in future, it is estimated that approximately 2,000 doctors will be required. (The request document of the Project states that the ratio of beds to doctors is 200:40.)

Even if the current projects to construct new hospitals in the coming 5 years are completed, since the number of doctors will increase by 2,690 and the number of those necessary will be 2,000, it is considered that there will be no shortage of doctors unless there is any considerable change in the social situation in Iraq.

Even so, it is in practice difficult for newly graduated doctors to provide quality medical services, the Ministry of Health is considering short-term measures.

Currently, in particular, the shortage of anesthetists is serious, causing situations where it is impossible to conduct surgeries, including emergency ones, though surgeons are available. The shortage is attributable to the brain drain of many professors of the department of anesthesiology, together with anesthetists. The restoration of security situation and improvement in the

hospital environments (provision of equipment and improvement of facilities) will be expected as incentive for them to return to their homeland.

The Ministry of Health is currently discussing dispatches (to rural areas) of medical personnel, including anesthetists, with the Government of Egypt so as to make up for shortage of personnel within the country. If the discussion is put into practice, certain alleviation is expected. It is also important, on the other hand, to secure qualified anesthetists as professors to be engaged in education for Iraqi anesthetists. Another task is to improve further postgraduate training of medical doctors in order for their learning to keep up and update medical techniques and knowledge, though the relevant activities have been carried out.

b) Nurses

Because of shortage of nurses, allocation plans of nurses are drawn up in a limited manner: they are allocated to out-patient departments, operation departments, ICU and CCU, where there are medical doctors, but the sufficient number of nurses is not allocated for care of general inpatients, so that it is fairly common for family members to attend and care inpatients.

Estimated annual attrition of nurses is around 1,052 people based on 44,201 nurses in total of 2009; this is calculated by the ages between 18-year-old and 60-year-old who can be certified. As of 2009, new graduates from nursing schools totaled some 3,000 people each year, it is hoped that nursing schools will continue to produce nurses at this pace. The Ministry of Health considers that the shortage has been improved but the problem lies in the disproportional balance of male and female nurses.

On the other hand, it is said that nursing education has a problem with technical level since training for nurses is carried out only within the country. In order to improve the quality of nursing care in Iraq, WHO is planning to hold education and training programs in Jordan or the northern part of Iraq, which is expected to lead to improvement of the quality of the nurses' techniques as a whole. Another problem is that there is no clear job description concerning duties in which nurses are required to engage.

c) Specialized Technicians

There is no shortage of specialized technicians at the moment. Estimated annual attrition of specialized technicians is around 1,261 people based on 49,175 technicians in total of 2009; this is calculated by the ages between 21-year-old and 60-year-old who can be certified. The new graduates from technical schools totaled 1,153 people in 2009. The number of students at technical schools increased in 2010 by 7.6% compared to 2009.[21] Thus, it is

[21] See Appendix 14 "Reference Data (Economical and Financial Condition, Health Medical Statistics, The Number of Medical and Educational Students"

assumed that the enough number of technicians, covering the attrition, is produced. A future task will be, if anything, further improvement of postgraduate training in order to respond to advances in medical techniques.

(5) Security situation of the site and its surrounding area

The following table is a data of injuries and casualties due to terrorism, which indicates the number of cases being reduced steadily from 2006 to 2009. In the 7 governorates for the project, Theeqar had the least number of cases of injuries and casualties in 2009, followed by Karbalaa, and Basra.

Table 4-2-4: Number of injuries and casualties due to terrorism

Governorate	Number of wounded in terrorist operations				Number of martyrs in terrorist operations			
	2006	2007	2008	2009	2006	2007	2008	2009
Baghdad	23,786	18,335	8,750	7,961	8,950	5,170	1,741	1,111
Basra	336	1,387	1,921	301	249	1,186	580	197
Nineveh	3,947	6,217	4,310	3,510	2,637	2,775	1,443	1,063
Maysan	133	253	278	154	18	140	152	59
Diwaniyah	121	241	50	23	170	197	22	4
Diyala	4,027	4,019	2,151	953	3,500	2,806	1,228	370
Anbar	2,442	817	225	570	3,930	1,534	181	174
Babil	1,021	1,674	386	831	401	648	206	178
Karbalaa	310	749	171	243	135	251	114	42
Kirkuk	1,863	2,431	855	1,028	695	655	362	342
Wasit	62	441	254	48	48	262	196	28
Theeqar	262	824	438	98	79	251	498	23
Muthanna	151	103		4	36	41	-	1
Salaheddin	472	778	659	209	570	471	333	476
Najaf	396	340	21	2	121	149	41	-
Total	39,329	38,609	20,469	15,935	21,539	16,536	7,097	4,068

(Source: MOH Annual report 2009)

(6) Validation of relevance related to development of facilities

1) Relevance of project scope and capacity of facilities from the technical viewpoint

The profitability of each hospital is not reviewed since medical services are free of charge in Iraq. Relevance of technology is reviewed as follows.

The standards of hospital establishment developed by the Ministry of Health specify the required departments and functions of a hospital according to its size.

The standard for a 200-bed general hospital is shown as follows. The hospitals planned in this project are required to be designed based on this standard.

a) Planned departments (type and quality of medical services)

Table 4-2-5: Planned departments and operational function

No.	Medical services
1	Surgery
2	Internal Medicine
3	Orthopedics
4	Obs. & Gyn.
5	Pediatrics
6	Ophthalmology
7	E.N.T
8	Urology
9	Dermatology
10	Dental
11	Psychiatry

No.	Operational function
1	Out Patient Department
2	Inpatient (Ward)
3	Emergency
4	Delivery
5	Diagnostics Imaging
6	Clinical Laboratory
7	Endoscope
8	Central Operation Theater and CSSD
9	Dialysis
10	Pharmacy
11	Physiotherapy
12	Maintenance（incl. SPD）
13	Nutrition

b) Scale of facilities

Scale of facilities is as below.[22]

Table 4-2-6: Number of beds and its breakdown

Services		Number of beds	Notes
General Ward	Internal med	70	
	Surgery	60	
	Obs. & Gyn.	30	incl. NICU(4 beds)
	Pediatrics	40	
Sub Total		200	
Special Unit	Emergency Observation	24	
	ICU	10	incl. isolation unit
	CCU	6	incl. isolation unit
	PICU	6	incl. isolation unit
Total		246	

Table 4-2-7: Number of operation rooms

Classification		Qty
Emergency		1
Day Surgery		1
Obstetrics		2
COT		4
	General	2
	Ophthalmology	1
	Orthopedics	1
Total		8

The standard for the scale of hospital in Iraq prescribes 120 m2 per bed as the minimum. This standard capacity does not include ICU and other

[22] Patients room should basically be of 1 bed or 2 beds, and the share should be 50/50. Additionally, technical space should be taken into consideration for the operation and maintenance of the facilities.

specialized beds.

A survey on 143 general hospitals which have 200 or more beds and were built in the last 10 years in Japan shows that the average floor area per bed is 70 – 80 m2. However, the scale varies from the smallest, 50 m2, to the largest, over 120 m2. Since there are various kinds of hospitals among what is called “general hospital”, it should not be discussed in terms of the average floor area only.

Since the floor area of 120 m2 in Iraq does not include specialized beds, it is necessary to calculate the figure including those beds at comparison with the figure for Japan.

The request of 200-bed hospitals totals 246 beds at each hospital including specialized beds. Thus, the floor area will be 100 m2, which is greater than the average of Japan by 20% and more. However, this scale is reasonable if the following factors are taken into account.

a. Since masonry construction is adopted for the hospitals requested, partition walls are approximately 240mm, twice or so as thick as those of the Japanese hospitals.
b. A standard hospital ward in Japan accommodates 4 beds, while that in Iraq accommodates 1 or 2 beds only.
c. Due to the sociocultural background in Iraq, a larger number of partitions are required to separate males and females.
d. Due to social habits, it is necessary to consider a large number of private rooms for administration offices.
e. Various machines and building facilities are larger than those in Japan.
f. It is common in Japan to outsource laundry, meal services, repair of medical equipment, etc., while it is common in Iraq to deal with these services within hospitals.
g. Unlike the hospitals in Japan, where medicines and consumables are timely supplied, those in Iraq cannot be expected such deliveries and need to have a large amount in stock.
h. Because of unstable infrastructures, including electricity, water supply and sewage, it is necessary for each hospital to be equipped with power generators, water purification systems and other plant facilities.

The hospitals construction project, which includes 10 (400-bed) hospitals each on the initiative of the Ministry of Health, is under construction by 3 different contractors. The floor areas per bed of each contractor are as follows.

