

Technical Assistance Plan

1. Background of Technical Assistant Plan

(1) Outline of the Project

The Project for Provision of Improved Water Source for Returned IDP in Acholi Sib-region (Amuru, Gulu, Kitgum, Lamwo, Pader Districts) in Republic of Uganda (hereinafter referred to as "the Project") aims at improving the livelihood condition of the returnee community through the provision of safe water within a reasonable walking distance. The Project will be implemented under the support of Japanese Grant Aid, and the main components of the Project are as follows:

Table 1 The Outline of the Project

Item	Description
Construction of water supply facilities	- Deep boreholes with Handpumps. 116 nos. (Alternative villages 36 nos.) (116 target villages and 36 alternative villages were selected from 152 villages.) - Piped water supply facilities. 6 nos. (6 RGCs are to be target communities for the Project. ¹)
Procurement of Equipment and Materials	- Truck Mounted Service Rig with Welding Machine, and Air Compressor for the Acholi Sub-region: 1 no. - Hand Pump Repair Tools for HPMS:(1 set for each sub-county office): 73 sets
Technical Assistance	1) Technical Assistance for Target Communities - Target Villages for Deep Boreholes with Handpumps:: 134 nos. Success rate of borehole drilling was set as 70 % so that the technical assistance for target communities is to be implemented for 132 villages (116 + 18) to keep the 116 nos. of target communities with successful boreholes. - RGCs for Piped Water Supply Facilities: 6 nos. ² 2) Training of Handpump Mechanics (HPMs) Target HPMS: Two (2) HPMS of every Sub-county in the Project area.

(2) Background of Technical Assistant Plan

1) Functional Recovery of Communities for Sustainable Operation and Maintenance of the Facilities

Civil conflict continued more than twenty years in Northern Uganda including Acholi sub-region and it made the development of the area more remarkably delay than the other parts of Uganda. People of Northern Uganda had been displaced from their home into internal camps which were installed around sub-county seats and so on for the people (Internally Displaced Person hereinafter referred to as "IDP"), and were forced to live under the wings of Ugandan government and aid agencies during the period of the conflict.

With relative peace beginning in 2007, IDPs started to return to villages and as of now about 90% or more people have returned to their original villages due to the statistics by UNHCR and others.

During the civil conflict, many donors intensively constructed social infrastructures as basic needs such as water supply facilities and latrines near IDP camps. On the other hand, almost no construction

¹ RGCs are defined as settlements with population ranges of 500 – 5,000 inhabitants, and are generally made up of a core trading center which has refinement factories of raw cotton and/or accumulation places of agricultural products.

² Under the condition of 70% success rate of borehole drillings and two borehole drillings in one village at maximum, 129 (=116+13) target villages are necessary for well drillings to keep 116 successful villages: In other words, 11 villages out of 116 priority villages cannot obtain success boreholes even after the second borehole drilling: and 2 villages out of these 11 villages also cannot obtain success boreholes, and additional 2 villages are necessary to keep 116 villages with success boreholes. In addition, there is a possibility that real success rate is to be below 70% during actual construction. Therefore, adding 5 villages as spare, a total of 134 villages (116 priority villages and 18 alternative villages) are set as the target villages of technical assistance program.

of social infrastructures has been done in their original villages because of their absences.

With post conflict IDPs returned to their original villages, the constructed water supply facilities were becoming unnecessary at IDP camps. At the same time the water supply facilities in their original villages were left without the operation and maintenance during their absences so that many of them have been broken.

In spite of their success of returning to their original villages, pre-existing relationship among community members has changed due to long life in the IDP camps. Therefore capability of a community function (for example, cohesiveness, decision-making and leadership), which other communities in other areas of Uganda usually have, has been still on the way to reproduction in Acholi sub-region. As a result, it is necessary for sustainable use of water supply facilities to recover functional capability of communities.

2) Critical Requirements of Construction of Rural Water Supply Facilities and Their Self Governing Operation and Maintenance

Among requested 16 RGCs, 11 RGCs have totally 28 existing piped water supply facilities. These facilities were constructed during the civil conflict as a part of humanitarian relief, and greater parts of their operation cost were defrayed by donors so that many of IDPs have had no experience of paying water user fee and operation cost.

According to hearings conducted in the field survey, many of the facilities stopped their operation in around 2009 after supports of donors have been finished. Only five (5) water supply facilities are operating. All these operating facilities have had solar power generation systems for working their submersible motor pumps. A water supply facility must have own Water and Sanitation Committee (WSC), however, many old WSCs have stopped their activities due to dispersion of committee members during the civil conflict.

Water user fee collections of flat-rate system tend to stagnate even in the sites where you can see the activities of WSCs and when the facilities break down, WSCs try to collect contributions temporarily from users for the repairs. When the repair and maintenance cost is high, for example, in case of repair of pumps and water supply and distribution facilities, WSCs cannot treat them and finally those facilities are going to be abandoned in most cases.

The situations of target villages where boreholes with handpumps to be installed are similar to the situation of RGCs above mentioned. People in the target villages do not have experience with O&M of water supply facilities and even with payment of water user fee.

On the other hand, developments activities in Uganda are demand driven, and are carried out through its system of decentralization that aims to bring politics closer to its citizens. The water sector in Uganda has been taking a bottom-up, participatory approach, not taking a top down approach. In the bottom up approach people are requested first to look at their lives, understand the situations, realize their problems, decide how to solve the problems, and plan their activities accordingly. This bottom-up process is called Demand Responsive Approach (DRA), a pillar of water facility management in Uganda.

In addition, Central government of Uganda obliges Communities to fulfill following requirements prior to construction of water supply facilities. The aims are to promote sensitization and ownership of expectant water users, and to keep higher sustainability of facilities to be constructed.

Table 2 Summary of Critical Requirements

Items	Contents
1 Memorandum of Understanding (MOU) signed before the go-ahead is given for construction	<ul style="list-style-type: none"> - MOUs that stipulate the nature of cooperation, obligations and responsibilities of signatory parties - Signed between (1) GoU and Districts, (2) Districts and Sub-counties, (3) communities and Sub-counties/Districts, and (4) clients.
2 Meaningful Involvement of Women	<p>Before construction goes ahead the community mobilization and empowerment should have reached the following minimum requirements for the meaningful involvement of women.</p> <ul style="list-style-type: none"> - The election of women to positions of: WSC Chair and WSC Treasurer is strongly encouraged to ensure empowerment of women in RWSS decision-making and management processes within community structures. - At least half of caretakers (water point attendants) and handpump mechanics selected by communities shall be women in case of boreholes with handpumps. . - Skills training shall be targeted to these women in particular, plus their appointed/elected male colleagues, so all can perform their jobs as required. - The entire community shall be involved in discussions involving siting of water sources and the choice of technology, with men and women initially being consulted separately to ensure that women’s viewpoints come forth in the process. - All communications/information to communities shall target both women and men.
3 Hygiene Promotion and Sanitation	<p>The provision of water offers an excellent opportunity to stimulate improved household latrine coverage and general household hygiene practices through community participation and empowerment.</p> <ul style="list-style-type: none"> - All households of community leaders shall have latrines that are safe, clean and used. - During the mobilization phase, household latrine coverage shall be increased by at least 30 percent (this in addition to the above requirement for all community leaders; the requirement of safe, clean and used also applies). - How the community intends to increase coverage and usage to a 95 percent level within four years after installation of its water supply facility shall be included as one aspect of the 8-Year O&M Plan.
4 Community Contributions	<p>The contribution varies according to necessary works as shown in below.</p> <ul style="list-style-type: none"> - New source: 180,000 UGS - Rehabilitation of existing source: 45,000 in cash
5 Settlement of Land and Ownership Conflicts	<p>Communities being assisted shall be required to satisfactorily prove (e.g. with written agreements) that all potential foreseeable land access and ownership issues have been resolved beforehand.</p>
6 Operation and Maintenance Plan	<p>Prior to commencement of any construction, there must be an approved O&M plan for at least 8 years. The plan should deal explicitly with:</p> <ul style="list-style-type: none"> - Method by that community covers O&M cost. - Lifespan of spare parts - Possibilities to obtain spare parts and its cost. - Cost for O&M - Cost for replacement of facility - Back up support and service by District - Countermeasures against the following areas of concern that have been raised at community level; Lack of commitment by some WSC members to attend meetings, Disagreements on allowances for WSC members/ pump mechanics, Users’ refusal to pay for O&M and problems in collecting funds, Access and management of handpump mechanics/plumbers, Users’ refusal to participate in cleaning of source, Unavailability of extension staff, Tools, spare parts and materials for repairs

This project also requests communities to fulfill above 6 critical requirements as pre-requisites prior to implementing construction of water supply facilities. When RGSs/Villages cannot fulfill these critical requirements, the RGCs/Villages will be excluded from targets sites of this project in principle. Therefore, software assistance is necessary for target RGCs/Villages to fulfill the critical

requirements.

Communities in Acholi sub-region are delay in reconstructing its basic capability of community functions as described previously. In addition, IDPs had received the full benefit of humanitarian relief including supply of safe water with free of charge during their long life in IDP camps. Therefore, deep activities of awareness-raising and gaining basic skills for O&M are necessary to make them fulfill the critical requirements and implement community-based O&M. Consequently, it is important for the software assistance in the project to take these situations into consideration and implement more finely-tuned activities than that in the other regions.

3) Actors Responsible to the Project in Local Government

Community members and WSCs play the major role in ensuring sustainability of water supply facilities those will be constructed in the Project.

While Local Governments, especially District Water Offices, play a supporting role by offering various kinds of assistances to WSCs. Reinforcement of such local offices for supporting WSC and monitoring its performance and the reinforcement of WSC are considered indispensable for sustainability of the water supply facilities.

The main actors for supporting these activities above mentioned in the Local Government are as follows:

Table 3 Actors in Local Government for Supporting Operation and Maintenance

	MoWE (DWD)	MoGLSD	Ministry of Health
District	District Water Officer Ass. Water Officer (Mobilization) Ass. Water Officer (Sanitation) Ass. Water Officer (Water Supply)	Community Development Officer (CDO)	Health Officer (HO)
County	County Water Officer (In charge of County but belongs to District Water Office: 1 Officer in each County)		
Sub-county	(Private Sectors) Handpump Mechanic (HPM) System Operator Spare Parts Dealer	Community Development Assistant (CDA)	Health Assistant (HA)

Local Governments in Uganda are facing delay of employments of necessary human resources at present due to rapid progress of the decentralization and so on. Most of Local Governments including District Water Offices are basically under the same situation. As a result, many District Water Officers tend to have been running multiple posts and duties. Districts Water Offices have their branch offices in sub-counties; however, there are substantially no technical specialists of water resources development. Real activities to facilitate community members and support WSCs are to be carried out by CDAs and HAs. In implementing these activities, Local Government Offices are likely to face the following issues:

- CDAs and HAs do not belong to District Water Offices
- CDAs are supposed to carry out various kinds of extension activities of which mobilization and sensitization for community-based management of water facility is only a part. It is nearly impossible for one CDA to manage and implement all the extension activities in a sub-county

Even if the staffs of the District Water Offices are to carry out mobilization/sensitization and WSC support activities, the District Water Offices have limited number of personnel. Their manpower is not sufficient. These facilitation and supporting activities are essential for the successful implementation

of the Project, however, the implementation seems to be difficult especially for fledgling District Water Offices. Therefore, it is also essential for securing sustainability of water supply facilities to assist supporting activities of District Water Offices for WSCs in line with strengthening of O&M activities of WSCs.

In addition, there are also budget issues for local governments to employ necessary human resources of DWOs so that it may take a moment longer period for the Project. Therefore, it is important for the Project to act directly and frequently to WSCs of the target villages, promote self-governing activities of WSCs and strengthen sustainability of water supply facilities.

4) Donor Harmonization

Uganda has been ahead in harmonization among donors. In water sector, many donors such as World Bank, Canada, Denmark and NGOs have intensively implement projects and expand various activities so that Meetings for donor harmonization have been held on a periodic basis to aim information exchanges and coordination of enforcement strategies among donors. In Acholi sub-region, donors such as UNHCR, UDSAID, and UNICEF have been conducting their assistance programs. UNHCR and USAID have especially respected the policies and strategies of Uganda, and they have been conducting assistant activities which have aimed at keeping higher sustainability of O&M of water supply facilities and helping communities to fulfill the critical requirements

Therefore, it is necessary for the Project to ensure that contents of mobilization and sensitization activities for community members and concerned parties should not vary widely from other donor’s activities, and to conduct assistant activities which are in line with the policies and strategies of the water sector in Uganda. Among others, consideration of equality and equity are necessary for treatment of the critical requirements for the construction of water supply facilities and setting up amount of the contribution to reduce differences among projects of various donors.

5) Current Situation of HPM

The water sector in Uganda has a strategy to deploy two HPMs in one sub-county or maximum number of boreholes with handpumps to be assigned a single HPM will be fifty units. In case of the Project area, there are more numbers of HPMs than the numbers requested above as shown in Table 4. In addition, DWOs are headed to establish “Handpump Mechanic Associations (HPMAs)” with the support of MoWE, UNICEF and other donors. The associations are a kind of private organizations, and will be registered at

Table 4 Number of Sub-Counties and their Handpump Mechanics

DWO	No. of Sub-County	No. of HPMs
Gulu	16	55
Amuru	5	32
Nwoya	4	15
Kitgum	10	112
Lamwo	10	115
Pader	12	80
Agago	16	36
Total	73	445

the district level as a Community Based Organization. Each HPM become a member of a HPMA (registered HPM) with paying membership fee. All the registered HPMs will form part of the District HPMA. A representative of HPMs (Senior HPM) at sub-county level will be selected among themselves. And a HPMA will be led by a single HPM selected from among the Senior HPMs. HPMA aim at organizing HPMs who are so far solely doing repair and inspection of handpumps as a sideline, giving education and skill upgrading to HPMs with lack skills, lifting their social status and increasing their incomes.

Given these circumstances, it will be no problem for HPMs to do minor repairs and inspections routinely. On the other hand, opportunities to meet treatment and repair of PVC riser pipes are

generally very few for HPMs. As a result, there are higher opportunities to happen some accidents when HPMs do these unaccustomed works, and these inappropriate repairs and inspections may result in breakdown of boreholes with handpumps.

(3) Necessity of Software Assistance (Issues)

Practical issues of the Project are followings:

- i) In Uganda, a water supply facility is a property of a community under the policy of decentralization. It obliges user of water supply facility (members of community) to implement O&M by themselves. And WSC should play a leading role in every day's O&M under the policy. However, independent-minded activities of WSCs have not yet developed even in RGCs which have existing water supply facilities. To solve this issue, it is necessary for RGCs to rebuild/establish WSC with strong leadership for conducting O&M of piped water supply facilities and move ahead on the activities aggressively. On the other hand, there are no existing WSCs in target villages for new boreholes with handpumps. Therefore, it is also necessary to establishment WSCs to promote O&M for the facilities to be constructed under the Project.
- ii) Government of Ugandan has established the six critical requirements against construction of water supply facilities to strengthen sustainability of constructed facilities and O&M activities. However the experiences of humanitarian relief during the civil conflict have made many members of target RGCs/Villages understood "the Ugandan Government is responsible for safe water supply to us". And they have little understanding of the importance on linkage between safe water and their health. As a result, there is higher possibility to meet troubles in O&M activities such as collection of water user fee so that their sensitization activities are necessary. In addition, there is another possibility for them to continue usage of unsafe water even after construction of facilities under the Project due to collection of water user fee.
- iii) The Project has prepared solar power generation system for piped water supply facility as countermeasure against the issue above mentioned due to low cost of the O&M. Application of this water supply system makes it possible to adopt flat rate system for water user fee collection which can also apply to a borehole with handpump system. The O&M system requests establishment of organization of O&M for each facilities to ensure collection of water user fee by concerned community and bring up ownership of water supply facility
- iv) Other donors have respected the policies and strategies of Uganda, and they have been conducting assistant activities which have aimed at keeping higher sustainability of O&M of water supply facilities and helping communities to fulfill the critical requirements. In addition, each community in Acholi sub-region has characteristic that the capability of a community function has been still on the way to reproduction. Therefore, it is necessary for sustainable use of water supply facilities to make efforts to minimize the difference of contents of assistance activities among donors, implement assistance activities with high quality for community members, and make the assistant activities for communities in line with the policies and strategies of the water sector in Uganda.
- v) The Project area has more numbers of HPMs than the numbers requested in the government strategy, and HPMs are dealing minor repairs and inspections routinely. On the other hand, opportunities to meet treatment and repair of PVC riser pipes are generally very few for HPMs, and the lack of the experience may cause higher opportunities of happening some accidents when HPMs do these unaccustomed works, and these inappropriate repairs and inspections may result in breakdown of boreholes with handpumps. In addition, groundwater has sometimes acid water quality in the Project area. As countermeasures against these problems, the Project is going to adopt handpump unit with higher quality, for example, adoption of acid-resistant uPVC riser pipes,

installation of stainless-steel socket to the end of riser pipe, and installation of centralizers to keep riser pipes at the center of casing pipes for protection of riser pipes. However most important countermeasure is a capacity development of HPMs to have specialized knowledge and skills to treat riser pipes properly when riser pipes are drawn up and down for its repair, inspection and re-installation.

2. Objectives of the Software Assistance

To solve the issues above described, the software assistance in the Project sets the following objectives.

- Effective use of the constructed water supply facilities, and positive and smooth collection of water user fee.
- Autonomous and sustainable operation and maintenance of the constructed water supply facility under cooperation of community members and the WSC.
- Strengthened support system by local government for WSCs.
- Improvement of repair and inspection method, and proper repair of handpumps by trained HPMs

The Project Design Matrix (PDM) of the software assistance is shown in Table 5.

3. Outputs of the Software Assistance

Outputs of the software assistance program activities are shown in below.

- Output 1 The concerned persons at the local government and community members understand aims, roles and importance of WSC, and are willing and motivated to take part in WSC support.
- Output 2 Community members understand the importance of safe water (relationship between safe water and health, sanitation, and hygiene), use efficiently constructed water supply facilities, and basic activities of WSC such as collection of water user fee go on smoothly.
- Output 3 Members of WSC understand the purpose of WSC, their roles, and organizational management practice, and O&M of the constructed water supply facilities go on smoothly under cooperation of community members and the WSC.
- Output 4 HPMs understand and master repair and inspection method of handpumps installed under the Project, repair and inspect handpumps properly, and community members use the handpumps sustainably.

4. Software Assistance Program Activities (Inputs Plan)

“Community mobilization and sensitization” and “HPM training” are implemented to achieve above outputs. Details of the activities are shown in below.

4.1 Community Mobilization and Sensitization Activities

(1) Contents of Activities

Community mobilization and sensitization activities are implemented through following three steps. Those are “Pre-Construction Workshop”, “During-Construction Workshop” and “Post-Construction Workshop”

i) Pre-Construction Workshop:

Workshop to representatives of community (boreholes with handpump), representative of RGC (piped water supply facility), concerned person in sub-county and community members. The purpose of the workshop is sensitization and organization of community members for fulfillment of the critical requirements.

ii) During-Construction Workshop:

Preparation for facility construction such as confirmation of construction sites, Workshop at installation of facility for explanation of facility usage, inspection and so on, construction of fence which is set up by community participation (boreholes with handpump), take-over of facility and so on.

iii) Post-Construction Workshop:

Workshops to representatives of community (Borehole with handpump), representatives of RGC (Piped water supply facility), and concerned person in sub-county for O&M of facility: Monitoring for confirmation on rate of achievement of self-sustaining O&M, and additional workshop if it is necessary.

The flowchart of these workshop activities is shown in Fig. 1.

In view of characteristics of the communities in Acholi sub-region described earlier, the software assistance program in the Project has planned a lot of inputs for aiming community's fulfillment of the critical requirements in the limited project period. For example, increase of number of facilitator's visits to villages/RGCs can promote quick appearance of effects by the activities and so on. Detailed software assistance programs are described facility-wise below.

1) Software Assistance Program for Deep Boreholes with Handpumps

a. Pre-Construction Workshop

Table 6 Contents of Pre-Construction Workshop

No.	Activities	Participants	Number of Days per Village
1	Greeting and courtesy call on sub-county, parish, and village leaders - Introduction/Explanation of the Project - Request for cooperation and assistance for the Project - Promotion of latrine construction by village leaders. Although direct beneficiaries of this software assistance program are villagers, it is essential to strengthen the support system by local governments such as village, parish and sub-county committees in order to secure sustainable O&M. For this reason this project is to establish close relationship with the local leaders and have them understand the project.	Leaders of sub-county, parish, and villages, village elders, opinion leaders, religious leaders, cultural leaders, teachers, and medical personnel	0.5 Day
	Initial visit to village - Introduction/Explanation of the Project - Explanation of Pre-Construction Workshop (objectives, procedures, schedule) - Introduction/Explanation of community-based O&M - Explanation of O&M fee including community contribution - Brief explanation of safe water and health	Village leaders (chief, elders, teachers, medical personnel, opinion leaders, cultural leaders, religious leaders, leaders of women's group, etc.)	
2	Participatory assessment and introduction of different water supply systems (different meetings for men and women if necessary) - Mapping of existing water sources, latrines, and other sanitation/hygiene facilities - Discussion on conditions, problems and solutions concerning water and health/sanitation/hygiene in their communities - Introduction/Explanation of water supply facilities: kinds, functions, water safety, investment and cost, cost for repair, maintenance, O&M, etc. Decision making on whether to accept the project (construction of handpump well in their community), - Explanation and provisional acceptance of MOUs between the community and the Consultancy firm. - Roles and responsibilities of the sub-county and the community Promotion of safe water and health, sanitation and hygiene Sensitization/Awareness education on gender, AIDS, and environment - In this session, villagers are to understand different roles of men and women and realize that women do almost all activities related to water.	Villagers and village leaders (chief, elders, teachers, medical personnel, opinion leaders, cultural leaders, religious leaders, leaders of women's group, etc.)	0.5 Day
3	Selection of well construction sites from technical and social points of views (2 different	Villagers and	0.5 Day

Table 6 Contents of Pre-Construction Workshop

No.	Activities	Participants	Number of Days per Village
	<p>sites in order of necessity/priority)</p> <p>Introduction/ Explanation of WSC</p> <ul style="list-style-type: none"> - roles, responsibilities, rules - importance of O&M and preventive maintenance <p>Selection of WSC executives</p> <p>Decision on the amount and payment methods of community contribution, and collection of community contribution</p> <p>Introduction of plan of activities for well construction</p> <ul style="list-style-type: none"> - role of the community - activities that the villagers are to participate <p>Promotion of safe water and health/sanitation/hygiene</p> <p>Sensitization/Awareness education on household wealth and gender</p> <ul style="list-style-type: none"> - sensitization/awareness on following facts and gender issues, and recognize villagers the importance of women participation to WSC: wealth related to water such as jerry-can, water jar, ladle, cup, etc. are usually belongings of women, and users are also women 	village leaders (chief, elders, teachers, medical personnel, opinion leaders, cultural leaders, religious leaders, leaders of women's group, etc)	
4	<p>Capacity building of WSC</p> <ul style="list-style-type: none"> - collection and management of O&M fee - bookkeeping - keeping records of meetings, handpump repair - preventive maintenance - roles and responsibilities of WSC executives - relation with the sub-county - necessity of monitoring and the method. <p>Confirmation of villager's wills to fulfill the Pre-condition (the Critical Requirements)</p> <p>Promotion of safe water and health/sanitation/hygiene</p> <p>Sensitization/Awareness education on gender, AIDS, and environment</p> <ul style="list-style-type: none"> - necessity of women participation to participatory O&M and WSC executives. 	WSC executives	0.5 Day
5	<p>Making of O&M Plan (Draft)</p> <ul style="list-style-type: none"> - O&M Plan is one of the Critical Requirements. Making the O&M Plan will make villagers and WSC executives understand particular activities needed, and how much money is needed for future O&M <p>Promotion of safe water and health/sanitation/hygiene</p> <p>Sensitization/Awareness education on gender, AIDS, and environment</p> <ul style="list-style-type: none"> - Gender and development, social equity 	WSC executives	0.5 Day
	<p>Confirmation of the fulfillment of the Critical Requirements on the site.</p> <ul style="list-style-type: none"> - Local consultants visit each target village, and confirm the status of the fulfillment of the Critical Requirements. 	WSC executives, CDA, HA	

b. During-Construction Workshop

After finishing Pre-Construction Workshop, tendering for selection of a contractor is to be conducted, and During/Post-Construction Workshop begins at the same time of commencement of construction work by selected contractor.

Table 7 Contents of During-Construction Workshop

No.	Activities	Participants	Number of Days per Village
1	<p>- <u>Confirmation of Water Supply Facility Construction Site</u></p> <p>Although the site selection was done during the pre-construction workshop, the site should be re-confirmed under attendance of involved persons so that there will be no conflicts or misunderstanding of the construction site.</p> <p>- <u>Participation in Water Supply Facility Construction: Confirmation, Planning and Implementation</u></p> <p>Although villagers' participation in construction was also explained and agreed upon in the pre-construction workshop, the construction schedule must be notified as soon as it is finalized. A plan should be made so that all the villagers clearly understand who is needed for what kind of work at what time on which day. By participating in the construction, they feel closer to the water supply facility. The former activity will lead to empowerment and the latter will lead to the formation of ownership. Labor contribution includes repair and/or maintenance of feeder roads to construction sites, and construction of fences.</p>	WSC executives, Villagers & Village leaders	0.5 Day
2	<p>- <u>Explanation of Handpump Usage</u></p> <p>When starting to use a handpump, ways to use a handpump, ways to clean handpump areas and other matters that handpump users need to pay attention to will be explained and</p>	WSC executives, especially	0.5 Day

Table 7 Contents of During-Construction Workshop

No.	Activities	Participants	Number of Days per Village
	discussed, and then persons in charge of these issues will be determined. A contractor is responsible to the explanation on technical matters for treating and O&M of water supply facility. Local consultants are responsible to watch the appropriateness of contractor's explanation, and if not appropriate, he/she will give advice to contractor from the point of view of communication skill. The selection and selection method of in charge of person are guided by local consultants as part of his/her activities in community mobilization and sensitization.	caretakers	
3	<u>Construction of Fence around the Water Supply Facility</u> Fence around water supply facility will be constructed by community's participation. Necessary tools and materials for the construction are also procured by community itself. Local consultants supervise the whole fence construction work, but contractor guide participated villagers technically and secure the quality of the fence construction. Selection of participants will be guided by local consultants as part of their community mobilization and sensitization activities.	WSC executives & Villagers who are involved in construction work.	0.5 Day
4	<u>Detailed Plan of O&M</u> - O&M plan made during the pre-construction workshop is to be transformed into a detailed plan by adding more items. O&M of handpumps was rather a notion/knowledge in villagers' heads during the pre-construction stage. Looking at drilling, construction of a platform, and handpump installation, and using a handpump will make a handpump a part of villagers' reality. O&M will become more tangible to them. Under such a circumstance, villagers will have better and realistic understanding of importance of O&M, and, thus are in a better position to make a detailed plan of O&M. After understanding that O&M of the water supply facility is not a responsibility given by government but a measure of achieving villager's objectives written in O&M Plan, self-motivated O&M lead to sustainability of the water supply facility. - O&M plan should contain concrete method for improvement of latrine coverage.	WSC executives, Villagers & Village leaders	0.5 Day
5	<u>Taking-over of Water Supply Facilities to Community</u> - Before villager's first use of the water supply facility, assembly will be held to officially confirm completion of the facility and its taking-over to the village and sub-county. Villagers can confirm their ownership of the facility through this assembly. The contents of the assembly are brief introduction by WSC executives and sub-county officers, and if possible, document of proofing taking-over. The document will promote villager's ownership.	WSC executives, Villagers, Village leaders, CDA & HA	0.5 Day

c. Post-Construction Workshop:

Post-Construction Workshop aims at capacity development of WSC executives on related matters to O&M of facility. Local consultants team visit communities periodically at interval of several months, monitor the rate of activities of WSC and community members for sustainable O&M, and implement additional workshop to establish sustainable O&M activity if it is necessary. In addition, when there are communities which have problems in sustainable O&M, it is necessary to monitor their activities and implement additional workshops even after finishing the Project. Therefore the issues shall be taken over to facilitators in concerned local government with a summary document which describes the situation of O&M and the issues of the concerned community to be solved.

The activities of post-construction workshop are shown in the following table.

Table 8 Contents of Post-Construction Workshop

No.	Activities	Participants	Number of Days per Village
6	<u>Capacity Development of WSC Executives and Monitoring System</u> - This is also continued from the pre-construction workshop. It aims to improve leadership and management skills of WSC. Local consultants also explain again issues of capacity development of WSC executives (management, account, etc.) and self-monitoring system with monitoring forms. In the during/post-construction workshop, capacity development for self-monitoring is one of the major topics as WSC is to fill out monitoring forms regularly. Contents of the forms and the ways to fill them out are to be explained. The monitoring forms should include the following items; on WSC management : O&M fee collection, amount collected, topics of discussion in WSC meetings, issues on operation, etc. on villagers : willingness and requests of villagers, water quantity and quality, cleaning	WSC executives, CDA & HA	0.5 Day

Table 8 Contents of Post-Construction Workshop

No.	Activities	Participants	Number of Days per Village
	<p>around the handpump, benefits of handpump to women and children, etc.</p> <p>on handpump : water amount, quality, cleaning around handpump, repair and maintenance by HPM, etc.</p> <p>on health/sanitation/hygiene : number of latrines and their usage and cleanliness, management of rubbish, management/disposal of feces, drinking of safe water, etc.</p> <p>As matters on O&M fee are of great importance, facilitators in local consultant team are to check conditions of collection, management and usage very carefully, and give proper advices if necessary.</p>		
7	<p><u>In Case of Failure of Well Drillings: Explanation of the Drilling Result and Guidance of the Direction of the Road ahead</u></p> <p>Success or failure on well drilling is a key issue for construction of the water supply facility. The maximum numbers of well drillings are set out two (2) boreholes in one site in the project. When the second borehole drilling results in failure, the construction of water facility in the relevant community is to be abandoned and the construction site is transferred to alternative villages.</p> <p>On this occasion, it may happen that the villagers in original site do not accept the transfer of the construction site, and it may cause conflict between the relevant villagers and DWO. To avoid these needless frictions, community mobilization and sensitization activities are to be implemented for the villagers those face to relinquishment of construction of water supply facility to make villagers understood about negative characteristics of groundwater development work and provide directions on selection of other water development technologies and other usage of collected contribution.</p> <p>Needless to say, the possibility of failure of well drillings must be explained in advance during pre-construction workshops. However, the target villages are more water scarce than the others so that extent of the villager's disappointment may be bottomless when they really meet the failure situation. Therefore it is important that facilitators in charge of the community mobilization and sensitization activities encourage the relevant villagers to continue their activities with high motivation and conscious towards construction of another water supply facility, and avoid that the villagers develop feeling of distrust and opposition against DWD/Local government.</p> <p>In addition, when the failure is explained to relevant villagers, it is also important that both facilitators in consultant team and local government attend the meeting and provide detailed explanation and advices by themselves.</p>	WSC executives, Village leaders, CDA & HA	React in the range of contract if needed
Monitoring	<p><u>Monitoring on Implementation Status of O&M activities by Cooperation between Sub-county office and Village</u></p> <p>After taking-over of a water supply facility to village, local consultants visit every target village and check usage situation of a water supply facility, continuity of O&M activities, contents and problems in the activities. When local consultants find problems which prevent self-reliant and sustainable activities, local consultants inquire the reason and contents of the problem, and consider on countermeasures and if additional workshop is necessary or not.</p> <p>Monitoring by local consultants is to be implemented through monitoring records filled in by a WSC and interview to WSC executives. Through the monitoring, local consultants provide encouragement and advice to WSC. These follow-up activities are effective to keep high continuity of WSC activities even if there are no problems.</p> <p>This monitoring is to be implemented at every several month and continued until the completion of the project.</p>	WSC executives	0.5 Day/one Workshop

2) Software Assistance Program for Piped Water Supply Facilities

a. Pre-Construction Workshop

Table 9 Contents of Pre-Construction Workshop

No.	Activities	Participants	Number of Days per Village
1	<p><u>Greeting and courtesy call on sub-county and RGC leaders</u></p> <ul style="list-style-type: none"> - Introduction/Explanation of the Project - Request for cooperation and assistance for the Project - Promotion of latrine construction by RGC leaders. <p><u>Initial visit to RGC</u></p> <ul style="list-style-type: none"> - Introduction/Explanation of the water supply facility (kind of facility, function, safety of supply water, cost of construction, cost of repair/inspection/O&M, etc.) - Explanation of Pre-Construction Workshop (objectives, procedures, schedule) - Explanation of requested matters from the Project to RGC - Introduction/Explanation of community-based O&M 	LCIII councilor, Sub-county chief and concerned officers, Leaders of RGC (executives, elders, teachers, religious leaders, medical	1.0 Day

Table 9 Contents of Pre-Construction Workshop

No.	Activities	Participants	Number of Days per Village
	<p>- Explanation of O&M fee including community contribution</p> <p>- Brief explanation of safe water and health (expected approach)</p> <p><u>Kochi Goma RGC</u></p> <p>- here were no detailed explanation of piped water supply facility plan, no explanation and signing on MOU among DWD, local Government and sub-county due to the difficulty of groundwater resource development in Kochi Goma RGC. Therefore, the explanation and signing are to be implemented in this workshop.</p> <p><u>Installation of Water and Sanitation Implementing Committee (WSIC)</u></p> <p>- This committee is to play a leading role on community mobilization and sensitization activities of RGC until installation of WSC at during-construction phase of water supply facility. Although direct beneficiaries of this software assistance program are villagers in RGC, it is essential to strengthen the support system by local governments such as village, parish and sub-county committees in order to secure sustainable O&M. For this reason this project is to establish close relationship with the local leaders and have them understand the project.</p>	experts, etc.) LCI chief.	
2	<p><u>Explanation of the role and responsibility of WSIC and Training of the operation</u></p> <p>- Especially on collection system of O&M fee and making action plan for fulfillment of critical requirements.</p>	WSC executives & LCI leader	1.0 Day
3	<p><u>Final Agreement on the Contents of Planed Piped Water Supply Facility</u></p> <p>- Water supply area, selected wells as part of the water supply facility, elevated tank, routs of transmission and distribution pipes, location of public taps, etc.</p> <p>Introduction of Participatory Assessment and Survey on Current Situation of Sanitation & Hygiene</p> <p>- Existing water sources, latrine, dry racks, garbage collection and disposal places, current situation of sanitation & hygiene facilities and safe water chain</p> <p>Promotion of safe water and health, sanitation and hygiene</p> <p>Sensitization/Awareness education on gender, AIDS, and environment</p> <p>- In this session, villagers are to understand different roles of men and women and realize that women do almost all activities related to water.</p>	WSC executives, RGC leaders (chief, LCI leader, elders, teachers, medical personnel, religious leaders, leaders of women's group, etc)	2.0 Days
4	<p>Feed-back of the Survey Result on Current Situation of Sanitation & Hygiene to RGC</p> <p>- Discussion on current situation of sanitation & hygiene of RGC, problems and solutions</p> <p>Making Action Plan for fulfillment of the Critical Requirements and agreement of the execution</p> <p>Explanation of Registration of Beneficiary Households and Start of the Registration</p> <p>Determination of collection method of O&M fee (Contribution) and Start of the Collection</p> <p>Promotion of safe water and health, sanitation and hygiene</p> <p>Sensitization/Awareness education on household wealth and gender</p> <p>- sensitization/awareness on following facts and gender issues, and recognize villagers the importance of women participation to WSC: wealth related to water such as jerry-can, water jar, ladle, cup, etc. are usually belongings of women, and users are also women</p>	WSC executives, RGC leaders (chief, LCI leader, elders, teachers, medical personnel, religious leaders, leaders of women's group, etc)	1.0 Day
5	<p>Assessment on progress for fulfillment of the Critical Requirements</p> <p>Promotion of household contribution to public health, sanitation, hygiene and community thorough household visits.</p> <p>Confirmation of registered beneficiary households</p>	WSC executives, RGC leaders (chief, LCI leader, elders, teachers, medical personnel, religious leaders, leaders of women's group, etc)	1.0 Day
6	<p>Making of O&M Plan (Draft)</p> <p>- O&M Plan is one of the Critical Requirements. Making the O&M Plan will make villagers and WSC executives understand particular activities needed, and how much money is needed for future O&M</p> <p>Promotion of safe water and health/sanitation/hygiene</p> <p>Sensitization/Awareness education on gender, AIDS, and environment</p> <p>- Gender and development, social equity</p>	WSC executives	1.0 Day
	Confirmation of the fulfillment of the Critical Requirements on the site.	WSC	

Table 9 Contents of Pre-Construction Workshop

No.	Activities	Participants	Number of Days per Village
	- Local consultants visit each project RGC, and confirm the status of the fulfillment of the Critical Requirements.	executives, CDA, HA	

b. During-Construction Workshops

After finishing Pre-Construction Workshop, tendering for selection of a contractor is to be conducted, and During/Post-Construction Workshop begins at the same time of commencement of construction work by selected contractor.

Table 10 Contents of During-Construction Workshop

No.	Activities	Participants	Number of Days per Village
1	Confirmation of Water Supply Facility Construction Sites - Although the site selection was done during the pre-construction workshop, the site should be re-confirmed under attendance of involved persons so that there will be no conflicts or misunderstanding of the construction site. Installation of WSC and Dissolution of WSIC for better future and Installation of WSC	WSIC executives, villagers, LCIII councilor, leaders of RGC, Sub-county officers	1.0 Day
2	Capacity building of WSC executives - collection and management of O&M fee - bookkeeping - keeping records of meetings and repairs of water supply facility. - preventive maintenance - roles and responsibilities of WSC executives - relation with the sub-county - necessity of monitoring and the method. - robbery prevention of water supply facility, especially on solar panels. Promotion of safe water and health/sanitation/hygiene Sensitization/Awareness education on gender, AIDS, and environment - necessity of women participation to participatory O&M and WSC executives.	WSC executives	1.0 Day
3	Explanation of usage etc. of water supply facility Facing to start usage of a water supply facility, explanation on matters WSC should be implemented as superintendent organization and how to treat the facility is to be conducted. Explanation on treatment of the facility includes on/off of submersible pumps, cleaning of solar panels and elevated tank, opening and closing of valve of distribution pipes, record of distribution volume, finding of leakages of transmission and distribution pipes, records of flow volumes of public taps. And person in charge of these matters are to be determined in this session. The contractor is responsible to the explanation on technical issues of the treatment of the water supply facility. Local consultants are responsible to watch the appropriateness of contractor's explanation, and if not appropriate, he/she will give advice to contractor from the point of view of communication skill. The selection and selection method of in charge of person are guided by local consultants as part of his/her activities in community mobilization and sensitization.	WSC executives	1.0 Day
4	<u>Detailed Plan of O&M</u> - O&M plan made during the pre-construction workshop is to be transformed into a detailed plan by adding more items. O&M of the water supply facility was rather a notion/knowledge in villagers' heads during the pre-construction stage. Looking at construction of the facility will make the facility a part of villagers' reality. O&M will become more tangible to them. Under such a circumstance, villagers will have better and realistic understanding of importance of O&M, and, thus are in a better position to make a detailed plan of O&M. After understanding that O&M of the water supply facility is not a responsibility given by government but a measure of achieving villager's objectives written in O&M Plan, self-motivated O&M lead to sustainability of the water supply facility. - O&M plan should contain concrete method for improvement of latrine coverage.	WSC executives, Villagers, RGC leaders	1.0 Day
5	<u>Taking-over of the Water Supply Facility to Sub-county</u> - Before villager's first use of the water supply facility, an assembly in RGC will be held to officially confirm completion of the facility and its taking-over to the sub-county. Villagers can confirm their ownership of the facility through this assembly. The contents of the assembly are brief introduction by WSC executives and sub-county officers, and if possible, document of proofing taking-over. The document will promote villager's ownership.	Sub county officer, WSC executives, Villagers, Representatives of RGC	1.0 Day

c. Post-Construction Workshops

Post-Construction Workshop aims at capacity development of WSC executives on related matters to O&M of facility. Local consultants team visit communities periodically at interval of several months, monitor the rate of activities of WSC and community members for sustainable O&M, and implement additional workshop to establish sustainable O&M activity if it is necessary. In addition, when there are communities which have problems in sustainable O&M, it is necessary to monitor their activities and implement additional workshops even after finishing the Project. Therefore the issues shall be taken over to facilitators in concerned local government with a summary document which describes the situation of O&M and the issues of the concerned community to be solved.

The activities of post-construction workshop are shown in below Table.

Table 11 Contents of Post-Construction Workshop

No.	Activities	Participants	Number of Days per Village
6	<p><u>Capacity Development of WSC Executives and Monitoring System</u></p> <p>- This is also continued from the pre-construction workshop. It aims to improve leadership and management skills of WSC. Local consultants also explain again issues of capacity development of WSC executives (management, account, etc.) and self-monitoring system with monitoring forms.</p> <p>In the during/post-construction workshop, capacity development for self-monitoring is one of the major topics as WSC is to fill out monitoring forms regularly. Contents of the forms and the ways to fill them out are to be explained. The monitoring forms should include the following items;</p> <p>on WSC management : O&M fee collection, amount collected, topics of discussion in WSC meetings, issues on operation, etc.</p> <p>on villagers : willingness and requests of villagers, water quantity and quality, cleaning around the handpump, benefits of handpump to women and children, etc.</p> <p>on handpump : water amount, quality, cleaning around handpump, repair and maintenance by HPM, etc.</p> <p>on health/sanitation/hygiene : number of latrines and their usage and cleanliness, management of rubbish, management/disposal of feces, drinking of safe water, etc.</p> <p>As matters on O&M fee are of great importance, facilitators in local consultant team are to check conditions of collection, management and usage very carefully, and give proper advices if necessary.</p>	WSC executives, CDA & HA	1.0 Day
Monitoring	<p><u>Monitoring on Implementation Status of O&M activities by Cooperation between Sub-county office and RGC</u></p> <p>After taking-over of a water supply facility to RGC, local consultants visit every project RGC and check usage situation of a water supply facility, continuity of O&M activities, contents and problems in the activities. When local consultants find problems which prevent self-reliant and sustainable activities, local consultants inquire the reason and contents of the problem, and consider on countermeasures and if additional workshop is necessary or not. Monitoring by local consultants is to be implemented through monitoring records filled in by WSC and interview to WSC executives. Through the monitoring, local consultants provide encouragement and advice to WSC. These follow-up activities are effective to keep high continuity of WSC activities even if there are no problems.</p> <p>This monitoring is to be implemented at every several month and continued until the completion of the project.</p>	WSC executives	1.0 Day

3) Points to be noted in Mobilization/Sensitization Activities

<Amount of Community Contribution>

Collection of community contribution money will commence at the 3rd workshop when a village choose WSC executives for deep borehole with handpump and at the 4th workshop when a RGC finishes making action plan towards fulfillment of the critical requirements and agree the execution of the action plan for piped water supply facility.

The amounts of contribution money are described as followings in Ugandan standards (no description for construction of piped water supply facility).

- Construction of deep boreholes with handpump: 180,000 Ush/facility (about 5,000 JPY)
- Repair of water supply facility: 250,000 Ush/facility (about 7,000 JPY)

The amounts of contribution money are to be determined at the time of Detailed Design Phase through the discussion among DWD, DWOs and Japanese side for both types of facilities in the Project

<Method of final decision of selecting villages/RGCs to commence construction of water supply facilities>

The village/RGC screening takes place based on fulfillment condition of the Critical Requirements. The following checklist for each village/RGC is used in the screening. Item 2 in the Table is not applied to RGCs due to no- installation of WSC at this moment.

Table 12 Checklist for Village Screening

Categories of Critical Requirements		Contents	Condition	Explanation of non-fulfillment using concrete examples (*: explanation is mandatory)	✓ if the requirement is not fulfilled	Final judgment
1.	Documents of Acceptation	Letter of introduction of the local NGO /consultancy firm by DWD-7	Y N			
		Necessary MOUs/letters of agreement between local government and sub-county (in case of RGC, DWD also should be included.)	Y N			
2.	Installation of WSC & Gender issues (women's participation)	Selection of WSC executives	Y N			
		By-Laws	Y N			
		Proportion of women (WSC executives)	More than 50%			
		Understanding, awareness, willingness, and actions toward gender development	good bad			
3.	Promotion of health, sanitation and hygiene	Understanding, willingness and actions toward latrine usage	good bad			
		Understanding, willingness and actions toward health, sanitation and hygiene in relation to safe water	good bad			
		Leaders' willingness to contribute to improvement of health, sanitation and hygiene of community members	good bad			
4.	Community (Village/RGC) contribution	Amount of community contribution collected (Target amount _____ Ush)	_____ Ush			
		Proof of existence of the contribution	Y N			
		Understanding of O&M fee, water user fee and willingness to pay	good bad			
		Agreement to participate in construction & monitoring	Y N			
5.	Settlement of Land Ownership Conflicts	Agreement paper on land contribution of the candidate facility construction sites	Y N			
6.	O&M Plan	Way(s) to cover costs for O&M	Y N			
		Estimated life of capital	Y N			

Table 12 Checklist for Village Screening

Categories of Critical Requirements	Contents	Condition	Explanation of non-fulfillment using concrete examples (*: explanation is mandatory)	✓ if the requirement is not fulfilled	Final judgment
	equipment and parts				
	Spare parts availability and costs	Y N			
	Maintenance costs	Y N			
	Equipment replacement costs	Y N			
	Backup support and services by District	Y N			
	Ways to increase latrine coverage and usage rate to 95%/100% in the next 4 years for villages/RGCs.	Y N			

The above checklist is at first filled out by WSC executives/WSIC executives, Leaders of village/RGC, CDA, HA and workshop facilitators at the time of pre-construction workshop completion. Detailed explanations of the checklist as well as specific instructions on how to fill out the columns will be given to the workshop facilitators in the facilitator’s training. This training is given by the Japanese consultant right before the commencement of the pre-construction workshop of the Project. After the completion of filling out the checklist, final judgment on fulfillment of the critical requirements is to be implemented according to following screening sheet.

Table 13 Screening Guide for the Final Selection of Communities where Facilities to be constructed

Requirements for Facility Construction	Content	Standard for Passing
1. Willingness of acceptance	Letter of introduction of the local NGO/consultancy firm by DWD, Necessary MOUs/letters of agreement	Must be “Yes”
	Selection of WSC executives By-Laws	
2. Installation of WSC & Gender issues (women’s participation)	Proportion of women (WSC executives)	Must be more than 50%. If less than 50%, must have an acceptable/sensible reason. (quality is as important as quantity: even if women occupy more than 50%, it is meaningless if they are not given a chance to express their opinions or participate in different activities)
	Understanding, awareness, willingness, and actions toward gender development	Must be “Yes”
3. Promotion of health, sanitation and hygiene	Understanding, willingness and actions toward latrine usage	Must be “Yes”
	Understanding, willingness and actions toward health/sanitation/hygiene in relation to safe water	
	Leaders’ willingness to contribute to improvement of health/sanitation/hygiene of community members	
4. Community contribution	Amount of community contribution collected (Target amount _____ Ush)	If less than the target amount, must have an acceptable/sensible reason. The amount of money collected is not always proportionate to the degree of understanding. What is important is that villagers fully understand that water supply facilities are not free gifts and that they must understand the necessity of O&M. In case that the amount does not reach the target amount but the

Table 13 Screening Guide for the Final Selection of Communities where Facilities to be constructed

Requirements for Facility Construction		Content	Standard for Passing
			willingness of O&M is recognized, the plan to collect money must be submitted.
		Proof of existence of the contribution	Must be "Yes". Even if the collected amount is less than the target amount, the collection activities should be started and continued.
		Understanding of O&M fee, water user fee and willingness to pay	Must be "Yes". Even if more than target amount was collected for community contribution, villagers' willingness to keep paying for O&M must be assured for attaining sustainable O&M.
		Agreement to participate in construction & monitoring	Must be "Yes" For construction of a borehole with a handpump, it is necessary for villagers to construct outer fence of the facility by themselves.
5	Settlement of Land and Ownership Conflicts	Agreement paper on land contribution of the candidate facility construction sites	Must be "Yes"
6	O&M Plan	Way(s) to cover costs for O&M	Must be "Yes". What is most important is that villagers understand the importance of O&M and act accordingly
		Estimated life of capital equipment and parts	
		Spare parts availability and costs	
		Maintenance costs	
		Equipment replacement costs	
		Backup support and services by District	
		Ways to increase latrine coverage and usage rate to 95%/100% in the next 4 years for villages/RGCs.	

If all the items are fulfilled and satisfactory, the RGC/village passes the screening. If not, officers at DWO and the Japanese consultant on social development, representing the Ugandan and the Japanese sides respectively, will jointly examine the ability of O&M of the relevant village/RGC and discuss the right and wrongs of construction of water supply facility in the village/RGC. Final judgments for screening of villages/RGCs are made during the last two weeks of the pre-construction stage. The results of screenings are to be fill in the rightmost columns of the checklist Final judgment for each items should be met consensus of Ugandan side and Japanese side.

(2) Detailed Input Plan (Implementation Structure and Input Plan)

1) Numbers of Target Sites for Software Assistance Program

Numbers of the target communities for software assistance program are total 134 villages and 6 RGCs. The break down is shown in below.

- Villages in where deep boreholes with handpumps to be constructed: 116 villages
- Alternative villages for construction of deep borehole with handpump: 18 villages
- RGCs in where piped water supply facilities to be constructed: 6 RGCs

Phase-wise numbers of sites those request mobilization and sensitization activities are summarized in below Table phase-wise

Table 14 Number of Water Supply Facilities which have Need of Mobilization and Sensitization Activities

Phase	Number of the Water Supply Facilities	
	Break Down	Total Number
1. Pre-Construction	Deep Borehole with handpump (116 sites+18 sites) +RGC (6 sites)	140 sites
2. During-Construction	Deep Borehole with handpump (116 sites + alternative sites)	122 sites

Table 14 Number of Water Supply Facilities which have Need of Mobilization and Sensitization Activities

Phase	Number of the Water Supply Facilities	
	+RGC (6 sites)	(minimum)
3, Post-Construction	Deep Borehole with handpump (116 sites + villages which are to be failed borehole drillings) + RGC (6 sites)	122 sites (minimum)

Institution of the rural water supply in Uganda requires to communities to install a WSC and conduct O&M activity for each water supply facility. Therefore, mobilization and sensitization activity (workshops) is to be implemented at site of each water supply facility.

2) Requirements for Experts of Mobilization and Sensitization

As described earlier, population in Acholi sub-region have experienced humanitarian relief period so that many of the population in the target RGCs understood that supply of safe water is one of the responsibility of the Ugandan government. In addition, they have little understanding of the relation between safe water and their health and the importance of the understanding. Therefore awareness-raising is necessary for them to accept payment of O&M fee and the collection system permanently, however, it is anticipated that the realization of the villager's acceptance may accompany a lot of difficulties. Consequently, it is necessary for the implementation of the mobilization and sensitization activities to deploy experts with considerable experience and high skills.

3) Implementation Structure and Roles of Each Experts

Mobilization and sensitization activities (workshops) are to be conducted by a Team composed of one Japanese expert on O&M specialist, local NGO/consulting firm (one community development expert and facilitators). The Community Development Expert (CDE) shall consider details of activities through discussions with Japanese Expert, and prepare action plans, action manuals, and handouts for workshops with consideration for Ugandan manners and customs, especially for that of Acholi sub-region. In addition, the CDE shall manage schedule of each facilitator and supervise the implementation status of workshops to promote effective implementation of activities. Therefore, the CDE is obliged to check and manage each facilitator's activity not only in his/her assignment period but also in the absence period of Japanese Expert.

The facilitators are to visit target villages/RGCs in charge and implement mobilization and sensitization activities under the direction and supervision of the CDE. The facilitators are to hold workshops which target at villagers and WSC executives in their mobilization and sensitization activities. In addition, the facilitators are to attend regular meetings (about once a week) held by the consultant, the client and the contractor, and make efforts for effective implementation of their mobilization and sensitization activities from mutual cooperation of adjustment of each schedule under the supervision of resident supervisor in the during/post-construction phase.

This software assistance involves the following individuals including local governments and their roles are also shown in below Table.

Table 15 Actors and Their Roles in the Software Assistance Program

Actors	Roles
1) Japanese Consultant on O&M	<ul style="list-style-type: none"> ➤ Overall planning, management and reporting of the software assistance program. ➤ Supervision/Guidance of local NGO/consultancy firm
2) DWD/ Counterparts	<ul style="list-style-type: none"> ➤ Overall planning and management of the program with the Japanese consultant ➤ Supervision/Guidance of local NGO/consultancy firm with the Japanese consultant ➤ Request assistance and cooperation from other ministries and local government offices for

Table 15 Actors and Their Roles in the Software Assistance Program

Actors	Roles
	<ul style="list-style-type: none"> ➤ program implementation when necessary ➤ Coordination among the Japanese consultant, local NGO/consultancy firm, and government offices
3) District Water Office Staff	<ul style="list-style-type: none"> ➤ Presence at the workshops and trainings ➤ Coordination among local NGO/consultancy firm, community, village, parish, sub-county ➤ Check the contents and progress of community mobilization and sensitization activities, HPM training done by local NGO/consultancy firm ➤ Guidance of WSCs in the target villages and monitoring of their activities, O&M fee collection, conditions of sanitation and hygiene in relation to water in target villages ➤ Support of WSC/WSIC ➤ Coordination of software assistance activities and well construction ➤ Check the situations of HPMs
4) CDA	<ul style="list-style-type: none"> ➤ Presence at the workshops ➤ Check the contents and progress of community mobilization and sensitization activities done by local NGO/consultancy firm ➤ Guidance of WSCs in the target villages and monitoring of their activities, O&M fee collection, conditions of sanitation and hygiene in relation to water in target villages ➤ Support of WSC
5) HA	<ul style="list-style-type: none"> ➤ Check the contents and progress of community mobilization and sensitization activities done by local NGO/consultancy firm ➤ Monitoring of conditions of sanitation and hygiene in target villages ➤ Support of WSC
6) Local NGO or Consultancy Firm	<ul style="list-style-type: none"> ➤ Support of District Water Office and CDAs, Has ➤ Make workshop materials, handouts, and necessary forms ➤ Write workshop planning report, manuals, and reports ➤ Facilitation of community mobilization and sensitization workshop ➤ Monitor WSC activities and conditions of sanitation and hygiene in target villages/RGCs ➤ Keep contacts with village/RGC, parish, sub-county officers and leaders to strengthen the system of support ➤ Coordination of concerned organizations/personnel so that villagers will receive information on water supply facility construction progress ➤ Write work reports
7) Contractor (construction)	<ul style="list-style-type: none"> ➤ Announce the progress of well construction to villagers ➤ Maintain good relationship with villagers, free of friction, conflicts and misunderstanding
8) WSC Executives	<ul style="list-style-type: none"> ➤ Collection and management of O&M fee ➤ Engage in operation and maintenance and promote better sanitation and hygiene as representatives of villagers ➤ Improvement of sanitation/hygiene condition of village/RGC ➤ Hold WSC meetings to discuss matters on WSC ➤ Hold meeting to report conditions of O&M fee management and handpumps to villagers ➤ Coordination and communication with village, parish, and sub-county officers/leaders
9) Villagers (Users of Water Supply Facility)	<ul style="list-style-type: none"> ➤ Awareness as owners of water supply facility, Correct usage of the facility ➤ Payment of O&M fee ➤ Participation in workshops and meetings ➤ Understanding of relationship between safe water and health, Effort to improve health, sanitation and hygiene ➤ Labor contribution for feeder road maintenance, construction of fence, and construction of drainage pit
10) HPMs	<ul style="list-style-type: none"> ➤ Repair and maintenance of handpumps ➤ Report the conditions of handpumps to WSCs ➤ Report to District Water Office when a handpump requires a major repair

4) Basic Idea of Input Plan and Assignment of Input

i) Pre-Construction Workshop

Pre-Construction Workshop is facilitated by consultants from local NGO or a local consultancy firm. The consultants visit each target Village/RGC at least five times for a village and six times for a RGC to facilitate workshop sessions. One consultant team consists of one facilitator and one assistant facilitator.

These activities are to be implemented in the detailed design stage. After selection of the CDE,

facilitators and assistant facilitators, preparation for implementation of mobilization and sensitization workshops (preparation of manuals and handouts for workshops, consideration on detail of activity schedule) will take about two weeks. Furthermore, confirmation work and summary of accomplishment and degree of attainment after workshops will take two weeks. Therefore, it is necessary for all mobilization and sensitization activities toward all target villages and RGCs to finish it in the other three months.

ii) During/Post-Construction Workshop

After finishing Pre-Construction Workshop, tendering for selection of a contractor is conducted, and During/Post-Construction Workshop begins at the same time of commencement of construction work of the selected contractor.

During/Post-Construction Workshop should be implemented in conformity with construction schedule so that it is important to hold workshops in appropriate timing through sufficient consultation at regular meetings with a contractor.

Local consultant teams visit each target Village/RGC during construction phase. In case of deep borehole with handpump, the local consultant teams implement confirmation of facility construction sites, confirmation of participation of a community in facility construction and its participation plan, witness to explanation of handpump usage done by the contractor and fence work by community members and ceremony of taking over a constructed facility to a community. In case of piped water supply facilities, the teams implement also confirmation of facility construction sites, capacity development of WSC, witness to explanation of a facility usage and O&M done by a contractor, and ceremony of taking over a constructed facility to a sub-county.

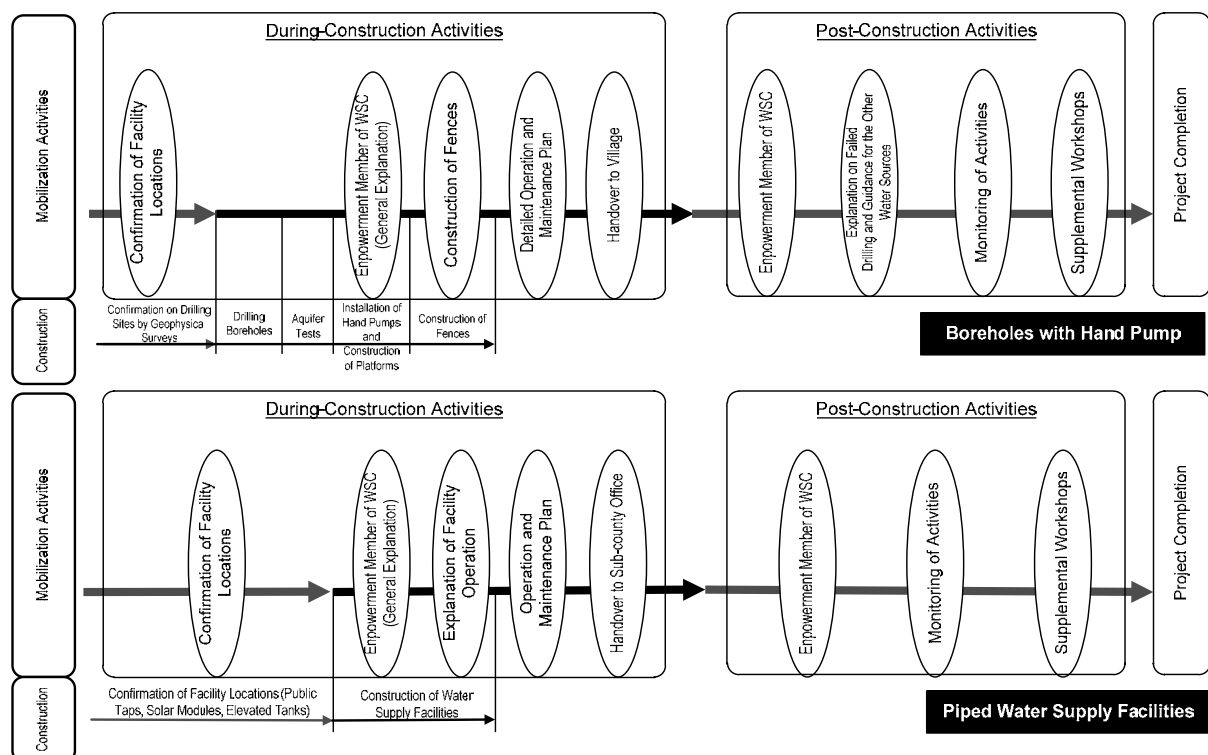


Fig. 1 Flow of Workshop in During/Post-Construction for each Facility Type

Post-Construction activities aim at capacity development of WSC executives about O&M issues of constructed facilities, and hold workshop for realization of the purpose. Furthermore the teams will

visit target villages/RGCs at the interval of every several months and check the activities of WSCs, and if it is necessary, additional workshops will be held for settlement of the activities of WSCs.

When there found difficulties in O&M issues of the constructed facilities, it is necessary to implement continuous monitoring and hold additional appropriate workshops to the relevant villages/RGCs even after the completion of the project. Therefore, the Japanese Expert is to summarize these situations and difficulties, and take over the issues to facilitators of relevant local government.

4.2 HPM Training

(1) Contents of Activities

HPM training aims at prevention of accidents which are likely to take place when HPMs draw up riser pipes and re-install them. Participants of the training are three HPMs for every sub-county. The contents of HPM training is shown in below Table.

Table 16 Contents of HPM Training

Activities	Content	Duration/ Sub-County
(Hardware) Treatment, repair and inspection methods of PVC riser pipes of U-2 type hand pumps which are installed in the Project	<ul style="list-style-type: none"> - Structure of the handpumps installed in the Project and the pump up technology. - Handpump repair tools and their usage. - Procedure and points about drawing up existing riser pipes and re-installation of fixed riser pipes. - Safety management and caution for handling - Common mistakes in installation and handling - Points for special attention when working with community members. 	2 days

(2) Detailed Input Plan (Implementation Structure and Input Plan)

1) Number of Sites for the Training of HPMs

Number of intended sub-counties for HPM training is to be 73, which are entire sub-counties in the Project area.

2) Requirement for Experts on HPMs Training

Experts on HPMs training should have experience of training practice of HPMs more than ten years. The experts also should have experience with treating PVC riser pipes and a lot of repair and installation of handpumps.

3) Implementation Structure and Roles of Experts

One Expert and his/her assistant expert will visit a site where deep borehole with handpump installed in the Project and implement HPMs training on the site. HPMs training should be implemented immediately after completion of the water supply facility construction as soon as possible.

4) Basic Idea of Input Plan and Assignment of Input

One local expert of HPM training and his/her assistant are to visit selected constructed sites of deep boreholes with handpumps under the Project, and implement HPM training using the constructed facility. Before implementing HPMs training, each sub-county selects three HPMs as representatives of sub-county so that the total number is 219 (3 HPMs x 73 sub-counties), and these HPMs will be divided into a ten-member group (22 groups). HPMs training will be implemented for every group. A HPM training takes about two days so that the total necessary period for the training is to be about 2.0 months (= 73 sub-counties x 3 HPMs / 10 x 2 days x 1.35 / 30 days).

5. Procurement of Human Resource for Software Assistance Program Activities

In Uganda, a lot of deep boreholes with handpumps and piped water supply systems have been constructed by donors including Japan. Especially, donors in the West have adopted the method of mobilization and sensitization of communities in their project to strengthen sustainability of the constructed facilities.

Government of Uganda has been entrusting the mobilization and sensitization activities for communities to local NGOs/consultants. As a result, Uganda has now many capable local NGOs/consultancy firms for implementation of the software assistance program planned in the Project, and there are many experienced experts at present.

The implementation method of the mobilization and sensitization activities in the Project is as follows:

- Appointment of several experienced local NGOs/consultancy firms which are acquainted to the planned mobilization and sensitization activities in the Project in consultation with DWD.
- Evaluation of proposals submitted by the appointed local NGOs/consultancy firms.
- Selection of the most capable local NGO/consultancy firm and entrustment of the mobilization and sensitization activities in the Project.

Capabilities of employed Community Development Expert and facilitators are to be evaluated through practical activities, and when their activities are poor, the contract is to be terminated. For such a case, contracts with local NGOs/consultancy firms will be divided into several contracts wherever possible. For example, Pre-Construction Workshop and During/Post-Construction Workshop will be contracted respectively.

Selection method of local NGOs/consultancy firms should have high transparency and accountability, and the method is to be adopted in consultation with Government of Uganda.

6. Implementation Schedule of Technical Assistance

The software assistance program consists of “community mobilization and sensitization (pre-construction phase, during-construction phase and post-construction phase) “and “Training of HPMS”. The activities in Pre-construction phase are implemented during the term of Detailed Design, and the activities in During/Post-construction phase are to be implemented in conformity with construction of the water supply facilities during the term of the construction.

Input plan for software assistance is shown in Fig. 2.

6.1 Implementation Schedule of Community Mobilization and Sensitization Activities

(1) Mobilization and Sensitization Activities at Pre-Construction Phase

Mobilization and sensitization activities at Pre-Construction Phase are implemented during Detailed Design stage.

Immediately after contract between the government of Uganda and Japanese consultancy firm, Japanese expert from the Japanese consultancy firm selects local consultants (community development specialist and facilitators), and review the contents of software assistance activities and its schedule and also prepare hand-outs and manuals for workshop with selected community development expert. After that, Japanese expert reviews assigning tasks of twelve contracted facilitators based on manuals mentioned above, and prepare holding workshop. It takes about 0.5 month for these preparation works. Period of Pre-Construction Workshop in sites takes 3.0 months.

The workshop will be held at all target sites including alternative sites. At the end of the phase, a review is implemented to confirm the rate of fulfillment of each target Village/RGC on the critical requirements. It takes 0.5 month. Implementation of these all activities is overlapped so that the total period for the activities will be 4.0 months.

A current status report is to be submitted at the end of the Pre-Construction Workshop. The report describes contents and results of the activities implemented in corresponding period.

(2) Mobilization and Sensitization Activities at During/Post-Construction Phase

During/Post-Construction Workshop should be implemented in conformity with construction schedule so that the activity begins at the same time of commencement of construction each facility. After commencing construction, a contractor will spend one or two months for preparatory work, therefore, During/Post-Construction Workshop will begin two month later of commencement of the construction. Japanese consultant begins its work such as selection of local consultants and preparation of manuals at one month before commencement of the construction. Practical period of the During/Post-Construction Workshop will be 12.0 months; the last one month will be spent for making report which describes the rate of achievement of the implemented activities. The report, which describes contents, schedules and results of the software assistance program activities, will be submitted as an accomplishment report of software assistance program activities. During/Post-Construction Workshop will take long period, 12.0 months, so that two current status reports are submitted at each juncture, those reports describe contents and progress of the activities implemented in corresponding periods. Total period of the Mobilization and Sensitization Activities at During/Post-Construction Phase takes 13.0 month.

6.2 Implementation Schedule of HPM Training

HPM trainings are to be intermittently implemented in line with the progress of the facility construction and in parallel with during/post workshops.

7. Outputs of Software Assistance Program Activities

Outputs of software assistance program activities are as follows:

Table 17 Software Assistance Program Activities and their Outputs

Outputs	Contents
1) Pre-construction Workshop manual for community members	Project Outline
	Handout/material on community-based O&M
	Handout/material on water supply facilities
	Handout/material on water and health, sanitation and hygiene
	Handout/material on community sensitization
	Handout/material on O&M plan
2) During/Post-Construction Workshop manual for WSC	Handout/material on monitoring
	Handout material on WSC
	Handout material on WSC management
	Form for O&M fee collection
	Accounting Form for O&M fee
	Form for WSC meetings
	Monitoring form for water supply facility
Monitoring form for WSC management	
3) Workshop planning report	Workshop procedures, methods, etc.
4) Workshop report	Report of workshop results
5) Planning Report for HPM training	Training procedures, methods, etc.
6) Training Report for MPMs	Report on training results

An accomplishment report of software assistance program activities including outputs above

mentioned is submitted to the responsible organization of the Project in the Government of Uganda.

8. Obligations of Recipient Country

The obligations required for the Government of Uganda for the smooth implementation of the soft component program and the enhancement of outcome and sustainability of the program are as follows:

- Employment cost and field allowance of facilitators (three personnel) staffed to DWD.
- Vehicles to be used by the facilitators above mentioned and its fuel cost.
- Support and convenience by DWO for registration of newly established WSC in target village/RGC.
- Follow-up activities for target villages those have no other choice but abandon construction of their water supply facilities due to adverse hydrogeological condition for groundwater development.
- Monitoring and follow-up activities for sustaining O&M of the constructed water supply facilities in the target villages/RGCs after finishing the soft component program.

In case of construction of a borehole with handpump, a contractor (which makes a contract of the construction work) dispatches necessary personnel and gives technical guidance and explanation on structure of a handpump for community members as part of the construction work at the time a handpump is installed. In addition, the contractor also dispatches necessary personnel to give guidance on how to construct outer fence of a handpump. Facilitators in the Project monitor these contractor's assistant activities to confirm the appropriateness

Table 5 Project Design Matrix for Software Assistance

Project : Project for Provision of Improved Water Source
For Returned IDP in Acholi sub-region
Location : Uganda

Duration :
Target Group : Members of Target RGCs/Communities
Creation Date: Made in April 2012

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
<p><u>Overall Goal</u></p> <ul style="list-style-type: none"> - Smooth O&M and Sustainable use of the constructed water supply facilities. - Improvement of condition of sanitation and hygiene by usage of safe water 	<ul style="list-style-type: none"> - Amount of collected water user fee - Water supply quantity by piped water supply facilities - Working ratio of borehole with handpump - Repair record of facility 	<ul style="list-style-type: none"> - Data from DWO - Data from District Health Office - Community mobilization and sensitization report 	Water policy and national development policy of Uganda remain the same
<p><u>Purpose of Software Assistance Program</u></p> <ul style="list-style-type: none"> - Effective use of the constructed water supply facilities and positive and smooth collection fo water user fee. - Autonomous and sustainable O&M of the constructed wter supply facilities under cooperation of community/RGC members and the WSC. - Improvement of repair and inspection method, and proper repair of handpumps by trained HPMS 	<ul style="list-style-type: none"> - Total volume of supplied water - Rate of collection of water user fee - Rate of participation in WSC meeting - Rate of participation of concerned person in local government to meetings of Villages/RGCs and meetings of WSCs - Conditions and frequency of handpump repair by HPMS 	<ul style="list-style-type: none"> - Record of facility operation - Record of collection of water user fee, and cashbook - Record of WSC meeting, activities. - Record of repair of facility 	Members of RGCs/Communities and concerned person in DWD and local governments continue to implement their activities.
<p><u>Outputs</u></p> <ol style="list-style-type: none"> 1 The concerned persons at the local government and community members understand aims, roles and importance of WSC, and are willing and motivated to take part in WSC support. 2 Community members understand the importance of safe water (relationship between sate water and health, sanitation, and hygiene), use efficiently constructed water supply facilities, and basic activities of WSC such as collection of water user fee go on smoothly. 3 Members of WSC understand the purpose of WSC, their roles, and organizational management practice, and O&M of the constructed water supply facilities go on smoothly under cooperation of community members and the WSC. 4 HPMS understand and master repair and inspection method of hamdpumps installed under the Project, repair and inspect handpumps properly, and community members use the handpumps sustainably. 	<ul style="list-style-type: none"> - Frequency of WSC meetings and community meetings - Number of participants in community meetings. - Determined water user fee - Total volume of supplied water, number of users, and rate of collection of water user fee. - Purpose of usage of existing unsafe water source and frequency of usage - Frequency of WSC meetings and community meetings - Amount of collected water user fee and the status of accounting management. - Frequency of troubles in O&M and its contents. - Methods to solve troubles - Number of repair of HPs and rate of operation of HPs - Status of repair and inspection of HPs 	<ul style="list-style-type: none"> - Community mobilization and sensitization report - Record of WSC meeting, activities. - Community mobilization and sensitization report - Record of facility operation - Record of collection of water user fee, and cashbook - Interview survey - Community mobilization and sensitization report - Record of collection of water user fee, and cashbook - Record of WSC meeting, activities. - Training report for HPMS - Records of handpump repair and inspection 	<p>Replacements of executives of WSCs and concerned person in local government do not happen frequently.</p> <p>Lives of members of RGCs/Communities do not change by unexpected events such as natural disaster, epidemics, etc.</p> <p>Members of RGCs/Villages continue to participate in the Project and O&M.</p> <p>Trained HPMS continue to participate in the Project and O&M.</p>
<p><u>Activities</u></p> <ul style="list-style-type: none"> - Following community mobilization and sensitization for target RGCs/Communities including OJT for facilitators in local government 1) Pre-Construction Workshop 2) During-Construction Workshop 3) Post-Construction Workshop 4) HPM Training 	<p>(Japanese side)</p> <ul style="list-style-type: none"> - Subcontractor (Local NGO, CBO, or consultancy firm) - Japanese consultant 	<p>(Ugandan side)</p> <ul style="list-style-type: none"> - Officers in DWD on mobilization and sensitization, sanitation and hygiene, - Assistant District Officers on mobilization and sensitization, sanitation and hygiene, - County officers, Community development assistant and Health assistant belongs to DWO 	<p>RGCs/Communities, those members and concerned person in local government understand necessity of facilities and the critical requirements, and agree the contents of the Project</p> <p><u>Pre-Condition</u> Members of target RGCs/Communities do not object to construction of water supply facilities.</p>

Implementation Schedule of Technical Assistance

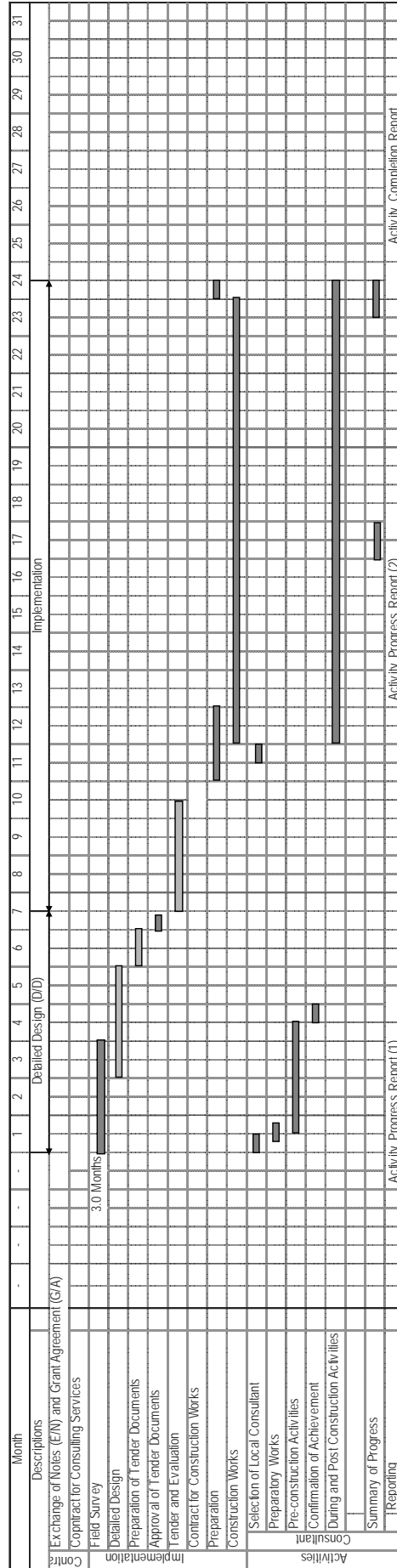


Fig. 2 Implementation of Technical Assistance Activities

Hydraulic Calculation of Transmission and Distribution Pipelines

1. Hydraulic Calculation of working water head and friction head loss for Transmission and Distribution Pipelines
 - Transmission pipeline is that from deepwell (L.W.L.) to elevated tank (H.W.L.) .
 - Distribution pipeline is that from elevated tank (L.W.L.) to public taps.
 - High Density Polyethylene Pipe (HDPE PN10) is adopted for transmission and distribution pipes as follows,

High-Density Polyethylene Pipe (HDPE) PN10

Nominal diameter (mm)	Outline	Inside diameter (mm)
OD32	Service pipe	28.2
OD40		35.2
OD50		44.0
OD63	Distribution pipe	55.4
OD90		79.2
OD110		96.8
OD160		141.0

2. Pipe friction head loss (Hp) for transmission pipeline and distribution pipeline is calculated by Hazen-Williams formula as follows;

$$H_p (m) = 10.666 \cdot C^{-1.85} \cdot D^{4.87} \cdot Q^{1.85} \cdot L$$

Where,

Wall roughness factor : C =130

Pipe inside diameter : D = (mm)

Flow rate : Q = (m³/sec)

Length of pipe : L = (m)

3. Outline and capacity of Elevated Tank

- Diameter of Elevated Tank is 4.0m.
- Capacity of Elevated Tank is approximately 75% of Maximum Daily Demand (storage water capacity 30m³ to 60m³).
- L.W.L. of elevated tank is 0.2m from bottom, and H.W.L. at 0.3m below top.

3. Outline of Public Taps

Public Tap (2 taps/stand)			
Public Taps	lit/min	lit/sec	m ³ /sec
Per stand	26.0	0.433	0.00043

- Public Tap: 2(two) taps per stand
- Discharge rate: 13.0lit/min per 1(one)tap.
- Minimum pressure at public taps: 0.5kg/cm² (5.0m).
Installation height of taps: G.L. +0.9m
- Minimum pressure at the connection of public tap stand: h = 0.9m +5.0 m = 5.9m or more from the L.W.L. in the E.T.

