

CHAPTER 3. Project Evaluation

3-1. Preconditions

- The Myanmar side is required to complete the procedures required for acquisition of the Project site, EIA, tax exemption and other necessary steps to be undertaken by the Myanmar side before commencement of construction of the Project.
- The Myanmar side is required to carry out the staff assignment and the budget allocation necessary for the operation/maintenance management of new water supply system. The Department of Water and Sanitation is required to submit application for the necessary budget to MCDC up to October of the previous year.
- The tax exemption for the Grant Aid Project in Myanmar is implemented through the method of duty exemption letter. In particular, the commercial tax exemption requires complicated procedures starting from MCDC and Mandalay district until the approval from the central government (the Ministry of Finance, the Executive Office of the President, the Cabinet, etc.) and takes a long time for approval. Therefore MCDC is required to communicate with the relevant organizations closely and carry out tax exemption procedures without any delay.
- It is required to pump groundwater as per the plan.

3-2. Necessary Input by Recipient Country

- The connection work to the primary power supply feeder for the water intake well, BPS No.1 and BPS No.7, etc. responsible for the recipient country is required to be carried out for sure to complete the Project without any problem.
- Particular attention should be paid on selection of the staff members who will participate in the soft component of the Project to ensure the effectiveness of capacity development. The organization is required to understand the importance of soft component.

3-3. Important Assumptions

- The policy of Myanmar in the water sector has not changed.
- The foreign currency portion of the Project is about 30%. Currently, fluctuations in the exchange rate are erratic and drastic sometimes. If the weakening of Yen continues, change of the plan such as reduction in the scope of the Project, etc. may be required.

3-4. Project Evaluation

3-4-1. Relevance

This Project is anticipated to contribute to improvement in living environment of the inhabitants in Mandalay City, where rapid economic development is expected, by improving the water supply system which is the lifeline of the citizen. In addition, the Project accords with "Cooperation for Improvement of the People's Life" and "Cooperation for Improvement of Infrastructure System necessary for Sustainable Economic Growth" out of three pillars in "Japan Cooperation Policy for Myanmar (April year 2012)". Therefore, its relevance is high.

3-4-2. Effectiveness

(1) Quantitative Effect

Index	Base Value (Actual Value for year 2013)	Target Value (year 2020) 【3 years after Project completion】
Daily average water flow rate of Pyi Gyi Tagon TS(m ³ /day)	1,137	9,386
Population served in Pyi Gyi Tagon TS	7,158	59,077
Execution rate for disinfection (%) (9 disinfection systems in Mandalay City implemented by the Project)	0	100

Note: 1: The base values of daily average water flow rate and population served (Source: MCDC Department of Water and Sanitation) are the existing water supply conditions in Pyi Gyi Tagon TS. The target values include these base values.

2: The base value of daily average water flow rate is the value estimated by MCDC.

Currently, instrumentation such as flow meter is not installed on the pipeline network. Therefore, distribution flow rate cannot be measured accurately. Under existing conditions, MCDC estimates the daily average water flow rate as 1,137m³/day based on the records of pump operating hours and their discharge flow rates. The per capita is also calculated as 160 Lpcd. Accordingly, per capita domestic water is estimated as 120 Lpcd~130 Lpcd taking into account the factors such as leakage ratio, consumption by non-domestic water, etc. Considering the trend of consumption by area with similar salient features, MCDC's estimated daily average water flow rate is judged to be within the appropriate range.

MCDC has no concrete plan for expansion of the existing service area in near futures. Therefore, it is assumed that the population served and the daily average water flow rate of this area will remain unchanged (not increased) for the time being.

Considering the above situation, the current population served and planned daily average water flow rate are taken as the base values (actual value for the year 2013) to establish quantitative effect

for evaluation of the Project. Also the target values (for the year 2020) are calculated by adding the population served by the planned water supply system and daily average water flow rate of the Project to these base values.

For evaluation of the Project effect, the quantitative effect has to be established. The target value of the quantitative effect is to be estimated using the data listed below. Therefore, Department of Water and Sanitation of MCDC is required to record and store the following operation/maintenance records to enable estimation of abovementioned quantitative effect indicators.

