

## (2) Technical Notes (July 20, 2010)


TECHNICAL NOTES  
ON THE PREPARATORY SURVEY (BASIC DESIGN)  
ON THE PROVISION OF EQUIPMENT FOR RURAL WATER SUPPLY PROJECT  
IN THE CENTRAL DRY ZONE  
IN THE UNION OF MYANMAR

Based on the Minutes of Discussions signed on May 26, 2010 between the Preparatory Survey Team (hereinafter referred to as “the Team”) of Japan International Cooperation Agency (hereinafter referred to as “JICA”) and Department of Development Affairs, Ministry of Progress of Border Areas and National Races and Development Affairs of Union of Myanmar (hereinafter referred to as “DDA”) on the Provision of Equipment for Rural Water Supply Project in the Central Dry Zone (hereinafter referred to as “the Project”), the consultant members of the Team had a series of discussions and conducted field surveys from May 16 to July 20, 2010.

As a result of the discussions and the surveys, both sides confirmed the technical conditions described on attached sheets.

The detail of the contents of the Project shall be decided by the further study and discussion with both parties.

Nay Pyi Taw, July 20, 2010



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Takeshi NAKANO  
Chief Consultant  
Preparatory Survey Team  
Kokusai Kogyo Co., Ltd.  
Japan



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U Myint Oo  
Deputy Director General (Engineer)  
Department of Development Affairs  
Ministry of Progress of Border Areas and  
National Races and Development Affairs  
The Union of Myanmar

## ATTACHMENT

DDA and the Team (hereinafter referred to as “the both sides”) have agreed upon and confirmed the following items.

### 1. CANDIDATE 110 VILLAGES

The both sides have confirmed the candidate 110 villages for the Survey at Sagaing, Magway and Mandalay Divisions requested by DDA (see Annex 1).

### 2. EVALUATION AND ELIMINATION FROM THE CANDIDATES

The both sides have confirmed that the candidate 110 villages may be classified by prioritization in accordance with the flow chart (see Annex 2), based on the results of the Social Survey, Water Quality Survey and Hydrogeological Survey.

The both sides have confirmed that some of the villages, such as village(s) with sufficient water source and/or with no suitable aquifer, may be eliminated from the Project’s candidates and there are no substitutional villages after the elimination.

The both sides have also confirmed that the conclusion will be made by the Team in Japan in accordance with all the Survey results.

### 3. INTEGRATION OF THE UNIT

The both sides have agreed that the unit for the Project is integrated to SI (International System).

### 4. EQUIPMENT PROCUREMENT

#### 4-1 Evaluation of Equipment

The both sides have confirmed that equipment to be requested by DDA shall be examined by the Team in accordance with the purpose of its use and drilling schedule planned by DDA.

#### 4-2 Drilling Rigs

##### (1) Drilling rigs owned by DDA

DDA explained existing drilling equipment owned by DDA as follows:

Rig No.	Remarks
001	TOP-300 (Renovated TRD-300 in Technical Corporation Project by JICA)
002	TOP-300 (Renovated TRD-300 in the Master Plan)
003	TOP-300 (Renovated TRD-300 in the Master Plan)
004	TOP-300 (Renovated TRD-300 in the Master Plan)
005	TOP-300 (Renovated TRD-300 in Technical Corporation Project by JICA)
006	TRD-300
007	TOP-300 (Original)
008	TOP-300 (Original)
009	TOP-500

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According to the Survey, the Team evaluated that the drilling capacity of one (1) TOP-500 rig was between 150 and 180 m depth, because its hydraulic pressure pump was exchanged to lower performance one. The Team also evaluated that the drilling capacity of the other eight (8) TOP-300 rigs were only between 100 and 130 m depth, because of their age.

(2) Drilling bits

The both sides have confirmed that number and specification of drilling bits may be determined in accordance with the result of hydrogeological survey.

#### 4-3 Consumable Goods

The both sides have confirmed that consumable goods are Bentonite, CMC, etc.

#### 4-4 Casings and Screens

The both sides have confirmed that the quantity and size of casings and screens shall be complied with the casing program designed by DDA. Nos. of wells, type (grade) of casings and screens, etc. will be finalized in Japan.

The both sides have also confirmed that mainly four (4) inch pipes shall be used for the well casings and screens.

#### 4-5 Air Compressor

The both sides have confirmed the following items regarding the air compressor.

- The reason for DDA's request for only one (1) unit in the Project is because an air compressor which was procured for the project of the Northern Shan State can be utilized for a new drilling rig.
- The air compressor will be utilized for the purpose of air lifting, not for the DTH drilling.
- The capacity of the air compressor shall be approximately 350 cfm.

#### 4-6 Cargo Trucks

The both sides have confirmed that a cargo truck is equipped with six (6) tons capacity crane.