Table 1 Hydraulic Calculation Table for Intake Facilities and Distribution Facilities (Elevated Tank to Public Taps)

RGCs	Population in Service Area (2017)	Water Demand (m ³ /day)	Intake facilities (Deep Well)							Transmission Facilities (Intake Pump to E.T., Transmission Pipeline)						Distribution Facilities (Elevated Tank to Public Taps)						Note
			Borehole No.	Borehole Depth (m)	Safe Yield (lit/min)	Static W.L.(m)	Dynamic W.L.(m)	Installation Depth of Pump (m)	Transmission Pipeline Deepwell (m)	Diameter (OD mm)	Friction Head Loss (m)	Maximum Lifting Height (D.W.L.-H.W.L.) (m)	Required E.T. Capacity A (m ³)	Planning E.T. Capacity B (m ³)	Allowance Ratio E.T. (B/A)	E.T. Height (G.L.+m)	Distribution Pipeline Public Taps (m)	Diameter (OD mm)	No. of Public Taps (2taps)			
Koch Goma	2100	42.0	BH-2	>48	20.0	8.30	22.86	35.75	26.2	OD63	0.02	33.00	31.5	40.0	127.0%	8.0	1,261.0	OD32-OD110	3.0			
			BH-1	88.0	30.0	10.84	29.9	41.25	1019.4	OD63	1.37	41.00										
Unyama	3600	72.0	BH-1	69.0	80.0	5.05	26.73	38.5	780.4	OD90	1.13	54.70	54.0	60.0	111.1%	13.2	1,664.7	OD32-OD110	13.0			
			BH-2	76.0	130.0	5.68	20.68	33.00	863.2	OD110	1.16	46.50	25.5	30.0	117.6%	7.0	1,018.0	OD32-OD90	6.0			
Awere	1700	34.0	BH-1	73.0	46.8	5.30	13.57	24.75	104.1	OD63	0.32	22.00										
			BH-2	84.0	48.8	3.28	13.16	24.75	234.4	OD63	0.78	22.00										
Adilang	3800	76.0	BH-3	70.0	50.0	17.00	28.66	41.25	625.6	OD63	2.17	44.00										
			BH-4	60.0	80.0	17.01	27.93	41.25	1290.5	OD90	1.87	49.00	57.0	60.0	105.3%	15.1	2,211.7	OD32-OD110	12.0			
			BH-1	91.0	20.0	15.54	32.61	44.00	76.2	OD63	0.05	49.00										
			BH-2	70.0	40.0	19.41	47.30	60.50	537.2	OD63	1.23	64.00										
Kitgum Matidi	2800	56.0	BH-2	48.0	90.0	25.92	27.53	38.50	927.7	OD90	1.67	60.00	42.0	50.0	119.0%	13.9	2,362.3	OD32-OD110	12.0			
			BH-1	91.0	72.0	29.40	45.48	57.75	784.8	OD90	0.94	75.00										
Coner Kilak	2000	40.0	BH-2	70.0	48.0	2.39	24.79	35.75	332.9	OD63	1.07	38.90	30.0	30.0	100.0%	9.1	1,292.8	OD32-OD110	7.0			
			BH-3	49.7	21.0	2.26	25.69	38.50	738.8	OD63	0.51	42.00										
			BH-1	91.0	20.0	4.73	19.60	30.25	212.2	OD63	0.14	30.00										

Table 1-1 Hydraulic Calculation Table of Koch Goma RGC (Transmission Facilities)

1. Koch Goma RGC		Population served: 2,100 Persons		Required Amount: 42.0 (m ³ /day)									
Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Pland Pumping Rate Qn (lit/min)	Pland Specific Yield Sc (lit/min/m)	Drawdown sw=Qn/Sc (m)	Drawdown after 6hrs (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-2	>48	1,130.58	20.0	20.0	1.73	11.56	3.00	14.56	8.30	22.86	35.75	
2	BH-1	88.0	1,131.09	30.0	30.0	1.67	17.96	1.10	19.06	10.84	29.90	41.25	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m ³)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Hight of E.T. (G.E.-Bottom of E.T.) (m)	Hight of E.T. (G.E.-H.W.L. of E.T.) (m)	Friction Head Losse (Deepwell to E.T.) (m)	Friction Head Losse (D.W.L.-H.W.L.) (m)	Note
1	BH-2	-	26.2	0.055	1,131.35	40.0	1,139.1	1,135.9	4.3	8.0	0.017	33.00	
2	BH-1	R-1~6	1019.4	0.055	1,131.35		1,139.1	1,135.9			1.373	41.00	

Total length: 1045.6 m

Table 1-2 Hydraulic Calculation Table of Koch Goma RGC (Distribution Facilities)

2. Koch Goma RGC		Population served: 2,100 Persons		Required Amount: 42.0 (m ³ /day)								
Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m ³ /s)	Nomina l dia (mm)	Pipe inside dia (m)	Pipe Flow Rate: S (m/sec)	Head Loss: Hp (m)	Dynamic Water Level(m)	Effective water head (m)	Note
		Elevated Tank	1,131.35						(L.W.L.)	1135.9	4.5	
1	Elevated Tank - R-1	26.2	1,131.05		0.00129	OD110	0.097	0.18	0.013	1135.8	4.8	
2	R-1 - R-2	217.0	1,127.60		0.00129	OD110	0.097	0.18	0.111	1135.7	8.1	
3	R-2 - R-3	99.5	1,125.37		0.00086	OD90	0.079	0.17	0.064	1135.7	10.3	
4	R-3 - R-4	101.5	1,122.25		0.00086	OD90	0.079	0.17	0.065	1135.6	13.3	
3	R-4 - PS-1	10.0	1,122.65	0.433	0.00043	OD32	0.028	0.69	0.273	1135.3	12.7	
4	R-4 - R-5	528.7	1,131.25		0.00043	OD90	0.079	0.09	0.095	1135.5	4.3	
5	R-5 - PS-2	217.9	1,128.44	0.433	0.00043	OD50	0.044	0.28	0.682	1134.8	6.4	
6	R-2 - R-7	50.2	1,128.07		0.00043	OD63	0.055	0.18	0.051	1135.7	7.6	
7	R-7 - PS-3	10.0	1,128.60	0.433	0.00043	OD32	0.028	0.69	0.273	1135.4	6.8	

Total length: 1,261.0 m

Table 2-1 Hydraulic Calculation Table of Uiyayama RGC (Transmission Facilities)

1.Uiyayama RGC		Population served: 3,600 Persons				Required Amount: 720 (m ³ /day)							
Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Plant Pumping Rate Qp (lit/min)	Planned Specific Yield Sc (lit/min/m)	Drawdown sw=Qu/Sc (m)	Drawdown after ohms (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-1	69.0	1,064.83	100.0	80.0	4.40	18.18	3.50	21.68	5.05	26.73	38.50	
2	BH-2	76.0	1,067.09	200.0	130.0	10.00	13.00	2.00	15.00	5.68	20.68	33.00	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m ³)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Height of E.T. (G.E.-Bottom of E.T.) (m)	Height of E.T. (G.E.-H.W.L. of E.T.) (m)	Friction Head Losse (Deepwell to E.T.) (m)	Friction Head Losse (D.W.L.-H.W.L.) (m)	Note
1	BH-1	R-1,2,3	780.4	0.079	1,078.81	60.0	1,091.7	1,086.9	7.9	13.2	1.132	54.70	
2	BH-2	R-1,2,4	863.2	0.097	1,078.81		1,091.7	1,086.9			1.157	46.50	

Total length: 1,643.6 m

Table 2-2 Hydraulic Calculation Table of Uiyayama RGC (Distribution Facilities)

2.Uiyayama RGC		Population served: 3,600 Persons				Required Amount: 720 (m ³ /day)						
Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m ³ /s)	Nominal dia (mm)	Pipe inside dia (m)	Pipe Flow Rate: S (m ³ /sec)	Head Loss: Hp (m)	Dynamic Water Level (m)	Effective water head (m)	Note
	Elevated Tank		1,078.81						(L.W.L.)	1086.9	8.1	
1	Elevated Tank - R-1	20.0	1,078.82		0.00559	OD116	0.097	0.76	0.155	1086.8	7.9	
2	R-1 - R-5	30.0	1,078.73		0.00430	OD116	0.097	0.58	0.143	1086.6	7.9	
3	R-5 - PS-1	10.0	1,079.26	0.433	0.00043	OD32	0.028	0.69	0.273	1086.3	7.1	
4	R-5 - R-6	219.6	1,078.14		0.00387	OD116	0.097	0.53	0.861	1085.7	7.6	
5	R-6 - PS-2	12.2	1,078.03	0.433	0.00043	OD32	0.028	0.69	0.333	1085.4	7.4	
6	R-6 - R-7	76.2	1,077.75		0.00043	OD63	0.055	0.18	0.078	1085.7	7.9	
7	R-7 - PS-3	61.5	1,077.03	0.433	0.00043	OD32	0.028	0.69	1.680	1084.0	7.0	
8	R-6 - R-8	87.3	1,076.98		0.00215	OD116	0.097	0.29	0.115	1085.6	8.7	
9	R-8 - PS-4	11.4	1,077.08	0.433	0.00043	OD32	0.028	0.69	0.311	1085.3	8.2	
10	R-8 - R-9	151.3	1,079.34		0.00086	OD116	0.097	0.12	0.037	1085.6	6.3	
11	R-9 - PS-5	5.0	1,079.54	0.433	0.00043	OD40	0.035	0.44	0.046	1085.5	6.0	
12	R-8 - R-10	28.3	1,076.26		0.00215	OD63	0.055	0.89	0.566	1085.1	8.8	
13	R-10 - R-11	47.0	1,074.84		0.00043	OD63	0.055	0.18	0.048	1085.0	10.2	
14	R-11 - PS-6	58.4	1,073.03	0.433	0.00043	OD32	0.028	0.69	1.595	1083.4	10.4	
15	R-10 - R-12	55.0	1,075.07		0.00172	OD63	0.055	0.71	0.728	1084.3	9.3	
16	R-12 - PS-7	10.0	1,074.83	0.433	0.00043	OD32	0.028	0.69	0.273	1084.1	9.2	
17	R-13 - R-13	33.8	1,073.98		0.00129	OD63	0.055	0.54	0.263	1084.1	10.1	
18	R-13 - PS-8	85.0	1,072.48	0.433	0.00043	OD32	0.028	0.69	2.322	1081.8	9.3	
19	R-13 - R-14	24.4	1,070.89		0.00086	OD63	0.055	0.36	0.090	1084.0	13.1	
20	R-14 - PS-9	10.3	1,071.00	0.433	0.00043	OD32	0.028	0.69	0.281	1083.7	12.7	
21	R-14 - R-15	67.5	1,068.06		0.00043	OD63	0.055	0.18	0.069	1083.9	15.9	
22	R-15 - PS-10	10.3	1,068.40	0.433	0.00043	OD32	0.028	0.69	0.281	1083.6	15.2	
23	R-1 - R-16	159.7	1,077.55		0.00129	OD63	0.055	0.54	1.242	1085.5	8.0	
24	R-16 - PS-11	10.0	1,077.95	0.433	0.00043	OD32	0.028	0.69	0.273	1085.2	7.3	
25	R-16 - R-17	121.2	1,074.39		0.00086	OD63	0.055	0.36	0.445	1085.1	10.7	
26	R-17 - PS-12	12.7	1,074.69	0.433	0.00043	OD32	0.028	0.69	0.347	1084.7	10.0	
27	R-17 - PS-13	246.6	1,067.09	0.433	0.00043	OD32	0.028	0.69	6.736	1078.3	11.2	

Total length: 1,664.7 m

Table 3-1 Hydraulic Calculation Table of Awere RGC (Transmission Facilities)

1.Awere RGC		Population served: 1,700 Persons		Required Amount: 34.0 (m ³ /day)									
Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Pland Pumping Rate Qn (lit/min)	Pland Specific Yield Sc (lit/min/m)	Drawdown sw=Qn/Sc (m)	Drawdown after 6hrs (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-1	73.0	999.00	85.0	46.8	6.10	7.67	0.60	8.27	5.30	13.57	24.75	
2	BH-2	84.0	998.98	75.0	48.8	10.00	4.88	5.00	9.88	3.28	13.16	24.75	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m3)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Hight of E.T. (G.E.-Botom of E.T.) (m)	E.T. (G.E.-H.W.L. of E.T.) (m)	Friction Head Losse (Deepwell to E.T.) (m)	Friction Head Losse (D.W.L.-H.W.L.) (m)	Note
1	BH-1	R-1	104.1	0.055	998.98	30.0	1,005.7	1,003.3	4.1	7.0	0.319	22.00	
2	BH-2	R-1,2,3	234.4	0.055	998.98		1,005.7	1,003.3			0.777	22.00	

Total length: 338.5 m

Table 3-2 Hydraulic Calculation Table of Awere RGC (Distribution Facilities)

2.Awere RGC		Population served: 1,700 Persons		Required Amount: 34.0 (m ³ /day)								
Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m3/s)	Nominal dia (mm)	Pipe inside dia (m)	Pipe Flow Rate: S (m/sec)	Head Loss: Hp (m)	Dynamic Water Level(m)	Effective water head (m)	Note
1	Elevated Tank - R-1	80.2	997.78		0.00258	OD90	0.079	0.52	0.395	1003.3	4.3	
2	R-1 - R-2	98.1	996.03		0.00258	OD90	0.079	0.52	0.483	1002.4	6.4	
3	R-2 - R-3	45.1	995.93		0.00258	OD90	0.079	0.52	0.222	1002.2	6.3	
4	R-3 - R-4	43.7	995.09		0.00258	OD90	0.079	0.52	0.215	1002.0	6.9	
5	R-4 - PS-1	5.0	995.18	0.433	0.00043	OD32	0.028	0.69	0.137	1001.8	6.7	
6	R-4 - R-5	13.2	994.79		0.00215	OD90	0.079	0.44	0.046	1001.9	7.1	
7	R-5 - R-6	206.1	993.34		0.00215	OD90	0.079	0.44	0.724	1001.2	7.9	
8	R-6 - PS-2	12.0	993.50	0.433	0.00043	OD32	0.028	0.69	0.328	1000.9	7.4	
9	R-6 - R-7	142.4	990.01		0.00172	OD90	0.079	0.35	0.331	1000.9	10.9	
10	R-7 - PS-3	16.8	990.34	0.433	0.00043	OD32	0.028	0.69	0.459	1000.4	10.1	
11	R-7 - R-8	73.8	990.45		0.00129	OD63	0.055	0.54	0.574	1000.3	9.8	
12	R-8 - PS-4	10.8	990.67	0.433	0.00043	OD32	0.028	0.69	0.295	1000.0	9.3	
13	R-8 - R-9	80.4	991.22		0.00086	OD63	0.055	0.36	0.295	1000.0	8.8	
14	R-9 - PS-5	76.2	992.22	0.433	0.00043	OD40	0.035	0.44	0.707	999.3	7.1	
15	R-9 - R-10	103.8	990.65		0.00043	OD63	0.055	0.18	0.106	999.9	9.2	
16	R-10 - PS-6	10.4	991.44	0.433	0.00043	OD32	0.028	0.69	0.284	999.6	8.2	

Total length: 1,018.0 m

Table 4-1 Hydraulic Calculation Table of Adilang RGC (Transmission Facilities)
 Population served: 3,800 Persons Required Amount: 76.0 (m³/day)

Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Plant Pumping Rate On (lit/min)	Plant Specific Yield Sc (lit/min/m)	Drawdown sw=QuSc (m)	Drawdown after fibrs (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-3	70.0	1,118.44	50.0	500	6.13	8.16	3.50	11.66	17.00	28.66	41.25	
2	BH-4	60.0	1,112.60	80.0	800	7.68	10.42	0.50	10.92	17.01	27.93	41.25	
3	BH-1	91.0	1,115.66	20.0	200	1.53	13.07	4.00	17.07	15.54	32.61	44.00	
4	BH-2	70.0	1,115.44	40.0	400	1.70	23.53	4.36	27.89	19.41	Loss: (Deepwell) 60.50	60.50	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m ³)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Height of E.T. (G.E.-H.W.L. of E.T.) (m)	Height of E.T. (G.E.-H.W.L. of E.T.) (m)	Friction Head Loss (Deepwell to E.T.) (m)	Friction Head Loss (D.W.L.-H.W.L.) (m)	Note
1	BH-3	R-1,4,5,6	625.6	0.055	1,115.57		1,130.4	1,125.6			2.168	44.00	
2	BH-4	R-7,8,9,10,11	1290.5	0.079	1,115.57	60.0	1,130.4	1,125.6	9.8	15.1	1.872	49.00	
3	BH-1	-	76.2	0.055	1,115.57		1,130.4	1,125.6			0.048	49.00	
4	BH-2	R-1,4	537.2	0.055	1,115.57		1,130.4	1,125.6			1.232	64.00	
Total length: 2529.5 m													

Table 4-2 Hydraulic Calculation Table of Adilang RGC (Distribution Facilities)
 Population served: 3,800 Persons Required Amount: 76.0 (m³/day)

Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m ³ /s)	Nominal inside dia (mm)	Pipe Flow Rate: S (m/sec)	Head Loss: Hp (m)	Dynamic Water Level (m)	Effective water head (m)	Note
1	Elevated Tank - R-1-1	20.0	1,115.57			DD110	0.141	0.33	1125.6	10.0	
2	R-1-1 - PS-1	15.9	1,115.57	0.433	0.0043	OD32	0.028	0.69	1125.2	9.6	
3	R-1-1 - R-1-2	123.4	1,116.25			DD110	0.141	0.30	1125.4	9.2	
4	R-1-2 - R-7	196.0	1,115.07	0.433	0.00344	OD90	0.079	0.70	1123.8	8.7	
5	R-7 - PS-2	12.2	1,115.10			OD32	0.028	0.69	1123.5	8.4	
6	R-7 - R-8	239.4	1,113.68	0.433	0.00301	OD90	0.079	0.61	1122.2	8.5	
7	R-8 - PS-3	22.5	1,113.98			OD32	0.028	0.69	1121.6	7.6	
8	R-8 - R-9	156.7	1,113.50			OD90	0.079	0.35	1121.9	8.4	
9	R-9 - PS-4	19.0	1,113.20	0.433	0.00043	OD32	0.028	0.69	1121.3	8.1	
10	R-9 - R-10	122.6	1,113.25			OD90	0.079	0.26	1121.7	8.5	
11	R-10 - R-12	64.8	1,113.31			OD63	0.055	0.54	1121.2	7.9	
12	R-12 - PS-5	44.9	1,113.24	0.433	0.00043	OD32	0.028	0.69	1120.0	6.7	
13	R-12 - R-13	52.3	1,113.33			OD63	0.055	0.36	1121.0	7.7	
14	R-13 - PS-6	92.3	1,113.31	0.433	0.00043	OD40	0.035	0.44	1120.1	6.8	
15	R-13 - R-14	240.5	1,113.09			OD63	0.055	0.18	1120.8	7.7	
16	R-14 - PS-7	10.0	1,113.10	0.433	0.00043	OD32	0.028	0.69	1120.5	7.4	
17	R-8 - R-15	111.7	1,113.20			OD63	0.055	0.36	1121.8	8.6	
18	R-15 - R-16	129.1	1,114.17			OD63	0.055	0.18	1121.7	7.5	
19	R-16 - PS-8	15.0	1,114.20	0.433	0.00043	OD32	0.028	0.69	1121.3	7.1	
20	R-15 - R-17	123.2	1,112.88			OD63	0.055	0.18	1121.6	8.7	
21	R-17 - PS-9	16.8	1,113.55	0.433	0.00043	OD32	0.028	0.69	1121.1	7.6	
22	R-12 - R-2	38.1	1,116.34			DD110	0.097	0.18	1125.4	9.1	
23	R-2 - PS-10	10.0	1,116.54	0.433	0.00043	OD32	0.028	0.69	1125.1	8.6	
24	R-2 - R-3	143.2	1,117.97			DD110	0.097	0.12	1125.4	7.4	
25	R-3 - PS-11	10.0	1,117.55	0.433	0.00043	OD32	0.028	0.69	1125.1	7.6	
26	R-3 - R-4	51.7	1,118.50			DD110	0.097	0.06	1125.4	6.9	
27	R-4 - R-5	118.3	1,119.03			DD110	0.097	0.06	1125.4	6.3	
28	R-5 - PS-12	16.1	1,119.24	0.433	0.00043	OD32	0.035	0.44	1125.2	6.0	
Total length: 2,211.7 m											

Table 5-1 Hydraulic Calculation Table of Kitgum Matidi RGC (Transmission Facilities)

1.Kitgum Matidi RGC		Population served: 2,800 Persons		Required Amount: 56.0 (m ³ /day)									
Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Pland Pumping Rate Qn (lit/min)	Plannd Specific Yield Sc (lit/min/m)	Drawdown sw=Qn/Sc (m)	Drawdown after 6hrs (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-2	48.0	992.08	150.0	90.0	69.00	1.30	0.31	1.61	25.92	27.53	38.50	
2	BH-1	91.0	994.82	80.0	72.0	6.50	11.08	5.00	16.08	29.40	45.48	57.75	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m ³)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Hight of E.T. (G.E.-Botom of E.T.) (m)	Hight of E.T. (G.E.-H.W.L. of E.T.) (m)	Friction Head Losse (D.W.L.-H.W.L.) (m)	Friction Head	Note
1	BH-2	R-1,2,3	927.7	0.079	1,007.41	50.0	1,021.0	1,017.0	9.4	13.9	1.673	60.00	
2	BH-1	R-1,2,4	784.8	0.079	1,007.41		1,021.0	1,017.0			0.937	75.00	

Total length: 1712.5 m

Table 5-2 Hydraulic Calculation Table of Kitgum Matidi RGC (Distribution Facilities)

2.Kitgum Matidi RGC		Population served: 2,800 Persons		Required Amount: 56.0 (m ³ /day)								
Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m ³ /s)	Nomin al dia (mm)	Pipe inside dia (m)	Pipe Flow Rate: S (m/sec)	Head Loss: Hp (m)	Dynamic Water Level(m)	Effective water head (m)	Note
1	Elevated Tank - R-1	30.0	1,007.41		0.00516	OD110	0.097	0.70	0.200	1017.0	9.6	
2	R-1 - R-2	23.8	1,007.19		0.00387	OD110	0.097	0.53	0.093	1016.8	9.4	
3	R-2 - PS-1	14.0	1,007.46	0.433	0.00043	OD32	0.028	0.69	0.382	1016.7	9.5	
4	R-2 - R-3	129.6	1,005.13		0.00344	OD90	0.079	0.70	1.086	1016.3	8.9	
5	R-3 - R-10	23.3	1,005.16		0.00215	OD63	0.055	0.89	0.466	1015.6	10.5	
6	R-10 - PS-2	10.8	1,005.26	0.433	0.00043	OD32	0.028	0.69	0.295	1015.2	10.0	
7	R-10 - R-11	130.6	1,004.62		0.00043	OD32	0.028	0.69	3.567	1014.9	9.6	
8	R-11 - PS-3	10.8	1,004.67	0.433	0.00043	OD32	0.028	0.69	0.295	1011.6	7.0	
9	R-10 - R-12	157.5	1,002.03		0.00129	OD63	0.055	0.54	1.225	1011.3	6.6	
10	R-12 - R-13	93.2	1,001.73		0.00043	OD32	0.028	0.69	2.546	1013.9	11.9	
11	R-13 - PS-4	6.4	1,001.90	0.433	0.00043	OD32	0.028	0.69	0.175	1011.4	9.7	

12	R-12	-	R-14	83.2	999.57		0.00086	OD63	0.055	0.36	0.306	1013.6	14.1
13	R-14	-	PS-5	10.0	999.70	0.433	0.00043	OD32	0.028	0.69	0.273	1013.4	13.7
14	R-14	-	R-15	123.6	999.19		0.00043	OD63	0.055	0.18	0.126	1013.5	14.3
15	R-15	-	R-16	37.1	998.49		0.00043	OD50	0.044	0.28	0.116	1013.4	14.9
16	R-16	-	PS-6	10.0	998.67	0.433	0.00043	OD32	0.028	0.69	0.273	1013.1	14.4
17	R-3	-	R-4	143.1	1,002.57		0.00129	OD63	0.055	0.54	1.113	1014.5	12.0
18	R-4	-	PS-7	11.0	1,002.65	0.433	0.00043	OD32	0.028	0.69	0.300	1014.2	11.6
19	R-4	-	R-5	63.3	1,001.14		0.00086	OD63	0.055	0.36	0.233	1014.3	13.1
20	R-5	-	PS-8	10.0	1,001.22	0.433	0.00043	OD32	0.028	0.69	0.273	1014.0	12.8
21	R-5	-	R-6	80.8	997.79		0.00043	OD63	0.055	0.18	0.082	1014.2	16.4
22	R-6	-	R-7	79.4	997.63		0.00043	OD63	0.055	0.18	0.081	1014.1	16.5
23	R-7	-	PS-9	10.2	997.78	0.433	0.00043	OD32	0.028	0.69	0.279	1013.8	16.1
24	R-1	-	R-17	166.6	1,010.25		0.00129	OD110	0.097	0.18	0.086	1016.7	6.5
25	R-17	-	PS-10	16.2	1,010.34	0.433	0.00043	OD40	0.035	0.44	0.150	1016.6	6.2
26	R-17	-	R-18	146.6	1,010.08		0.00043	OD63	0.055	0.18	0.149	1016.6	6.5
27	R-18	-	PS-11	17.3	1,010.08	0.433	0.00043	OD32	0.028	0.69	0.473	1016.1	6.0
28	R-17	-	R-19	255.4	1,008.74		0.00043	OD63	0.055	0.18	0.260	1016.5	7.7
29	R-19	-	R-20	384.0	1,007.75		0.00043	OD63	0.055	0.18	0.391	1016.1	8.3
30	R-20	-	PS-12	84.5	1,009.19	0.433	0.00043	OD40	0.035	0.44	0.784	1015.3	6.1

Total length: 2,362.3 m

Table 6-1 Hydraulic Calculation Table of Corner Kilak RGC (Transmission Facilities)

1. Corner Kilak RGC		Population served:		2,000 Persons		Required Amount:		40.0 (m ³ /day)					
Item	BH No.	Borehole Depth (m)	Borehole G.Elevation (m)	Maximum Safe Yield (lit/min)	Pland Pumping Rate Qn (lit/min)	Pland Specific Yield Sc (lit/min/m)	Drawdown sw=Qn/Sc (m)	Drawdown after 6hrs (m)	Total Drawdown (m)	Static W.L. (G.E.-m)	Dynamic W.L. (G.E.-m)	Installation Depth of Pump (G.E.-m)	Note
1	BH-2	70.0	1,058.94	60.0	48.0	2.40	20.00	2.40	22.40	2.39	24.79	35.75	
2	BH-3	49.7	1,057.01	30.0	21.0	0.95	22.11	1.32	23.43	2.26	25.69	38.50	
3	BH-1	91.0	1,062.24	25.0	20.0	1.39	14.39	0.48	14.87	4.73	19.60	30.25	
Item	BH No.	Route of Pipeline	Distance (m)	Transmission Pipeline Inside dia (m)	G.Elevation Elevated Tank (m)	Capacity of Elevated Tank (m ³)	H.W.L. of E.T. (m)	L.W.L. of E.T. (m)	Hight of E.T. (G.E.-Botom of E.T.) (m)	Hight of E.T. (G.E.- Losse Deepwell to E.T.) (m)	Friction Head Losse (Friction Head Losse+Friction Head Losse Deepwell to E.T.) (m)	Friction Head Losse (D.W.L.-H.W.L.) (m)	Note
1	BH-2	R-1,2,4,5	332.9	0.000	1,061.85	0.0	1,067.8	1,068.3	6.2	9.1	38.90	38.90	
2	BH-3	R-1,2,4,6,10	738.8	0.000	1,061.85		1,067.8	1,068.3			0.514	42.00	
3	BH-1	R-1,2,3	212.2	0.000	1,061.85		1,067.8	1,068.3			0.135	30.00	
Total length:				1283.9 m									

Table 6-2 Hydraulic Calculation Table of Corner Kilak RGC (Distribution Facilities)

2. Corner Kilak RGC		Population served:		2,000 Persons		Required Amount:		40.0 (m ³ /day)				
Route of Pipeline	Section	Length of Pipeline (m)	Ground Elevation (m)	Flow (lit/s)	Cumulative Flow (m ³ /s)	Nominal dia (mm)	Pipe inside dia (m)	Pipe Flow Rate: S (m/sec)	Head Loss: Hp (m)	Dynamic Water Level (m)	Effective water head (m)	Note
1	Elevated Tank - R-1	22.5	1,061.18	2.433	0.00301	OD110	0.097	0.41	0.055	1068.2	6.4	
2	R-1 - R-2	34.9	1,061.58	0.433	0.00301	OD110	0.097	0.41	0.086	1068.1	7.0	
3	R-2 - PS-1	10.0	1,061.85	0.433	0.00043	OD32	0.028	0.69	0.273	1067.8	6.5	
4	R-2 - R-4	44.4	1,062.30	0.433	0.00215	OD110	0.097	0.29	0.059	1068.1	6.0	
5	R-4 - PS-2	171.7	1,059.53	0.433	0.00043	OD50	0.044	0.28	0.537	1067.5	5.8	
6	R-4 - R-6	100.1	1,062.56	0.433	0.00172	OD110	0.097	0.23	0.088	1068.0	8.0	
7	R-6 - R-7	88.5	1,061.75	0.433	0.00086	OD90	0.079	0.17	0.057	1067.9	5.4	
8	R-7 - PS-3	11.7	1,061.85	0.433	0.00043	OD50	0.044	0.28	0.037	1067.9	6.2	
9	R-7 - R-8	105.3	1,061.61	0.433	0.00043	OD63	0.055	0.18	0.107	1067.8	6.0	
10	R-8 - R-4	155.6	1,060.70	0.433	0.00043	OD50	0.044	0.28	0.487	1067.3	6.6	
11	R-6 - R-9	145.2	1,060.41	0.433	0.00086	OD63	0.055	0.36	0.533	1067.3	6.9	
12	R-9 - PS-5	10.0	1,060.51	0.433	0.00043	OD32	0.028	0.69	0.273	1067.0	6.5	
13	R-9 - R-10	181.4	1,059.08	0.433	0.00043	OD63	0.055	0.18	0.185	1067.1	8.0	
14	R-10 - R-11	88.4	1,058.93	0.433	0.00043	OD40	0.035	0.44	0.820	1066.3	7.3	
15	R-11 - PS-6	7.1	1,058.93	0.433	0.00043	OD32	0.028	0.69	0.194	1066.1	7.1	
15	R-1 - R-12	106.0	1,059.27	0.433	0.00043	OD63	0.055	0.18	0.108	1068.1	8.8	
16	R-12 - R-7	10.0	1,059.40	0.433	0.00043		0.028	0.69	0.273	1067.8	8.4	
Total length:		1,292.8 m										

Results of Social Condition Survey

1. Method and Kinds of Social Surveys

In case of 16 candidate RGCs, at first, the Village Survey of 16 RGCs was conducted to know various conditions of each RGC, and select RGCs in which piped water supply facilities to be constructed. After that, the Household Survey in Selected 6 RGCs was conducted to know household conditions. In case of 294 candidate villages, firstly, the Rapid Village Survey of 294 Villages was conducted to select villages in which boreholes with handpumps to be constructed. Secondary, the Supplementary Village Survey of Selected 152 Villages and the Household Survey in Selected 152 Villages were conducted to know detail condition of these villages.

Methods of Surveys and the Content

	Kinds of Surveys	Survey Methods	Survey Object
Survey A	Village Survey of 16 RGCs	Questionnaire	Requested 16 RGCs (Piped water supply facilities)
Survey B	Rapid Village Survey of 294 Villages	Questionnaire	Requested 294 Villages (Borehole with handpump)
Survey C	Household Survey in Selected 6 RGCs	Questionnaire	5 household in each RGC (Selected 6 RGCs)
Survey D	Supplementary Village Survey of Selected 152 Villages	Questionnaire	Selected 152 Villages
Survey E	Household Survey in Selected 152 Villages	Questionnaire	4 households in each village (Selected 152 villages)

2. Results of Social Surveys

A. The Village Survey of 16 RGCs

■ Population and Household

General			A. Population and Households									
			A1 Population in the village within the RGC (includes returned IDPs)			A2 Population in the village related to the RGC (includes returned IDPs)			A3 Household in the RGC		A4 Population of IDP	
RGC No.	RGC No.	District	Total	Male	Female	Total	Male	Female	Total	Av. HH size	Settled IDP	IDP in future
1	Pabbo Trading Centre	Amuru	8,211	3,697	4,514	7,140	3,824	3,316	1,642	5	6,300	630
2	Elegu	Amuru	2,100	1,180	980	13,405	6,902	6,503	482	6	1,042	740
3	Kochi Goma	Nwoya	3,600	1,450	2,150	9,300	4,900	5,400	1,780	5	12,900	1,292
4	Alero	Nwoya	4,895	2,249	2,646	2,417	1,533	884	1,701	4	6,417	1,240
5	Awach	Gulu	1,052	979	823	5,598	2,782	2,816	831	4	3,354	350
6	Unyama	Gulu	3,856	2,057	1,799	5,767	2,484	3,283	1,382	3	3,577	500
7	Bobu	Gulu	5,000	2,300	2,800	5,707	2,450	3,257	1,200	6	5,300	1,000
8	Awere	Gulu	2,030	821	1,209	24,800	10,814	14,120	385	5	2,030	240
9	Lira Palwo	Agago	540	210	330	178	74	104	200	4	60	30
10	Adilang	Agago	3,015	1,087	1,928	629	225	404	338	6	75	43
11	Olebi	Lamwo	1,685	819	866	547	212	335	725	7	40	20
12	Agoro	Lamwo	764	332	432	312	134	178	296	6	78	18
13	Omiya-Anyima	Kitgum	721	300	421	431	197	234	145	8	80	35
14	Kitgum Matidi	Kitgum	3,000	700	2,300	930	378	522	489	6	20	15
15	Corner Kilak	Pader	1,224	600	624	286	126	100	235	6	40	20
16	Pajule	Pader	1,451	681	770	309	130	179	342	6	120	20

■ Distribution of Hospitals, Clinics, Dispensaries and Drug Shops

RGC No.	RGC	District	Hospitals	Clinics	Dispensaries	Health Centres	Drug shops	Other
1	Pabbo Trading Centre	Amuru	None	None	None	3	8	
2	Elegu	Amuru	None	None	None	None	None	
3	Koch Goma	Nwoya	None	None	None	1	5	
4	Alero	Nwoya	None	None	None	1	4	
5	Awach	Gulu	None	None	None	1	3	Traditional healer and herbalist
6	Unyama	Gulu	None	1	None	1	5	Karin Medical Centre
7	Bobi	Gulu	None	None	None	1	5	
8	Awere	Gulu	None	None	None	1	3	
9	Lira Palwo	Agago	None	None	None	1	6	
10	Adilang	Agago	None	None	None	1	7	
11	Olebi	Lamwo	None	None	None	1	4	
12	Agoro	Lamwo	None	None	None	1	5	
13	Omiya-Anyima	Kitgum	None	None	None	1	7	
14	Kitgum Matidi	Kitgum	None	None	None	1	4	
15	Corner Kilak	Pader	None	None	None	1	4	
16	Pajule	Pader	None	None	None	1	11	

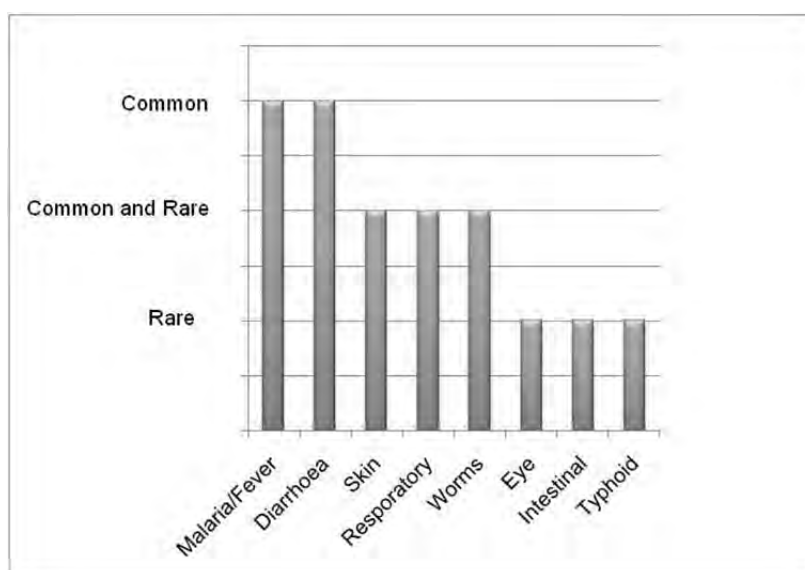
■ Types of Household Latrine in use

RGC No.	RGC	District	Ordinary P.T (%)	Improved Traditional P.T (%)	Eco San (%)	4. Others (Specify)	Latrine Coverage rate in the RGC (%)
1	Pabbo Trading Centre	Amuru	50	30	5	None	85
2	Elegu	Amuru	20	0	0	Bush	20
3	Koch Goma	Nwoya	70	28	0	Sharing	90
4	Alero	Nwoya	70	10	0	Sharing	80
5	Awach	Gulu	60	15	0	None	75
6	Unyama	Gulu	60	20	5	None	85
7	Bobi	Gulu	80	10	0	None	90
8	Awere	Gulu	40	10	0	Bush	38
9	Lira Palwo	Agago	80	0	0	None	90
10	Adilang	Agago	80	0	0	None	80
11	Olebi	Lamwo	92	0	0	None	92
12	Agoro	Lamwo	64	0	0	None	62
13	Omiya-Anyima	Kitgum	80	4	0	None	68
14	Kitgum Matidi	Kitgum	90	10	0	None	61
15	Corner Kilak	Pader	16	0	0	None	16
16	Pajule	Pader	30	45	0	None	75

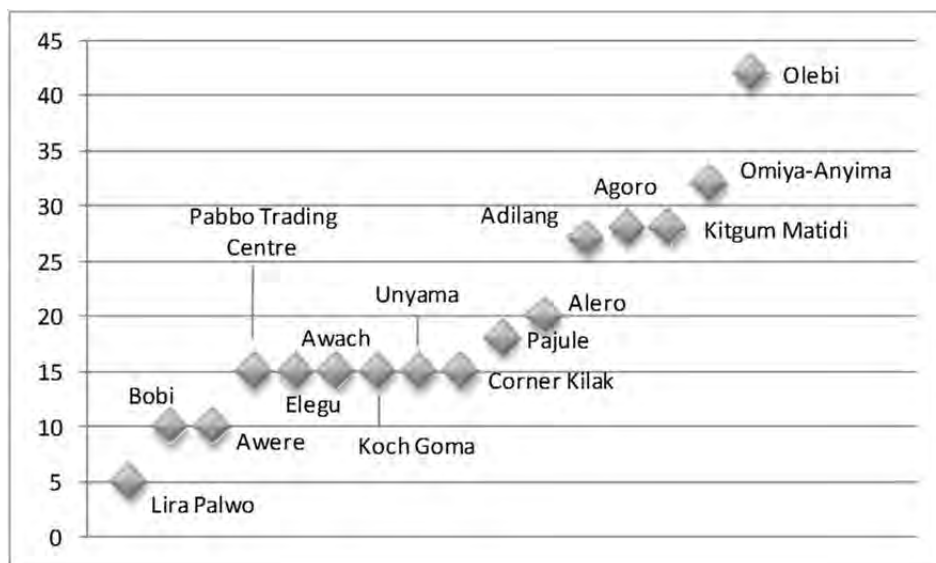
■ Latrine Coverage, Cleaning and Constraints against Latrine Construction

RGC No.	RGC	District	Latrine Coverage Rate in the RGC (%)	Methods of Latrine Cleaning	Constraints against Latrine Construction and Usage
15	Comer Kilak	Pader	16	Sweeping	Laziness and negligence. Lack of construction materials
2	Elegu	Amuru	20	No proper means. The existing ones are dirty	Lack of money to buy building materials
8	Awere	Gulu	38	Use slaps, wash, clean (sweep), apply ash to avoid flies.	Lack of digging materials (such as Matox, Spades, Hoes etc)
14	Kitgum Matidi	Kitgum	61	Washing and sweeping	Lack of funds
12	Agoro	Lamwo	62	Sweeping	Lack of construction materials. Rocks prevent digging
13	Omiya-Anyima	Kitgum	68	Sweeping & sometimes burning/smoking to reduce flies	Lack of building materials
5	Awach	Gulu	75	Apply ash to avoid flies	Unknown
16	Pajule	Pader	75	Washing and sweeping	Land issues; land tenure. Lack of digging Materials
4	Alero	Nwoya	80	Use ash and charcoal to reduce bad odour	Lack of building materials
10	Adilang	Agago	80	Sweeping	Lack slabs. Digging pits is difficult due to hard rock formations
1	Pabbo Trading Centre	Amuru	85	Washing	Inability to acquire materials such as Slabs, Cement, and Burnt Bricks
6	Unyama	Gulu	85	Washing and use of detergents	Lack of money for durable materials
3	Koch Goma	Nwoya	90	Washing	Lack materials to construct durable latrines
7	Bobo	Gulu	90	Apply ash to avoid flies	Expensive construction materials
9	Lira Palwo	Agago	90	Sweeping	Poor soil structure and lack of construction materials
11	Olebi	Lamwo	92	Sweeping	Lack of tools

■ Occurrence of Water Borne Diseases in the RGCs



■ Infant Mortality Rate (Number/1000) in the RGCs



■ Organizations and Activity for Water Supply

RGC No.	RGC	Organization	Existence	Organized year	Lasted year	Activity
1	Pabbo Trading Centre	WSC		2001	7	Cleaning water points
2	Elegu		Never Existed			No activity
3	Koch Goma	WSC		2004	4	Coordination and keeping clean the water points
4	Alero		Never Existed			No activity
5	Awach	Private Sector	Existing	2002		Maintaining the private water source and equipment
6	Unyama		Never Existed			No activity
7	Bobi	WSC		2006	2	Cleaning the water sources
8	Awere	WSC	Existing	2004	6	Train pump mechanics, mobilisation of Fuel.
9	Lira Palwo	WSC	Existing	2008		Water bill collection, maintaining cleanlines
10	Adilang	WSC	Existing	2008		Not active
11	Olebi	WSC	Existing	2003		Clean the water sources
12	Agoro		Never Existed			No activity
13	Omiya-Anyima		Never Existed			No activity
14	Kitgum Matidi		Never Existed			No activity
15	Corner Kilak	WSC		2008	2	Protection and cleaning the water sources
16	Pajule	WSC	Existing			Mobilise and sensitise communities on water and sanitation

■ RGCs with Women's Organizations

RGC No.	RGC with Women's Organizations	Activities of Women's Group
3	Koch Goma	Bee Keeping
4	Alero	Voluntary Savings and Loans Association (VSLA)
5	Awach	Insufficient records and Knowledge by the respondent
6	Unyama	VSLA
8	Awere	Gender based advocacy

■ RGCs with Youth Groups

RGC No	RGC with Youth Group	Activities of Group	State
1	Pabbo Trading Centre	Foot Ball	Not Very Active
3	Koch Goma	AYA Drama on HIV/AIDS	Not Very Active
4	Alero	Farming	Not Very Active
6	Unyama	Youth United, Straight Talk	Not Active
8	Awere	HIV awareness	Active
16	Pajule	Sports activities	Active

■ Community Contribution for a new facility and Willingness to Pay for O&M

RGC No.	RGC	Contribution for New Water Facility	Availability of Material	Contribution of material for Water facility	Willingness to regularly pay for O&M	Price to pay per House Hold
1	Pabbo Trading Centre	Security	Sand, Gravel, Water	Sand, Gravel, Water	Yes	1,000
2	Elegu	Labour and Land	Sand, Gravel	Sand, Gravel	Don't Know	
3	Koch Goma	Land and money for maintainance	Sand, Gravel	Sand, Gravel	Yes	500
4	Alero		Sand, Gravel, Water	Sand, Gravel, Water	Don't Know	
5	Awach	Land and Labour	Sand, Gravel	Sand, Gravel	Yes	1,000
6	Unyama	Land and Labour	Sand, Gravel, Water	Sand, Gravel, Water, Bricks	Yes	
7	Bobu	land	Sand, Gravel, Water	Sand, Gravel, Water	No	
8	Awere	Labour	Sand, Gravel, Water		Don't Know	
9	Lira Palwo	Land	Sand, Water	Water	Yes	1,000
10	Adilang	Materials	Water	Water	Yes	200
11	Olebi	Land	Sand, Water	Bricks	Yes	1,000
12	Agoro	Labour	Sand, Water	Bricks	Yes	1,000
13	Omiya-Anyima	Land and Labour	Water	Water, Labour	Yes	1,000
14	Kitgum Matidi	Land	Sand, Water	Sand, Water	Yes	1,000
15	Corner Kilak	Labour	Sand, Water	Water	Yes	1,000
16	Pajule	Land and Labour	Sand	Sand, Water	Yes	500

■ Source of income of Villages in 16 RGCs

	Source of Income	Frequency per category			
		Many	Some	Few	None
1	Selling Animals	0	5	9	1
2	Selling Agricultural Produce	8	5	3	0
3	Selling Labour	3	7	6	0
4	Forestry	0	4	3	8
5	Other	0	6	2	2

■ Average household income in 16 RGCs

No.	RGC	Average Monthly HH income	Average Annual HH income	Seasonal changes in Income	Reason for the Seasonality
1	Pabbo Trading Centre	45,000	540,000	Yes	Better income during harvest season
2	Elegu	85,000	1,020,000	Yes	
3	Koch Goma	100,000	1,000,000	Yes	
4	Alero	90,000	1,080,000	Yes	
5	Awach	70,000	840,000	Yes	
6	Unyama	100,000	1,200,000	Yes	
7	Bobi	80,000	960,000	Yes	
8	Awere	75,000	900,000	Yes	
9	Lira Palwo	20,000	240,000	Yes	
10	Adilang	15,000	180,000	Yes	
11	Olebi Trading Centre	50,000	1,000,000	Yes	
12	Agoro	40,000	480,000	No	Better income during harvest season
13	Omiya-Anyima	30,000	300,000	Yes	
14	Kitgum Matidi	40,000	480,000	Yes	
15	Corner Kilak	30,000	360,000	Yes	
16	Pajule	20,000	240,000	Yes	
Average overall		55,625	620,000		
Min		15,000	120,000		
Max		100,000	1,200,000		
Median		47,500	510,000		

■ Animals per household

Type of Livestock	Number per HH (average)
Cattle	1
Sheep	1
Goats	3
Total	5

■ Water consumption in RGCs (LPCPD)

RGC No.	RGC	Consumption LPCPD
1	Pabbo Trading Centre	11 -15
2	Elegu	6-10
3	Koch Goma	16-20
4	Alero	6-10
5	Awach	11-15
6	Unyama	6-10
7	Bobi	5 or less
8	Awere	5 or less
9	Lira Paluo	5 or less
10	Adilang	5 or less
11	Olebi Trading Centre	5 or less
12	Agoro	5 or less

RGC No.	RGC	Consumption LPCPD
13	Omiya-Anyima	5 or less
14	Kitgum Matidi	5 or less
15	Corner Kilak	5 or less
16	Pajule	5 or less

■ Schools and commercial facilities

(Sorted on the basis of the number of students – more to less)

	RGC	Institutions			Pupils/students			Restaurants
		Day	Board-ing	Total	Day	Board-ing	Total	
1	Pabbo TC	7	0	7	4,950	0	4,950	4
3	Koch Goma	3	0	3	3,260	0	3,260	12
10	Adilang	2	0	2	2,446	0	2,446	3
5	Awach	3	0	3	2,363	0	2,363	2
14	Kitgum Matidi	4	0	4	2,322	0	2,322	9
7	Bobi	2	2	4	1,500	602	2,102	4
9	Lira Paluo	2	2	4	1,300	600	1,900	7
8	Awere	3	2	5	1,369	0	1,369	2
6	Unyama	0	1	1	0	1200	1,200	5
4	Alero	2	0	2	1,104	0	1,104	2
13	Omiya-Anyima	1	0	1	1,021	0	1,021	10
15	Corner Kilak	1	0	1	928	0	928	5
11	Olebi TC	4	0	4	830	0	830	8
12	Agoro	1	0	1	800	0	800	8
2	Elego	0	0	0	-	0	-	3
16	Pajule	0	0	0	-	0	-	10

■ Accessibility to the RGCs

No.	RGC	Road Access		Public Transport	Frequency of Bus per day
		Dry Season	Wet Season		
1	Pabbo Trading Centre	Good	Good	Daily	Once
2	Elegu	Good	Good	Daily	Twice
3	Koch Goma	Not so good	Not so good	Daily	Once
4	Alero	Not so good	Not so good	Daily	Twice
5	Awach	Good	Not so good	No regular service	No regular service
6	Unyama	Good	Good	Daily	Twice
7	Bobi	Good	Not so good	Daily	Three times
8	Awere	Good	Not so good	Daily	Twice
9	Lira Paluo	Good	Good	Daily	Once
10	Adilang	Good	Good	Daily	Once
11	Olebi Trading Centre	Good	Good	Daily	Three times
12	Agoro	Good	Good	No regular service	No regular service
13	Omiya-Anyima	Good	Good	Daily	Three times
14	Kitgum Matidi	Good	Good	Daily	Once

No.	RGC	Road Access		Public Transport	Frequency of Bus per day
		Dry Season	Wet Season		
15	Corner Kilak	Good	Good	Daily	Once
16	Pajule	Good	Good	Daily	Three times

B. The Rapid Village Survey of 294 Villages

■ Population of Villages in Amuru District

No.	Village	Village No.	District	Total Population
1	Reckiceke	32	Amuru	11,802
2	Lamolo Coke	33	Amuru	11,700
3	Olinga	12	Amuru	11,012
4	Opok	19	Amuru	10,430
5	Abyee	17	Amuru	9,800
6	Ogeli	31	Amuru	9,750
7	Mutema	30	Amuru	8,940
8	Odur	23	Amuru	8,515
9	Amoyokuma	27	Amuru	8,500
10	Paomo	9	Amuru	4,437
11	Kal centre	10	Amuru	3,897
12	Teddi	25	Amuru	3,766
13	Pukure	20	Amuru	3,246
14	Bibia East	1	Amuru	3,080
15	Andara	11	Amuru	3,080
16	Labongo	28	Amuru	2,464
17	Lujoro	29	Amuru	2,455
18	Kati Kati A	13	Amuru	2,320
19	Palukere East	5	Amuru	2,301
20	Pukumu	7	Amuru	1,827
21	Coorom	21	Amuru	1,550
22	Palukere West	35	Amuru	1,512
23	Ceri	15	Amuru	1,460
24	Abongo	26	Amuru	1,300
25	Okidi North	3	Amuru	1,280
26	Apa	34	Amuru	1,160
27	Kal east	2	Amuru	1,034
28	Amora	18	Amuru	1,010
29	otorokume	16	Amuru	792
30	Abera	14	Amuru	658
31	Pacilo East	4	Amuru	642
32	Pupwonya East	8	Amuru	536
33	Apotokito	24	Amuru	470
34	Amilobo	22	Amuru	267
35	Agoro	6	Amuru	170

■ Population of Villages in Nwoya District

No.	Village	Village No.	District	Total Population
1	Latekodong	40	Nwoya	9,820
2	Kal	48	Nwoya	8,100
3	Pawatomero East	68	Nwoya	8,000
4	Lulyango	43	Nwoya	5,986
5	Kalang	55	Nwoya	5,000
6	Pakiye	61	Nwoya	4,600
7	Agonga B	54	Nwoya	4,170
8	bungu	60	Nwoya	4,020
9	Bwobonam B	37	Nwoya	3,900
10	Kal B	59	Nwoya	3,855
11	Lakalac	56	Nwoya	3,540
12	Lapono	47	Nwoya	3,100
13	Bwobonam A	36	Nwoya	3,000
14	oyinya	42	Nwoya	2,892
15	Langol	39	Nwoya	2,883
16	Labyei	51	Nwoya	2,800
17	onyomtil	53	Nwoya	2,792
18	Pawatomero Central	67	Nwoya	2,619
19	Lalar	41	Nwoya	2,600
20	Paminolango	62	Nwoya	2,600
21	Patira West	66	Nwoya	2,600
22	Lapem	57	Nwoya	2,580
23	Akago (Obira)	46	Nwoya	2,500
24	Owak	49	Nwoya	2,500
25	Patira East	65	Nwoya	2,500
26	kweyo	45	Nwoya	2,210
27	Lodi	64	Nwoya	2,200
28	Belkec	63	Nwoya	2,100
29	Pajaa	50	Nwoya	2,050
30	Lagazi	70	Nwoya	1,900
31	Okii	52	Nwoya	1,884
32	Pawatomero West	69	Nwoya	1,867
33	Gotringo	38	Nwoya	1,747
34	Amuka	44	Nwoya	1,700
35	Goro	58	Nwoya	1,590

■ Population of Villages in Gulu District

Serial No.	Village	Village No.	District	Total Population
1	Gulu PTC	95	Gulu	5,000
2	Omel	90	Gulu	3,244
3	Cetkana	80	Gulu	2,662
4	Kati-Kati Lacor	87	Gulu	2,285
5	Mede Centre II	99	Gulu	2,079
6	Twonokun	79	Gulu	2,066
7	Adak	105	Gulu	2,000
8	Kiteny	100	Gulu	1,902
9	Acutomer	89	Gulu	1,764
10	Lukodi I	85	Gulu	1,736
11	Atupibokeber I	91	Gulu	1,700
12	Paromo I	73	Gulu	1,500
13	Paromo II	74	Gulu	1,500
14	Atupibokeber II	92	Gulu	1,400
15	Angany	103	Gulu	1,378
16	Agoro I	96	Gulu	1,268
17	Obiya	83	Gulu	1,215
18	Kiteny Central	101	Gulu	1,182
19	Paminmel	84	Gulu	1,082
20	Anyadwe	102	Gulu	890
21	Agung B	94	Gulu	800
22	Bwobo I	81	Gulu	679
23	Ajuku	93	Gulu	600
24	Mede Centre I	98	Gulu	595
25	Burcoro I	71	Gulu	560
26	Burcoro II	72	Gulu	560
27	Ayweri I	75	Gulu	480
28	Tugo	76	Gulu	480
29	Alamu	104	Gulu	476
30	Lagot Ki Col	86	Gulu	452
31	Kidiro	97	Gulu	431
32	Bwobo II	82	Gulu	351
33	Oguru-Lakuny II	78	Gulu	340
34	Lakwela	88	Gulu	300
35	Oguru-Lakuny I	77	Gulu	299

■ Population of Villages in Omoro District

No.	Village	Village No.	District	Total Population
1	Adak	110	(Omoro)	9,025
2	Along	107	(Omoro)	8,635
3	Ibar	108	(Omoro)	8,300
4	Acet Central	133	(Omoro)	4,350
5	Owak	136	(Omoro)	4,000
6	Bwobo tochi	137	(Omoro)	3,900
7	Lamin Lawino	138	(Omoro)	3,690
8	Arema	109	(Omoro)	3,000
9	Ariya	111	(Omoro)	3,000
10	Kal A and B	116	(Omoro)	2,506
11	Agangolaro	134	(Omoro)	2,443
12	Otal	123	(Omoro)	2,067
13	Atede	114	(Omoro)	2,018
14	Aparowiya I	126	(Omoro)	1,974
15	Labworomor	106	(Omoro)	1,939
16	Dika	139	(Omoro)	1,865
17	Alwii	124	(Omoro)	1,700
18	Aparowiya II	127	(Omoro)	1,550
19	Idure	130	(Omoro)	1,500
20	Awatlela	131	(Omoro)	1,473
21	Barolam (Corner Oja B,barolam dog odek)	135	(Omoro)	1,455
22	Abole	112	(Omoro)	1,391
23	Obwola	115	(Omoro)	1,360
24	Latinnyer	125	(Omoro)	1,360
25	Labuje	118	(Omoro)	1,309
26	Laminokure	132	(Omoro)	886
27	Adak	129	(Omoro)	834
28	Hima	120	(Omoro)	714
29	Abuga	140	(Omoro)	697
30	Abuturu I	121	(Omoro)	444
31	Wanglobo	128	(Omoro)	430
32	Abuturu II	122	(Omoro)	276
33	Abili	113	(Omoro)	270
34	Acutyeng	117	(Omoro)	169
35	Abura	119	(Omoro)	129

■ Population of Villages in Agago District

Serial No.	Village	Village No.	District	Total Population
1	Sub County HQ	144	Agago	1,800
2	Kotomor east	150	Agago	1,800
3	Amin Ogwal	151	Agago	800
4	Tori East	145	Agago	780
5	apano Central	155	Agago	760
6	Agweng	146	Agago	620
7	Langalagada	143	Agago	600
8	Owito	158	Agago	550
9	Oringo Ongom	152	Agago	515
10	Lutage	141	Agago	500
11	Te Vwao	153	Agago	500
12	Laming Onen	170	Agago	500
13	Opal Oryoneko	156	Agago	490
14	Okwang Central	168	Agago	480
15	opyel Central	154	Agago	478
16	Lapyem	148	Agago	470
17	Atanga	159	Agago	456
18	Wilo Pany	174	Agago	450
19	Alwee	147	Agago	420
20	Labedongony	178	Agago	420
21	Te Okiro	179	Agago	420
22	Lapirin	142	Agago	400
23	Apil West	160	Agago	400
24	Dong Agweng B	165	Agago	400
25	Wii Atup	167	Agago	400
26	Lakwa A	171	Agago	400
27	Loborom	177	Agago	400
28	Lela Kabala	173	Agago	372
29	Abalukwang	163	Agago	370
30	Acam Roma	172	Agago	370
31	Acan Dano	169	Agago	355
32	Gweno	157	Agago	350
33	Awelo	164	Agago	350
34	Aleb Tong	166	Agago	350
35	Tong Wiri South	176	Agago	289
36	Kapir	162	Agago	255
37	Olokitoo	149	Agago	250
38	Katongotut	161	Agago	240
39	Lapirin	175	Agago	

■ Population of Villages in Lamwo District

No.	Village	Village No.	District	Total Population
1	Kamama central H/C III	218	Lamwo	2,020
2	Ayuu-lipur(Barara)	209	Lamwo	962
3	Kafata (Mbuya Parent sch.)	216	Lamwo	905
4	Pawena central (Tee Kasia)	212	Lamwo	850
5	Dyangbii (Near lutara's home)	215	Lamwo	850
6	Padwat Central (Padwat P/S)	181	Lamwo	780
7	Lanywang E-walagiri	208	Lamwo	767
8	Pobutu	190	Lamwo	756
9	Amina (Nino mit)	214	Lamwo	730
10	Lagwel P/S	193	Lamwo	726
11	Tedo pe	205	Lamwo	718
12	Tumbafu West	195	Lamwo	680
13	Popany (Popany)	189	Lamwo	650
14	Arusha (Aloyi)	217	Lamwo	630
15	Langole (Keca)	202	Lamwo	618
16	Ajaa ogala (Alere)	210	Lamwo	611
17	Obere	196	Lamwo	610
18	Lobiluku (obokolot)	201	Lamwo	606
19	Dech East	185	Lamwo	590
20	Anaka South (Alwala)	211	Lamwo	556
21	Mudu East (Mal)	183	Lamwo	555
22	Lumwaka A	200	Lamwo	507
23	Kamama Central	192	Lamwo	500
24	Dog Lokutu East	186	Lamwo	499
25	Biber (Itiba)	203	Lamwo	486
26	Moroto East	199	Lamwo	473
27	Lorombenge B	197	Lamwo	451
28	Tadi South	187	Lamwo	419
29	Liri Central	207	Lamwo	412
30	Gem (Gem)	188	Lamwo	406
31	Apyeta Central	180	Lamwo	400
32	Padwat West (Laluru Oyika)	182	Lamwo	397
33	Lio-Tee okworo	184	Lamwo	373
34	Aguu P/S	204	Lamwo	365
35	Amica South	194	Lamwo	358
36	Guria North	206	Lamwo	340
37	Abera (Tee Ogali)	213	Lamwo	315
38	Mekmek	191	Lamwo	275
39	Tumanun A	198	Lamwo	189

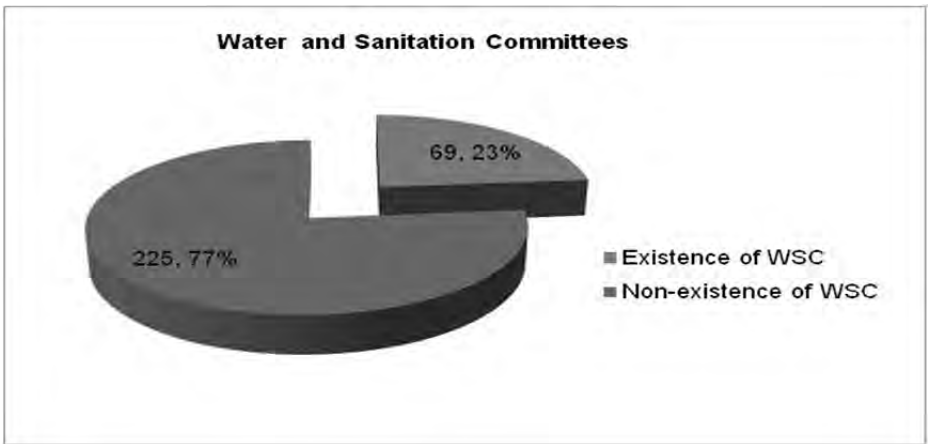
■ Population of Villages in Kitgum District

No.	Village	Village No.	District	Total Population
1	Pagen Central (Corner Padibe)	232	Kitgum	1,058
2	Pamolo central	233	Kitgum	1,037
3	Ocettokkee Trading centre	231	Kitgum	952
4	Lugwar central	219	Kitgum	775
5	Juba	240	Kitgum	726
6	Langii	225	Kitgum	717
7	Akino (Dem kulu kwach)	229	Kitgum	699
8	Tangi Agoro	222	Kitgum	670
9	Gulu gwen Orua .B.	230	Kitgum	657
10	Okidi central	221	Kitgum	656
11	Otoboi (security site)	252	Kitgum	645
12	Nyapea A	244	Kitgum	630
13	Degwac P/s	238	Kitgum	559
14	Pella wicere	248	Kitgum	556
15	Bol kol Central	224	Kitgum	538
16	Lokira S	220	Kitgum	483
17	Parwech Alango	223	Kitgum	483
18	Loluko (Tumatoo)	250	Kitgum	480
19	Agora	253	Kitgum	471
20	Panyum "A"	234	Kitgum	468
21	Labworomor	246	Kitgum	465
22	Winyorac-Pawiny	242	Kitgum	454
23	Rucurucu	228	Kitgum	415
24	Akilok south-kalor(security site	255	Kitgum	413
25	Daniel Comboni P/S	237	Kitgum	410
26	Jerusalem	226	Kitgum	402
27	Ladot onen central (P/S)	251	Kitgum	393
28	Lakokok	243	Kitgum	386
29	Lobale	249	Kitgum	360
30	Lokom (P/S)	254	Kitgum	355
31	Lelapongor	245	Kitgum	348
32	Obwore west	247	Kitgum	337
33	Yepa A	239	Kitgum	324
34	Ayom Olola "B"	235	Kitgum	320
35	Apeca	227	Kitgum	309
36	Lagot B	236	Kitgum	308
37	Lacen Otinga West	241	Kitgum	258

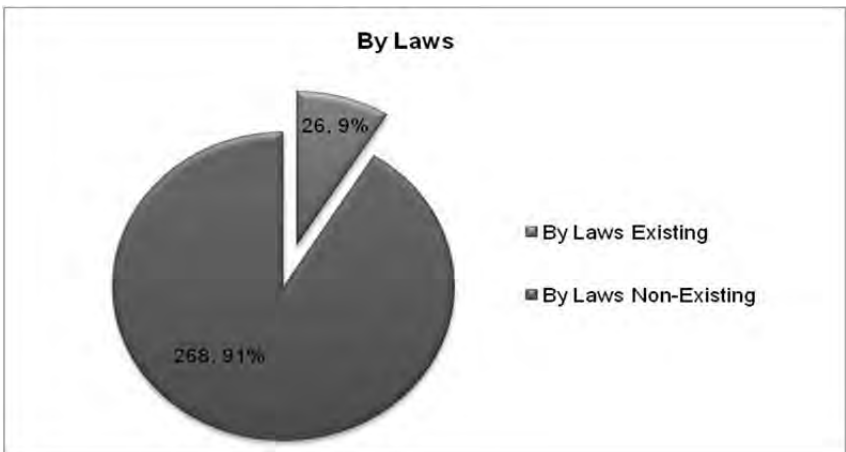
■ Population of Villages in Pader District

No.	Village	Village No.	District	Total Population
1	Atup	270	Pader	978
2	Panyakawa	265	Pader	832
3	Tungtwon	274	Pader	796
4	Ongako	275	Pader	760
5	Adula West	280	Pader	732
6	Atede central	273	Pader	618
7	Telela west	291	Pader	616
8	Parwech Lukee east	271	Pader	602
9	Alilli	258	Pader	600
10	Te-okuto	260	Pader	569
11	Libii	269	Pader	559
12	Pagor	290	Pader	555
13	Aria	264	Pader	550
14	Obalo	287	Pader	540
15	Ongany Nangulu	294	Pader	535
16	Tee tworo	261	Pader	471
17	Dagolwato	289	Pader	439
18	Bolo laming	272	Pader	388
19	Lanyalwala	276	Pader	380
20	Ogan Gwok Roko	257	Pader	375
21	Lacek Onyele	262	Pader	368
22	Aringo yon	268	Pader	360
23	Alipan West	281	Pader	348
24	Apwor kla	263	Pader	344
25	Leebit	279	Pader	340
26	Dure north	286	Pader	340
27	Bangalela	282	Pader	329
28	Wiko	277	Pader	299
29	Nek-Nono	259	Pader	289
30	Lela awoki	285	Pader	280
31	Tetito	293	Pader	267
32	Lapoyaokwee	266	Pader	247
33	Wang Opok East	288	Pader	227
34	Keko Paadum	284	Pader	200
35	Bunga	283	Pader	187
36	Otinga	267	Pader	185
37	Lapeny	292	Pader	180
38	Lali	278	Pader	155
39	Lapa mac	256	Pader	138

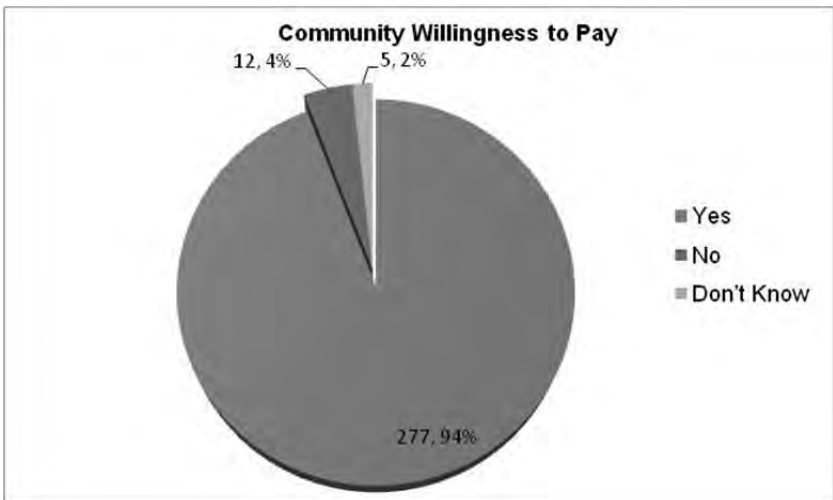
■ Organizations and Activities for Water Supply



■ Existence of By-laws



■ Community willingness to pay



- ✓ Contribution that the Villages willing to pay include the followings
 - + The villages which are willing to contribute Local Materials for Construction e.g. sand, gravel etc are 63.
 - + There are 57 Villages which are willing to contribute Labour and Land
 - + The villages which are willing to contribute Labour alone were 39
 - + The villages which are willing to contribute Land are 35
 - + The rest of the villages (46) expressed willingness to provide cash contribution, clearing the area, water point sources, paths, bushes and the like.

■ Villages with women Organizations who conduct Water related activities

Village	Village Number	Activity
Padwat West (Lalum)	182	Cash box
Bungu	60	Cleaning
Pawatomero West	69	Cleaning and washing
Akago	46	Cleaning around the borehole
Adula West	280	Cleaning Water Area
Kafata (Mbuya Parent sch.)	216	Cleaning Water point
Bwobonam B	37	Cleaning Water Source
Pawatomero Central	67	Cleaning Water Source
Pawatomero East	68	Cleaning Water Source
Okid North	3	Cleaning water sources
Lujoro	29	Contribute money for repair
Pajaa	50	Digging Roads
Onyomtil	53	Digging Routes
Abole	112	Drilling Water
Belkec	63	Fund collection
Amica South	194	Keeping the water point
Tumbafu West	195	Maintenance Water Hygiene and Sanitation
Bwobonam A	36	Mobilisation
Gotringo	38	Mobilisation
Patira West	66	Mobilisation, Collection of water fees
Lulyango	43	Mobilization
Latekodong	40	Opening channels
Ajaa Ogala (Alere)	210	Overseeing water source
Lanyalwala	276	Practicing Hygiene
Abongo	26	Sanitation
Kal B	59	Slashing
Pakiye	61	Slashing
Lalar	41	Slashing around water sources
Langol	39	Slashing around water sources
Lodi	64	Slashing Water Sources

■ Villages with Youth organizations who conduct water related activities

Village	Village Number	Activity
Tumbafu West	195	Cleaning Bushy Area
Akago	46	Cleaning Roads
Owak	49	Cleanliness Committee
Ajaa ogala (Alere)	210	Clearing Water Point
Amica South	194	Clearing Water point
Arema	109	Clearing Water Sources
Padwat Central (Padwat P/S)	181	Clearing Water Sources
Kal B	59	Fencing
Paminolango	62	Fencing boreholes
Kafata (Mbuya Parent sch.)	216	Fencing the area
Belkec	63	Making slabs
Lulyango	43	Opening water to water source
Lapem	57	Protection
Bungu	60	Slashing
Lapono	47	Slashing
Pawatomero East	68	Slashing
Patira East	65	Slashing, Road Clearing
Labyei	51	Well digging

■ Villages with Other Organizations who conduct Water related activities

Villages	Village Number	Activity
Cetkana	80	Borehole maintenance
Mede Centre I	98	Borehole maintenance
Anyadwe	102	Borehole maintenance
Abili	113	Borehole maintenance
Ayuu-lupur(Barara)	209	Cash Box Saving
Parwech Lukee East	271	Collecting Water Fees
Labuje	118	Drilling Borehole
Pawena central (Tee Kasia)	212	Helping hand regarding water
Tetito	293	Hygiene Promotion
Kafata (Mbuya Parent sch.)	216	Keeping water safe
Abura	119	Providing Sanitation Tools
Acutyeng	117	Provision of Cement
Atede Central	273	Repairing of Borehole
Abera (Tee Ogali)	213	Water Maintenance

■ Villages with Community Collective activities which are Water related (1)

Village	Village Number	Activity
Cetkana	80	Borehole maintenance
Patira East	65	Borehole maintenance
Lio-Tee okworo	184	Cleaning the water area
Lutage	141	Cleaning the water point
Akwang Central	168	Cleaning Water Sources
Atanga	159	Cleaning Water sources
Wii Atup	167	Cleaning Water Sources
Pajaa	50	Cleaning water spring/well
Akago	46	Clearing roads
Dech East	185	Clearing the Bush around the water source
Dog Lokutu East	186	Clearing the Bush around the water source
Popany (Popany)	189	Clearing the Bush around the water source
Tadi South	187	Clearing the Bush around the water source
Dure North	286	Clearing the paths to the water source
Biber (Itiba)	203	Clearing the road to the water source
Lobiluku (Obokolot)	201	Clearing the road to the water source
Loromibengo B	197	Clearing the road to the water source
Lumwaka A	200	Clearing the road to the water source
Moroto East	199	Clearing the road to the water source
Lagwel P/S	193	Clearing the road/path leading to the water source
Abalukwang	163	Clearing water point
Olokitoo	149	Clearing water Point Areas
Langole (Keca)	202	Collecting money
Alwee	147	Collecting water fees
Lapyem	148	Collecting water fees
Sub-County HQ	144	Collecting Water fees
Gweno	157	Collecting Water Fees
Langalagada	143	Communal Grazing
Coorom	21	Communal water cleaning
Parwech Lukwee East	271	Constructing a soak pick at the borehole area
Lanyweng Walagiri	208	Contributing money
Tumbafu West	195	Contributing money for maintenance
Arusha (Aloyi)	217	Contributing some money
Amin Ogwal	151	Digging Sock pits
Lela Kabala	173	Digging Sock pits
Tong Wiri South	176	Digging Sock Pits
Wilo Pany	174	Digging Sock Pits
Aleb tong	166	Digging Water Channels
Kati Kati A	13	Educating people on how to keep water sources clean

■ Villages with Community Collective activities which are Water related (2)

Village	Village Number	Activity
Goro	58	Fencing
Atede Central	273	Fencing off the borehole
Kamama Central	192	Fencing off the water area
Atup	270	Fencing off the water area to prevent animals from using it
Labeledongony	178	Fencing off the Water Source
Leebit	279	Fencing off the water source
Telela West	291	Fencing off the water source
Apyeta Central	180	Fencing The areas within the water point
Apwor Kla	263	Fencing the water area
Aguu P/S	204	Fencing the water source
Guria North	206	Fencing the water source
Obere	196	Fencing the water source
Kotomor East	150	Fencing water points
Opal Oryoneko	156	Fencing Water points
Te Vwao	153	Fencing Water Points
Apil West	160	Group farming
Agoro I	96	Hand dug well
Kidiro	97	Hand dug well
Lamin Lawino	138	Keeping water areas clean
Amina (Nino mit)	214	Maintaining the water facilities
Amica South	194	Maintaining water point
Acutyeng	117	Maintenance of Water Sanitation
Abura	119	Maintenance of Water Source
Anaka South (Alwala)	211	Making sure proper hygiene is kept
Loborom	177	Monthly Subscription
Padwat Central (Padwat P/S)	181	Practicing Hygiene
Ayuu-Iupur(Barara)	209	Practicing water hygiene and sanitation
Ajaa ogala (Alere)	210	Practicing water safety methods
Paminmel	84	Protected spring
Abera (Tee Ogali)	213	Providing labour force
Kamama Central H/Q	192	Providing Labour Force
Mudu East (Mal)	183	Providing Security
Gem (Gem)	188	Raising Revenue for repairs
Olinga	12	Reporting of Repair
Acan Dano	169	Road Clearing to water source
Pawena central (Tee Kasia)	212	Safe Guarding water point
Bunga	283	Slashing around the water source
Ogan Gwok Roko	257	Slashing the area
Lacek onyele	262	Slashing the water area
Alipan West	281	Sweeping and collecting rubbish
Tee Tword	261	Sweeping around water points
Tedo pe	205	Sweeping the water source
Tumanun A	198	Sweeping the water source
Hima	120	UNICEF-Drilling Water
Owito	158	Village Savings and loan Association (VSLA)
Awelo	164	Water Fees Subscription
Dong Agweng B	165	Water Fees Subscription

■ Water Consumption per Day per Household

Water Consumption	No. of Villages
6 - 7 Jerry cans per Household	65 Villages
3 - 5 Jerry cans per Household	37 Villages
1 – 2 Jerry cans per Household	192 Villages

C. The Household Survey in 6 RGCs

■ Household Composition of Correspondents

No.	RGC	RGC No.	Respondent			Household Composition				
			Name of Respondent	Gender	Occupation	Men	Women	Boys	Girls	Total
1	Koch Goma	PWS-03	Onen Julius	Male	Business	1	1	3	1	6
			Apio Lily Jamila	Female	Business	1	1	3	2	7
			Kilama Geofrey	Male	Commercial Farmer	1	2	4	3	10
			Anena Jenifer	Female	Farmer	1	3	3	2	9
			Aol Agnes	Female	Peasant Farmer	1	1	2	4	8
2	Unyama	PWS-06	A dala Paul	Male	Peasant	1	0	2	2	5
			Ventorina Lalango	Female	Farmer	2	3	4	3	12
			Abalo Alice	Female	Farmer	1	1	1	1	4
			Nyero Joe	Male	Business	1	1	2	2	6
			Aloyo Isabella	Female	Produce Buyer	1	1	0	2	4
3	Awere	PWS-08	A tukene Kenneth	Male	Farmer	1	1	2	1	5
			Adong Ejerima	Female	Farmer	2	2	3	3	10
			Oryem Karlo	Male	Farmer	1	1	3	3	8
			Oryem John	Male	Business	1	2	5	5	13
			Ajok Jenifer	Female	Business	2	2	3	1	8
4	Adilang	PWS-10	Opio Lamson	Male	Business	1	2	5	3	11
			Lanwaka Santa	Female	Business	1	1	2	2	6
			Oroma Hellen	Female	Farmer	1	1	4	3	9
			Atimango Sarah	Female	Housewife and peasant	1	2	5	0	8
			Oyugi Timothy	Male	Peasant	5	6	7	3	21
5	Kitgum Matidi	PWS-14	Kilama Joel	Male	Farmer	1	2	3	1	7
			Atto Korina	Female	Farmer	1	1	1	4	7
			Ayugi Florence	Female	Peasant Housewife	1	1	2	3	7
			Ali Eddy	Male	Business	1	1	0	1	3
			Laker Nighty	Female	Business	2	1	1	2	6
6	Comer Kilak	PWS-15	Okello Daniel	Male	Business	1	1	0	1	3
			Adong Rose	Female	Business	1	1	2	2	6
			Acaa Hellen	Female	Farmer	1	1	2	4	8
			Ochan Patrick	Male	Farmer	3	2	1	0	6
			Okumu Jackson	Male	Farmer	2	2	3	1	8

■ Distance to Water Points, Number of Round -Trips and Time Taken per Trip in the Dry Season

No.	RGC	RGC No.	District	County	Sub-county	Parish	Village	Number of Household Members	Number of round trips per day	Distance to Water Source (m)	Time for one roundtrip (min)	Method of water transport
1	Koch Goma	PWS-03	Nwoya	Nwoya	Koch Goma	Kal	Kal	6	2	500	30	Footing
							Bunga Mon	7	6	200	120	
							Kal	10	4	1,000	30	
							Bungaraon	9	4	100	280	
							Kal	8	4	750	120	
2	Unyama	PWS-06	Gulu	Aswa	Unyama	Pakwelo	Unyama B	5	6	1,500	50	
							Unyama A	12	2	1,500	60	
							Unyama Central	4	4	400	30	
							Tefoyo	6	2	100	10	
							Tefoyo	4	3	50	10	
3	Awere	PWS-08	Gulu	Omoro	Odek	Lamola	Ajau	5	5	200	20	
								10	4	500	20	
								8	4	300	10	
								13	6	410	30	
								8	3	1,000	20	
4	Adilang	PWS-10	Agago	Agago	Adilang	Lalal	Central	11	4	500	60	
							Lalal North	6	10	300	30	
							Central B	9	4	100	10	
							Lumule	8	3	2,000	90	
							Lumule West		3	2,000	120	
5	Kitgum Matidi	PWS-14	Kitgum	Cwa	Kitgum Matidi	Ibakara	Pagwa-Awere	7	8	500	30	
							Pagwa-Awere	7	6	500	30	
							Central	7	8	500	120	
							Central Ward	3	4	1,000	120	
							Bobo Central	6	5	1,000	60	
6	Comer Kilak	PWS-15	Pader	Aruu	Pader	Kilak	Kilak Central A	3	4	300	30	
							Central B	6	6	300	30	
							Central B	8	12	200	15	
							Central A	6	5	300	15	
							Central B	8	9	350	38	

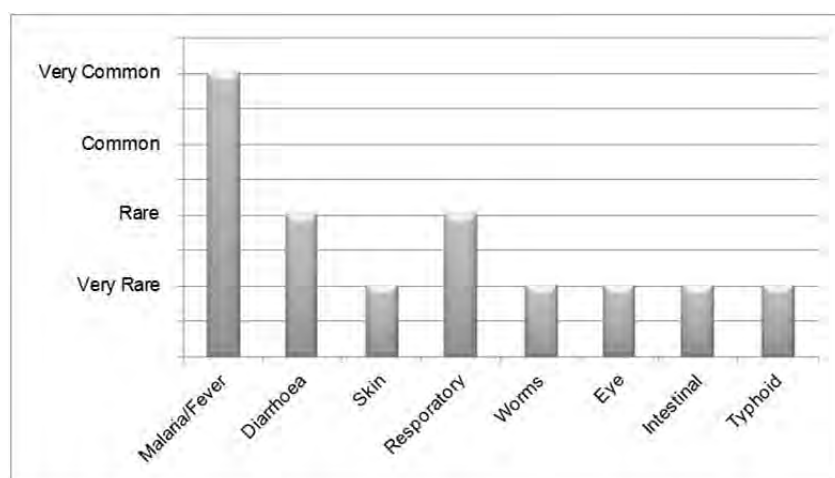
■ Main Roles of Persons at Household Level

No.	RGC	RGC No.	Main role of each person in the household			
			Men	Women	Boys	Girls
1	Koch Goma	PWS-03	Shop attendance	Farming, cooking, business	Sweeping	Young
			Salon operation	Cooking, business	Young	Water collection
			Farming	Cooking	Animal rearing	Water collection
			Farming	Cooking	Sweeping	Domestic work
			Farming, hunting	Cooking, farming	Sweeping	Cooking, domestic work
2	Unyama	PWS-06	Farming	N/A - no women	Sweeping	Water collection, cooking
			Farming	Cooking, farming	Farming	Water collection, cooking
			Farming	Cooking	Young	Young
			Provision	Cooking, farming	Animal rearing	Cooking, washing
			Farming	Cooking, child rearing	No boys	Young
3	A were	PWS-08	Farming	Cooking, farming	Animal rearing	Nothing
			Farming	Cooking, farming	Sweeping, Animal rearing	Water collection, cooking
			Farming	Cooking, farming	Sweeping, Animal rearing	Water collection, cooking
			Farming	Cooking, farming	Animal rearing	Water collection, cooking
			Farming	Cooking, domestic work	Sweeping	Washing
4	A dilang	PWS-10	Farming, business	Cooking, farming	Sweeping, Animal rearing	Water collection
			Farming	Cooking, fetching water	Nothing	Water collection
			Provision	Cooking, farming	Sweeping	Cooking, washing
			Farming	Cooking, fetching water	Sweeping	No girls
			Farming	Cooking, farming	Animal rearing	Water collection, cooking
5	Kitgum Matidi	PWS-14	Farming	Cooking, fetching water	Animal rearing	Water collection
			Farming	Cooking, fetching water	Sweeping	Cooking
			Farming	Cooking, farming	Nothing	Water collection, cooking
			Farming	Cooking, farming	No boys	Young
			Farming	Farming, cooking, business	Farming, Animals rearing	Water collection, cooking
6	Comer Kilak	PWS-15	Provision	Cooking	No boys	Water collection, cooking
			Farming	Cooking, fetching water	Sweeping	Water collection
			Provision	Cooking, farming	Sweeping	Water collection
			Provision	Cooking, fetching water	Young	No girls
			Farming	Cooking, farming	Animal rearing	Water collection

■ Comparison of Water Conditions in the Wet and Dry Seasons

No.	RGC	RGC No.	District	Number of Household Members	Dry Season		Wet Season	
					Number of round trips per day	Time for one roundtrip (min)	Number of round trips per day	Time for one roundtrip (min)
1	Koch Goma	PWS-03	Nwoya	6	2	30	2	20
				7	6	120	4	120
				10	4	30	4	30
				9	4	280	3	120
				8	4	120	2	80
2	Unyama	PWS-06	Gulu	5	6	50	6	50
				12	2	60	2	60
				4	4	30	2	10
				6	2	10	2	10
				4	3	10	3	10
3	A were	PWS-08	Gulu	5	5	20	5	20
				10	4	20	3	20
				8	4	10	4	10
				13	6	30	6	30
				8	3	20	3	20
4	Adilang	PWS-10	Agago	11	4	60	4	60
				6	10	30	10	30
				9	4	10	4	10
				8	3	90	2	90
				21	3	120	1	120
5	Kitgum Matidi	PWS-14	Kitgum	7	8	30	5	30
				7	6	30	4	30
				7	8	120	5	60
				3	4	120	4	120
				6	5	60	5	60
6	Comer Kilak	PWS-15	Pader	3	4	30	4	30
				6	6	30	6	30
				8	12	15	10	10
				6	5	15	5	15
				8	9	38	6	28

■ Prevalence of Water-Borne Diseases in Families within the RGCs



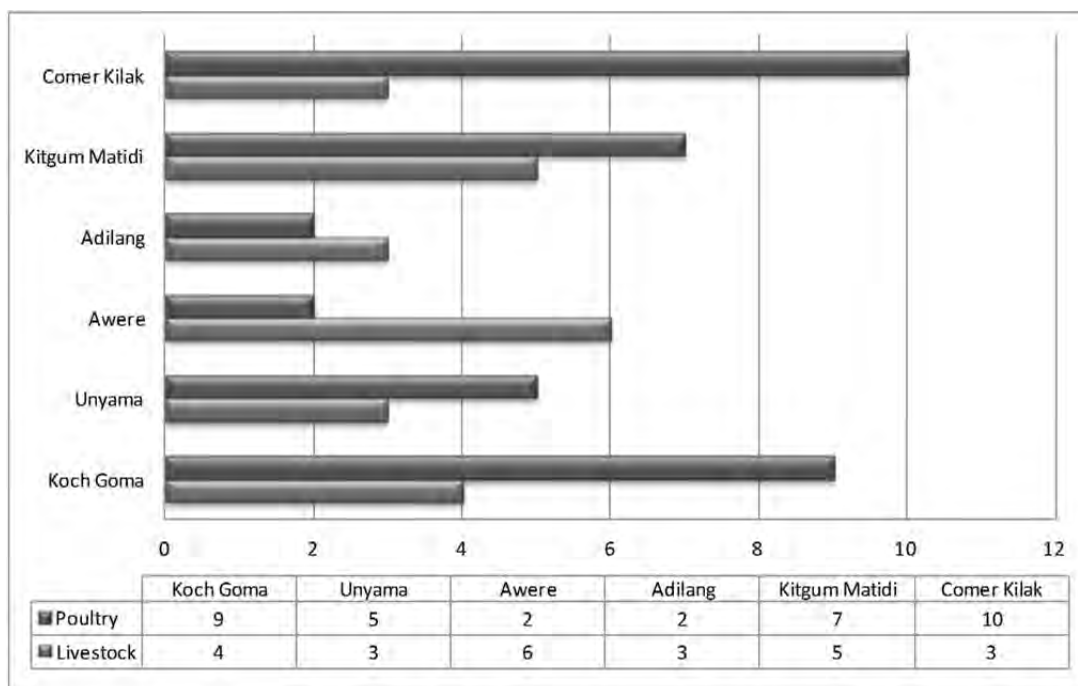
■ Average Household Income

No.	RGC	RGC No.	District	Average Monthly HH Income (Ush)	Average Annual HH Income (Ush)	Seasonal changes in Income (Common Response)
1	Koch Goma	PWS-03	Nwoya	647,000	9,364,000	Yes
2	Unyama	PWS-06	Gulu	953,000	11,436,000	Yes
3	Awere	PWS-08	Gulu	341,300	4,096,000	Yes
4	Adilang	PWS-10	Agago	359,500	3,880,000	Yes
5	Kitgum Matidi	PWS-14	Kitgum	1,287,280	8,260,000	Yes
6	Comer Kilak	PWS-15	Pader	810,000	9,720,000	Yes
Average overall (Ush)				733,013	7,792,667	
Min (Ush)				341,300	3,880,000	
Max (Ush)				1,287,280	11,436,000	
Median (Ush)				728,500	8,812,000	

■ Animals per Household

Type of Liestock	Number of Household (Average)
Cattle	1
Pigs	1
Goats	3
Poultry (Chicken/Ducks)	6

■ Average Number of Poultry and Livestock in Each RGC



■ Expenditure related to Water

- Average Expenditure for water related issues 783 Ush/month
- Average expenditure in past O & M 950 Ush/month
- Average present O&M expenditure 936 Ush/month
- Average amount of willingness to pay (household) 894 Ush/month

■ Average Household Expenditure on Water and Sanitation in Each RGC

No.	RGC	Average Household Expenditure			
		Water related issues (Ush/month)	Sanitation related issues (Ush/month)	Health related issues (Ush/month)	How much is payable for drinking water
1	Koch Goma	600	1,800	35,000	500
2	Unyama	1,400	2,000	38,200	1,100
3	Awere	400	600	13,400	300
4	Adilang	900	1,400	11,000	720
5	Kitgum Matidi	1,000	1,300	19,400	1,000
6	Comer Kilak	620	3,000	34,600	900

■ Operation and Maintenance Expenses in the RGCs

No.	RGC	Leading Responses at Household Level		
		Initial Contribution for water supply (Ush)	Monthly payment for O&M in the past (Ush)	Monthly payment for O&M presently (Ush)
1	Koch Goma	500	500	500
2	Unyama	1,000	1,000	1,000
3	Awere	500	500	500
4	Adilang	1,000	1,000	1,000
5	Kitgum Matidi	1,000	1,000	1,000
6	Comer Kilak	1,000	1,000	1,000

D. The Supplementary Village Survey of selected 152 Villages

■ Medical Facilities in the Villages and outside the Villages

Medical facilities	Amuru		Nwoya		Gulu	
	With in the Village	Outside the village	With in the Village	Outside the village	With in the Village	Outside the village
Hospital	1	2	1	0	0	0
Clinic	1	0	4	6	3	12
Health Centre/Dispensary	4	18	0	5	2	15
Drug Store	1	0	3	0	6	9
None	25	0	4	1	12	1

■ Continue from above Table

Agago		Lamwo		Kitigum		Pader	
With the Village	in Outside the village	With the Village	in Outside the village	With the Village	in Outside the village	With the Village	in Outside the village
0	0	0	1	0	0	0	0
0	1	0	1	0	0	0	0
2	22	3	25	2	0	0	0
0	0	2	8	0	1	0	4
0	24	24	1	17	18	19	15

■ Over all Latrine coverage of Villages in Amuru District

Village	Village No.	District	Latrine coverage %
Reckiceke	32	Amuru	88
Pukure	20	Amuru	82
Ogeli	31	Amuru	75
Abyee	17	Amuru	69
Odur	23	Amuru	67
Kal centre	10	Amuru	55
Lamolo Coke	33	Amuru	52
Palukere West	35	Amuru	52
Opok	19	Amuru	45
Pupwonya East	8	Amuru	44
Amoyokuma	27	Amuru	40
Andara	11	Amuru	37
Lujoro	29	Amuru	32
Paomo	9	Amuru	31
Abera	14	Amuru	30
Apa	34	Amuru	30
Pukumu	7	Amuru	27
Pacilo East	4	Amuru	25
Teddi	25	Amuru	18

Village	Village No.	District	Latrine coverage %
Coorom	21	Amuru	17
Mutema	30	Amuru	13
Amora	18	Amuru	12
Olinga	12	Amuru	10
Kati Kati A	13	Amuru	10
Okidi North	3	Amuru	8
Labongo	28	Amuru	7
Palukere East	5	Amuru	5
Ceri	15	Amuru	5
Bibia East	1	Amuru	0

■ Over all Latrine coverage of Villages in Nwoya District

Village	Village No.	District	Latrine coverage %
Lodi	64	Nwoya	70
Patira East	65	Nwoya	70
Kal	48	Nwoya	61
Akago	46	Nwoya	60
Pawatomero East	68	Nwoya	60
Pawatomero Central	67	Nwoya	41
Bwobonam B	37	Nwoya	40
Latekodong	40	Nwoya	40
Patira West	66	Nwoya	31
Lagazi	70	Nwoya	30
Agonga B	54	Nwoya	28
Paminolango	62	Nwoya	20

■ Over all Latrine coverage of Villages in Gulu District

Village	Village No.	District	Latrine coverage %
Agoro I	96	Gulu	95
Kal A and B	116	Gulu	93
Adak	110	Gulu	91
Latinnyer	125	Gulu	91
Gulu PTC	95	Gulu	90
Atede	114	Gulu	90
Aparowiya II	127	Gulu	89
Obwola	115	Gulu	87
Owak	136	Gulu	86
Lamin Lawino	138	Gulu	86
Labworomor	106	Gulu	85
Ariya	111	Gulu	85

Village	Village No.	District	Latrine coverage %
Aparowiya I	126	Gulu	84
Adak	105	Gulu	81
Acutomer	89	Gulu	80
Ibar	108	Gulu	73
Kiteny Central	101	Gulu	72
Otal	123	Gulu	72
Omel	90	Gulu	69
Along	107	Gulu	65
Alwii	124	Gulu	60

■ Over all Latrine coverage of Villages in Agago District

Village	Village No.	District	Latrine Coverage %
Lutage	141	Agago	19
Sub County HQ	144	Agago	40
Tori East	145	Agago	15
Agweng	146	Agago	26
Lapyem	148	Agago	20
Kotomor east	150	Agago	17
Amin Ogwal	151	Agago	30
Oringo Ongom	152	Agago	16
Te Vwao	153	Agago	22
opyel Central	154	Agago	32
Opal Oryoneko	156	Agago	12
Owito	158	Agago	21
Atanga	159	Agago	20
Abalukwang	163	Agago	30
Aleb Tong	166	Agago	25
Wii Atup	167	Agago	31
Laming Onen	170	Agago	84
Lakwa A	171	Agago	10
Acam Roma	172	Agago	22
Lela Kabala	173	Agago	28
Tong Wiri South	176	Agago	28
Labeledongony	178	Agago	18
Te Okiro	179	Agago	48

■ Over all Latrine coverage of Villages in Lamwo District

Village	Village No.	District	Latrine Coverage %
Dyangbii (Near lutara's home)	215	Lamwo	75
Amina (Nino mit)	214	Lamwo	67

Village	Village No.	District	Latrine Coverage %
Lanywang E-walagiri	208	Lamwo	65
Pawena central (Tee Kasia)	212	Lamwo	65
Kamama central H/C III	218	Lamwo	60
Obere	196	Lamwo	57
Arusha (Aloyi)	217	Lamwo	52
Dech East	185	Lamwo	49
Pobutu	190	Lamwo	49
Tumbafu West	195	Lamwo	49
Padwat West (Laluru Oyika)	182	Lamwo	46
Padwat Central (Padwat P/S)	181	Lamwo	44
Ajaa ogala (Alere)	210	Lamwo	43
Lobiluku (obokolot)	201	Lamwo	39
Biber (Itiba)	203	Lamwo	39
Loromibenge B	197	Lamwo	38
Lagwel P/S	193	Lamwo	36
Lio-Tee okworo	184	Lamwo	35
Kafata (Mbuya Parent sch.)	216	Lamwo	35
Lumwaka A	200	Lamwo	34
Guria North	206	Lamwo	32
Moroto East	199	Lamwo	31
Ayuu-lupur(Barara)	209	Lamwo	30
Dog Lokutu East	186	Lamwo	29
Liri Central	207	Lamwo	29
Tadi South	187	Lamwo	28
Langole (Keca)	202	Lamwo	25
Gem (Gem)	188	Lamwo	16

■ Over all Latrine coverage of Villages in Kitgum District

Village	Village No.	District	Latrine Coverage %
Langii	225	Kitgum	100
Winyorac-Pawiny	242	Kitgum	100
Pamolo central	233	Kitgum	99
Yepa A	239	Kitgum	90
Juba	240	Kitgum	82
Pagen Central (Corner Padibe)	232	Kitgum	80
Lacen Otinga West	241	Kitgum	80
Lakokok	243	Kitgum	75
Gulu gwen Orua .B.	230	Kitgum	74
Ayom Olola "B"	235	Kitgum	65
Akino (Dem kulu kwach)	229	Kitgum	62
Ocettokkee Trading centre	231	Kitgum	60
Panyum "A"	234	Kitgum	60
Labworomor	246	Kitgum	59
Okidi central	221	Kitgum	58
Otoboi (security site)	252	Kitgum	39
Agora	253	Kitgum	28
Rucurucu	228	Kitgum	16
Lobale	249	Kitgum	2

■ Over all Latrine coverage of Villages in Pader District

Village	Village No.	District	Latrine Coverage %
Alilli	258	Pader	87
Libii	269	Pader	80
Dure north	286	Pader	73
Bangalela	282	Pader	69
Apwor kla	263	Pader	61
Lapeny	292	Pader	61
Aringo yon	268	Pader	50
Lela awoki	285	Pader	50
Obalo	287	Pader	50
Atup	270	Pader	48
Aria	264	Pader	40
Parwech Lukee east	271	Pader	37
Nek-Nono	259	Pader	34
Te-okuto	260	Pader	27
Tee tworo	261	Pader	25
Pagor	290	Pader	23
Dagolwato	289	Pader	17
Lapoyaokwee	266	Pader	15
Lali	278	Pader	0

■ Methods of latrine cleaning and constraints of latrine usage

District	Methods Used	Constraints against latrine to use
Amuru	Sweeping, Mopping, smearing with cow dung	Lack of finances for construction
Nwoya	Sweeping and using ashes	Lack of materials, old age, finances
Gulu	Sweeping, Mopping, smearing with cow dung	Lack of finances for construction
Agago	Sweeping and smearing with ash and cow dung	Rocky tecture of soil texture
Lamwo	Sweeping, smearing	Ignorance, lack of construction materials and laziness
Kitgum	Use ash, Sweeping, smearing	Old age lack of construction materials, ignorance
Pader	Sweeping the latrines and pouring ash	Lack of tools for digging the hole and old age.