- Daily average water flow rate (m³/day): Data on flow rate from operation records
- Population served by water supply: Water bills (number of water supply connections x 5.8 persons)
- Chlorine disinfection execution rate: Chlorine disinfection facilities operation records (excluding power interruption durations)

(2) Qualitative Effect

- Improvement in the health of inhabitants (improvement in waterborne diseases)
- Improvement in the inhabitant's living environment (Improvement in the labor required for getting water)

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Appendix 1. Member List of the Study Team

1 - 1 . First and Second Field Survey

Member's Name and Occupation

No	Job Title	Name	Occupation
1	Team Leader	Mr. Shigeyuki MATSUMOTO	Director Water Resources Management Division1, Global Environment Department, JICA
2	Cooperation Planning	Ms. Tomoko KASHIHARA	Water Resources Management Division1, Global Environment Department, JICA
3	Chief Consultant/Water Supply Planning	Mr. Toshifumi OKAGA	TEC International Co., Ltd.
4	Hydrogeology	Mr. Shigeki KIHARA	Kokusai Kogyo Co., Ltd.
5	Groundwater development	Mr. Mitsuyoshi SAITO	Kokusai Kogyo Co., Ltd.
6	Water supply facility	Mr. Masashi KAWAMURA	TEC International Co., Ltd.
7	Disinfection facility	Mr. Norio TANAKA	TEC International Co., Ltd.
8	Organization/ Operation maintenance	Mr. Atsuo ONO	TEC International Co., Ltd.
9	Environment & social consideration	Mr. Hirokatsu UTAGAWA	Kokusai Kogyo Co., Ltd.
10	Implementation/cost estimation	Mr. Kazuo SHIRAI	TEC International Co., Ltd.
11	Project coordination/Socio-economic survey/Interpreter	Ms. Hsumon Win	TEC International Co., Ltd.

1 - 2 . Explanation of Draft Final Report

Member's Name and Occupation

No	Job Title	Name	Occupation
1	Team Leader	Ms. Eriko TAMURA	Director Water Resources Management Team 1, Global Environment Department, JICA
2	Cooperation Planning	Ms. Tomoko KASHIHARA	Water Resources Management Team 1, Global Environment Department, JICA
3	Chief Consultant/Water Supply Planning	Mr. Toshifumi OKAGA	TEC International Co., Ltd.
4	Groundwater development	Mr. Toshifumi OKAGA	Kokusai Kogyo Co., Ltd.
5	Water supply facility	Mr. Masashi KAWAMURA	TEC International Co., Ltd.
6	Project coordination/Socio-economic survey/Interpreter	Ms. Hsumon Win	TEC International Co., Ltd.

Appendix 2. Study Schedule

2 - 1 . First field survey

Number		1	2	3	4	5	6	7	8	9	10	11
Date		Shigeyuki Matsumoto and Tomoko Kashihara	Toshifumi OKAGA	Shigeki KIHARA	Mitsuyoshi SAITO	Masashi KAWAMURA	Atsuo ONO	Norio TANAKA	Hirokatsu UTAGAWA	Kazuo SHIRAI	Yasuhiko MORITA	Hsumon Win
		Officials	Chief Consultant	Hydrogeology	Groundwater development	Water supply facility	Organization/ Operation maintenance	Disinfection facility	Environment & social consideration	Implementation /cost estimation	Water quality test	Project coordination/Socio-economic survey/Interpretation
21-Apr-14	Mon	Moving (TYO-YGN)										Same as member of No.2 and 3, and selection of surveyors for socio-economic survey
22-Apr-14	Tue	Meeting with JICA Myanmar office, Preparation of natural condition survey										ditto
23-Apr-14	Wed	Preparation of natural condition survey										ditto
24-Apr-14	Thu	Moving (YGN-MDY), Meeting with MCDC										ditto
25-Apr-14	Fri	Preparation of natural condition survey										ditto
26-Apr-14	Sat	ditto										ditto
27-Apr-14	Sun	Moving (TYO - YGN)	Moving (YGN-MDY)	Preparation of electric sounding survey								ditto
28-Apr-14	Mon	Meeting with JICA Myanmar office and ADB and Courtesy call on EoJ			ditto							ditto
29-Apr-14	Tue	Moving (TYO -YGN), Meeting with MCDC, Mayor (Mandalay city) and Mandalay Regional Gov.			ditto							ditto
30-Apr-14	Wed	Meeting with MCDC and field survey			ditto							ditto
1-May-14	Thu	Meeting with MCDC and conclusion of MM			ditto	Moving (TYO - YGN)						ditto
2-May-14	Fri	Meeting with JICA Myanmar office and moving (MDY-YGN)	Meeting with MCDC, Request for collection of materials	Meeting with MCDC regarding hydrogeology	Moving (YGN-MDY)							ditto
3-May-14	Sat	Arriving at TYO	ditto	Moving (MDY-YGN)	Field survey of electric sounding survey							Translation work and data collection
4-May-14	Sun		Holiday	Moving (YGN-TYO)	Data analysis regarding test well							ditto
5-May-14	Mon		Selection of water supply area	Arriving at TYO	Field survey and test well drilling plan							ditto
6-May-14	Tue		Population data collection		ditto	Moving (TYO - YGN)	Moving (TYO - YGN)					ditto
7-May-14	Wed		ditto		ditto	Moving (YGN-MDY)	Moving (YGN-MDY)					ditto