Item	A	B	C
Total floor area of hospital	54,669 m2	62,223 m2	58,656 m2
Floor area per bed	137 m2/ bed	156 m2/ bed	147 m2/ bed
Floor area of accommodation facility for doctors	4,760 m2	8,046 m2	8,071 m2

As shown above, these hospitals are designed to be fairly larger than the minimum standard of 120 m2. These 400-bed hospitals include some diagnosis and treatment departments which are not planned in the 200-bed hospitals in this project.

In line with this, this project plans to make the scale at 120 m2 per bed. Accordingly, the total floor area of the hospital will be 200 beds x 120 m2 = 24,000 m2. Meanwhile, where infrastructures – power generations – are concerned, plant facilities including water purification and sewage treatment will be constructed in accordance with the request from the Ministry of Health, which says that, because of frequent electric outages, it is necessary to have power generators which can supply all the necessary electricity for several days.

Accommodation facility for doctors will be constructed separately. It will be designed to accommodate 50 people with considering the number of doctors for a 200-bed hospital. The proportion of single doctors and those with families is set at 1:1, and the floor area will be designed at 60 m2 for the former and 150 m2 for the latter. Therefore, the scale of the accommodation facility will be 5,000 m2.[23]

2) Consistency with the domestic design standard

Clear standards related to architecture and construction in Iraq are still undeveloped, therefore design/constructions are based on the standards that are considered to be adequate by the designer/constructor (standard of their own country if the designer/constructors are in foreign companies).

The standard of the U.S., International Building Code (hereafter referred to as "IBC")[24], and the design standard of Japan, Building Standards Act, are compared in this section, in order to validate the relevance of the legal aspects related to the development of facilities.

According to the engineers of the Ministry of Health and local consultants, in Iraq, IBC is applied for the design and construction in the project for 10 (400-bed) hospitals currently under construction, and is also often applied in design/construction of facilities.

However, this project is related to the construction of 200-bed hospitals, therefore this validation is focusing on the architectural standard related to the same function.

[23] See: Appendix 8 "Proposed Floor Plan of New Hospitals"

[24] IBC, which stipulates the minimum required standards related to architecture, was established by the International Code Council of U.S., and is the standard of architectural laws of the states in the U.S.

Table 4-2-8: Comparison between the Building Standards Act of Japan and IBC

Item	Building Standards Act of Japan	IBC		
Fireproof Quasi-fireproof	Fireproof shall be provided for openings on a firewall.	706 707	Fire Walls Fire Barriers	Each opening shall not exceed 15 m2. The aggregate width shall not exceed 25% of the length of the wall.
Fire Compartment	Shaft enclosures shall have a fire-resistance rating of not less than 45 min.	708	Shaft Enclosures	Fire-resistance rating of not less than 2 hours (4 stories or more), and not less than 1 hour (less than 4 stories)
	An enclosed EV lobby is not required.	708	Shaft Enclosures	An enclosed EV lobby shall be provided at each floor, connecting more than 3 stories.
	Stories shall be divided into fire compartments of not more than 1,500 m2.	407.4	Smoke Barriers	Stories shall be divided into smoke compartments of not more than 2,000 m2 (hospitals)
Building Construction	Min. area of exterior wall openings shall be based on effective daylight rate.	705	Exterior Walls	Max. area of exterior wall openings shall be based on fire separation distance and degree of opening protection.
Structural Calculation	Thickness of protection for reinforcement shall be measured to the outside of the reinforcement.	704	Fire Resistance -rating of Structural Members	Thickness of protection for reinforcement shall be measured to the outside except stirrups or spiral reinforcement ties projecting not more than 12.7mm into the protection.
Interior Finishes	The allowable fire performance and smoke development of interior finishes shall be limited based on building functions, numbers of floors and building areas.	800	Interior Finishes	The allowable fire performance and smoke development of interior finishes shall be limited based on occupancy classification.
		803	Thickness exemption	Materials of less than 0.9mm applied directly to the surface of walls or ceilings shall not be required to be tested.
Means of Egress	Limitation of a ceiling height is not specified.	1003	Ceiling Height	A ceiling height shall be not less than 2,286mm.
	The means of egress width and numbers are not specified.	1005	Egress Width	The means of egress width and number shall be based on total occupant load.
	Means of egress doors in hospitals are not specified.	1008	Doors, Gates and Turnstiles	Means of egress doors used for the movement of beds shall provide a clear width not less than 1,054mm and height not less than 2,032mm. (Hospitals)
	A height of stairways headroom is not specified.	1009	Stairways	Stairways shall have a min. headroom clearance of 2,032mm.
	Stair riser heights shall be max.200mm and treads shall be min. 240mm. (hospital with living rooms on the upper floor totally over 200 m2)			Stair riser heights shall be 178mm max. and 102mm min. Winder treads shall have a min. depth of 279mm.
	Stairway landings shall be installed at every 4m height. (hospital with living rooms on the upper floor totally over 200 m2)			Unspecified.
	The common path of egress shall not exceed 25m. The travel distance to the exit access stairway door shall not exceed 50m.	1014	Exit Access	The common path of egress travel shall not exceed 22,860mm. The travel distance to the exit access stairway doors shall not exceed 60,960mm.
				A suite of sleeping rooms of not less than 93 m2 shall have not less than 2 exit doors, and the travel distance between any point in the suite and an exit access door shall not exceed 30,840mm.
Road				Unspecified
Use Zoning	Restriction shall be based on use zones Height shall be based on oblique line. Aare shall be based on building coverage ration/floor area ratio and fire-resistance rating			Unspecified
Building Coverage Ratio/Floor Area Ratio		5	General Building Heights and Areas	Height and area shall be based on fire-resistance rating. No restriction based on zoning No restriction if the fire-resistance ratings of primary structure is 3 hours and etc.
Restriction of height/shadow				
Fire Zone Semi-fire zone				Unspecified

Table 4-2-8 shows the typical differences between the Building Standards Act of Japan and IBC, based on the former.

Many of the items in IBC are related to prevention of fire accidents or prevention of the damages spreading in the event of fire. The items for "evacuation equipment" are especially detailed and strictly regulated compared to the Building Standards Act of Japan, specifying the width of evacuation routes or sizes of fittings on the route. On the other hand, it does not have regulations that specify the area of usage, fire prevention area, and is a standard that is not specific to a limited area.

Detailed comparison of fire resistant performance or structural strength, etc. has not been carried out. However, it can be considered that the basic principle or regulations are both similar.

Although slight differences can be observed between the two overall, if the IBC is satisfied, then the Building Standards Act of Japan is basically satisfied. However, attention must be paid to the differences if design and construction are conducted in Iraq based on the IBC, as described in Table 4-2-8.

3) Relevance of technical level related to the planned facilities

When construction of hospitals and general buildings compared, special technologies as shown below are required for construction of hospitals.

Table 4-2-9: Special technologies required for hospitals

Item	Details	Iraqi techniques	
		Design	Construction
Seismic Isolation/Damping Structure	In areas of earthquake occurrence Standard buildings with earthquake resistance are secured, the inside of which is quaked heavily. It is proved by earthquakes all over the world that hospitals with earthquake resistance are no longer functioned.	N/A	N/A
Radiation Shield Technology	Doors and glasses are made of particular kind of material, ex. lead, but construction technology is not so particular.	X	X
Electromagnetic Shield Technology	Electromagnetic shield is necessary for electroencephalography rooms and MRI rooms, which is higher technology than radiation and requires special contractor technique.	N/A	N/A
Soundproofing Technology	Soundproofing is necessary for hearing test rooms and etc., which doesn't demand so high technology as broadcasting facilities and musical halls and its technology isn't so particular.	N/A	X
Air Cleaning Technology	Particular technology of design and construction, such as HEPA-filters and pressure control is required.	N/A	N/A
Medical Gas System	Installation by special contractor is required.	N/A	N/A
Steam Supply System	Installation by special contractor is required.	N/A	N/A
Building Control Technology	This technology manages air conditioning and electric equipment etc. uniformly and implements reduction of operation cost by energy saving etc.	N/A	N/A
Water purifying System	Particular equipment purifying water are required, but design and construction are not particular.	X	X

N/A : Not Applicable, X : Applicable

Hospitals are functional facilities where departments are mutually linked in a complex system. Medical services could be supplied in the past in a pavilion-type layout where departments were placed individually. However, a highly integrated facility layout is required for a modern medical service, and therefore, an experienced design team is essential for the design.

(7) Relevance of technical level related to planning of equipment

The standard equipment list is presented in the hospital establishment standard issued by the Ministry of Health. The listed items meet the above-mentioned planned departments and those are necessary in general hospitals.

The pieces of medical equipment being requested are not high-level medical equipment used in specialized hospitals. It is necessary, however, to implement operation training for the latest equipment at the time of installation.

Major equipment at each department is as follows.[25]

- Diagnostics Imaging Dept.