■ Water-Borne Diseases in Gulu District

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
MALARIA	12	8	1	0
DIARRHEA	2	7	10	2
SKIN	0	8	7	6
RESPIRATORY	5	3	2	11
INTESTINAL	0	0	5	16
TYHOID	2	6	4	9
EYE	0	2	10	9

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
WORMS	7	1	8	5
OTHERS	6	1	0	0

■ Water-Borne Diseases in Agago District

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
MALARIA	22	1	0	0
DIARRHEA	1	20	2	0
SKIN	0	6	10	7
RESPIRATORY	0	11	6	6
INTESTINAL	1	11	10	1
TYPHOID	1	6	2	14
EYE	0	5	7	11
WORMS	1	10	0	12
OTHERS	0	1	2	4

■ Water-Borne Diseases in Lamwo District

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
MALARIA	21	8	0	0
DIARRHEA	2	21	4	2
SKIN	0	4	11	14
RESPIRATORY	2	13	7	7
INTESTINAL	0	8	6	15
TYHOID	5	13	4	7
EYE	1	5	8	15
WORMS	2	16	11	0
OTHERS	0	0	0	0

■ Water-Borne Diseases in Kitgum District

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
MALARIA	8	6	4	1
DIARRHEA	0	9	7	3
SKIN	0	0	3	16
RESPIRATORY	0	1	2	16
INTESTINAL	0	0	0	19
TYHOID	0	3	5	11

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
EYE	1	2	3	13
WORMS	1	2	8	7
OTHERS	0	4	0	1

Water-Borne Diseases in Pader District

DISEASE	FREQUENCY			
	Very Common	Common	Rare	Very rare
MALARIA	16	3	0	0
DIARRHEA	3	10	6	0
SKIN	0	6	10	3
RESPIRATORY	1	9	7	2
INTESTINAL	1	5	7	6
TYHOID	0	2	9	8
EYE	3	4	6	6
WORMS	6	7	4	2
OTHERS	0	0	1	0

■ Infant mortality rate in Amuru District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Amora	18	2010	120	750	90
Pacilo East	4	2010	50	600	30
Labongo	28	2010	50	600	30
Okidi North	3	2010	70	572	40
Pukumu	7	2010	40	525	21
Coorom	21	2010	96	521	50
Pukure	20	2010	100	480	48
Palukere East	5	2010	66	455	30
Lujoro	29	2010	70	429	30
Kati Kati A	13	2010	28	429	12
Palukere West	35	2010	55	364	20
Ogeli	31	2010	60	334	20
Abyee	17	2010	96	313	30
Pupwonya East	8	2010	65	308	20
Opok	19	2010	60	250	15
Odur	23	2010	120	167	20
Mutema	30	2009	70	143	10
Olinga	12	2010	127	134	17
Lamolo Coke	33	2010	40	125	5

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Apaa	34	2010	200	80	16
Amoyokuma	27	2010	100	70	7
Bibia East	1	2010	40	63	10
Reckiceke	32	2010	50	60	3
Teddi	25	2010	120	50	6
Paomo	9	2010	40	50	2
Andara	11	2010	170	42	7
Ceri	15	2010	147	41	6
Kal centre	10	2010	56	36	2
Abera	14	2010	87	35	3

■ Infant mortality rate in Nwoya District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Paminolango	62	2010	50	300	15
Latekodong	40	2010	60	250	15
Pawatomero East	68	2009	80	200	16
Patira East	65	2010	65	150	9
Patira West	66	2009	65	139	9
Lagazi	70	2010	80	125	10
Agonga B	54	2010	80	125	10
Akago	46	2010	45	112	5
Pawatomero Central	67	2010	86	105	9
Lodi	64	2009	70	100	7
Bwobonam B	37	2010	60	100	6
Kal	48	2010	100	90	9

■ Infant mortality rate in Gulu District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Gulu PTC	95	2009	110	273	30
Atede	114	2010	41	244	10
Latinnyer	125	2010	27	223	6
Agoro I	96	2010	100	200	20
Labworomor	106	2011	200	200	40
Aparowiya I	126	2010	45	156	7
Ibar	108	2010	200	150	30
Alwii	124	2010	36	139	5
Along	107	2008	300	134	40
Aparowiya II	127	2010	30	134	4

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Otal	123	2010	39	103	4
Obwola	115	2010	35	58	2
Omeh	90	2010	100	50	5
Adak	105	2010	67	45	3
Ariya	111	2010	45	45	2
Kal A and B	116	2010	34	30	1
Kiteny Central	101	2010	100	20	2
Lamin Lawino	138	2010	56	18	1
Acutomer	89	2010	100	10	20
Adak	110	2009	140	8	30
Owak	136	2010	54	0	0

■ Infant mortality rate in Agago District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Acam Roma	172	2010	15	534	8
Atanga	159	2010	13	462	6
Agweng	146	2010	20	450	9
Aleb Tong	166	2010	20	400	8
Lela Kabala	173	2010	8	375	3
Tong Wiri South	176	2010	14	358	5
Tori East	145	2010	30	334	10
Kotomor east	150	2010	30	334	10
Te Okiro	179	2010	12	334	4
Amin Ogwal	151	2010	48	292	14
Lakwa A	171	2010	7	286	2
Sub County HQ	144	2010	30	267	8
Wii Atup	167	2010	35	258	9
Opal Oryoneko	156	2010	32	250	8
opyel Central	154	2010	30	200	6
Laming Onen	170	2010	5	200	1
Lutage	141	2010	17	177	3
Labeledongony	178	2010	6	167	2
Oringo Ongom	152	2010	40	150	6
Owito	158	2010	40	150	6
Te Vwao	153	2010	55	128	7
Abalukwang	163	2010	8	125	1
Lapyem	148	2010	29	35	9

■ Infant mortality rate in Lamwo District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Moroto East	199	2010	9	445	4
Dech East	185	2010	10	300	3
Lumwaka A	200	2011	47	213	10
Guria North	206	2010	38	185	7
Lobiluku (obokolot)	201	2010	39	154	6
Biber (Itiba)	203	2009	20	150	3
Loromibenge B	197	2010	14	143	2
Apyeta Central	180	2010	43	140	6
Padwat Central (Padwat P/S)	181	2010	37	136	5
Pobutu	190	2010	15	134	2
Padwat West (Laluru Oyika)	182	2010	38	132	5
Langole (Keca)	202	2010	24	125	3
Dog Lokutu East	186	2010	53	114	6
Tadi South	187	2010	44	114	5
Lanywang E-walagiri	208	2010	29	104	3
Obere	196	2009	23	87	2
Tumbafu West	195	2010	47	86	4
Gem (Gem)	188	2010	24	84	2
Lagwel P/S	193	2010	39	77	3
Liri Central	207	2007	70	72	5
Dyangbii (Near lutara's home)	215	2010	60	67	4
Ajaa ogala (Alere)	210	2011	80	63	5
Kafata (Mbuya Parent sch.)	216	2010	80	63	5
Arusha (Aloyi)	217	2007	50	60	3
Lio-Tee okworo	184	2010	52	58	3
Ayuu-lupur(Barara)	209	2010	70	58	4
Kamama central H/C III	218	2010	60	50	3
Amina (Nino mit)	214	2010	50	40	2
Pawena central (Tee Kasia)	212	2010	60	34	2

■ Infant mortality rate in Kitgum District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Gulu gwen	230	2010	10	300	3

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Orua .B.					
Akino (Dem kulu kwach)	229	2010	10	200	2
Labworomor	246	2010	15	200	3
Otoboi (security site)	252	2010	35	143	5
Winyorac-Pawiny	242	2010	30	100	3
Lakokok	243	2010	10	100	1
Agora	253	2010	35	86	3
Ocettokkee Trading centre	231	2010	36	84	3
Lobale	249	2010	25	80	2
Rucurucu	228	2010	15	67	1
Panyum "A"	234	2010	38	53	2
Lacen Otinga West	241	2010	47	43	2
Yepa A	239	2010	61	33	2
Langii	225	2010	48	21	1
Pagen Central (Corner Padibe)	232	2010	57	18	1
Juba	240	2010	64	16	1
Okidi central	221	2010			
Pamolo central	233	2010			
Ayom Olola "B"	235	2010			

■ Infant mortality rate in Pader District

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Obalo	287	2010	32	375	12
Lali	278	2010	22	364	8
Lapoyaokwee	266	2010	9	334	3
Dagolwato	289	2010	30	334	10
Dure north	286	2010	7	286	2
Libii	269	2009	25	280	7
Aringo yon	268	2010	18	278	5
Atup	270	2010	22	182	4
Lapeny	292	2010	28	179	5
Parwech Lukee east	271	2010	52	173	9
Lela awoki	285	2010	12	167	2
Tee tworo	261	2010	32	157	5
Aria	264	2010	34	147	5

Village	Village No.	Year recorded	No. of Births	Number / 1000	No. of Deaths
Pagor	290	2010	35	115	4
Alilli	258	2010	37	109	4
Apwor kla	263	2010	43	70	3
Te-okuto	260	2010	52	58	3
Bangalela	282	2010	38	27	4
Nek-Nono	259	2010	24	0	0

■ Average Monthly Income per Household in Amuru District

Village No.	Village	Ave. monthly Income per HH (Ush.)
7	Pukumu	150,000
33	Lamolo Coke	100,000
20	Pukure	80,000
27	Amoyokuma	80,000
18	Amora	60,000
4	Pacilo East	50,000
10	Kal centre	50,000
11	Andara	50,000
23	Odur	50,000
1	Lujoro	40,000
17	Bibia East	40,000
30	Abyee	40,000
32	Mutema	40,000
29	Reckiceke	40,000
21	Coorom	30,000
34	Apa	30,000
14	Abera	25,000
3	Okidi North	20,000
5	Palukere East	20,000
13	Kati Kati A	20,000
25	Teddi	20,000
9	Paomo	15,000
12	Olinga	15,000
15	Ceri	15,000
28	Labongo	15,000
19	Opok	10,000
35	Palukere West	10,000
8	Pupwonya East	5,000
31	Ogeli	5,000

■ Average Monthly Income per Household in Nwoya District

Village No.	Village	Ave. monthly Income per HH (Ush.)
37	Bwobonam B	150,000
48	Kal	80,000
66	Patira West	70,000
67	Pawatomero Central	50,000
46	Akago	30,000
62	Paminolango	15,000
68	Pawatomero East	12,000
40	Latekodong	10,000
54	Agonga B	10,000
65	Patira East	10,000
70	Lagazi	10,000
64	Lodi	9,000

■ Average Monthly Income per Household in Gulu District

Village No.	Village	Ave. monthly Income per HH (Ush.)
110	Adak	50,000
111	Ariya	50,000
123	Otal	50,000
90	Omel	40,000
114	Atede	40,000
95	Gulu PTC	30,000
116	Kal A and B	24,000
106	Labworomor	20,000
107	Along	20,000
115	Obwola	20,000
126	Aparowiya I	20,000
138	Lamin Lawino	20,000
96	Agoro I	15,000
127	Aparowiya II	15,000
136	Owak	15,000
89	Acutomer	10,000
101	Kiteny Central	10,000
105	Adak	10,000
108	Ibar	10,000
124	Alwii	10,000
125	Latinnyer	10,000

■ Average Monthly Income per Household in Agago District

Village No.	Village	Ave. monthly Income per HH (Ush.)
173	Lela Kabala	97,000
141	Lutage	72,000
163	Abalukwang	36,000
144	Sub County HQ	20,000
145	Tori East	20,000
154	opyel Central	20,000
178	Labedongony	20,000
176	Tong Wiri South	17,000
179	Te Okiro	17,000
159	Atanga	16,000
146	Agweng	15,000
171	Lakwa A	15,000
172	Acam Roma	15,000
148	Lapyem	10,000
152	Oringo Ongom	10,000
156	Opal Oryoneko	10,000
166	Aleb Tong	10,000
167	Wii Atup	10,000
170	Laming Onen	6,000
150	Kotomor east	5,000

■ Average Monthly Income per Household in Lamwo District

Village No.	Village	Ave. monthly Income per HH (Ush.)
197	Loromibenge B	300,000
207	Liri Central	150,000
210	Ajaa ogala (Alere)	150,000
181	Padwat Central (Padwat P/S)	120,000
218	Dyangbii (Near lutara's home)	100,000
215	Kamama central H/C III	100,000
214	Amina (Nino mit)	80,000
196	Lio-Tee okworo	50,000
201	Dog Lokutu East	50,000
184	Lagwel P/S	50,000
193	Obere	50,000
186	Lobiluku (obokolot)	50,000
209	Ayuu-lupur(Barara)	40,000
195	Gem (Gem)	30,000
188	Tumbafu West	30,000
187	Tadi South	25,000

206	Guria North	25,000
190	Dech East	20,000
208	Pobutu	20,000
202	Langole (Keca)	20,000
185	Biber (Itiba)	20,000
203	Lanywang E-walagiri	20,000
212	Apyeta Central	10,000
182	Padwat West (Laluru Oyika)	10,000
199	Moroto East	10,000
200	Lumwaka A	10,000
216	Pawena central (Tee Kasia)	10,000
180	Kafata (Mbuya Parent sch.)	10,000
217	Arusha (Aloyi)	3,000

■ Average Monthly Income per Household in Kitgum District

Village No.	Village	Ave. monthly Income per HH (Ush.)
249	Lobale	30,000
242	Winyorac-Pawiny	25,000
252	Otoboi (security site)	25,000
229	Akino (Dem kulu kwach)	20,000
246	Labworomor	20,000
253	Agora	20,000
230	Gulu gwen Orua .B.	15,000
243	Lakokok	15,000
228	Rucurucu	10,000
232	Pagen Central (Corner Padibe)	10,000
221	Okidi central	7,500
225	Langii	5,000
231	Ocettokkee Trading centre	5,000
233	Pamolo central	5,000
234	Panyum "A"	5,000
239	Yepa A	5,000
241	Lacen Otinga West	5,000
240	Juba	4,000
235	Ayom Olola "B"	2,000

Average Monthly Income per Household in Pader District

Village No.	Village	Ave. monthly Income per HH (Ush.)
264	Aria	400,000
290	Pagor	120,000
263	Apwor kla	100,000

Village No.	Village	Ave. monthly Income per HH (Ush.)
287	Obalo	100,000
268	Aringo yon	50,000
269	Libii	50,000
266	Lapoyaokwee	30,000
286	Dure north	30,000
278	Lali	20,000
282	Bangalela	20,000
285	Lela awoki	20,000
270	Atup	18,000
259	Nek-Nono	15,000
271	Parwech Lukee east	15,000
258	Alilli	10,000
260	Te-okuto	10,000
261	Tee tworo	10,000
289	Dagolwato	10,000
292	Lapeny	5,000

■ Total Number of Students per District

District	PRIMARY		SECONDARY		HIGH SCHOOL		OTHERS	
	Day	Boarding	Day	Boarding	Day	Boarding	Day	Boarding
Amuru	21072	-	4,600	0	0	0	87	0
Nwoya	9010	-	300	400	0	0	0	0
Gulu	9782	800	1,820	900	0	0	930	0
Agago	2043	-	-	0	0	0	0	0
Lamwo	4548	-	-	0	0	0	0	0
Kitgum	2130	-	-	0	0	0	0	0
Pader	350	-	-	0	0	0	0	0

E. The Household Survey of Selected 152 Villages

■ Number of Trips per Day in Dry Season

Items	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Count - people who mentioned source.	376	116	48	96	8	8	96
Minimum no. of trips	1	1	1	1	3	1	1
Maximum no. of trips	15	10	6	12	8	8	8
Mean no. of trips	3	3	2	3	7	3	3

■ Distance to the Water Source in Dry Season (unit: meters)

Degree	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Min	1	30	100	1	1,000	500	1
Max	6,000	9,000	2,000	8,000	3,500	2,000	15,000
Mean	1,262	1,093	675	1,381	2,625	1,183	1,481

■ Time for One Round Trip in Dry Season (unit: minutes)

Degree	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Min	3	2	10	10	30	30	10
Max	500	280	120	300	150	180	1,500
Mean	84	60	47	85	103	59	83

■ Method of Water Transport in Dry Season

Methods	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Footing	298	98	41	78	7	4	91
Bicycle	27	7	1	0	0	0	7
Bicycle, Footing	8	2	0	2	0	0	0
Total	333	107	42	80	7	4	98

■ Main Source of Water in Rainy Season

Item	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Count – People who mentioned source	347	137	43	135	14	14	101
Min	1	1	1	1	1	1	0
Max	15	10	7	10	8	8	10
Mean	3	3	2	3	5	4	3

■ Distance to the Source in Rainy Season

Degree	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/ valley dam	River/ stream
Min	1	30	1	1	14	14	2
Max	8,000	8,000	2,000	8,000	8,000	3,500	7,000
Mean	1,281	1,169	753	1,165	3,074	1,477	1,102

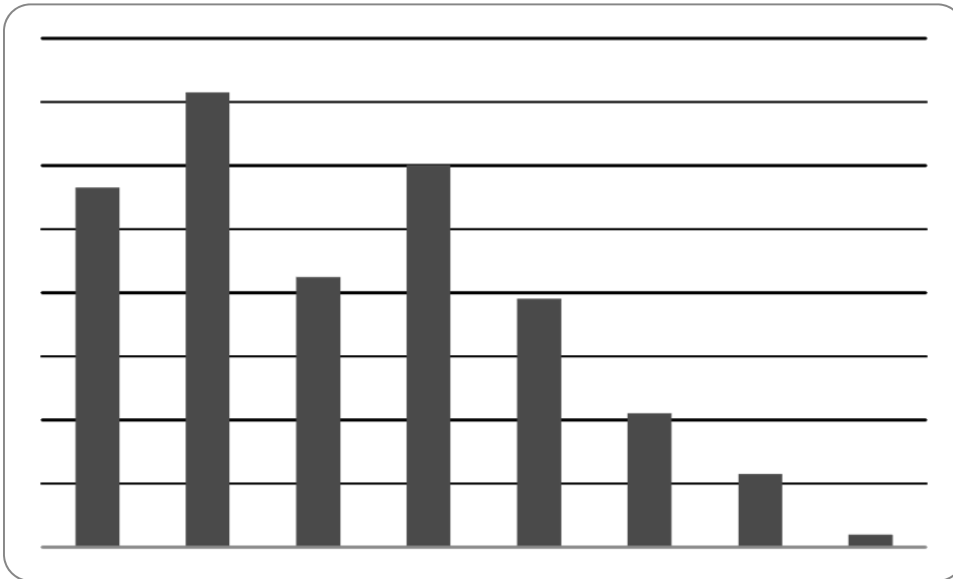
■ Time Taken for a Round Trip (Rainy Season)

Degree	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/valley dam	River/s tream
Min	5	5	5	3	45	15	10
Max	480	280	110	480	150	180	320
Mean	65	56	40	63	86	51	65

■ Method of Water Transport

Methods	Borehole	Shallow well	Protected Spring	Unprotected spring	Gravity flow system	Dam/valley dam	River/stream
Footing	307	118	37	118	14	11	94
Bicycle	17	5	1	0	0	0	6
Bicycle, footing	5	3	0	0	0	0	0
Total	329	126	38	118	14	11	100

■ Household Water Consumption per Capita per Day (LPCPD)



■ Household Income of Household

Degree	Monthly Income	Annual Income
Max	540,400	12,360,000
Min	0	0
Mean	54,784	577,442

■ Average Number of Livestock of Household

Degree	Cattle	Pigs	Goats	Chicken/Ducks
Max	14	30	80	60
Min	0	0	0	0
Mean	1	1	3	9

■ Expenditure of Household on Water

Degree	Water related issues, (Ush/month)	Sanitation related issues (Ush/month)	Health related issues (Ush/month)	How much payable for drinking water
Max	20,000	50,000	100,000	15,000
Min	0	0	0	0
Mean	951	2,771	11,482	737

Average payable amount for drinking water is 738 Ush.

Interview Sheets for Survey A: Village Survey of 16

Village Survey of 16 RGCs (Survey A)					Date:	/ / 2011	
RGC		RGC number		Distict		County	
	Sub county		Parishs				
			Villages				
Name of Enumerator		Respondent		Position			
				Phone Number			
Location of the Centre (GPS Arc 1960)		UTM-E (m)		UTM-N (m)		Altitude (m)	
A. Population and Households							
A1. Population in the villages within the RGC (Village population includes returned IDPs.)							
Total		Male		Female			
A2. Population in the villages related to the RGC (Village population includes returned IDPs.)							
Total		Male		Female			
A3. Number of households within the RGC (includes returned IDPs.)							
Total		Average population per household					
A4. Population of Internally displaced person (IDPs)							
Settled IDPs in the RGC		Expected IDPs being returned to the RGC in future					
B. Health, Sanitation and Hygiene in the RGC							
B1. Number of							
1) Hospitals		2) Clinics	3) Dispensaries	4) Health Centres			
5) Drug shops		6) Other (Specify)					
B2. Types of household latrine in use							
Type		No. of households in RGC	% of all the existing households				
Traditional Pit Latrine							
Improved Traditional Pit Latrine							
Ventilated Improved Pit Latrine							
Other (specify:)							
B3. Latrine coverage rate in the RGC %							
B4. What are the methods of latrine cleaning?				Answer			
B5. What are some of the constraints to use and construction of latrine, if any?				Answer			
B6. Water-Borne Diseases in RGCs							
Disease		Prevalence				the Number of patients per year	
		very common	common	rare	very rare		
a. Malaria/fever							
b. Diarrhea							
c. Skin Disease							
d. Respiratory Disease							
e. Worms							
f. Eye Disease/Infection							
g. Intestinal Infection							
h. Typhoid							
i. Other (Specify:)							
B7. Infant Mortality Rate		(Year:)	/1000	Infant less than one year old			
C. Organizations and Activities for Water Supply							
C1. Did/Does the RGC have the organization for Operation and Maintenance (O&M) of Water Supply Facilities?							
1. Water Service Board		2. Private Sector					
3. Water and Sanitation Committee		Name of 2, if any:					
C2. The organization was/were		1. organized in (year) , and is still existing					
		2. organized in (year) , and lasted for (year). It does not exist now.					
		3. never existed. (In this case, Skip to C16)					
C3. What kind of activities did the organization conduct in years past?				Answer			
C4. Details of the organization members (roles and genders).							
Member's Role		male	female	Member's Role		male	female
C5. Has the management of the organization been going well?				Answer		Yes	No
If the answer is "No", what is the problem?							

C6. Structure of the organization and number of employees of each cell					
Name of Cells	Number of employees	Name of Cells	Number of employees		
C7. Income and expenditure of the organization (Year: _____)					
Income	Ush	Expenditure	Ush		
C8. The breakdown					
Income		Expenditure			
Water revenue	Ush	Personal cost	Ush		
	Ush	Fuel cost	Ush		
	Ush	Maintenance	Ush		
	Ush	Other cost	Ush		
If the organization has other incomes, please specify in the above table.					
C9. Method of water tariff collection.					
1. Specify					
2. Water fee (Ush) _____ per 20 liters _____ per month					
C10. Unaccounted for Water					
1. Bill collection rate _____ %	2. Leakage _____ %	3. Unaccounted for water _____ %			
C11. How much did a household pay as an initial contribution?	1. _____ Ush	2. None	3. don't know		
C12. a. How much does/did each household pay regulary for O&M?	1. _____ Ush	2. None	3. Other (Specify _____)		
b. How offen does/did each household pay the above amount?	1. monthly	2. weekly	3. Other (Specify _____)		
C13. (If money is collected regulary) Who collects the money for the organization?	Answer _____				
C14. (If money is collected regulary) Where is the money kept?	Answer _____				
C15. What kind of repair did the organization do for the water supply faciliteis?	Answer _____				
C16. Does the RGC has by-laws?	1. Yes	2. No			
C17. (if the by-laws exist) Are they in operation?	1. Yes	2. No			
C18. Does the RGC receive any service about O&M from the Government?	1. Yes	2. No			
C19. (If received) What service does the RGC receive?	Answer _____				
C20. What contribution can the RGC do for a new water facility construction?	Answer _____				
C21. a. What kind of construction materials are available locally?	1. sand	2. gravel	3. water	4. other (specify)	
b. What kind of construction materials can the RGC contribute for water facility construction ?	1. sand	2. gravel	3. water	4. other (specify)	
C22. a. Do you think villagers will be willing to pay money or in-kind regulary for O&M?	1. Yes		2. No	3. Don't know	
b. (if villagers will be willing to pay) How much money will a household pay?	1. _____ Ush	2. Don't know			
D. Organization / Association / Self Help Group in the RGC					
D1. Organization and Activities					
Organization / Group	Water-Related Activities	Other Activity	Comments (if any)		
1. Women's Organization					
2. Youth Organization					
3. Other (Specify _____)					
4. Other (Specify _____)					
D2. Collective Water-Related Activities (if any)					
Water-Related Activity		Participants			
1					
2					
D3 Other Collective Activities (if any)					
Activity		Participants			
1					
2					
E. Economic Condition					
E1. Income					
Sources of Income		Number of Villagers Getting the Income			
		Many	Some	A few	None
1. Selling animals (specify: _____)					
2. Selling agricultural crops (specify: _____)					
3. Selling labor (specify: _____)					
4. Forestry (specify: _____)					
4. Other (specify: _____)					
4. Other (specify: _____)					
E2. Income per household					
1. Average monthly income per household		Ush			
2. Average yearly income per household		Ush			
3. Are there seasonal change of income?		Answer _____			

	3. Are there seasonal change of income?	Answer							
	4. Number of livestock per household	No. of Cattle		No. of sheep		No. of goats			
	5. Remittances	a. None	b. Some	c. Others (Specify: _____)					
E3.	Unemployment	1. Male (%)	2. Female (%)						
E4.	Health and Sanitation Expenditure								
	1. Payment for water of a jelly can	a. Ush		b. Nothing (Never pay)					
	2. Water consumption (liters per capita per day)			1. less than 5	2. 6 ~ 10	3. 11 ~ 15	4. 16 ~ 20	5. 21 ~ 30	
				6. 31 ~ 50	7. more than 50				
	3. Latrine cost including soap								
	payment	Nothing	A little	in between a little and a lot		A lot			
	% of all the RGC household								
	4. Payment for medicine and hospital								
	payment	Nothing	A little	in between a little and a lot		A lot			
	% of all the RGC household								
E5.	Schools and Commercial facilities								
		None	Primary	Secondary	High school	Others (Specify _____)			
	1. Number of Day schools								
	2. Number of the Students								
		None	Primary	Secondary	High school	Others (Specify _____)			
	3. Number of Boarding Schools								
	4. Number of the Students								
	5. Number of Restaurants								
	6. Any water use facilities (Specify: _____)								
E6.	Vehicle Accessibility								
	1. Vehicle Accessibility to the RGC in Dry Season			1. Good	2. No good	3. Impossible	4. Others (_____)		
	2. Vehicle Accessibility of the RGC in Rainy Season			1. Good	2. No good	3. Impossible 4. Others (_____)			
	3. Transportation	1. None	2. Daily bus	3. Weekly bus	4. Others (_____)				
	4. Daily Frequency of Bus (if daily bus is available)			1. Once a day	2. Twice a day	3. 3 times a day	4. Others (_____)		
E7.	Electricity								
	1. Existence of Electricity	a. None	b. Single Phases	c. Three Phases					
	2. Voltage								
	3. Distance to Electricity	a. ~ 100m	b. 101 ~ 500m	d. 501 ~ 1000m	e. 1001m ~				
	4. Transformer	a. None		b. Existent					
	5. Distance to Transformer	a. ~ 100m	b. 101 ~ 500m	d. 501 ~ 1000m	e. 1001m ~				
	6. Tariff (Ush)	a. Commercial Use		b. Domestic Use		c. Public Use			
E8.	Existing Development Project								
	1. Water-Related Activity								
	Donor Organization	Project Name			Activity		Year Startd	Year Ended	
	UNICEF								
	UNDP								
	NGO (Specify _____)								
	Other (Specify _____)								
	Other (Specify _____)								
	2. Other Activity								
	Donor Organization	Project Name			Activity		Year Startd	Year Ended	
	UNICEF								
	UNDP								
	NGO (Specify _____)								
	Other (Specify _____)								
E9.	Development Project in Future								
	1. Water-Related Activity								
	Donor Organization	Project Name			Activity		Year Startd	Year Ended	
	UNICEF								
	UNDP								
	NGO (Specify _____)								
	Other (Specify _____)								
	Other (Specify _____)								
	2. Other Activity								
	Donor Organization	Project Name			Activity		Year Startd	Year Ended	
	UNICEF								
	UNDP								
	NGO (Specify _____)								
	Other (Specify _____)								
E10.	What are the problems that people in the RGC are facing everyday?								
	Answer								

E11.	Are there any adverse effects of water fetching for job opportunity of women?								
	Answer								
	Are there any adverse effects of water fetching for school attendance of children?								
	Answer								
F.	Existing Water Source								
F1.	Existing Water Supply								
	Water Source	Number	Average Distance from home: one way (m)	Average time to fetch water; round-trip (min)	Main person to fetch water 1. men 2. women 3. boys 4. girls	Use of facility 1. all season 2. dry season only 3. rainy season only	Water Amount in Dry Season 1. Good 2. o.k./ so-so 3. bad	Water Quality 1. Good 2. o.k./ so-so 3. bad	
	a. Borehole (functioning)				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	b. Borehole (not functioning)								
	c. Shallow Well				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	d. Protected Spring				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	e. Unprptected Spring				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	f. Gravity Flow Scheme				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	g. Dam/Valle Tank				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	h. River				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
	i. Other (Specify)				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3	
F2.	Are there any water purification facilities?							1. Yes 2. No	
F3.	If the answer of F2 is yes, what kind of water quality problem do you have?							Answer	
F4.	Do you have satisfaction on existing water supply facilities?							1. Yes 2. No	
F5.	If the answer of F4 is No, what is the problem?							Answer	
F6.	What kind of activity did the villagers do for solving problem?							Answer	
F7.	Functioning Borehole								
	Fuctioning Boreholes	Year Constructed	Well Depth (m)	Static Water Level (m)	Pumping Method 1. Engine 2. Motor 3. Wind mill 4. Handpump 5. Nothing	Constructed by 1. Government 2. UNICEF 3. Individual/ Pnate Sector 4. Other (NGO) 5. Don't know	O&M by 1. Government 2. UNICEF 3. Individual/ Private Secor 4. Other(NGO) 5. Don't know	Water Fee if any (Ush. Per month)	Satisfaction 1. very satisfied 2 satisfied 3. o.k. 4. not satisfied 5 disgusted
	Borehole 1				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 2				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 3				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 4				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 5				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 6				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Borehole 7				1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5
	Functioning Borehole (continued)								
	Fuctioning Boreholes	Tank Volume (m ³)	Population Served	No. of Times Broken	Reason for Having been Broken	Spare Parts Changed	Repair done by Whom	Cost of Repair (Ush.)	Method for Collection Money for Repair
	Borehole 1								
	Borehole 2								
	Borehole 3								
	Borehole 4								
	Borehole 5								
	Borehole 6								
	Borehole 7								
F8.	Non-Functioning Borehole								
	Non-Fuctioning Boreholes	Year Constructed	Constructed by 1. Government 2. UNICEF 3. Individual/ Pnate Sector 4. Other (NGO) 5. Don't know	Year Broken	Reason for being broken, if known	Reason for no erpair			
	Borehole 1		1, 2, 3, 4, 5						
	Borehole 2		1, 2, 3, 4, 5						
	Borehole 3		1, 2, 3, 4, 5						
	Borehole 4		1, 2, 3, 4, 5						
	Borehole 5		1, 2, 3, 4, 5						
F9.	Springs								
		Spring 1	Spring 2	Spring 3	Spring 4	Spring 5	Spring 6		
	Flow rate of Springs (m3/hour)								

Interview Sheets for Survey B: Rapid Village Survey of 294 Villages

The Rapid Village Survey of 294 Villages (the Survey B)						Date: / / 2011
Village	Village number	District	County			
Sub county	Parishes		Position			
Name of Enumerator	Respondent		Phone Number			
Location of the Centre (GPS Arc 1960) (a requested point of well or assembly house of the villaeg)		UTM-E (m)	UTM-N (m)	Altitude (m)		
A. Population and Households						
A1. Population in the villages (Village population includes returned IDPs.)						
Total		Male	Female			
A2. Number of households in the Village (includes returned IDPs.)						
Total		Average population per household				
A3. Population of Internally displaced person (IDPs)						
Settled IDPs in the Village		Expected IDPs being returned to the Villaeg in future				
C. Organizations and Activities for Water Supply						
C1. Did/Does the Villaeg have the Water and Sanitation Committee for Operation and Maintenance (O&M) of Water Supply Facilities?						
1. Yes		2. No				
C2. The organization was/were						
1. organized in		(year), and is still existing				
2. organized in		(year), and lasted for				
3. never existed.		(In this case, Skip to C16)				
C3. What kind of activities did the organization conduct in years past? Answer						
C4. Details of the organization members (roles and genders),						
Member's Role		male	female	Member's Role		male
C16. Does the Villaeg has by-laws? 1. Yes 2. No						
C17. (if the by-laws exist) Are they in operation? 1. Yes 2. No						
C20. What contribution can the Village do for a new water facility construction? Answer						
C21. a. What kind of construction materials are available locally? 1. sand 2. gravel 3. water 4. other (specify)						
b. What kind of construction materials can the Village contribute for water facility construction? 1. sand 2. gravel 3. water 4. other (specify)						
C22. a. Do you think villagers will be willing to pay money or in-kind regularly for O&M? 1. Yes 2. No 3. Don't know						
b. (if villagers will be willing to pay) How much money will a household pay? 1. Ush 2. Don't know						
D. Organization / Association / Self Help Group in the Village						
D1. Organization and Activities						
Organization / Group		Water-Related Activities	Other Activity	Comments (if any)		
1. Women's Organization						
2. Youth Organization						
3. Other (Specify)						
4. Other (Specify)						
D2. Collective Water-Related Activities (if any)						
Water-Related Activity			Participants			
1						
2						
D3. Other Collective Activities (if any)						
Activity			Participants			
1						
2						
E. Economic Condition						
E6. Vehicle Accessibility						
1. Vehicle Accessibility to the Village in Dry Season		1. Good	2. No good	3. Impossible	4. Others ()	
2. Vehicle Accessibility of the Village in Rainy Season		1. Good	2. No good	3. Impossible	4. Others ()	
3. Transportation		1. None	2. Daily bus	3. Weekly bus	4. Others ()	
4. Daily Frequency of Bus (if daily bus is available)		1. Once a day	2. Twice a day	3. 3 times a day	4. Others ()	

E8. Existing Development Project							
1. Water-Related Activity							
Donor Organization		Project Name		Activity		Year Startd	Year Ended
UNICEF							
UNDP							
NGO (Specify)							
Other (Specify)							
Other (Specify)							
2. Other Activity							
Donor Organization		Project Name		Activity		Year Startd	Year Ended
UNICEF							
UNDP							
NGO (Specify)							
Other (Specify)							
E9. Development Project in Future							
1. Water-Related Activity							
Donor Organization		Project Name		Activity		Year Startd	Year Ended
UNICEF							
UNDP							
NGO (Specify)							
Other (Specify)							
Other (Specify)							
2. Other Activity							
Donor Organization		Project Name		Activity		Year Startd	Year Ended
UNICEF							
UNDP							
NGO (Specify)							
Other (Specify)							
F. Existing Water Supply Facilities							
F1. Existing Water Supply							
Water Source	Number	Average Distance from home: one way (m)	Average time to fetch water: round-trip (min)	Main person to fetch water 1. men 2. women 3. boys 4. girls	Use of facility 1. all season 2. dry season only 3. rainy season only	Water Amount in Dry Season 1. Good 2. o.k./ so-so 3. bad	Water Quality 1. Good 2. o.k./ so-so 3. bad
a. Borehole (functioning)				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
b. Borehole (not functioning)							
c. Shallow Well				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
d. Protected Spring				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
e. Unprptected Spring				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
f. Gravity Flow Scheme				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
g. Dam/Valle Tank				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
h. River				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
i. Other (Specify)				1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
F4. Do you have satisfaction on existing water supply facilities?			1. Yes	2. No			
F5. If the answer of F4 is No, what is the problem?			Answer				
F6. What kind of activity did the villagers do for solving problem?			Answer				
E4. Health and Sanitation Expenditure							
1. Payment for water of a jelly can		a.	Ush	b. Nothing (Never pay)			
2. Water consumption (liters per capita per day)			1. less than 5	2. 6 ~ 10	3. 11 ~ 15	4. 16 ~ 20	5. 21 ~ 30
			6. 31 ~ 50	7. more than 50			

Interview Sheets for Survey C: Household Survey in Selected 6

The Household Survey in Selected 6 RGCs (the Survey C)							Date: / / 2011	
<i>Pre-requisite of respondent : Who has his/her family and live in the area within RGC</i>								
RGC		RGC number		Distict		County		
	Sub county		Parishs		Village			
	Name of Enumerator							
	Name of Respondent		Age	Gender	1. Male	2. Female		
			Occupatipon	IDP or Not	1. Yes	2. No		
A.	Household Composition (Numbers)		Men	Women	Boys	Girls		
B.	What is the main role of each person in the household?							
	Men		Women					
	Boys		Girls					
C.	When did you return to the Village?		1. _____ years ago	2. No trasmigration				
D.	Water-related Issues							
D1.	Main sources(s) of water							
	1. Dry Season							
		a. Borehole	b. Shallow well Dug well	c. Protected spring	d. Unprotected spring	e. Gravity flow system	f. Dam/ Valley tank	g. River/ Stream
	Number of roundtrips per day							
	Distance (m)							
	Time for one roundtrip (min)							
	Method of water transport							
	Person to fetch water	1	1	1	1	1	1	1
	1=most ~ 4=least	2	2	2	2	2	2	2
	M: men W: women	3	3	3	3	3	3	3
	B: boy G: girl	4	4	4	4	4	4	4
	2. Rainy Season							
		a. Borehole	b. Shallow well Dug well	c. Protected spring	d. Unprotected spring	e. Gravity flow system	f. Dam/ Valley tank	g. River/ Stream
	Number of roundtrips per day							
	Distance (m)							
	Time for one roundtrip (min)							
	Method of water transport							
	Person to fetch water	1	1	1	1	1	1	1
	1=most ~ 4=least	2	2	2	2	2	2	2
	M: men W: women	3	3	3	3	3	3	3
	B: boy G: girl	4	4	4	4	4	4	4
D2.	Water Consumption							
	1. Payment for water of a jelly can		a. Ush	b. Nothing (Never pay)				
	2. Water consumption (liters per capita per day)			1. less than 5	2. 6 ~ 10	3. 11 ~ 15	4. 16 ~ 20	5. 21 ~ 30
				6. 31 ~ 50	7. more than 50			
D3.	Water-Borne Disease in the Family / Household.							
	Disease	Prevalence 1. very common 2. common 3. rare 4. very rare	Main Cause (Why did they get sick?)	Remedy/ Coping Method (What do you do when you get sick?)	Prevention (What do you do to avoid getting sick?)			
	a. Malaria/fever							
	b. Diarrhea							
	c. Skin Disease							
	d. Respiratory Disease							
	e. Worms							
	f. Eye Disease/Infection							
	g. Intestinal Infection							
	h. Typhoid							
	i. Other (Specify: _____)							

D4. Water and Sanitation Problems of the Family																																		
1. Circle (O) the ones that apply.																																		
a. Water source is too far																																		
b. Little water at the source in dry season																																		
c. Little water at the source even in rainy season																																		
d. Water quality is bad; a. smell, b. color, c. taste, d. other:(specify _____)																																		
e. Too many people use the same water source																																		
f. Poor water drainage																																		
g. Broken / stolen handpump or water supply facilities																																		
h. Many children are sick; a. diarrhea, b. malaria, c. respiratory disease, d. skin infection, e. eye infection, f. worms, g. other: specify _____																																		
i. Many adults are sick a. diarrhea, b. malaria, c. respiratory disease, d. skin infection, e. eye infection, f. worms, g. other: specify _____																																		
j. No / too few latrines																																		
k. Not clean clothes																																		
l. Not clean water drawing containers																																		
m. Not clean houses / compounds																																		
n. Other; specify _____																																		
2. Which one in the list above is the main problems for you? For the ranking, put "a" through "n".																																		
Rank (1=biggest problem) 1 2 3																																		
E. Others																																		
E1. Are there any adverse effects of water fetching for job opportunity of women?																																		
Answer _____																																		
E2. Are there any adverse effects of water fetching for school attendance of children?																																		
Answer _____																																		
E3. What is your responsibility for maintaining the water supply facilities?																																		
Answer _____																																		
F. Household Income																																		
F1. Total Income of the Household / Family																																		
1. Monthly Income _____ Ush 2. Yealy Income _____ Ush																																		
F2 Household Income																																		
<table border="1"> <thead> <tr> <th>Source of Income</th> <th>Monthly Income (Ush)</th> <th>Yearly Income (Ush)</th> <th>Ratio (Yearly) (% of Household Income)</th> </tr> </thead> <tbody> <tr> <td>selling animals (specify: _____)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>selling agricultural crops (specify: _____)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>selling labor (specify: _____)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>commercial activity (specify: _____)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>other 1 (specify: _____)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>other 2 (specify: _____)</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							Source of Income	Monthly Income (Ush)	Yearly Income (Ush)	Ratio (Yearly) (% of Household Income)	selling animals (specify: _____)				selling agricultural crops (specify: _____)				selling labor (specify: _____)				commercial activity (specify: _____)				other 1 (specify: _____)				other 2 (specify: _____)			
Source of Income	Monthly Income (Ush)	Yearly Income (Ush)	Ratio (Yearly) (% of Household Income)																															
selling animals (specify: _____)																																		
selling agricultural crops (specify: _____)																																		
selling labor (specify: _____)																																		
commercial activity (specify: _____)																																		
other 1 (specify: _____)																																		
other 2 (specify: _____)																																		
F3. Are there any seasonal changes of the Household income? 1. Yes 2. No																																		
F4. (If the answer of the F3 is "Yes",) How much change does happen usally? Difference																																		
for corresponding month Maximum Ush Minimum Ush																																		
F5. How many livestocks does the Household has?																																		
No. of Cattle No. of Sheep No. of Goats Other																																		
F6. Does the Household have Remittances? 1. Yes 2. No.																																		
F7. (If the answer of the F6 is "Yes",) How much remittances does your household have?																																		
1. Monthly Remittances Ush 2. Yearly Remittances Ush																																		
G. Expenditure on Water																																		
G1. How much does your Household spend for;																																		
1. Water-related issues/matters? (O&M, water, jelly can, etc.) Ush/month																																		
2. Sanitation, and hygiene-related issues/matters? (latrine expenses, soap, etc.) Ush/month																																		
3. Health-related issues/matters? (medicine, hospital visit, etc.) Ush/month																																		
G2. How much do you expect your household to pay for Drinking water in future? Ush/month																																		

H. Water and Sanitation Committee (WSC) and O&M Experience.						
H1.	Have you ever paid for water?				1. Yes	2. No
H2.	How much money did you pay as an initial contribution for water supply?				1. _____ Ush.	2. None 3. don't know
H3.	How much money did you pay every month for Operation & Maintenance?				1. _____ Ush.	2. None 3. don't know
H4.	How much money do you pay every month for Operation & Maintenance?				1. _____ Ush.	2. None 3. don't know
H5-a	Do you think people in your village will be willing to pay money or in-kind every month for WSC / O&M if a new water supply facilities are constructed?				1. Yes	2. No
H5-b	(If yes) How much will they be willing to pay per HH?				1. _____ Ush.	2. None 3. don't know
H6-a.	Will you pay for O&M of a new water supply facility?				1. Yes	2. No
H6-b.	(If yes) How much will you be willing to pay?				1. _____ Ush.	2. None 3. don't know
H7-a.	Do you know of any water facilities or handpumps that are out of order?				1. Yes	2. No
H7-b.	(If yes) Why has nobody repaired them?			Answer		
I. Family / Household Issues: What are the problems/difficulties your family is facing every day? (1=biggest problem, 6=least problem)						
	1	2	3			
	4	5	6			
J. Expectation and Fear (Please do not feed "the Right Answers" to the respondent. We want to know what people in communities think.)						
J1.	In what ways will Water Supply Facilities (WSF) improve people's lives in your village? What (good things) do you expect from WSF?					
J2.	What kind of difficulties/problems will a WSF bring to the villagers? What do you fear about a WSF?					
	J1. Expectation for a Water Supply Facility			J2. Fear for a Water Supply Facility		
	1			1		
	2			2		
	3			3		
	4			4		
	5			5		
Period.						

Interview Sheets for Survey D: Supplementary Village Survey of Selected 152

The Supplementary Village Survey of Selected 152 Villages (the Survey D)						Date: / / 2011
Village		Village number		District		County
Sub county		Parishes				
Name of Enumerator		Respondent			Position	
					Phone Number	
Location of the Centre (GPS Arc 1960)		UTM-E (m)		UTM-N (m)		Altitude (m)
(a requested point of well or assembly house of the villaeg)						
A. Population and Households						
A1. Population in the villages (Village population includes returned IDPs.)						
Total		Male		Female		
A2. Number of households in the Village (includes returned IDPs.)						
Total		Average population per household				
A3. Population of Internally displaced person (IDPs)						
Settled IDPs in the Village			Expected IDPs being returned to the Villaeg in future			
Name of sub-village	Population	Name of sub-village	Population			
B. Health, Sanitation and Hygiene of the Village						
B1. Medical facilities in the Village						
	1. None	2. Hospital	3. Clinic	4. Health centre/ Dispensary	5. Drug store	6. Other()
B2. Medical facilities outside the Village (in the next village)						
	1. None	2. Hospital	3. Clinic	4. Health centre/ Dispensary	5. Drug store	6. Other()
B3. Distance to the nearest Medical Facilities from the Village centre (m)						
	1. ~ 200	2. 201 ~ 1000	3. 1001~2000	4. 2001~5000	5. 5001~	
B4. Transportation cost for above (one round trip)						
				Ush.		
B5. Types of household latrine in use						
Type	No. of housholds in the village	% of all the existing households				
Traditional Pit Latrine						
Improved Traditional Pit Latrine						
Ventilated Improved Pit Latrine						
Other (specify:)						
B6. Latrine coverage rate in the village %						
B7. What are the methods of latrine cleaning? Answer						
B8. What are some of the constraints to latrine construction and usage, if any? Answer						
B9. Water-Borne Diseases in the Village						
Disease	Prevalence				Number of patients per year	
	very common	common	rare	very rare		
a. Malaria/fever						
b. Diarrhea						
c. Skin Disease						
d. Respiratory Disease						
e. Worms						
f. Eye Disease/Infection						
g. Intestinal Infection						
h. Typhoid						
i. Other (Specify:)						
B10. Infant Mortality Rate (Year:) /1000 Infant less than one year old						
C. Organizations and Activities for Water Supply						
C1. Did/Does the Villaeg have the Water and Sanitation Committee for Operation and Maintenance (O&M) of Water Supply Facilities?						
1. Yes 2. No						
C2. The organization was/were						
1. organized in (year) , and is still existing						
2. organized in (year) , and lasted for (year). It does not exist now.						
3. never existed.		(In this case, Skip to C16)				
C3. What kind of activities did the organization conduct in years past? Answer						

Note: Tint colored parts of Interview contents already has finished in the Survey B “Rapid Village Survey” during Phase I.

C4. Details of the organization members (roles and genders),					
Member's Role	male	female	Member's Role	male	female
C5. Has the management of the organization been going well?			Answer	Yes	No
If the answer is "No", what is the problem?					
C6. Number and the roles of employees of the organization (if any)					
Role	Number of employees		Role	Number of employees	
C7. Income and expenditure of the organization (Year: _____)					
Income	Ush	Expenditure	Ush		
C8. Breakdown					
Income			Expenditure		
1. Water revenue	Ush	Personal cost	Ush		
2	Ush	Fuel cost	Ush		
3	Ush	Maintenance	Ush		
4	Ush	Other cost	Ush		
If the organization has other incomes, please specify in the above table.					
C9. Method of water tariff collection.					
1. Specify					
2. Water fee (Ush)		per 20 liters		per month	
C10. Unaccounted for Water					
1. Bill collection rate _____ %		2. Leakage _____ %		3. Unaccounted for water _____ %	
C11. How much did a household pay as an initial contribution?					
1. _____ Ush		2. None		3. don't know	
C12. a. How much does/did each household pay regularly for O&M?					
1. _____ Ush		2. None		3. Other (Specify _____)	
b. How often does/did each household pay the above amount?					
1. monthly		2. weekly		3. Other (Specify _____)	
C13. If money is collected regularly. Who collects the money for the organization?			Answer		
C14. If money is collected regularly. Where is the money kept?			Answer		
C15. What kind of repair did the organization do for the water supply facility?			Answer		
C16. Does the Village has by-laws? 1. Yes 2. No					
C17. (if the by-laws exist) Are they in operation? 1. Yes 2. No					
C18. Does the village receive any service of Handpump mechanic (HPM)?			1. Yes 2. No		
C19. If HPM exists, was he/she trained?			1. Yes 2. No		
(in other words, does he/she have enough experiences and qualifications?)					
C20. What contribution can the Village do for a new water facility construction?			Answer		
C21. a. What kind of construction materials are available locally?					
1. sand		2. gravel		3. water 4. other (specify)	
b. What kind of construction materials can the Village contribute for water facility construction ?					
1. sand		2. gravel		3. water 4. other (specify)	
C22. a. Do you think villagers will be willing to pay money or in-kind regularly for O&M?					
1. Yes		2. No		3. Don't know	
b. (if villagers will be willing to pay) How much money will a household pay? 1. _____ Ush 2. Don't know					
D. Organization / Association / Self Help Group in the Village					
D1. Organization and Activities					
Organization / Group	Water-Related Activities		Other Activity		Comments (if any)
1. Women's Organization					
2. Youth Organization					
3. Other (Specify _____)					
4. Other (Specify _____)					
D2. Collective Water-Related Activities (if any)					
Water-Related Activity			Participants		
1					
2					
D3. Other Collective Activities (if any)					
Activity			Participants		
1					
2					

Note: Tint colored parts of Interview contents already has finished in the Survey B "Rapid Village Survey" during Phase I.

E. Economic Condition									
E1. Income									
Sources of Income					Number of Villagers Getting the Income				
					Many	Some	A few	Non	
1. Selling animals (specify: _____)									
2. Selling agricultural crops (specify: _____)									
3. Selling labor (specify: _____)									
4. Forestry (specify: _____)									
5. Other (specify: _____)									
6. Other (specify: _____)									
E2. Income per household									
1. Average monthly income per household					Ush _____				
2. Average yearly income per household					Ush _____				
3. Are there seasonal change of income?					Answer _____				
4. Number of livestock per household					No. of Cattle	No. of sheep		No. of goats	
5. Remittances					a. None	b. Some	c. Others (Specify: _____)		
E3. Unemployment ratio									
1. Male					(%)	2. Female		(%)	
E4. Health and Sanitation Expenditure									
1. Payment for water of a jelly can					a. _____ Ush	b. Nothing (Never pay)			
2. Water consumption (liters per capita per day)					1. less than 5	2. 6 ~ 10	3. 11 ~ 15	4. 16 ~ 20	5. 21 ~ 30
					6. 31 ~ 50	7. more than 50			
3. Latrine cost including soap									
payment					Nothing	A little	in between a little and a lot		A lot
% of all the village household									
4. Payment for medicine and hospital									
payment					Nothing	A little	in between a little and a lot		A lot
% of all the Village household									
E5. Schools and Commercial facilities									
					None	Primary	Secondary	High school	Others (Specify _____)
1. Number of Day schools									
2. Number of the Students									
					None	Primary	Secondary	High school	Others (Specify _____)
3. Number of Boarding Schools									
4. Number of the Students									
5. Number of Restaurants									
6. Any water use facilities (Specify: _____)									
E6. Vehicle Accessibility									
1. Vehicle Accessibility to the Village in Dry Season					1. Good	2. No good	3. Impossible	4. Others (_____)	
2. Vehicle Accessibility to the Village in Rainy Season					1. Good	2. No good	3. Impossible	4. Others (_____)	
3. Transportation					1. None	2. Daily bus	3. Weekly bus	4. Others (_____)	
4. Daily Frequency of Bus (if daily bus is available)					1. Once a day	2. Twice a day	3. 3 times a day	4. Others (_____)	
E7. Electricity									
1. Existence of Electricity					a. None	b. Single Phases	c. Three Phases		
2. When there is electric power service, how many hours (daily average) is there any electric power service?					(_____ hr./day)				
E8. Existing Development Project									
1. Water-Related Activity									
Donor Organization		Project Name			Activity		Year Startd	Year Ended	
UNICEF									
UNDP									
NGO (Specify _____)									
Other (Specify _____)									
Other (Specify _____)									
2. Other Activity									
Donor Organization		Project Name			Activity		Year Startd	Year Ended	
UNICEF									
UNDP									
NGO (Specify _____)									
Other (Specify _____)									

Note: Tint colored parts of Interview contents already has finished in the Survey B “Rapid Village Survey” during Phase I.

E9. Development Project in Future								
1. Water-Related Activity								
Donor Organization		Project Name		Activity		Year Startd	Year Ended	
UNICEF								
UNDP								
NGO (Specify)								
Other (Specify)								
Other (Specify)								
2. Other Activity								
Donor Organization		Project Name		Activity		Year Startd	Year Ended	
UNICEF								
UNDP								
NGO (Specify)								
Other (Specify)								
E10. What are the problems that people in the village are facing everyday?								
Answer								
E11. Are there any adverse effects of water fetching on employment opportunities for women?								
Answer								
Are there any adverse effects of water fetching on school attendance for children?								
Answer								
F. Existing Water Source								
F1. Existing Water Supply								
a) Functioning Borehole								
No.	Sub-village Name	Constructed by 1. Government 2. UNICEF 3. Individual/ Private sector 4. Other (NGO) 5. Don't know	Main person to fetch water 1. men 2. women 3. boys 4. girls	Use of facility 1. all season 2. dry season only 3. rainy season only	Water Amount in Dry Season 1. Good 2. o.k./ so-so 3. bad	Water Quality 1. Good 2. o.k./ so-so 3. bad		
Borehole 1			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3		
Borehole 2			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3		
Borehole 3			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3		
Borehole 4			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3		
Borehole 5			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3		
a) Functioning Borehole (continue)								
Fuctioning Boreholes	Year Constructed	Well Depth (m)	Static Water Level (m)	Pumping Method 1. Engine 2. Motor 3. Wind mill 4. Handpump 5. Nothing	O&M by 1. Government 2. UNICEF 3. Individual 4. Other 5. Don't know	Water Fee if any (Ush. Per month)	Satisfaction 1. very satisfied 2 satisfied 3. o.k. 4. not satisfied 5 disgusted	
Borehole 1				1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5	
Borehole 2				1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5	
Borehole 3				1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5	
Borehole 4				1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5	
Borehole 5				1, 2, 3, 4, 5	1, 2, 3, 4, 5		1, 2, 3, 4, 5	
a) Functioning Borehole (continued)								
Fuctioning Boreholes	Tank Volume (m3)	Population Served	No. of Times Broken	Reason for Having been Broken	Spare Parts Changed	Repair done by Whom	Cost of Repair (Ush.)	Method for Collection Money for Repair
Borehole 1								
Borehole 2								
Borehole 3								
Borehole 4								
Borehole 5								

Note: Tint colored parts of Interview contents already has finished in the Survey B “Rapid Village Survey” during Phase I.

b) Non-Functioning Borehole							
No.	Sub-village Name	Constructed by 1. Government 2. UNICEF 3. Individual/ Private sector 4. Other (NGO) 5. Don't know	Year Constructed	Year Broken	Reason for being broken, if known	Reason for no repair	
Borehole N1							
Borehole N2							
Borehole N3							
Borehole N4							
Borehole N5							

Water Source	No.	Sub-village Name	Constructed by 1. Government 2. UNICEF 3. Individual/ Private sector 4. Other (NGO) 5. Don't know	Main person to fetch water 1. men 2. women 3. boys 4. girls	Use of facility 1. all season 2. dry season only 3. rainy season only	Water Amount in Dry Season 1. Good 2. o.k./ so-so 3. bad	Water Quality 1. Good 2. o.k./ so-so 3. bad
c. Shallow Well	1						
	2						
	3			1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
	4						
	5						
d. Protected Spring	1						
	2						
	3			1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
	4						
	5						
e. Unprotected Spring	1						
	2						
	3			1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4
	4						
	5						
f. Gravity Flow Scheme	1			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
g. Dam/Valle Tank	1			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
h. River	1			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3
i. Other (Specify)	1			1, 2, 3, 4	1, 2, 3	1, 2, 3	1, 2, 3

F2. Are there any water purification facilities?	1. Yes	2. No	
F3. If the answer of F2 is yes, what kind of water quality problem do you have?	Answer		
F4. Do you have satisfaction on existing water supply facilities?	1. Yes	2. No	
F5. If the answer of F4 is No, what is the problem?	Answer		
F6. What kind of activity did the villagers do for solving problem?	Answer		

F7 Springs							
	Spring 1	Spring 2	Spring 3	Spring 4	Spring 5	Spring 6	
Water amount of Springs (Discharge) 1= good, 2= so so, 3=no good	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	
Water quality 1= good, 2= so so, 3=no good	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	

Period.							
---------	--	--	--	--	--	--	--

Interview Sheets for Survey E: Household Survey in Selected 152 Villages

The Household Survey in Selected 152 Villages (the Survey E)					Date: / / 2011				
<i>Pre-requisite of respondent : Rewtured IDP who has his/her family</i>									
Village		Village No.		District		County			
Sub county		Parishs							
Name of Enumerator									
Name of Respondent		Age		Gender		1. Male 2. Female			
		Occupatipon							
A. Household Composition									
(Numbers)		Men		Women		Boys		Girls	
B. What is the main role of each person in the household?									
Men		Women							
Boys		Girls							
C. When did you return to the Village?									
1		years ago		2. No trasmigration					
D. Water-related Issues									
D1. Main sources(s) of water									
1. Dry Season									
		a. Borehole	b. Shallow well Dug well	c. Protected spring	d. Unprotected spring	e. Gravity flow system	f. Dam/ Valley tank	g. River/ Stream	
Number of roundtrips per day									
Distance (m)									
Time for one roundtrip (min)									
Method of water transport									
Person to fetch water		1	1	1	1	1	1	1	
1=most ~ 4=least		2	2	2	2	2	2	2	
M: men W: women		3	3	3	3	3	3	3	
B: boy G: girl		4	4	4	4	4	4	4	
2. Rainy Season									
		a. Borehole	b. Shallow well Dug well	c. Protected spring	d. Unprotected spring	e. Gravity flow system	f. Dam/ Valley tank	g. River/ Stream	
Number of roundtrips per day									
Distance (m)									
Time for one roundtrip (min)									
Method of water transport									
Person to fetch water		1	1	1	1	1	1	1	
1=most ~ 4=least		2	2	2	2	2	2	2	
M: men W: women		3	3	3	3	3	3	3	
B: boy G: girl		4	4	4	4	4	4	4	
D2. Water Consumption									
1. Payment for water of a jelly can		a. Ush		b. Nothing (Never pay)					
2. Water consumption (liters per capita per day)		1. less than 5	2. 6 ~ 10	3. 11 ~ 15	4. 16 ~ 20	5. 21 ~ 30	6. 31 ~ 50	7. more than 50	
D3. Water-Borne Disease in the Family / Household.									
Disease		Prevalence 1. very common 2. common 3. rare 4. very rare		Main Cause (Why did they get sick?)		Remedy/ Coping Method (What do you do when you get sick?)		Prevention (What do you do to avoid getting sick?)	
a. Malaria/fever									
b. Diarrhea									
c. Skin Disease									
d. Respiratory Disease									
e. Worms									
f. Eye Disease/Infection									
g. Intestinal Infection									
h. Typhoid									
i. Other (Specify:)									

D4.	Water and Sanitation Problems of the Family			
	1. Circle (O) the ones that apply.			
	a. Water source is too far			
	b. Little water at the source in dry season			
	c. Little water at the source even in rainy season			
	d. Water quality is bad;	a. smell,	b. color,	c. taste, d. other:(specify _____)
	e. Too many people use the same water source			
	f. Poor water drainage			
	g. Broken / stolen handpump			
	h. Many children are sick;	a. diarrhea,	b. malaria,	c. respiratory disease,
		d. skin infection,	e. eye infection,	f. worms,
		g. other: specify _____		
	i. Many adults are sick	a. diarrhea,	b. malaria,	c. respiratory disease,
		d. skin infection,	e. eye infection,	f. worms,
		g. other: specify _____		
	j. No / too few latrines			
	k. Not clean clothes			
	l. Not clean water drawing containers			
	m. Not clean houses / compounds			
	n. Other; specify _____			
	2. Which one in the list above is the main problems for you? For the ranking, put "a" through "n".			
	Rank (1=biggest problem)	1	2	3
E.	Others			
	E1. Are there any adverse effects of water fetching for job opportunity of women?			
	Answer _____			
	E2. Are there any adverse effects of water fetching for school attendance of children?			
	Answer _____			
	E3. What is your responsibility for maintaining the water supply facilities?			
	Answer _____			
F.	Household Income			
	F1. Total Income of the Household / Family			
	1. Monthly Income	_____ Ush	2. Yealy Income	_____ Ush
	F2 Household Income			
	Souce of Income		Monthly Income (Ush)	Yearly Income (Ush)
	selling animals (specify: _____)			Ratio (Yearly) (% of Household Income)
	selling agricultural crops (specify: _____)			
	selling labor (specify: _____)			
	commercial activity (specify: _____)			
	other 1 (specify: _____)			
	other 2 (specify: _____)			
	F3. Are there any seasonal changes of the Household income?		1. Yes	2. No
	F4. (If the answer of the F3 is "Yes",) How much change does happen usally?			Difference
	for corresponding month	Maximum	Ush	Minimum
				Ush
	F5. How many livestock does the Household has?			
	No. of Cattle	No. of Sheep	No. of Goats	Other
	F6. Does the Household have Remittances?		1. Yes	2. No.
	F7. (If the answer of the F6 is "Yes",) How much remittances does your household have?			
	1. Monthly Remittances	_____ Ush	2. Yearly Remittances	_____ Ush
G.	Expenditure on Water			
	G1. How much does your Household spend for;			
	1. Water-related issues/matters? (O&M, water, jelly can, etc.)		Ush/month	
	2. Sanitation, and hygiene-related issues/matters? (latrine expenses, soap, etc.)		Ush/month	
	3. Health-related issues/matters? (medicine, hospital visit, etc.)		Ush/month	
	G2. How much do you expect your household to pay for Drinking water in future?		Ush/month	

H. Water and Sanitation Committee (WSC) and O&M Experience.			
H1.	Have you ever paid for water?	1. Yes	2. No
H2.	How much money did you pay as an initial contribution for water supply?	1. _____ Ush.	2. None 3. don't know
H3.	How much money did you pay every month for Operation & Maintenance?	1. _____ Ush.	2. None 3. don't know
H4.	How much money do you pay every month for Operation & Maintenance?	1. _____ Ush.	2. None 3. don't know
H5-a	Do you think people in your village will be willing to pay money or in-kind every month for WSC / O&M if a new water supply facilities are constructed?	1. Yes	2. No
H5-b	(If yes) How much will they be willing to pay per HH?	1. _____ Ush.	2. None 3. don't know
H6-a.	Will you pay for O&M of a new water supply facility?	1. Yes	2. No
H6-b.	(If yes) How much will you be willing to pay?	1. _____ Ush.	2. None 3. don't know
H7-a.	Do you know of any water facilities or handpumps that are out of order?	1. Yes	2. No
H7-b.	(If yes) Why has nobody repaired them? Answer		
I. Family / Household Issues: What are the problems/difficulties your family is facing every day? (1=biggest problem, 6=least problem)			
	1	2	3
	4	5	6
J. Expectation and Fear (Please do not feed "the Right Answers" to the respondent. We want to know what people in communities think.)			
J1.	In what ways will a handpump improve people's lives in your village? What (good things) do you expect from a handpump?		
J2.	What kind of difficulties/problems will a handpump bring to the villagers? What do you fear about a handpump?		
	J1. Expectation for a handpump	J2. Fear for a handpump	
	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
Period.			

Survey Result of Water Source for Piped Water Supply System

As the survey for piped water supply system, Horizontal Electrical Profiling, Vertical Electrical Sounding, Test borehole drilling, and pumping test performed with existing were performed. Boreholes which satisfy planned water demand were selected based on these result.

Methodology of Survey

(1) Horizontal Electrical Profiling

Purpose of Horizontal Electrical Profiling (HEP) is to detect the structure of fault which keeps groundwater more or to explore the change of thickness of weathered zone. Though the thickness of weathered zone is hard to estimate by this method generally, the place which has low resistivity is estimated to have thicker weathered zone than higher resistivity place. Because the deeper rock has the higher resistivity in such rocky area which is consisted of granite or gneiss. Therefore, the most of candidate points for Vertical electrical Sounding are set at the place which has the lowest resistivity place on the HEP line.

This method is measured by moving horizontally and repeating the measurement with keeping electrode spacing constant. In this study, current electrode spacing was 40m, potential electrode spacing was 5m, and moving interval was 10m. The measurement line length was about 200m in average, but it was changed depending on the situation of the site. To select a drilling point, 2 HEP lines were conducted basically.

(2) Vertical Electrical Sounding

Purpose of Vertical Electrical Sounding (VES) is to estimate the thickness of weathered layer and the depth of bedrock, and to judge the suitability of the place as drilling. VES is the most precise when the geological layer is layered. However, this target area is rocky area, which is difficult to analyze.

This method is measured by fixing a center point and repeating the measurement with expanding the electrode spacing. The bigger electrode spacing is corresponding to the deeper information. In this study, current electrode spacing was changed from 1.5m to 120m. This means the exploration depth is 120m. Because the drilling depth of existing well is almost up to 70m, the exploration depth 120m was recognized as enough. Additionally, VES was conducted near the existing well which had seemed the pumped water was enough. This is called as "Comparison Survey." This survey let us know the suitable resistivity structure in the target area.

(3) Test Borehole Drilling

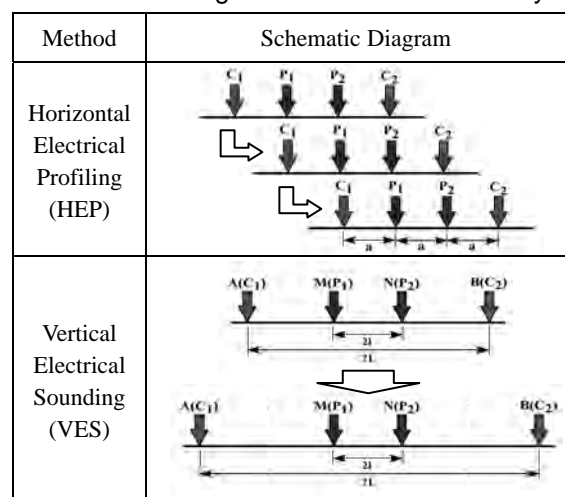
At the selected point by VES, the test borehole drillings were conducted. The diameters of drilling were; 12 inches up to 6m depth, 10 inches from 6m depth in the collapse layer, and 8 inches in the rock. While

Quantity of Survey for Piped Water Supply System

RGC No.	RGC Name	Electrical Survey			Test Drilling	Pumping Test for Existing Well
		Comp.	HEP.	VES.		
PWS-03	Koch Goma	1	7	4	2	2
PWS-06	Unyama	1	4	4	2	4
PWS-08	Awere	1	4	2	1	2
PWS-10	Adilang	1	4	2	2	4
PWS-14	Kitgum Matidi	1	4	2	2	2
PWS-15	Corner Kilak	1	4	2	1	3
Total		6	27	16	10	17

Comp.: Comparison Survey, HEP: Horizontal electrical profiling,
VES: Vertical Electrical Sounding.

Electrode Configuration of Electrical Survey



the drilling, the drilled samples were collected and the geological condition was confirmed. After drilling, the borehole was washed by airlifting. The geophysical logging along the borehole wall was conducted. According to these geological information and geophysical logging result, screen positions were decided. Gravel was installed in the screen section between screen and borehole wall. And the above of the screen section, clay (bentonite) was installed as sanitary seal. Additionally, concrete was set from 6m depth in order to surface to protect contamination from the surface.

Pumping test was conducted to confirm the potential of the aquifer. It is consisted of the step drawdown test, the constant rate pumping test and recovery test. The step drawdown test was to estimate the safe yield of the well, measured by 5 steps and 2 hours each step. The constant rate test was conducted 24 hours continuously with the pumping rate which was determined by the step drawdown test. The recovery test was conducted up to recover the water level as static water level after constant rate test.

(4) Pumping test for the existing well

The yield of the borehole was concerned the shortage of water amount against the population of RGC. Therefore, conversion from existing well to the constructing piped water scheme was considered. The yields of existing wells were confirmed by the pumping test.

As most of the tested wells were not used that that time, the boreholes were washed first by airlifting for 2 hours average. Next, the boreholes were confirmed to keeping the wall or to being clear from foreign object by using borehole camera. The method of pumping test was the same as the pumping test for the test drilling. Finally, the wells were recovered as before.

Result of the Pumping Test

These tests are conducted to be secured of enough water yield in the RGCs. As the final result, total of safe yields of each borehole is important. The results of pumping tests are shown below.

Result of Pumping Test for Test Borehole Drilling

RGC Name	Drilling No.	Drilled Depth (m)	Static Water Level (m)	Safe Yield (m ³ /hr)	Dynamic Water Level at Safe Yield (m)	Specific Yield (m ³ /day/m)
Koch Goma	PWS-03-TD-1	88.0	10.84	1.8	20.94	4.28
	PWS-03-TD-2	61.0	8.26	< 0.3	-	-
Unyama	PWS-06-TD-1	76.0	8.33	2.4	20.94	4.57
	PWS-06-TD-2	76.0	5.68	12.0	30.00	11.84
Awere	PWS-08-TD-1	73.0	2.16	4.5	18.49	6.61
Adilang	PWS-10-TD-1	91.0	15.54	1.2	28.56	2.21
	PWS-10-TD-2	70.0	19.41	2.4	42.50	2.49
Kitgum Matidi	PWS-14-TD-1	91.0	29.40	4.8	42.83	8.58
	PWS-14-TD-2	91.0	29.83	0.6	60.28	0.47
Corner Kilak	PWS-15-TD-1	91.0	4.73	1.5	25.51	1.73

Result of Pumping Test for Existing Borehole

RGC Name	Drilling No.	Drilled Depth (m)	Static Water Level (m)	Safe Yield (m ³ /hr)	Dynamic Water Level at Safe Yield (m)	Specific Yield (m ³ /day/m)
Koch Goma	PWS-03-AT-1	>48.0	8.30	1.2	20.11	2.44
	PWS-03-AT-2	86.8	5.21	0.3	17.81	0.57
Unyama	PWS-06-AT-1	69	5.05	6.0	29.29	5.94
	PWS-06-AT-2	-	10.08	--	--	--
	PWS-06-AT-3	30	2.18	0.6	7.60	2.66
	PWS-06-AT-4	25	5.05	0.6	13.18	1.77
Awere	PWS-08-AT-1	73	5.30	5.1	14.27	13.65
	PWS-08-AT-2	84	3.28	4.5	10.76	14.44
Adilang	PWS-10-AT-1	70	17.00	3.0	24.88	9.14
	PWS-10-AT-2	51	20.75	<0.6	--	--

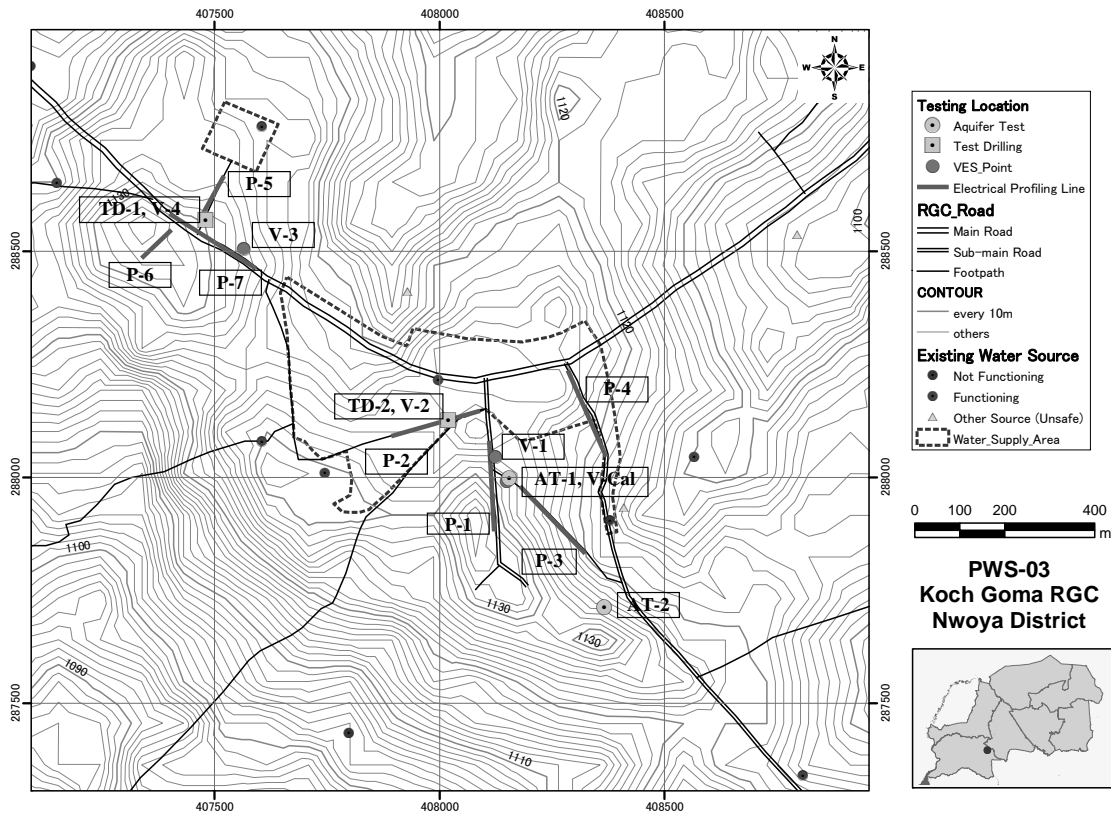
RGC Name	Drilling No.	Drilled Depth (m)	Static Water Level (m)	Safe Yield (m ³ /hr)	Dynamic Water Level at Safe Yield (m)	Specific Yield (m ³ /day/m)
Kitgum Matidi	PWS-10-AT-3	65	21.00	<0.9	--	--
	PWS-10-AT-4	60	17.01	4.8	29.40	9.3
	PWS-14-AT-1	48	25.92	9	37.06	19.39
	PWS-14-AT-2	49.7	25.00	1.8	34.61	40
Corner Kilak	PWS-15-AT-1	70	2.39	3.6	41.70	2.20
	PWS-15-AT-2	49.7	2.26	1.8	<33.3	--
	PWS-15-AT-3	70	4.77	0.6	15.00	1.41

Wells hatched by yellow color are used for the water source of piped water supply scheme in each RGC. Although safe yield of TD-1 and AT-2 in Awere RGC are the same, comparing with specific yield values, AT-2 will be used as a water source of piped water scheme.

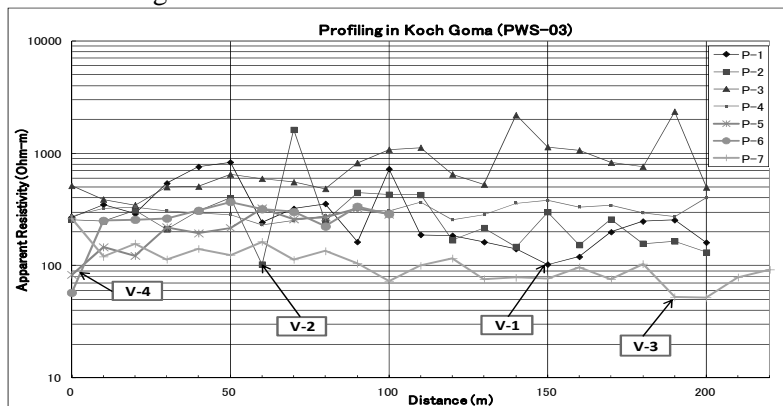
The results of survey are shown by RGC.

(1) Koch Goma

Survey lines and points, tested wells, positions of test drillings are shown in the map below.

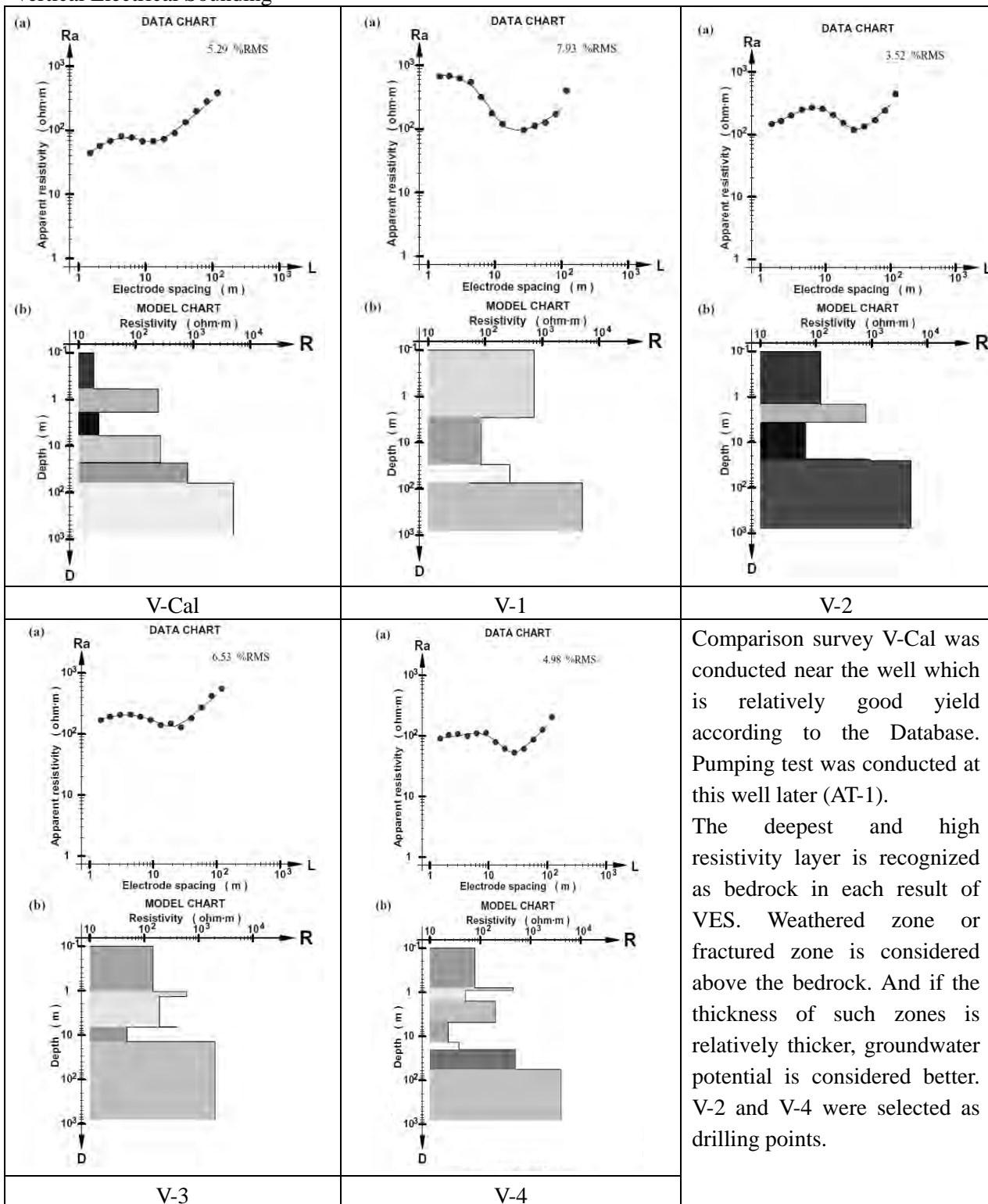


Horizontal Electrical Profiling



The points of VES are selected as the lowest resistivity point in the line P-1, P-2, P-5 and P-7. P-3, P-4 and P-6 lines have relatively high resistivity in the whole lines and there is no significant low resistivity point.