Number		1	2	3	4	5	6	7	8	9	10	11
Date		Shigeyuki Matsumoto and Tomoko Kashihara	Toshifumi OKAGA	Shigeki KIHARA	Mitsuyoshi SAITO	Masashi KAWAMURA	Atsuo ONO	Norio TANAKA	Hirokatsu UTAGAWA	Kazuo SHIRAI	Yasuhiko MORITA	Hsumon Win
		Officials	Chief Consultant	Hydrogeology	Groundwater development	Water supply facility	Organization/ Operation maintenance	Disinfection facility	Environment & social consideration	Implementation /cost estimation	Water quality test	Project coordination/Socio-economic survey/Interpretation
8-May-14	Thu		Calculation of water demand and meeting with MCDC		ditto	Calculation of water demand and field survey						ditto
9-May-14	Fri		ditto		ditto	Confirmation of the existing facilities	Field survey and preparation of socio condition survey					ditto
10-May-14	Sat		Internal meeting		Internal meeting							ditto
11-May-14	Sun		Data analysis		Data analysis	Data analysis and machine arrangement	Data analysis					ditto
12-May-14	Mon		Calculation of planned water supply amount		Supervision of sub contract for drilling test well	Field survey for distribution pipeline	Field survey and preparation of socio condition survey					ditto
13-May-14	Tue		ditto		ditto	ditto	ditto					ditto
14-May-14	Wed		Confirmation of city planning		ditto	ditto	ditto					ditto
15-May-14	Thu		Meeting with MCDC, Request for collection of materials		ditto	ditto	ditto					ditto
16-May-14	Fri		Confirmation of the existing facilities		ditto	ditto	Meeting with MCDC					ditto
17-May-14	Sat		Internal meeting		Internal meeting							ditto
18-May-14	Sun		Moving (MDY-YGN)		Data analysis regarding test well	Simple water quality test and sampling for laboratory test	Preparation of socio condition survey					Instruct to surveyor for socio economic survey
19-May-14	Mon		Meeting with JICA Myanmar office and moving (YGN-TYO)		Supervision of sub contract for drilling test well	ditto	Supervision of socio condition survey					Translation work and data collection
20-May-14	Tue		Arriving at TYO		ditto	ditto	ditto					ditto
21-May-14	Wed				ditto	ditto	ditto					ditto
22-May-14	Thu				ditto	ditto	Meeting with ADB					ditto
23-May-14	Fri				ditto	ditto	Supervision of socio condition survey					ditto
24-May-14	Sat				ditto	ditto	ditto					ditto
25-May-14	Sun				Data analysis regarding test well	Data analysis	Data analysis					ditto

Number		1	2	3	4	5	6	7	8	9	10	11
Date		Shigeyuki Matsumoto and Tomoko Kashihara	Toshifumi OKAGA	Shigeki KIHARA	Mitsuyoshi SAITO	Masashi KAWAMURA	Atsuo ONO	Norio TANAKA	Hirokatsu UTAGAWA	Kazuo SHIRAI	Yasuhiko MORITA	Hsumon Win
		Officials	Chief Consultant	Hydrogeology	Groundwater development	Water supply facility	Organization/ Operation maintenance	Disinfection facility	Environment & social consideration	Implementation /cost estimation	Water quality test	Project coordination/Socio-economic survey/Interprete
26-May-14	Mon				Supervision of sub contract for drilling test well and confirmation of well site	Selection of sub contractor	Supervision of socio condition survey and meeting with MCDC					ditto
27-May-14	Tue				ditto	Simple water quality test and sampling for laboratory test	ditto					ditto
28-May-14	Wed				ditto	Field survey from planned wells to planned distribution reservoir	ditto					ditto
29-May-14	Thu				ditto	Confirmation of the site for new distribution reservoir	Moving (MDY-YGN)					ditto
30-May-14	Fri				ditto	ditto	Arriving at TYO					ditto
31-May-14	Sat				Internal meeting	Confirmation of water pipe bridge, pipe crossing and internal meeting						ditto
1-Jun-14	Sun				Data analysis regarding test well	Data analysis		Moving (TYO - YGN)				ditto
2-Jun-14	Mon				Supervision of sub contract for drilling test well	Instruct of topographic survey to Sub contractor		Moving (YGN-MDY)	Moving (TYO - YGN)			ditto
3-Jun-14	Tue				ditto	Meeting with MCDC		Meeting with MCDC	Moving (YGN-MDY)			ditto
4-Jun-14	Wed				ditto	Field survey of distribution pipeline route		Survey on chlorine demand (Water quality test)	Meeting with MCDC			ditto
5-Jun-14	Thu				ditto	ditto		ditto	Data collection for environmental social consideration and preparation of stakeholder meeting			ditto