  General X-ray, Fluoroscopic X-ray, CT devices, Mammography, Mobile X-ray, etc.

  CT devices have been already adopted in 200-bed hospitals, and are now considered to be common equipment in Iraq. On the other hand, some hospitals, such as educational hospitals and hospitals in the capital of governorates, are equipped with MRI devices, but those at a lower level located in urban areas, are beginning to adopt the devices.

- Wards (internal medicine, surgery, pediatrics, Obs. & Gyn., ICU, CCU, and PCU)

  Basically, electric beds are adopted. A standard set of equipment is supplied, including patient monitors, ventilators, ECG, defibrillators, infusion pumps, syringe pumps, and infant incubators.

- Outpatient (internal medicine, surgery, dermatology, urology, neurology, dentistry, pulmonology, Obs. & Gyn., pediatrics, ophthalmology, ENT, and orthopedics)

  Together with examination tables, equipment unique to each department is supplied, which includes ultrasound apparatus, ECG, EEG, audiometers, dental units, slit lamps, ophthalmology lasers, ENT treatment units, and dermatological lasers. Some hospitals in the capital of governorates are equipped with calculus lithotripsy devices, but not so many hospitals at a lower level in urban areas are equipped with them.

- Central Operation Theater

[25] See: Appendix 9 “List of Equipment”

・ Laundry

Washing machines, dryers, flat ironers, etc.

4-2-3. Implementation and procurement plan

The schedule after signing the L/A is shown below, and it is estimated that roughly 68 months are required for the completion of the construction. The project term is expected to be a total of 80 months (after the selection of a consultant) if warranty period of 24 months are included.

The consultants hired under the loan of JICA, and construction company must contract based on the yen loan guideline of JICA.

The bidding will be separated to construction of facilities and procurement of equipment. It is assumed that One-stage-Two-envelope method will be applied for the bidding of construction of facilities. In principle, prequalification (PQ) will be carried out prior to bidding.

Under the responsibility of Iraqi government, 14 months are expected for the site preparation, which includes bidding for selection of the contractor as well as the works period. However, this period must be no longer than the time of a contract agreement of the project. Additionally, equipment will be installed after the completion of the facility.

Warranty period is 24 months after the handing-over of the facilities and equipment.

Table 4-2-10[26] shows the tentative schedule at present. It will be scheduled to finalize the implementation schedule, etc. at the time of appraisal (financing examination) after the necessity and validity, etc. will be judged as adequate for the yen loan project.

Table 4-2-10: (Proposed) implementation schedule

Process	Period
1. Selection of consultant	12 months
2. Detailed design	16 months
3. Bidding Preparation of bidding documents, PQ, PQ evaluation, consent of JICA, bidding, evaluation, consent of JICA, contract negotiation, concurrence of JICA, establishment of L/C	Construction 16 months Equipment 16 months
4. Construction	24 months
5. Training for operation and maintenance of facilities and equipment	3 months
6. Procurement of equipment, installation, training for operation and maintenance	25 months
7. Warranty period	24 months
MOH's site preparation	14 months

4-3. Operation and maintenance plan of the project

a) Operation system

6 hospitals out of the 7 requested hospitals will be relocation and newly construction with staff to be transferred from the existing hospitals. As for the Kirkuk hospital which is to be newly established, the priority will be given to secure personnel as stated in letters from the Ministry of Health.

The organizational chart of the new hospital is summarized in the following figure.

[26] For the overall operation schedule, see Appendix "13 Overall Schedule".

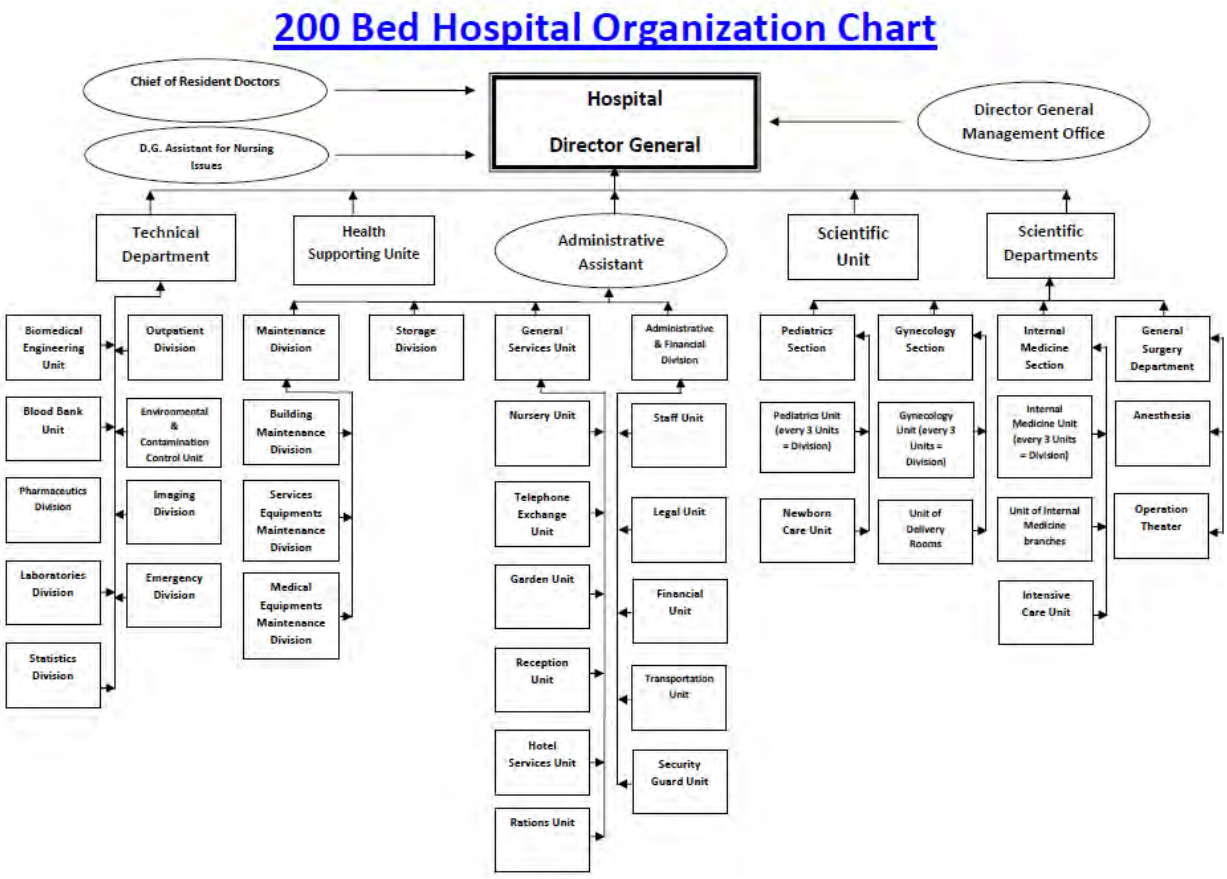


Figure 4-3-1 : Organization chart of new hospital

b) Operation and maintenance system

Resident engineers belonging to the health department of each governorate will be dispatched to the operation and maintenance department in the organizational chart shown above, and be in charge of operation and maintenance of buildings, facilities and medical equipment.

Engineers of a standard operation and maintenance department are:

* Facility engineer: 1-2 persons
* Electrical engineer: 1-2 persons (Technicians may serve as substitutes for engineers)
* Mechanical engineer: 1-2 persons (Technicians may serve as substitutes for engineers)
* Engineer of medical equipment: 1-2 persons

4-4. Estimated project cost

4-4-1. Estimated cost

(1) Contents of the project

Contents and their details in the project are as follows.

Contents	Details
Site preparation and exterior work	Filling, land preparation, exterior work, exterior furniture, etc.
Security outside the site	Cost of security surrounding the construction sites
Cost of hospital construction Cost of construction of main building Cost of guards of contractors Cost of guards of contractors' facilities	 Total construction floor area: 24,000 m2. Cost of guards upon assumption that Japanese companies participate in the project. Cost of guards of facilities where personnel of the Japanese companies stay.
Construction of Energy center	1,000 m2
Construction of staff accommodation	5,000 m2
Procurement of medical equipment	1 set (see: Appendix 9 "List of Equipment")
Medical information system	1 set
Cost of design administration and project management	The cost includes, basic design, work related to bidding, work related to construction administration, work related to project management, and guards.
Technical transfer / training	Technical transfer / training which should be conducted for efficient operation of the hospitals. However, the cost related to usage, operation and maintenance of facilities and medical equipment to be constructed / procured under the project will be included in the cost of construction of hospitals and the cost of procurement of medical equipment.

(2) Estimation conditions

1) Construction work

Since there is no particular official unit price estimate per square meter which should be adopted at the time of budget application for public construction, hired consultants are in charge of calculating approximate cost estimate for each project.