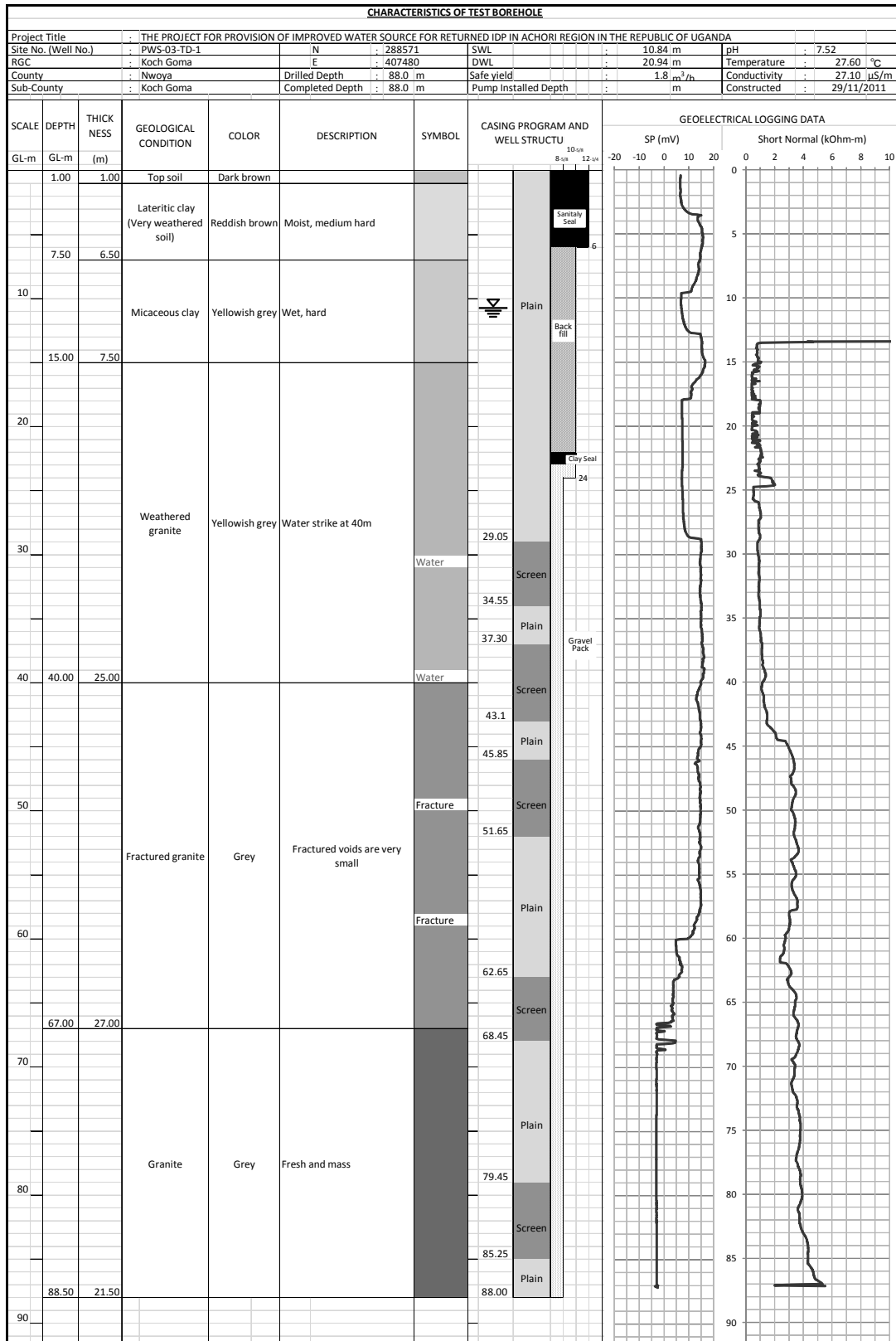
Vertical Electrical Sounding



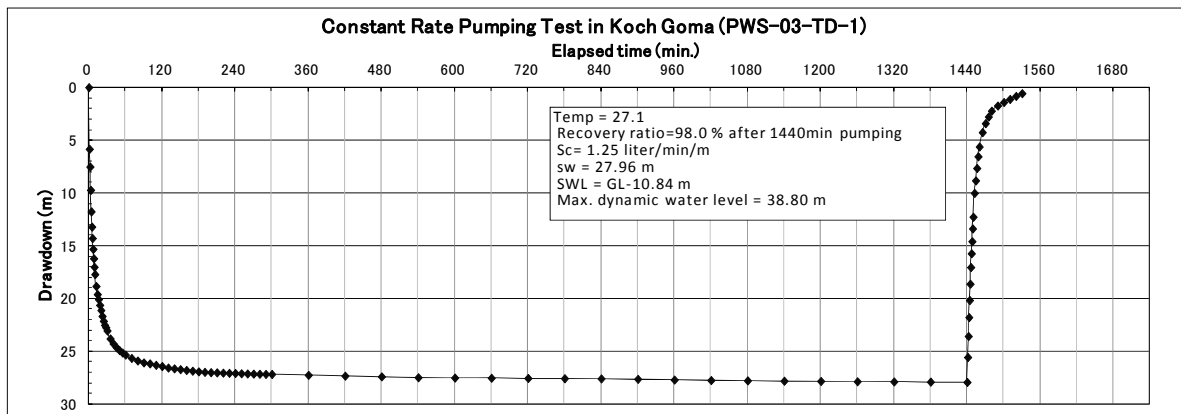
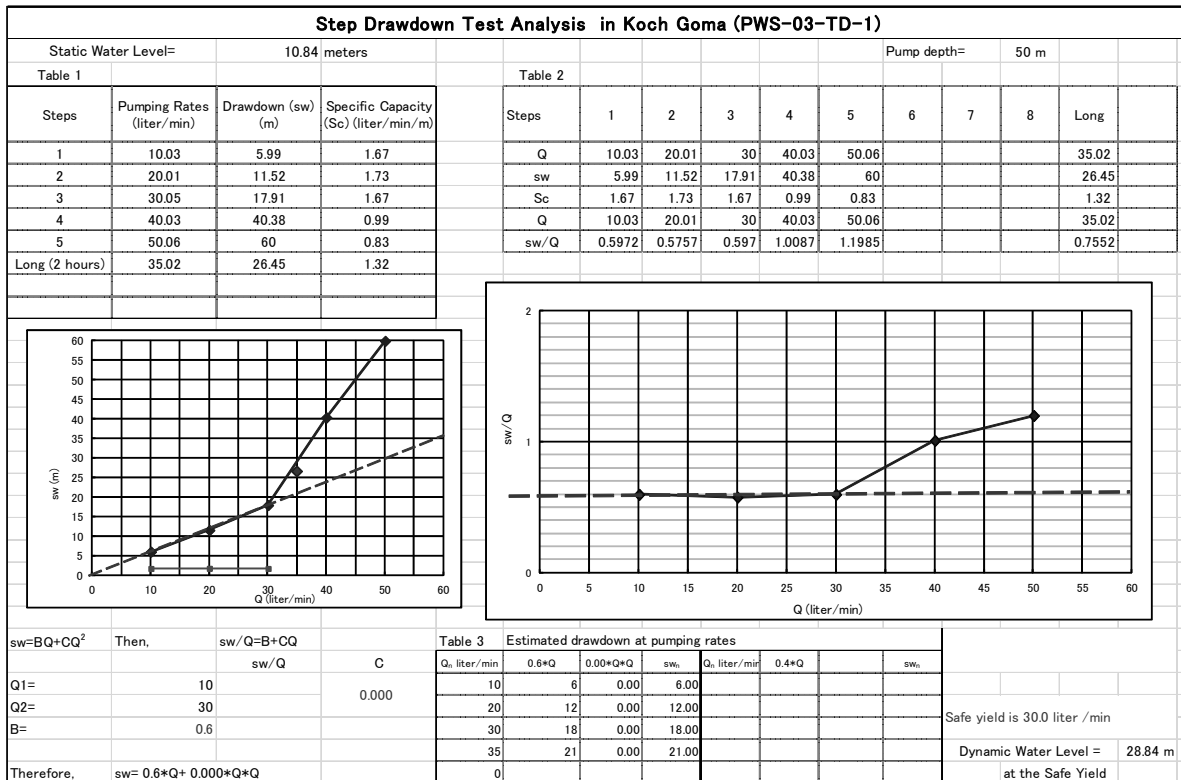
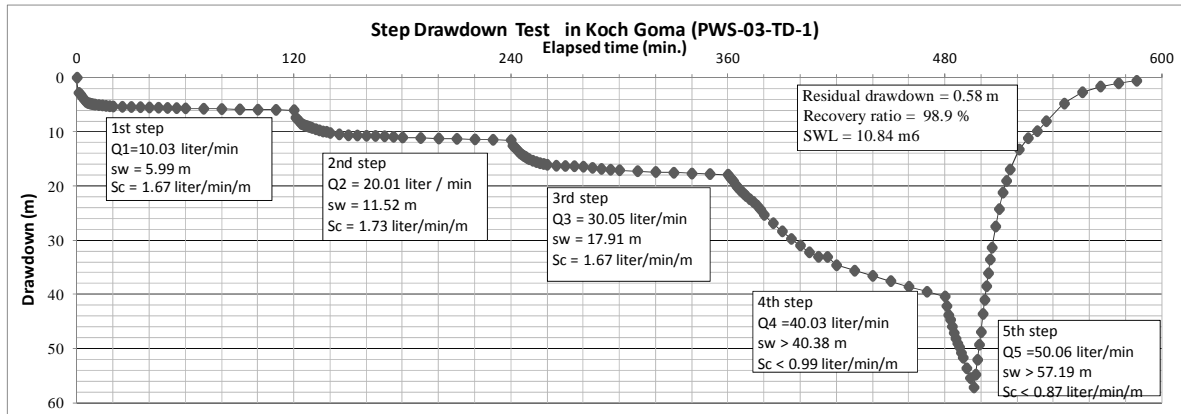
Test borehole drilling

a) PWS-03-TD-1

The drilling log including geological column and geophysical logging at VES V-4 is shown below.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 1.8m³/hr (30L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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 E-mail: waterquality@nwsco.co.ug


CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited **Serial No:** 2011/740-1
Sample Source: Borehole Water, Nwoya District **Sampled by:** Client
Date Sample Received: 04-12-2011 **Date of Report:** 06-12-2011

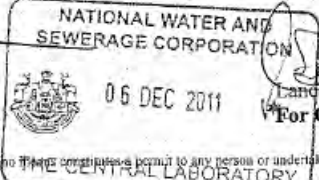
Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source ID:	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	K3207/11	
pH	--	6.67	6.5 – 8.5
Electrical Conductivity	µS/cm	234	2500
Colour: apparent	PCo	0	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	120	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	128	500
Hardness: total as CaCO ₃	mg/L	100	500
Calcium: Ca ²⁺	mg/L	20.8	75
Magnesium: Mg ²⁺	mg/L	11.5	50
Bi-Carbonate: as CaCO ₃	mg/L	128	500
Chloride: Cl ⁻	mg/L	0.60	500
Fluoride: F ⁻	mg/L	0.13	1.5
Iron: total	mg/L	0.01	1.0
Sulphate: SO ₄ ²⁻	mg/L	9	200
Nitrate - N	mg/L	0.02	5.0
Faecal coliforms	CFU/100mL	0	0


Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.



Herbert Wataga
SENIOR QC OFFICER



06 DEC 2011



Lande E. Okwerede
For QUALITY CONTROL MANAGER

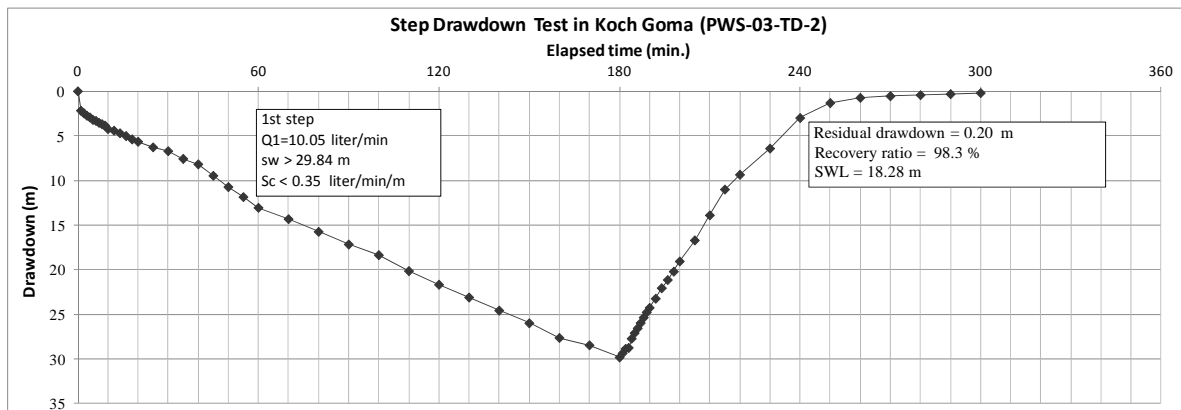
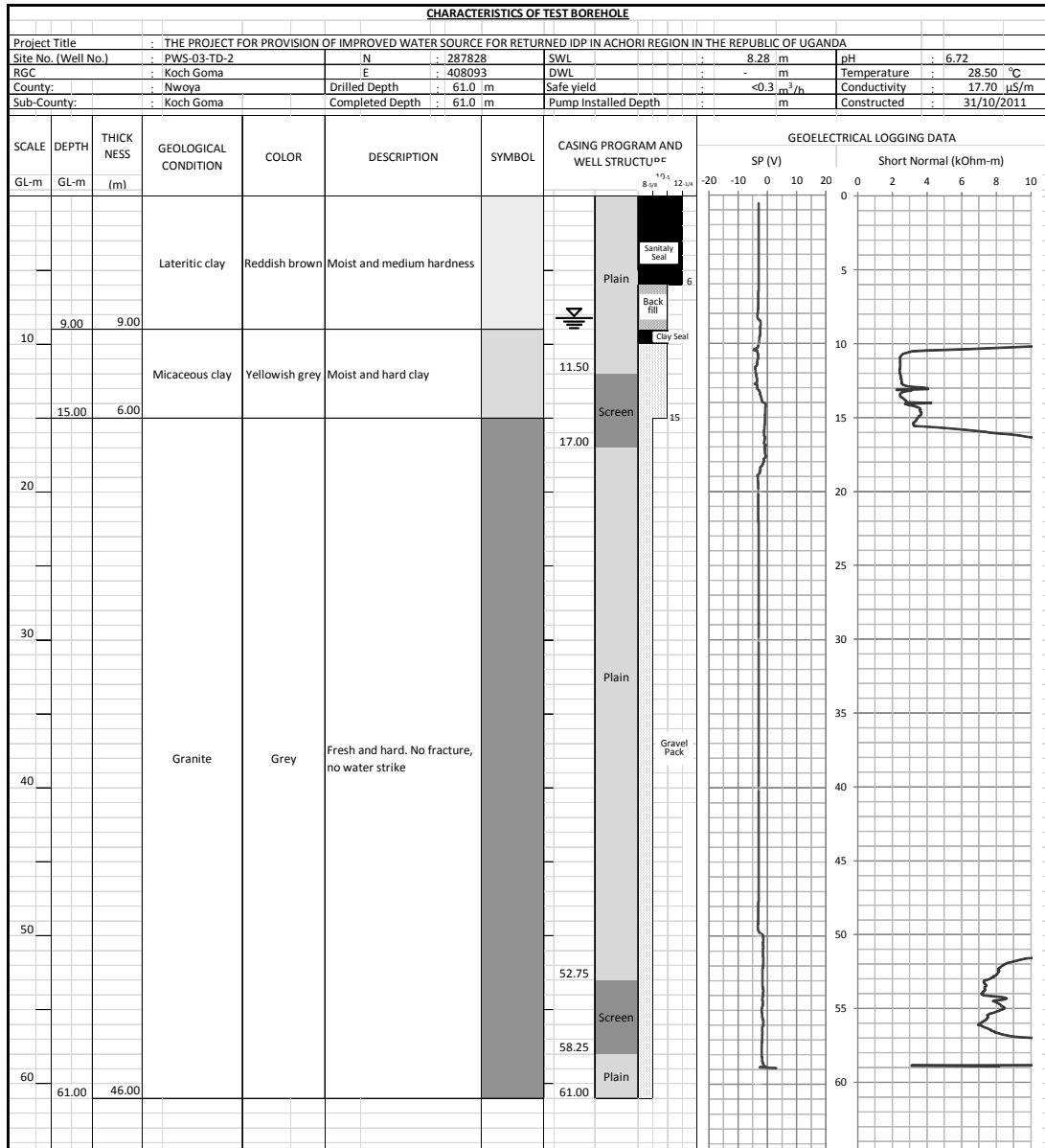
NB: The NWSOC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

b) PWS-03-TD-2

The results of drilling log, pumping test and water quality analysis at the point of VES V-2 are shown below.

Fresh granite was appeared from 15m depth in this well, and there is no good aquifer. Therefore, screen was set in 1.5m to 17m depth. Even if the pumping rate 10L/min was used in the pumping test, the water level was still going down. Therefore, the safe yield was recognized less than 5 L/min, and this well cannot be used as production well.

The result of water quality analysis shows that the test didn't detect any problem parameter.





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CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited

Serial No: 2011/740-2

Sample Source: Borehole Water, Nwoya District

Sampled by: Client

Date Sample Received: 04-12-2011

Date of Report: 06-12-2011

Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source ID:	National Standards for potable water. (Maximum Permissible)
		Koch Goma Kal Koch Goma Nwoya PWS-03-2-TD/ DWD 35548	
WS Sample Nr	--	K3208/11	
pH	--	6.43	6.5 - 8.5
Electrical Conductivity	µS/cm	135	2500
Colour: apparent	PtCo	13	15
Turbidity	NTU	1.6	10.0
Total Dissolved Solids	mg/L	69	1200
Total Suspended Solids	mg/L	1	0.0
Alkalinity: total as CaCO ₃	mg/L	72	500
Hardness: total as CaCO ₃	mg/L	60	500
Calcium: Ca ²⁺	mg/L	16.0	75
Magnesium: Mg ²⁺	mg/L	4.8	50
Bi-Carbonate: as CaCO ₃	mg/L	72	500
Chloride: Cl ⁻	mg/L	0.22	500
Fluoride: F ⁻	mg/L	0.09	1.5
Iron: total	mg/L	0.04	1.0
Sulphate: SO ₄ ²⁻	mg/L	2	200
Nitrate - N	mg/L	0.03	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks

The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.

Herbert Wataga
SENIOR QC OFFICER

NATIONAL WATER AND
SEWERAGE CORPORATION

06 DEC 2011

Lance E. Okwerede
For QUALITY CONTROL MANAGER

NB: The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

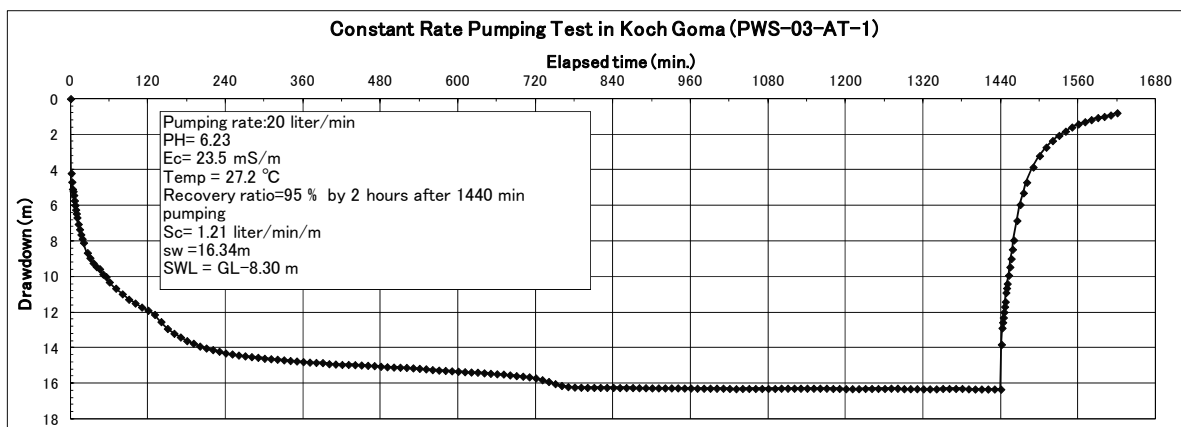
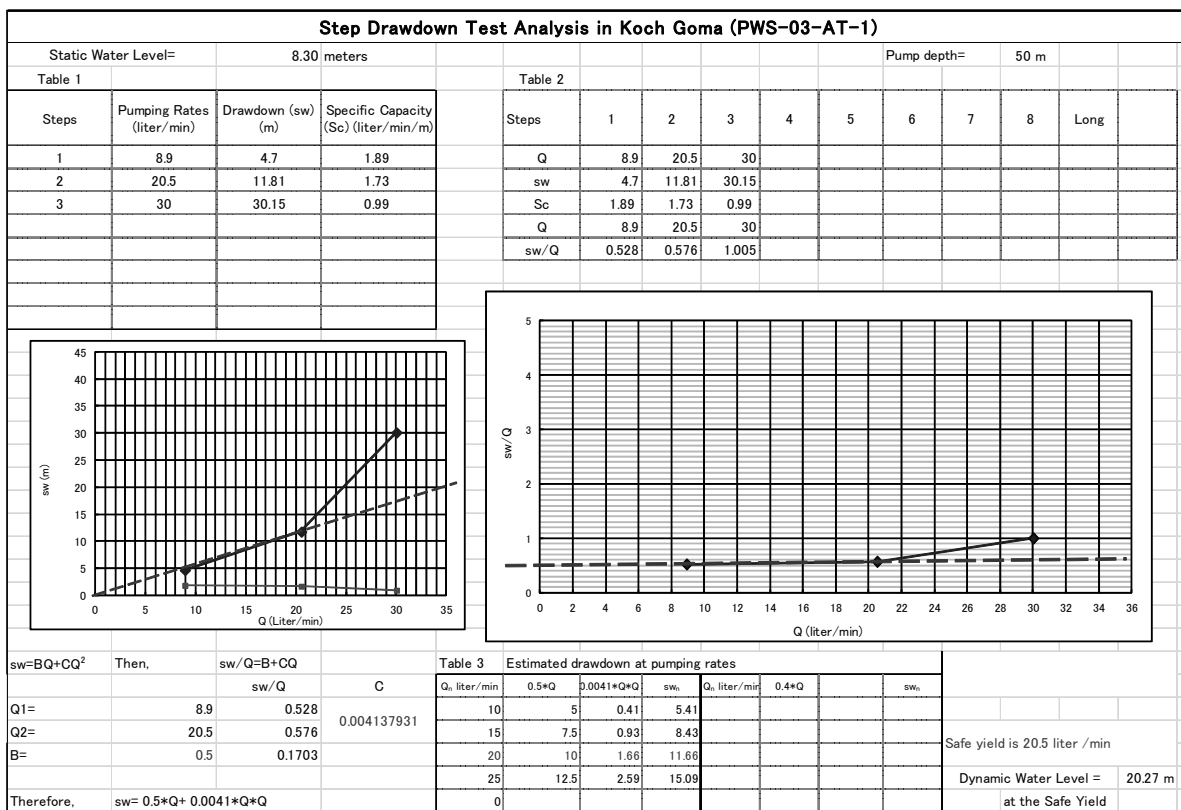
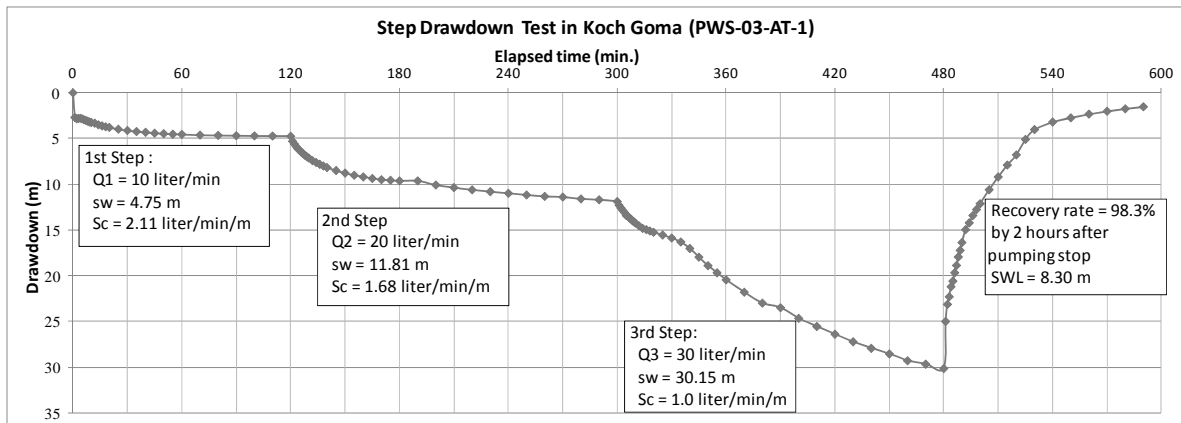
THE CENTRAL LABORATORY

Result of Pumping Test for Existing Well

Since there had been no piped water scheme in Koch Goma RGC, 2 wells were selected from the Database as better yield relatively, for pumping test well.

a) PWS-03-AT-1

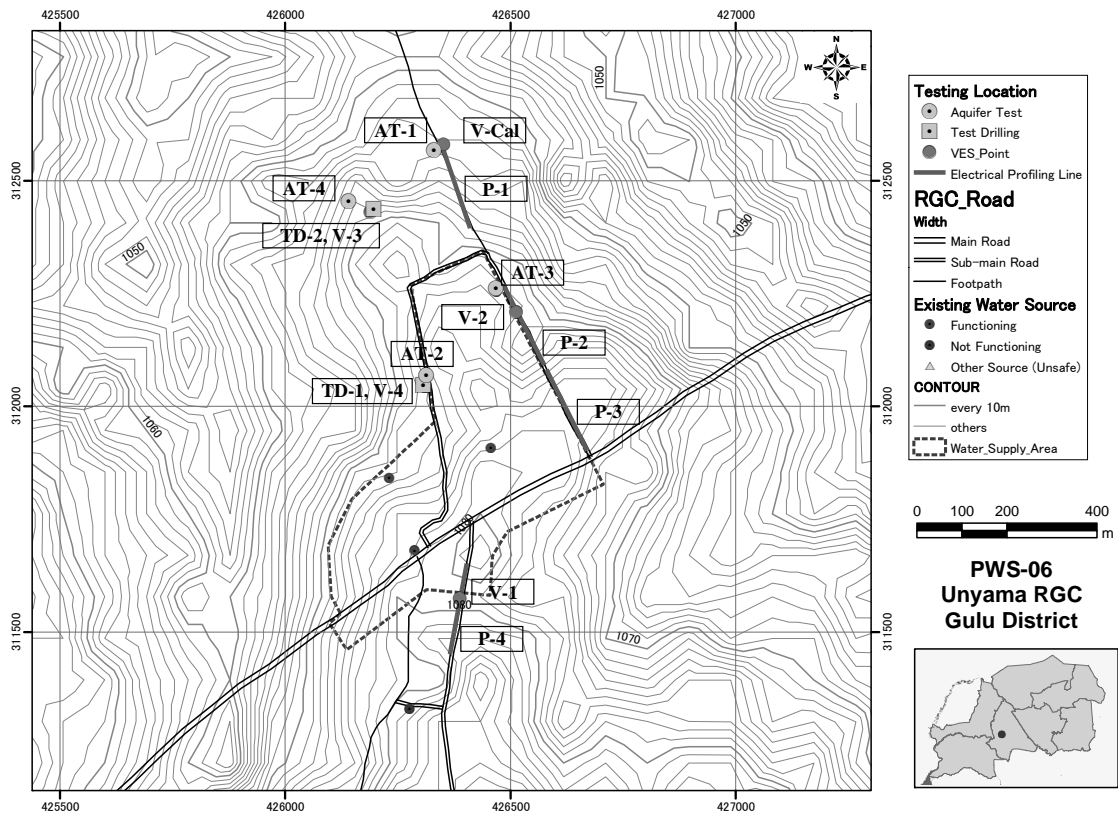
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



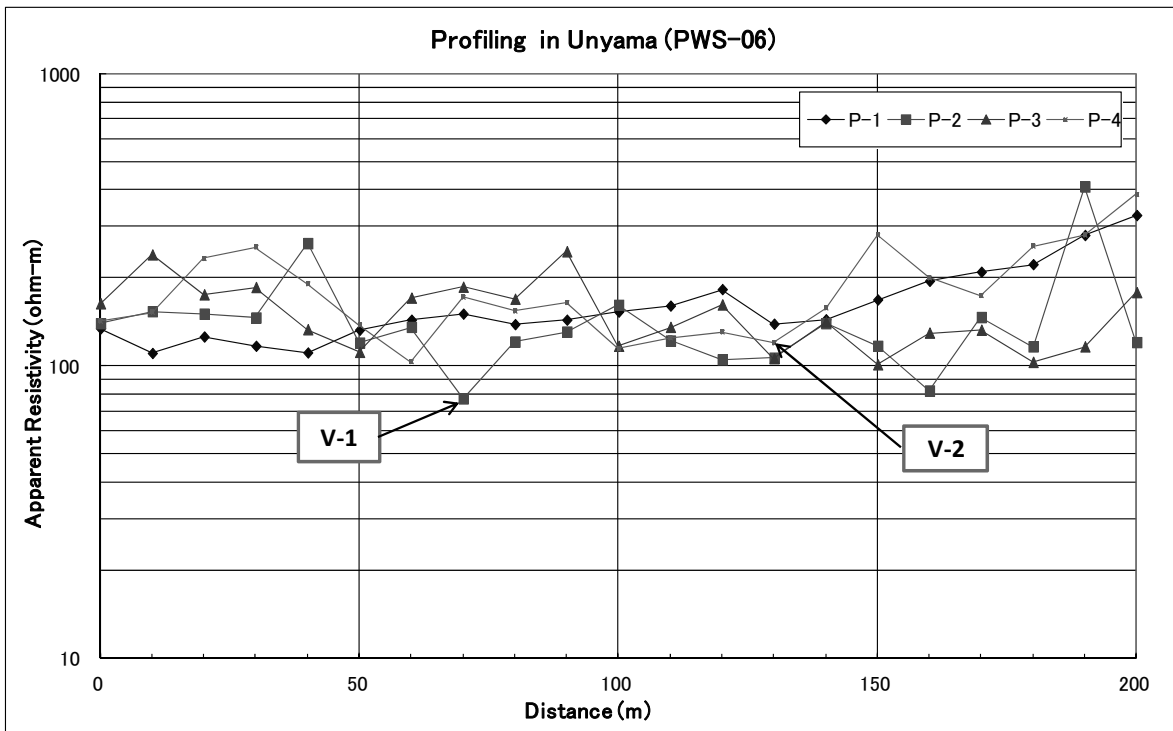
From this results, the safe yield of this well is recognized as 1.2m³/hr (20 L/min). At PWS-03-AT-2, yield was not obtained as expected

(2) Unyama

Survey lines and points, tested wells, positions of test drillings are shown in the map below.

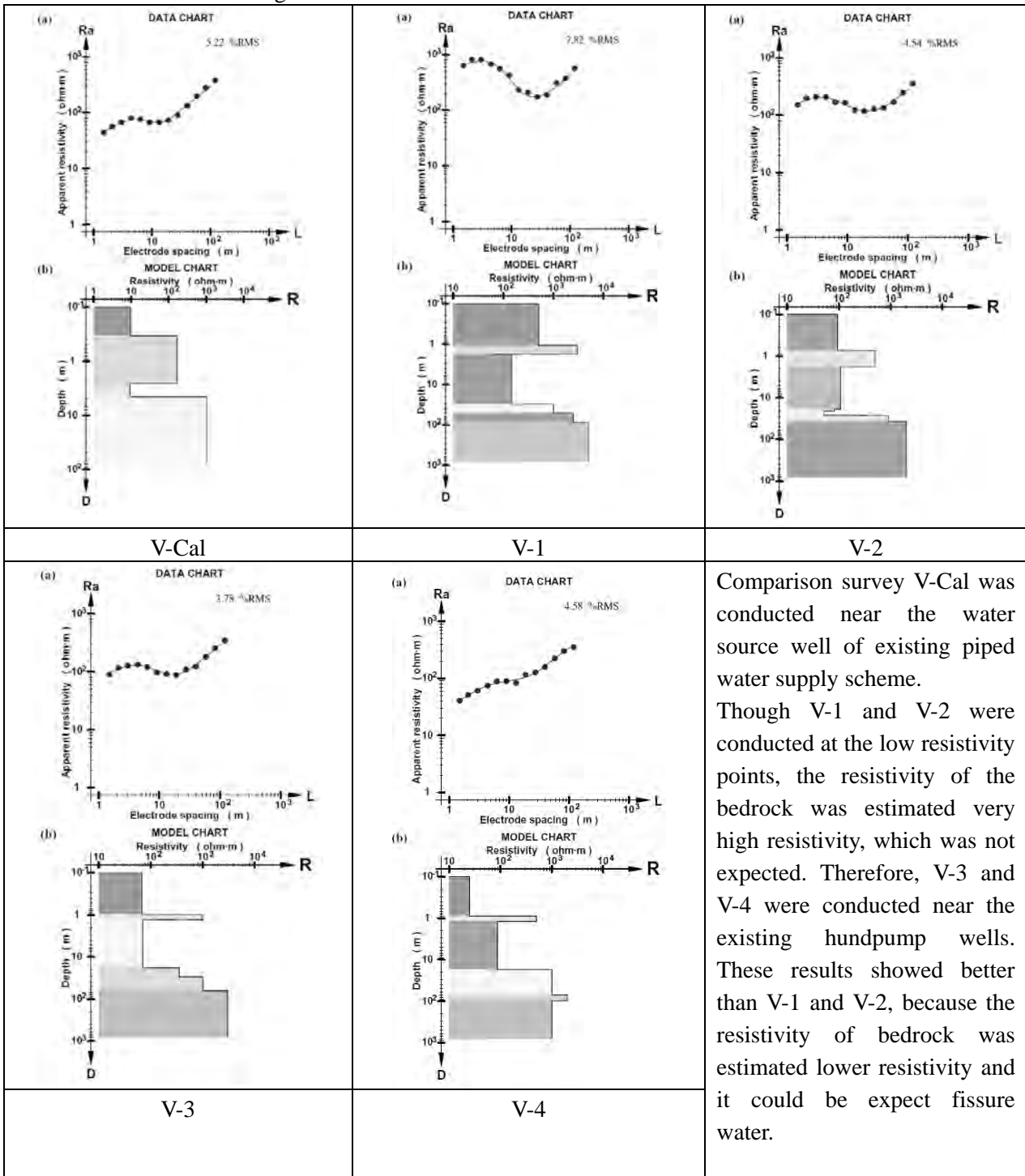


Horizontal Electrical Profiling



P-1, P-2 and P-3 were set on a line. The point of V-1 was selected as the lowest resistivity point in these 3 lines. In the P-4 line, the point of V-2 was selected as low resistivity and low elevation on the topography.

Vertical Electrical Sounding

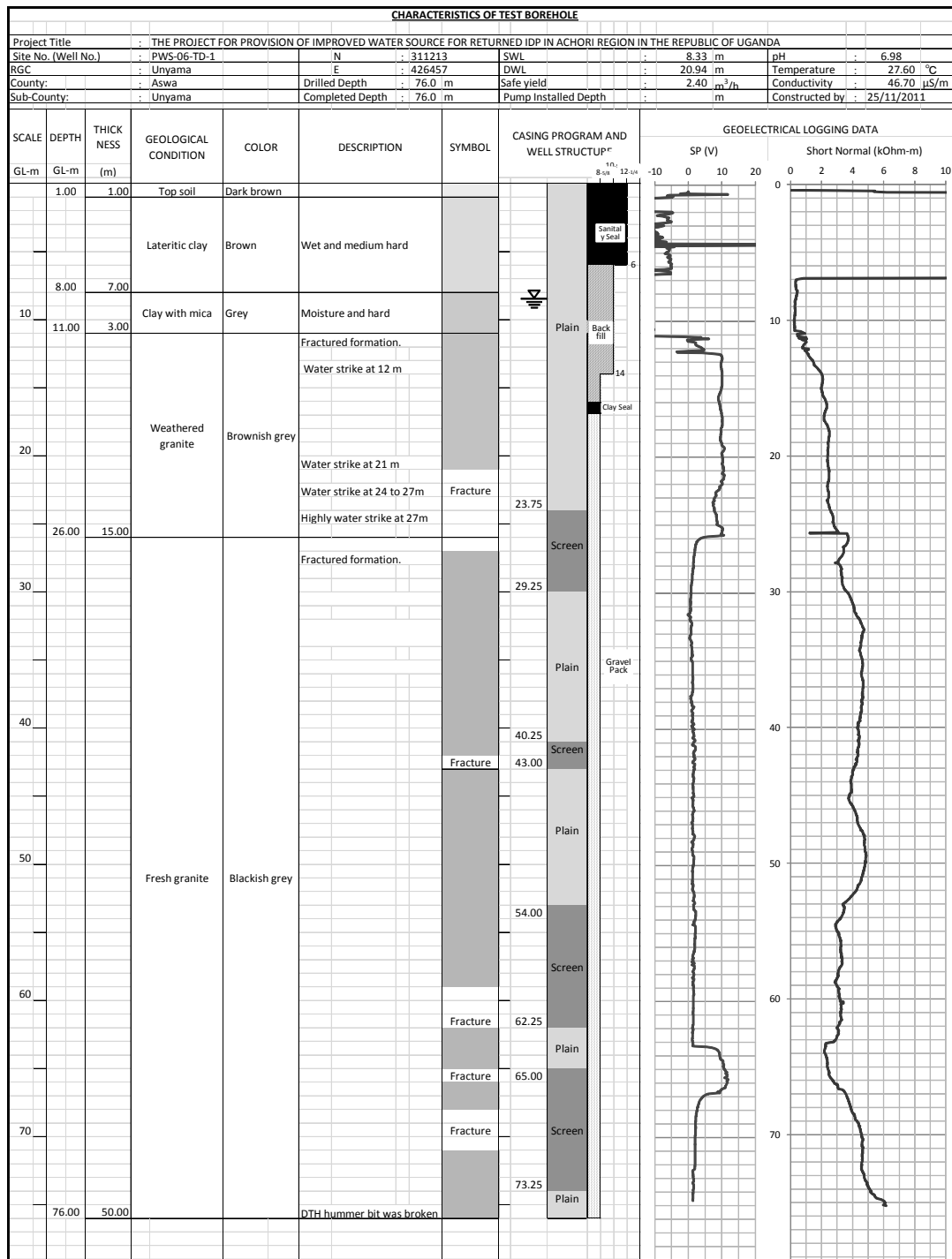


Test borehole drilling

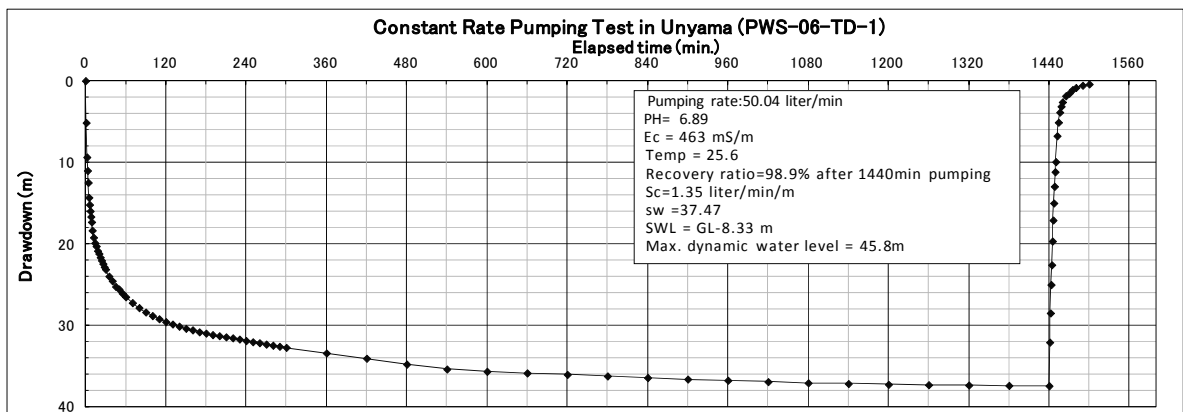
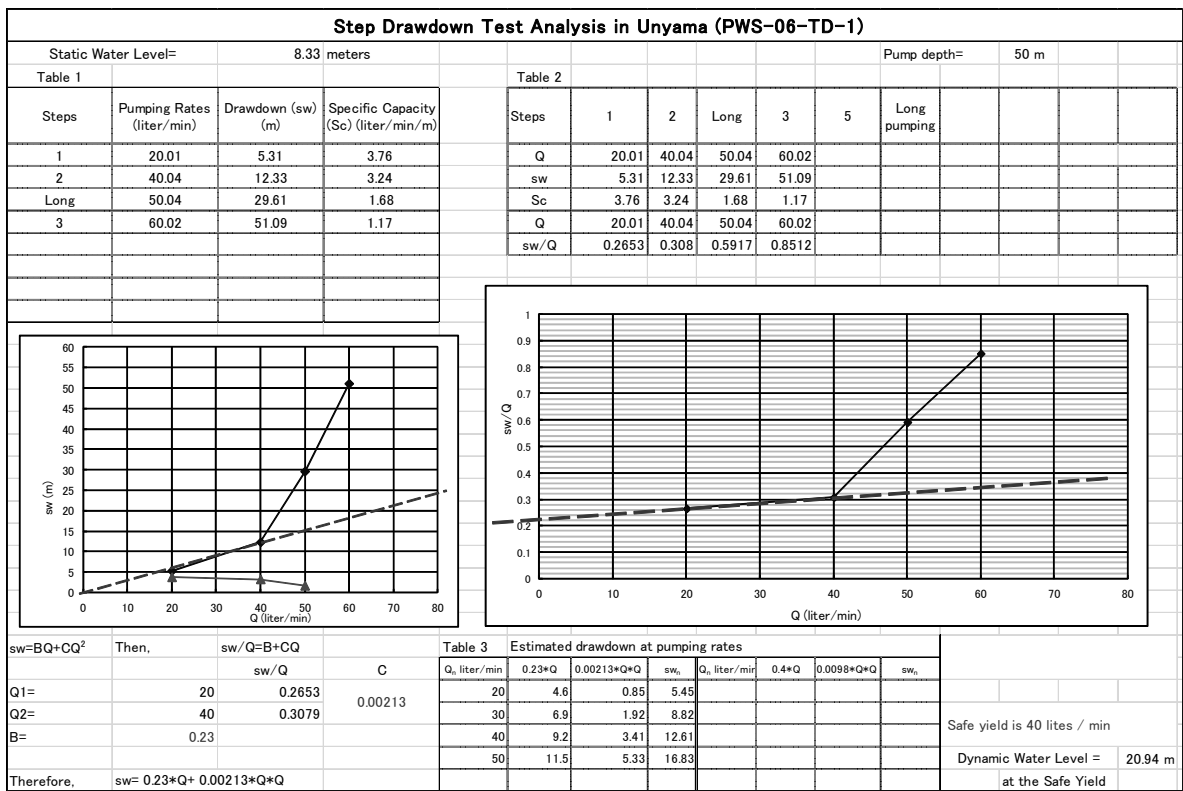
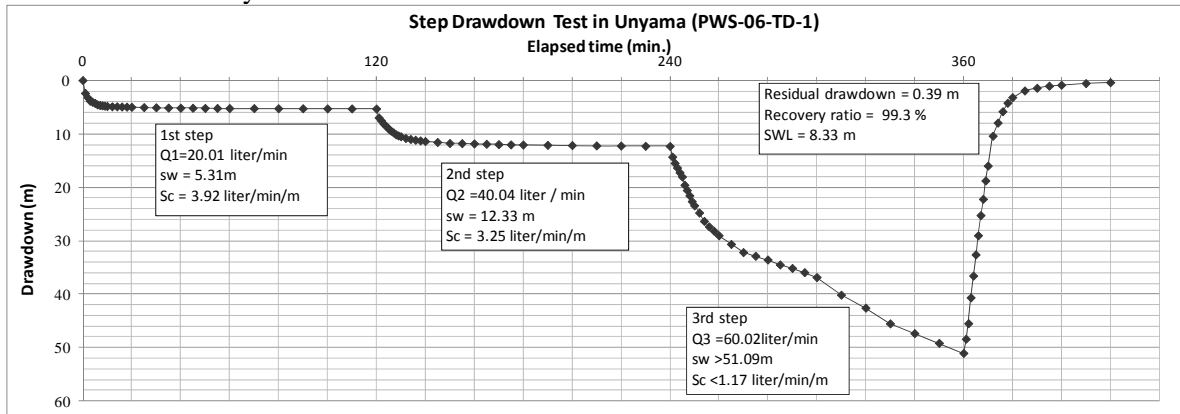
a) PWS-06-TD-1

In this borehole, bedrock appeared at 11m depth. Though the bedrock depth was shallow, fissure water was appeared at several depth in the bedrock.

The drilling log including geological column and geophysical logging at VES V-4 is shown below.



The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 2.4m³/hr (40L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



NATIONAL WATER AND SEWERAGE CORPORATION

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E-mail: waterquality@nwsco.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited

Serial No: 2011/736-1

Sample Source: Borehole Water, Gulu District

Sampled by: Client

Date Sample Received: 02-12-2011

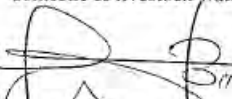
Date of Report: 05-12-2011

Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source ID:	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	Unyama RGC - 1 Pakwelo Unyama Aswa PWS-06-1-TD/ DWD 35544	
		K3144/11	
pH	--	6.60	6.5 – 8.5
Electrical Conductivity	µS/cm	425	2500
Colour: apparent	PtCo	0	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	215	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	130	500
Hardness: total as CaCO ₃	mg/L	110	500
Calcium: Ca ²⁺	mg/L	28.0	75
Magnesium: Mg ²⁺	mg/L	9.6	50
Bi-Carbonate: as CaCO ₃	mg/L	130	500
Chloride: Cl ⁻	mg/L	1.04	500
Fluoride: F ⁻	mg/L	0.11	1.5
Iron: total	mg/L	0.02	1.0
Sulphate: SO ₄ ²⁻	mg/L	23	200
Nitrate – N	mg/L	0.01	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks

The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.


Herbert Wataga
SENIOR QC OFFICER

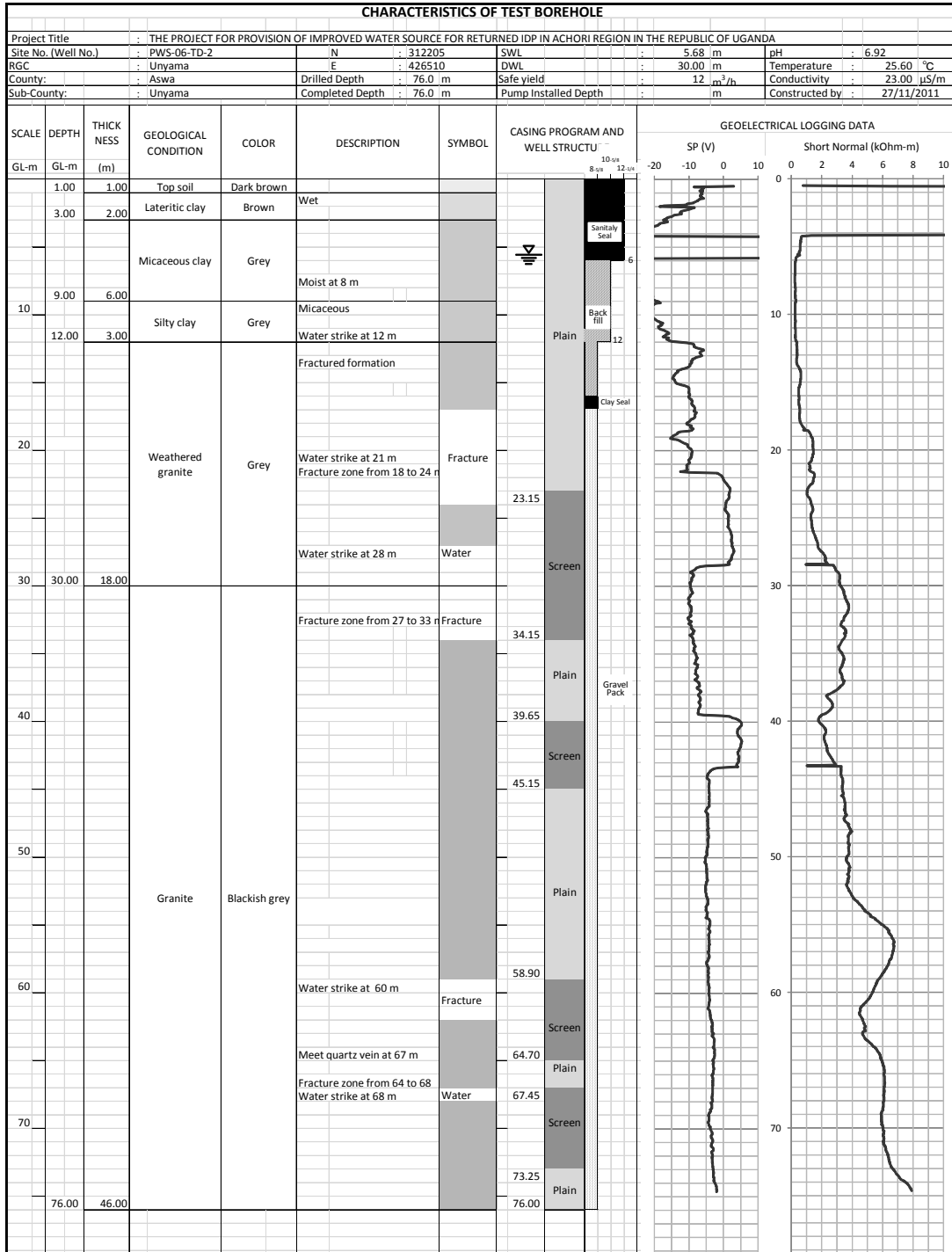


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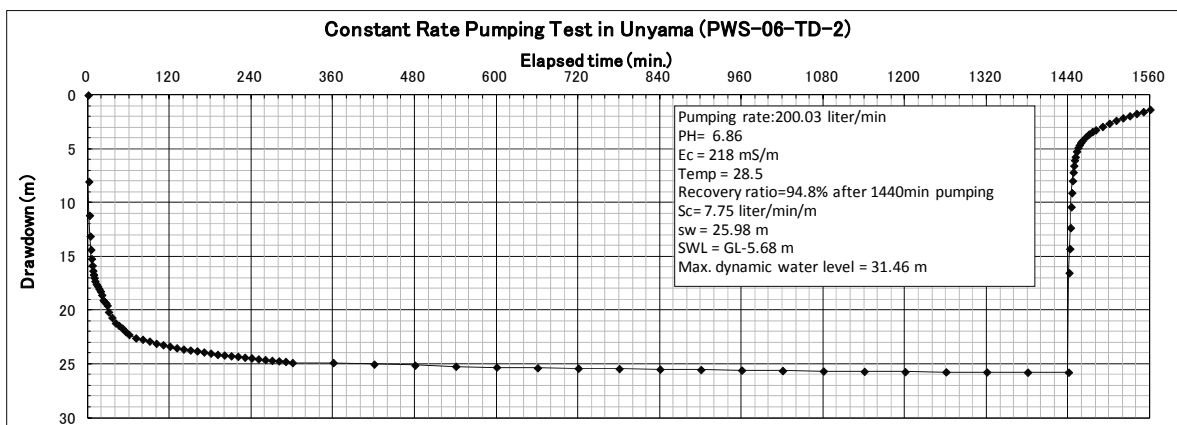
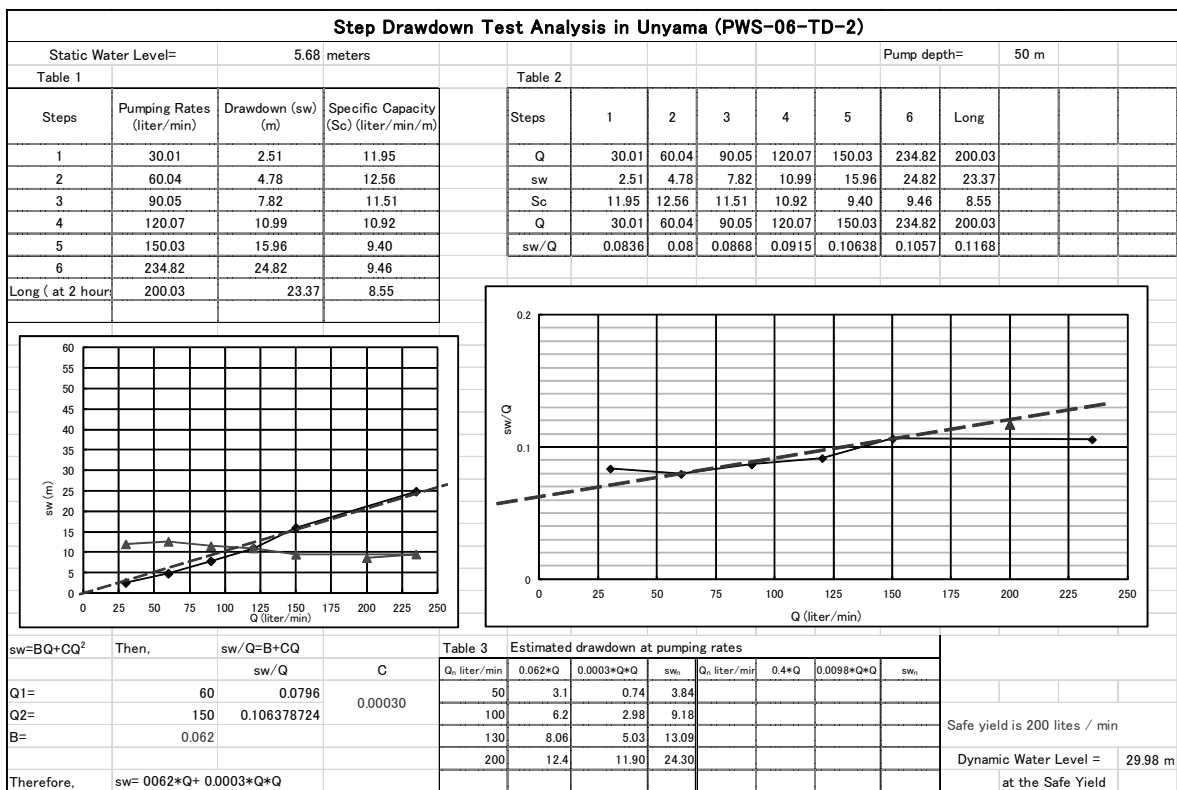
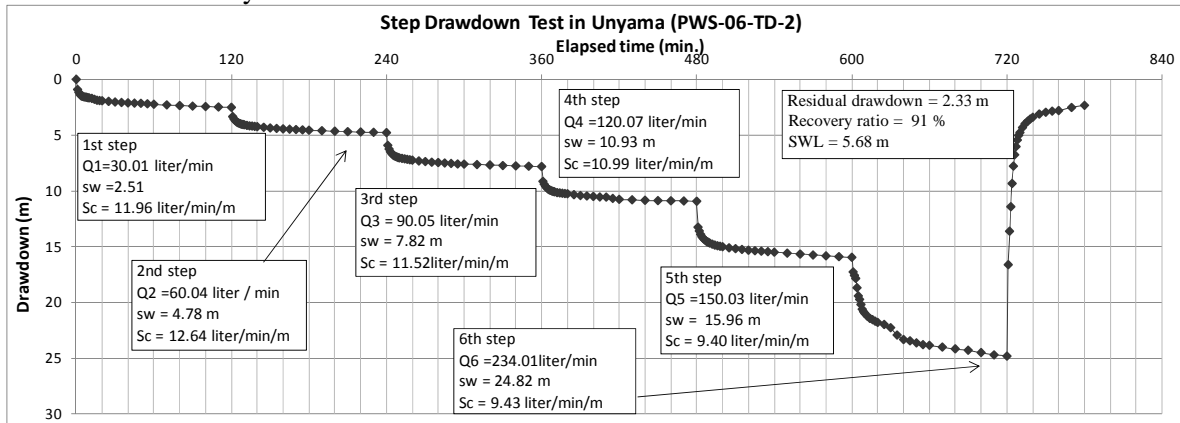
b) PWS-06-TD-2

The drilling log including geological column and geophysical logging at VES V-3 is shown below.

Though the weathered zone of the bedrock appeared at 12m depth also, groundwater was found at several depth in the weathered zone and the bedrock.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 12m³/hr (200L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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 E-mail: waterquality@nWSC.co.ug

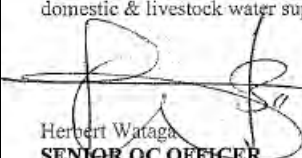
CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited **Serial No:** 2011/736-2
Sample Source: Borehole Water, Gulu District **Sampled by:** Client
Date Sample Received: 02-12-2011 **Date of Report:** 05-12-2011

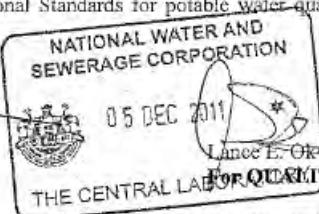
Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source ID:	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	Unyama RGC - 2 Pakwelo Unyama Aswa PWS-06-2-TD/ DWD 35545	
		K3145/11	
pH	--	6.58	6.5 – 8.5
Electrical Conductivity	µS/cm	248	2500
Colour: apparent	PtCo	9	15
Turbidity	NTU	1.5	10.0
Total Dissolved Solids	mg/L	131	1200
Total Suspended Solids	mg/L	1	0.0
Alkalinity: total as CaCO ₃	mg/L	180	500
Hardness: total as CaCO ₃	mg/L	100	500
Calcium: Ca ²⁺	mg/L	20.0	75
Magnesium: Mg ²⁺	mg/L	12.0	50
Bi-Carbonate: as CaCO ₃	mg/L	180	500
Chloride: Cl ⁻	mg/L	0.80	500
Fluoride: F ⁻	mg/L	0.13	1.5
Iron: total	mg/L	0.00	1.0
Sulphate: SO ₄ ²⁻	mg/L	4	200
Nitrate - N	mg/L	0.02	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.



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Lance E. Okwerede
FOR QUALITY CONTROL MANAGER

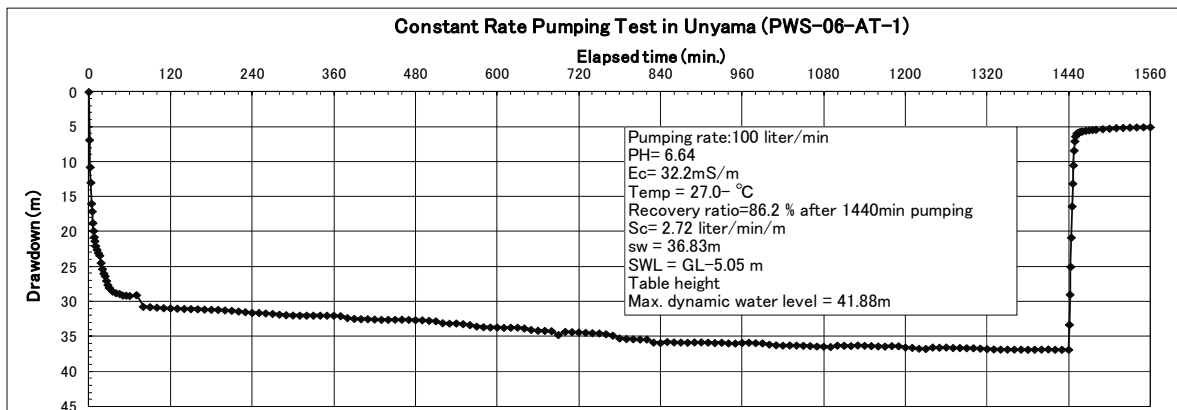
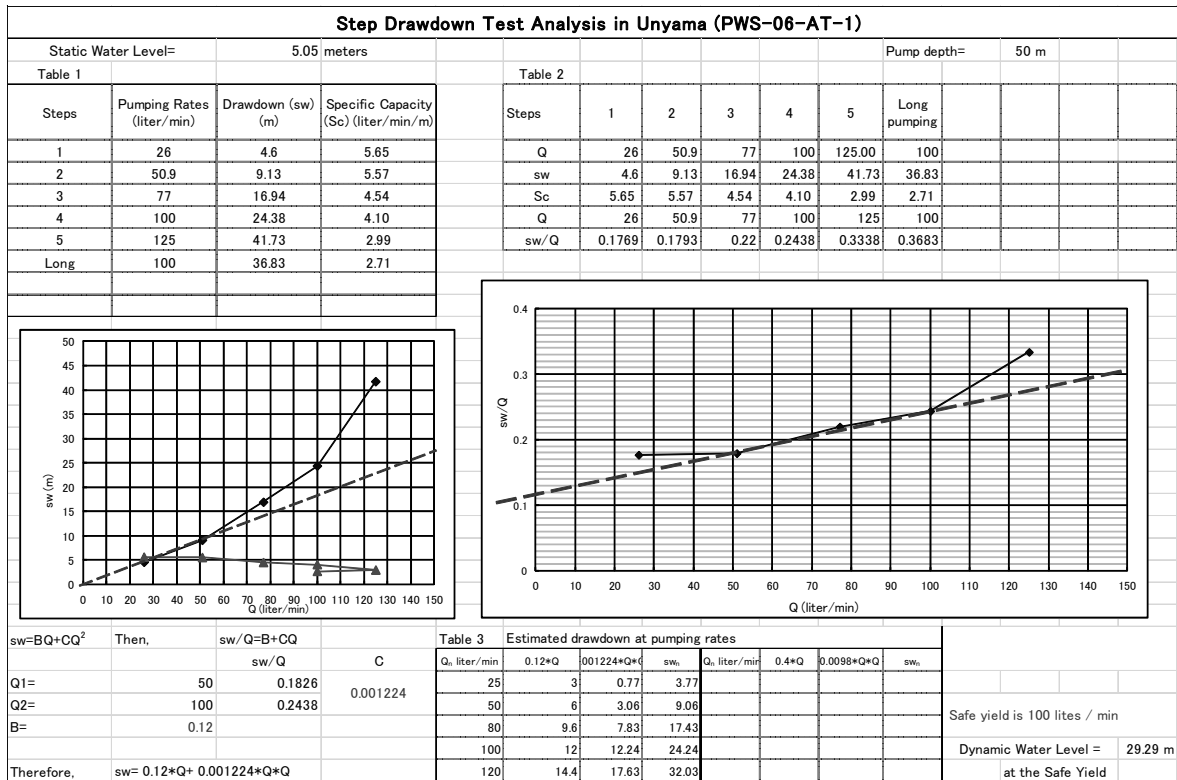
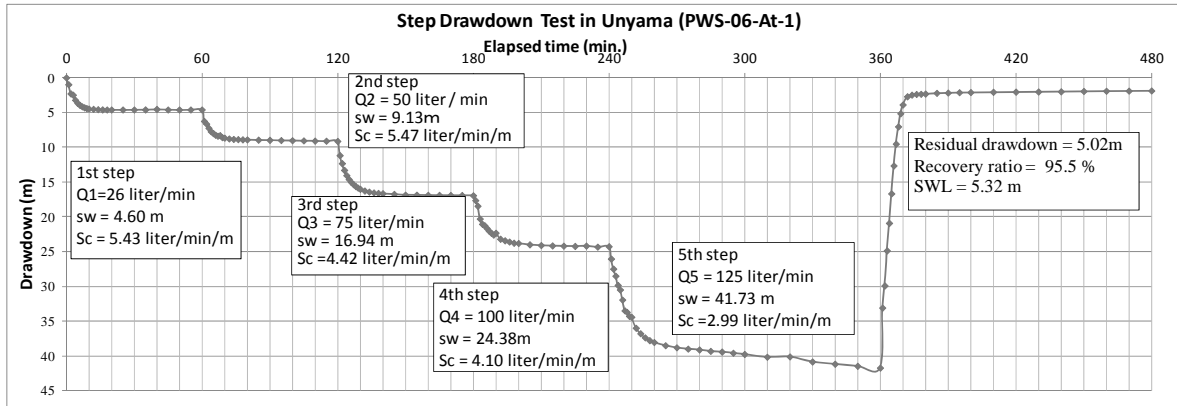
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Result of Pumping Test for Existing Well

Pumping tests were conducted at the well of the existing piped water scheme and at the wells which the residents told us (PWS-06-AT-2, PWS-06-AT-3, PWS-06-AT-4). PWS-06-AT-1 has much yield, but others are only 10 L/min. Only the result of PWS-06-AT-1 is shown in this report.

a) PWS-06-AT-1

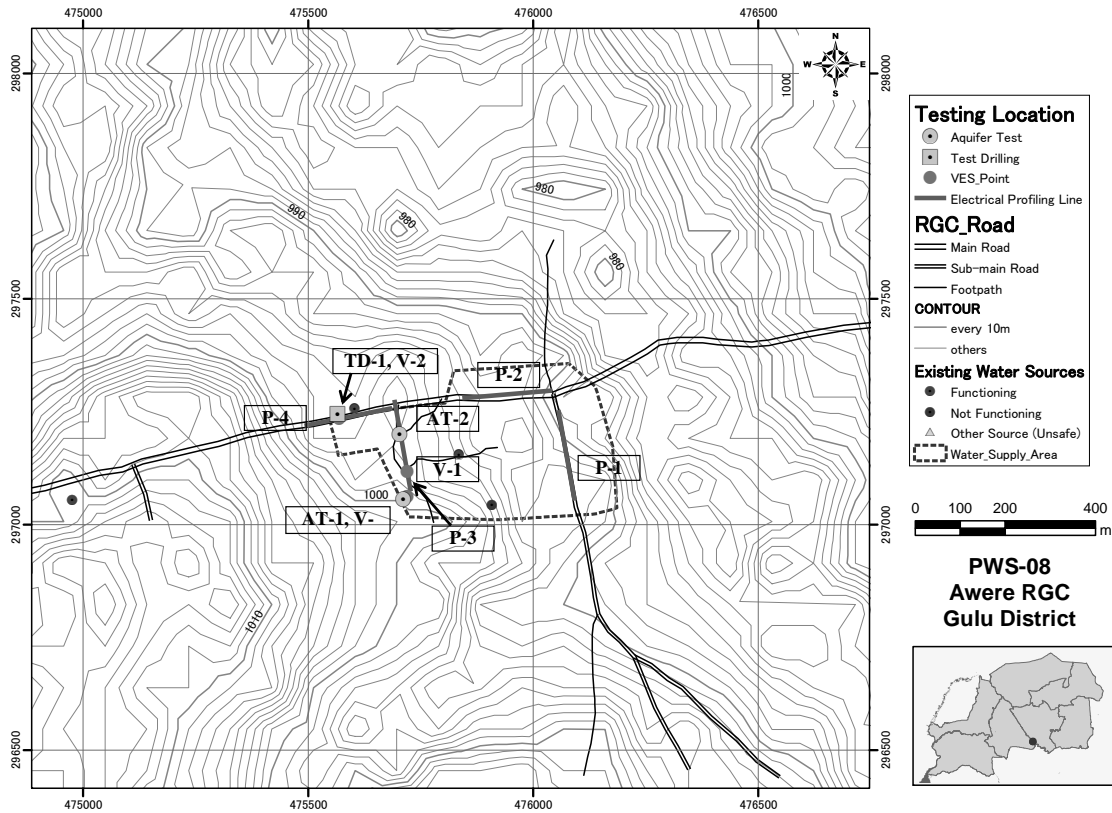
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



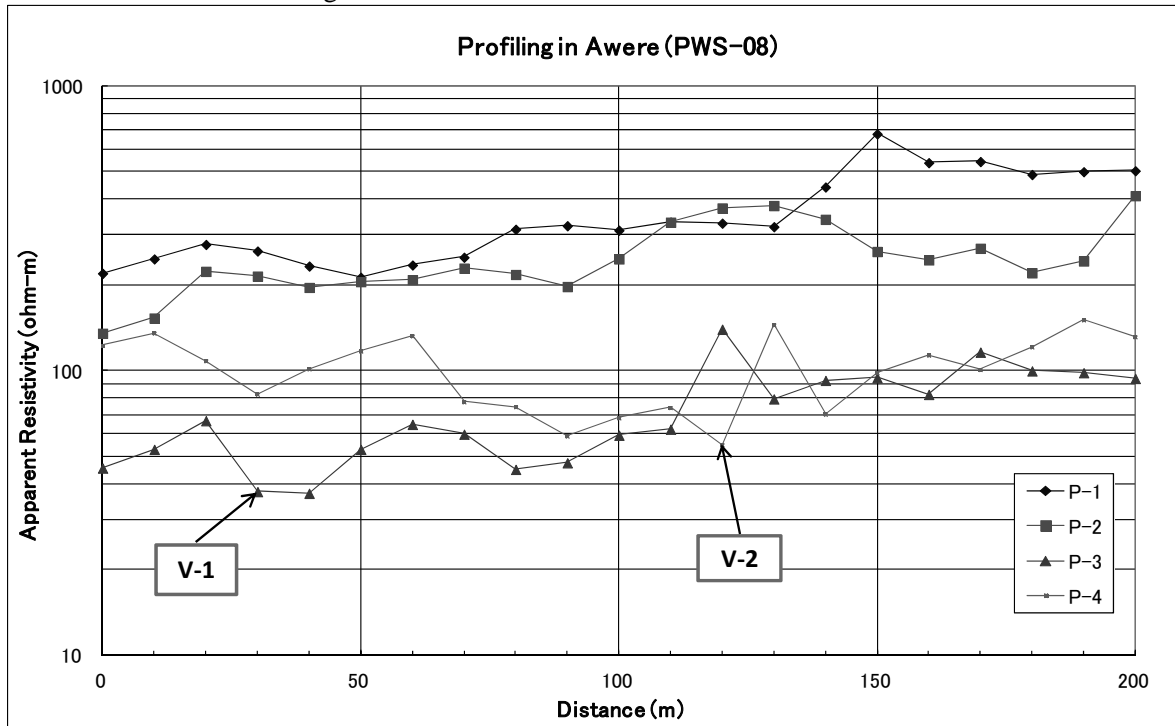
Safe yield was estimated 6.0m³/hr (100L/min) .

(3) Awere

Survey lines and points, tested wells, positions of test drillings are shown in the map below.

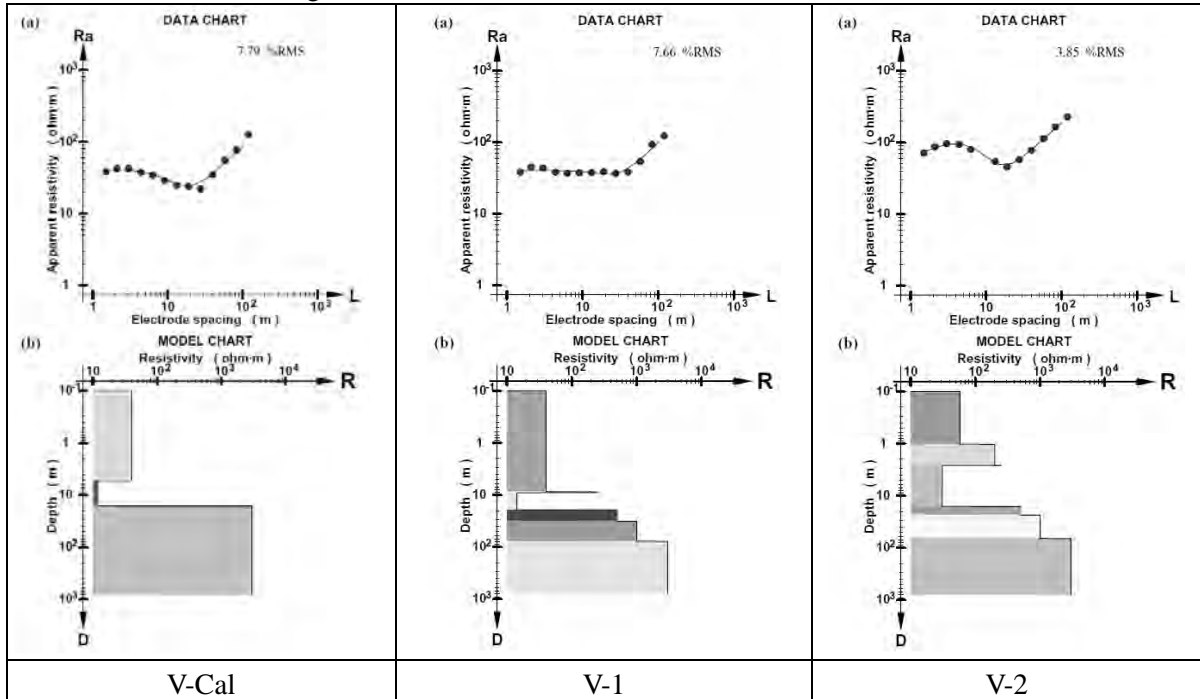


Horizontal Electrical Profiling



P-1 and P-2 lines have relatively high resistivity in the whole lines and there is no significant low resistivity point. The points of VES are selected as the lowest resistivity point in the line P-3 and P-4

Vertical Electrical Sounding



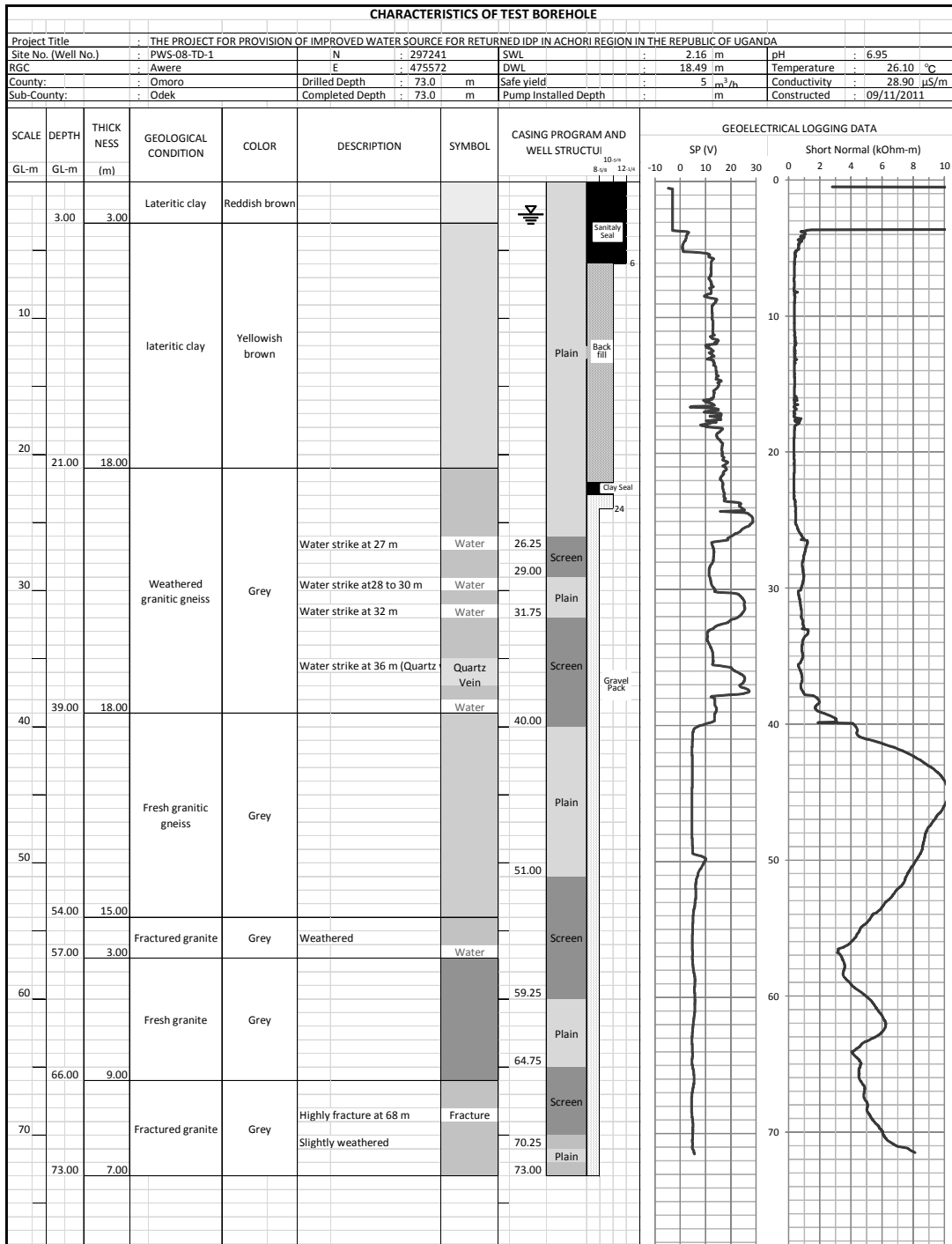
Comparison survey V-Cal was conducted near the well of the existing piped water supply scheme. In this result, the existing well was set at the place which was not very good as resistivity structure, because the bedrock depth was shallow and the resistivity was high.

The results of V-1 and V-2 are similar. The drilling point was selected at V-2, because the result was similar to V-Cal.

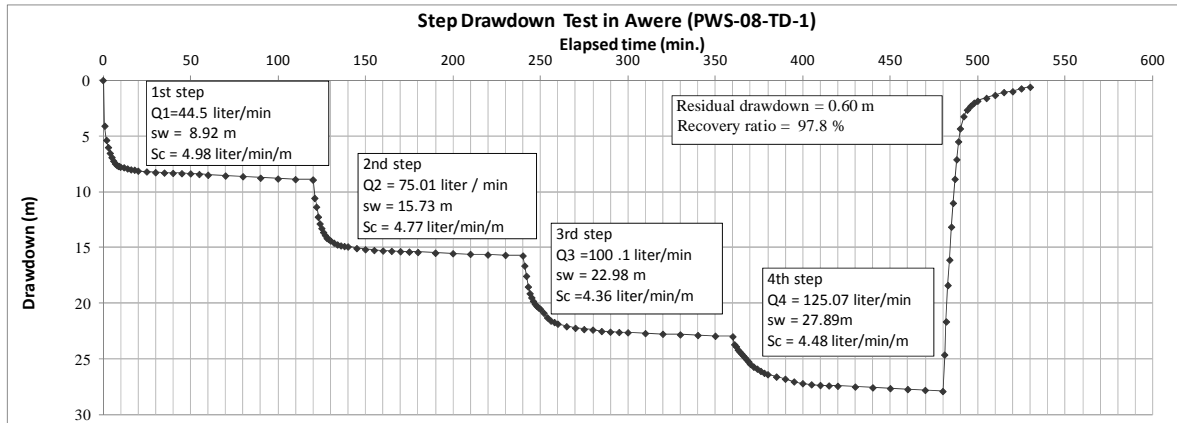
Test borehole drilling

a) PWS-08-TD-1

The drilling log including geological column and geophysical logging at PWS-08-TD-1 is shown below. Test drilling was planned only one place in Awere RGC. Lateritic clay had accumulated thick and weathered zone appeared at 21m depth. Several aquifers were found in the weathered zone.



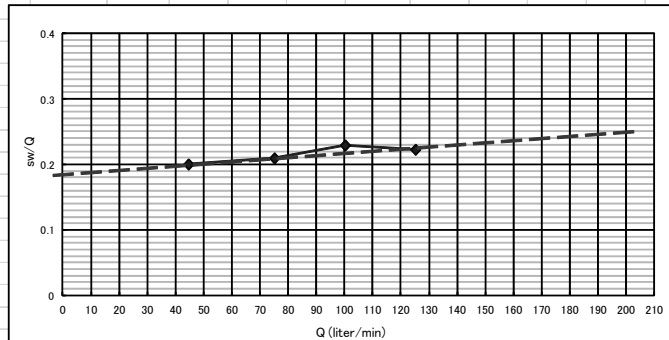
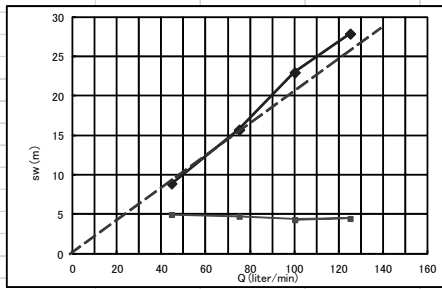
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Step Drawdown Test Analysis in Awere (PWS-08-TD-1)

Static Water Level = 2.16 meters Pump depth = 50 m

Table 1				Table 2									
Steps	Pumping Rates (liter/min)	Drawdown (sw) (m)	Specific Capacity (Sc) (liter/min/m)	Steps	1	2	3	4	Long	6	7	8	Long
1	44.5	8.92	4.98	Q	44.5	75.01	100.1	125.07	100.12				
2	75.01	15.73	4.76	sw	8.92	15.73	22.98	27.89	23.21				
3	100.1	22.98	4.35	Sc	4.98	4.76	4.35	4.48	4.31				
4	125.07	27.89	4.48	Q	44.5	75.01	100.1	125.07	100.12				
Long	100.12	23.21	4.31	sw/Q	0.2004	0.2097	0.2295	0.2229	0.2318				



sw=BQ+CQ² Then, sw/Q=B+CQ C

Q1= 44.5 0.2004 0.000304818

Q2= 75.01 0.2097

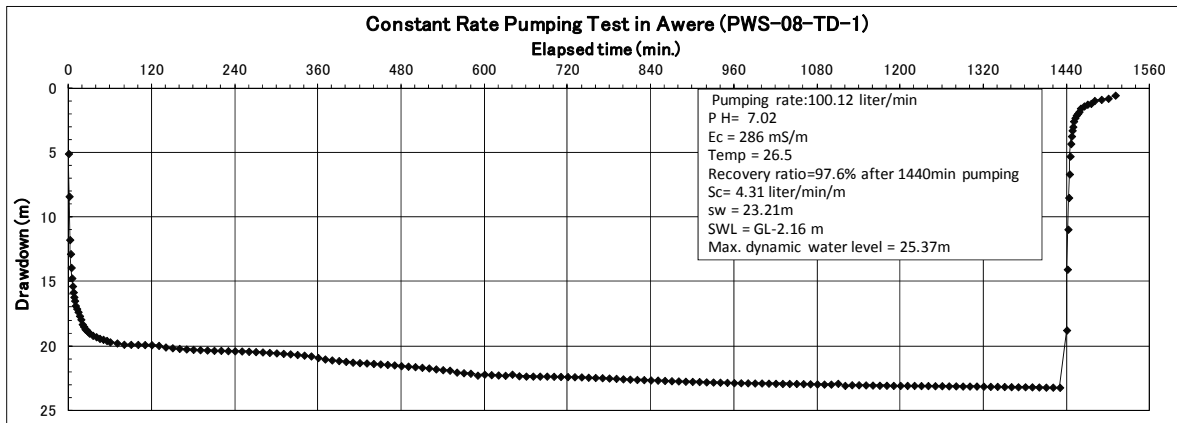
B= 0.18

Therefore, sw= 0.18*Q+ 0.0003*Q*Q

Table 3 Estimated drawdown at pumping rates						
Q _s liter/min	0.18*Q	0.0003*Q*Q	sw _s	Q _s liter/min	0.4*Q	sw _s
50	9	0.76	9.76			
75	13.5	1.71	15.21			
80	14.4	1.95	16.35			
100	18	3.05	21.05			
120	21.6	4.39	25.99			


Safe yield is 75 liter/min

Dynamic Water Level = 17.37 m at the Safe Yield



Safe yield was estimated 4.5m³/hr (75L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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CERTIFICATE OF ANALYSIS


CLIENT: Draco (U) Limited **Serial No:** 2011/725-2
Sample Source: Borehole Water, Gulu District **Sampled by:** Client
Date Sample Received: 28-11-2011 **Date of Report:** 30-11-2011

Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source No.	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	K3091/11	
pH	--	6.56	6.5 – 8.5
Electrical Conductivity	µS/cm	285	2500
Colour: apparent	PtCo	1	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	143	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	220	500
Hardness: total as CaCO ₃	mg/L	130	500
Calcium: Ca ²⁺	mg/L	28.0	75
Magnesium: Mg ²⁺	mg/L	12.0	50
Bi-Carbonate: as CaCO ₃	mg/L	220	500
Chloride: Cl ⁻	mg/L	0.80	500
Fluoride: F ⁻	mg/L	0.11	1.5
Iron: total	mg/L	0.01	1.0
Sulphate: SO ₄ ²⁻	mg/L	9	200
Nitrate – N	mg/L	0.02	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.