#### 4-7 Motor Pumps and Diesel Generator

(1) Type of pumps

DDA preferred submersible motor pump because of its cost and the easy access to spare parts in the local market. Additionally, DDA acquired the technical knowledge of installation and maintenance of the pump from the local dealer.

(2) OJT for the submersible motor pump

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DDA would like to accept the short term On the Job Training (OJT).

(3) Categorizations of well pumps

The both sides have confirmed that the categorizations in three (3) or four (4) Total Dynamic Head

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(TDH) and capacity of well pumps shall be decided in Japan.

(4) Water level relay

DDA requested that the submersible motor pump should be equipped with the water level relay switch to avoid the damage of submersible motor from dry operation of low water level in the borehole. On the other hand, the both sides have confirmed that water level relay switch for the water storage tank is not necessary.

(5) Diesel engine generator

DDA explained that diesel engine generators should be procured along with all of submersible motor pump, because the local electricity in the village would be unstable and could damage the submersible motor. Another reason for the request was that 220 V/single phase electricity would not drive the submersible motor of 400 V/three phase /50 Hz.

#### 4-8 Iron Removal Devices

The both sides have confirmed that iron removal devices shall be prepared by DDA if necessary.

### 5. TECHNICAL ASSISTANCE

The both sides have agreed that the initiation of short term training for operation and maintenance shall be planned and prepared by the Japanese side at DDA Nyaung-U Central Workshop, if it is necessary for the new equipment, including submersible motor pumps and generators.

### 6. DELIVERY OF THE EQUIPMENT AND MATERIALS TO BE PROCURED

#### 6-1 Delivery Site

The both sides have confirmed the following duties regarding the delivery site of the new equipment and materials.

- The new equipment and materials to be procured in this Project shall be delivered to DDA Yangon Workshop (stockyard) by the Japanese side.
- DDA shall be responsible for the delivery of the new equipment and materials to each destination.

#### 6-2 Necessary Space

The both sides have confirmed the following items regarding the space for the new equipment and materials in the DDA Yangon Workshop (stockyard).

- DDA shall clean and organize the stockyard sufficiently for the new equipment and materials of the Project.
- For precision machineries, at least two (2) warehouses in the DDA Yangon Workshop (stockyard) are required to stock them. DDA shall prepare these warehouses for the Project.

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### 7. SOCIAL SURVEY

The Team conducted a Social Survey targeting 110 villages initially proposed by DDA. The survey was

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carried out by a local consultant and consisted of 1) Village Profile Survey and 2) Household Survey. According to the survey result, all of the surveyed villages (110) had water resources in their village boundary. However, such water resources were seasonal (available only in the rainy season) and do not have enough quantity of water throughout the year. Moreover, during the interview, residents from some villages commented that their water had ferric smell or salty taste. Survey results would be analyzed in Japan.

## **8. WATER QUALITY SURVEY**

### **8-1 Proposed National Drinking Water Quality Standards**

The both sides have confirmed that DDA laboratory can analyze 12 parameters out of 26 parameters regulated by Proposed National Drinking Water Quality Standards.

### **8-2 Water Quality Test in Myanmar**

The Team collected 190 water samples (90 from Magway Division, 52 from Mandalay and 48 from Sagaing Division) to investigate physical and chemical properties conform to the Proposed National Drinking Water Quality Standards. The samples were sent to Mandalay City Development Committee (MCDC) Water Laboratory to analyze 12 parameters (pH, Color, Turbidity, Electric Conductivity, Calcium, Hardness, Magnesium, Chloride, Alkalinity, Iron, Manganese and Sulphate). DDA has agreed that all analyses results will be reported at the Explanation of Draft Final Report.

### **8-3 Water Quality Test in Japan**

DDA has agreed that 100 water samples taken from 45 villages (19 from deep tube wells drilled/rehabilitated in the previous Technology Transfer Project and 26 from water sources in the 110 villages) will be sent to Japan for necessary analyses. For the details of the water samples, see Annex 3.

### **8-4 Structure and Existing Equipment at the Laboratories**

The Team visited DDA and MCDC laboratories to understand the structure of organization for water quality investigation around the Central Dry Zone. Present conditions of analytical equipment and chemicals were confirmed by observations and interviews with the laboratory staff.

## **9. HYDROGEOLOGICAL SURVEY**

The both sides have agreed that the hydrogeological survey was conducted by the following contents and procedure in order to determine well drilling depth, type/capacity of well drilling machine and quantity/quality of well construction materials.

### **9-1 Pre-Survey**

Pre-Survey team, which consisted of DDA Field Representative and the Team members in charge of hydrogeology/geophysical survey visited all of concerned 20 DDA Township Offices in three (3)

Divisions in order to collect information on existing wells as well as data of geophysical survey previously conducted.