According to hearing surveys conducted by a local consultant, a common construction cost of personal housing in Iraq was 700 - 800 USD/m2, though there are slight differences among regions. The construction cost of an office building was 800 - 950 USD/m2, and that of a hospital was 950 - 1050 USD/m2.

In Japan, on the other hand, construction of a hospital costs almost twice as high as that of a personal housing.[27] A comparison of the costs shown above suggests that the cost of construction of hospital is relatively more expensive - by 20 - 30 % - than that of a personal housing in Iraq. Even so, it is not necessarily appropriate to apply these figures to the project.

The outline of facilities of 200-bed hospitals surveyed is as follows.

Basically, the concrete-reinforced brick masonry construction is applied to the building with the floor mold slab method. No concrete slab is laid on the floor, where the earth is compacted, and floor tiles (terrazzo or natural stones)

[27] The unit cost of construction of public hospitals in Japan averaged 404,200JPY/m2. (According to a survey of Ministry of Internal Affairs and Communications of Japan, published in April 2010. The survey covered 238 hospitals constructed during the period of 1999-2008. In passing, the nationwide average unit price of new housings surveyed in 2004 by government financial corporation was 182,000JPY/m2.)

A standard set of equipment is supplied, including shadow-less lamps ceiling type, operation tables, anesthesia apparatus, electric cautery, patient monitors, C-arm X-ray, mobile X-ray, surgical microscopes, and sets of surgical instruments.

- Central Sterilization Supply Department

  A standard set of equipment is supplied, including steam sterilizers, plasma sterilizers, ultrasonic cleaning machines, automatic jet washing machines, drying machines, and bag sealers.

- Emergency Department

  Operation tables, anesthesia apparatus, electric cautery, patient monitor, C-arm X-ray, etc.

- Delivery Department

  Delivery beds, delivery monitoring devices, and aspirators for delivery.

- Endoscope Department

  Gastrovideoscopes, duodenovideoscopes, bronchovideoscopes, etc.

- Dialysis Department

  Dialysis machines, beds, reverse osmosis water purification system, etc.

- Clinical Laboratory Department

  (Biochemistry, hematology, blood bank, pathology, microbiology and autopsy)

  Automatic analyzers, automated urine analyzers, blood gas analyzers, spectrophotometers, centrifuges, automated blood cell analyzers, blood refrigerators, microscopes, ELISA, automated staining apparatus, etc.

- Rehabilitation Department

  Equipment related to exercise therapy, equipment related to physical therapy, equipment related to occupational therapy, etc.

- Pharmaceutical Department

  Tablet packaging machines, power packaging machines, dispensing counters, clean benches, etc.

- Kitchen and catering

  Cooking utensils, a set of dish washing apparatus, plate ware, thermal/refrigerated serving wagons, etc.

are laid directly on the surface of the compacted earth. Thus, the floor is considerably irregular due to water in the soil and moles.

The door of the radiation department is made of lead. The walls are not made of concrete, but brick masonry construction method is applied. In addition, ordinary glass is used for the junction part underneath the fittings, and for power window. Thus, there are some difficulties concerning protection from radiation.

There are no washing facilities at some outpatient examination rooms, where people are obliged to use bowl to wash their hands.

The building is not equipped with any of fire alarm, fire-extinguishing installation, emergency electric lighting system, or central medical gas facilities.

Split air-conditioners are used. Split air-conditioners are installed in ICU and the operation department, too. There is neither pressure control system nor air cleaning system (with HEPA filters). The sterilization room is not equipped with any vapor discharging system: a ventilation fan on the wall is a sole facility for ventilation.

It seems possible, because of these facilities, to construct a hospital with the cost of a mere 20 – 30% higher than that of an ordinary housing. However, it is essential for a modern hospital to have facilities paying attention to cleanness, safety in general, and safety of patients and staff. If these facilities are added, the construction cost may well be some twice as much (approx. 1,400 – 1,600USD) as that of an ordinary housing even in Iraq.

3 contractors are currently in charge of construction of the 10 hospitals under the project of the Ministry of Health. The construction cost is in fact as shown in the table below.

Contractors	Company A	Company B	Company C
Construction Cost	US$ 1,506/m2	US$ 1,425/m2	US$ 1,572/m2

Average	Maximum	Minimum
US$ 1,501/m2	US$ 1,572/m2	US$ 1,425/m2

In the course of discussions, the Ministry of Health emphasized that the following matters should be taken into account when comparing the construction costs of the above-mentioned 400-bed hospitals and the 200-bed hospitals to be constructed under this project.

1. For the 400-bed hospitals, any possibility of repair after completion was not taken into account. In the case of the 200-bed hospitals under this project, sufficient floor height (5.5m or so) will be secured in consideration of expansion and repair work which is inevitable for construction of hospitals.

(A factor to increase the cost)

2. Compared to the 400-bed hospitals, the unit cost of construction of the 200-bed hospitals will be higher due to the smaller size. (A factor to increase the cost)
3. The construction contract for a 180-bed hospital in Karbalaa was concluded by a company from India at 800 USD/m2, and the construction contract for a 50-bed hospital by a company from Turkey at 1,200 USD/m2. Although the unit costs of these hospitals are lower than that of the 400-bed hospitals mentioned above, no particular measures for possible expansion or repair in future were taken into account. Apparently, the final grade of these 2 hospitals remains unknown.

2) Procurement of medical equipment

The cost of medical equipment procurement is calculated based on the quotations from manufacturers. In passing, the cost of equipment includes the costs of transportation, installation and training for operation and maintenance.

3) Others (cost of site preparation, cost of guards, etc.)

The local standard price will be adopted for site preparation. As for the cost of guards, quotations from security companies were taken into account.

(3) Estimated project cost

1) Total project cost

The estimated project cost will be disclosed after the completion of the tendering procedure of the project.

4-4-2. Cost for operation and maintenance

Additional cost for operation and maintenance after implementation of this project is estimated as below.

Table 4-4-2: Maintenance cost

Item	Cost (Million ID)	Notes
Maintenance of Facilities	1,042.7	2% of construction cost
Utility Cost	2,987.5	refer to Table 4-4-3
Maintenance of Medical Equipment	702.1	2% of equipment cost
Total	4,732.2	

Table 4-4-3: Utility cost

Item	Cost (Million ID)	Condition of Estimation	
Electricity (rating: 5MW)	2,601.7	Consumed Amount per 1 hour (kWh)	4,000
		Power Distributing Hours per day (hours)	22
		A year (days)	365
		Consuming Rate (Load Rate)	0.6
		Unit Price (ID/kWh)	135
Fuel (generator: 1,000KVA)	226.5	Consumed Amount (L per hour) (0.6 load)	194
		Generating Hours (hours per day)	2
		A year (days)	365
		Unit Price (ID/L)	400
		Number of Generators	4
Water	13.7	Consumed Amount (ton/day)	500
		A year (days)	365
		Unit Price (ID/ton)	75
LPG	14.1	Consumed Amount per day (kg)	250
		A year (days)	365
		Unit Price (ID /kg)	155
Medical gas	131.4	O_2 (ID per year)	129,600,000
		N_2O (ID per year)	1,800,000
Total	2,987.5		

The increase of the cost for operation and maintenance needed as the result of this project is about 6-23% compared with the existing budget for operation and maintenance, which include the maintenance cost and the commodity cost, of regulating healthcare administrative institutions in targeted sites in 2009 as shown in the below table. The high increase rate indicates that the current budget for operation and maintenance is small, but it is estimated that the time to allocate large budget for existing old facilities and equipment is past.

On the other hand, the increase of the cost for operation and maintenance needed as the result of this project is 1.09% compared with the budget for operation and maintenance of the Ministry of Health in 2009, and 0.46% compared with the total budget of the Ministry of Health in 2009.

Although the rates are different among each governorate, it is not heavy burden for the total budget of the Ministry of Health. Therefore it can be concluded that the Ministry of Health can secure the distribution of budget to each government for the costs.