Herbert Wataga
SENIOR QC OFFICER



NATIONAL WATER AND SEWERAGE CORPORATION
 30 NOV 2011
THE CENTRAL LABORATORY

Rance E. Okwerede
QUALITY CONTROL MANAGER

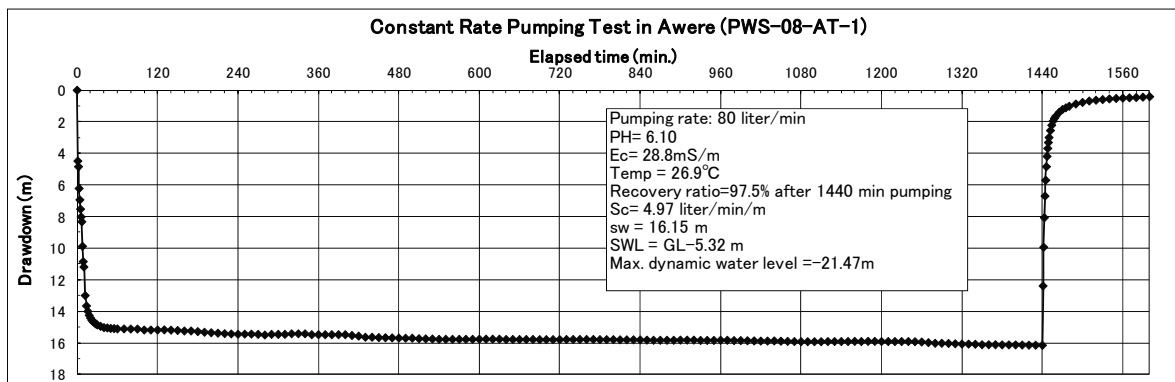
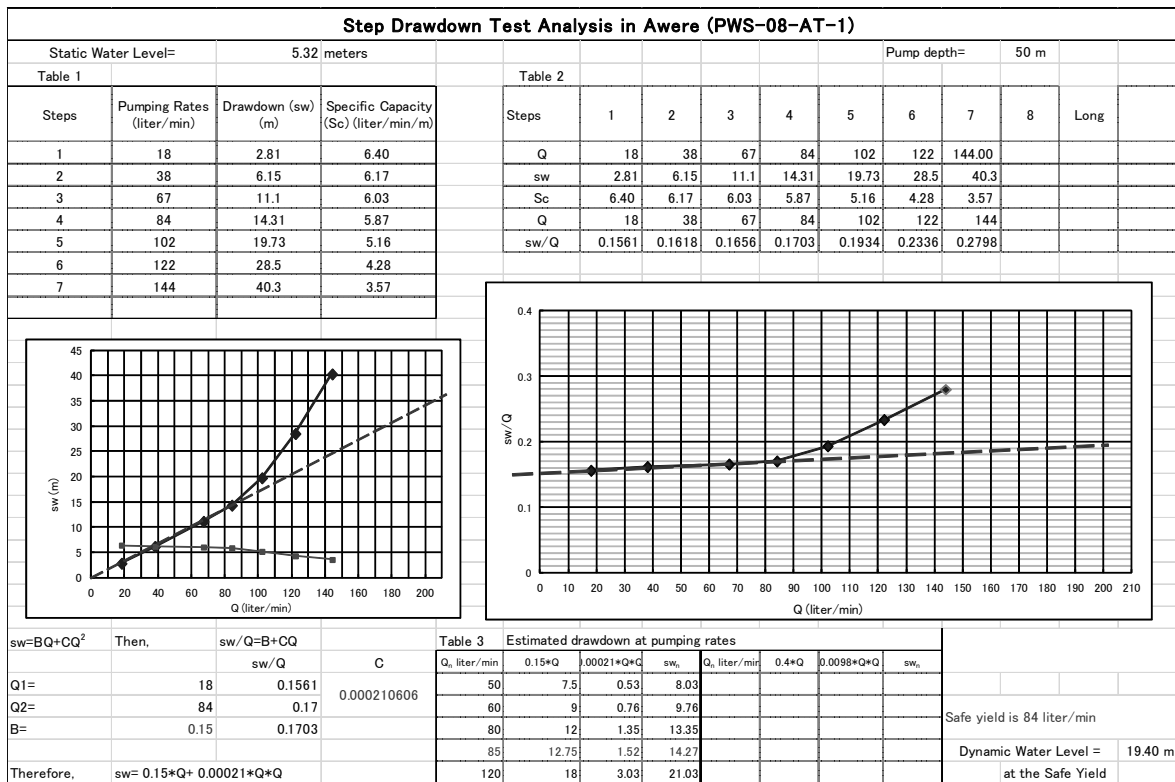
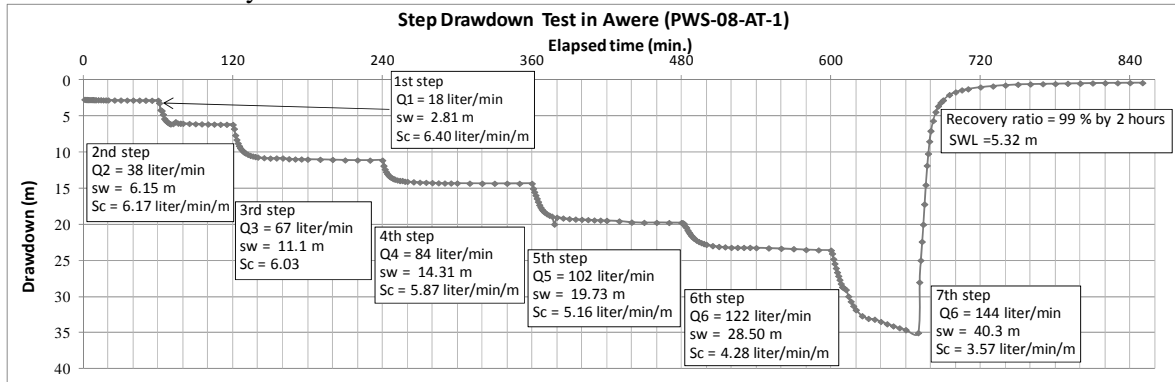
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Result of Pumping Test for Existing Well

The pumping tests were conducted in the well of the existing piped water supply scheme and in the well which was selected from the database.

a) PWS-08-AT-1

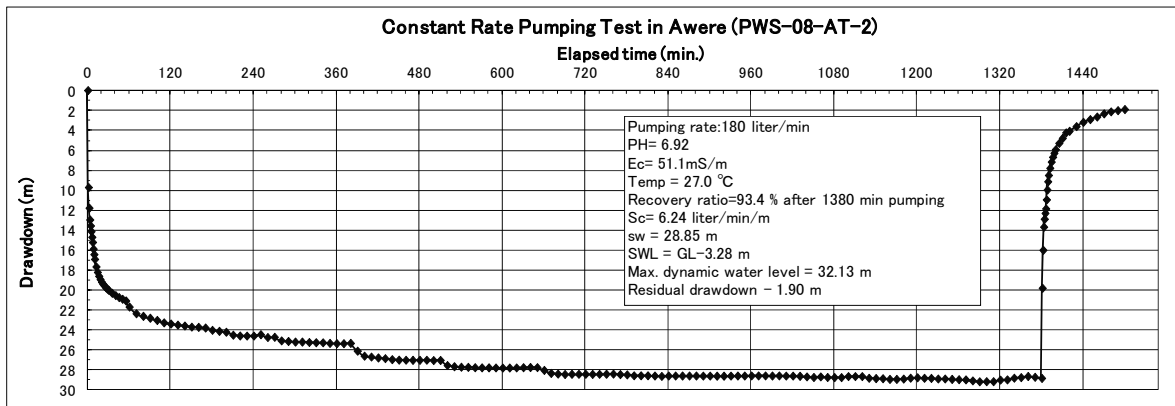
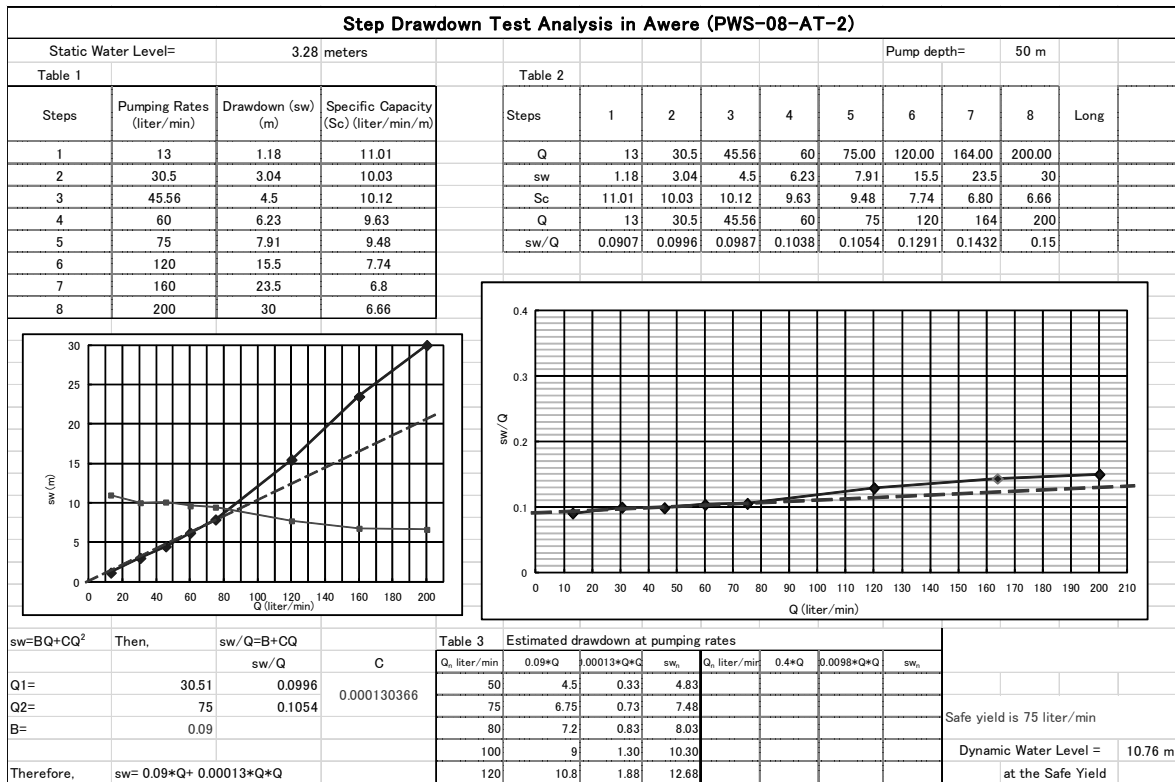
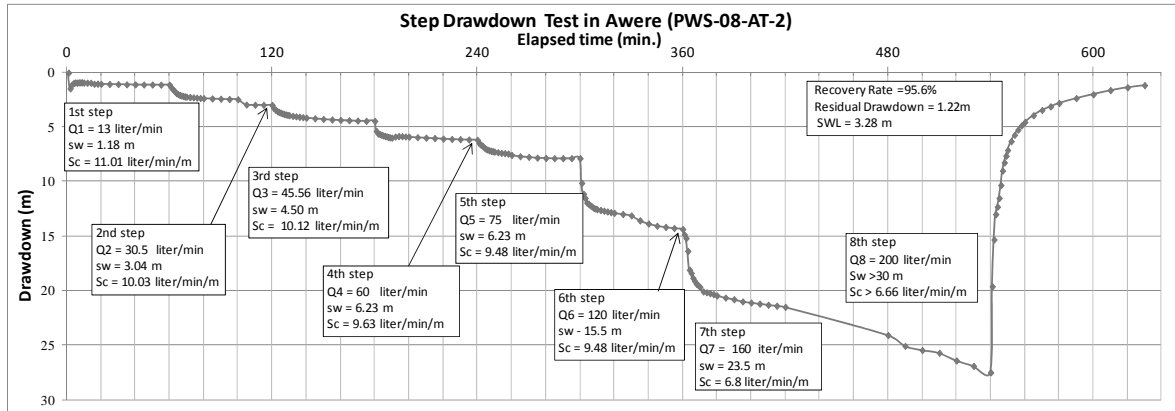
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 5.0m³/hr (84L/min) .

b) PWS-08-AT-2

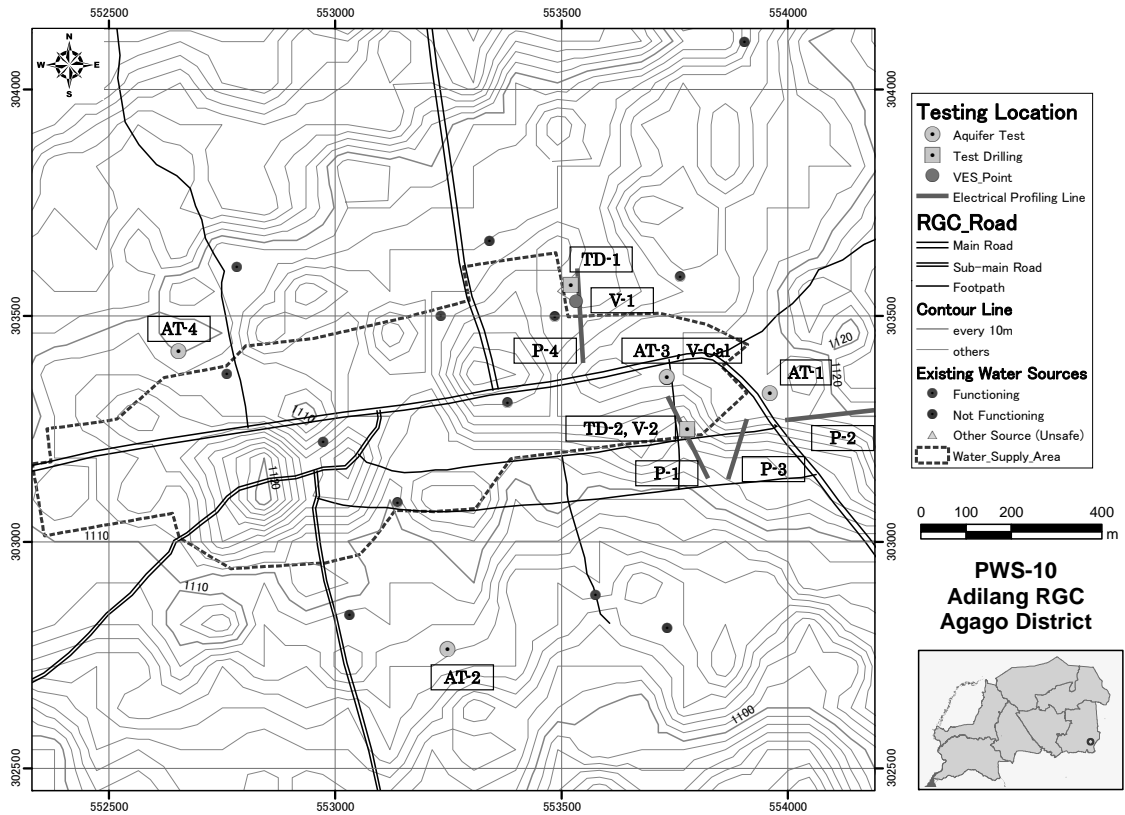
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



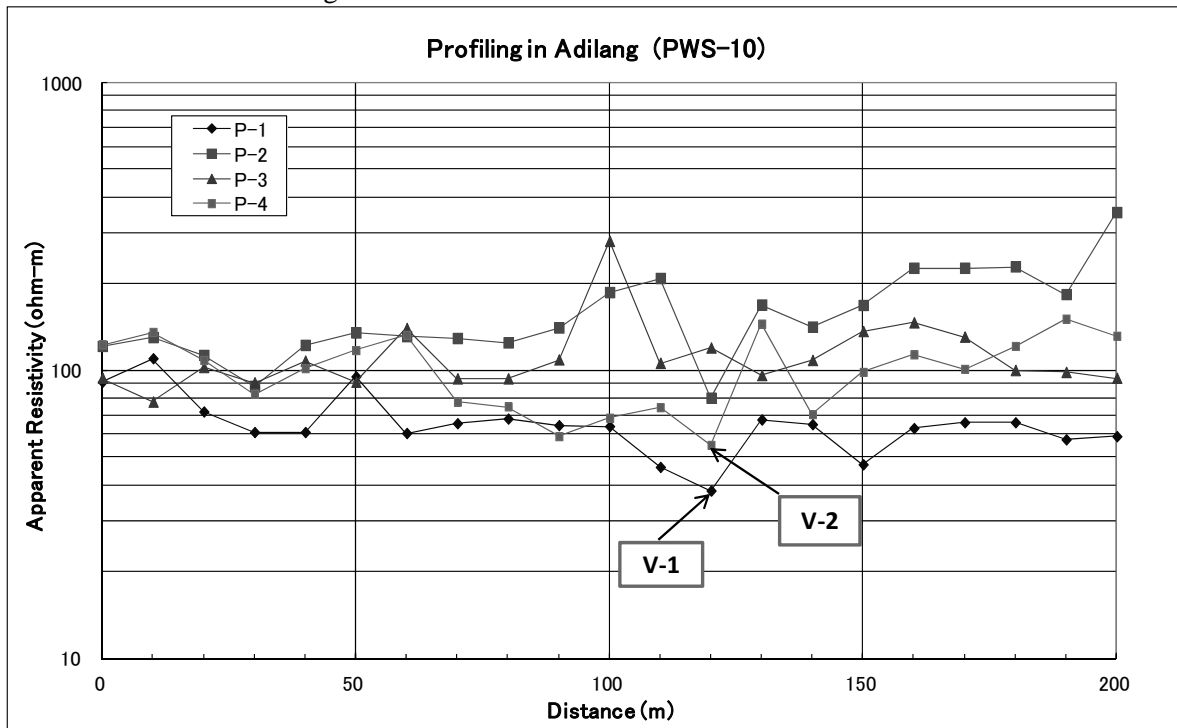
Safe yield was estimated 4.5m³/hr (75L/min) .

(4) Adilang

Survey lines and points, tested wells, positions of test drillings are shown in the map below.



Horizontal Electrical Profiling

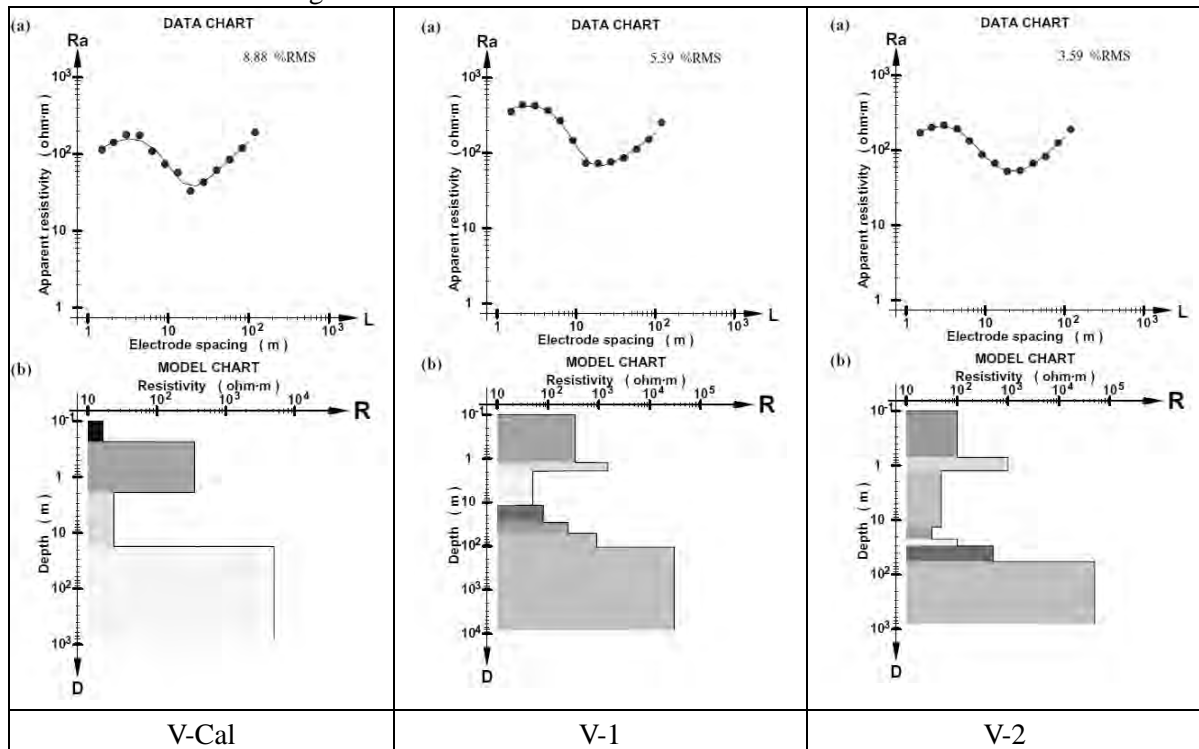


The points of VES are selected as the lowest resistivity point in the line P-1, P-2, P-5 and P-7. P-3, P-4 and P-6 lines have relatively high resistivity in the whole lines and there is no significant low resistivity point.

There are mountains, elevation difference is about 800m from Adilang RGC, for the east of the RGC. The topography is almost flat with gently tilted forward the west. Being close to the mountain in the east, the bedrock was expected shallow. But the groundwater recharge was expected more in the eastern part of the RGC. Therefore, the measurement lines of HEP were set in the east of the RGC.

The result of HEP showed the resistivity of P-2 and P-3 lines were higher than P-1 and P-4 lines. The bedrock depths of P-2 and P-3 lines were expected shallower. Therefore, the VES points were selected from P-1 and P-4 lines. The lowest points in each line were selected as VES points.

Vertical Electrical Sounding



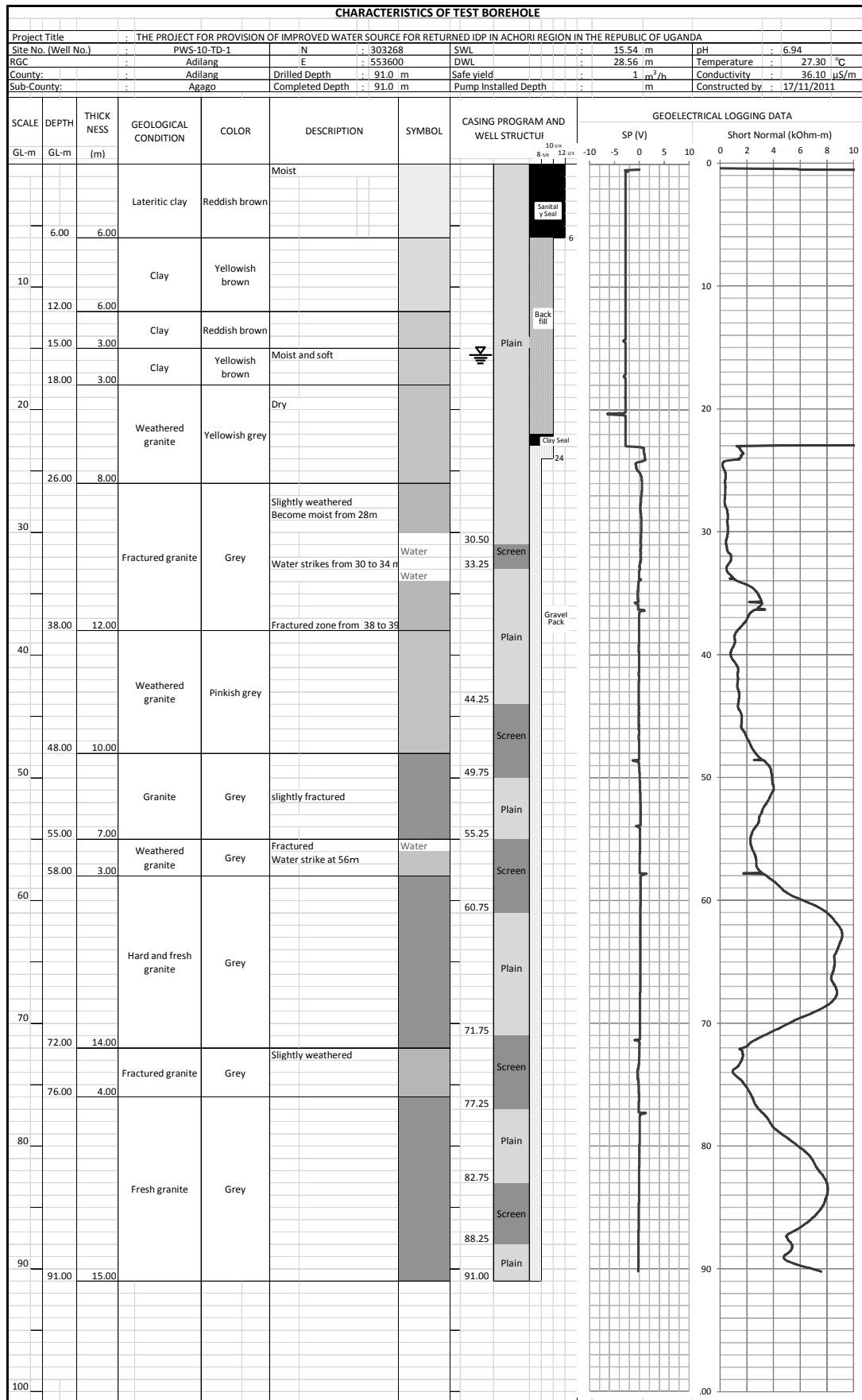
Comparison survey V-Cal was conducted near the existing well (pumping test point of existing well; AT-3). The VES results of V-1 and V-2 were similar to the result of V-Cal. But the bedrock depth was estimated deep, from several 10m to 100m depth against the expectation. At the V-1 point, the layer of 250Ωm in the depth of 38m to 51m and the layer of 900Ωm in the depth of 51m to 105m were expected fissure water. At the V-2 point, the layer of 100Ωm in the depth of 22m to 38m and the layer of 600Ωm in the depth of 30m to 58m were expected fissure water. The resistivity of fresh bedrock was calculated 10,000Ωm or more, fissure water couldn't be expected in the layer.

Test borehole drilling

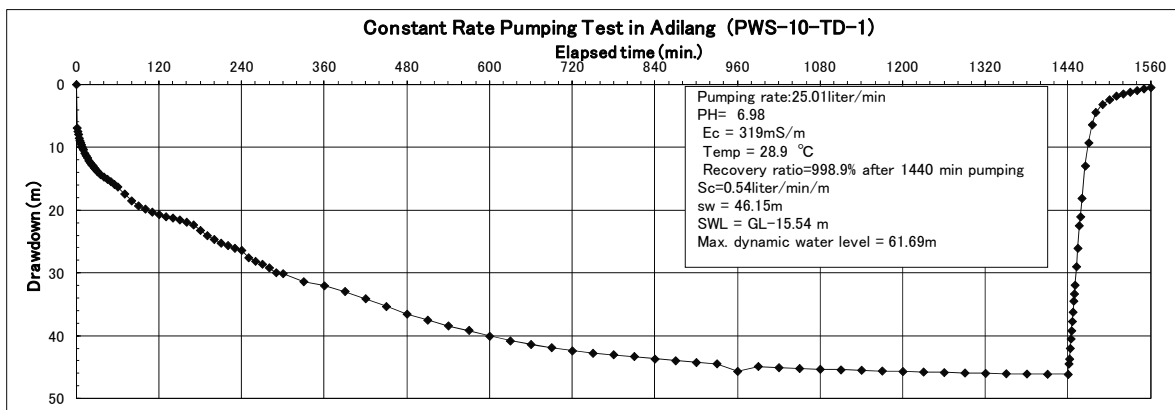
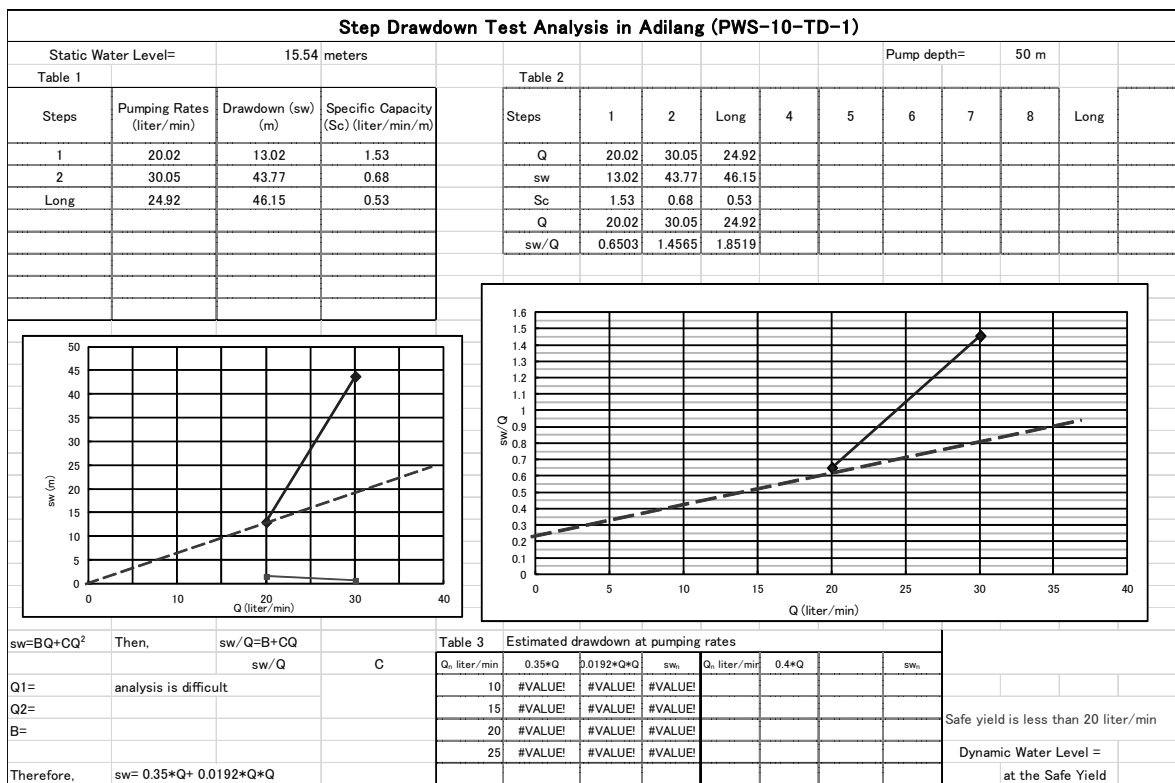
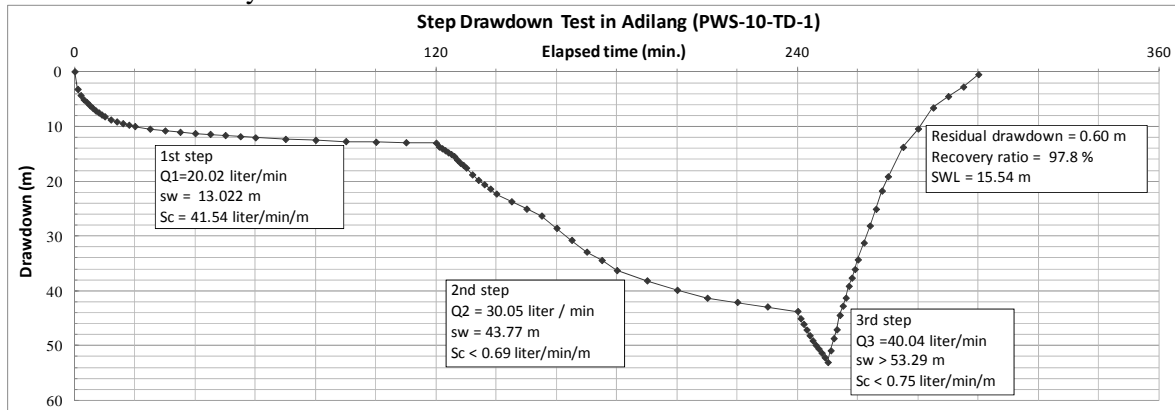
a) PWS-10-TD-1

The drilling log including geological column and geophysical logging at VES V-1 is shown below.

Laterite clay layer continue to 18m depth, and granite appears under the layer. Groundwater was found in the fractured zone from 30m to 34m.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 1.2m³/hr (20L/min) .

Constant rate test was conducted with 1.5 m³/hr and continued 24 hours. The drawdown went down to more than 40m. It was over discharge. But the recovery was fast and recovered 99.9%.

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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 E-mail: waterquality@nWSC.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited **Serial No:** 2011/725-3
Sample Source: Borehole Water, Agago District **Sampled by:** Client
Date Sample Received: 28-11-2011 **Date of Report:** 30-11-2011


Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source No.	National Standards for potable water. (Maximum Permissible)
WS Sample Nr:	--	Adilang RGC-1 Lalali Adilang Agago PWS-10-1-TD/ DWD 35540	
		K3092/11	
pH	--	6.68	6.5 – 8.5
Electrical Conductivity	µS/cm	335	2500
Colour: apparent	PtCo	2	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	169	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	250	500
Hardness: total as CaCO ₃	mg/L	120	500
Calcium: Ca ²⁺	mg/L	24.0	75
Magnesium: Mg ²⁺	mg/L	14.4	50
Bi-Carbonate: as CaCO ₃	mg/L	250	500
Chloride: Cl ⁻	mg/L	1.05	500
Fluoride: F	mg/L	0.13	1.5
Iron: total	mg/L	0.01	1.0
Sulphate: SO ₄ ²⁻	mg/L	16	200
Nitrate – N	mg/L	0.02	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.

Herbert Wataga
SENIOR QC OFFICER

NATIONAL WATER AND SEWERAGE CORPORATION



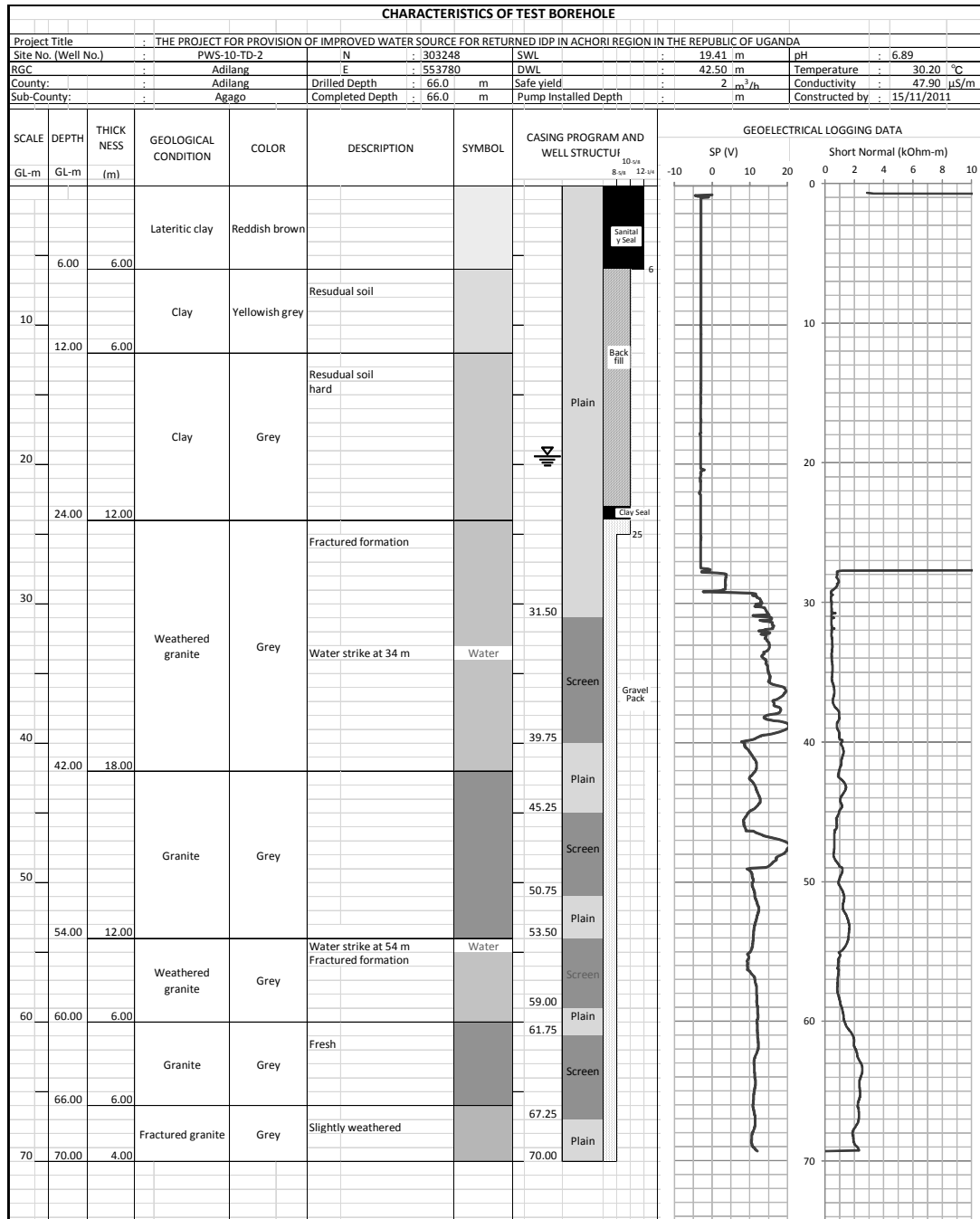
30 NOV 2011

Rance E. Okwerede
For QUALITY CONTROL MANAGER

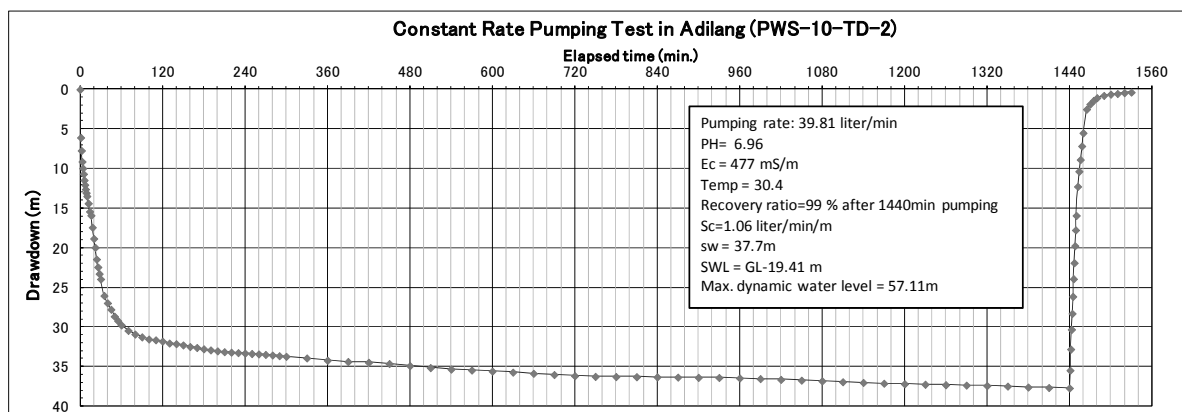
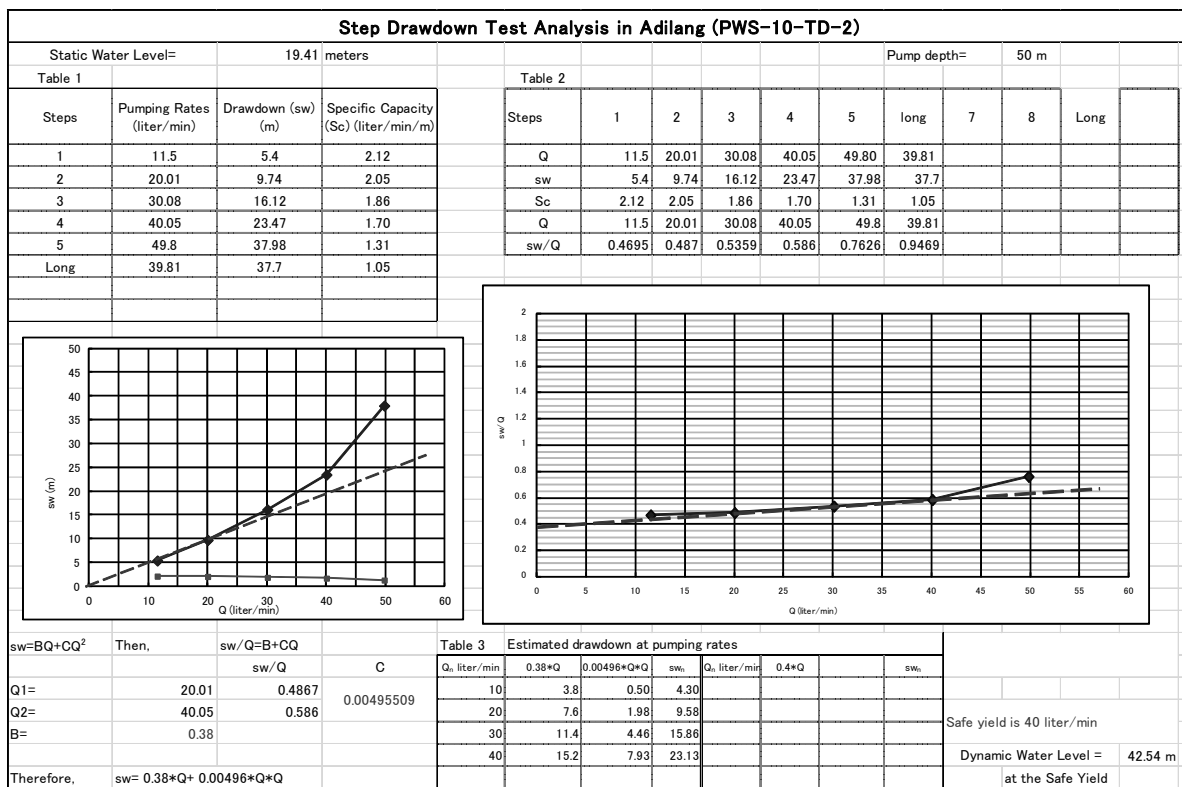
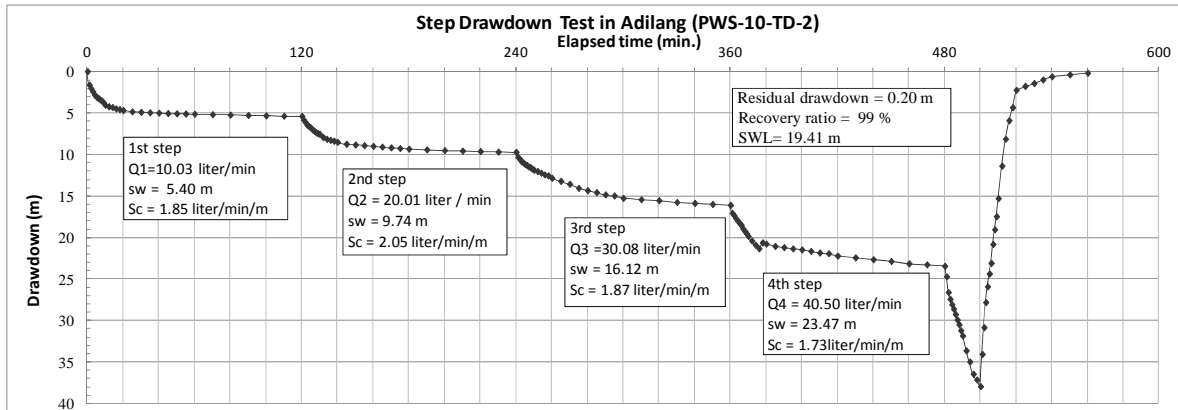
NB: The NWSC certificate of analysis by name is not valid for any other purpose than that for which it was issued.

b) PWS-10-TD-2

The drilling log including geological column and geophysical logging at VES V-2 is shown below. Laterite clay layer continue to 24m depth, and granite appears under the layer. Groundwater was found in the fractured zone at 30m and 54m depth.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 2.4m³/hr (40L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited **Serial No:** 2011/725-4

Sample Source: Borehole Water, Agago District **Sampled by:** Client


Date Sample Received: 28-11-2011 **Date of Report:** 30-11-2011

Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source No.	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	K3093/11	
pH	--	6.82	6.5 – 8.5
Electrical Conductivity	µS/cm	433	2500
Colour: apparent	PtCo	0	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	218	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	280	500
Hardness: total as CaCO ₃	mg/L	140	500
Calcium: Ca ²⁺	mg/L	36.0	75
Magnesium: Mg ²⁺	mg/L	12.0	50
Bi-Carbonate: as CaCO ₃	mg/L	280	500
Chloride: Cl ⁻	mg/L	1.10	500
Fluoride: F ⁻	mg/L	0.10	1.5
Iron: total	mg/L	0.00	1.0
Sulphate: SO ₄ ²⁻	mg/L	28	200
Nitrate – N	mg/L	0.01	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.

Herbert Wataga
SENIOR QC OFFICER



30 NOV 2011

THE CENTRAL LABORATORY

Francis Okwerede
For QUALITY CONTROL MANAGER

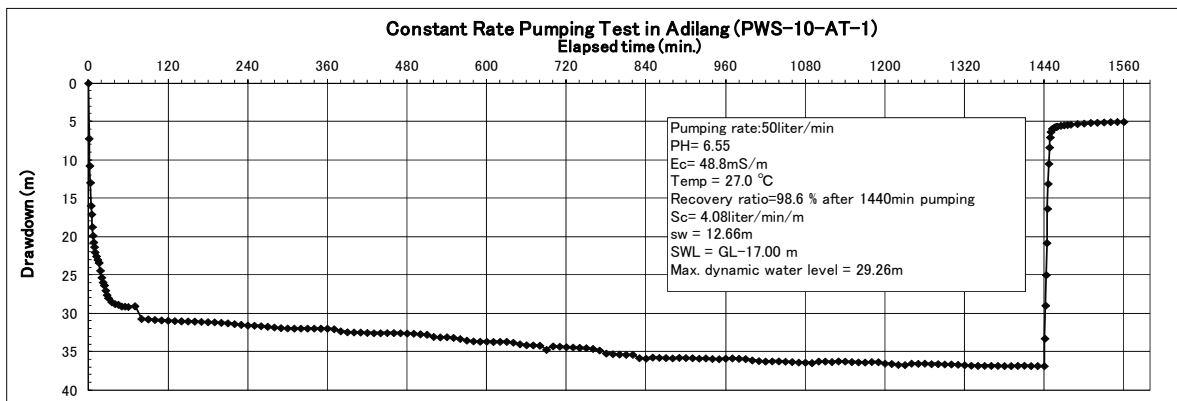
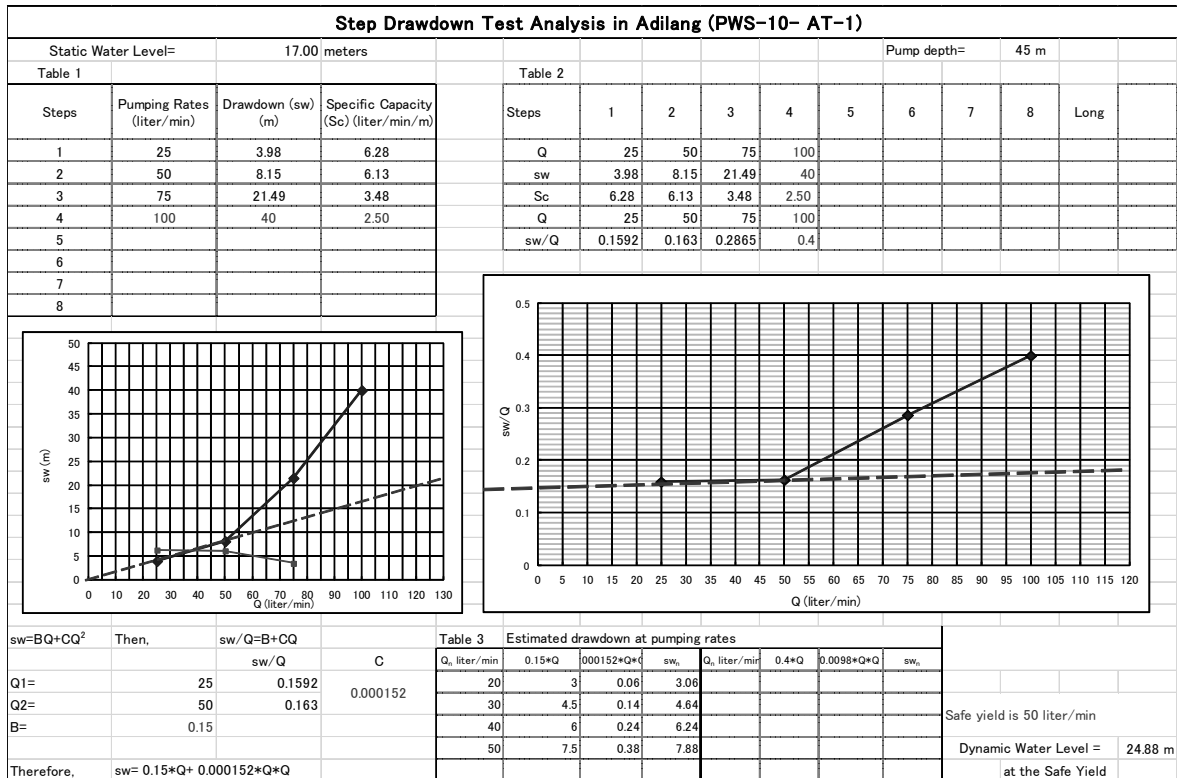
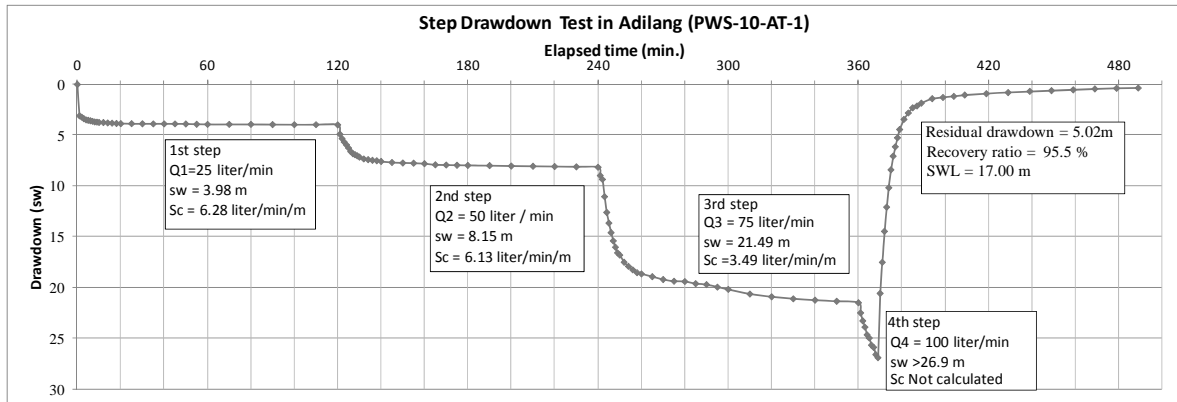
NB: The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

Result of Pumping Test for Existing Well

Although there were three schemes of piped water supply before, these are not used at all currently. Two well were selected for the pumping test in these three wells.

a) PWS-10-AT-1

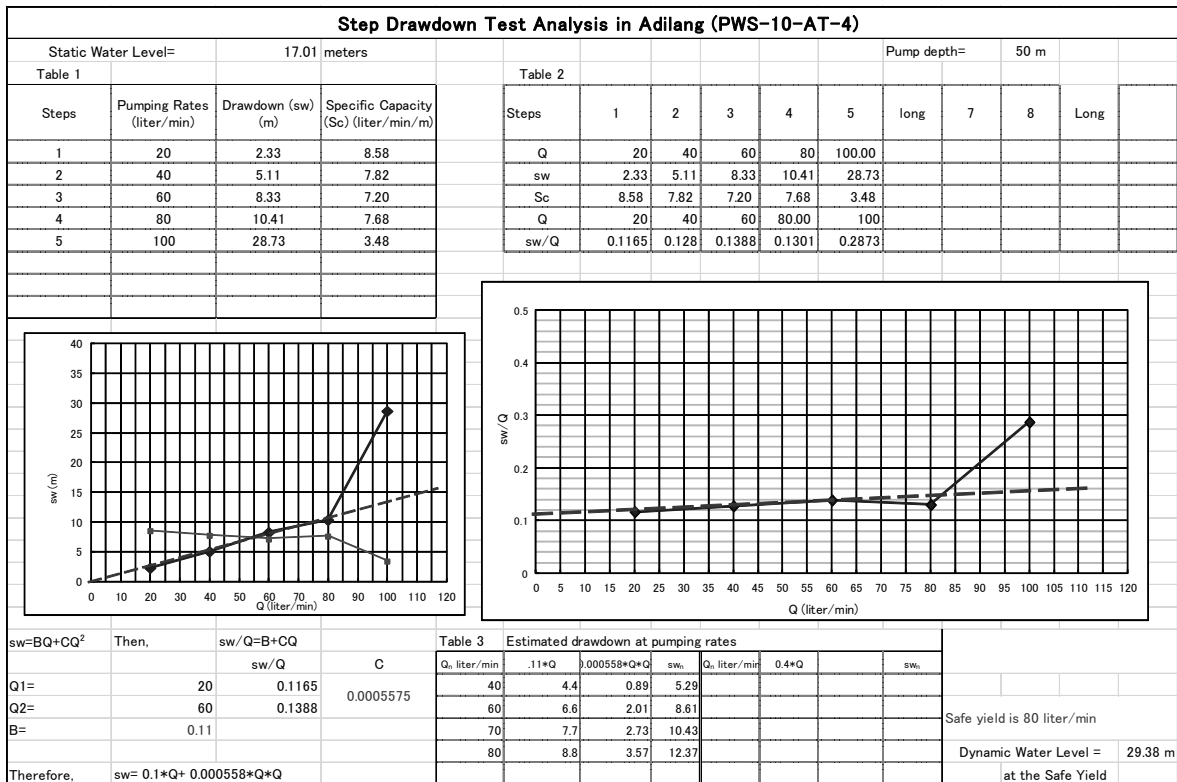
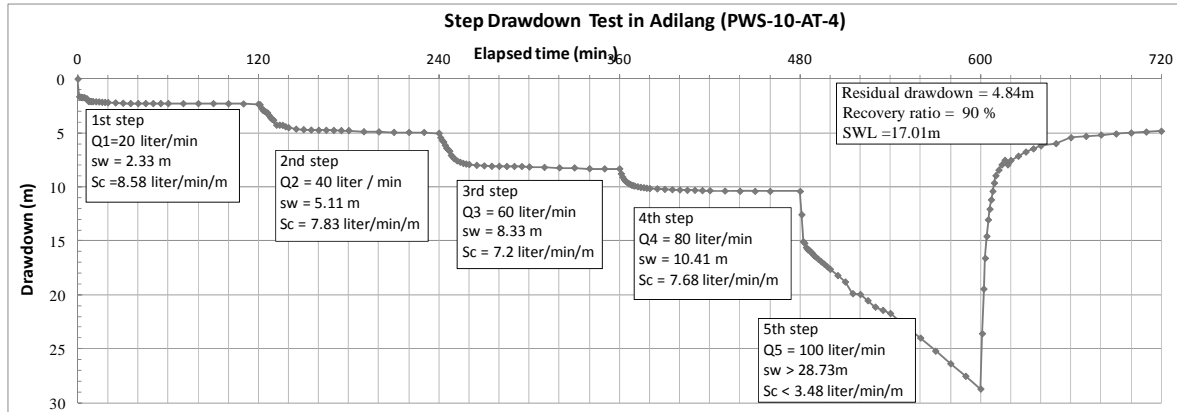
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 3.0m³/hr (50L/min) .

a) PWS-10-AT-4

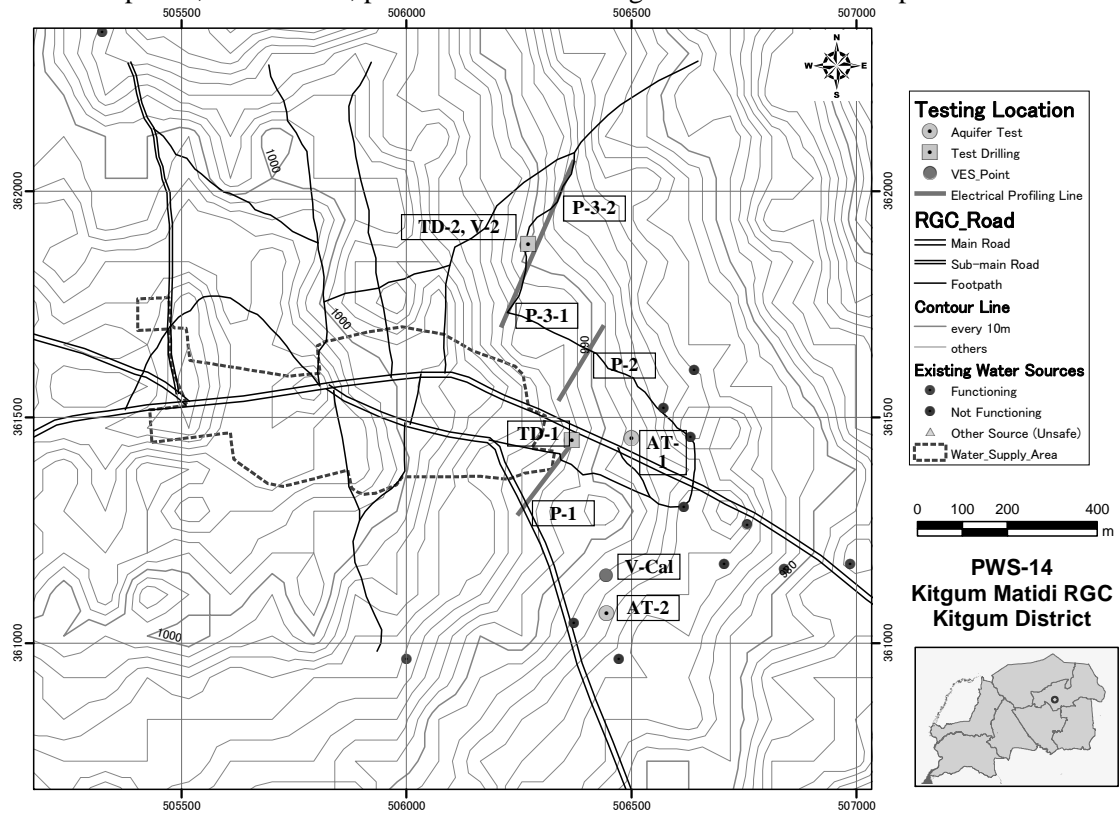
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



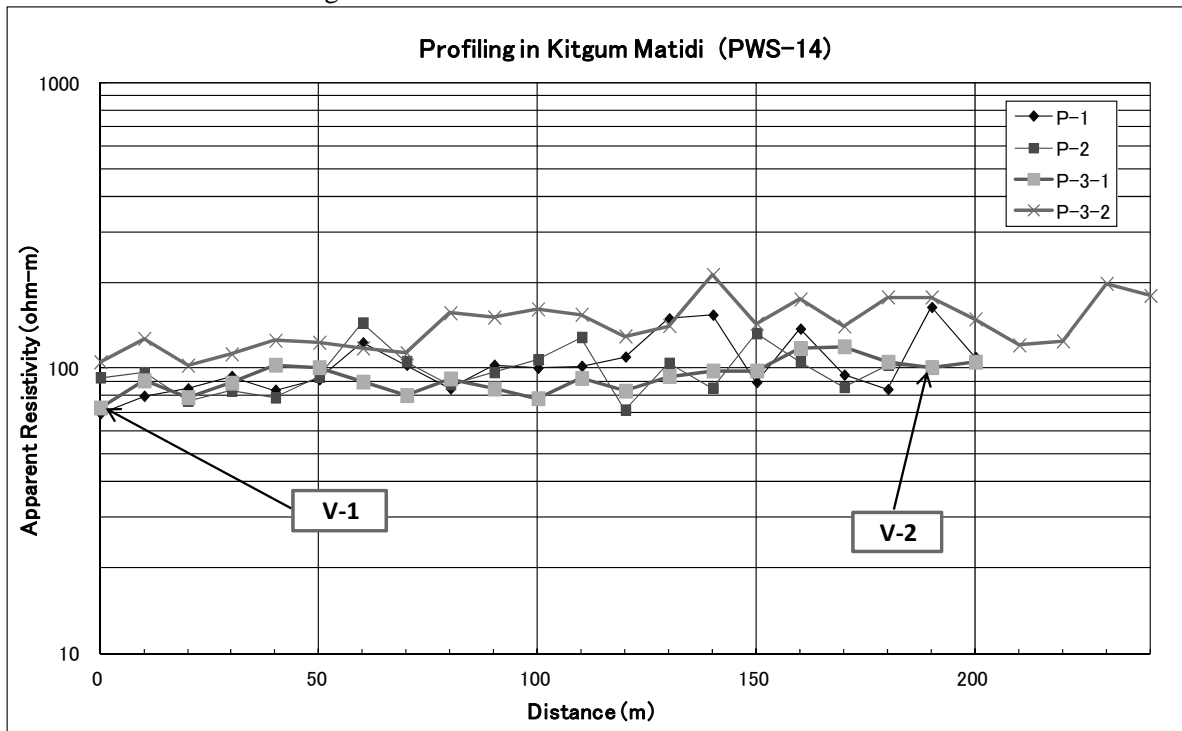
Safe yield was estimated 4.8m³/hr (80L/min) .

(5) Kitgum Matidi

Survey lines and points, tested wells, positions of test drillings are shown in the map below.

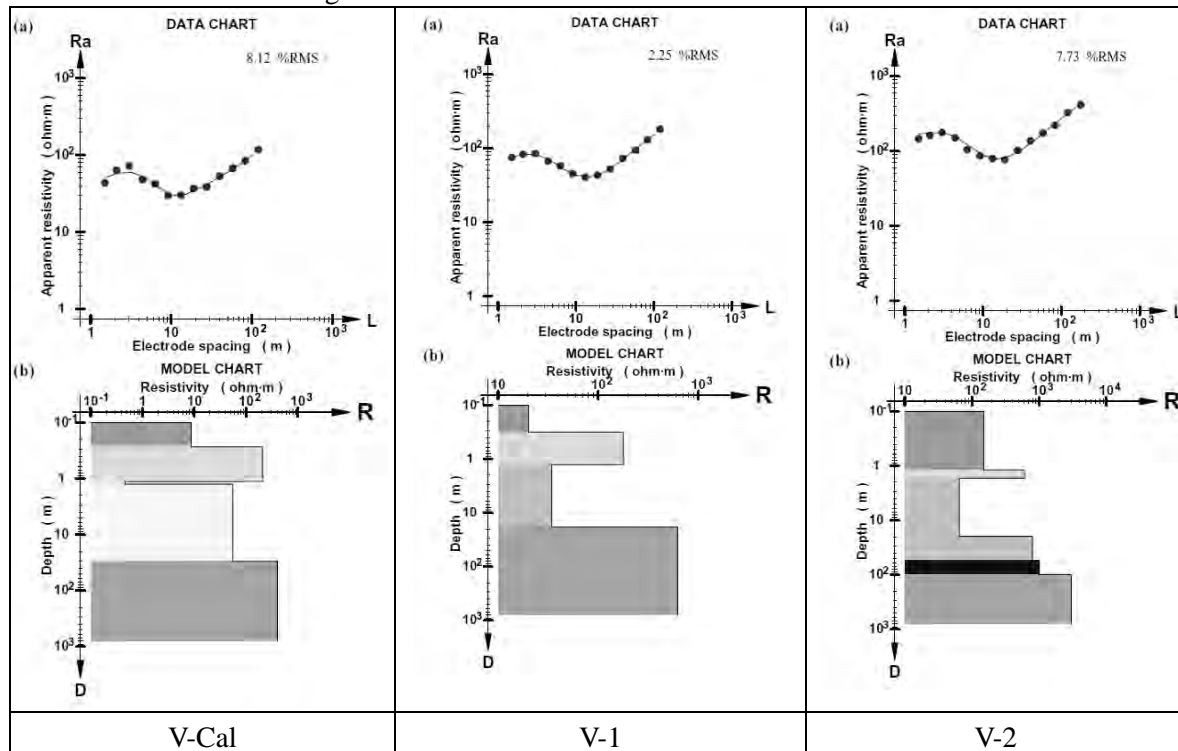


Horizontal Electrical Profiling



The point of V-1 was selected as the lowest resistivity point in the line P-1 and P-2. Line P-3-1 and P-3-2 were set towards river in the north of the RGC. This was expected that the sediments were the thicker towards the river. But the resistivity of the P-3-1 and P-3-2 become higher towards the river. V-2 was set at the point which was expected changing point of geology.

Vertical Electrical Sounding



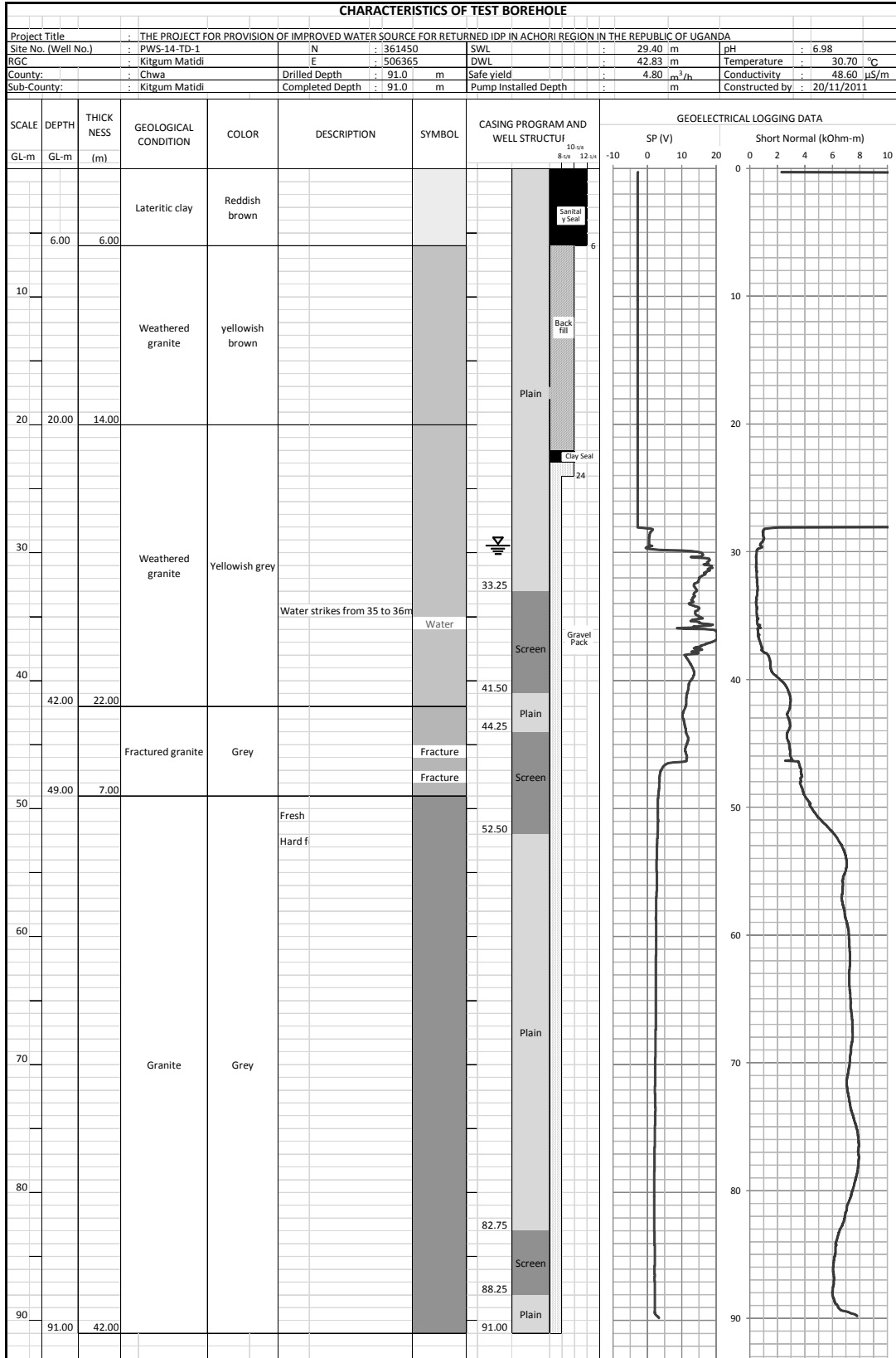
Comparison survey V-Cal was conducted near the existing piped water supply scheme. According to the result of V-Cal, the resistivity of bedrock is less than 1,000Ωm which is relatively low value in Acholi area. Though the result of V-1 was similar to V-Cal, the bedrock depth was expected shallow. In the result of V-2, the bedrock was expected to appear shallower than 20m. This bedrock was expected fresh rock.

Test borehole drilling

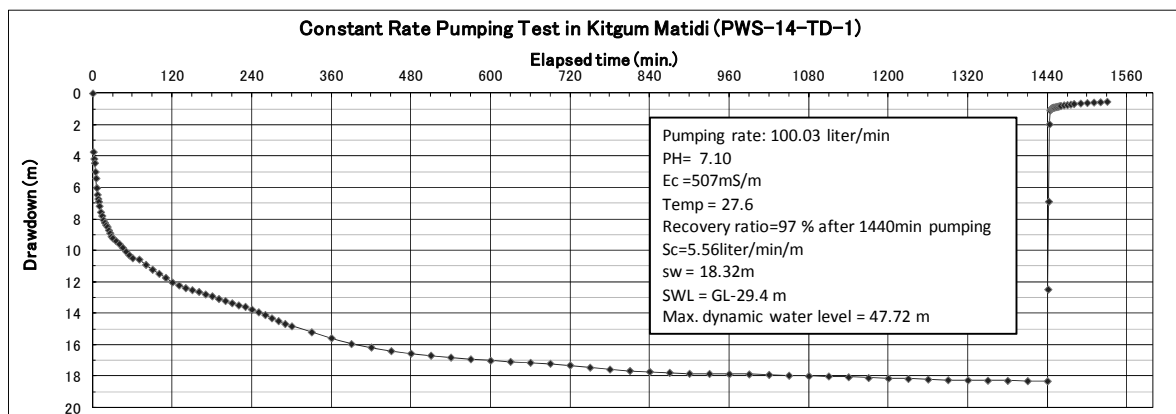
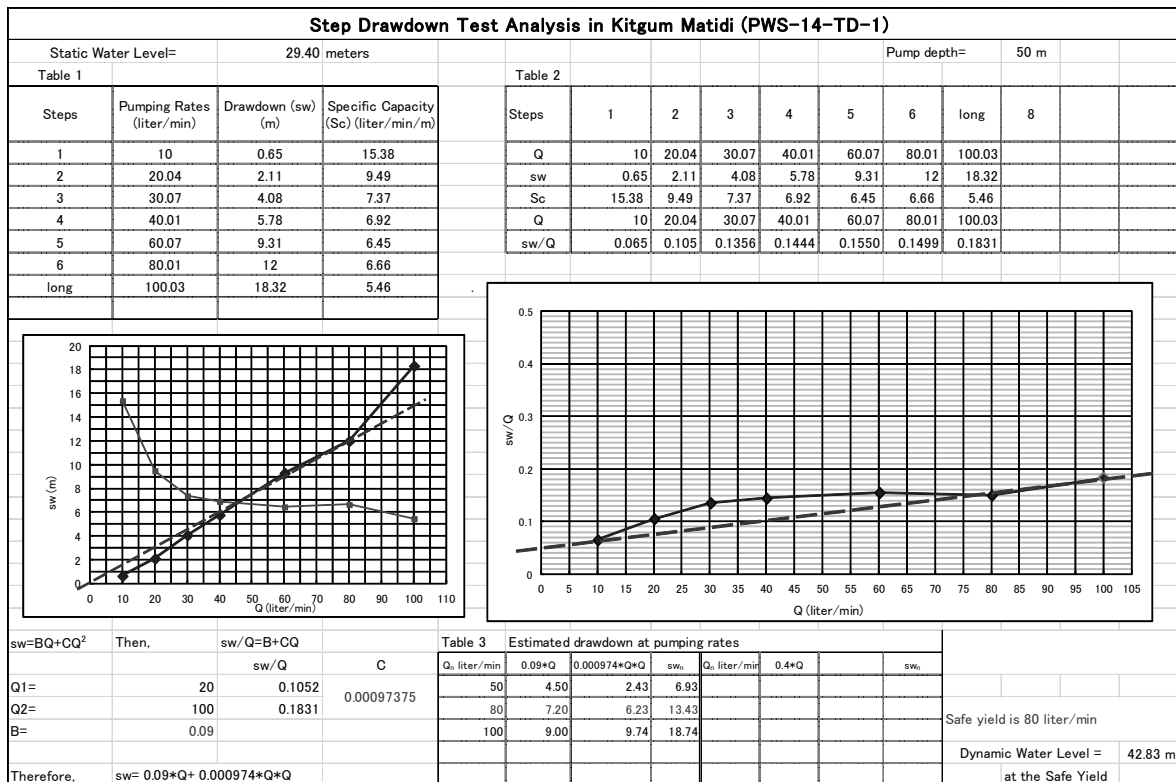
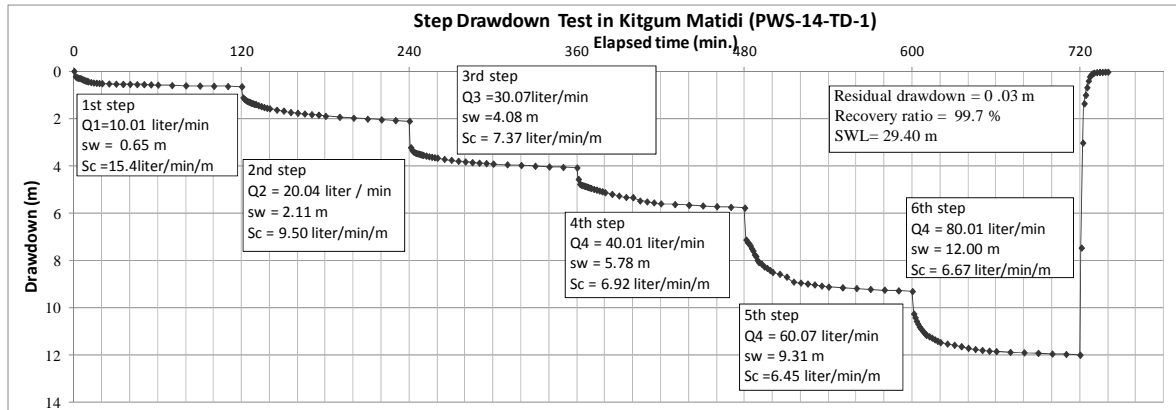
a) PWS-14-TD-1

The drilling log including geological column and geophysical logging at VES V-1 is shown below.

The bedrock appears 6m depth. But the weathered zone continues to 42m dept. Main aquifer is 35m depth.



The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 4.8m³/hr (80L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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CERTIFICATE OF ANALYSIS

CLIENT: Draco (U) Limited

Serial No: 2011/725-5

Sample Source: Borehole Water, Kitgum District

Sampled by: Client

Date Sample Received: 28-11-2011

Date of Report: 30-11-2011

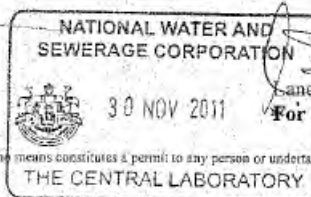
Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source No.	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	Kitgum Matidi RGC Ibakara Kitgum Matidi Chua PWS-14-1-TD/ DWD 35542	
pH	--	K3094/11	
		6.95	6.5 – 8.5
Electrical Conductivity	µS/cm	472	2500
Colour: apparent	PtCo	1	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	238	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	330	500
Hardness: total as CaCO ₃	mg/L	180	500
Calcium: Ca ²⁺	mg/L	40.0	75
Magnesium: Mg ²⁺	mg/L	19.2	50
Bi-Carbonate: as CaCO ₃	mg/L	330	500
Chloride: Cl ⁻	mg/L	1.40	500
Fluoride: F	mg/L	0.23	1.5
Iron: total	mg/L	0.00	1.0
Sulphate: SO ₄ ²⁻	mg/L	33	200
Nitrate – N	mg/L	0.01	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks

The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.

Herbert Wataga
SENIOR QC OFFICER



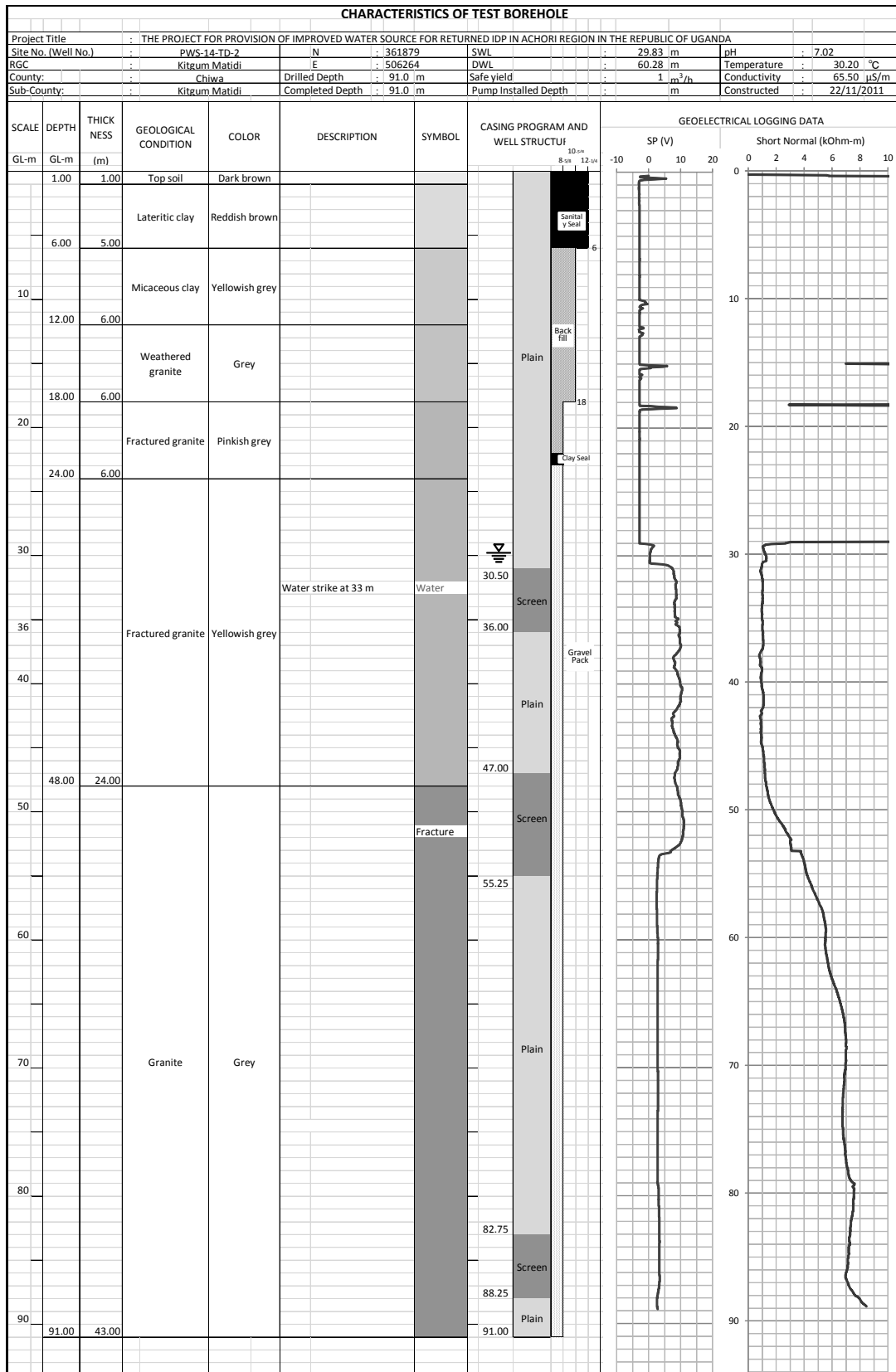
Janet E. Okwerede
For QUALITY CONTROL MANAGER

NB: The NWSC certificate of analysis by no means constitutes a permit to any person or undertaking to conduct business

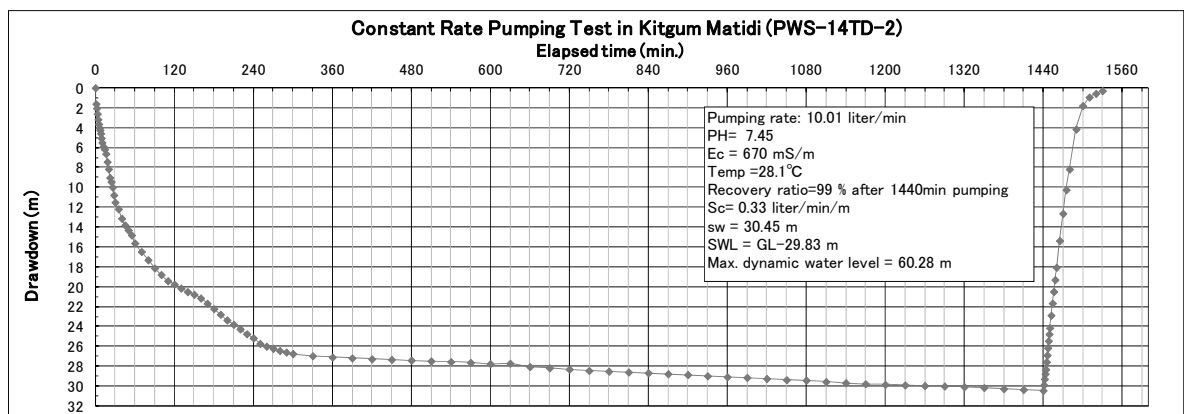
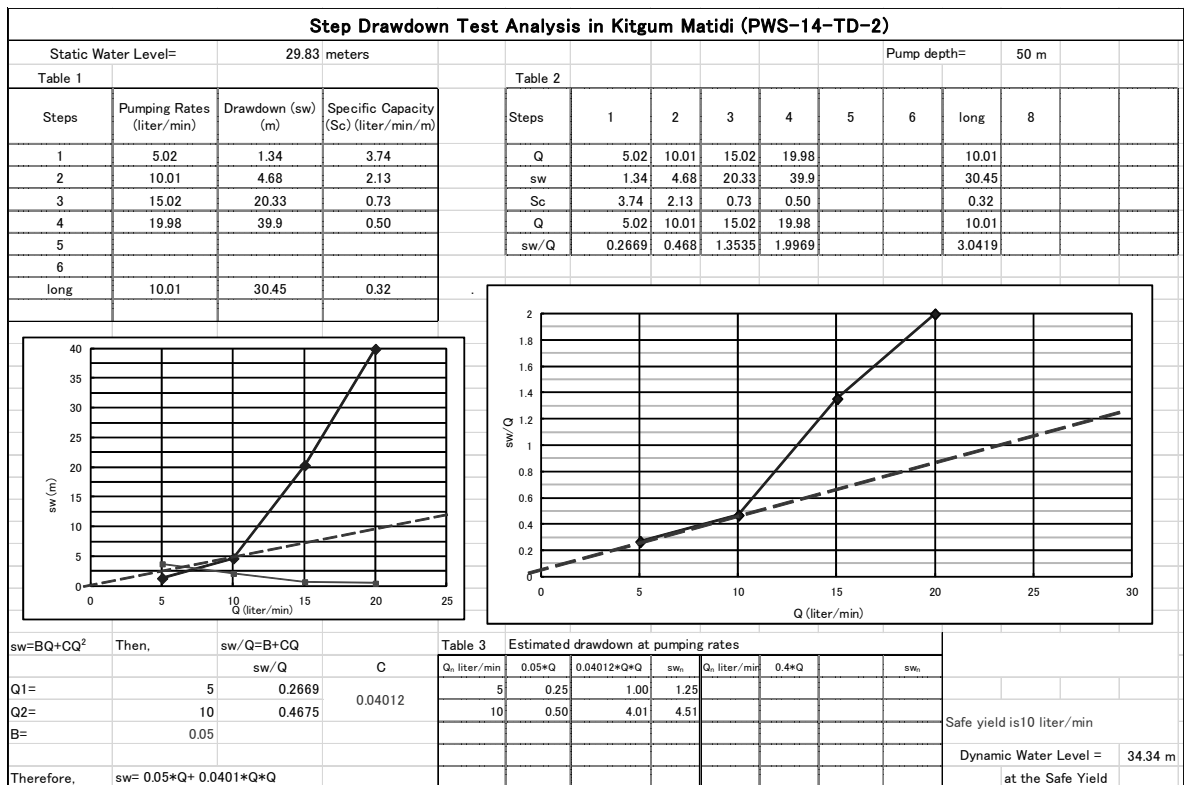
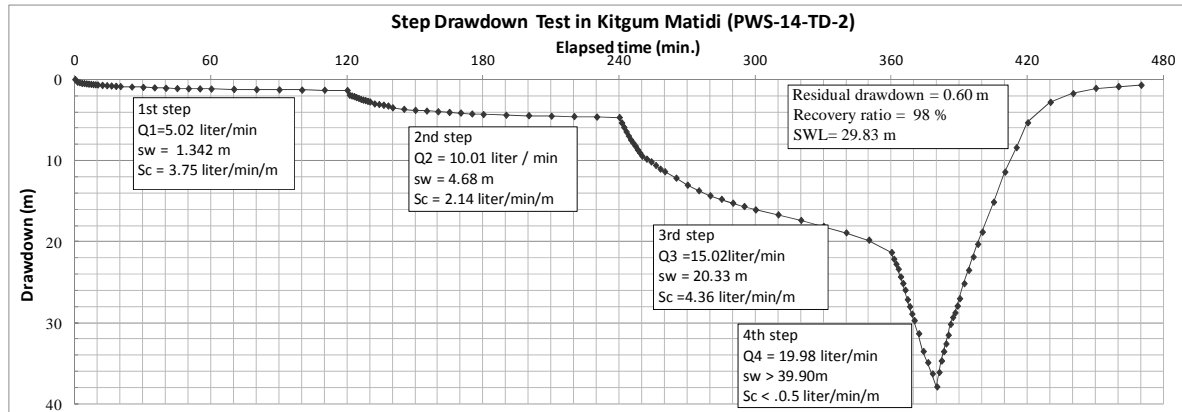
THE CENTRAL LABORATORY

b) PWS-14-TD-2

The drilling log including geological column and geophysical logging at VES V-2 is shown below. Weathered zone is thin compared to TD-1. Main aquifer was 33m depth in the fissure.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated $0.6\text{m}^3/\text{hr}$ (10L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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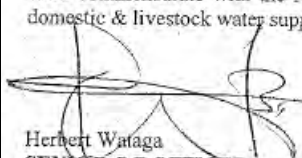
CERTIFICATE OF ANALYSIS

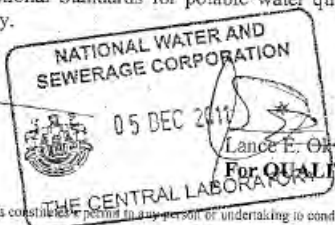
CLIENT: Draco (U) Limited **Serial No:** 2011/736-3
Sample Source: Borehole Water, Kitgum District **Sampled by:** Client
Date Sample Received: 02-12-2011 **Date of Report:** 05-12-2011

Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source ID:	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	Kitgum Matidi RGC - 2 Ibakara Kitgum Matidi Chua PWS-14-2-TD/ DWD 35546	
		K3146/11	
pH	--	6.91	6.5 – 8.5
Electrical Conductivity	µS/cm	580	2500
Colour: apparent	PtCo	2	15
Turbidity	NFU	0.1	10.0
Total Dissolved Solids	mg/L	293	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	320	500
Hardness: total as CaCO ₃	mg/L	180	500
Calcium: Ca ²⁺	mg/L	48.0	75
Magnesium: Mg ²⁺	mg/L	14.4	50
Bi-Carbonate: as CaCO ₃	mg/L	320	500
Chloride: Cl ⁻	mg/L	2.44	500
Fluoride: F ⁻	mg/L	0.24	1.5
Iron: total	mg/L	0.76	1.0
Sulphate: SO ₄ ²⁻	mg/L	86	200
Nitrate – N	mg/L	0.01	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.