Pre-Survey team also visited 2 to 4 villages of each Township for information collection through talking with the head and other representing staff of the village on water resources use as well as situation of existing deep wells (drilled depth, yield, water level, water quality) of the village and its vicinity. On the site, Pre-survey team decided the target depths for the electrical resistivity survey, and tried to understand the characteristics of topography/geology of the area by field observation during moving from village to village.

Pre-Survey done by joint team of DDA and the Team commenced on the June 2, and it took substantial 11 days in 21 days.

Among 44 villages visited, the Team found that the two (2) villages (Padaukgon (SA-13) and Yaymain(N) (SA-23)) with the least probability of groundwater development by deep well drilling were excluded from the candidate villages. Consequently, the total number of the Vertical Electric Sounding (VES) conducting villages came to 108.

At the villages where previous VES data exists, the Team confirmed that the Survey was not necessary, as far as the data were good enough. After elimination of such seven (7) villages (Yaylar (MG-18), Sanyayin (MG-29), Sebauk (MA-1), Aukshitpin (MA-22), Phaungtaw (MA-23), Khatlan (MA-25) and Neikbanwa (SA-26)), total number of the villages where resistivity survey should be conducted came to 101.

## 9-2 VES

The VES was to be conducted by use of Schlumberger's electrodes array in consideration of groundwater level, which was distinctive throughout the Central Dry Zone. Three (3) teams (2 of DDA and 1 of Bridge Asia Japan (hereinafter referred to as "BAJ")) conducted the survey separately, but the DDA and BAJ joint team took measurement on the first field survey day, for matching of measurement method. The plan of sharing the work was as follows:

DDA team A headed by U Soe Naing : 37 villages in 6 Townships of Magway Division

DDA team B headed by U Win Mg Mg : 26 villages in 8 Townships of Sagaing Division

BAJ team headed by U Win Htike : 47 villages in 6 Townships of Mandalay & Magway Division

The teams of BAJ and DDA jointly conducted the VES field measurement on June 1 at Magyizaik villages (MA-18), in order to unify the both teams' survey method. Each survey team started their field works at different places, and finished the work on different day, as follows:

DDA team A : 32 villages of 5 TS in Magway Division, 22 days from June 15 to July 6

DDA team B : 25 villages of 9 TS in Sagaing and Mandalay Division, in 22 days from June 8 to July 5

BAJ team : 44 villages of 6 TS in Mandalay and Magway Divisions, in 39 days from June 1 to July 9

Owing much to their high technology in data acquisition and also to the wettish ground of rainy season, which allows better transmission of electrical current, the most of obtained data were fairly good, resulting to the limited number of the village where the re-survey was required, that was only at Kaphyu village (MG-25).

**9-3 VES Analysis and Overall Hydrogeological Analysis**

Each survey team reported a week’s survey data to Nyaung-U for reviewing by the Team members in charge of geophysical survey. Analysis of VES, that classifies resistivity value with depth, was done in two ways. One was computer analysis conducted by each survey team using the same analysis software and the other was the manual curve matching method conducted by the Team.

Overall analysis to determine the depths of the wells involved a) interpretation on relation between resistivity and lithology/geology, b) comparison between computer analysis and manual analysis, c) determination and/or estimation of groundwater level based on information obtained during the Pre-Survey and others collected throughout the Survey period after the Pre-Survey.

DDA teams began data processing work (resistivity classification with depth) using computer, after coming back in Nyaung-U, while the Team continued data processing manually on all of the numerical data received from each survey team. The output of the analyses is as follows:

The maximum depth of the wells to be drilled in 108 villages is 400 m (3 wells), while the minimum depth is 110 m (2 wells), and the total drilling length comes up to 25,510 m/108 wells, averaging 236 m.

Estimated drilling depth	No. of wells
400~350 m	8 wells
349~300 m	14 wells
299~250 m	29 wells
249~200 m	28 wells
199~150 m	22 wells
149~100 m	7 wells
Total	108 wells

Tentative data as of July 15, 2010

The both sides have confirmed that there may be possible difference in depth, categorization and total nos. of well in the above table.

The rock classification for determination of the type/number of the drilling bit, as well as the number of the screen casings will be available after further analysis.

**9-4 Workshop on VES Analysis**

The workshop to discuss technology/technique of VES analysis, was carried out 2 times as follows:

July 8 : Seven (7) participants (4 from DDA, 2 from the Team, 1 Interpreter)

July 15 : Six (6) participants (1 from DDA, 2 from the Team, 2 from BAJ, 1 Interpreter)

Major issues discussed were as follows:

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- Comparison between computer and manual analysis
- Difficulty of detecting groundwater level by VES
- Interpretation of resistivity value at the places where salty groundwater bed underlies

#### **10. BUDGET FOR OPERATION AND MAINTENANCE**

The both sides have confirmed that DDA shall be committed to allocate the budget for operation and maintenance of the equipment to be procured in the Project.