Table 4-4-4: The cost for operation and maintenance after implementation of this project

(Millions of ID)

Chamber of	Budget																
	1	2	3	4	5	6	7	8 (1～7)	9 (4+6)	10	11 (9÷10)	12	13 (11×12)	14	15 (14-13)	16 (15÷9)	17 (15÷8)
	Investment	Donation	Other expense	Maintenance	Medical Service	Commodity	Compensation of employees	Total budget	Budget for maintenance and operation	No. of existing beds (govenorate)	Existing cost for maintenance and operation per bed (govenorate)	No. of beds (targeted hospital)	Existing cost for maintenance and operation (targeted hospital)	Planned cost for maintenance and operation	Increased cost for maintenance and operation	Increase rate of cost for maintenance and operation	Rate of increased cost for maintenance and operation compared with total budget
the Ministry of Health (except for Department of Inspector General)	364,625	20,435	23,150	11,095	12,830	1,261,328	54,533	1,747,997	1,272,423								
Department of Health Basra	6,589	1,393	239	9,245	4,336	32,100	142,732	196,634	41,345	3,106	13.3	173	2,303	4,732	2,429	5.88%	1.24%
Department of Health Nineveh	2,549	2,409	258	10,835	5,082	38,703	166,283	226,120	49,538								
Baghdad Health Directorate / Karkh	1,615	2,353	216	9,115	4,276	32,412	212,641	277,163	41,527								
Department of Health Theeqar	5,101	1,633	163	6,561	3,077	23,147	110,161	149,843	29,707	1,549	19.2	120	2,301	4,732	2,431	8.18%	1.62%
Department of Health Diyala	255	1,220	115	4,771	2,238	17,327	83,925	112,147	22,099	1,221	18.1	100	1,810	4,732	2,922	13.22%	2.61%
Department of Health Babil	714	1,135	151	6,163	2,891	21,894	121,157	160,531	28,057	1,778	15.8	78	1,231	4,732	3,501	12.48%	2.18%
Department of Health Anbar	6,952	1,127	92	5,169	2,425	18,524	78,856	113,144	23,693								
Department of Health Maysan	7,649	1,001	78	3,678	1,725	12,771	61,799	88,701	16,449								
Department of Health Wasit	3,400	842	93	4,175	1,958	14,846	67,195	92,508	19,021								
Department of Health Kirkuk	850	1,163	104	4,573	2,145	15,709	69,442	93,985	20,281	1,187	17.1		0	4,732	4,732	23.33%	5.03%
Department of Health Najaf	11,051	808	96	4,274	2,005	15,194	89,584	123,012	19,469								
Department of Health Qadisiya	5,950	916	117	3,976	1,865	14,122	82,562	109,508	18,098								
Department of Muthanna	5,099	361	76	2,585	1,212	9,227	36,265	54,824	11,812								
Department of Health Karbalaa	4,395	752	105	3,579	1,679	12,729	71,407	94,646	16,308	1,060	15.4	206	3,169	4,732	1,563	9.58%	1.65%
Department of Health Salaheddin	3,400	693	132	4,473	2,098	15,947	61,048	87,791	20,420	1,194	17.1	200	3,420	4,732	1,312	6.43%	1.49%
Department of Medical City	11,900	721	78	3,748	1,758	13,497	64,903	96,604	17,245								
Department of Baghdad / Rusafa	16,150	2,729	299	12,485	5,856	44,274	218,654	300,447	56,759								
Department of Inspector General	0	323	16	452	844	543	4,653	6,832	995								
Total	431,500	42,103	25,577	110,952	60,300	1,614,294	1,797,801	4,132,436	1,725,246				14,234	33,124	18,890	1.09%	0.46%

(Source: MOH Annual report 2009/ based on Table 2-3-3, 3-1-2)

Note:

- 1 to 8 are quoted from Table 3-1-2.
- 9 is the sum of 3 and 6 as the existing budget for operation and maintenance.
- 10 is quoted from Table 2-3-3.
- 11 is the cost for operation and maintenance per bed. Since it includes the cost of primary healthcare facilities, the actual cost for operation and maintenance is less than the cost of 11 (due to no data of the primary and secondary healthcare facilities separately).

4-5 Consideration for implementation of the project

4-5-1. Technology and effectiveness of the Japanese company

(1) Water treatment technology

Since a large volume of clean water is required in medical facilities, the water purification technology of Japan can be utilized. Additionally, since water is lacking in Iraq, sewage can be treated as recycled wastewater and be utilized for toilet cleaning water, which filtration technology of Japan can contribute to.

(2) Air conditioning and ventilation technology

Unlike general buildings, air conditioning and ventilation system in medical facilities is unique: various air conditioning systems are used, which require reliable purification and thermal environment. Additionally, the energy consumption is large due to the high volume of intake of outdoor air and the long operation time, therefore energy saving air conditioning system must be considered for Iraq, where electric power supply is unstable. From such point of view, the air conditioning and ventilation technology of Japan can be utilized.

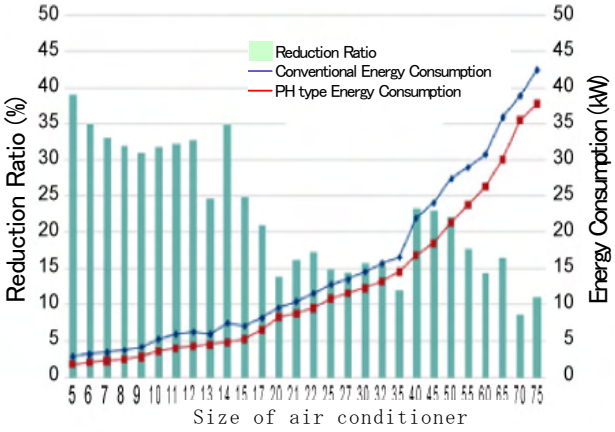


Figure 4-5-1: Energy-saving air conditioner – comparison of energy consumption

(Source: Shinko Kogyo CO., LTD)

Figure 4-5-1 shows the chart for the comparison of energy consumption between new and old air conditioners made by Japanese manufacturers. Depending on the size of the air conditioner, 10% to 40% electric power consumption can be reduced. Therefore, from the viewpoint of unstable power supply and consideration to environment, utilization of technology of Japanese company is very effective.

(3) Cogeneration technology

In addition to the high thermoelectric ratio, the operation time of electric equipment such as air conditioners is long in hospitals, therefore backup generators are required. Thus, introduction of cogeneration is ideal for hospitals. Additionally, since the power supply is undeveloped and unstable in Iraq, it is preferable to introduce a generator using gas, which can be

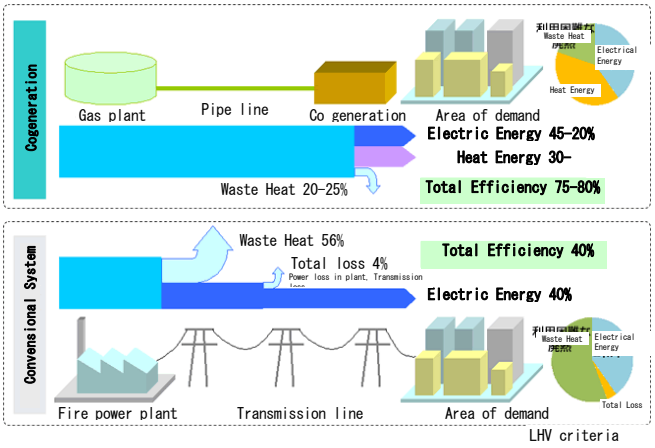


Figure 4-5-2: Comparison of total efficiency of cogeneration

(Source: The Center for Promotion of Natural Gas)

easily secured.

Additionally, as shown in Figure 4-5-2, cogeneration system has almost twice of the total efficiency compared to the conventional system, therefore is beneficial in terms of energy saving, CO2 emission reduction, and economic efficiency.

Especially, the power generation efficiency of gas cogeneration manufactured by Japanese companies is in general higher than those manufactured in other countries. Therefore, depending on the output of the generator, the power generation efficiency is approx. 40% higher. Hence, there is a high possibility of introducing the technology of the Japanese companies.

(4) Facility monitoring technology

It is essential to monitor each facility of the building adequately and conduct a proper operation and control, for the reduction of operation and maintenance cost, and reduction of CO2 emission. By using Building Management System (BMS), reduction of lifecycle cost, improvement of management quality, and efficient work can be carried out.

Figure 4-5-3 shows the change in energy consumption of before and after the energy-saving renovation of a certain existing hospital. In this renovation, a management control system for air conditioning related equipment was introduced (as well as employing insulation film for windows). Extracting and measuring the wasted energy consumption that was not visible resulted in realization of energy saving effect.

The Building Energy Management System (BEMS) can gather, store, and analyze the data in addition to the BMS, where energy consumption trend after the introduction is visualized, and control/adjustment can be carried out corresponding to the trend. The BEMS products manufactured by Japanese companies have higher performance than those manufactured by other countries, therefore can further accelerate the energy saving of the building.