 Herbert Wataga
SENIOR QC OFFICER

NATIONAL WATER AND SEWERAGE CORPORATION
 05 DEC 2011

 Lance E. Okwerede
For QUALITY CONTROL MANAGER

THE CENTRAL LABORATORY

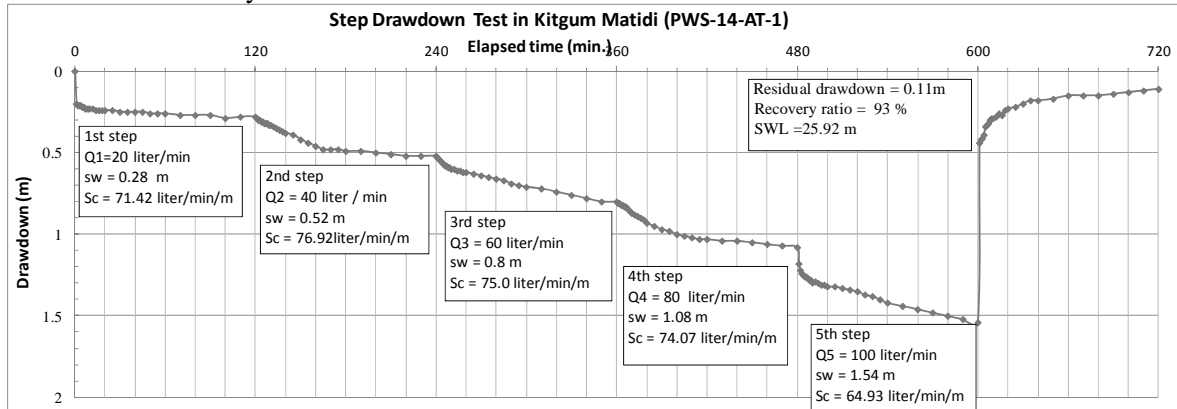
NB: The NWSC certificate of analysis by no means constitutes a promise in any person or undertaking to conduct business.

Result of Pumping Test for Existing Well

Although there were three schemes of piped water supply in this RGC before, only one scheme which is used solar power system is functioning currently. The pumping test was conducted at the well in the unused system.

a) PWS-14-AT-1

The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.

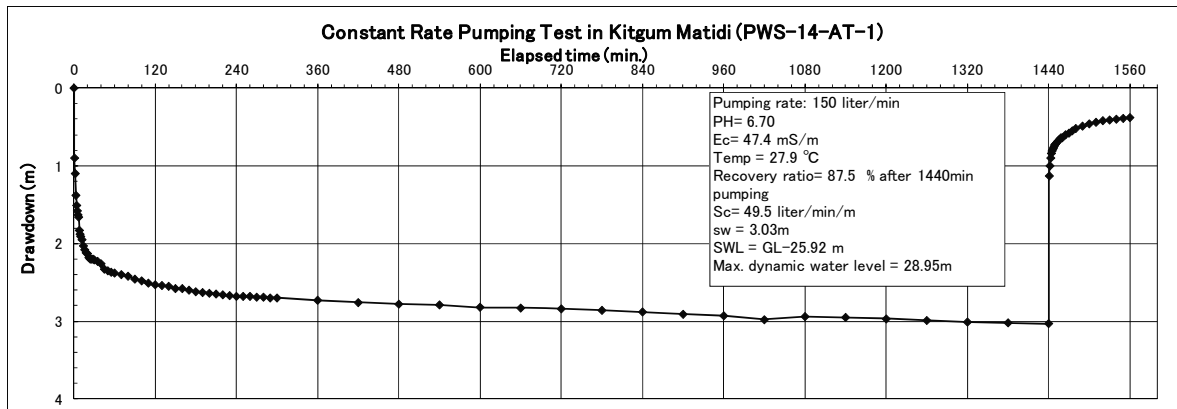
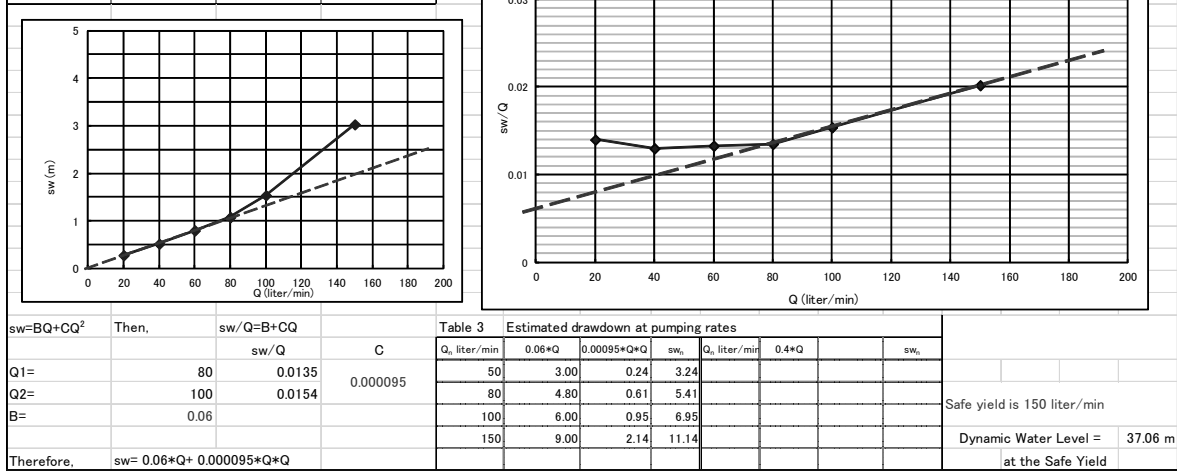


Step Drawdown Test Analysis in Kitgum Matidi (PWS-14-AT-1)

Static Water Level = 25.92 meters Pump depth = 50 m

Steps	Pumping Rates (liter/min)	Drawdown (sw) (m)	Specific Capacity (Sc) (liter/min/m)
1	20	0.28	71.42
2	40	0.52	76.92
3	60	0.8	75.00
4	80	1.08	74.07
5	100	1.54	64.93
Long	150	3.03	49.50

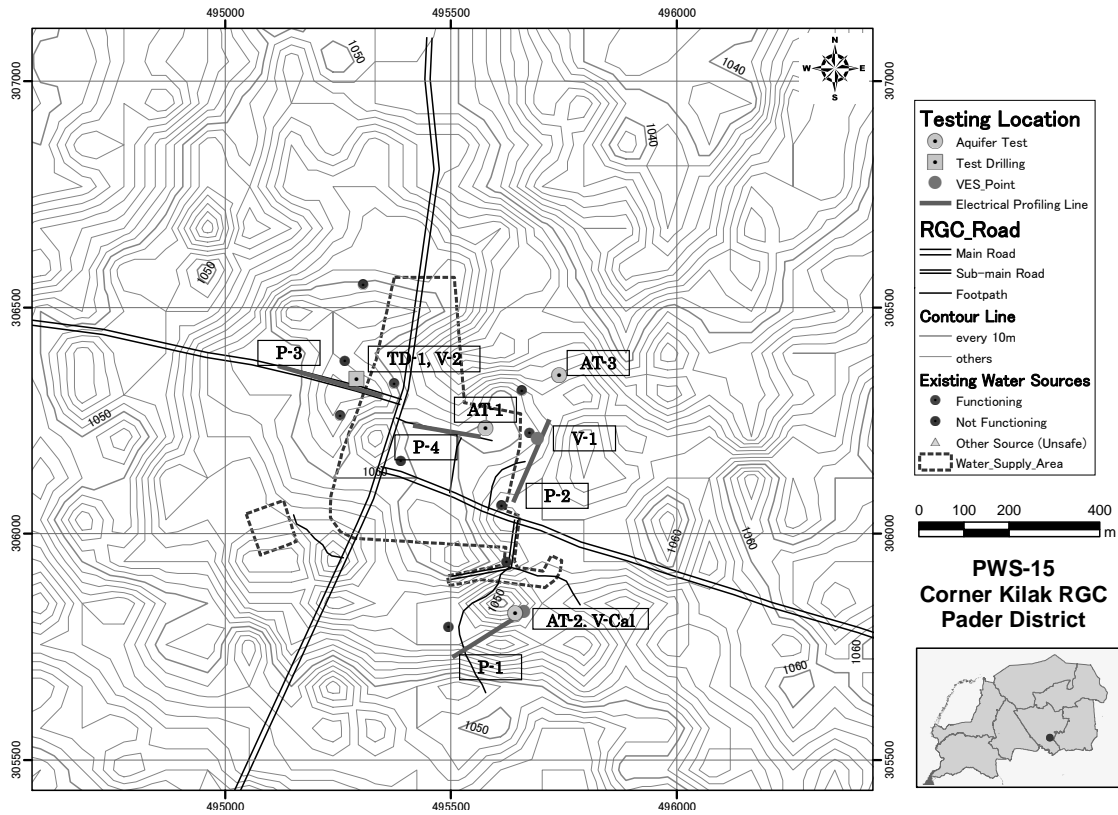
Steps	1	2	3	4	5	long	7	8
Q	20	40	60	80	100.00	150.00		
sw	0.28	0.52	0.8	1.08	1.54	3.03		
Sc	71.42	76.92	75.00	74.07	64.93	49.50		
Q	20	40	60	80.00	100	150		
sw/Q	0.014	0.013	0.0133	0.0135	0.0154	0.0202		



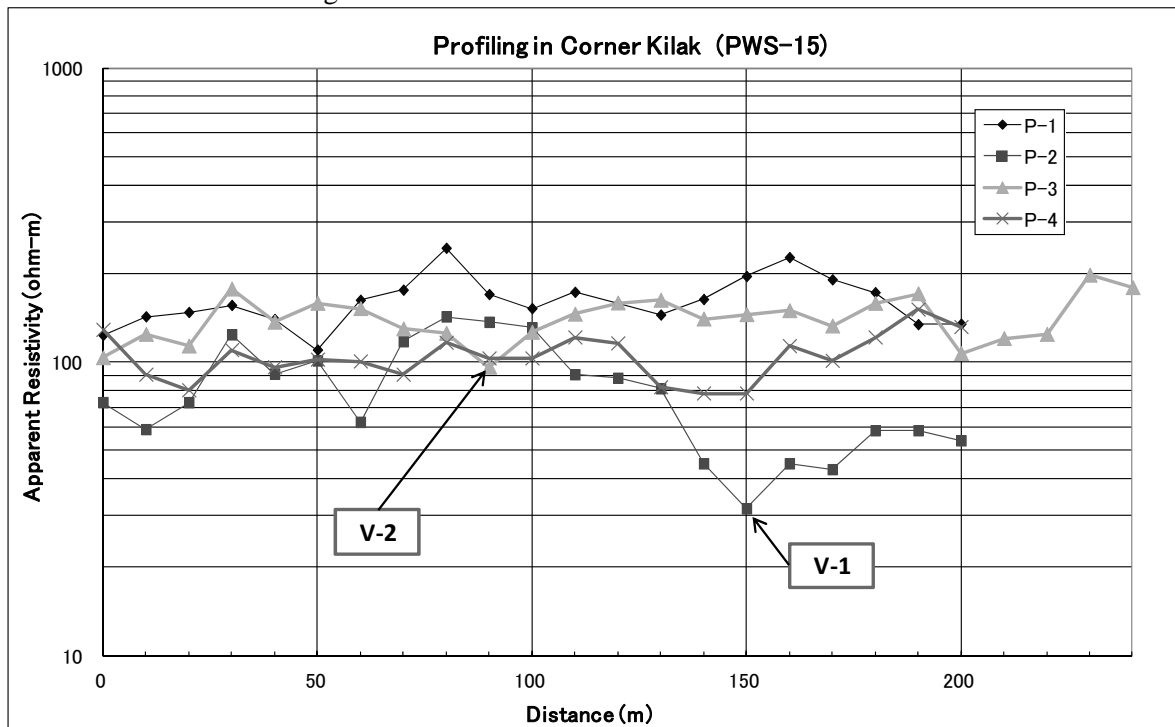
Drawdown was only 1.5m with the discharge of 100L/min. This means the well is high permeability area. The constant rate pumping test was conducted with 150L/min, and its drawdown was only 3m after 24 hours. Safe yield was estimated 9.0m³/hr (150L/min).

(6) Corner Kilak

Survey lines and points, tested wells, positions of test drillings are shown in the map below.

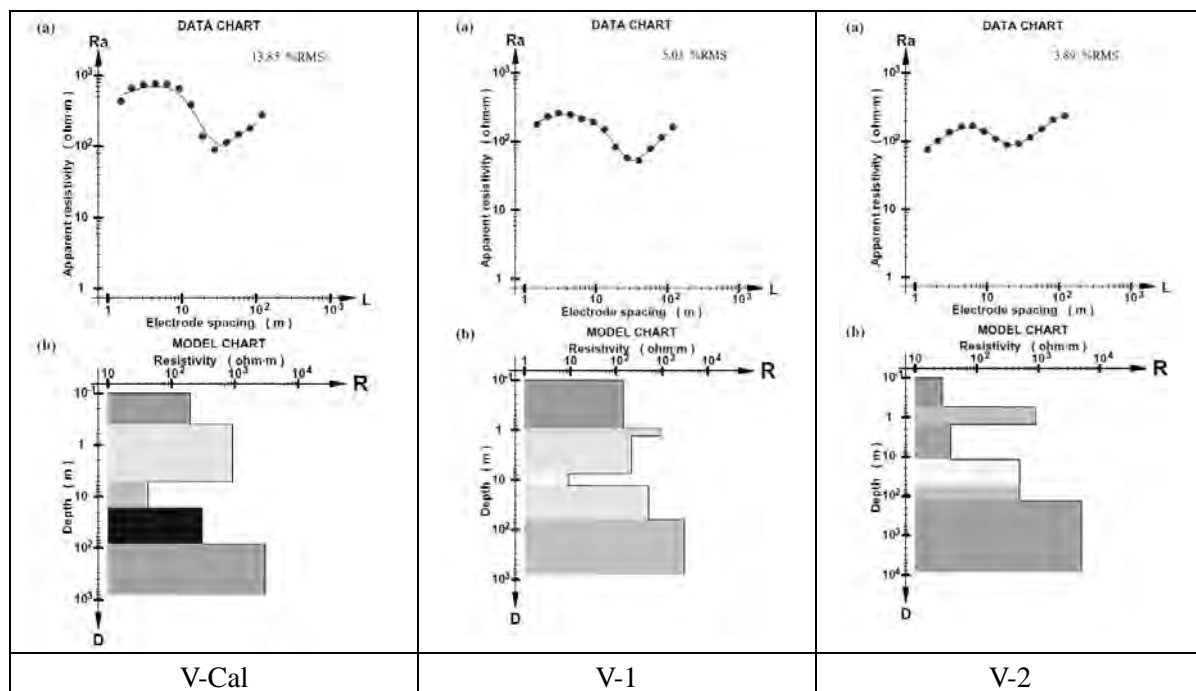


Horizontal Electrical Profiling



The VES point V-1 was selected as the lowest resistivity point in the line P-1 and P-2. And the V-2 was selected as the lowest resistivity point in the line P-3 and P-4.

Vertical Electrical Sounding



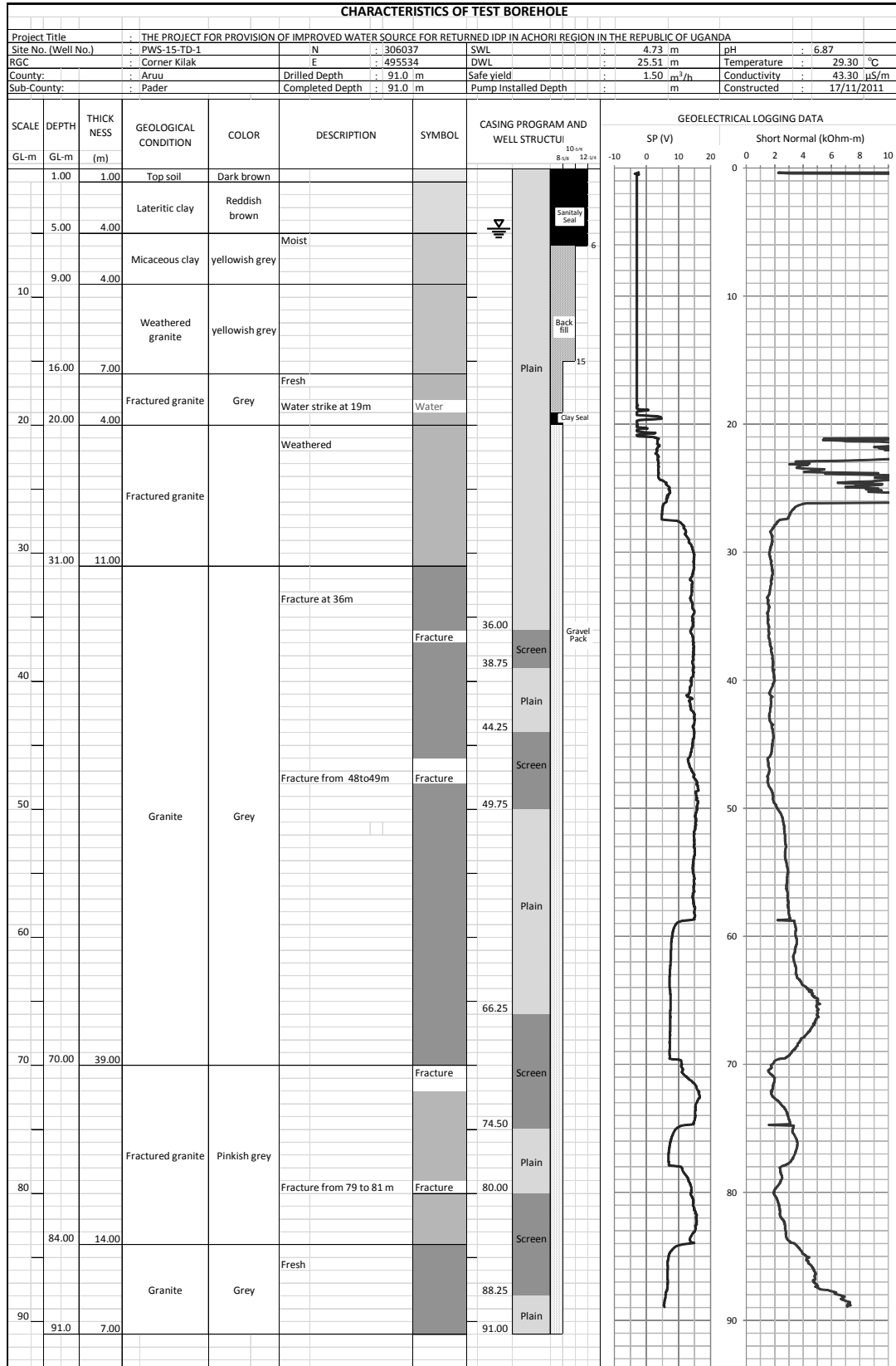
Comparison survey V-Cal was conducted near the handpump well. In this result, the layer of resistivity 300Ωm continues to 80m depth. This layer was expected as weathered zone.

The weathered zones in V-1 and V-2 are expected 70m and 120m depth respectively. But the resistivities of the zones were higher than V-Cal.

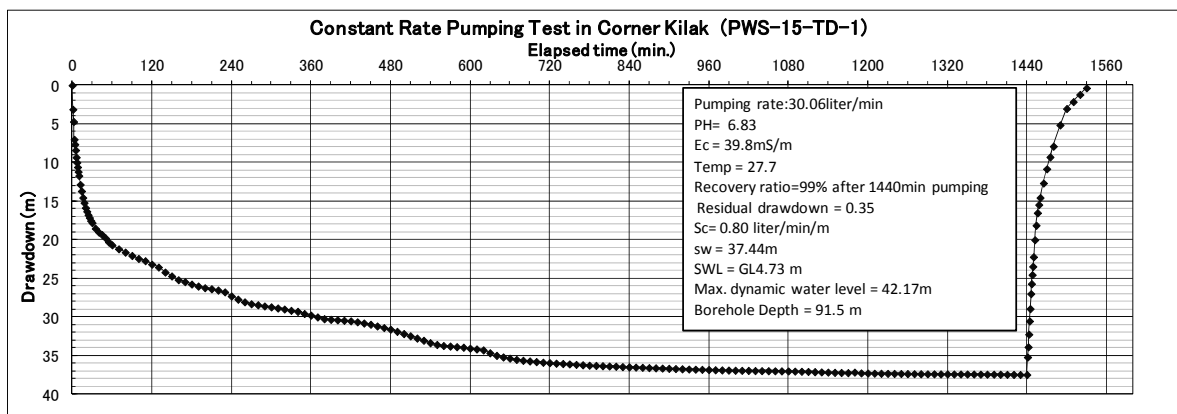
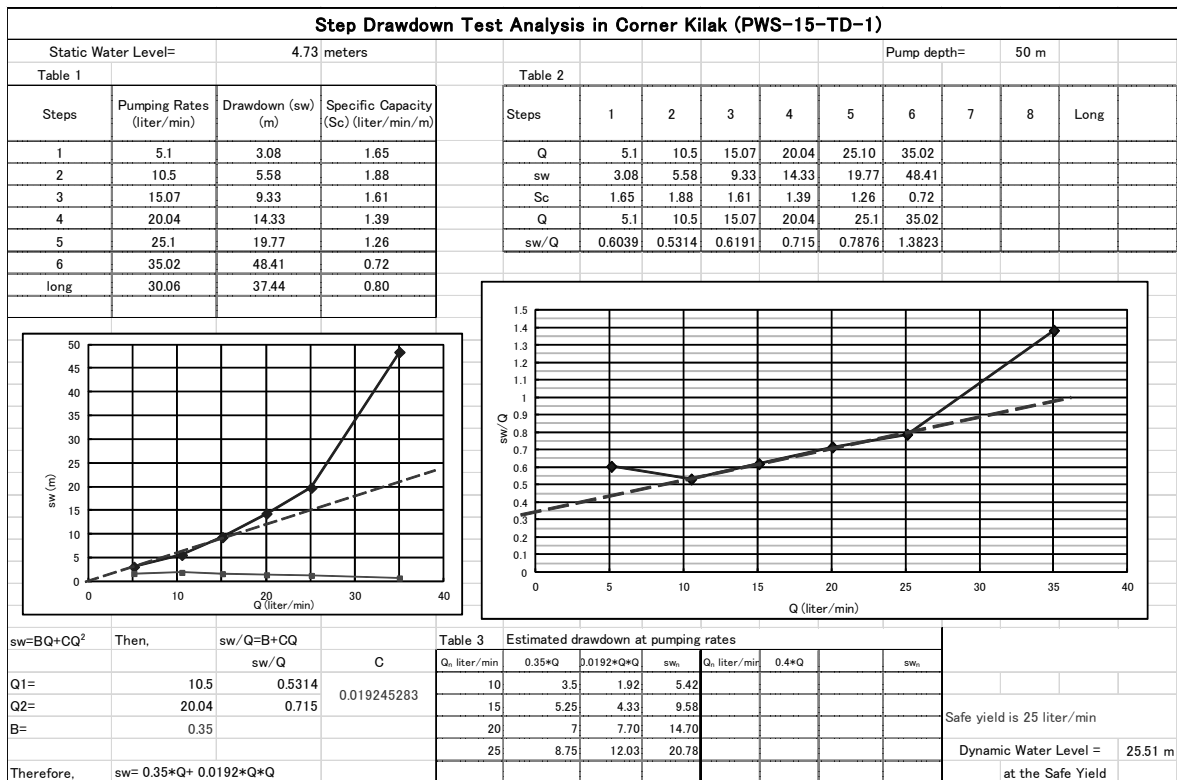
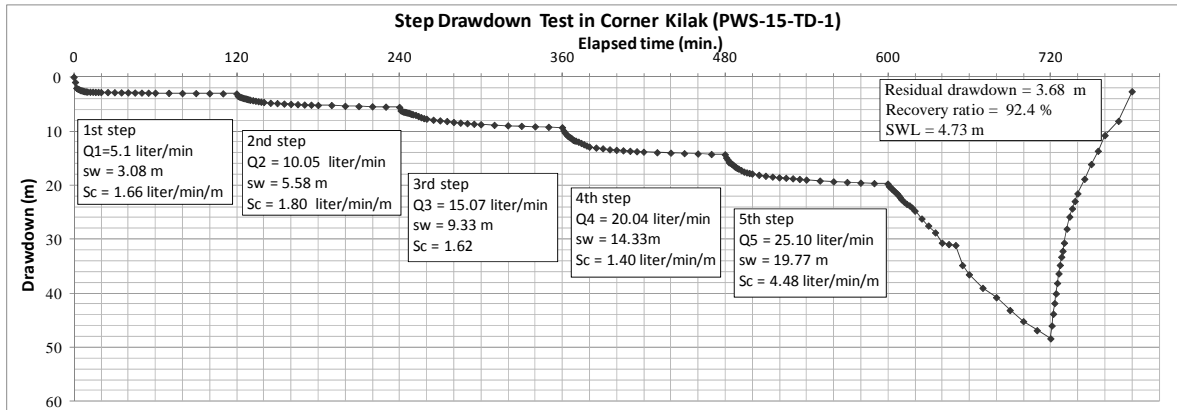
Test borehole drilling

a) PWS-15-TD-1

The drilling log including geological column and geophysical logging at VES V-2 is shown below.




The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Safe yield was estimated 1.5m³/hr (25L/min) .

Sample water obtained while pumping test was analyzed the water quality. Compared with the standard of water quality, there is no parameter which is over the standard.



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CERTIFICATE OF ANALYSIS

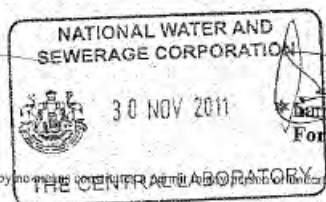
CLIENT: Draco (U) Limited **Serial No:** 2011/725-6
Sample Source: Borehole Water, Pader District **Sampled by:** Client
Date Sample Received: 28-11-2011 **Date of Report:** 30-11-2011


Table of Analytical Results

Parameters	Units	Location: Parish: S/County: County: Source No.	National Standards for potable water. (Maximum Permissible)
WS Sample Nr	--	Corner Kilak RGC Kilak Pader Aruu PWS-15-1-TD/ DWD 35543	
		K3095/11	
pH	--	6.70	6.5 – 8.5
Electrical Conductivity	µS/cm	365	2500
Colour: apparent	PtCo	0	15
Turbidity	NTU	0.1	10.0
Total Dissolved Solids	mg/L	185	1200
Total Suspended Solids	mg/L	0	0.0
Alkalinity: total as CaCO ₃	mg/L	200	500
Hardness: total as CaCO ₃	mg/L	150	500
Calcium: Ca ²⁺	mg/L	32.0	75
Magnesium: Mg ²⁺	mg/L	16.8	50
Bi-Carbonate: as CaCO ₃	mg/L	200	500
Chloride: Cl ⁻	mg/L	1.20	500
Fluoride: F ⁻	mg/L	0.11	1.5
Iron: total	mg/L	0.00	1.0
Sulphate: SO ₄ ²⁻	mg/L	26	200
Nitrate – N	mg/L	0.00	5.0
Faecal coliforms	CFU/100mL	0	0

Remarks
 The sample showed satisfactory physio-chemical & bacteriological characteristics of the source, which were commensurate with the National Standards for potable water quality. The source may be used for domestic & livestock water supply.


Herbert Wataga
SENIOR QC OFFICER


30 NOV 2011


Justice E. Okwerede
For QUALITY CONTROL MANAGER

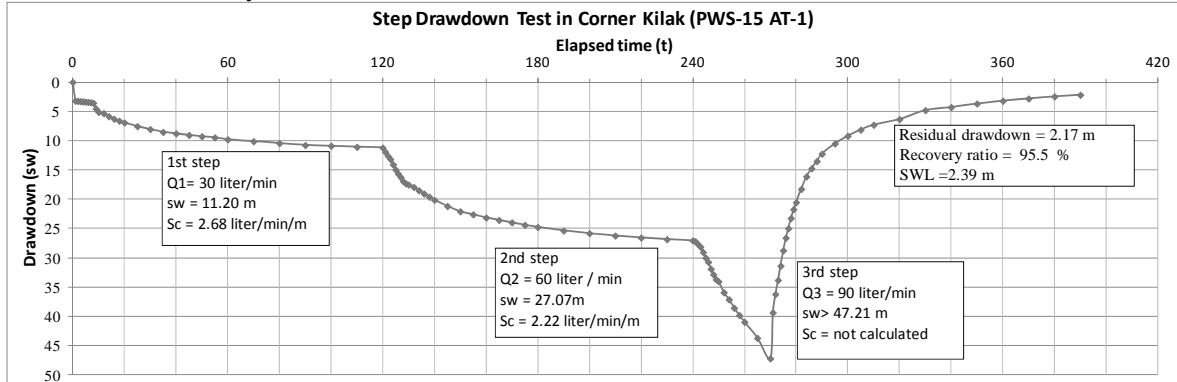
NB: The NWSC certificate of analysis by no means constitute a warranty or a promise of performance or a contract to conduct business.

Result of Pumping Test for Existing Well

There were two systems of piped water supply scheme in Corner Kilak RGC. One was broken and other was abandoned. Pumping test was conducted at the abandoned well.

a) PWS-15-AT-1

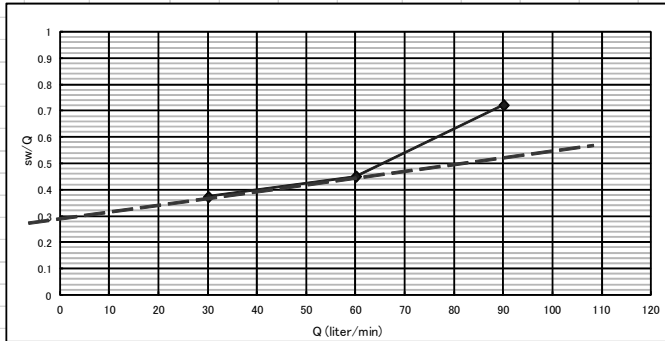
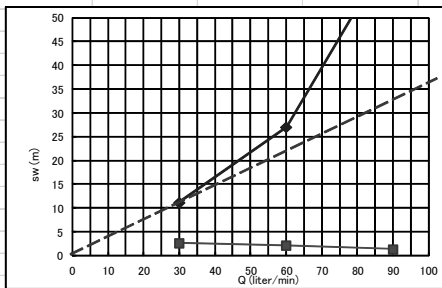
The results of pumping test are shown below. Upper graph is drawdown curve of step drawdown test, middle is the analysis of the step drawdown test, and lower graph shows drawdown curve of constant rate test and recovery test.



Step Drawdown Test Analysis in Corner Kilak (PWS-15-AT-1)

Static Water Level = 2.39 meters Pump depth = 50 m

Table 1				Table 2				
Steps	Pumping Rates (liter/min)	Drawdown (sw) (m)	Specific Capacity (Sc) (liter/min/m)	Steps	1	2	3	Long
1	30	11.2	2.67	Q	30	60	90	30
2	60	27.07	2.21	sw	11.2	27.07	65	14.71
3	90	65	1.38	Sc	2.67	2.21	1.38	2.03
Long	30	14.71	2.03	Q	30	60	90	30.00
				sw/Q	0.3733	0.451	0.7222	

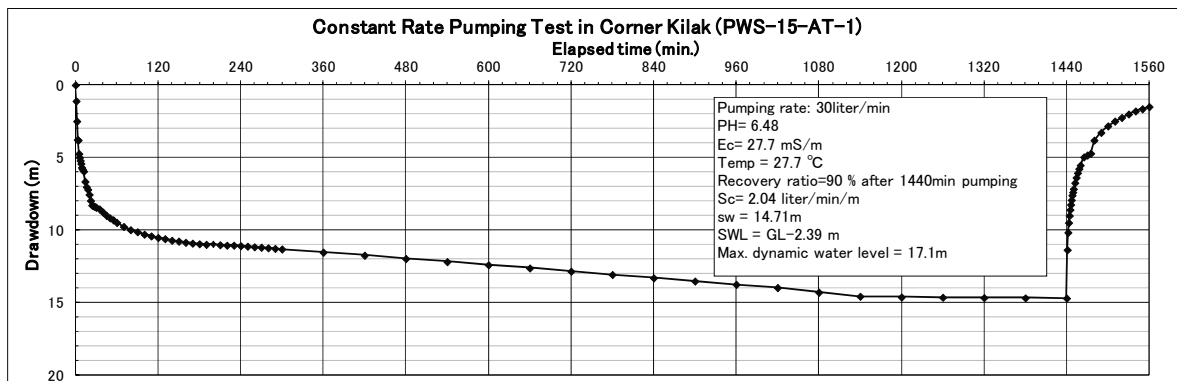


sw=BQ+CQ² Then, sw/Q=B+CQ Table 3 Estimated drawdown at pumping rates

Q ₁	Q ₂	B	C	Q ₁ liter/min	0.29*Q	0.00252*Q+Q	sw ₁	Q ₂ liter/min	0.4*Q	sw ₂	
30	60	0.29	0.005815	30	8.70	5.23	13.93	60	17.40	20.93	38.33
	90			60	17.40	20.93	38.33	80	23.20	37.22	60.42

Therefore, sw= 0.29*Q+ 0.00584*Q*Q

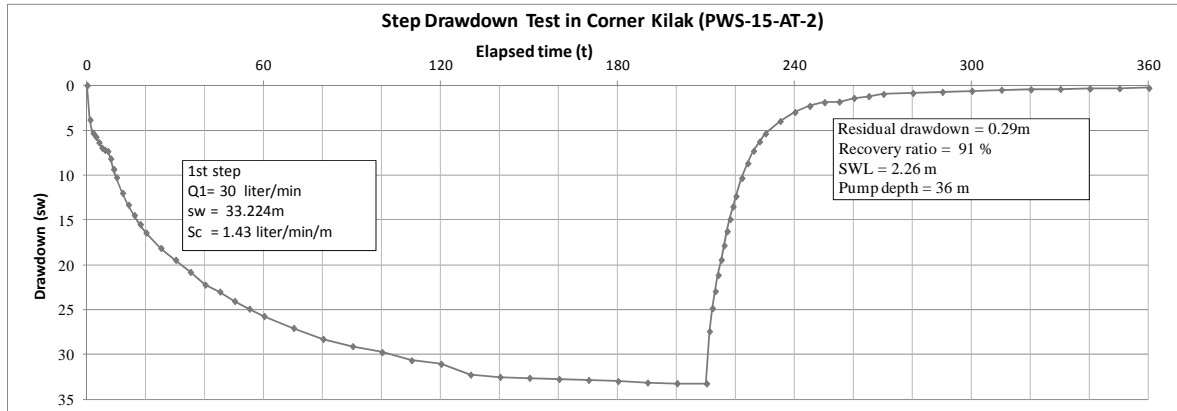
Safe yield is 60 liter/min
Dynamic Water Level = 40.72 m at the Safe Yield



Safe yield was estimated 1.5m³/hr (25L/min) .

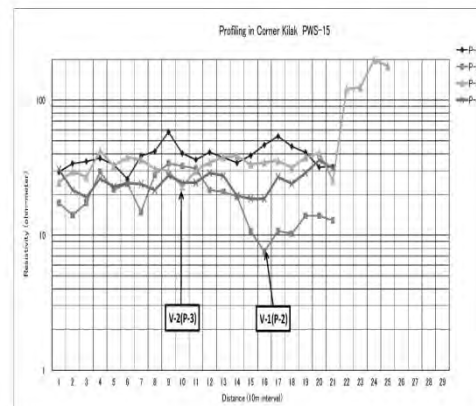
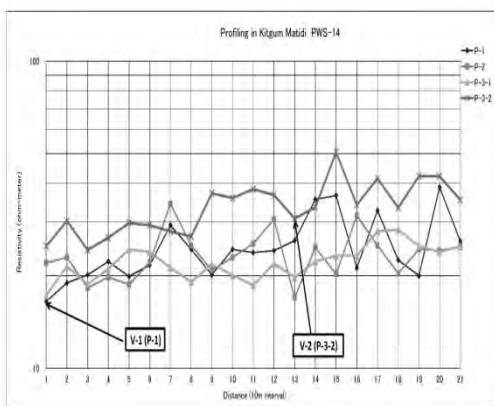
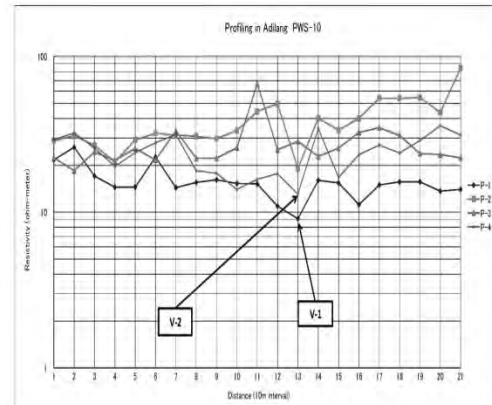
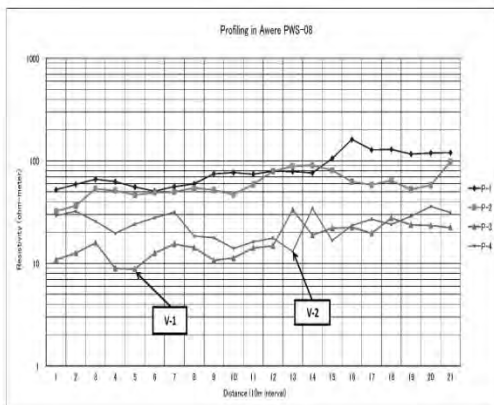
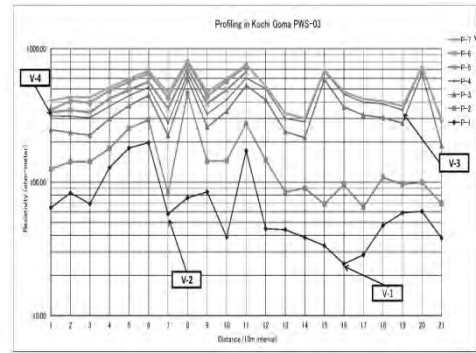
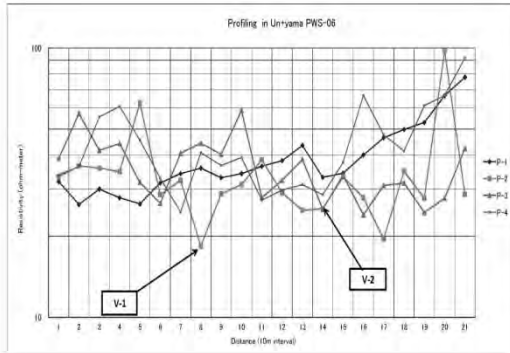
a) PWS-15-AT-2

The result of pumping test is shown below. Constant rate pumping test was conducted for 200 minutes, and recovery test was conducted.



Safe yield was estimated 1.8m³/hr (30L/min) .

Geophysical Survey Results



Summary of Vertical Electric Sounding and Drilling Depth

Villages	Cord No. of VES	Estimated aquifer depth (m)	Estimated hard depth of rocks (m)	Resistivity of aquifer (ohm meter)	Resistivity of hard rocks (ohm meter)	Estimated drilling depth (m)	E	N	Drilled Depth of Test Drilling
Kochi Goma PWS-03	V-cal	& to 62 m	62 m	270 & 800	5,000	-	408198	287748	-
	V-1	3 to 75 m	75 m	84 & 271	5,000	75	408198	287748	
	V-2	3.5 to 25.5 m	25.5 m	513 & 900	5,000	60	408093	287828	60
	V-3	13 to 29 m	29 m	812	2,000	30	407563	288506	
	V-4	20 to 56 m	56 m	500	4,000	80	407480	288571	80
Unyama PWS-06	V-cal	0.3 to >100 m	>100 m	150 to 1016	-	-	426351	312581	
	V-1	4 to 30 m	30 m	134	3,000	60	426340	312563	76
	V-2	2 to 35 m	35 m	104	3,000	45	426310	312044	
	V-3	18 to 63 m	63 m	350	3,000	80	426340	312563	
	V-4	17 to 70 m	70 m	999	2,000	80	426310	312044	80
Awere PWS-08	V-cal	5.2 to 16.1	16 m	10 ?	3,000	-	475791	296758	
	V-1	19 to 77 m	77 m	500, 1000	3,000	77	475789	296802	
	V-2	16 to 66 m	66 m	500, 1000	3,000	70	475572	297241	73
Adilang PWS-010	V-cal	1.8 to 17 m	17 m	24 & 421	5,000	-	553733	303362	
	V-1	11.5 to 105 m	105 m	80, 250, 900	50,000	90	553600	303268	90
	V-2	22 to 58 m	58 m	100, 500	50,000	70	553780	303248	70
Kitgum Matidi PWS-14	V-cal	2.0 to >100m	>100 m	60 & 400	-	-	506443	361150	
	V-1	8.4 to >100 m	>100 m	620	-	90	506365	361450	90
	V-2	20 to 98	98.0	800 & 1000	3,000	90	506264	361879	90
Corner Kilak PWS-15	V-cal	17 to 82 m	303.0	82	3,000	-	495717	305528	
	V-1	13 to 62	62	503	3,000	90	495747	305905	
	V-2	12 m to 129 m	129	496 500	5,000	90	495534	306037	91

Summary of Vertical Electric Sounding and Drilling Depth								
Villages	Cord No. of VES	Estimated aquifer depth (m)	Estimated hard depth of rocks (m)	Resistivity of aquifer (ohm meter)	Resistivity of hard rocks (ohm meter)	Estimated drilling depth (m)	E	N
Kochi Goma PWS-03	V-cal	& to 62 m	62 m	270 & 800	5,000	-	408198	287748
	V-1	3 to 75 m	75 m	84 & 271	5,000	75	408198	287748
	V-2	3.5 to 25.5 m	25.5 m	513 & 900	5,000	60	408093	287828
	V-3	13 to 29 m	29 m	812	2,000	30	407563	288506
	V-4	20 to 56 m	56 m	500	4,000	80	407480	288571
Unyama PWS-06	V-cal	0.3 to >100 m	>100 m	150 to 1016	-	-	426351	312581
	V-1	4 to 30 m	30 m	134	3,000	60	426340	312563
	V-2	2 to 35 m	35 m	104	3,000	45	426310	312044
	V-3	18 to 63 m	63 m	350, 1000	3,000	80	426340	312563
	V-4	17 to 70 m	70 m	999	2,000	80	426310	312044
Awere PWS-08	V-cal	5.2 to 16.1	16 m	10 ?	3,000	-	475791	296758
	V-1	19 to 77 m	77 m	500, 1000	3,000	80	475789	296802
	V-2	16 to 66 m	66 m	500, 1000	3,000	70	475572	297241
Adilang PWS-010	V-cal	1.8 to 17 m	17 m	24 & 421	5,000	-	553733	303362
	V-1	11.5 to 105 m	105 m	80, 250, 900	50,000	90	553600	303268
	V-2	22 to 58 m	58 m	100, 500	50,000	70	553780	303248
Kitgum Matidi PWS-14	V-cal	2.0 to >100m	>100 m	60 & 400	-	-	506443	361150
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	V-1	13 to 62	62	503	3,000	90	495747	305905
	V-2	12 m to 129 m	129	496 500	5,000	90	495534	306037

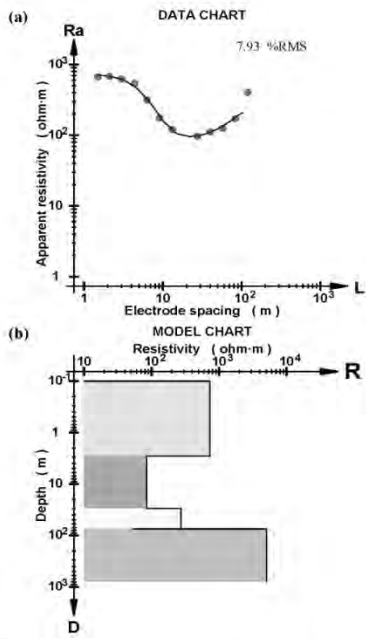


Figure 3. Inverse modelling for sounding <Field data>- Schlumberger array at "PWS-03 Kochi Goma V-1".

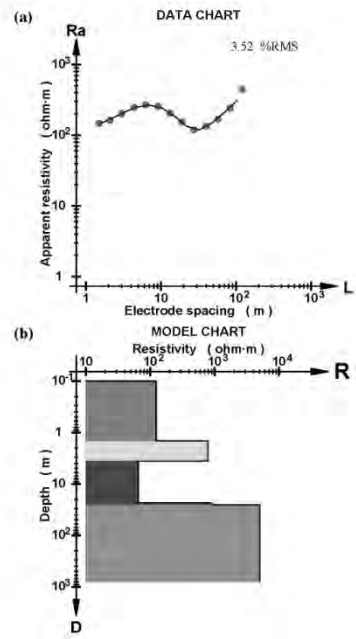


Figure 3. Inverse modelling for sounding <03 Kochi Goma V-2Field.dat>- Schlumberger array at "PWS-03 Kochi Goma V-2".

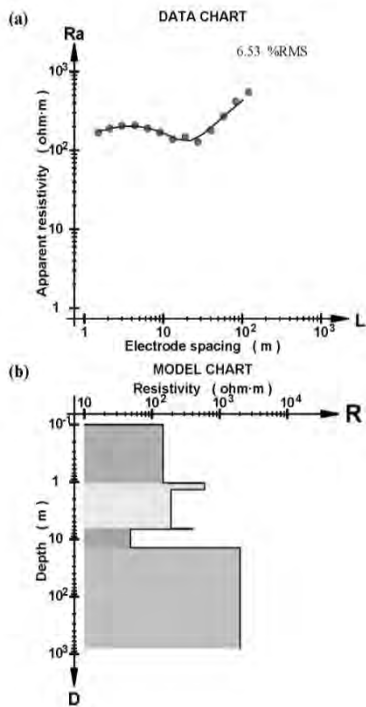


Figure 3. Inverse modelling for sounding <03 Kochi Goma V-3Field.dat>- Schlumberger array at "PWS-03 Kochi Goma V-3".

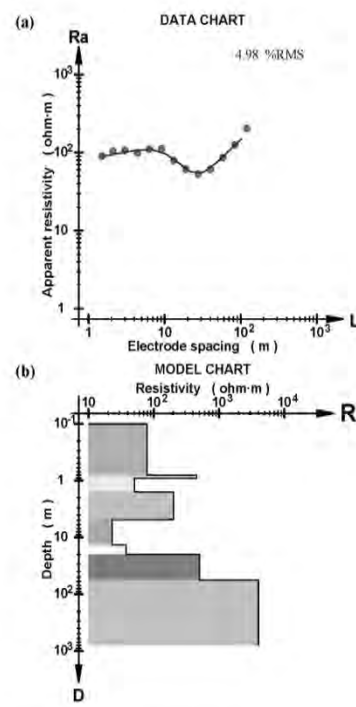


Figure 3. Inverse modelling for sounding <03 Kochi Goma V-4Field.dat>- Schlumberger array at "PWS-03 Kochi Goma V-4".

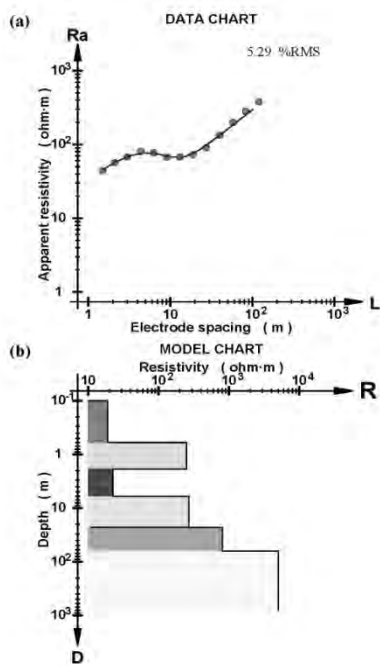


Figure 3. Inverse modelling for sounding <03 Kochi Goma VcalField.dat> - Schlumberger array at "PWS-06 Unyama Vcal".

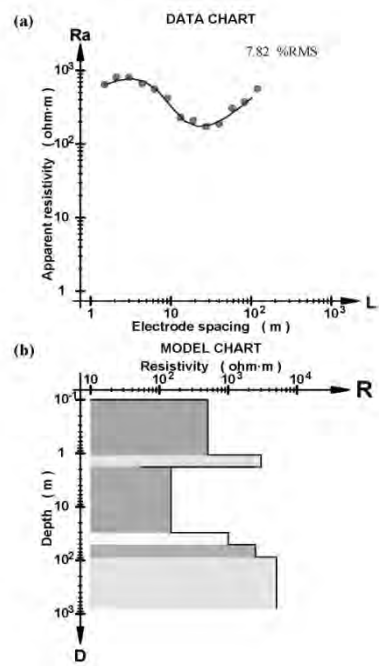


Figure 3. Inverse modelling for sounding <06 Unyama V-1Field.dat> - Schlumberger array at "PWS-06 Unyama V-1".

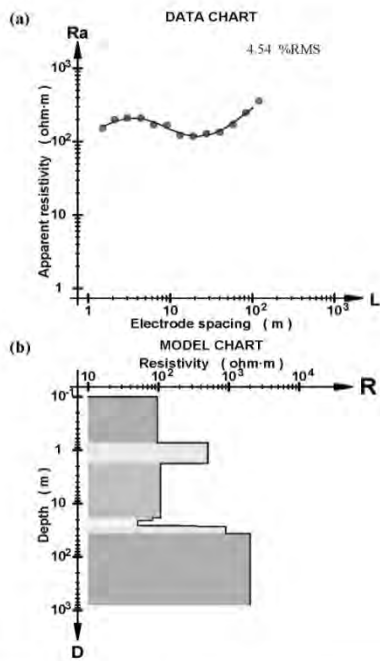


Figure 3. Inverse modelling for sounding <06 Unyama V-2Field.dat> - Schlumberger array at "PWS-06 Unyama V-2".

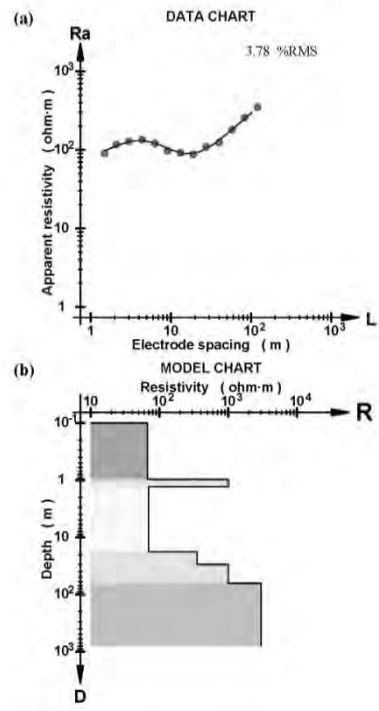


Figure 3. Inverse modelling for sounding <06 Unyama V-3Field.dat> - Schlumberger array at "PWS-06 Unyama V-3".

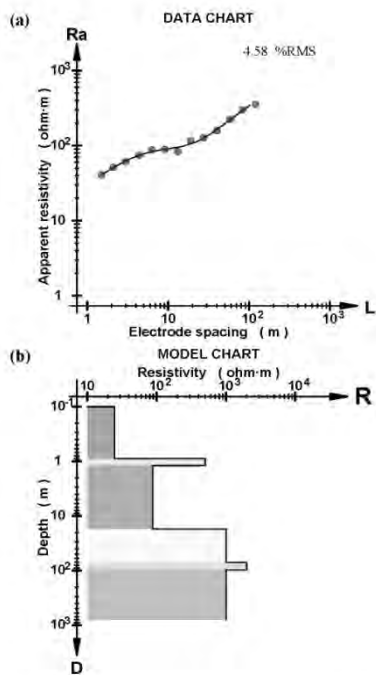


Figure 3. Inverse modelling for sounding <06 Unyama V-4Field.dat> - Schlumberger array at "PWS-06 Unyama V-4".

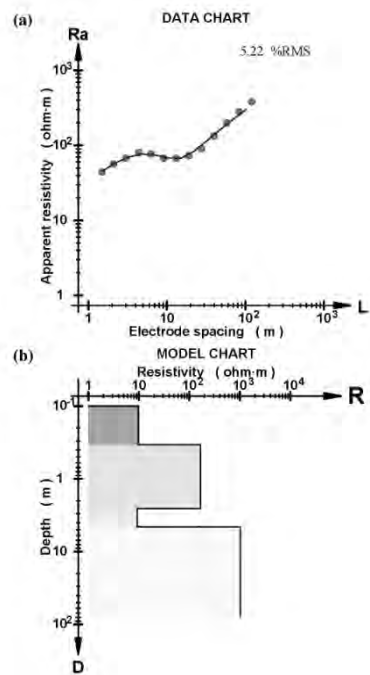


Figure 3. Inverse modelling for sounding <03 unyama VcalField.dat> - Schlumberger array at "PWS-06 Unyama Vcal".

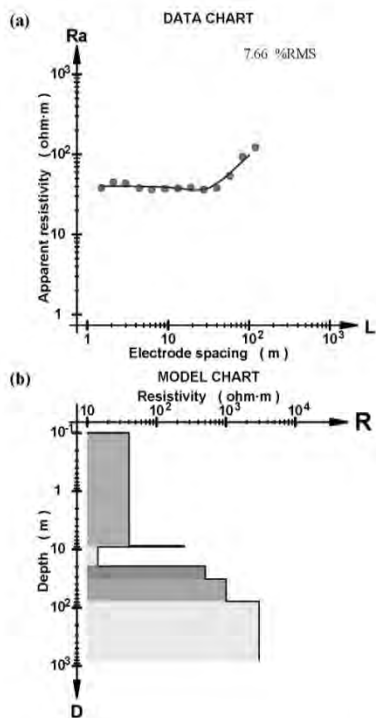


Figure 3. Inverse modelling for sounding <08 Awere V-1Field.dat> - Schlumberger array at "PWS-08 Awere V-1".

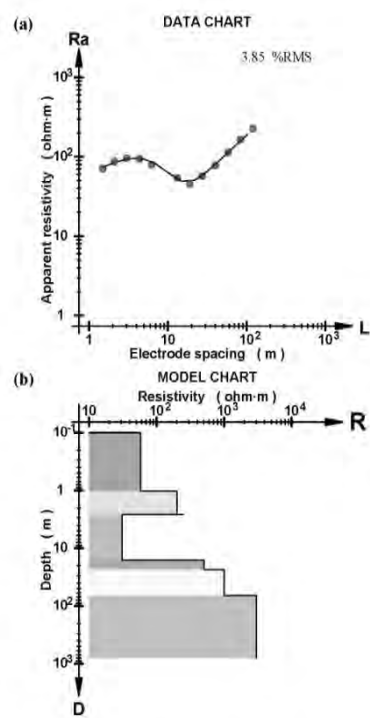


Figure 3. Inverse modelling for sounding <08 Awere V-2Field.dat> - Schlumberger array at "PWS-08 Awere V-2".

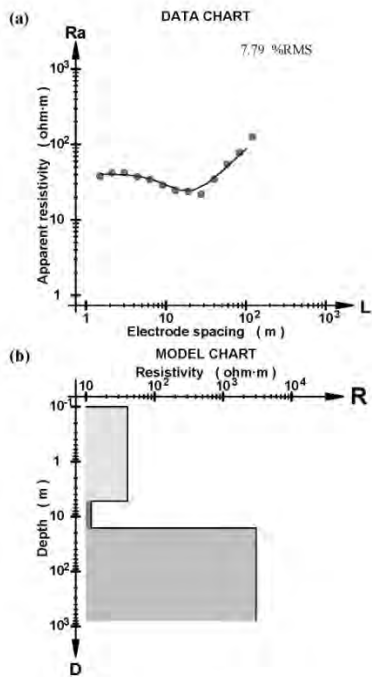


Figure 3. Inverse modelling for sounding <10 PWS-08 VcalField.dat>- Schlumberger array at "PWS-08 Awere V-cal".

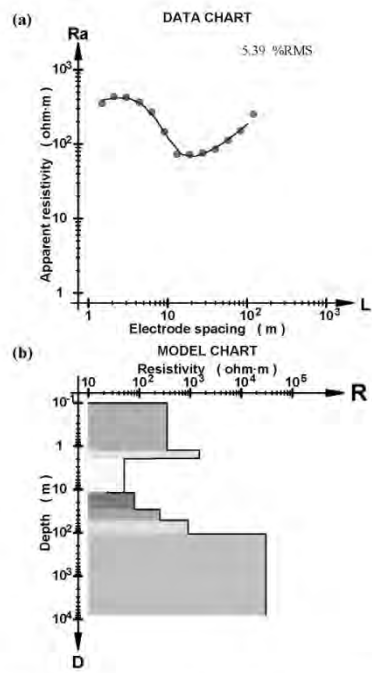


Figure 3. Inverse modelling for sounding <10 Adilang V-1Field.dat>- Schlumberger array at "PWS-10 Adilang V-1".

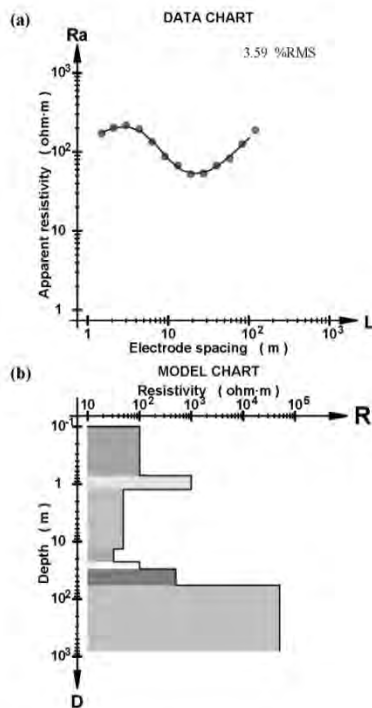


Figure 3. Inverse modelling for sounding <10 Adilang V-2Field.dat>- Schlumberger array at "PWS-10 Adilang V-2".

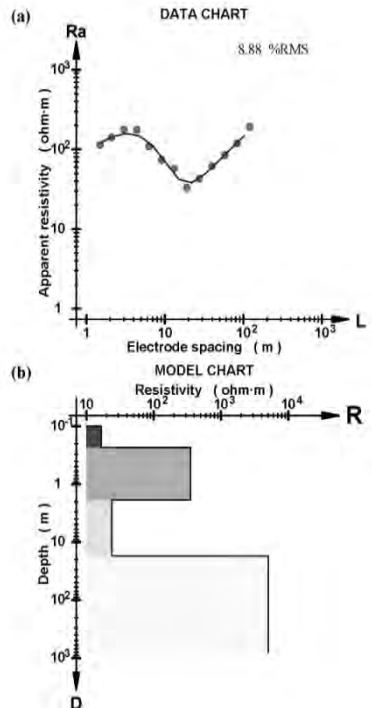


Figure 3. Inverse modelling for sounding <10 Adilang VcalField.dat>- Schlumberger array at "PWS-10 Adilang V-cal".

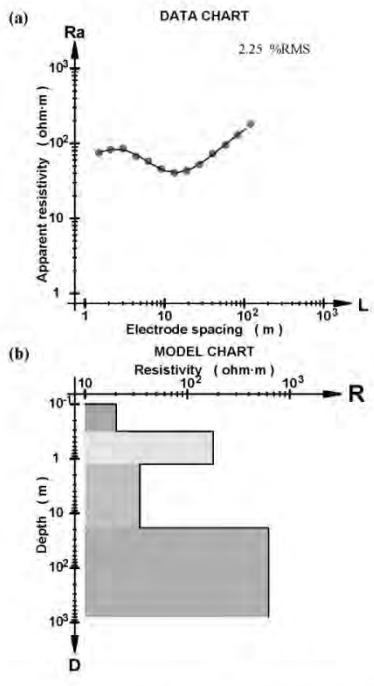


Figure 3. Inverse modelling for sounding <14 Kitgum Matidi V-1.dat> - Schlumberger array at "PWS-14 Kitgum Matidi V-1".

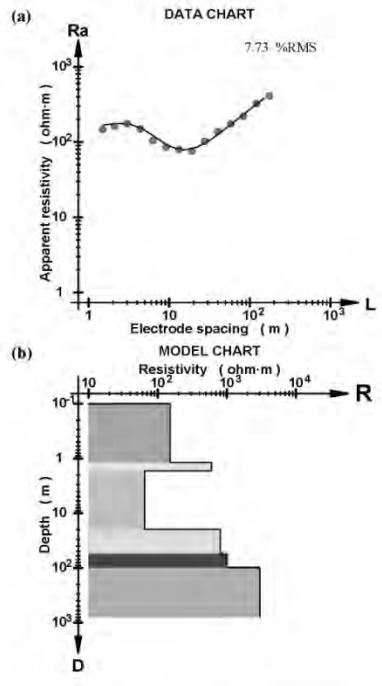


Figure 3. Inverse modelling for sounding <14 Kitgum Matidi V-2.dat> - Schlumberger array at "PWS-14 Kitgum Matidi V-2".

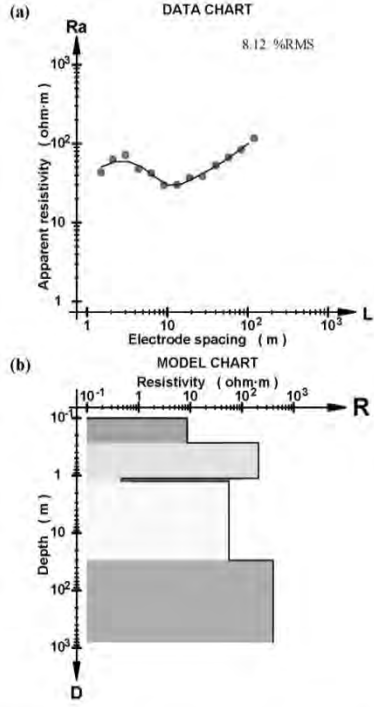


Figure 3. Inverse modelling for sounding <14 Kitgum Matidi V-cal.dat> - Schlumberger array at "PWS-14 Kitgum Matidi V-cal".

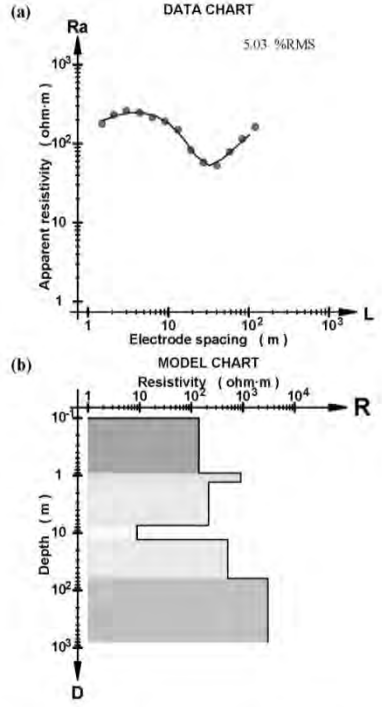


Figure 3. Inverse modelling for sounding <15 Corner Kilak V-1.dat> - Schlumberger array at "PWS-15 Corner Kilak V-1".

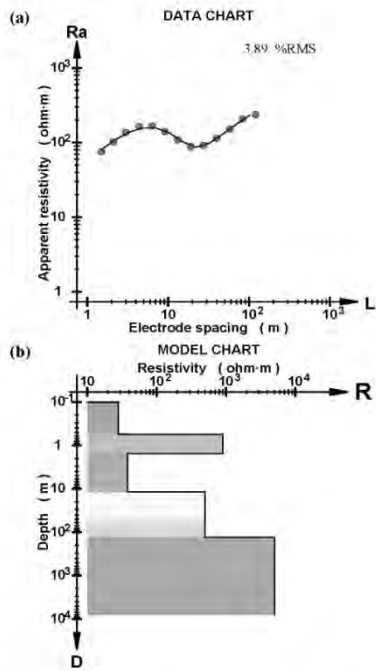


Figure 3. Inverse modelling for sounding =15 Corner Kilak V-2.dat-- Schlumberger array at "PWS-15 Corner Kilak V-2".

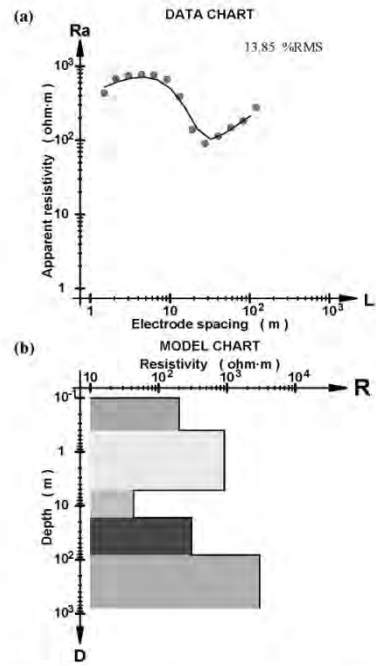
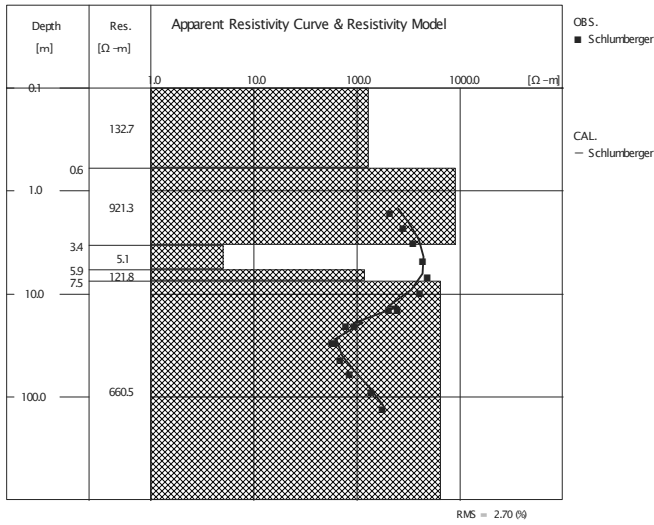
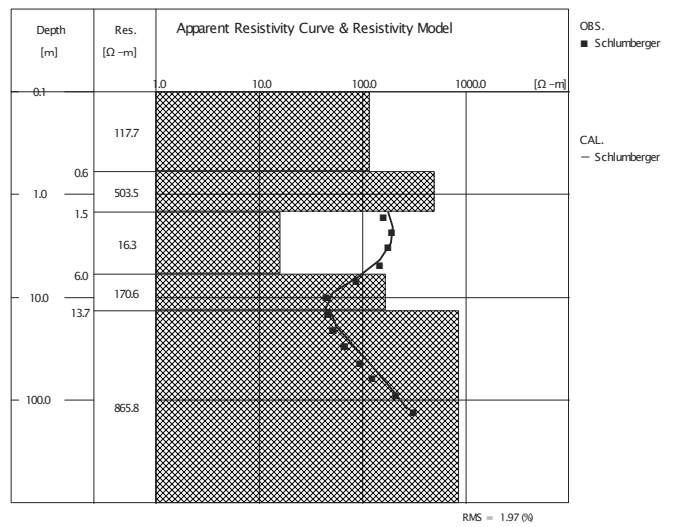


Figure 3. Inverse modelling for sounding =15 Corner Kilak V-cal.dat-- Schlumberger array at "PWS-15 Corner Kilak V-cal".

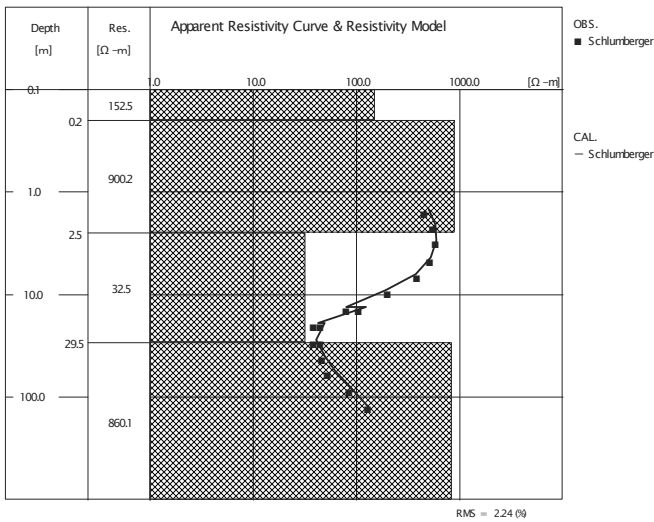
No.1: Bibia East village, Amuru district, Attiak subcounty,
UTM-E:396387 UTM-N:383918



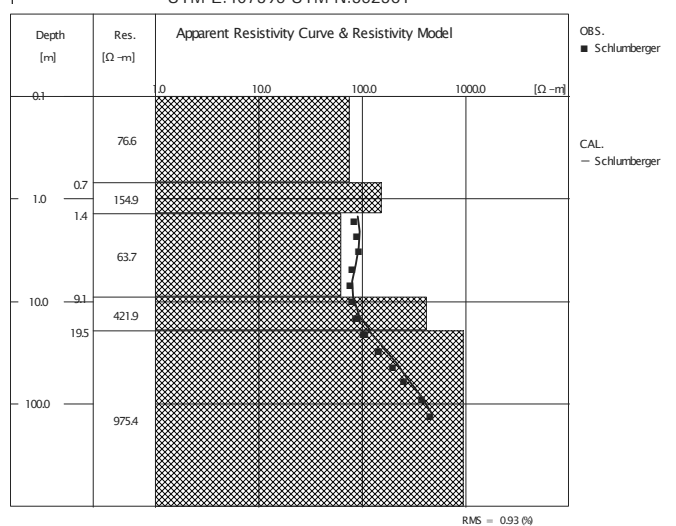
No.3: Okidi North village, Amuru district, Attiak subcounty,
UTM-E:412097 UTM-N:363826



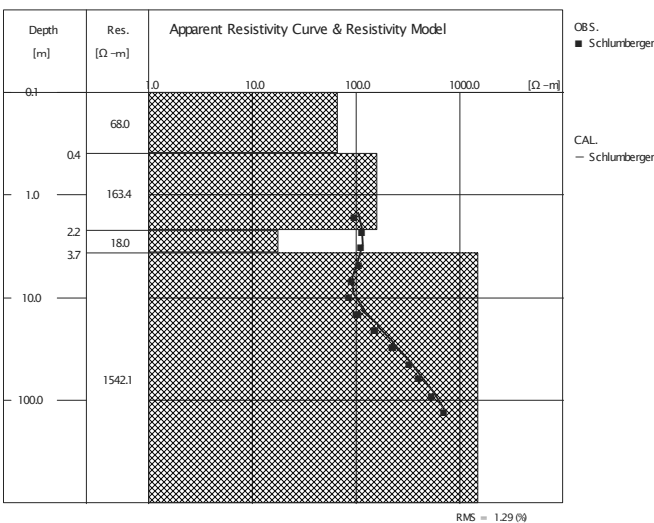
No.4: Pacilo East village, Amuru district, Attiak subcounty,
UTM-E:400957 UTM-N:376117



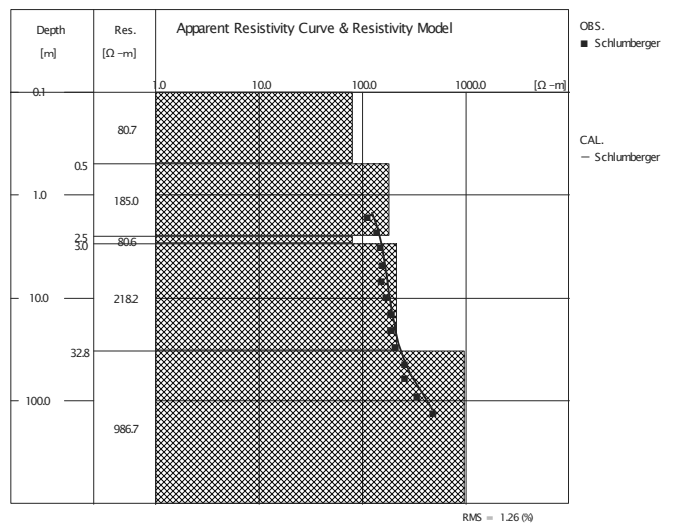
No.5: Palukere East village, Amuru district, Attiak subcounty,
UTM-E:407395 UTM-N:352361



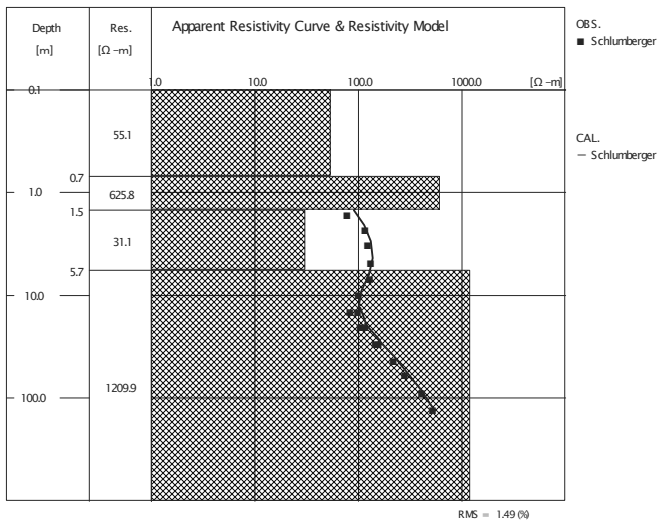
No.7: Pukumu village, Amuru district, Attiak subcounty,
UTM-E:408694 UTM-N:338567



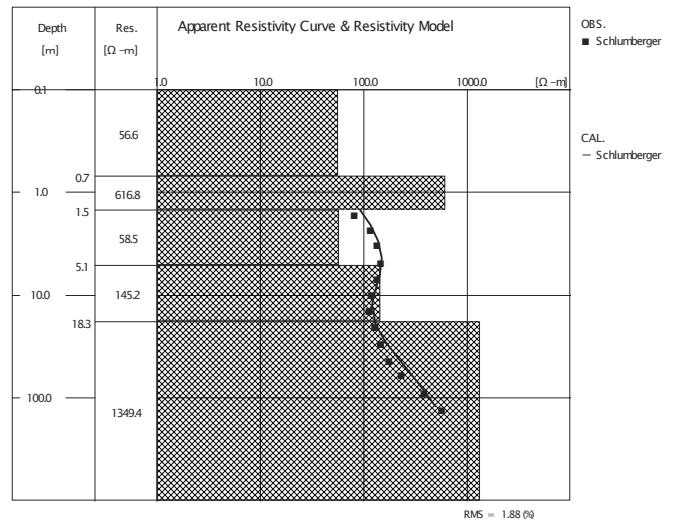
No.8: Pupwonya East village, Amuru district, Attiak subcounty,
UTM-E:404609 UTM-N:356634



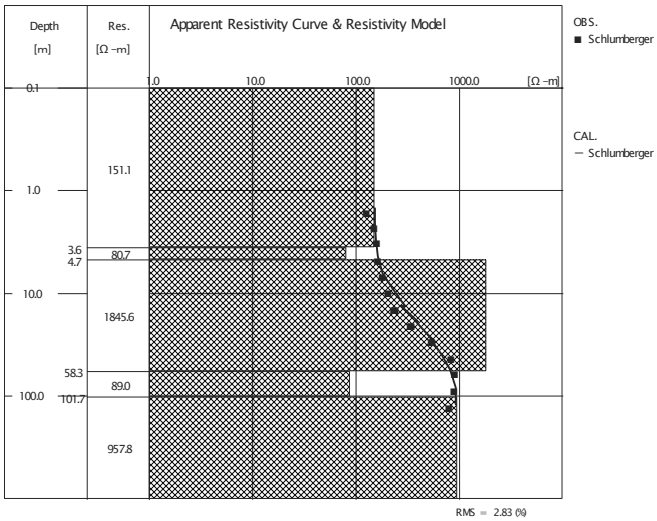
No.9: Paomo village, Amuru district, Pabbo subcounty,
UTM-E:406623 UTM-N:331311



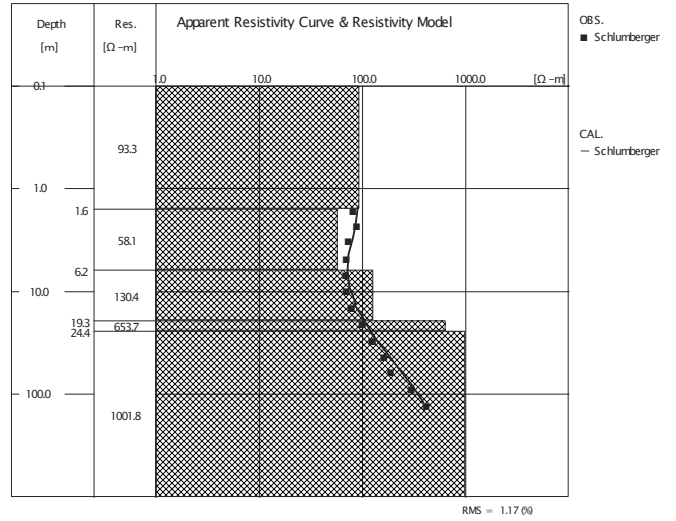
No.10: Kal centre village, Amuru district, Pabbo subcounty,
UTM-E:403517 UTM-N:333497



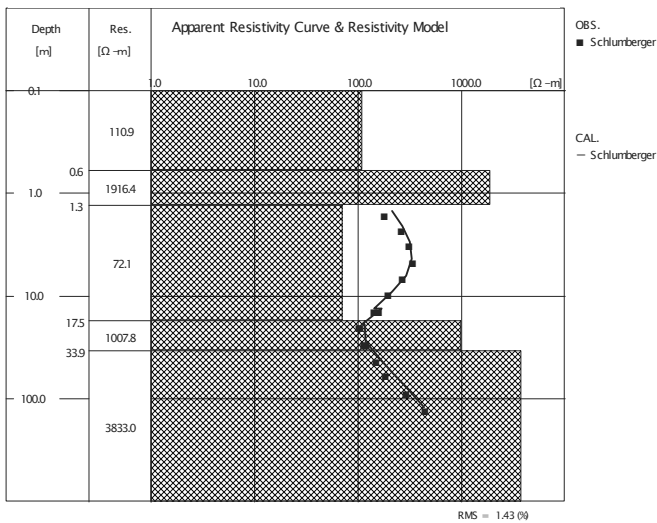
No.11: Andara village, Amuru district, Pabbo subcounty,
UTM-E:386735 UTM-N:328418



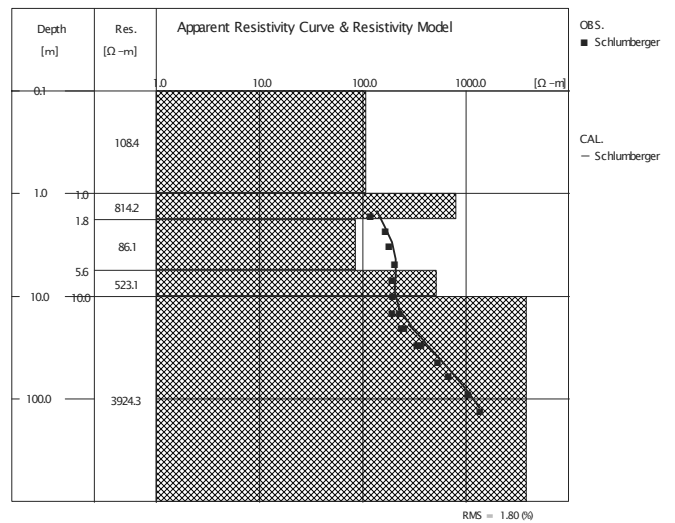
No.12: Olinga village, Amuru district, Pabbo subcounty,
UTM-E:395901 UTM-N:336185



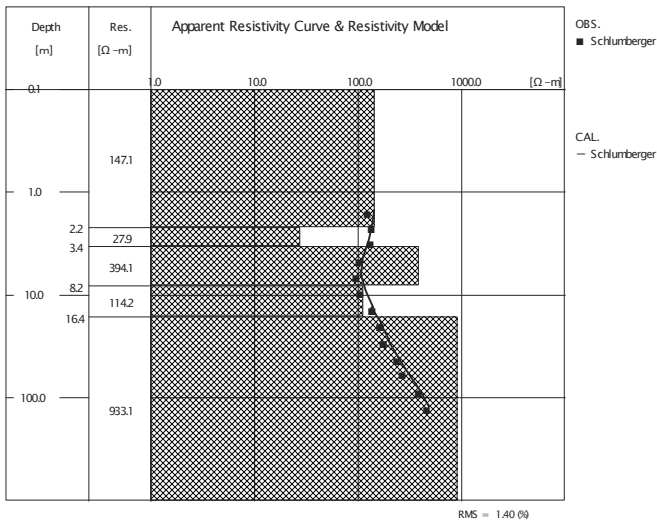
No.13: Kati Kati A village, Amuru district, Pabbo subcounty,
UTM-E:400447 UTM-N:325290



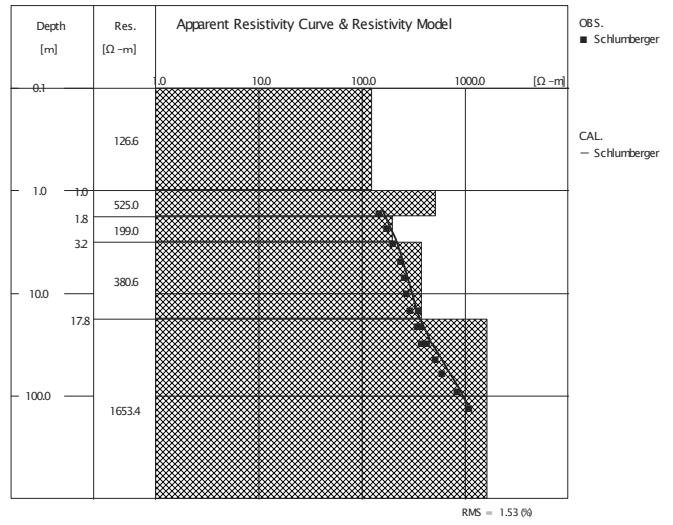
No.14: Abera village, Amuru district, Pabbo subcounty,
UTM-E:402173 UTM-N:337352



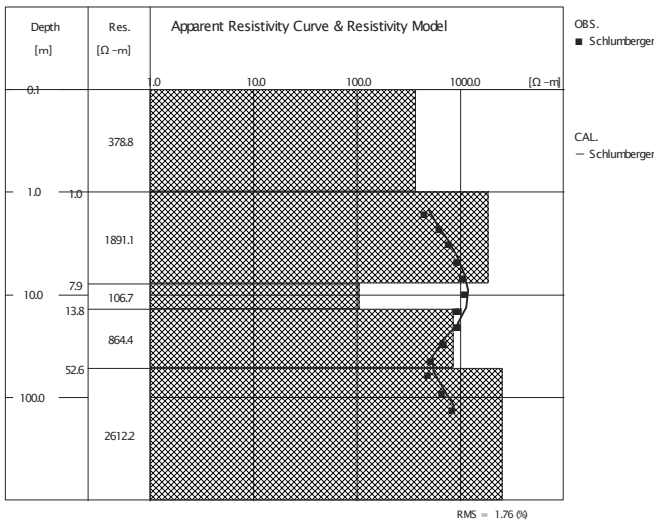
No.15: Ceri village, Amuru district, Pabbo subcounty,
UTM-E:391917 UTM-N:360365