Number		1	2	3	4	5	6	7	8	9	10	11
Date		Shigeyuki Matsumoto and Tomoko Kashihara	Toshifumi OKAGA	Shigeki KIHARA	Mitsuyoshi SAITO	Masashi KAWAMURA	Atsuo ONO	Norio TANAKA	Hirokatsu UTAGAWA	Kazuo SHIRAI	Yasuhiko MORITA	Hsumon Win
		Officials	Chief Consultant	Hydrogeology	Groundwater development	Water supply facility	Organization/ Operation maintenance	Disinfection facility	Environment & social consideration	Implementation /cost estimation	Water quality test	Project coordination/Socio-economic survey/Interpretation
6-Jun-14	Fri				ditto	ditto		ditto	ditto			Preparation of stakeholder meeting
7-Jun-14	Sat				Internal meeting			Internal meeting		Moving (YGN-MDY)		ditto
8-Jun-14	Sun				Data analysis regarding test well	Data analysis		Data analysis		Confirmation of water supply plan		ditto
9-Jun-14	Mon				Field survey with MCDC (Confirmation of the site for planned wells)	Outline design of water supply facilities		Survey on chlorine demand (Water quality test)	Data collection for environmental social consideration and preparation of stakeholder meeting	Field survey of target water supply area		ditto
10-Jun-14	Tue				ditto	ditto		ditto	ditto	ditto		ditto
11-Jun-14	Wed				ditto	ditto		ditto	ditto	ditto		ditto
12-Jun-14	Thu				ditto	Explanation of survey result to MCDC		Confirmation of sites for planned disinfection facilities	Stakeholder meeting	Confirmation of construction site for new facilities		ditto
13-Jun-14	Fri				Supervision of sub contract for drilling test well	Moving (MDY-YGN-TYO)		ditto	Preparation of report of stakeholder meeting	ditto		ditto
14-Jun-14	Sat				ditto	Arriving at TYO		ditto	ditto	ditto		ditto
15-Jun-14	Sun				ditto			ditto	ditto	Data analysis		ditto
16-Jun-14	Mon				ditto			ditto	Scoping and evaluation of impact	Data collection for cost estimation and confirmation of construction companies		ditto
17-Jun-14	Tue				ditto			Moving (MDY-YGN-TYO)	Study on alternative plan and monitoring plan	ditto		ditto
18-Jun-14	Wed				ditto			Arriving at TYO	ditto	ditto		ditto
19-Jun-14	Thu				ditto				ditto	ditto		ditto
20-Jun-14	Fri				ditto				ditto	ditto	Moving (YGN-MDY)	ditto
21-Jun-14	Sat				ditto				ditto	ditto	Simple water quality test (recheck and remaining samples)	ditto

Number		1	2	3	4	5	6	7	8	9	10	11
Date		Shigeyuki Matsumoto and Tomoko Kashihara	Toshifumi OKAGA	Shigeki KIHARA	Mitsuyoshi SAITO	Masashi KAWAMURA	Atsuo ONO	Norio TANAKA	Hirokatsu UTAGAWA	Kazuo SHIRAI	Yasuhiko MORITA	Hsumon Win
		Officials	Chief Consultant	Hydrogeology	Groundwater development	Water supply facility	Organization/ Operation maintenance	Disinfection facility	Environment & social consideration	Implementation /cost estimation	Water quality test	Project coordination/Soc io-economic survey/Interprete #
22-Jun-14	Sun				Moving (MDY- YGN-TYO)				Data analysis	Data analysis	ditto	Holiday
23-Jun-14	Mon				Arriving at TYO				Preparation of report of field survey	Study on construction plan	ditto	Translation work and data collection
24-Jun-14	Tue								ditto	ditto	ditto	ditto
25-Jun-14	Wed								Moving (MDY- YGN-TYO)	ditto	Simple water quality test and moving (MDY-YGN-TYO)	ditto
26-Jun-14	Thu								Arriving at TYO	ditto	Arriving at TYO	ditto
27-Jun-14	Fri									Moving (MDY- YGN)		ditto
28-Jun-14	Sat									Data collection for cost estimation and confirmation of construction companies		ditto
29-Jun-14	Sun									ditto		ditto
30-Jun-14	Mon									Moving (YGN- TYO)		ditto
1-Jul-14	Tue									Arriving at TYO		