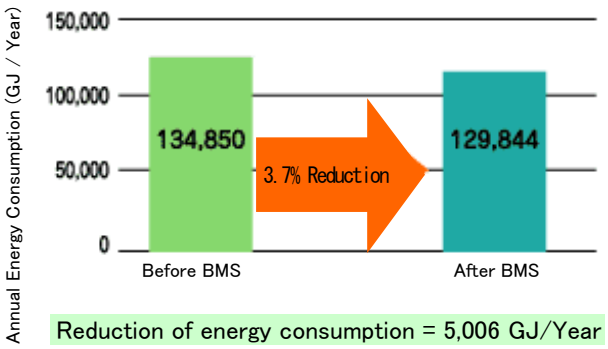


Figure 4-5-3: Change in energy consumption of before and after the introduction of BMS
(Source: Yamatake CO., LTD)

(5) High-efficiency lighting technology

High-efficiency lighting includes LED lights or organic EL lights. However, when the cost is considered, high-efficient fluorescent lights are still the most realistic choice. Various high-efficiency lights or lighting equipment such as Hf[28] fluorescent lights or compact fluorescent lights is commercialized due to the advancement of manufacturing technology or inverter technology. The latest lighting equipment manufactured by

[28] High-frequency lighted fluorescent light. The efficiency of lamp is higher and saving energy is more than existing fluorescent light.

Japanese companies consumes 30% to 40% less energy compared to 15 years ago, and can be effective for reduction of CO2 emission and energy saving.

Additionally, by introducing lighting equipment controlled by automatic dimmers or human detectors can contribute to further energy saving.

However, these pieces of lighting equipment have not been certified by the local safety standards of Iraq, therefore although it depends on the time of bidding, it is unlikely for Japanese products to be employed.

(6) Seismic isolation technology

If the construction sites are in the earthquake zone, seismic isolation and vibration control technologies are effective. In this project, Salaheddin, Kirkuk and Diyala is in such zones. The effective use of seismic isolation and vibration control technologies will minimize vibration of the buildings and avoid medical equipment from falling at the time of earthquake, making it possible for the hospitals to continue the medical activities.

In Japan, a quake-prone country, quite a few hospitals have adopted the technologies, and Japanese companies are well experienced in this field from the global viewpoint. They also have lots of data and information about cases in the past, and have gained public reputations which can guarantee their performance and technologies firmly relying on performance tests. Contracts with such Japanese companies will enable construction of hospitals with reliable, seismic-isolated/vibration controllable structures.

(7) Technologies to design medical facilities

Hospitals serve as centers of rescue and treatment activities when the local communities are damaged by earthquake or other disasters, and thus are required to be equipped with supplementary facilities for electricity, water supply and other infrastructures; secure room for additional beds for emergency; and be designed as seismic isolation and vibration control buildings which can serve as disaster-prevention facilities with sufficient redundancy. In Japan, where there are many earthquakes, there are more hospitals with such seismic isolation and vibration control structures, compared to other countries in the world.

At designing hospitals, it is necessary to take into consideration not only energy-saving to deal with global environmental issues, but also preventative measures against hospital-acquired infections and food-poisoning. At the same time, it is necessary to use electromagnetic shielding and other special technologies as in Table 4-2-9, so that it is desirable to adopt technologies designed by Japanese companies from the viewpoint of the environmental operation and maintenance.

In recent days, hospitals are required to upgrade the medical technologies rapidly; satisfy varied social needs; introduce information processing system and other information technologies; improve their medical services to patients; and alleviate the heavy work environments for doctors and nurses. In such demanding circumstances, it is essential to take in security measures and systems using the latest information technologies at designing modern hospitals, so that it is hoped that designs by experienced Japanese companies will be adopted.

4-5-2. Main materials and equipment that can be procured from Japan and their costs

This project is still in the feasibility study, and the standard of each facility/equipment is not determined yet, therefore the materials and equipment to be supplied cannot be reviewed in detail. Therefore, the materials and equipment that may possibly be supplied are shown in Table 4-5-1, based on the past cases.

However, Japanese companies that have actually delivered items to Iraq in the current structure after the war are rare, and it is difficult to calculate the cost of delivery of materials and equipment at this stage. Consequently, only the contents of materials and equipment that may possibly be supplied are listed here.

Table 4-5-1: Prospective products of Japanese companies

Mechanical	Air Conditioning
UPVC Pipe and Fittings	Air Conditioner
Galvanized Iron Pipe and Fittings	Refrigerant Pipe and Fittings
Valves	Refrigerant Pipe Duct
Level Control Valve	Intake and Exhaust Fan
Ball Tap	Air Diffuser and Resister
Manhole Cover and Valve Box	Spiral Duct and Fittings
Drain Fittings	Duct Cap
Vent Cowl	Kitchen Hood
Flexible Joint	
City Water Transfer Pump	Electrical
Rain Water Transfer Pump	Low voltage Main Feeder Panel
Fire Service Pump	Diesel Engine Generator
City Water Booster Pump	Distribution Board
Drain Pump	Terminal Board
Chemical Feeder	Cable and Wire
City Water Reservoir	PVC Conduit
City Water Elevated Water Tank	Cable Tray
Rain Water Elevated Water Tank	Steel Tracking
Grease Trap	PVC Wiring Duct
Electric Water Heater	Light Switch and Socket Outlet
Kitchen Equipment	Surface Isolator
Medical Oxygen Supply Unit	Electrode
Medical Vacuum Unit	Public Address System
	CCTV System
	Lightening Protection System

4-5-3. Possibility of participation of Japanese companies

As stated above, utilizing the technologies of Japanese companies will be very beneficial for the project, from the point of energy saving and reduction of CO2 emission. However, the advantage in terms of performance and reliability is not necessarily clear compared to manufacturers of other countries. Additionally, considering the long distance for transportation due to the geographic location of Japan and Iraq, as well as the situation of security in Iraq, the order to Japanese companies is not necessarily advantageous in case of international competitive bidding. Furthermore, it is very unlikely to order to Japan, when the lack of experience and high cost took into account, other than the above reasons.

However, all the Japanese companies which we interviewed are highly interested in this project which takes place in the center of the Middle East with several hospitals, as a step for those companies to advance overseas or explore overseas market.

Chapter 5. Evaluation of the Project

Chapter 5 Evaluation of the Project

5-1. Precondition and external condition for achievement of the project

5-1-1. Precondition

a) Current medical personnel working at the existing hospitals, which are located in 6 governorates, except Kirkuk, are scheduled to be reallocated to the new hospitals which will be reconstructed from the existing hospitals. As for new Kirkuk hospital, there is a need of new staff employment. It is assumed that other new 6 hospitals also need additional employment due to expansion of the hospitals. Therefore, the Ministry of Health secures necessary personnel to manage the new hospitals.

b) In addition to that, it is indispensable for hospital operation to regularly keep and procure medical drugs and consumables, etc., necessary for providing healthcare service. The Ministry of Health manages stock and procures them appropriately.

c) The Ministry of Health makes appropriate operation and maintenance of facilities and equipment to be supplied in the project not to make obstacles in healthcare service provision.

d) The Ministry of Health takes sufficient budgetary measure to secure personnel, medical drugs, materials and spare parts.

5-1-2. External condition

a) The security situation in Iraq remains in the balance. During hospital constructions and after hospital openings, the security situation does not deteriorate.

5-2. Evaluation of the project

5-2-1. Relevance

The project is judged as valid from the reasons below.

(1) Healthcare policy

The project is based on the “National Development Plan 2010-2014”, and “Strategic Plan of the Iraqi Ministry of Health 2009-2013” which aim at “improvement of health status; for its realization, improvement of primary, secondary, and tertiary level healthcare services; reduction of the disparity between urban and rural areas; and, training/reeducation of human resource, etc.” Through improvement of aging and lacking healthcare facilities, the project provides healthcare services to the regions appropriately in terms of both quality and quantity.

(2) Beneficiaries

The population of the 7 targeted sites in the project is 2.3 million in total. It is estimated that the hospital beds per capita in the regions would be increased and the healthcare services of secondary level would be improved by this project. It is also expected that the patient acceptance situation of each governorate would be improved by reallocation of patients in the regions by improvement of secondary healthcare facilities.

5-2-2. Effectiveness

(1) Feasibility of the project

As to review of qualitative effect and quantitative effect (FIRR (Financial Internal Rate of Return) and EIRR (Economic Internal Rate of Return)) of the project, in Iraq the cost of healthcare services is hardly calculable since the healthcare services are free of charge, and the data for the labor costs and material costs of each hospital is inadequate due to the situation that the healthcare provision system is still on the process of development. Additionally, several data needed for other cost-benefit analysis are also very limited. Due to the above, the internal rate of return is not calculated in this project.

(2) Setting of operational effect indicator (baseline of indicator)

In consideration of the nature and the current situation of the healthcare sector in Iraq, the feasibility of the project will be assessed by operational effect indicator measured by comparing the situation prior to and after implementation of the project.

2 types of operational effect indicators, “structure indicators” and “process indicators” are to be adopted.