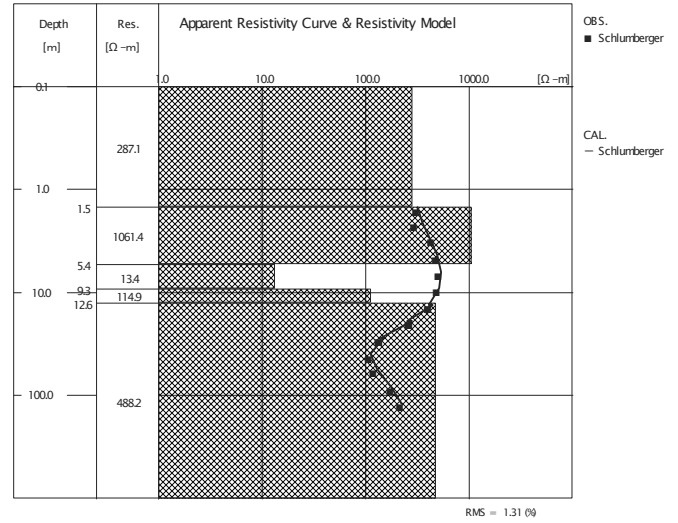
No.18: Amora village, Amuru district, Lamogi subcounty,
UTM-E:396642 UTM-N:322953



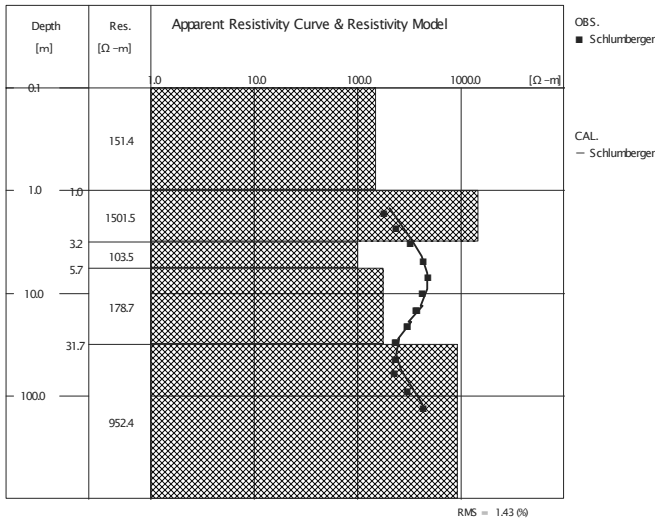
No.19: Opok village, Amuru district, Lamogi subcounty,
UTM-E:397189 UTM-N:315231



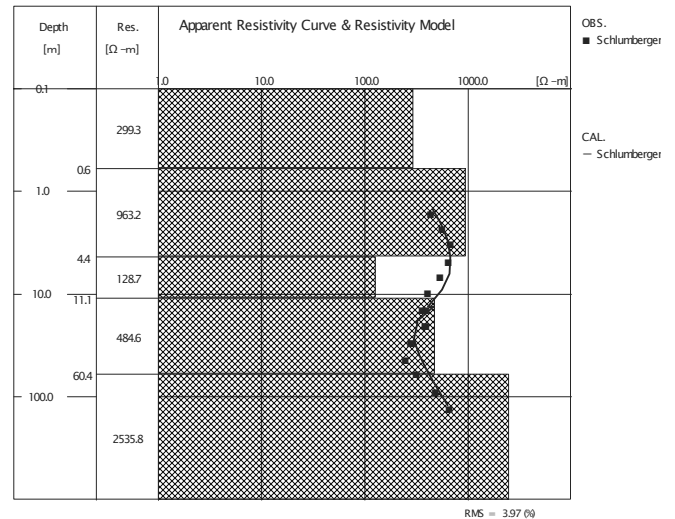
No.20: Pukure village, Amuru district, Lamogi subcounty,
UTM-E:412625 UTM-N:306510



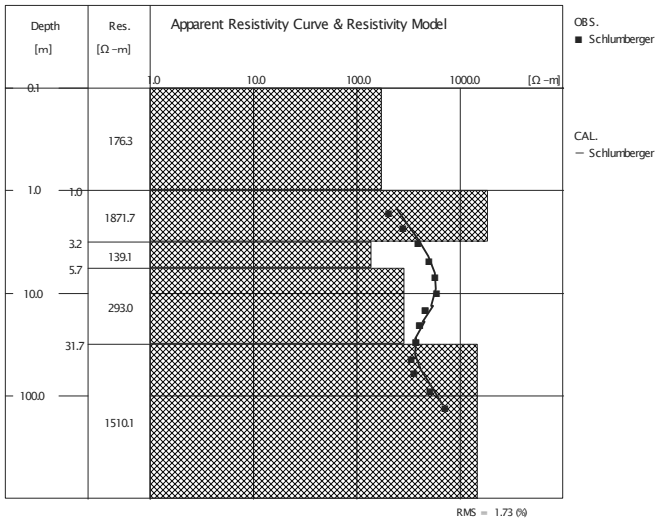
No.21: Coorom village, Amuru district, Lamogi subcounty,
UTM-E:393796 UTM-N:310628



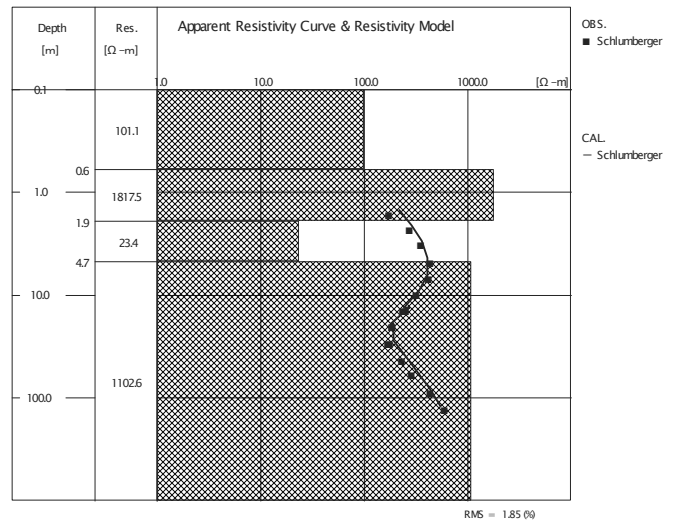
No.25: Teddi village, Amuru district, Amuru subcounty,
UTM-E:374857 UTM-N:327028



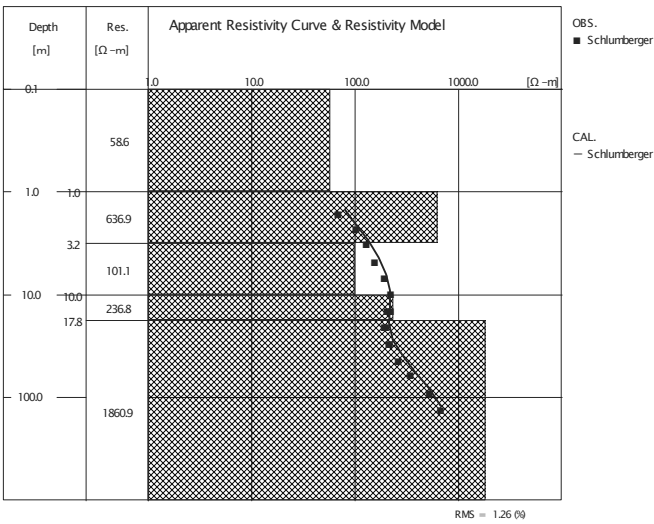
No.28: Labongo village, Amuru district, Amuru subcounty,
UTM-E:384827 UTM-N:309834



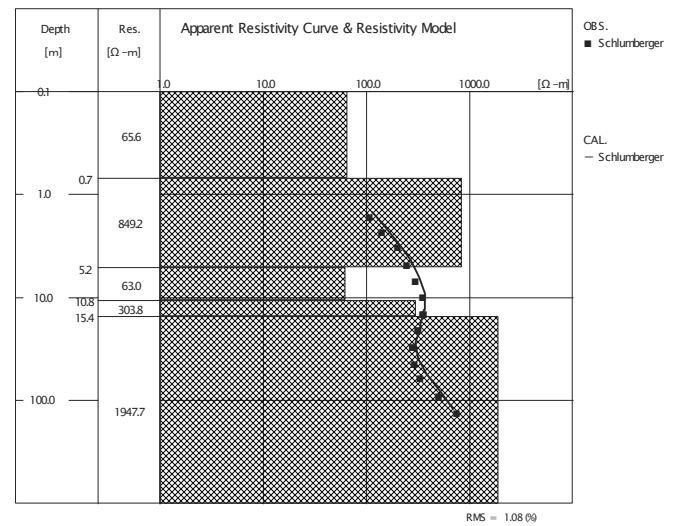
No.29: Lujoro village, Amuru district, Amuru subcounty,
UTM-E:373678 UTM-N:313990



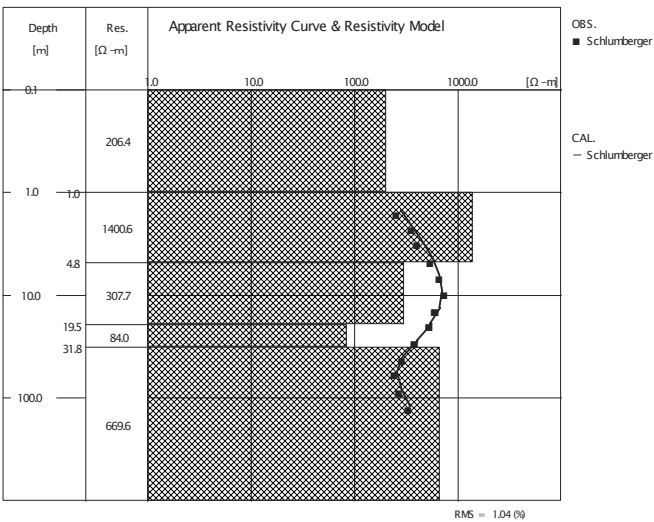
No.30: Mutema village, Amuru district, Amuru subcounty,
UTM-E:375205 UTM-N:318963



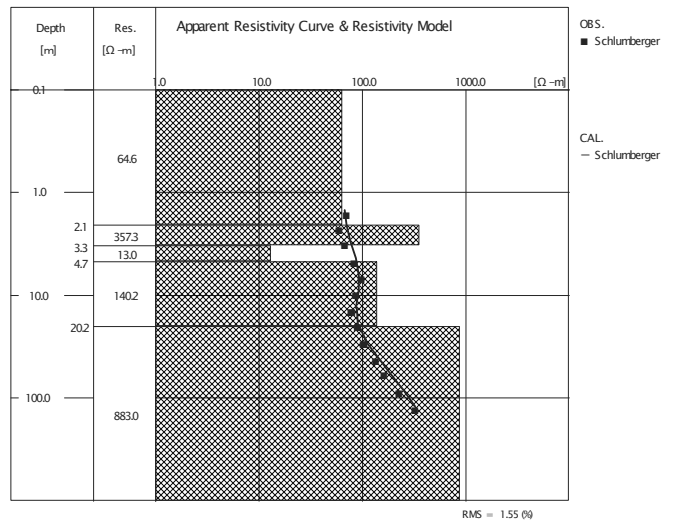
No.31: Ogeli village, Amuru district, Amuru subcounty,
UTM-E:390999 UTM-N:311108



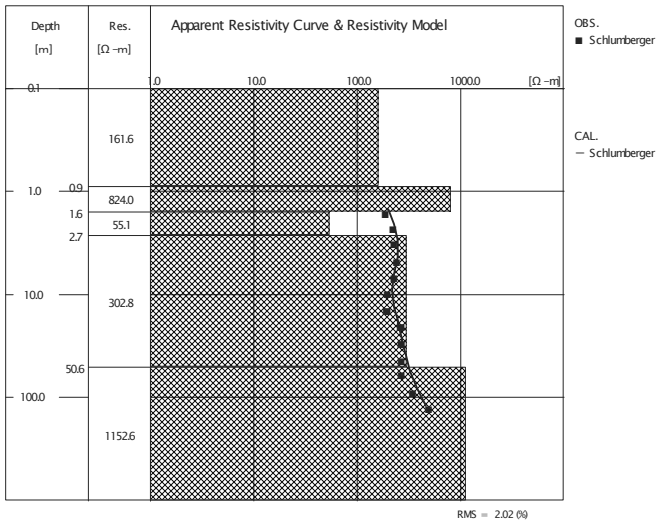
No.32: Reckiceke village, Amuru district, Amuru subcounty,
UTM-E:380581 UTM-N:313215



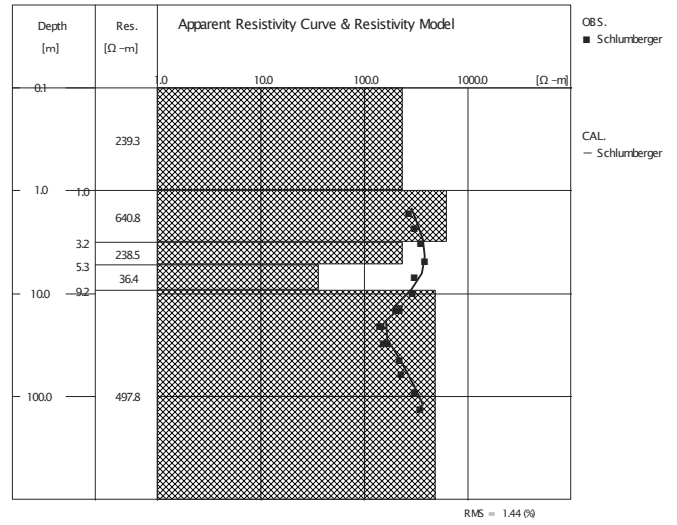
No.33: Lamolo Coke village, Amuru district, Lamogi subcounty,
UTM-E:403244 UTM-N:321728



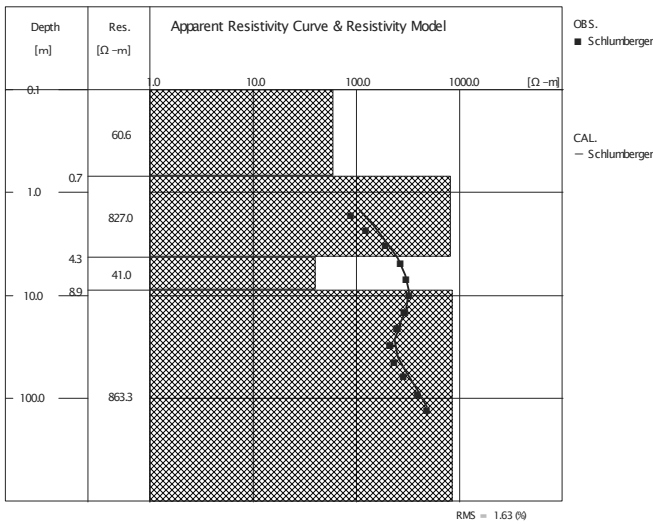
No.34: Apaa village, Amuru district, Pabbo subcounty,
UTM-E:363715 UTM-N:332208



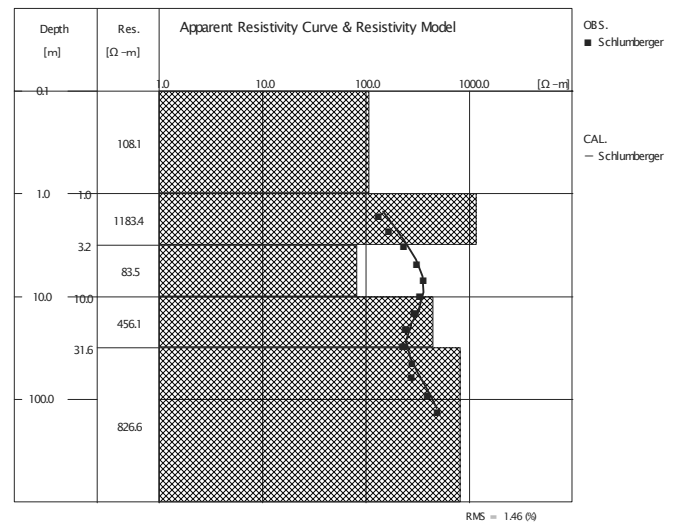
No.37: Bwobonam B village, Nwoya district, Alero subcounty,
UTM-E:387450 UTM-N:294739



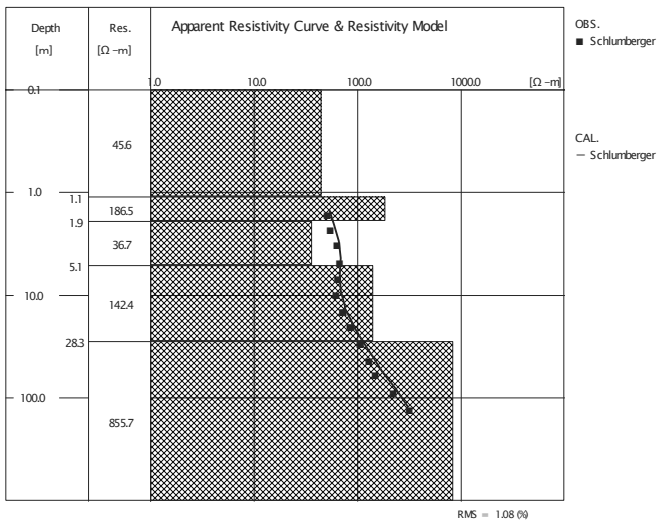
No.40: Latekodong village, Nwoya district, Alero subcounty,
UTM-E:380795 UTM-N:306929



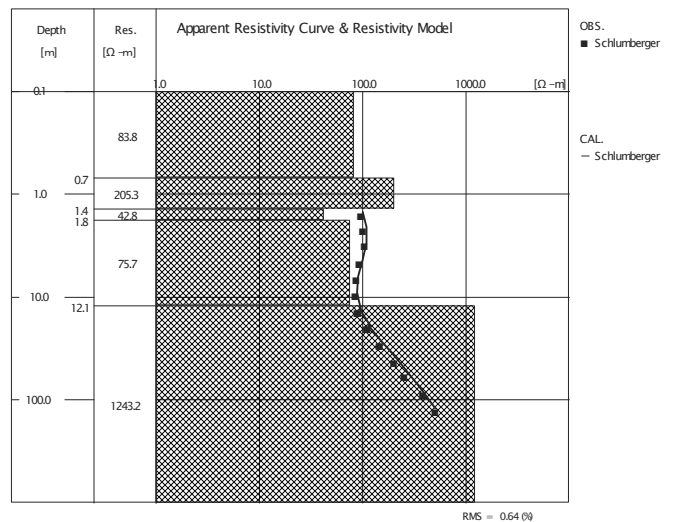
No.46: Akago village, Nwoya district, Anaka subcounty,
UTM-E:384975 UTM-N:284875



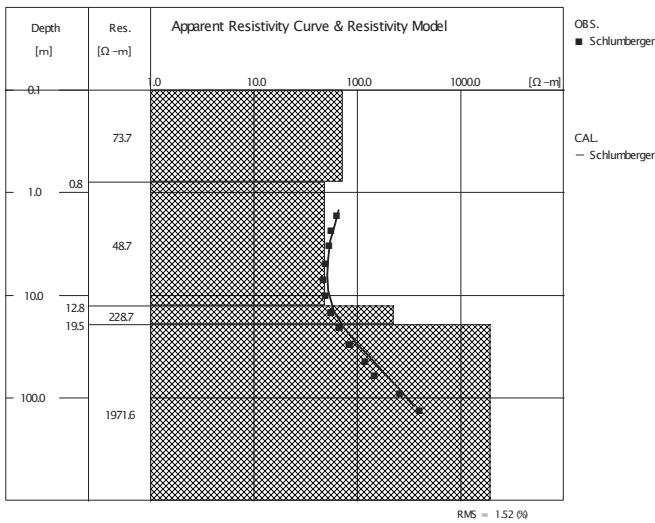
No.48: Kal village, Nwoya district, Anaka subcounty,
UTM-E:383312 UTM-N:287398



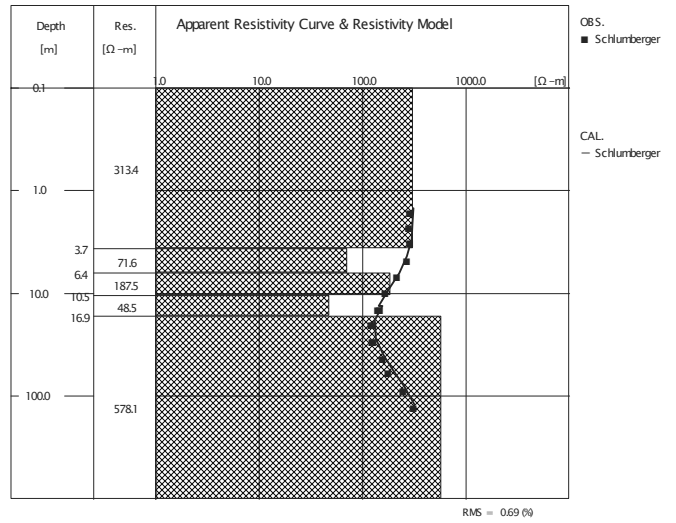
No.54: Agonga B village, Nwoya district, Koch Goma subcounty,
UTM-E:398237 UTM-N:286347



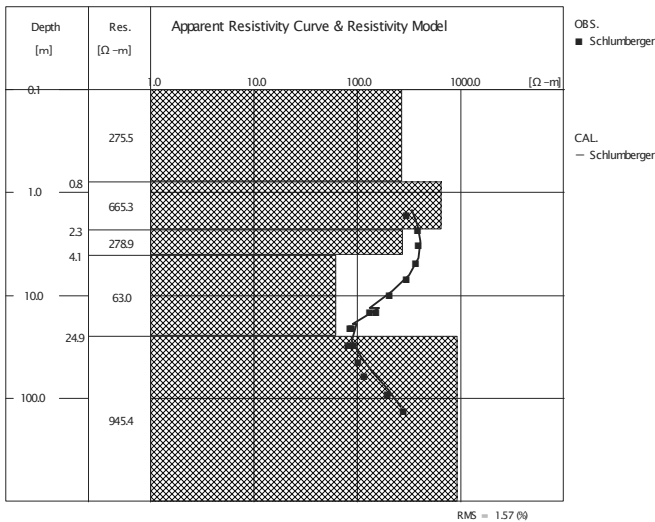
No.62: Paminolango village, Nwoya district, Puronga subcounty,
UTM-E:361235 UTM-N:287448



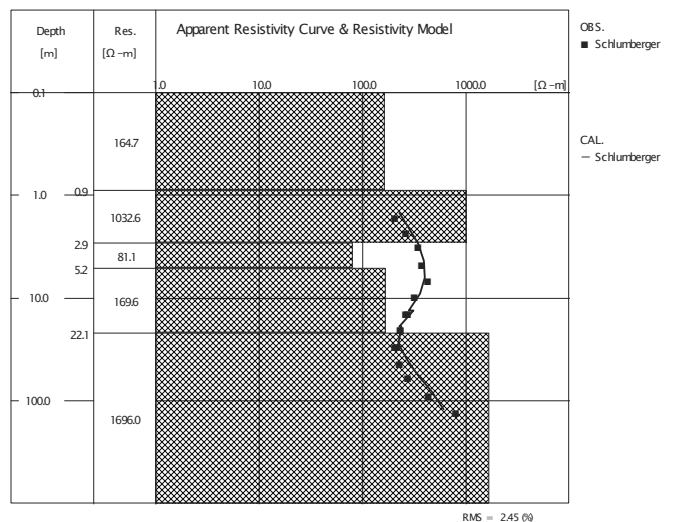
No.64: Lodi village, Nwoya district, Puronga subcounty,
UTM-E:377232 UTM-N:286490



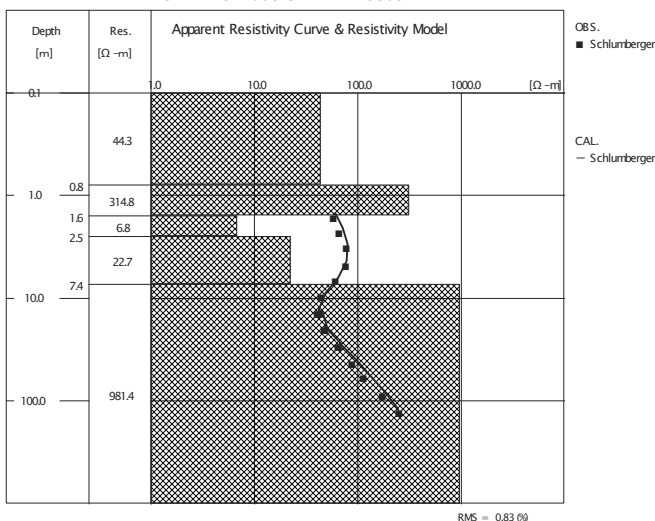
No.67: Pawatmero Central village, Nwoya district, Puronga subcounty,
UTM-E:371302 UTM-N:282068



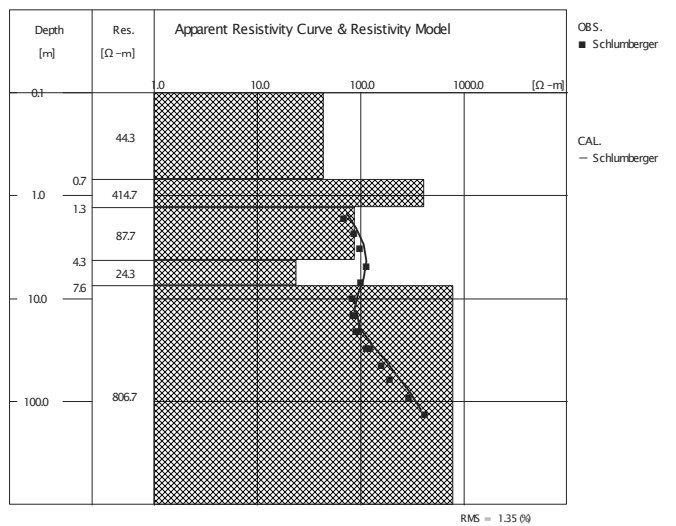
No.68: Pawatmero East village, Nwoya district, Puronga subcounty,
UTM-E:373025 UTM-N:281064



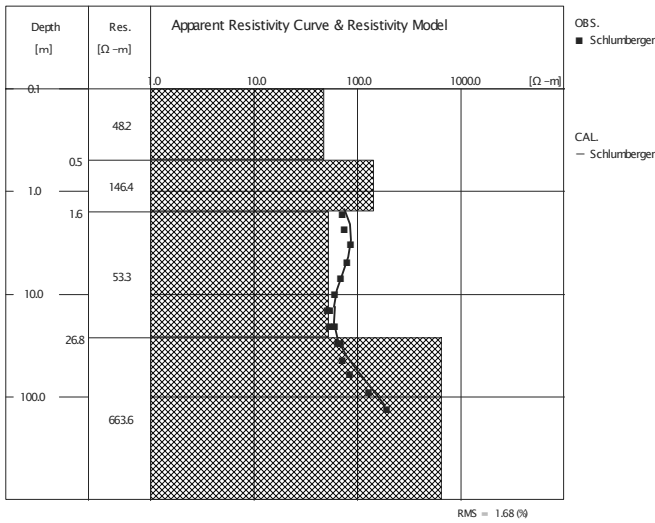
No.70: Lagazi village, Nwoya district, Puronga subcounty,
UTM-E:371068 UTM-N:278363



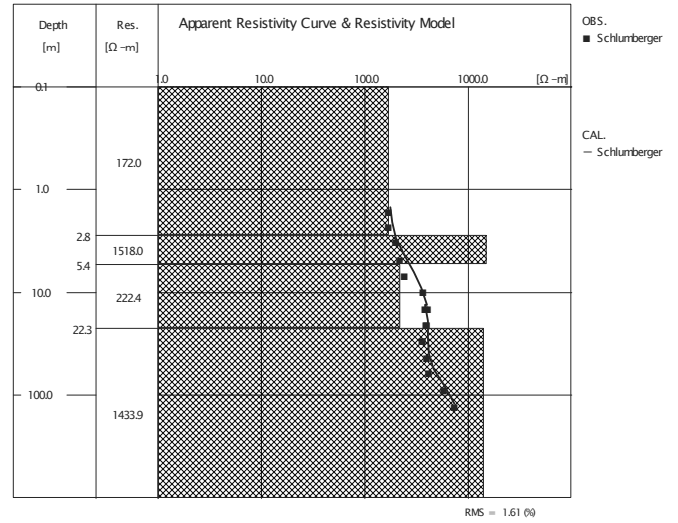
No.89: Acutomer village, Gulu district, Paicho subcounty,
UTM-E:439276 UTM-N:311655



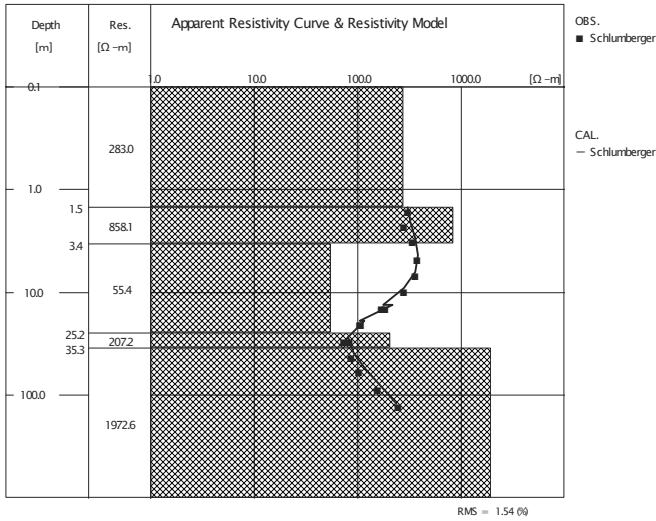
No.90: Omel village, Gulu district, Paicho subcounty,
UTM-E:455389 UTM-N:313977



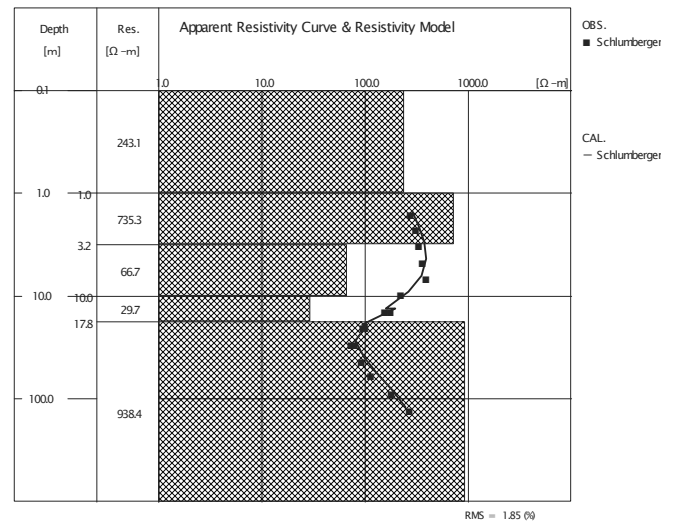
No.95: Gulu PTC village, Gulu district, Paicho subcounty,
UTM-E:426141 UTM-N:312314



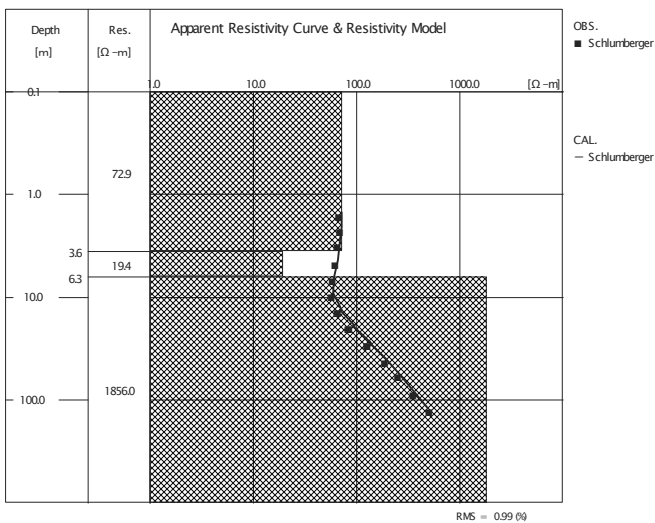
No.96: Agoro I village, Gulu district, Palaro subcounty,
UTM-E:428966 UTM-N:348503



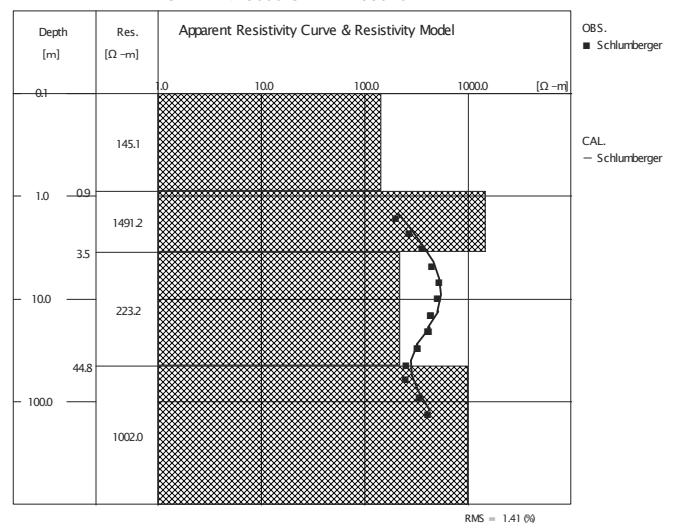
No.101: Kiteny Central village, Gulu district, Palaro subcounty,
UTM-E:430615 UTM-N:335090



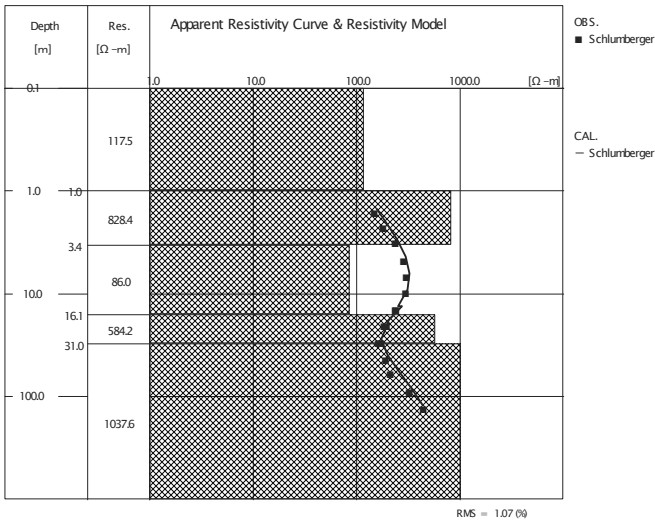
No.105: Adak village, Gulu district, Patiko subcounty,
UTM-E:412398 UTM-N:327819



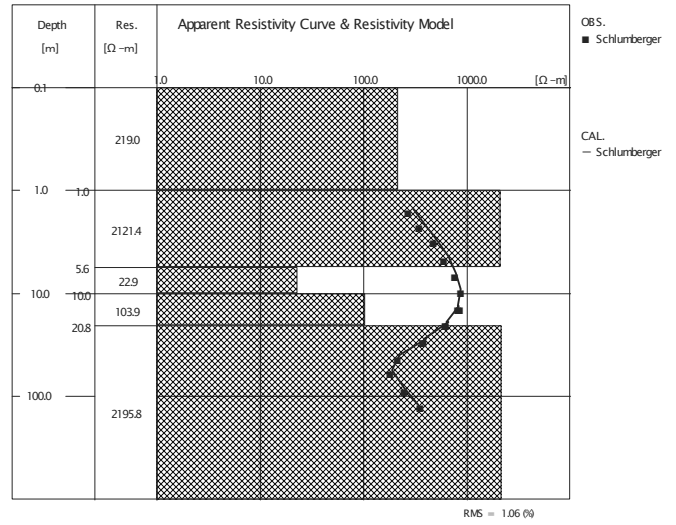
No.106: Labworomor village, Gulu district, Bobi subcounty,
UTM-E:423655 UTM-N:283076



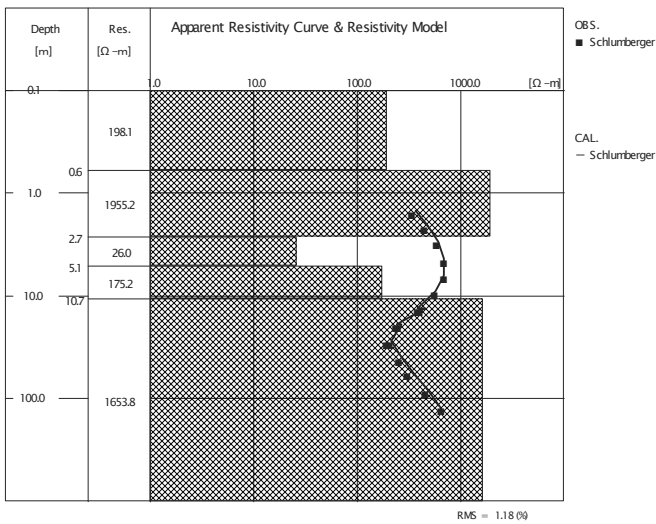
No.107: Along village, Gulu district, Bobi subcounty,
UTM-E:429337 UTM-N:283849



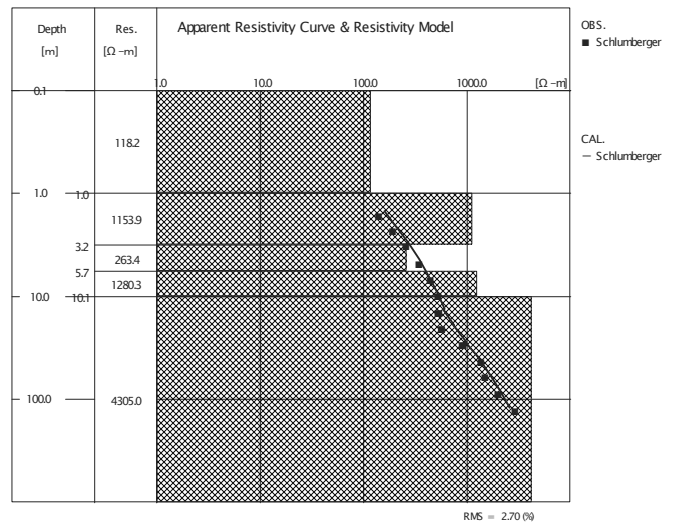
No.108: Ibar village, Gulu district, Bobi subcounty,
UTM-E:423030 UTM-N:290357



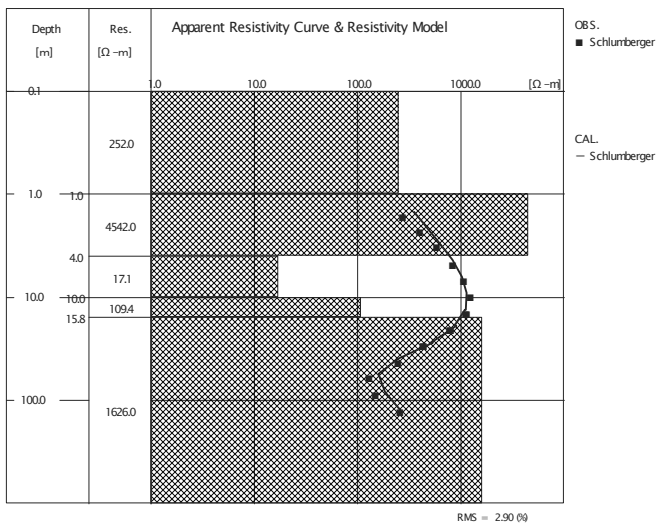
No.110: Adak village, Gulu district, Bobi subcounty,
UTM-E:435973 UTM-N:278031



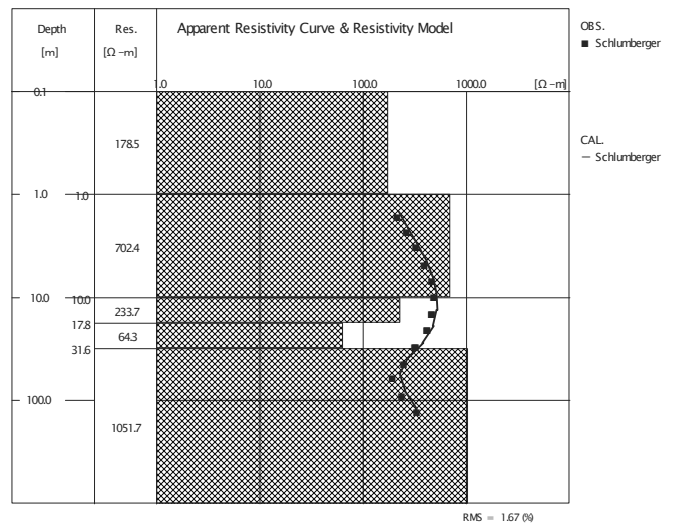
No.114: Atede village, Gulu district, Koro subcounty,
UTM-E:432488 UTM-N:305168



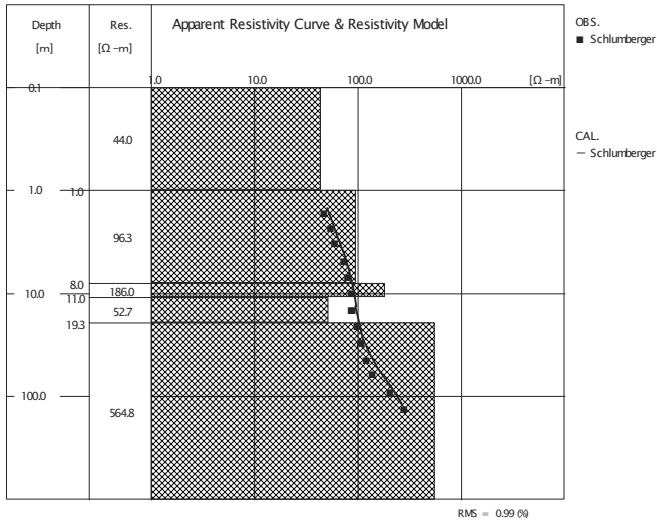
No.115: Obwola village, Gulu district, Koro subcounty,
UTM-E:426871 UTM-N:300517



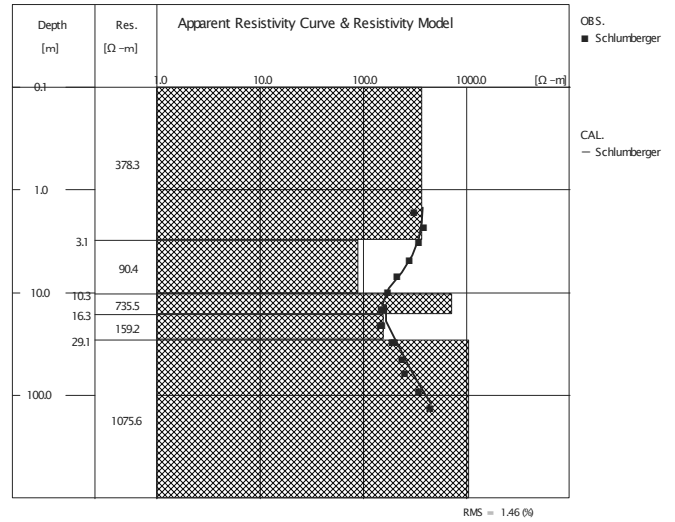
No.116: Kal A and B village, Gulu district, Koro subcounty,
UTM-E:422981 UTM-N:302339



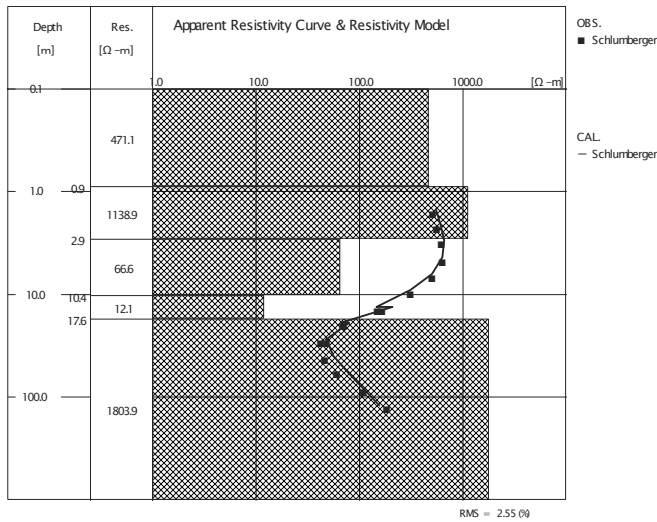
No.123: Otal village, Gulu district, Lalogi subcounty,
UTM-E:450599 UTM-N:291106



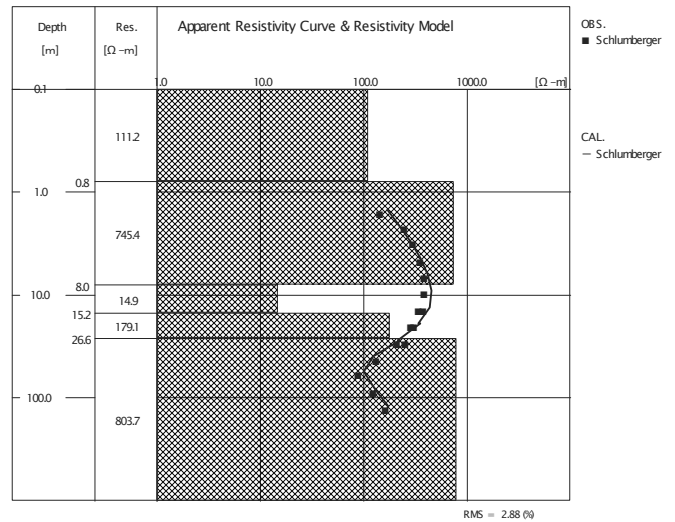
No.124: Alwii village, Gulu district, Lalogi subcounty,
UTM-E:445602 UTM-N:302073



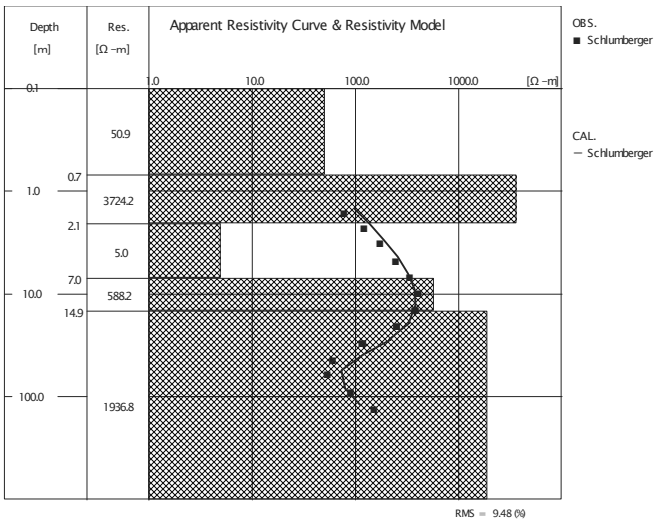
No.126: Aparowiya I village, Gulu district, Lalogi subcounty,
UTM-E:455380 UTM-N:295943



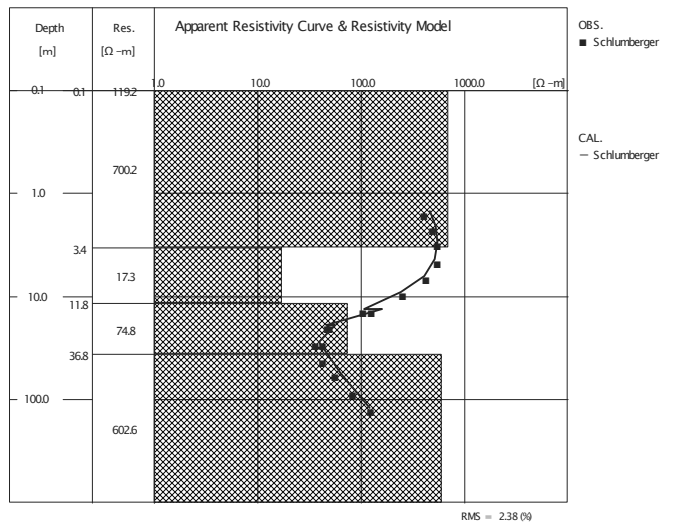
No.136: Owak village, Gulu district, Ongako subcounty,
UTM-E:418159 UTM-N:300706



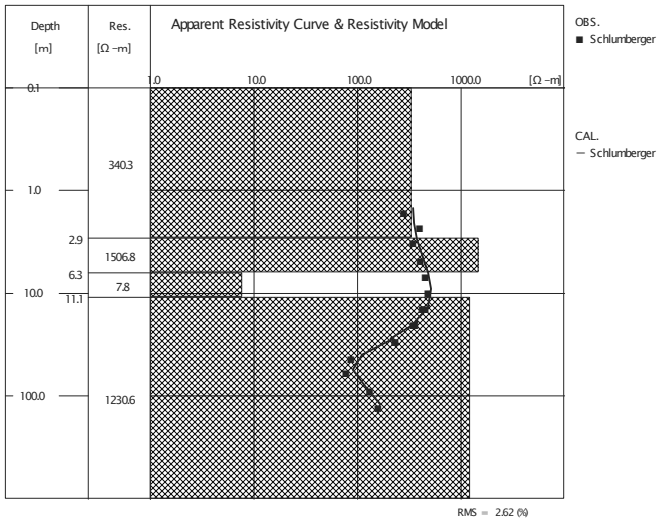
No.144: Sub County HQ village, Agago district, Lira Palwo subcounty,
UTM-E:517603 UTM-N:308198



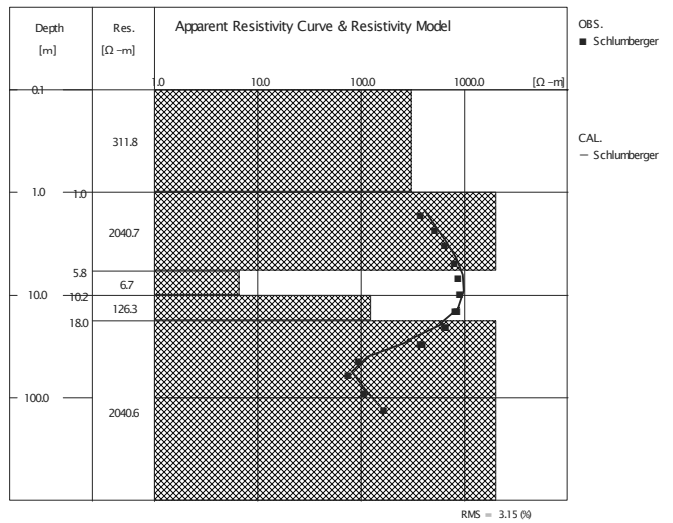
No.145: Tori East village, Agago district, Lira Palwo subcounty,
UTM-E:523089 UTM-N:310535



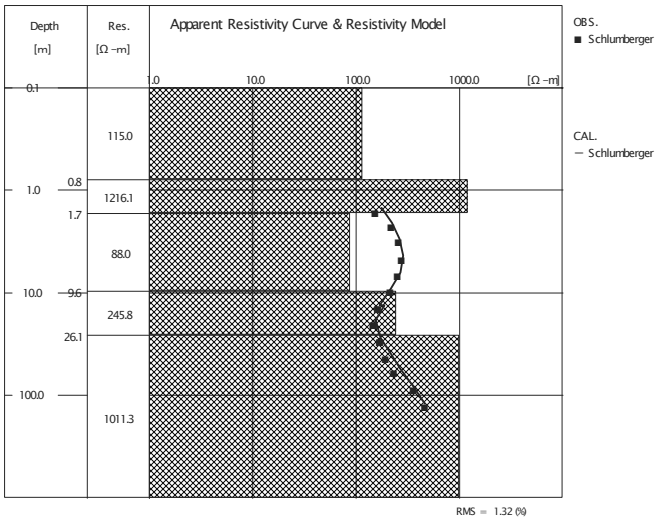
No.148: Lapyem village, Agago district, Lira Palwo subcounty,
UTM-E:520609 UTM-N:303918



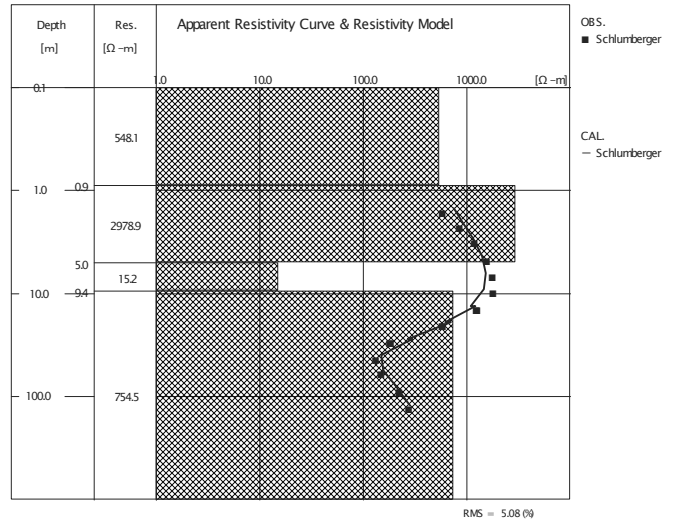
No.151: Amin Ogwal village, Agago district, Kotomor subcounty,
UTM-E:533904 UTM-N:291298



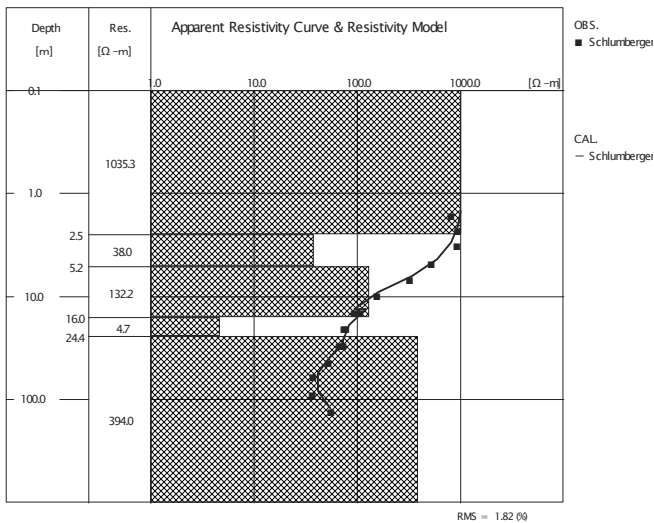
No.152: Oringo Ongom village, Agago district, Kotomor subcounty,
UTM-E:544478 UTM-N:294236



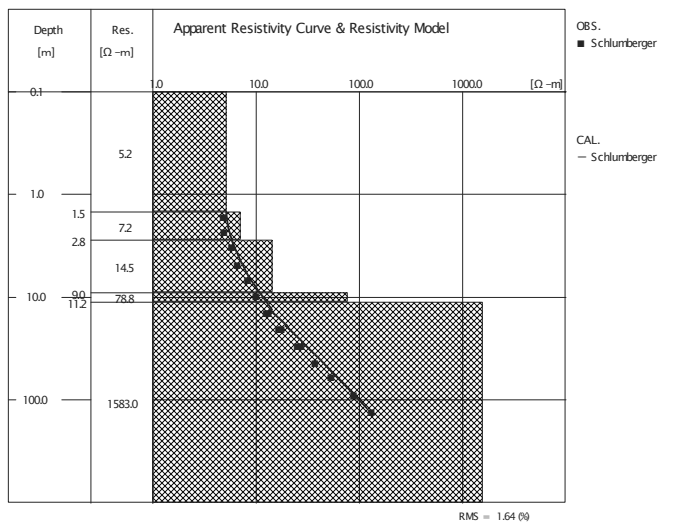
No.153: Te Vwao village, Agago district, Kotomor subcounty,
UTM-E:536864 UTM-N:295283



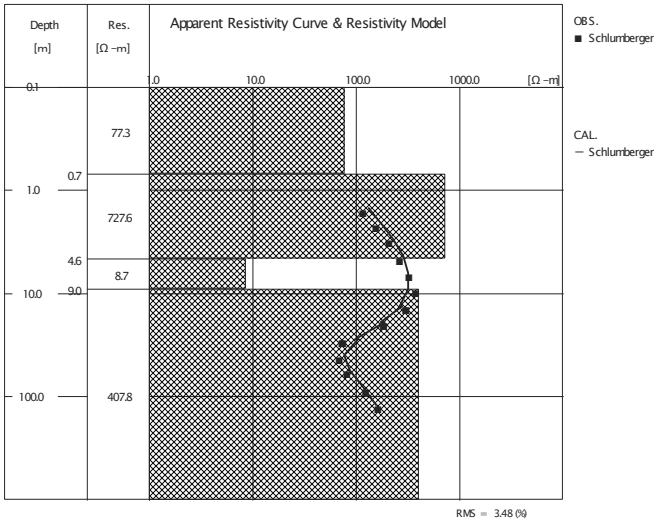
No.154: opyel Central village, Agago district, Patongo subcounty,
UTM-E:531313 UTM-N:297597



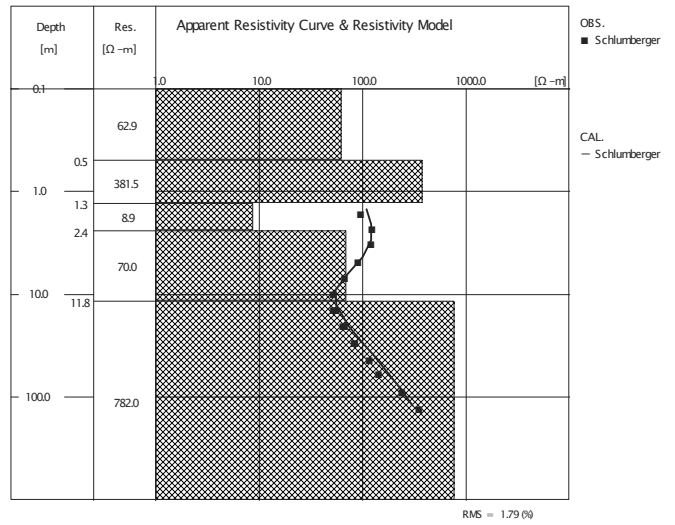
No.156: Opal Oryoneko village, Agago district, Patongo subcounty,
UTM-E:526892 UTM-N:297083



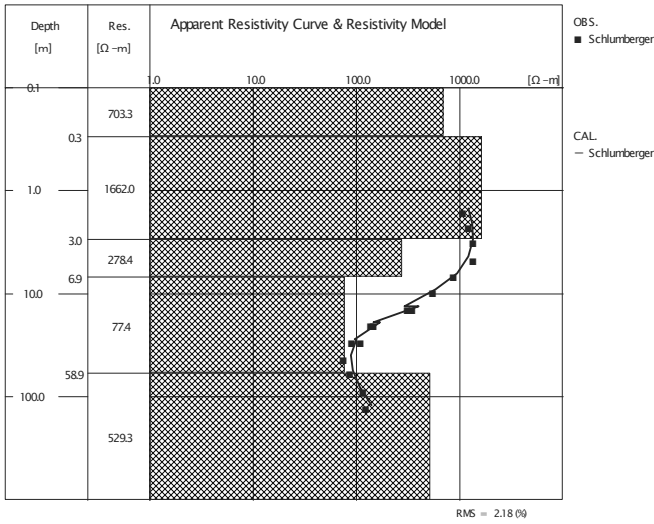
No.158: Owito village, Agago district, Patongo subcounty,
UTM-E:539248 UTM-N:300950



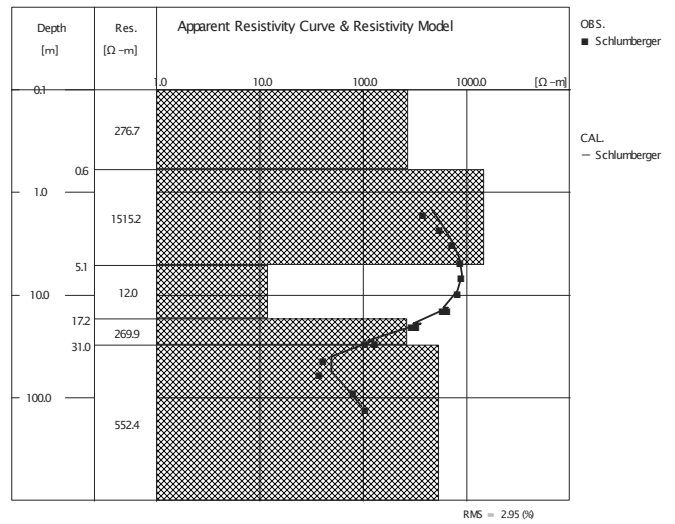
No.159: Atanga village, Agago district, Wol subcounty,
UTM-E:528107 UTM-N:339220



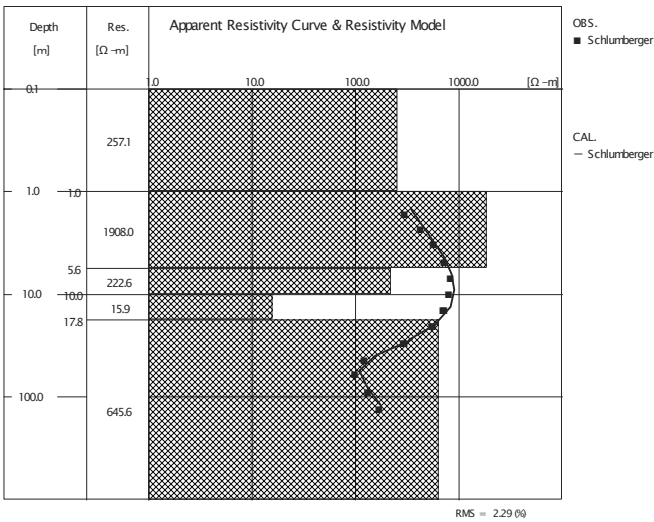
No.163: Abalukwang village, Agago district, Wol subcounty,
UTM-E:526624 UTM-N:345993



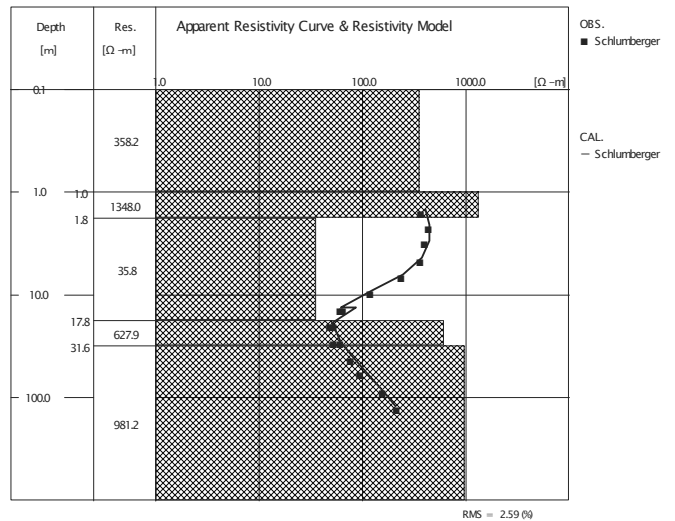
No.166: Aleb Tong village, Agago district, Arum subcounty,
UTM-E:517127 UTM-N:301209



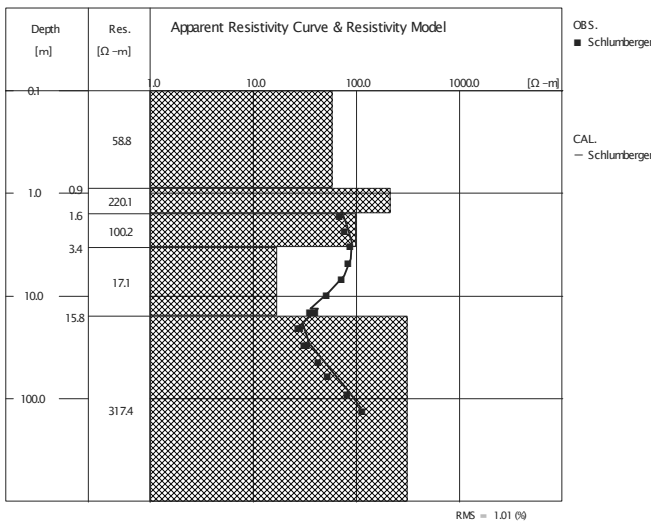
No.167: Wii Atup village, Agago district, Arum subcounty,
UTM-E:508951 UTM-N:294643



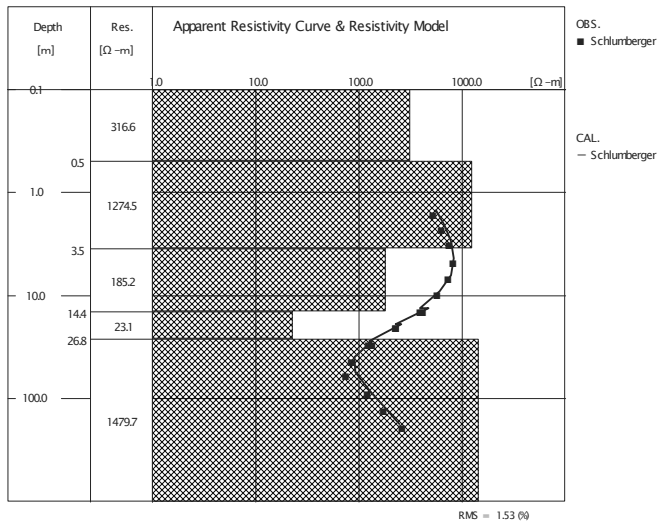
No.170: Laming Onen village, Agago district, Omiya Pacwa subcounty,
UTM-E:542125 UTM-N:356790



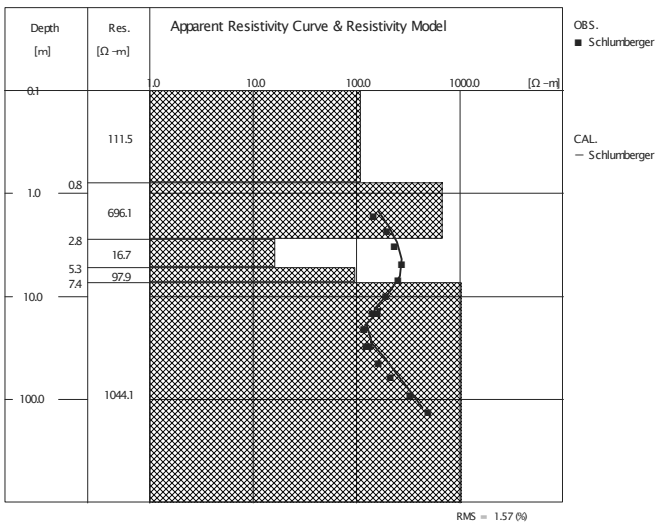
No.172: Acam Roma village, Agago district, Lokole subcounty,
UTM-E:540882 UTM-N:304694



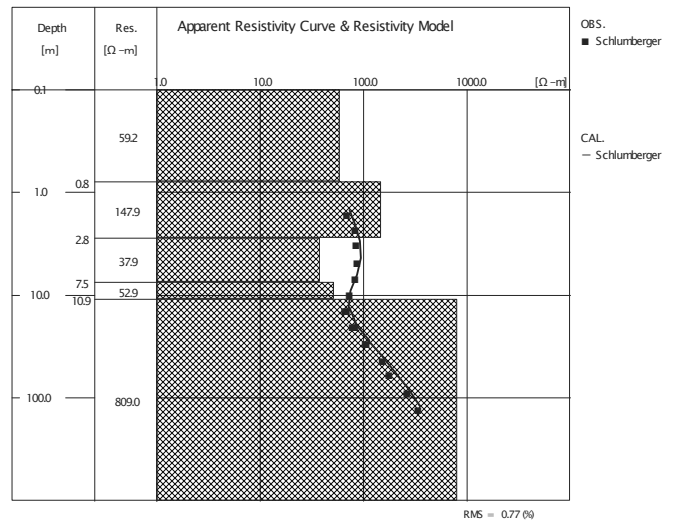
No.173: Lela Kabala village, Agago district, Wol subcounty,
UTM-E:528060 UTM-N:335501



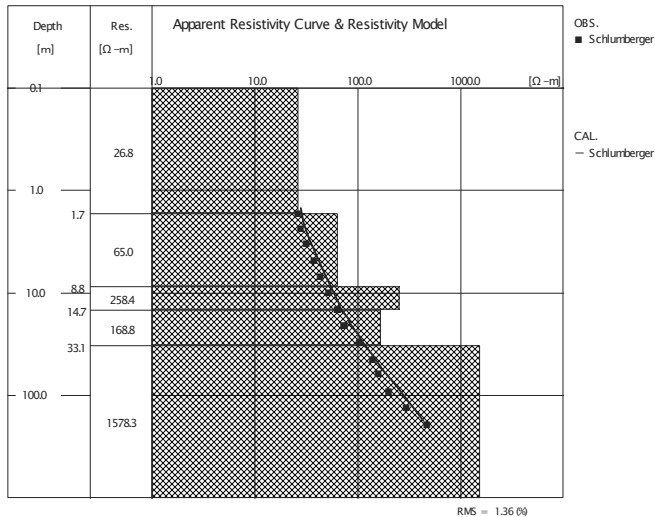
No.176: Tong Wiri South village, Agago district, Paimol subcounty,
UTM-E:549715 UTM-N:337910



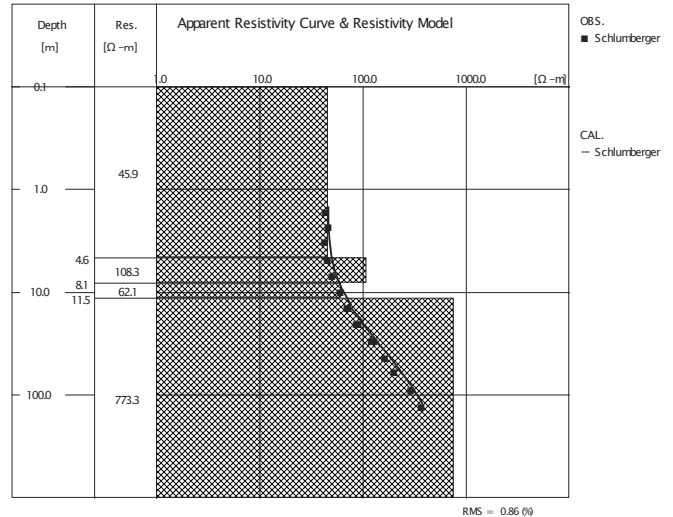
No.178: Labeledongony village, Agago district, Paimol subcounty,
UTM-E:549053 UTM-N:346307



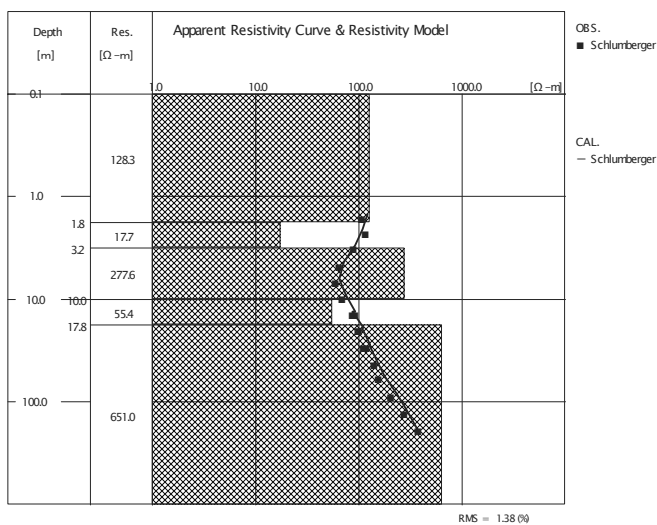
No.180: Apyeta Central village, Lamwo district, Palabek Oglii subcounty,
UTM-E:435129 UTM-N:373012



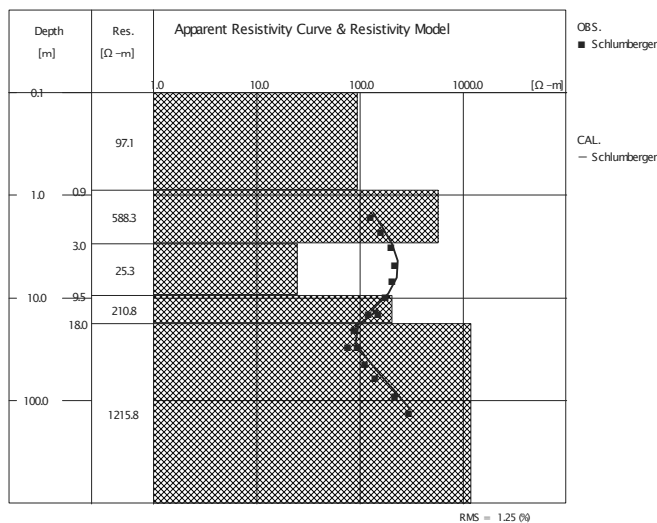
No.181: Padwat Central (Padwat P/S) village, Lamwo district,
Palabek Oglii subcounty,
UTM-E:441381 UTM-N:381277



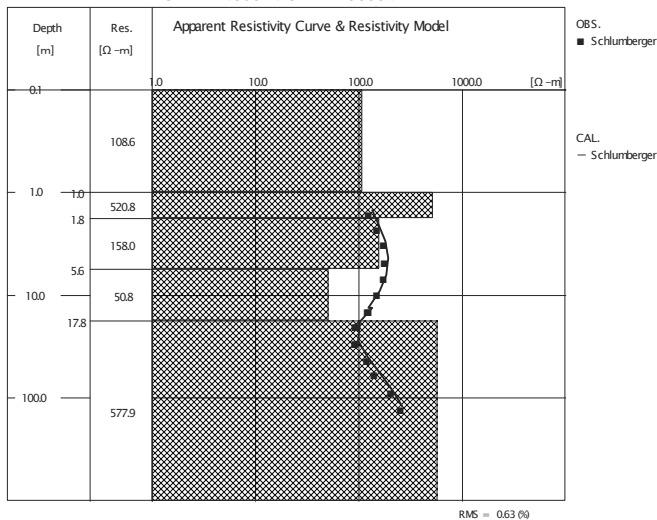
No.182: Padwat West (Laluru Oyika) village, Lamwo district, Palabek Ogili subcounty, UTM-E:434496 UTM-N:378572



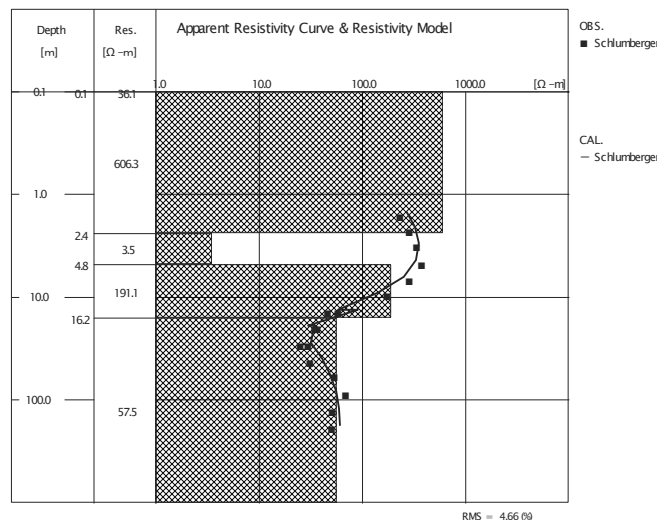
No.186: Dog Lokutu East village, Lamwo district, Padibe East subcounty, UTM-E:480952 UTM-N:387461



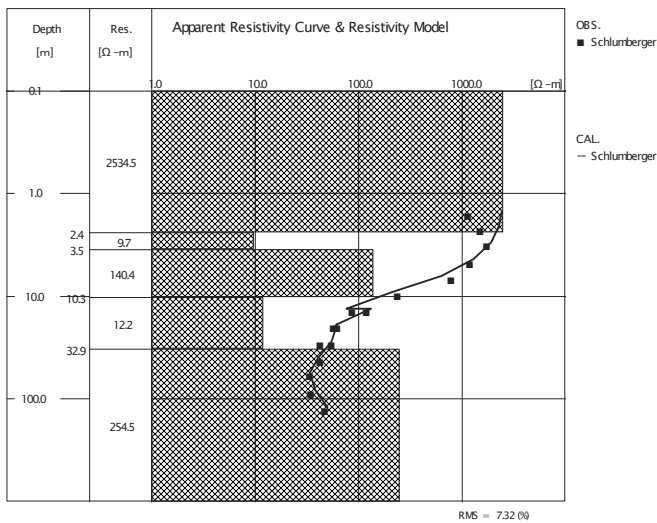
No.187: Tadi South village, Lamwo district, Padibe East subcounty, UTM-E:485324 UTM-N:383841



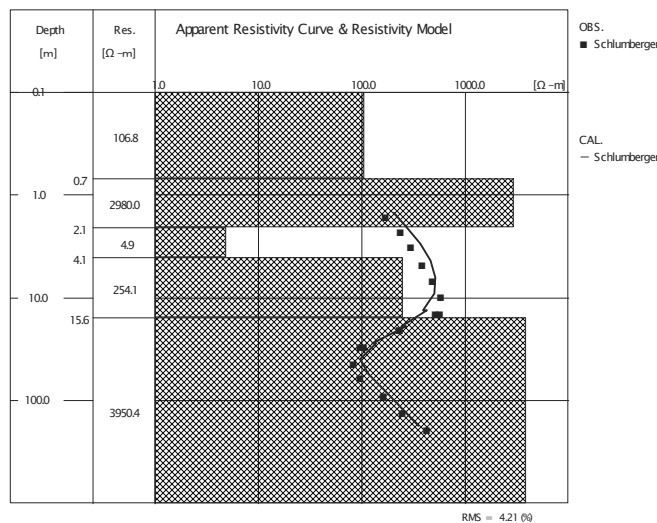
No.188: Gem (Gem) village, Lamwo district, Madi-opei subcounty, UTM-E:509008 UTM-N:397053



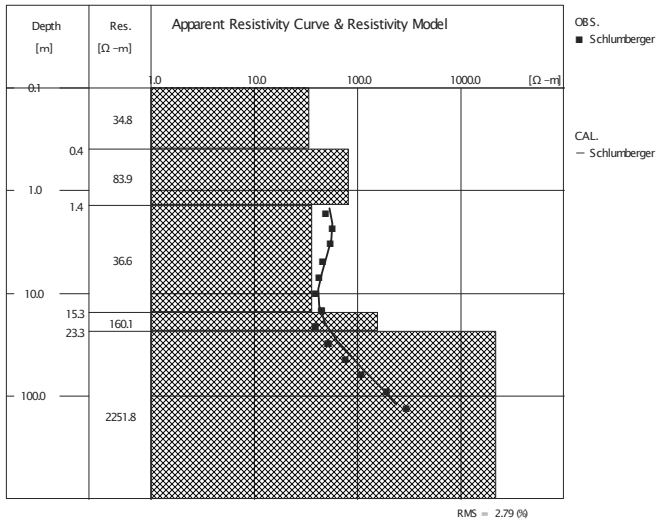
No.190: Pobutu village, Lamwo district, Madi-opei subcounty, UTM-E:504639 UTM-N:399710



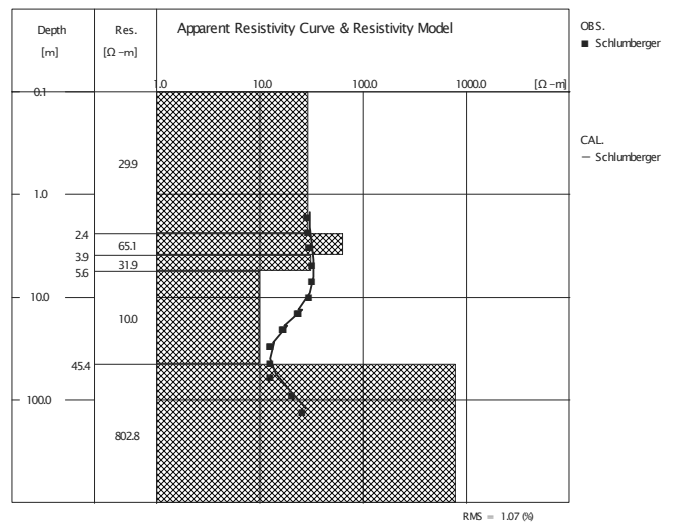
No.193: Lagwel P/S village, Lamwo district, Padibe West subcounty, UTM-E:483769 UTM-N:379558



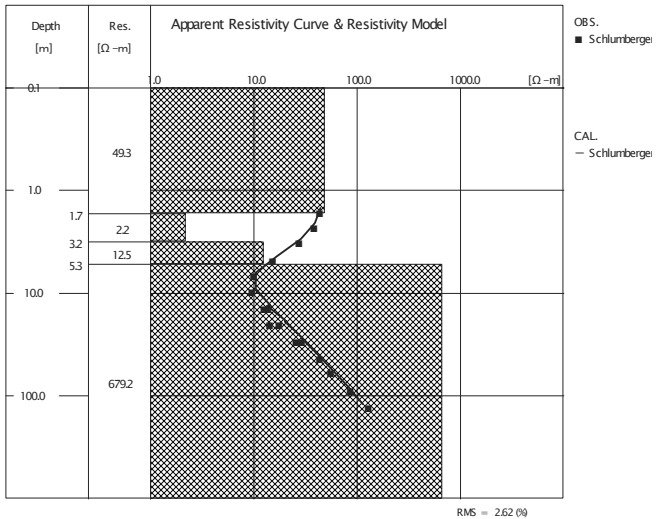
No.195: Tumbafu West village, Lamwo district, Padibe West subcounty,
UTM-E:466552 UTM-N:383911



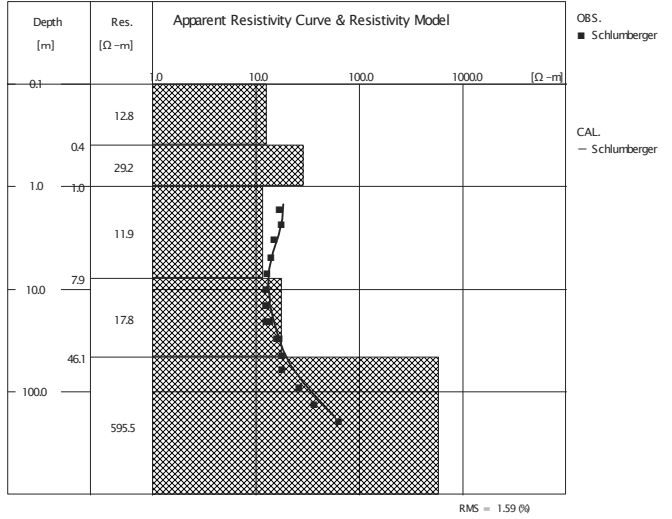
No.196: Obere village, Lamwo district, Agoro subcounty,
UTM-E:501968 UTM-N:421416



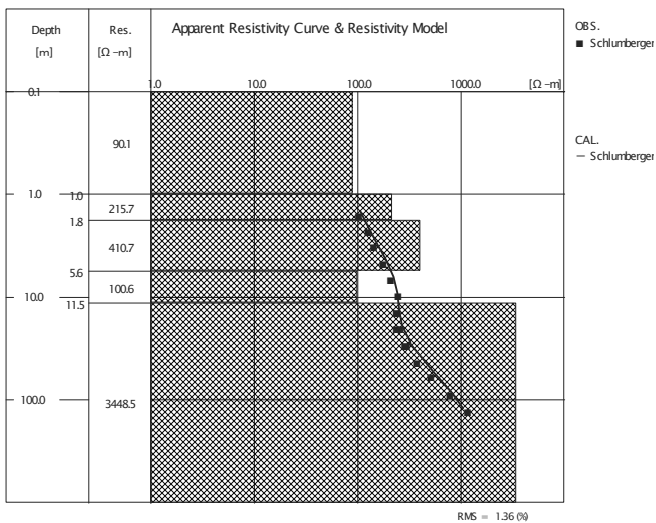
No.197: Loromibenge B village, Lamwo district, Agoro subcounty,
UTM-E:504277 UTM-N:415722



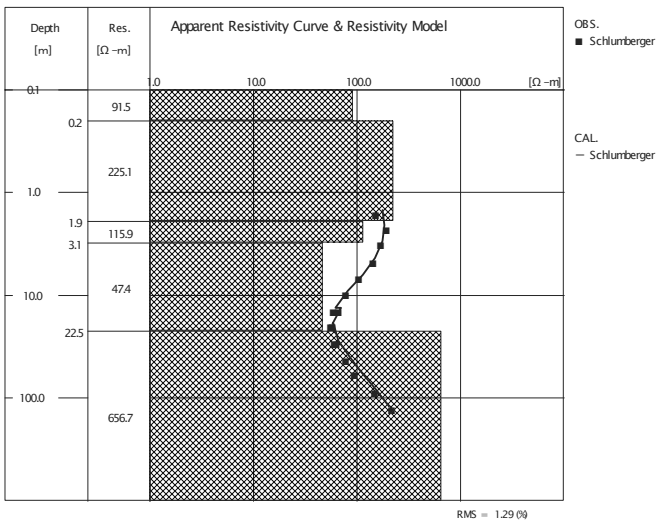
No.199: Moroto East village, Lamwo district, Agoro subcounty,
UTM-E:492139 UTM-N:408450