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List of Candidate 110 Villages (1/4)

MAGWAY DIVISION

Sr. No.	Code No.	Township	Village Tract	Village	Myanmar Name
1	MG-01	Chauk	Gwaycho	Sharpin	ရှားပင်
2	MG-02	Chauk	Gwaypin	Suetut	ဆူးတက်
3	MG-03	Chauk	Gwaypin	Thapaypin	သပြေပင်
4	MG-04	Chauk	Gwaypin	Gwaypin (Ywama)	ငွေပင် (ရွာမ)
5	MG-05	Chauk	Htainsun	Tonywar	တုံရွာ
6	MG-06	Chauk	Kyaungshartaw	Uyin (E)	ဥယျာဉ် (အရှေ့)
7	MG-07	Chauk	Nayweltaw	Nayweltaw (W)	နဂွံတော (နောက်)
8	MG-08	Chauk	Nyaungzin	Myaynelain	မြေနီလိမ်
9	MG-09	Chauk	Myay Son	Myayson (E)	မြေစွန်း (အရှေ့)
10	MG-10	Chauk	Poakpakan	Thangon	သံကုန်း
11	MG-11	Chauk	Poakpakan	Hmatgyiphone	မှတ်ကြီးဖုန်း
12	MG-12	Chauk	Byipin	Bombwe	ဘုန်းဘွဲ့
13	MG-13	Chauk	Byipin	Molar	မိုလာ
14	MG-14	Chauk	Sardaung	Sardaung (W)	ဆားတောင် (နောက်)
15	MG-15	Chauk	Segan	Thithla	သစ်လှ
16	MG-16	Chauk	Sweboukkan	Zeechopin	ဇီးချိုပင်
17	MG-17	Chauk	Swebaukkan	Htansu Ywarma	ထန်းစု ရွာမ
18	MG-18	Chauk	Swebaukkan	Yaylar	ရေလာ
19	MG-19	Chauk	Taungthar	Taungthar (N)	တောင်သာ (မြောက်)
20	MG-20	Chauk	Thlonetway	Thayetgone	သရက်ကုန်း
21	MG-21	Chauk	Thanbo	Sanyoe	စမ်းရိုး
22	MG-22	Chauk	Thanbo	Kyauktai	ကျောက်တိုင်
23	MG-23	Chauk	Thanbo	Twinphyuyoe	တွင်းဖြူရိုး
24	MG-24	Chauk	Twinlat	Konegyi	ကုန်းကြီး
25	MG-25	Chauk	Twinlat	Kaphyu	ကဖြူ
26	MG-26	Chauk	Wathesan	Wathesan	ဝသဲဆန်း
27	MG-27	Chauk	Wathesan	Thanbo	သံဘို
28	MG-28	Chauk	Wathesan	Thayetpin	သရက်ပင်
29	MG-29	Chauk	Wathesan	Sanyayin	စမ်းရေယာဉ်
30	MG-30	Chauk	Kywetut	Kywetut Ywama	ကျွဲတပ် ရွာမ

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List of Candidate 110 Villages (2/4)

MAGWAY DIVISION

Sr. No.	Code No.	Township	Village Tract	Village	Myanmar Name
31	MG-31	Yanangya	Naga	Ziphyugone	ဇီးဖြူကုန်း
32	MG-32	Yanangya	Naga	Htanaunghla	ထနောင်းလှ
33	MG-33	Nat Mauk	Waryonkone	Oakpho	အုတ်ဖို
34	MG-34	Nat Mauk	Kyaukpon	Gwekan (S)	ရွေးကန်(တောင်)
35	MG-35	Nat Mauk	Kyaukpon	Kyaukpon	ကျောက်ပုံ
36	MG-36	Nat Mauk	Thamonpin	Ywathit	ရွာသစ်
37	MG-37	Nat Mauk	Thetwin	Thetwin (S)	တက်ဝန်(တောင်)
38	MG-38	Myothit	Chauk Kyar	Chauk Kyar	ချောက်ကြား
39	MG-39	Myothit	Phalangyine	Dahatgon	ဒဟတ်ကုန်း
40	MG-40	Myothit	Wargyiaing	Wargyiaing	ဝါကြီးအိုင်
41	MG-41	Myothit	Yonetaw	Yonedaw	ရုံးတော
42	MG-42	Myothit	Magyigone	Magyigone	မကြီးကုန်း
43	MG-43	Myothit	Teepinsan	Ngarlonepho	ငါးလုံးဖို
44	MG-44	Myothit	Yaypyae	Natywar	နတ်ရွာ
45	MG-45	Myothit	Yaypyae	Yaypyae	ရေပြည်
46	MG-46	Myothit	Bork	Bork	ဘော့
47	MG-47	Myothit	Laytaisin	Gwetaw	ရွေးတော
48	MG-48	Myothit	Laytaisin	Laytaisin(N)	လေးတိုင်စင် (မြောက်)
49	MG-49	Sa Lin	Thitkaukaung	Kaigy	ကိုင်းကြီး
50	MG-50	Sa Lin	Shwezanthee	Chaungyetet (N)	ချောင်းရေတက်(မြောက်)
51	MG-51	Magway	Kyitsonpway	Kyitsonpway	ကျစ်စုံပွေး
52	MG-52	Magway	Nyaungbin	Nyaungbin	ညောင်ပင်