1) Structure indicators

The structure indicators concern matters to be prepared in advance to provide medical services, such as hospital facilities and the number of medical doctors. In this project, the presence and function of emergency medical services, the presence and function of maternal and child medical services, the number of departments, the capacity and number of beds for general patients and special units, and number of medical doctors allocated are to be adopted as structure indicator.

Table 5-2-1: Structure indicators

	indicators	Remarks
1	Provision of emergency medical services	Initial emergency care / outpatient care only, or Ability to admit emergency patients
2	Provision of maternal and child medical services	Obs. & Gyn. department / pediatrics department
3	Medical departments	Number of medical departments
4	No. of beds	For general patients (for individual medical departments)
		Special units (for individual kinds of units)
5	No. of medical doctors	Number of medical doctors allocated

2) Process indicators

Process indicators concern the contents of medical services to be provided. Since the healthcare statistics are not well established in Iraq, adoptable indicators are inevitably limited. Thus, in this project, the number of inpatients and the number of deliveries, with which the basis of the data was confirmed, are to be adopted as process indicators.

Table 5-2-2: Process indicators

	indicators	Remarks
1	No. of inpatients	Annual total number of inpatients
		Number of inpatients per day
2	No. of deliveries	Annual number of deliveries

3) Indicators for the current operational effects at the 7 targeted sites

The current structure and process indicators at the 7 project sites are as follows.

These values are the values answered from the hospitals in each governorate and the values calculated based on the answer values, to the questionnaires presented to the Ministry of Health and the healthcare departments of the governorate in the course of the field study.

Table 5-2-3: Current values of structure indicators [*1]

	Site	Salaheddin	Kirkuk[*2]	Diyala	Babil[*3]	Karbalaa	Theeqar	Basra
1	Provision of emergency medical services	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○
2	Provision of maternal and child medical services	○	○	○	○	○	○	○
3	No. of medical departments	7	19	11	16	15	9	8
	01 Internal medicine	○	○	○	○	○	○	○
	02 General surgery	○	○	○	○	○	○	○
	03 Respiratory				○	○		
	04 Cardiology		○		○	○		
	05 Gastroenterology		○		○	○		
	06 Nephrology and Diabetes				○	○		
	07 Neurology		○					
	08 Oncology		○					
	09 Dermatology	○	○	○	○	○	○	○
	10 Pediatrics	○	○	○	○	○	○	○
	11 Psychiatry		○		○			
	12 Orthopedics		○	○		○	○	○
	13 Plastic surgery		○					
	14 E.N.T.		○	○	○	○		
	15 Urology		○		○			
	16 Neurosurgery		○					
	17 Ophthalmology		○	○	○	○	○	
	18 Obs. and Gyn.	○	○	○	○	○	○	○
	19 Dental		○	○	○	○	○	
	20 Anesthesiology	○	○	○	○	○		○
	21 Radiology	○	○	○	○	○	○	○
4	Total No. of beds	50	425	72	171	206	109	173
	General patients	44	342	56	122	170	89	133
	Internal medicine	10	82	12	20	32	18	30
	General surgery	10	60	12	12	16	16	35
	Pediatrics	10	40	17	40	63	37	40
	Obs. & Gyn. (except for NICU)	10	74	9	32	35	18	28
	Special units	6	12	16	49	36	20	40

	ICU	0	4	0	0	0	0	0
	CCU	0	8	0	0	12	0	0
	NICU	0	0	0	14	8	0	0
	PICU	0	0	0	0	0	0	0
	Emergency beds	6	0	16	29	16	20	40
5	No. of doctors	42	N/A	15	65	44	38	13

*1. The values and other data in the table are based on the answer sheets by each hospital.

*2. The values for the existing hospital in Kirkuk are references only: because the hospital will be newly built in Kirkuk. (The same will apply to the following table.)

*3. The values for Babil are the sum of those for the existing 3 hospitals subject to the project. (The same will apply to the following table.) However, the value of number of departments is the sum excluding the overlapping departments.

Table 5-2-4: Current values of process indicators

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	No. of inpatients							
	Annual total No. of inpatients*1	17,520	33,945	9,808	24,952	18,980	17,516	21,900
	No. of inpatients per day*2	48.0	93.0	26.9	68.4	52.0	48.0	60.0
2	Annual no. of deliveries*3	2,400	9,152	3,099	1,317	6,267	7,612	4,035

*1. The annual total number of inpatients, which is annual total number of inpatients at 24 o'clock and discharged patients, is based on the answer sheets by each hospital.

*2. The number of inpatients per day is calculated by dividing the annual total number of inpatients by the number of days admitted (365 days: for all hospitals).

*3. The annual number of deliveries is based on the answer sheets presented by each hospital.

(3) Setting of the target values for operational effect indicators after completion of the project

1) Setting of the target values for structure indicators

The target values for structure indicators after completion of the project are set principally in accordance with the contents of the requests from the Iraqi government.

As for the number of medical doctors, however, the target is set as in the following table in consideration of the policy of the Ministry of Health concerning personnel allocation.

Table 5-2-5: Approach to setting of the target values for structure indicators

	Indicators	Approach
1	Provision of emergency medical services	The new hospitals are designed as secondary hospitals in accordance with the request from the Iraqi government. They will be designed to be able to provide emergency medical services and hospitalization.
2	Provision of maternal and child medical services	According to the request from the Iraqi government, the new hospitals will proclaim themselves to be hospitals with obstetric and pediatric services, and be able to provide services both to inpatients and outpatients.
3	No. of medical departments	According to the request, the number of departments is 11 (internal medicine, general surgery, dermatology, pediatrics, psychiatry, orthopedics, E.N.T, urology, ophthalmology, Obs. & Gyn., and dental). Although, anesthesiology and radiology are not advocated, the function of them will be supplied to the new hospitals because surgical operation and imaging diagnosis ought to be conducted as a matter of course.

4	No. of beds	According to the request, A total of 246 beds – that is, 200 beds for general patients (including 4 beds at NICU of the department of Obs. & Gyn.) and 46 specialized beds – will be supplied to the new hospitals. (In consideration of the fact that the target level of the Ministry of Health, 2.5 beds/1,000 populations, cannot be achieved even after implementation of this project and other hospital construction projects to increase the number of beds; and the high population growth rate of the country (approx. 2.5%/year according to Databank in 2011 of the World Bank), it can be considered that the demand for the beds to be supplied under the project is fairly high.)
5	No. of medical doctors	According to the request, a total of 40 medical doctors will be allocated. However, the Ministry of Health plans to make up for the shortage by transferring those at the existing hospitals on the 6 target sites, except for Kirkuk, to the new hospitals. Thus, the number of doctors will be determined for each hospital. If the current number of doctors exceeds the number of doctors in the request document, no particular change will be made. But in case the former falls below the latter and for the hospital to be newly constructed in Kirkuk, a total of 40 doctors will be allocated as requested.

2) Setting of the target values for process indicators

The target values for the process indicators after completion of the project are set in consideration of the impacts of heightened demand for medical services as a result of the population growth in Iraq.

The population growth rate will be calculated in the following manner. The number of inpatients and the number of deliveries are set in accordance with the calculated growth rate and the concept as shown in Table 5-2-6 below.

[Calculation of the population growth rate]

2.5%/year (from 2006 to 2009) is adopted as the population growth rate in Iraq according to Databank in 2011 of the World Bank.

The project plans to complete the construction of the new hospitals in 2017, so that the operational effects will be assessed in 2 years, 2019. Accordingly, 2018 is set as the subject year for assessment.

The population growth rate for 9 years between 2009 and 2018 will be:

$(100\% + 2.5\%)^9 = \underline{124.9\%}$

Table 5-2-6: Approach to setting of the target values for process indicators

	Indicators	Approach
1	No. of inpatients	
	Annual total No. of inpatients	In consideration of the number of inpatients to be able to admit additionally as a result of the increase in the number of beds, and heightened demand for medical services as a result of the population growth in the country, the value for the indicator is calculated by the current number of inpatients multiplied by the proportion of the increase in the number of beds and the population growth rate until the subject year for assessment, 124.9%. That is, the value is calculated in the following formula. The annual total number of inpatients at a new hospital at each site = The current annual total No. of inpatients × the proportion of the increase in No. of beds (= total No. of beds at new hospital / total No. of beds at existing hospitals) × The population growth rate until the subject year for assessment
	No. of inpatients per day	The value is calculated by dividing the annual total number of inpatients obtained above by the operating days of the hospital, 365 days.
2	Annual No. of deliveries	In consideration of the number of deliveries as a result of the population growth in the country, the value for the indicator is calculated by the current number of deliveries multiplied by the population growth rate until the subject year for assessment, 124.9%. That is, the value is calculated in the following formula. The annual number of deliveries at a new hospital at each site = The current annual total No. of deliveries × the population growth rate until the subject year for assessment

3) The target values for operating effect indicators after completion of the project

The target values for operational effect indicators set forth in accordance with the previous 1) - 2) are as shown in the following table.