YGN: Yangon, MDY: Mandalay, TYO: Tokyo, EoJ: Embassy of Japan

2 - 2 . Second field survey

Number		2	3	11
Date		Toshifumi OKAGA	Shigeki KIHARA	Hsumon Win
		Chief Consultant	Hydrogeology	Project coordination/Socio-economic survey/Interpreter
7-Jul-14	Mon	Moving (TYO -YGN)		
8-Jul-14	Tue	Moving (YGN-MDY), Meeting with MCDC		
9-Jul-14	Wed	Meeting with Chief Engineer, Dept. of water and sanitation, MCDC	Supervision of sub contract for pumping test	
10-Jul-14	Thu	Meeting with official of MOFA, Japan and Counsellor of EoJ	ditto	
11-Jul-14	Fri	Meeting with Chief Engineer, Dept. of water and sanitation, MCDC	ditto	
12-Jul-14	Sat	Water quality test	ditto	
13-Jul-14	Sun	Data analysis		
14-Jul-14	Mon	Conclusion of Technical notes	Supervision of sub contract for pumping test	
15-Jul-14	Tue	Meeting with Mandalay regional Gov. and moving (MDY-YGN-TYO)	Meeting with Mandalay regional Gov. and moving	
16-Jul-14	Wed	Arriving at TYO		

YGN: Yangon, MDY: Mandalay, TYO: Tokyo,

2 - 3 . Explanation of draft final report

Number		1	2	4	3	11	
Date		Eriko Tamura and Tomoko Kashihara	Toshifumi OKAGA	Masashi KAWAMURA	Mitsuyoshi SAITO	Hsumon Win	
		Officials	Chief Consultant	Water supply facility	Groundwater development	Project coordination/Socio-economic survey/Interpreter	
6-Jan-15	Tue	Moving (TYO -YGN)					
7-Jan-15	Wed	Moving (YGN-MDY), Meeting with MCDC					
8-Jan-15	Thu	Meeting with Chief Engineer, Dept. of water and sanitation, MCDC and Courtesy call on Mayor					
9-Jan-15	Fri	Moving (MDY-YGN, Report to EoJ, Moving (YGN-TYO)	Moving (MDY-YGN, Report to EoJ		Confirmation of installation condition of test drilling well and its borehole		
10-Jan-15	Sat	Arriving at TYO	Survey on tax exemption, BA and AP		Meeting with MCDC (Status of groundwater development)		
11-Jan-15	Sun	/	Data analysis				
12-Jan-15	Mon		Additional data collection (other donor's Project)		Meeting with MCDC (Environmental Social Consideration and Status of groundwater development)		
13-Jan-15	Tue		Additional data collection (other donor's Project)	Moving (YGN-MDY) and Meeting with MCDC (Request for additional materials)		Moving (YGN-MDY)	Meeting with MCDC (Request for additional materials)
14-Jan-15	Wed		Moving (MDY-YGN(Kawamura and Hsumon), Moving (YGN-TYO)				
15-Jan-15	Thu		Arriving at TYO				

YGN: Yangon, MDY: Mandalay, TYO: Tokyo, EoJ: Embassy of Japan

Appendix 3. List of Parties Concerned in the Recipient Country

3 - 1 . Myanmar side

(1) MCDC (Mandalay City Development Committee)

U Tun Kyi	Committee Member
U Tint Lwin	Former Chief Engineer, Department of water and sanitation
U Tun Win	Chief Engineer, Department of water and sanitation
U Zint Min Thant	Assistant Engineer, Department of water and sanitation
Daw Khin May Htay	Chief Engineer, Department of road
Daw Mya Khwar Nyo	Assistant Engineer, Department of road
U Khin Mg Nyunt	Assistant Engineer, Department of road

3 - 2 . Japanese side

(1) Embassy of Japan

Mr. Hideaki Matsuo	Counsellor
Mr. Shoichi Watanabe	Second Secretary

(2) JICA Myanmar Office

Mr. Masahiko Tanaka	Chief Representative
Mr. Akihiko Sanjo	Senior Representative
Ms. Noriko Sakurai	Project Formulation Advisor

3 - 3 . Others

(1) ADB (Asia Development Bank)

Ms. Eri Honda	Principal Urban Development Specialist, Urban Development and Water Division, Southeast Asia Department
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(2) ADB (PPTA Project)

Dr. Gary MOYS	Team Leader
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(3) AFD (French Development Agency)

Ms. Julia De Pierrepont	Project Officer
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