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List of Candidate 110 Villages (3/4)

**MANDALAY DIVISION**

Sr. No.	Code No.	Township	Village Tract	Village	Myanmar Name
1	MA-01	Kyauk Pa Daung	Sebauk	Sebauk	ဆည်ပေါက်
2	MA-02	Kyauk Pa Daung	Taungzin	Aleywar	အလယ်ရွာ
3	MA-03	Kyauk Pa Daung	Bemyar	Seyinsu	စီရင်စု
4	MA-04	Kyauk Pa Daung	Tagama	Tagama	တံခါးမ
5	MA-05	Kyauk Pa Daung	Theegone	Myoukgone	မျောက်ကုန်း
6	MA-06	Kyauk Pa Daung	Khin Mon	Phonthar Ywarthit	ဖုံသာ ရွာသစ်
7	MA-07	Kyauk Pa Daung	Takangan	Takangan (Ywarthit)	တငါကန် (ရွာသစ်)
8	MA-08	Kyauk Pa Daung	Takangan	Ywardenshay	ရွာတန်းရှည်
9	MA-09	Kyauk Pa Daung	Sindaingkan	Kyansou	ကြံ့စို
10	MA-10	Kyauk Pa Daung	Kyauksitkan	Kyauksitkan	ကျောက်ဆစ်ကန်
11	MA-11	Kyauk Pa Daung	Gwetaukkone	Leyar (N)	လယ်ယား (မြောက်)
12	MA-12	Kyauk Pa Daung	Amyaungkan	Inbinsan	အင်ပင်စန်း
13	MA-13	Kyauk Pa Daung	Leyar (S)	Leyar (S)	လယ်ယား (တောင်)
14	MA-14	Nyaung U	Kannigyi	Kannigyi	ကန်နီကြီး
15	MA-15	Nyaung U	Kantein	Kantein	ကန်တိမ်
16	MA-16	Nyaung U	Yansun	Yansun	ရမ်းဆမ်း
17	MA-17	Nyaung U	Myaenegyi	Myaenegyi	မြေနဲကြီး
18	MA-18	Nyaung U	Taungzin	Magyizauk	မကျီးစောက်
19	MA-19	Nyaung U	Kuywa	Taungkwin	တောင်ခွင်
20	MA-20	Nyaung U	Kudaw	Kudaw	ကူတော
21	MA-21	Nyaung U	Chaunggwa	Ngalinpoak	ငါလင်းပုတ်
22	MA-22	Pyaw Bwe	Moekaung	Aukshitpin	ဥသျှစ်ပင်
23	MA-23	Pyaw Bwe	Phaungtaw	Phaungtaw	ဖောင်းတော
24	MA-24	Nwa Hto Gyi	Pyinse	Pyinse	ပြင်စည်
25	MA-25	Nwa Hto Gyi	Khatlan	Khatlan	ခက်လန်း
26	MA-26	Nwa Hto Gyi	Zaydate	Tetse	တက်စီ
27	MA-27	Taung Tha	Theegone	Kyaukpau	ကျောက်ဖူး
28	MA-28	Taung Tha	Chaunggwa	Twinpyar (Zeepinkan Tawtike)	တွင်းပြာ
29	MA-29	Taung Tha	Pudauksarkone	Pudauksarkone	ပဒပ်စာကုန်း
30	MA-30	Yame Thin	Katin	Katin	ကတင်
31	MA-31	Yame Thin	Paukaing	Sargyin (S)	ဆားကျင်း(တောင်)

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List of Candidate 110 Villages (4/4)