Table 5-2-7: Values of structure indicators after completion of the project

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	Provision of emergency medical services	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○	Inpatient acceptable ○
2	Provision of maternal and child medical services	○	○	○	○	○	○	○
3	No. of medical departments *1	11	11	11	11	11	11	11
	01 Internal medicine	●	●	●	●	●	●	●
	02 General surgery	●	●	●	●	●	●	●
	03 Respiratory							
	04 Cardiology							
	05 Gastroenterology							
	06 Nephrology and Diabetes							
	07 Neurology							
	08 Oncology							
	09 Dermatology	●	●	●	●	●	●	●
	10 Pediatrics	●	●	●	●	●	●	●
	11 Psychiatry	●	●	●	●	●	●	●
	12 Orthopedics	●	●	●	●	●	●	●

	13 Plastic surgery							
	14 E.N.T.	●	●	●	●	●	●	●
	15 Urology	●	●	●	●	●	●	●
	16 Neurosurgery							
	17 Ophthalmology	●	●	●	●	●	●	●
	18 Obs. and Gyn.	●	●	●	●	●	●	●
	19 Dental	●	●	●	●	●	●	●
	20 Anesthesiology	○	○	○	○	○	○	○
	21 Radiology	○	○	○	○	○	○	○
4	Total No. of beds	246	246	246	246	246	246	246
	General patients*2	196	196	196	196	196	196	196
	Internal medicine	70	70	70	70	70	70	70
	General surgery	60	60	60	60	60	60	60
	Pediatrics	40	40	40	40	40	40	40
	Obs.& Gyn. (except for NICU)	26	26	26	26	26	26	26
	Special units*2	50	50	50	50	50	50	50
	ICU	10	10	10	10	10	10	10
	CCU	6	6	6	6	6	6	6
	NICU	4	4	4	4	4	4	4
	PICU	6	6	6	6	6	6	6
	Emergency beds	24	24	24	24	24	24	24
5	No. of doctors*2	42	40	40	65	44	40	40

*1. Anesthesiology and Radiology are excluded from the number of departments. However, the function of them will be preserved in the new hospitals.

*2. The breakdowns of the numbers of beds for general patients and special units are in accordance with the request document.

*3. As for the number of doctors, no particular change will be made to Salaheddin, Babil and Karbalaa where the existing number exceeds the requested number, 40 people. As for Diyala, Theeqar and Basra, where the number falls short of the requested number, as well as Kirkuk, where a hospital will be newly constructed, the requested number of doctors will be allocated.

Table 5-2-8: Values of process indicators after completion of the project

	Site	Salaheddin	Kirkuk	Diyala	Babil	Karbalaa	Theeqar	Basra
1	No. of inpatients							
	Annual total No. of inpatients	89,790	48,839*1	41,850	44,829	28,306	49,369	38,891
	No. of inpatients per day	246.0	133.8	114.7	122.8	77.6	135.3	106.6
	(Rate of increased No. of beds)	492.0%	-	341.7%	143.9%	119.4%	225.7%	142.2%
	(Population growth rate)	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%
2	Annual No. of deliveries	2,998	5,148*2	3,871	1,645	7,827	9,507	5,040
	(Population growth rate)	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%	124.9%

*1. Since the hospital in Kirkuk will be newly constructed, it is impossible to calculate the number of inpatients after completion of the construction of the hospital in accordance with the values for the existing hospital. Thus, the average value for annual total number of inpatients after completion of the construction of the hospitals at the other 6 sites is applied.

*2. Since the hospital in Kirkuk will be newly constructed, it is impossible to calculate the number of deliveries after completion of the construction of the hospital in accordance with the values for the existing hospital. Thus, the average value for annual total number of deliveries after completion of the construction of the hospitals at the other 6 sites is applied.

(4) Assessment of the operational effects

The degree of improvement is assessed by subtracting the value of each current operational effect indicator in Table 5-2-3 and 5-2-4 from the value of each operational effect indicator after completion of the project shown in Tables 5-2-7 and 5-2-8.

Regarding the improvement of the structure indicators described in the table 5-2-9, provision of emergency medical services and maternal and child medical services becomes same as the current situation through preservation of the functions of ability to admit emergency patients and establishment of obstetrics and pediatrics department as secondary healthcare facilities.

As for medical departments, improvement will be accomplished through establishment of kinds of departments which are not provided in the existing hospitals. By sites, greater improvement in the order is the 11 departments of improvement in the new hospital in Kirkuk, 6 departments in Salaheddin, and 5 departments in Basra.

As for hospitalization function, in general hospital beds, improvement is greater in 196 beds in Kirkuk, 152 beds in Salaheddin and 140 beds in Diyala, which is the similar order to special units such as ICU and CCU.

As for number of medical doctors allocated, greater improvement in the order as 40 in Kirkuk, 27 in Basra, and 25 in Diyala. However, in Salaheddin, Babil, and Karbalaa, number of medical doctors allocated exceeds 40 of baseline even as the same as current.

Table 5-2-9: Degree of improvement of structure indicators *1

	Site	Salaheddin	Kirkuk*2	Diyala	Babil	Karbalaa	Theeqar	Basra
1	Provision of emergency medical services	The same as current	The same as current	The same as current	The same as current	The same as current	The same as current	The same as current
2	Provision of maternal and child medical services	The same as current	The same as current	The same as current	The same as current	The same as current	The same as current	The same as current
3	No. of medical departments *3							
	No. of new established departments	6 Psychiatry, Orthopedics, E.N.T, Urology, Ophthalmology, Dental	11 Internal medicine, General Surgery, Dermatology, Pediatrics, Psychiatry, Orthopedics, E.N.T, Urology, Ophthalmology, Obs.& Gyn. Dental	2 Psychiatry, Urology	1 Orthopedics	2 Psychiatry, Urology	3 Psychiatry, E.N.T, Urology	5 Psychiatry, E.N.T, Urology, Ophthalmology, Dental
4	Total No. of beds	196	246	174	75	40	137	73
	General patients	152	196	140	74	26	107	63
	Internal medicine	60	70	58	50	38	52	40
	General surgery	50	60	48	48	44	44	25
	Pediatrics	30	40	23	0	-23	3	0
	Obs. & Gyn. (except for NICU	16	26	17	-6	-9	8	-2
	Special units	44	50	34	1	14	30	10
	ICU	10	10	10	10	10	10	10

	CCU	6	6	6	6	-6	6	6
	NICU	4	4	4	-10	-4	4	4
	PICU	6	6	6	6	6	6	6
	Emergency beds	18	24	8	-5	8	4	-16
5	No. of doctors	0	40	25	0	0	2	27

*1. The degree of improvement is calculated by subtracting each value in Table 5-2-3 from the relevant value in Table 5-2-7.

*2. Since the hospital in Kirkuk will be newly constructed, the degree of improvement is calculated by setting all the values for the existing hospitals at null.

*3. Number of new established departments is the number of departments which are not established in the existing hospitals (excluding anesthesiology and radiology) among the departments of the new hospitals.
In Babil and Karbalaa, respiratory, cardiology, gastroenterology, and nephrology and diabetes which is established in the existing hospitals is not advocated in the new hospitals. However, it is reasonably considered that these department will be maintained in the new hospitals as function (be combined with internal medicine) because the doctors of existing hospital with these specialties transfer to the new hospitals.

Regarding the improvement of the process indicators of the table 5-2-10, improvement in the number of inpatients is greater, and the number of patients per day is more than 80 in the more than half of the sites. This improvement will be expected and ensured not only by increase of beds but also by the operational support such as the expansion of departments and the number of doctors allocated.

Then, number of deliveries is expected to improve in all sites from 300 to 5,000 cases because of the increase in demand due to population growth, and so on. The biggest improvement is more than 5,000 in Kirkuk, with new hospital construction, and then, more than 1,800 of Theeqar, more than 1,500 in Karbalaa is greater improvement.

Table 5-2-10: Degree of improvement of process indicators *1

	Site	Salaheddin	Kirkuk*2	Diyala	Babil	Karbalaa	Theeqar	Basra
1	No. of inpatients							
	Annual total No. of inpatients	72,270	48,839	32,042	19,877	9,326	31,853	16,991
	No. of inpatients per day	198.0	133.8	87.8	54.4	25.6	87.3	46.6
2	Expected annual No. of deliveries	598	5,148	772	328	1,560	1,895	1,005

*1. The degree of improvement is calculated by subtracting each value in Table 5-2-4 from the relevant value in Table 5-2-8.

*2. Since the hospital in Kirkuk will be newly constructed, the degree of improvement is calculated by setting all the values for the existing hospitals at null.