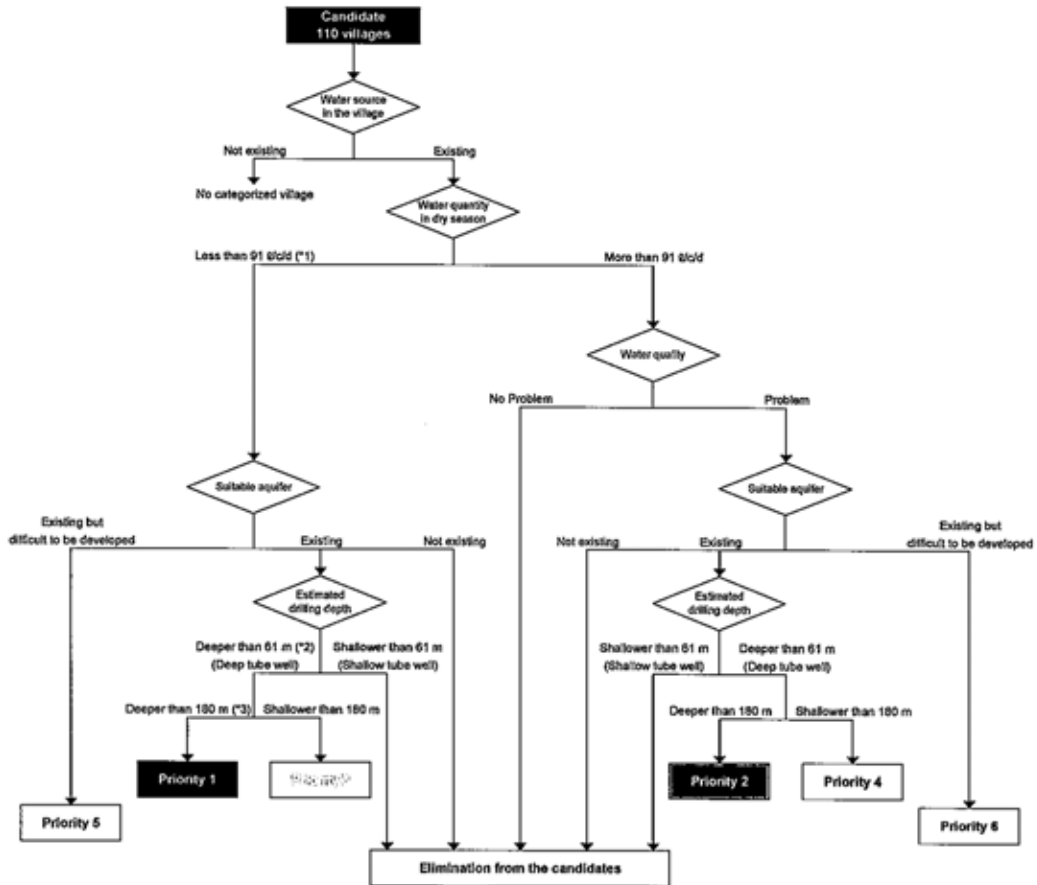
SAGAING DIVISION

Sr. No.	Code No.	Township	Village Tract	Village	Myanmar Name
1	SA-01	Bu Ta Lin	Yehtwat	Yehtwat	ရဲထွက်
2	SA-02	Bu Ta Lin	Chindwin	Chindwin	ချင်းတွင်း
3	SA-03	Wet Let	Myindaw	Myindaw	မြင်တော်
4	SA-04	Wet Let	Taiywa	Tamakan	တမာကန်
5	SA-05	Wet Let	Mingone	Sahmon	စမ္မန်း
6	SA-06	Wet Let	Minywa	Wetleywa	ဝက်လည်ရွဲ
7	SA-07	Wet Let	Yoneywa	Yonethar	ရုံးသာ
8	SA-08	Ayar Daw	Chinpin	Htainpinkar	ထိန်ပင်ကား
9	SA-09	Ayar Daw	Chinpin	Thanbayargyin	သံပုရာကျင်း
10	SA-10	Pe Le	Kandouk	Kandouk	ကန်ဒေါင့်
11	SA-11	Pe Le	Ayechanthar	Ayechanthar	အေးချမ်းသာ
12	SA-12	Pe Le	Mintaipin	Mintaipin	မင်းတိုင်ပင်
13	SA-13	Pe Le	Wunbaechaink	Padaukgon	ပိတောက်ကုန်း
14	SA-14	Yin Mar Pin	Minzu	Phowintaung	ဖိုလ်ဝင်တောင်
15	SA-15	Yin Mar Pin	Shwepankhaing	Tebingan	တယ်ပင်ကန်
16	SA-16	Yin Mar Pin	Lakapya	Indaw	အင်တော
17	SA-17	Yin Mar Pin	Myayeik	Myayeik	မြရိပ်
18	SA-18	Yin Mar Pin	Kapaing	Kapaing	ကပိုင်
19	SA-19	Yin Mar Pin	Sinzwel	Sinzwel(N)	ဆင်စွယ်(မြောက်)
20	SA-20	Sa Lin Gyi	Paungkatar	Zedaw	ဇီးတော
21	SA-21	Sa Lin Gyi	Yonepinyoe	Pyawbwe	ပျော်ဘွယ်
22	SA-22	Sa Lin Gyi	Myayzone	Nyaungpintar	ညောင်ပင်သာ
23	SA-23	Sa Lin Gyi	Yaymain	Yaymain (N)	ရေမိန် (မြောက်)
24	SA-24	Ka Ni	Taungpouk	Nyaungpinle	ညောင်ပင်လည်
25	SA-25	Ka Ni	Thaminchan	Minma	မင်းမ
26	SA-26	Mon Ywa	Kyecoak	Neikbanwa	နိဗ္ဗာန်ဝ
27	SA-27	Mon Ywa	Kyaungkone	Bawga	ဘော်ဂါ

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Flow Chart of Evaluation for Candidates



Remark: \*1 DDA has recommended water consumption in rural area is more than 91 g/c/d (20 gal/c/d).  
 \*2 DDA has defined "Deep tube well" means deeper tube well than 61 m (200 feet) depth.  
 \*3 The Team has evaluated that current drilling capacity of DDA is evaluated up to 180 m depth (Max.) with TOP-500.

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Annex 3

List of Water Samples to be sent to Japan for Necessary Analyses

Item#	Division	TownShip	Village / Town	Item#	Division	TownShip	Village / Town
1	Sagain	Ayar Daw	Thanbayargyin	26	Magway	Chauk	Ko Su *
2		Mon Ywa	Neikbarwa	27		Chauk	San Su (Ywa Ma) *
3		Sa Lin Gyi	Zedaw	28		Chauk	Thwe Net (Ywa Thit) *
4		Sa Lin Gyi	Pyawbwe	29		Chauk	Thanbo *
5		Yin Mar Pin	Myayeik	30		Chauk	Sudaw *
6		Wet Let	Wet Let	31		Chauk	Gwaygyo *
7		Wet Let	Tamakan	32		Chauk	Suetut *
8		Wet Let	Sahmon	33		Chauk	Gwaypin (Ywama)
9		Wet Let	Yonethar	34		Chauk	Naywellaw (W)
10	Mandalay	Kyaukpadung	Kanni	35		Chauk	Sardaung (W)
11		Kyaukpadung	Ywaalu *	36		Chauk	Htansu Ywama
12		Kyaukpadung	Lapapya *	37		Chauk	Taungthar (N)
13		Nyaung U	Sipin Thar *	38		Chauk	Thayetgone
14		Nyaung U	Dann *	39		Chauk	Konegyi
15		Nyaung U	Thee Dwin *	40		Chauk	Kaphyu
16		Nyaung U	Pho Ni Kan *	41		Myothit	Magyigon
17		Nyaung U	Igyi *	42		Myothit	Bork
18		Nyaung U	Sin Lu Aing *	43		Nat Mauk	Oakpho
19		Nyaung U	Kyun *	44		Nat Mauk	Kyaukpon
20		Nyaung U	Mya *	45		Sa Lin	Chaungyelet (N)
21		Nyaung U	Myaung *				
22		Nyaung U	Let *				
23		Taung Tha	Kyaukpau				
24		Taung Tha	Pudauksarkone				
25		Yame Thin	Sargyin (S)				

\* From the deep tube wells drilled/rehabilitated in the previous Technology Transfer Project

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**(3) Minutes of Discussions (December 14, 2010)**

MINUTES OF DISCUSSIONS  
ON  
THE PREPARATORY SURVEY  
ON  
THE PROVISION OF EQUIPMENT FOR RURAL WATER SUPPLY PROJECT  
IN THE CENTRAL DRY ZONE  
IN THE UNION OF MYANMAR  
(EXPLANATION ON DRAFT FINAL REPORT)

In May 2010, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Provision of Equipment for Rural Water Supply Project in the Central Dry Zone (hereinafter referred to as "the Project") and entrusted the survey to the Government of the Union of Myanmar (hereinafter referred to as "Myanmar") and through discussion, field survey and technical evaluation of the result in Japan, JICA prepared a draft final report of the survey.

In order to explain and to consult with the Government of Myanmar on the component of the draft final report, JICA dispatched to Myanmar the Draft Final Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Fumihiko Okiura, Director, Water Resources Management Division I, Water Resources and Disaster Management Group, Global Environment Department, JICA from 8th to 16<sup>th</sup> December, 2010.

As a result of discussions, both sides confirmed the main items described in the attached sheets.

Nay Pyi Taw, December 14, 2010



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Fumihiko Okiura  
Leader  
Draft Final Report Explanation Team  
Japan International Cooperation Agency  
Japan



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U Soe Ko Ko  
Director General  
Department of Development Affairs  
Ministry of Progress of Border Areas  
and National Races and Development Affairs  
The Union of Myanmar

## ATTACHMENT

### 1. Component of the Draft Final Report

The Myanmar side agreed and accepted in principle the component of the draft final report explained by the Team. The Project sites map and components of the Project are respectively shown in **Annex-1** and **Annex-2**.

### 2. Responsible and Implementation Agency

2-1 The responsible agency is Ministry of Progress of Border Areas and National Races and Development Affairs.

2-2 The Implementing Agency is Department of Development Affairs (hereinafter referred to as "DDA"). The organization chart of DDA is shown in **Annex-3**.

### 3. Japan's Grant Aid Scheme

3-1 The Myanmar side understands the Japan's Grant Aid Scheme explained by the Team, as described **Annex-4**.

3-2 The both sides will take necessary measures, as described in **Annex-5**, for smooth implementation of the Project, as condition for the Japan's Grant Aid to be implemented.

### 4. Schedule of the Survey

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Myanmar by March 2011.

### 5. Other Relevant Issues

#### 5-1) Components of the Project

The Myanmar side agreed the component of the Project shown in **Annex-2**

The related issues to the components are shown as below.

#### 1) Target villages

The both sides confirmed that the number of the target village for the Project will be 87 villages as shown in **Annex-6** considering the possibility of the successful well construction regarding the water quality and quantity based on the result of field survey and analysis in Japan.

#### 2) Pick-Up Truck

The both sides agreed that the pick-up trucks are excluded from the components of the Project as two numbers of pick up truck have been already provided to DDA through "Project on Rural water Supply Technology in the Central Dry Zone" conducted between JICA and DDA from 2006 to 2009, and DDA have a number of vehicles which can be used for transportation on operation and maintenance of installed facilities so that implementation



of the Project would be available.

#### **5-2) Project Cost Estimate**

The Team explained to the Myanmar side the Project Cost Estimate as described in **Annex-7**. It is provisional estimate and would be further examined by the Government of Japan for the approval of the Grant. The Myanmar side understood that the Project Cost Estimate is not final and subject to be modified. Both sides agreed that the Project Cost Estimate should never be duplicated or released to any outside parties until signing of all the contract(s) for the Project.

#### **5-3) Soft Component of the Project**

The soft component of the Project would be conducted to strengthen and to enhance the accuracy of water analysis system of DDA, so that they will be able to measure the water quality of the installed deep tube wells accurately and to prevent the negative impact to the villagers caused by contamination of drinking water.

#### **5-4) Undertakings by the Myanmar Side**

In case the request is approved by the Japanese Government, the Myanmar side agreed to undertake following issues in addition to the general undertaking shown in **Annex-5**.

##### **1) Implementation structure of deep tube well construction by the Myanmar side**

The both sides confirmed that the construction works of the deep tube wells in the Project shall be executed by the Myanmar side with its full responsibility:

- DDA will assign appropriate number of staffs who have experience and skill of drilling deep tube wells. The staff allocation plan is shown in **Annex-8**.
- DDA will secure the necessary budget timely.

##### **2) Operation and Maintenance of Facilities, Equipment and Materials**

The water supply facilities constructed by the Myanmar side shall be properly operated and maintained by the target villages with support from DDA. The equipment and materials procured through the Project shall be properly operated and maintained by DDA.

##### **3) Semiannual Report**

Semiannual report of progress of the deep tube well construction work will be submitted by DDA to JICA Myanmar Office. Following items should be included in the report.

- Progress of the well construction
- Stock of procured well construction materials
- Utilization record of procured equipment

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- Others (water quality issues, etc)

4) Travel Allowance and Daily Allowance for the Training of DDA Staff for the Soft Component

DDA will bear the necessary expenses for travel and daily allowances which are necessary for the training of DDA staff implemented in the soft component of the Project.

5) Staff Allocation for Soft Component

DDA will timely assign appropriate number of qualified staffs for implementing soft component of the Project.

**5-5) Shortages or Surplus of Procured Materials for Well Construction**

The Myanmar side will complete the construction of deep tube wells for targeted 87 villages even in case of the shortage of the materials for well construction procured by the Project due to failure of well installation, though 5% of extra materials will be procured by the Project.

In case surplus materials remain after the construction of wells for the targeted 87 villages the Myanmar side will utilize the materials procured by the Project for the other villages listed in "Plan on Adequate Provision of Rural Water Supply in the Central Dry Zone".

**5-6) Tax Exemption**

The tax exemption, custom duty, and any other taxes and fiscal levies in Myanmar which is to be arisen from the Project activities will be ensured by DDA. DDA will take any procedures necessary for tax exemption.

**5-7) Overlapping with Other Projects**

The Myanmar side explained that the Project would not be overlapped with any other projects supported by other donor agencies, NGOs, and Myanmar official organizations.

**5-8) Visibility of the Project**

The Team explained that the visibility of the Project should be ensured as a token of cooperation from the Japanese people if the Project is realized. The Myanmar side explained the following ideas to enhance publicity of the Project:

- (a) To prepare brochures
- (b) To publicize the Project in the mass media, and
- (c) Commemoration panels

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