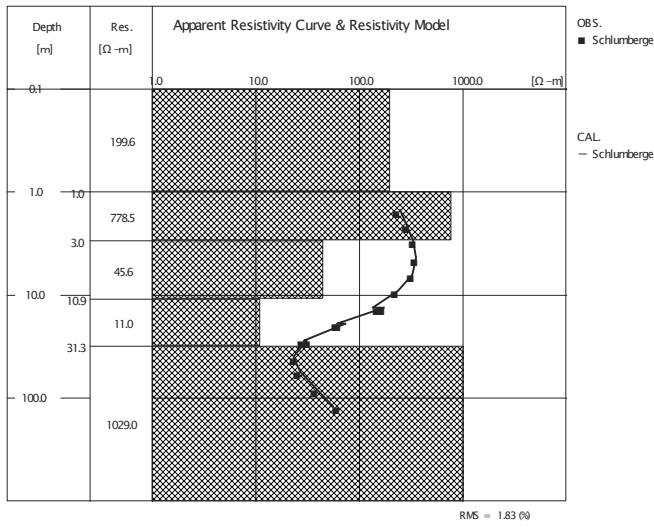
No.200: Lumwaka A village, Lamwo district, Agoro subcounty,
UTM-E:490073 UTM-N:417929



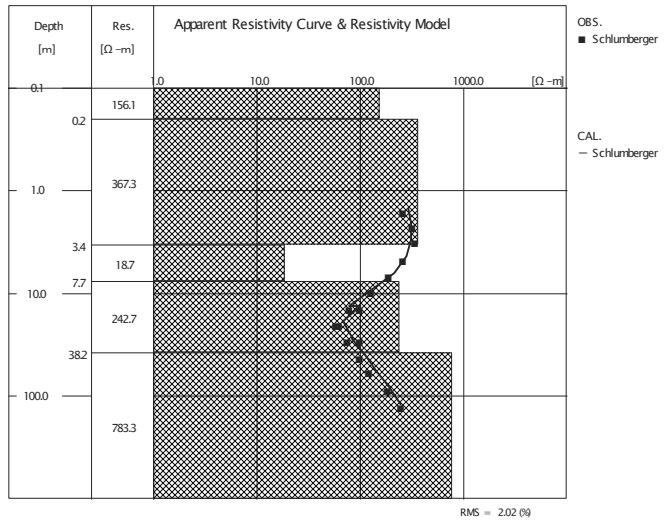
No.201: Lobiluku (obokolot) village, Lamwo district, Paloga subcounty,
UTM-E:492257 UTM-N:394602



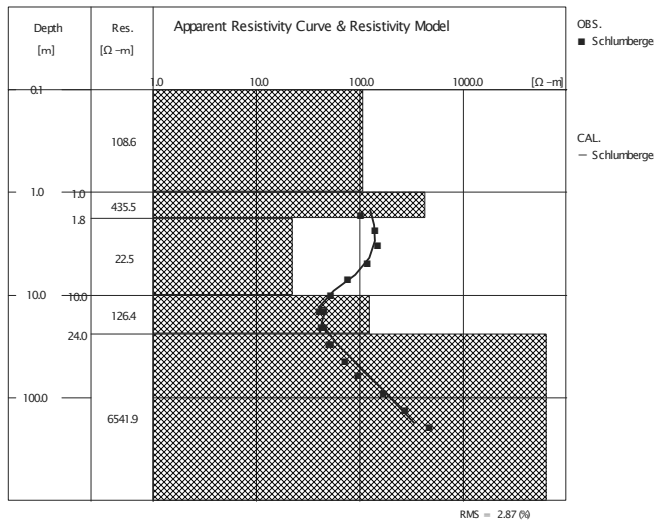
No.202: Langole (Keca) village, Lamwo district, Paloga subcounty,
UTM-E:495794 UTM-N:388810



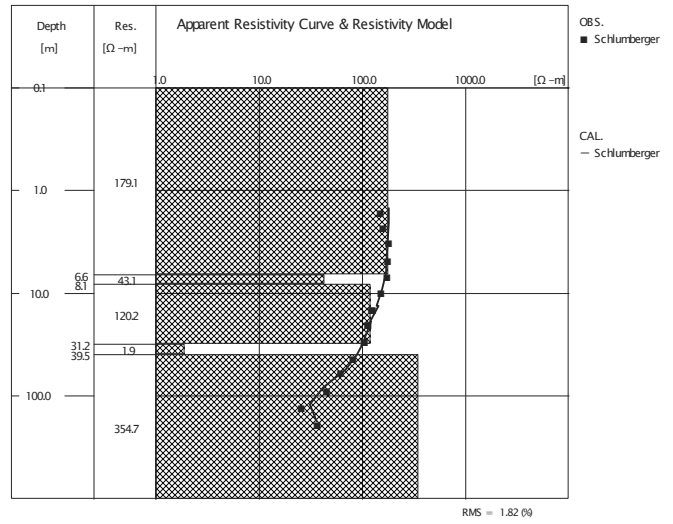
No.203: Biber (Iiba) village, Lamwo district, Paloga subcounty,
UTM-E:495849 UTM-N:396814



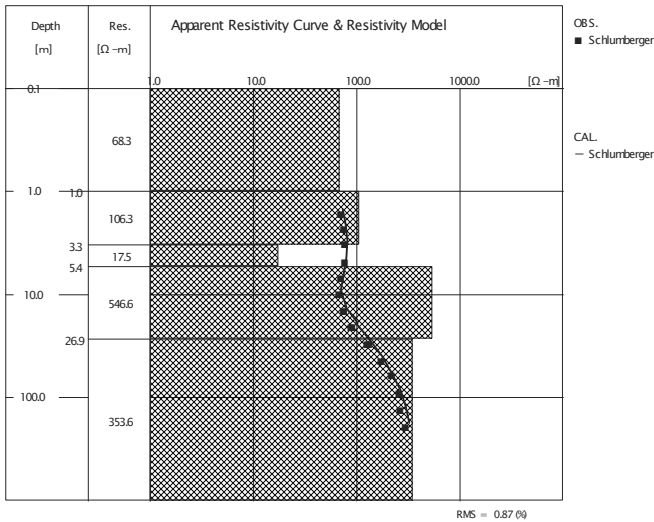
No.206: Guria North village, Lamwo district, Lokung subcounty,
UTM-E:470417 UTM-N:408677



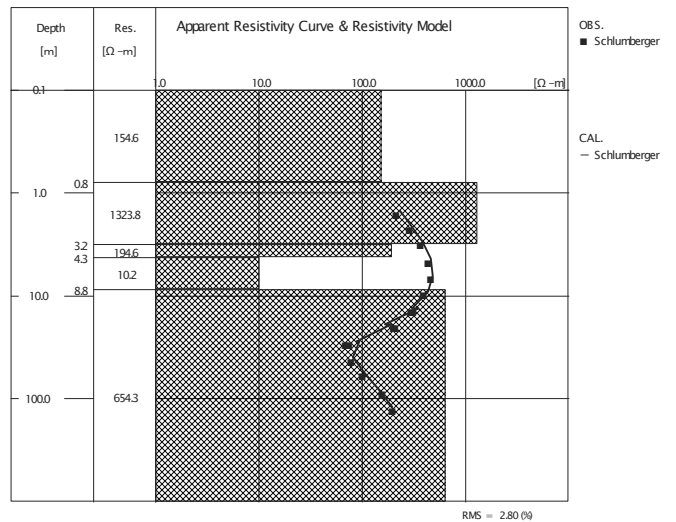
No.207: Liri Central village, Lamwo district, Palabek Kal subcounty,
UTM-E:453060 UTM-N:392306



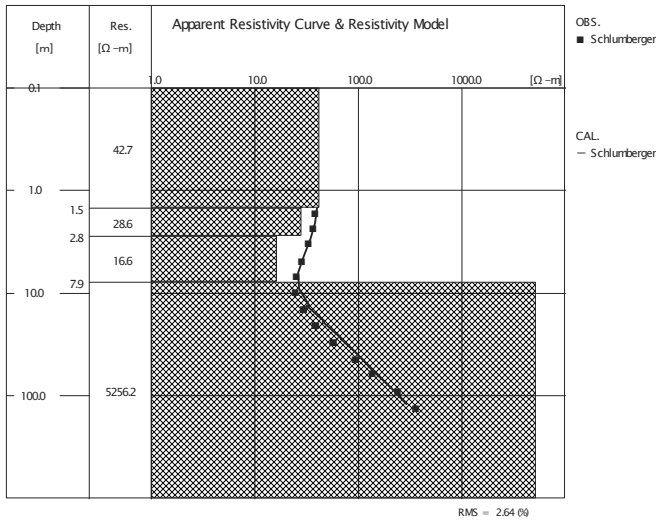
No.208: Lanywang E-walagiri village, Lamwo district,
Palabek Kal subcounty,
UTM-E:451679 UTM-N:381747



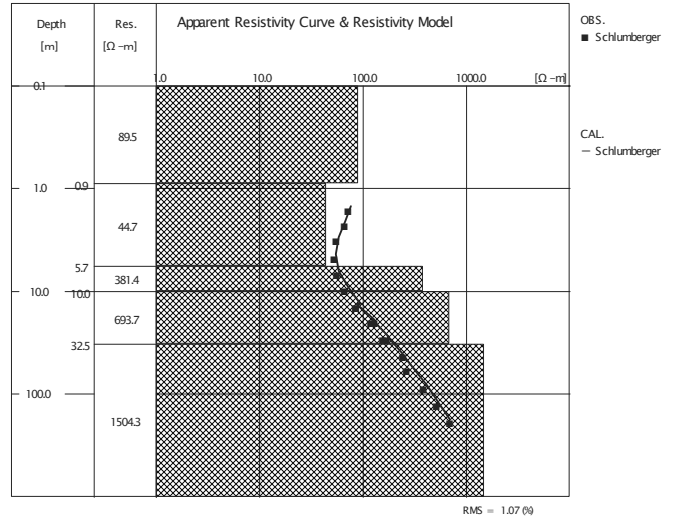
No.209: Ayu-lupur(Barara) village, Lamwo district,
Palabek Gem subcounty,
UTM-E:454495 UTM-N:373928



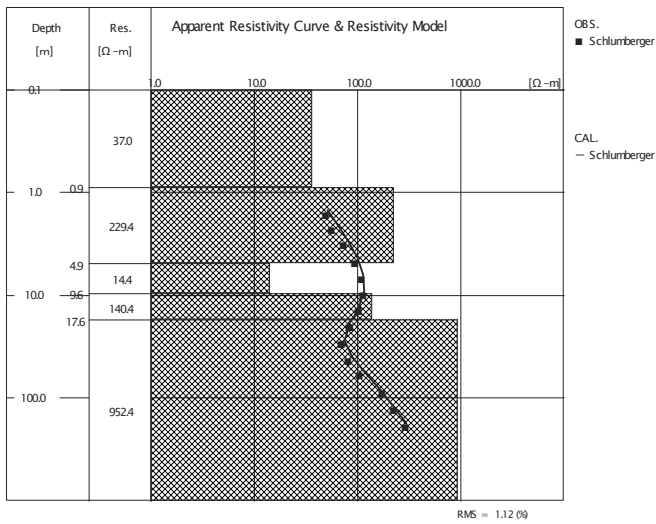
No.210: Ajaa ogala (Alere) village, Lamwo district,
Palabek Gem subcounty,
UTM-E:449890 UTM-N:371612



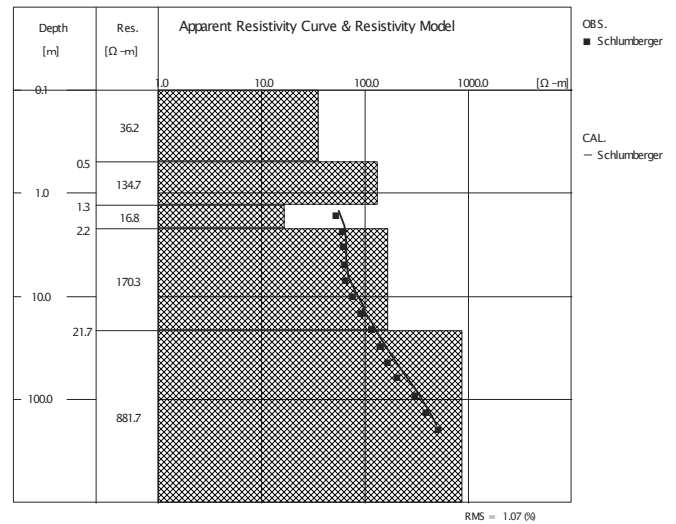
No.212: Pawena central (Tee Kasia) village, Lamwo district,
Palabek Gem subcounty,
UTM-E:465044 UTM-N:365084



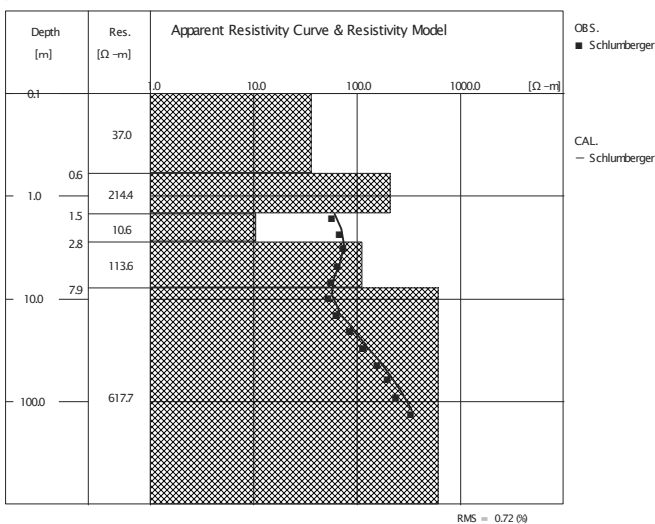
No.216: Kafata (Mbuya Parent sch.) village, Lamwo district,
Palabek Gem subcounty,
UTM-E:462493 UTM-N:377107



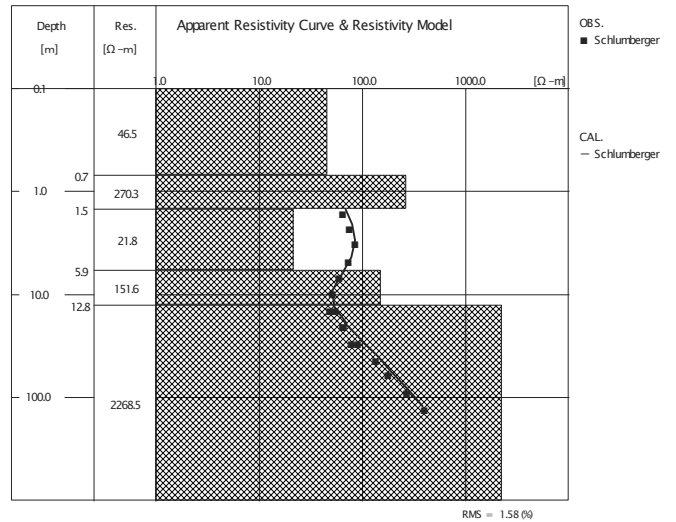
No.217: Arusha (Aloyi) village, Lamwo district, Palabek Gem subcounty,
UTM-E:461313 UTM-N:371083



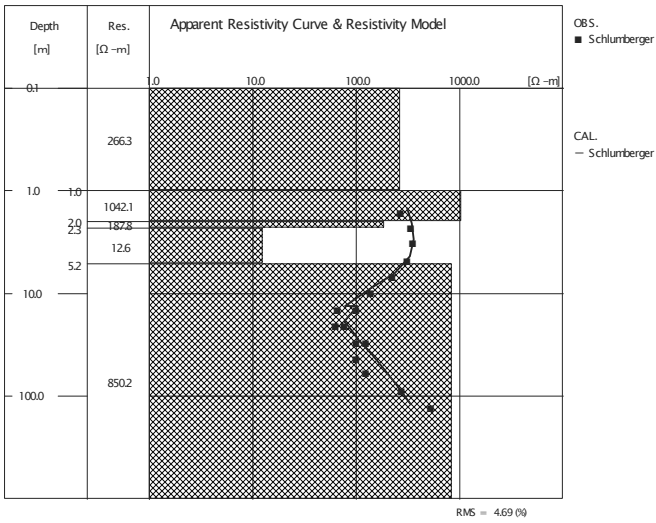
No.218: Kamama central H/C III village, Lamwo district,
Palabek Gem subcounty,
UTM-E:461124 UTM-N:373412



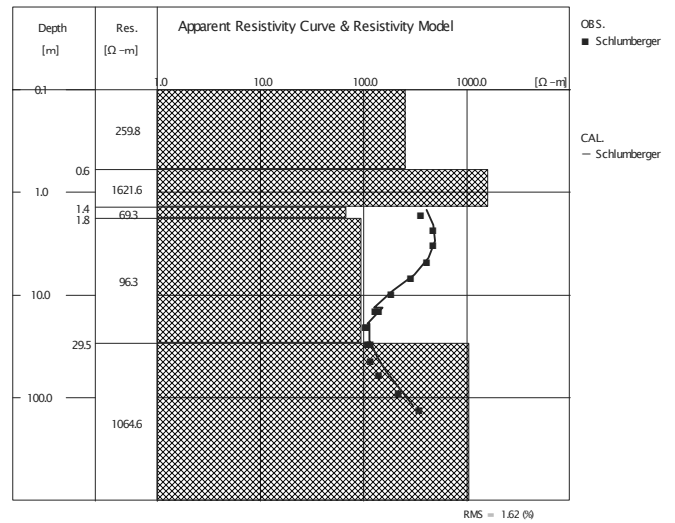
No.221: Okidi central village, Kitgum district, Amida subcounty,
UTM-E:480352 UTM-N:355246



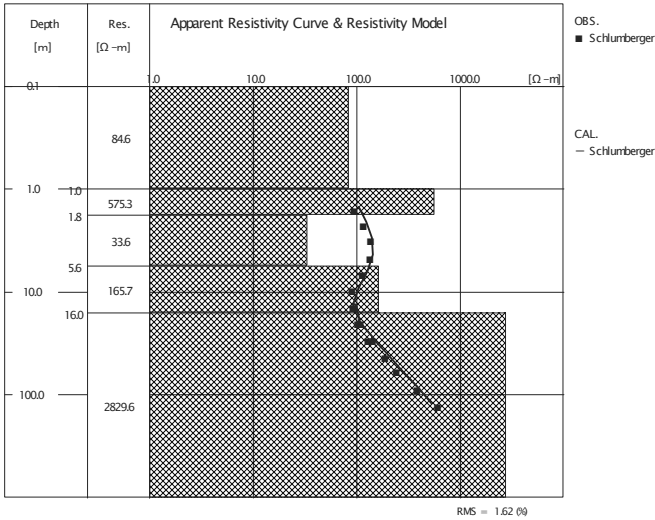
No.228: Rucurucu village, Kitgum district, Lagoro subcounty,
UTM-E:505054 UTM-N:352812



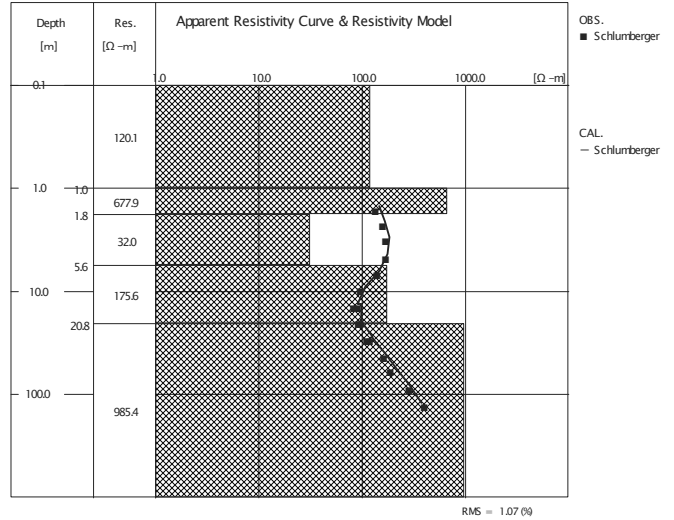
No.229: Akino (Dem kulu kwach) village, Kitgum district, Lagoro subcounty,
UTM-E:496037 UTM-N:356728



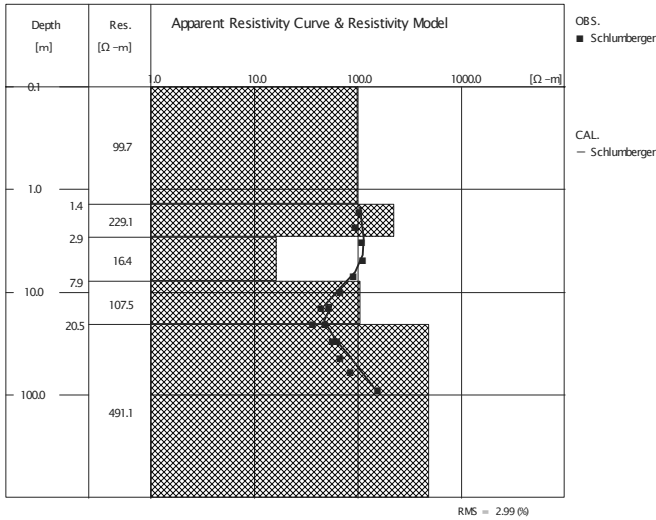
No.230: Gulu gwen Orua .B. village, Kitgum district, Lagoro subcounty,
UTM-E:513928 UTM-N:359772



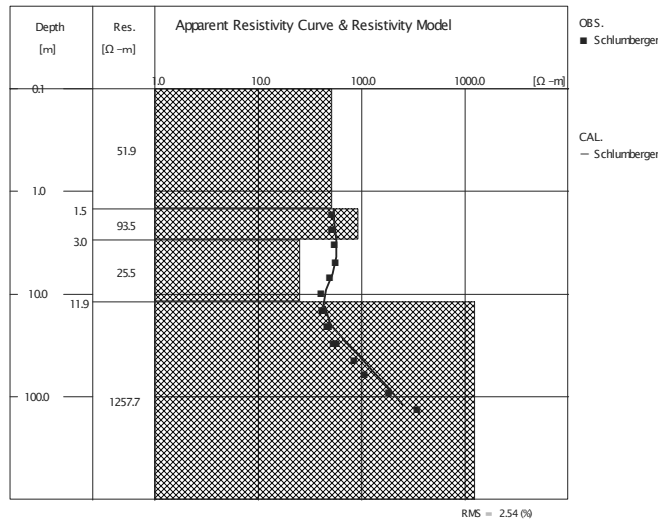
No.231: Ocettokkee Trading centre village, Kitgum district,
Layamo subcounty,
UTM-E:485014 UTM-N:373689



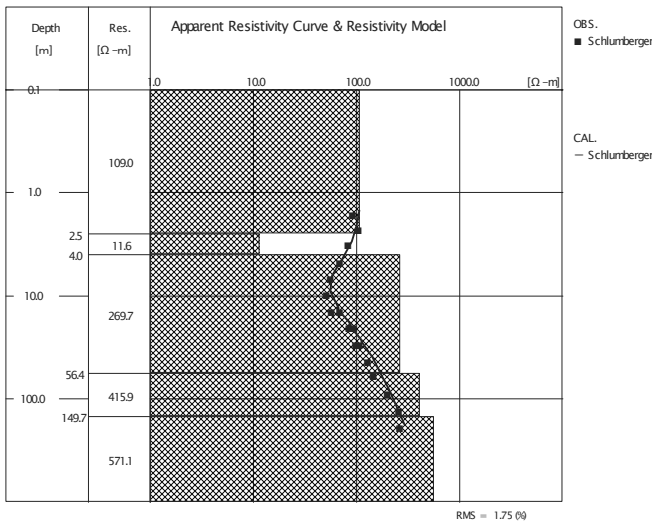
No.232: Pagen Central (Corner Padibe) village, Kitgum district,
Layamo subcounty,
UTM-E:488914 UTM-N:368550



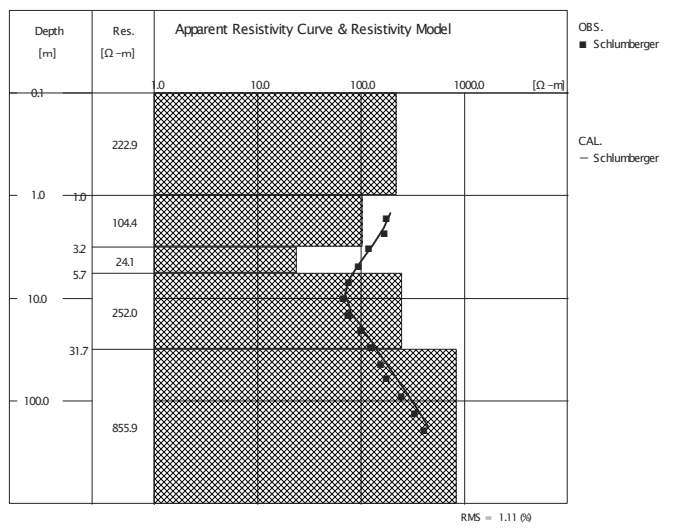
No.233: Pamolo central village, Kitgum district, Layamo subcounty,
UTM-E:493870 UTM-N:371263



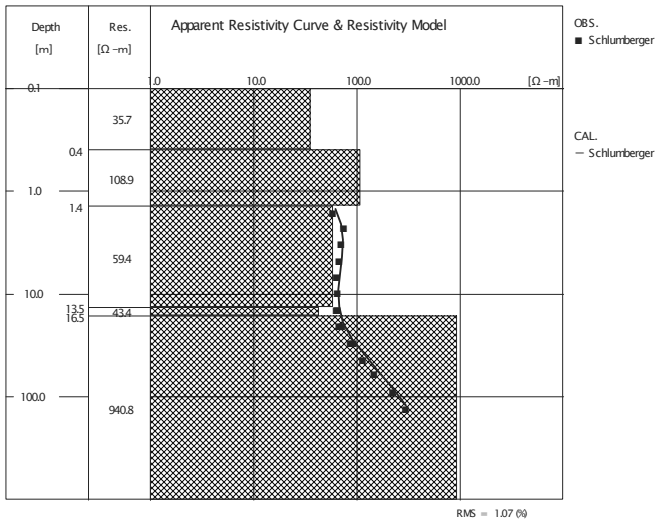
No.234: Panyum "A" village, Kitgum district, Mucwini subcounty, UTM-E:500762 UTM-N:373992



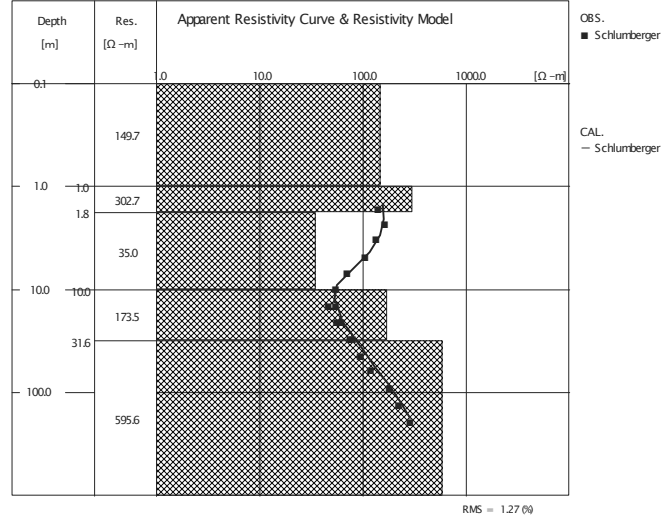
No.235: Ayom Olola "B" village, Kitgum district, Mucwini subcounty, UTM-E:507000 UTM-N:387662



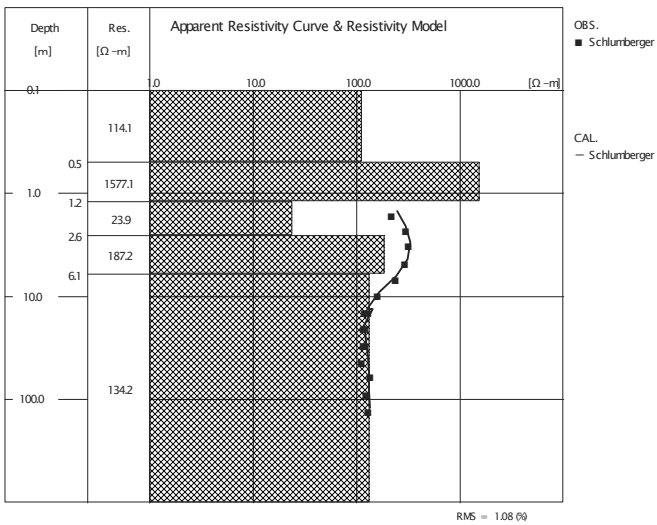
No.239: Yepa A village, Kitgum district, Mucwini subcounty, UTM-E:504619 UTM-N:377841



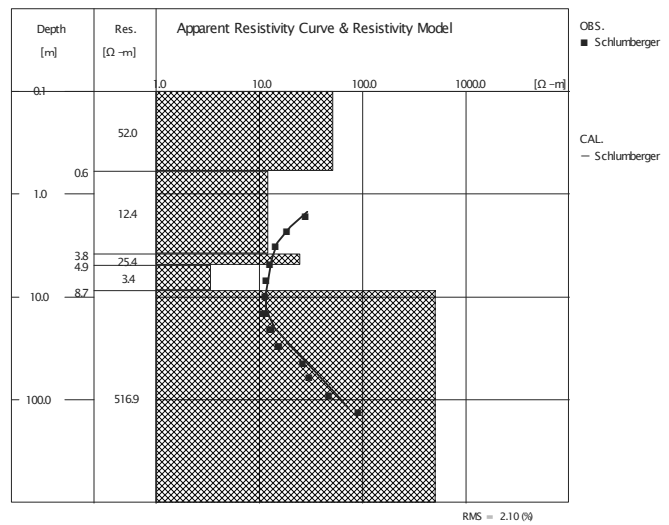
No.241: Lacen Otinga West village, Kitgum district, Mucwini subcounty, UTM-E:502303 UTM-N:370953



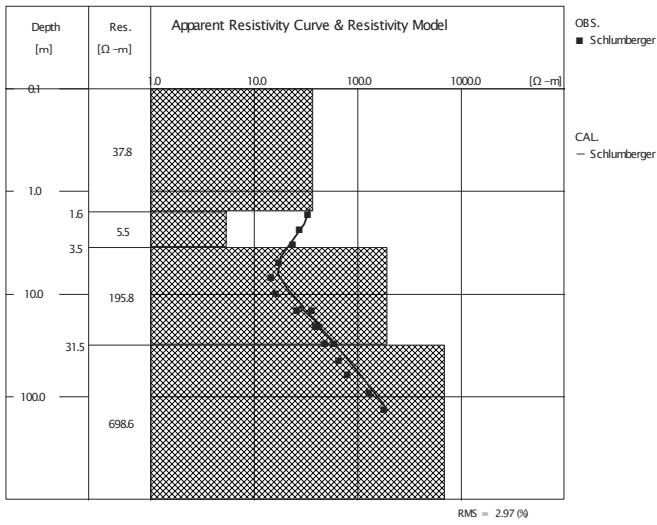
No.242: Winyorac-Pawiny village, Kitgum district, Namokora subcounty, UTM-E:540400 UTM-N:377101



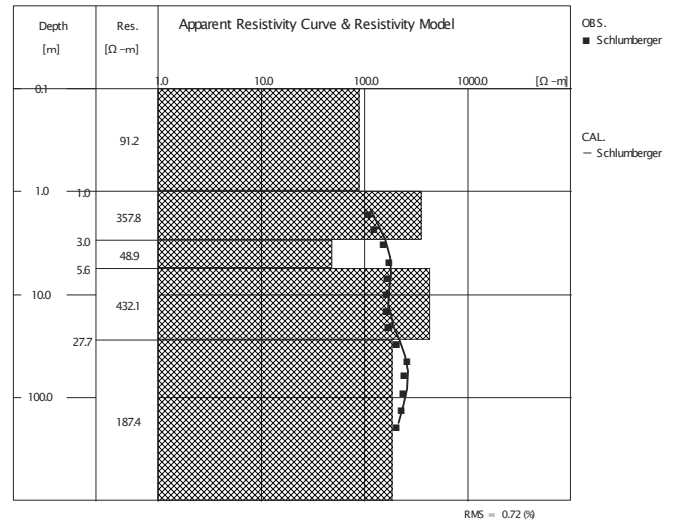
No.243: Lakokok village, Kitgum district, Namokora subcounty, UTM-E:530921 UTM-N:370470



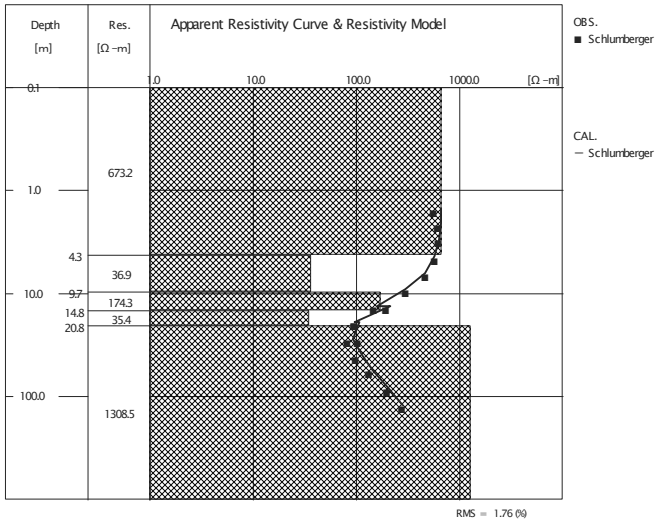
No.246: Labworomor village, Kitgum district, Omiya Anyima subcounty, UTM-E:524443 UTM-N:359919



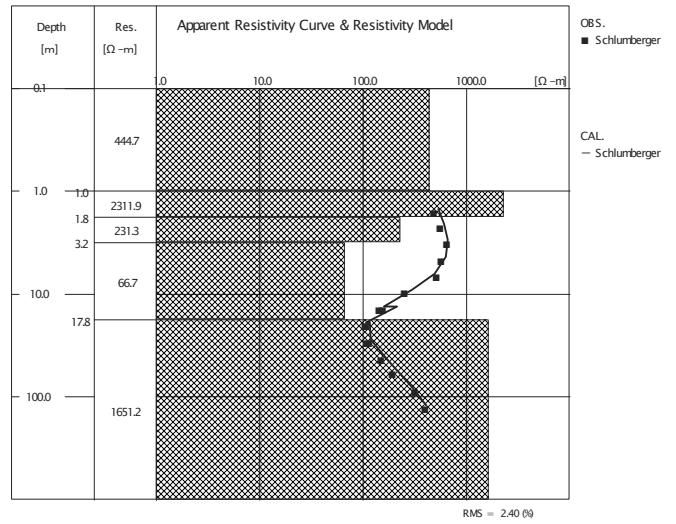
No.249: Lobale village, Kitgum district, Orom subcounty, UTM-E:573724 UTM-N:383302



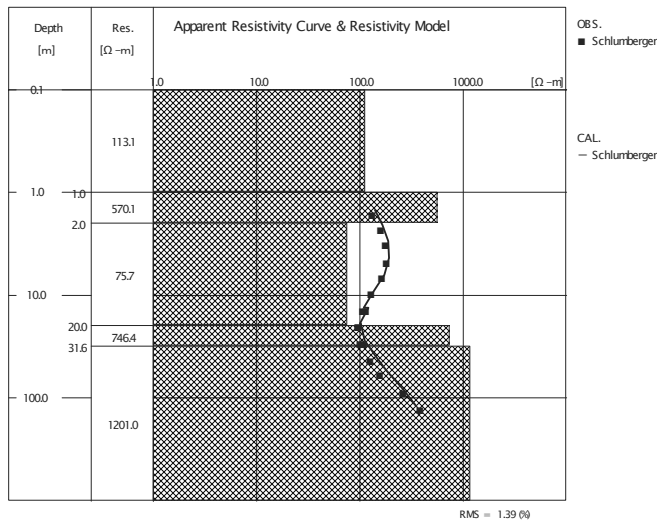
No.252: Otaboi (security site) village, Kitgum district, Orom subcounty, UTM-E:557663 UTM-N:367018



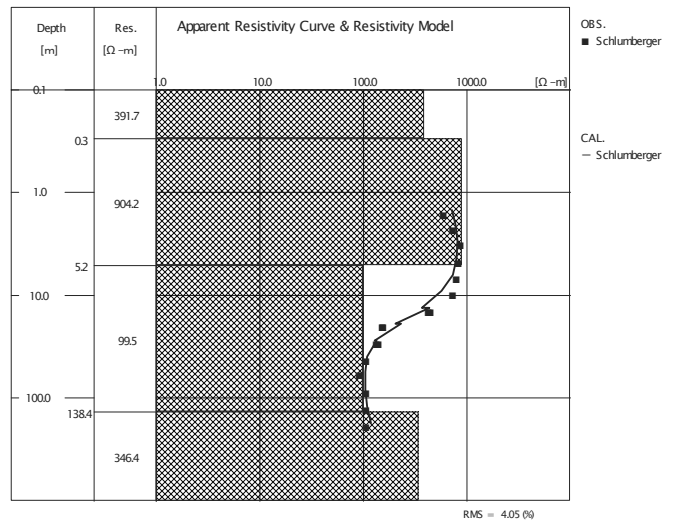
No.253: Agora village, Kitgum district, Orom subcounty, UTM-E:549191 UTM-N:372344



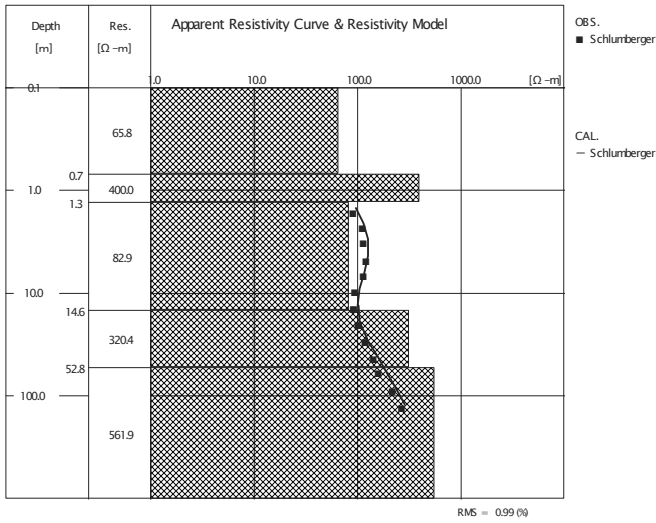
No.258: Alilli village, Pader district, Lapul subcounty, UTM-E:484516 UTM-N:316124



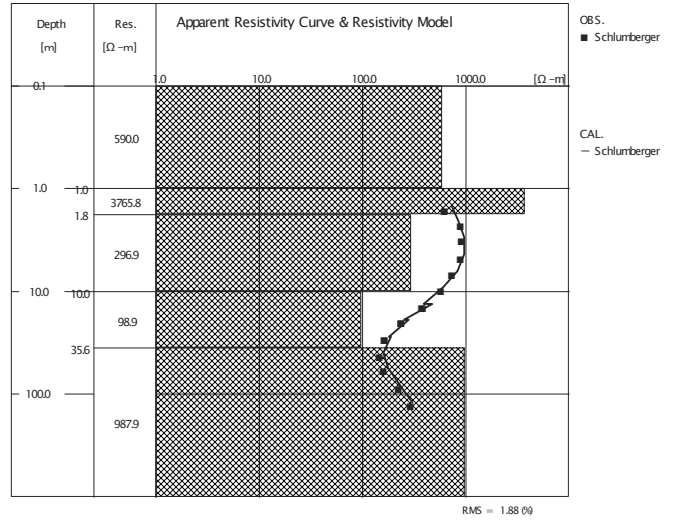
No.259: Nek-Nono village, Pader district, Lapul subcounty, UTM-E:490030 UTM-N:336578



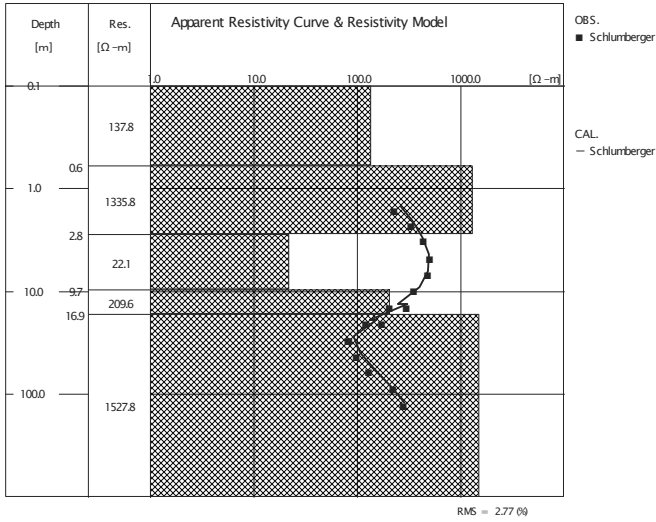
No.260: Te-okuto village, Pader district, Puranga subcounty,
UTM-E:488003 UTM-N:290245



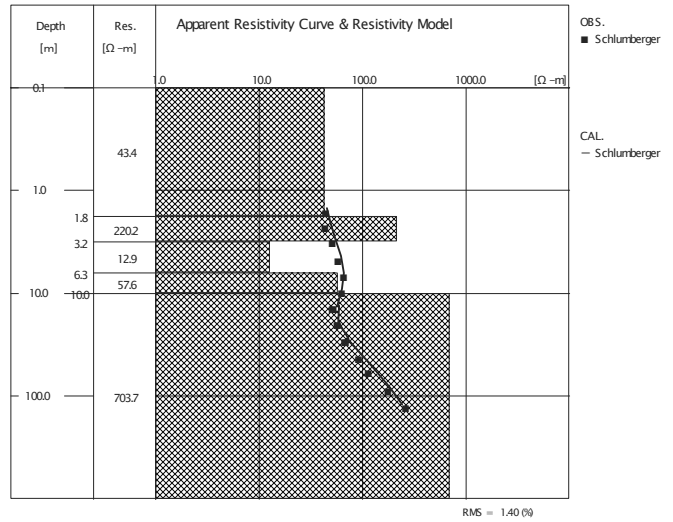
No.261: Tee twoo village, Pader district, Puranga subcounty,
UTM-E:499287 UTM-N:300466



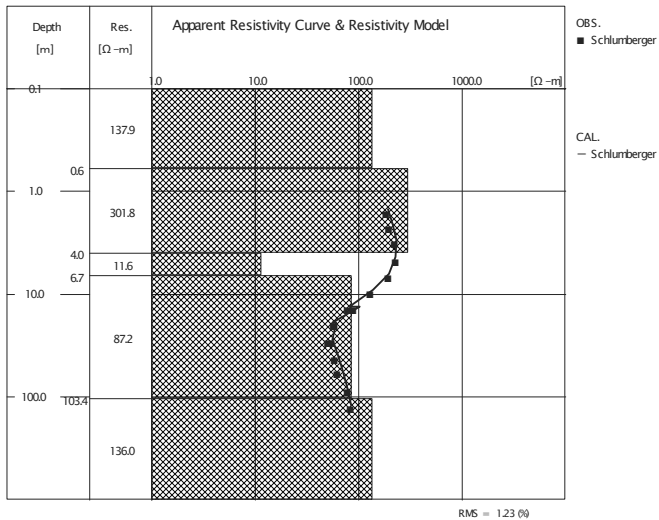
No.263: Apwor kla village, Pader district, Puranga subcounty,
UTM-E:500882 UTM-N:290534



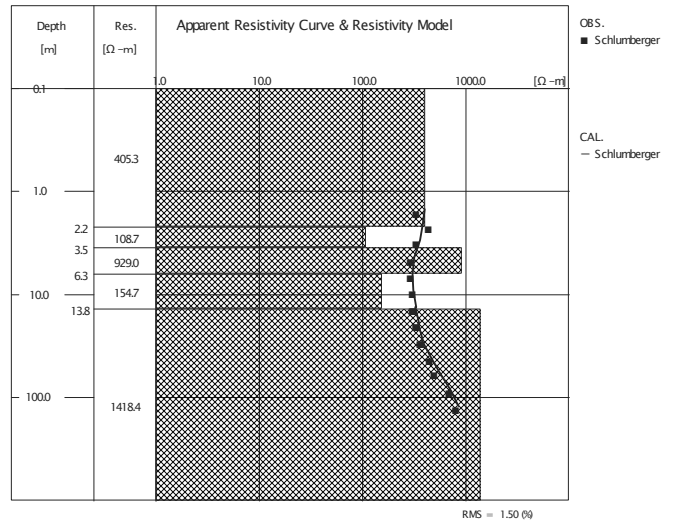
No.264: Aria village, Pader district, Atanga subcounty,
UTM-E:469506 UTM-N:330884



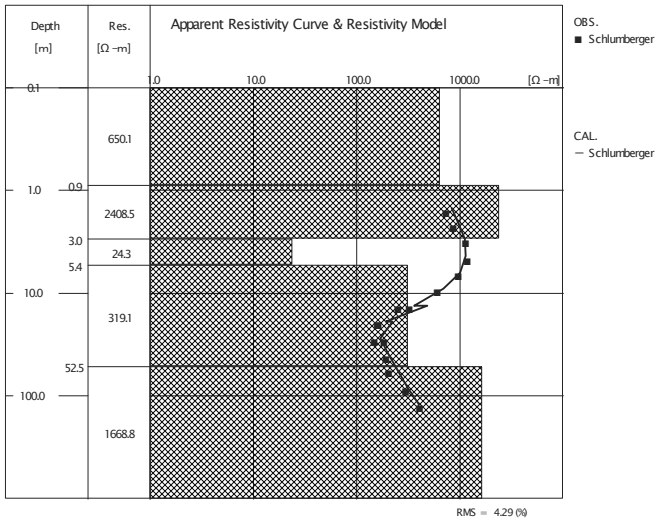
No.266: Lapoyaokwee village, Pader district, Atanga subcounty,
UTM-E:467050 UTM-N:326214



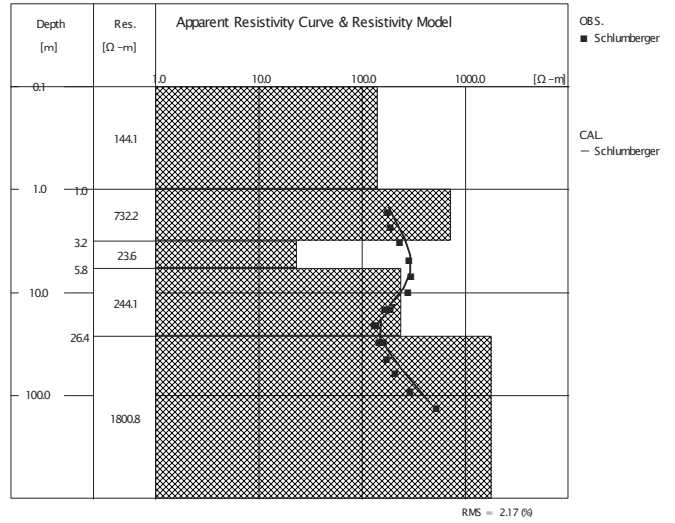
No.269: Libii village, Pader district, Angagura subcounty,
UTM-E:458248 UTM-N:335712



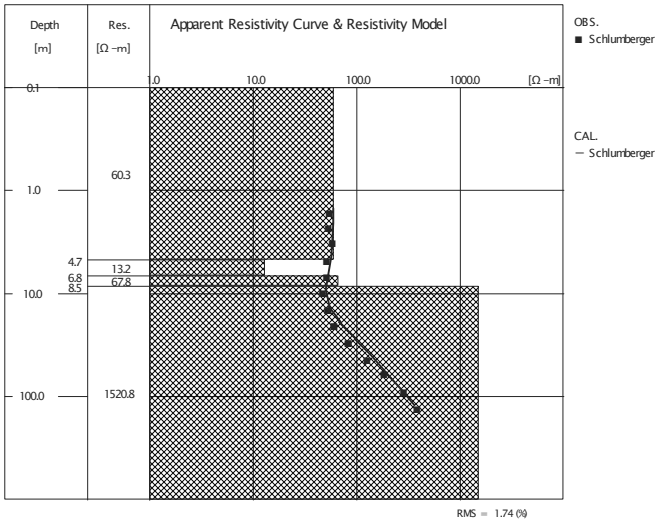
No.270: Atup village, Pader district, Awere subcounty,
UTM-E:494310 UTM-N:301058



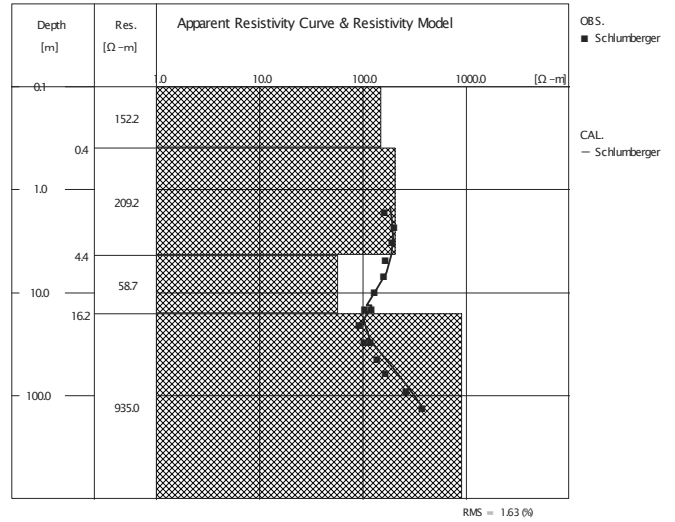
No.271: Parwech Lukee east village, Pader district, Awere subcounty,
UTM-E:483071 UTM-N:301102



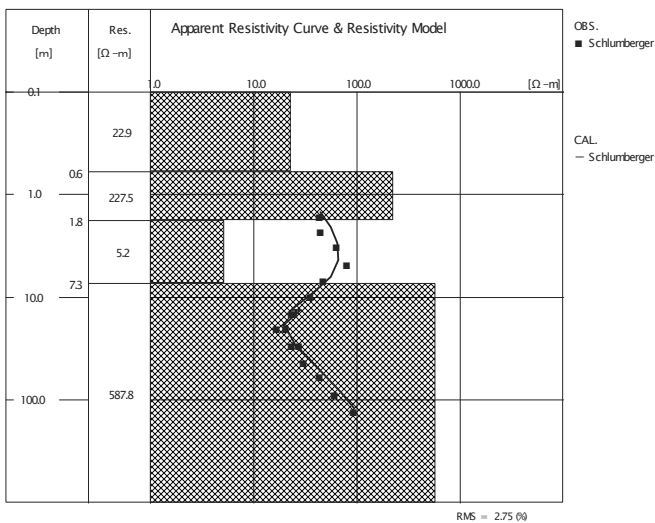
No.278: Lali village, Pader district, Laguti subcounty,
UTM-E:473445 UTM-N:334671



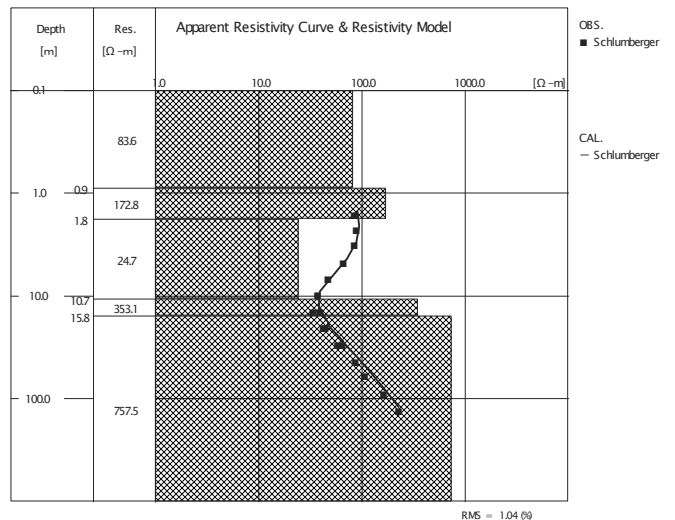
No.282: Bangalela village, Pader district, Pajule subcounty,
UTM-E:503916 UTM-N:336703



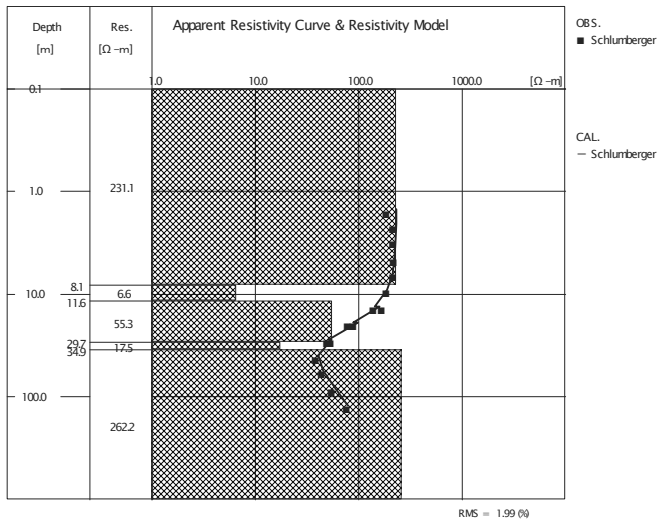
No.285: Lela awoki village, Pader district, Latanya subcounty,
UTM-E:504749 UTM-N:343241



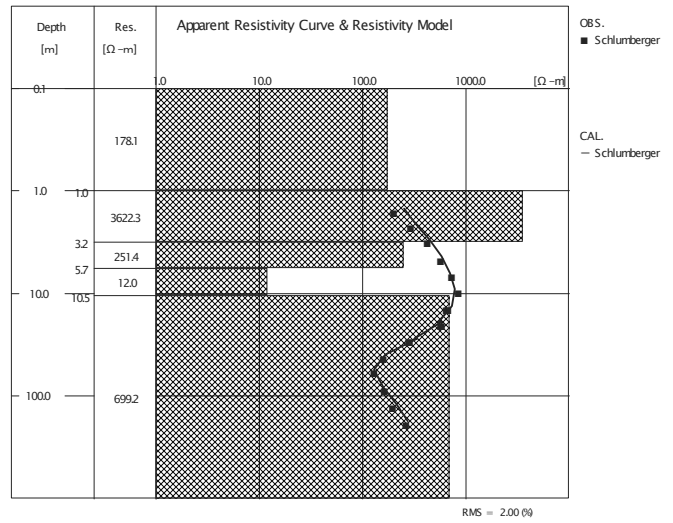
No.286: Dure north village, Pader district, Latanya subcounty,
UTM-E:493419 UTM-N:356213



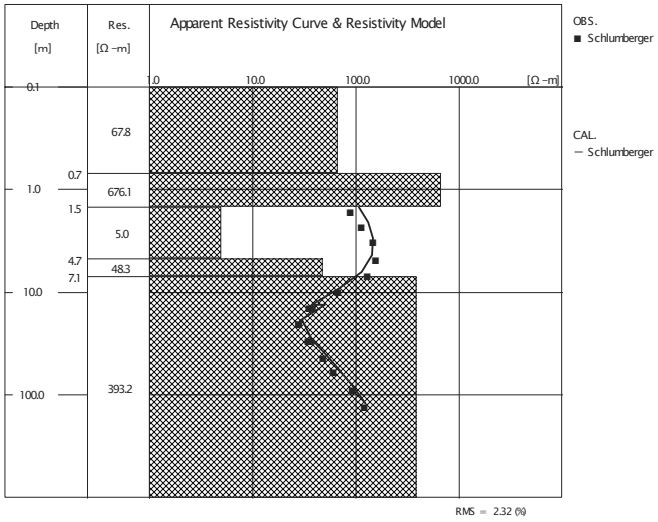
No.287: Obalo village, Pader district, Latanya subcounty,
UTM-E:493402 UTM-N:344026



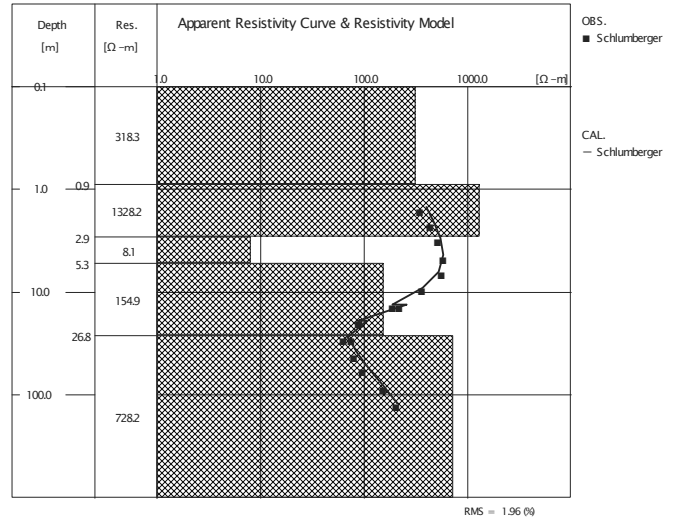
No.289: Dagolwato village, Pader district, Latanya subcounty,
UTM-E:500237 UTM-N:350197



No.290: Pagor village, Pader district, Ogom subcounty,
UTM-E:516053 UTM-N:321113



No.292: Lapeny village, Pader district, Ogom subcounty,
UTM-E:500851 UTM-N:315398



Result of Foundation Survey

Elevated tanks are planned to be constructed in the outline design of water supply facilities. The survey on bearing capacity of soil foundation was carried out at the sites of the planned elevated tank. The foundation survey was carried out in the excavated pit for each site of elevated tank.

The soil type was found to be sandy solid laterite or medium laterite. The measurement of the long-term bearing capacity was made in each pit applying the formula of Penetration Test by PWRI (Public Works Research Institute of Japan) method.

The following table shows the bearing capacity of various soil conditions. The count of drops of weight is also presented as reference.

Approximate Allowable Long-term Bearing Capacity by N-Value

Foundation		Long-term Allowable Bearing Capacity (t/m ²)	Remarks	
			N-Value (N)	Count of Weight Drop by Bar Penetration for Reference* (N _{CAdjusted})
Sandy ground	Very Density	30	30 - 50	9 - 14
	Density	20	20 - 30	6 - 9
	Medium	10	10 - 20	3 - 6
	Loose	5	5 - 10	2 - 3
	Very loose	0	5 or less	2 or less

Note) *: Penetration Test by PWRI method

N-Value; $N = (0.33 \sim 1) \times N_c$

Where; N_c: (Count of 5kg-weight drop from the height of 50 cm until the bar penetrates 10cm below ground surface)

Diameter of rod to be used for this method shall be 28mm in the PWRI method, but the rod of 12mm diameter was applied for this in-situ test. The observed count was adjusted as follows:

Adjustment factor = $A_{(12mm)}/A_{(28mm)} = 0.184$ (Ratio of sectional areas)

The counts (N_{CAdjusted}) presented in the above table are those adjusted with this factor.

Based on the above table, the counts observed in the field tests were converted to the long-term allowable bearing capacities as shown in the following table.

Estimated Bearing Capacities at Elevated Tank Sites

RGC	Estimated Long-term Allowable Bearing Capacity (t/m ²)	Observed Counts of Weight Drops	Remarks
Unyama RGC	10 or more	6 ~ 7	Deeper than 0.73~1.12m
Awere RGC	5 or more	more than 3	Deeper than 1.15m
Koch Goma RGC	10 or more	6 ~ 8	Deeper than 0.7m
Kitgum Matidi RGC	10 or more	6 ~ 7	Deeper than 0.85 ~ 0.95m
Coner Kilak RGC	10 or more	6 ~ 8	Deeper than 0.6 ~ 1.3m
Adilang RGC	10 or more	6 ~ 8	Deeper than 0.6 ~ 0.65m

The findings in each excavated pit are presented in the following photos.

- i) Gulu District: Unyama RGC Confirmation soil bearing capacity of the elevated tank foundation.



GL to 1.12m: Top soil of medium sandy clay.
Deeper than 1.12m: Difficult to excavate manually due to hard laterite.
Long-term allowable bearing capacity: Over 10t/m².



GL to 0.73m: Top soil of medium sandy clay.
Deeper than 0.73m: Difficult to excavate manually due to hard laterite.
Long-term allowable bearing capacity: Over 10t/m².

- ii) Gulu District: Awere RGC Confirmation soil bearing capacity of the elevated tank foundation.



GL to 1.15m: Topsoil with weathered hard laterite.
Deeper than 1.15m: Manual excavation is possible but hard due to rather hard laterite.
Long-term allowable bearing capacity: Over 5t/m²



GL to 1.15m: Top soil of clay.
Deeper than 1.15m: Manual excavation is rather difficult due to rather large grain diameter of hard laterite.
Long-term allowable bearing capacity: Over 5t/m²

- iii) Nwoya District: Koch Goma RGC Confirmation soil bearing capacity of the elevated tank foundation.

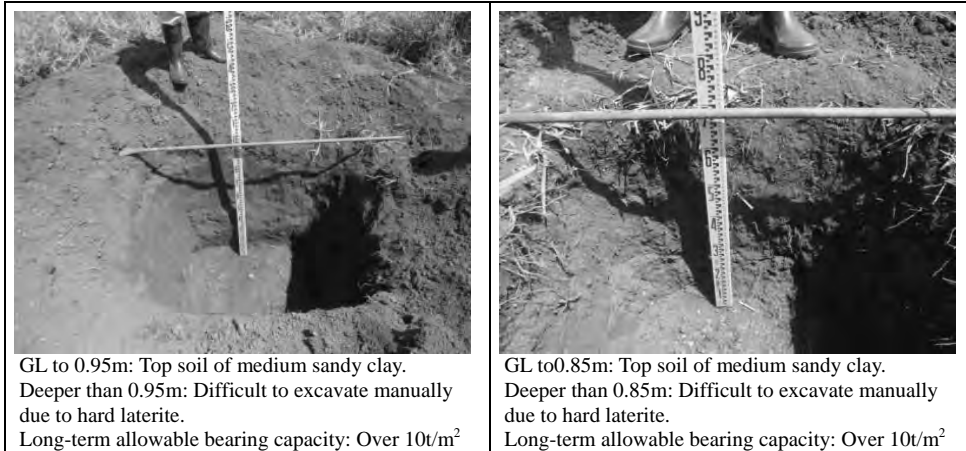


GL to 0.70m: Top soil of clay with small particle of hard laterite.
Deeper than 0.70m: Difficult to excavate manually due to hard laterite.
Long-term allowable bearing capacity: Over 10t/m²



GL to 0.70m: Top soil of clay with small particle of laterite.
Deeper than 0.70m: Difficult to excavate manually due to hard laterite.
Long-term allowable bearing capacity: Over 10t/m²

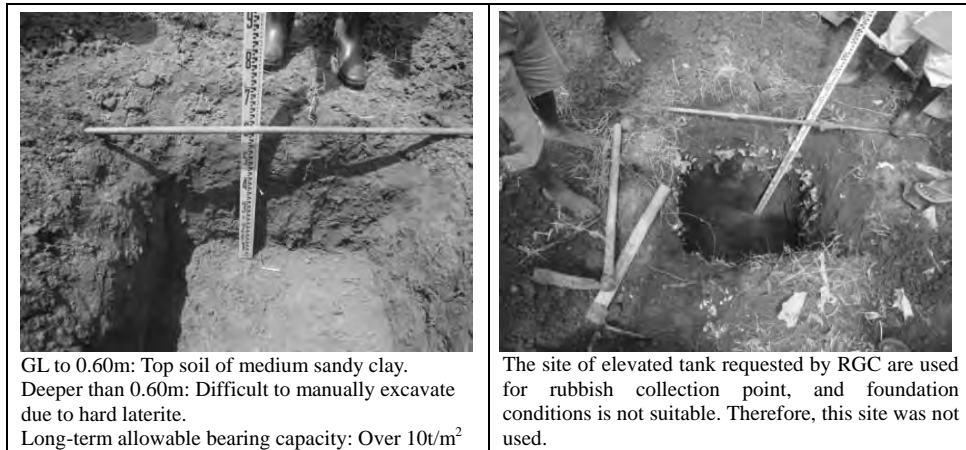
- iv) Kitgum District: Kitgum Matidi RGC Confirmation soil bearing capacity of the elevated tank foundation.



GL to 0.95m: Top soil of medium sandy clay.
 Deeper than 0.95m: Difficult to excavate manually due to hard laterite.
 Long-term allowable bearing capacity: Over 10t/m²

GL to 0.85m: Top soil of medium sandy clay.
 Deeper than 0.85m: Difficult to excavate manually due to hard laterite.
 Long-term allowable bearing capacity: Over 10t/m²

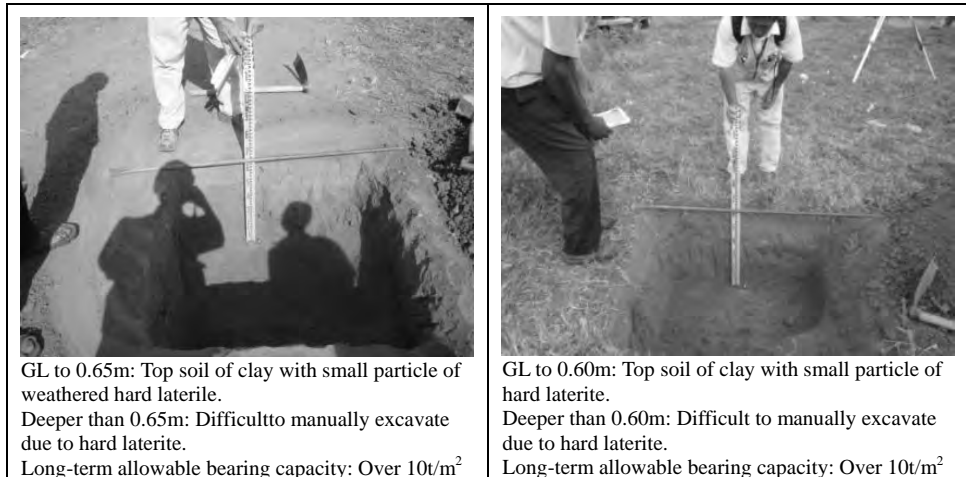
- v) Pader District: Coner Kilak RGC Confirmation soil bearing capacity of the elevated tank foundation.



GL to 0.60m: Top soil of medium sandy clay.
 Deeper than 0.60m: Difficult to manually excavate due to hard laterite.
 Long-term allowable bearing capacity: Over 10t/m²

The site of elevated tank requested by RGC are used for rubbish collection point, and foundation conditions is not suitable. Therefore, this site was not used.

- vi) Agago District: Adilang RGC Confirmation soil bearing capacity of the elevated tank foundation.

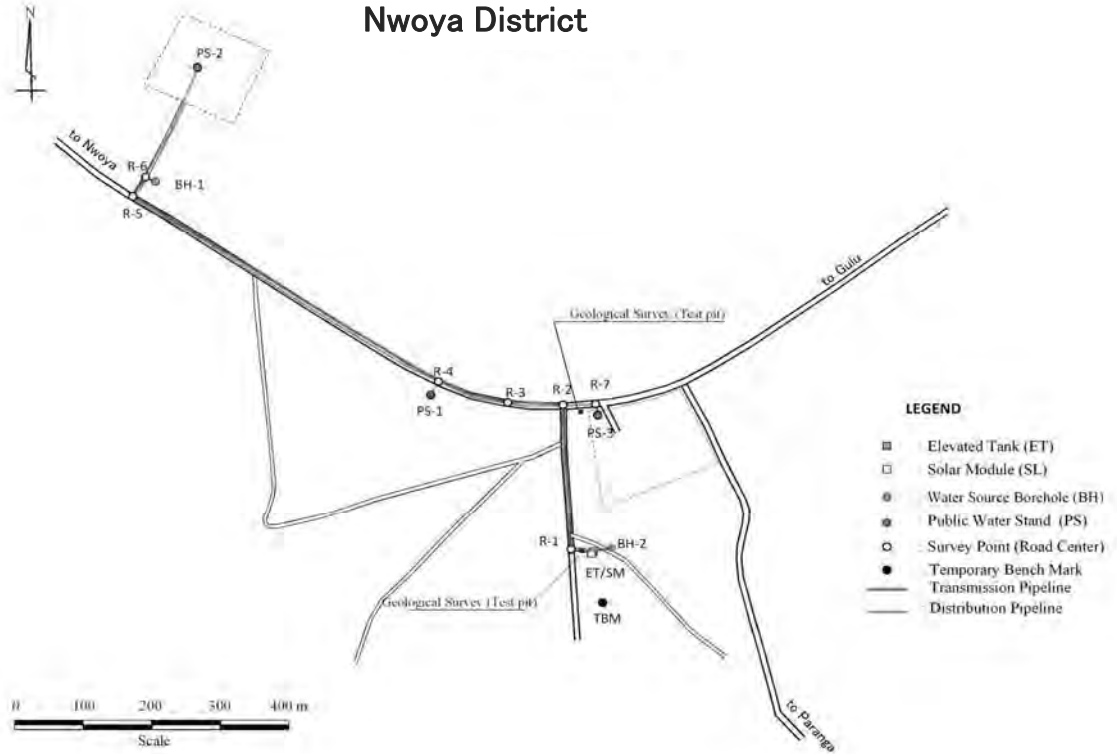


GL to 0.65m: Top soil of clay with small particle of weathered hard laterite.
 Deeper than 0.65m: Difficult to manually excavate due to hard laterite.
 Long-term allowable bearing capacity: Over 10t/m²

GL to 0.60m: Top soil of clay with small particle of hard laterite.
 Deeper than 0.60m: Difficult to manually excavate due to hard laterite.
 Long-term allowable bearing capacity: Over 10t/m²

Topographic Survey Results

Koch Goma RGC
Nwoya District



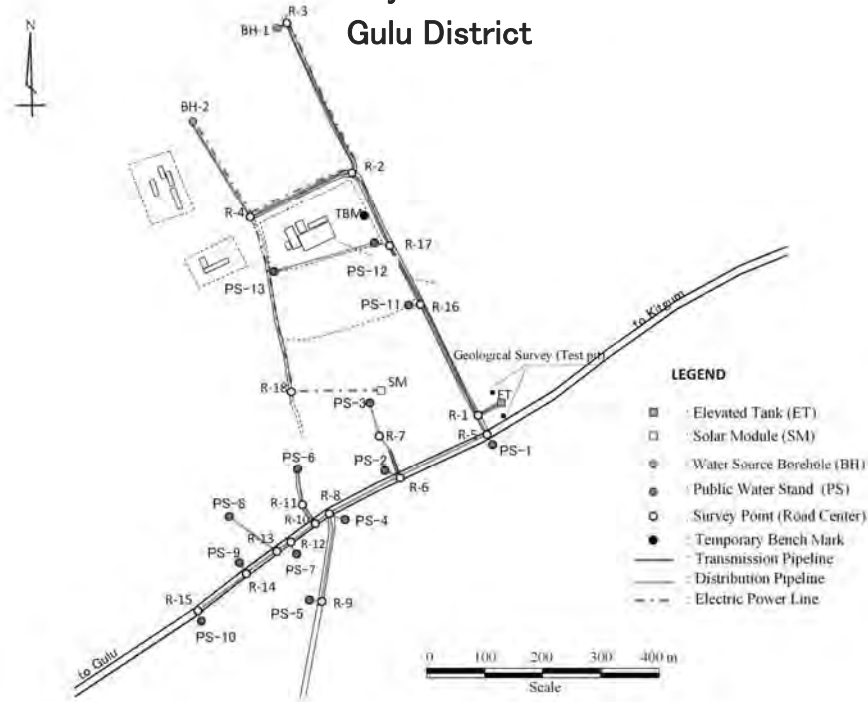
Transmission Pipeline

Point	Coordination (UTM)	Elevation (m)	Distance (m)
TBM	N 408215 E 287653	1132.00	-
BH-1	N 407565 E 288277	1131.09	11.5
R-6	N 407555 E 288281	1128.07	35.0
R-5	N 407542 E 288248	1131.25	528.7
R-4	N 407991 E 287958	1122.25	101.5
R-3	N 408081 E 287928	1125.37	99.5
R-2	N 408174 E 287919	1127.60	217.0
R-1	N 408195 E 287703	1131.05	26.2
ET	N 408222 E 287703	1131.35	
BH-2	N 408248 E 287704	1130.58	26.2
ET	N 408222 E 287703	1131.35	
from BH-1 to ET			1,019.4
from BH-2 to ET			26.2
Total			1,045.6

Distribution Line

Point	Coordination (UTM)	Elevation (m)	Distance (m)
ET	N 408222 E 287703	1131.35	26.2
R-1	N 408195 E 287703	1131.05	217.0
R-2	N 408174 E 287919	1127.60	99.5
R-3	N 408081 E 287928	1125.37	101.5
R-4	N 407991 E 287958	1122.25	10.0
PS-1	N 407988 E 287949	1122.65	528.7
R-4	N 407991 E 287958	1122.25	217.9
R-5	N 407542 E 288248	1131.25	50.2
PS-2	N 407633 E 288446	1128.44	10.0
R-2	N 408174 E 287919	1127.60	
R-7	N 408224 E 287923	1128.07	
PS-3	N 408226 E 287915	1128.60	
Total			1,261.0

Unyama RGC Gulu District



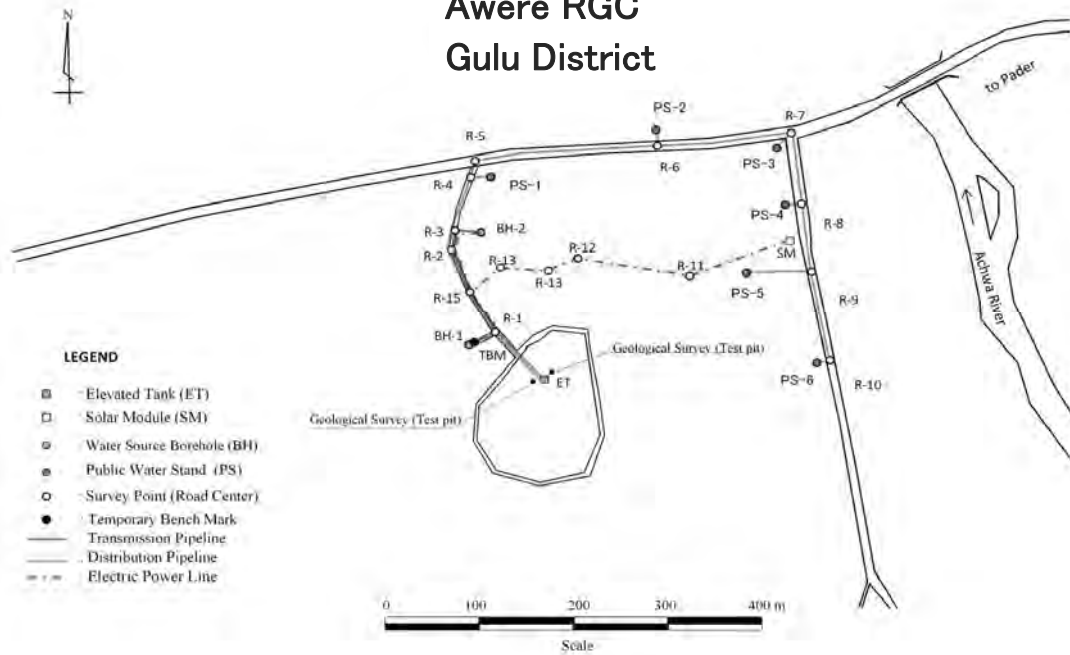
Transmission Pipeline

Point	Coordination	Elevation (m)	Distance (m)
TBM	N 426553 E 311962	1,073.00	-
BH-1	N 426409 E 312278	1,064.83	10.0
R-3	N 426415 E 312281	1,064.38	268.3
R-2	N 426522 E 312035	1,070.49	482.1
R-1	N 426740 E 311605	1,078.82	20.0
ET	N 426758 E 311614	1,078.81	172.2
BH-2	N 426284 E 312116	1,067.09	188.9
R-4	N 426350 E 311957	1,071.93	482.1
R-2	N 426522 E 312035	1,070.49	20.0
R-1	N 426740 E 311605	1,078.82	780.4
ET	N 426758 E 311614	1,078.81	863.2
from BH-1 to ET			780.4
from BH-2 to ET			863.2
Total			1,643.6

Distribution Line

Point	Coordination	Elevation (m)	Distance (m)
ET	N 426758 E 311614	1,078.81	20.0
R-1	N 426740 E 311605	1,078.82	30.0
R-5	N 426753 E 311578	1,078.73	10.0
PS-1	N 426754 E 311573	1,079.26	219.6
R-5	N 426753 E 311578	1,078.73	12.2
R-6	N 426556 E 311481	1,078.14	76.2
PS-2	N 426546 E 311488	1,078.03	61.5
R-6	N 426556 E 311481	1,078.14	87.3
R-7	N 426531 E 311553	1,077.75	11.4
PS-3	N 426539 E 311614	1,077.03	151.3
R-6	N 426556 E 311481	1,078.14	5.0
R-8	N 426480 E 311438	1,076.98	28.3
PS-4	N 426489 E 311431	1,077.08	47.0
R-8	N 426480 E 311438	1,076.98	58.4
R-9	N 426470 E 311287	1,079.34	55.0
PS-5	N 426465 E 311287	1,079.54	10.0
R-8	N 426480 E 311438	1,076.98	33.8
R-10	N 426456 E 311423	1,076.26	85.0
R-11	N 426433 E 311464	1,074.84	24.4
PS-6	N 426426 E 311522	1,073.03	10.3
R-10	N 426456 E 311423	1,076.26	67.5
R-12	N 426412 E 311390	1,075.07	10.3
PS-7	N 426418 E 311384	1,074.83	10.3
R-12	N 426412 E 311390	1,075.07	159.7
R-13	N 426384 E 311371	1,073.98	10.0
PS-8	N 426321 E 311428	1,072.48	121.2
R-13	N 426384 E 311371	1,073.98	12.7
R-14	N 426364 E 311357	1,070.89	246.6
PS-9	N 426355 E 311362	1,071.00	
R-14	N 426364 E 311357	1,070.89	
R-15	N 426312 E 311314	1,068.06	
PS-10	N 426317 E 311305	1,068.40	
R-1	N 426740 E 311605	1,078.82	
R-16	N 426669 E 311748	1,077.55	
PS-11	N 426667 E 311745	1,077.95	
R-16	N 426669 E 311748	1,077.55	
R-17	N 426614 E 311854	1,074.39	
PS-12	N 426605 E 311863	1,074.69	
R-17	N 426614 E 311854	1,074.39	
PS-13	N 426377 E 311879	1,067.09	
Total			1,664.7

Awere RGC Gulu District



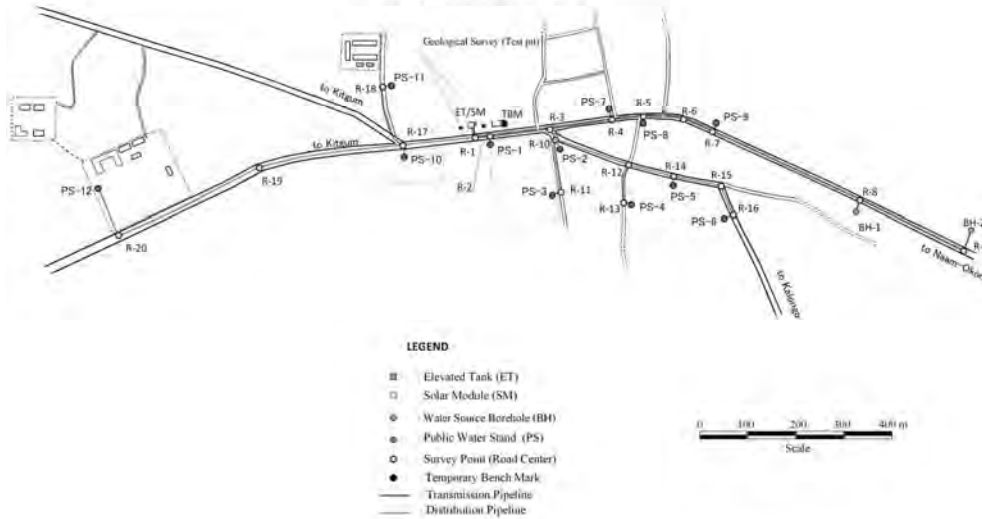
Transmission Pipeline

Point	Coordination	Elevation (m)	Distance (m)
TBM	N 475790 E 296760	999.00	-
BH-1	N 475791 E 296759		23.9
R-1	N 475811 E 296772	997.78	80.2
ET	N 475863 E 296711	998.98	
BH-2	N 475783 E 296900	998.98	11.0
R-3	N 475772 E 296901	995.93	45.1
R-2	N 475762 E 296857	996.03	
R-1	N 475811 E 296772	997.78	98.1
ET	N 475863 E 296711	998.98	80.2
from BH-1 to ET			104.1
from BH-2 to ET			234.4
Total			338.5

Distribution Line

Point	Coordination	Elevation (m)	Distance (m)
ET	N 475863 E 296711	998.98	80.2
R-1	N 475811 E 296772	997.78	
R-2	N 475762 E 296857	996.03	98.1
R-3	N 475772 E 296901	995.93	45.1
R-4	N 475777 E 296946	995.09	43.7
PS-1	N 475784 E 296945	995.18	5.0
R-4	N 475780 E 296944	995.09	13.2
R-5	N 475778 E 296957	994.79	206.1
R-6	N 475983 E 296978	993.34	
PS-2	N 475982 E 296990	993.50	12.0
R-6	N 475983 E 296978	993.34	142.4
R-7	N 476125 E 296988	990.01	16.8
PS-3	N 476119 E 296980	990.34	
R-7	N 476125 E 296988	990.01	73.8
R-8	N 476141 E 296916	990.45	10.8
PS-4	N 476132 E 296910	990.67	
R-8	N 476142 E 296912	990.45	80.4
R-9	N 476156 E 296837	991.22	76.2
PS-5	N 476080 E 296832	992.22	
R-9	N 476156 E 296837	991.22	103.8
R-10	N 476175 E 296735	990.65	10.4
PS-6	N 476167 E 296736	991.44	
Total			1,018.0

Kitgum Matidi RGC Kitgum District



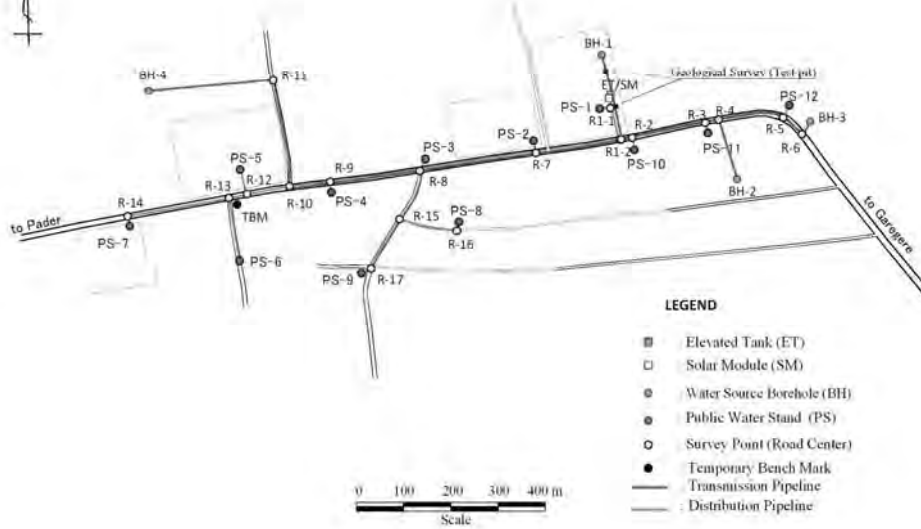
Transmission Pipeline

Point	Coordination		Elevation (m)	Distance (m)
TBM	N 505807	E 361277	1,007.00	-
BH-1	N 506446	E 361151	994.82	21.4
R-8	N 506459	E 361168	992.34	213.8
R-7	N 506267	E 361262	997.79	79.4
R-6	N 506192	E 361288	997.79	80.4
R-5	N 506112	E 361299	1,001.14	63.3
R-4	N 506049	E 361293	1,002.57	143.1
R-3	N 505907	E 361275	1,005.13	129.6
R-2	N 505779	E 361255	1,007.19	23.8
R-1	N 505756	E 361249	1,007.43	30.0
ET/SM	N 505757	E 361283	1,007.41	30.0
BH-2	N 506593	E 361145	992.08	33.1
R-9	N 506579	E 361115	991.08	131.2
R-8	N 506459	E 361168	992.34	733.4
R-1	N 505756	E 361249	1,007.43	30.0
ET/SM	N 505757	E 361283	1,007.41	784.8
from BH-1 to ET				927.7
from BH-2 to ET				1,712.5
Total				

Distribution Line

Point	Coordination		Elevation (m)	Distance (m)
ET	N 505757	E 361283	1,007.41	30.0
R-1	N 505756	E 361249	1,007.43	23.8
R-2	N 505779	E 361255	1,007.19	14.0
PS-1	N 505780	E 361241	1,007.46	129.6
R-2	N 505779	E 361255	1,007.19	23.3
R-3	N 505907	E 361275	1,005.13	10.8
R-10	N 505917	E 361254	1,005.16	130.6
PS-2	N 505907	E 361250	1,005.26	10.8
R-10	N 505917	E 361254	1,005.16	157.5
R-11	N 505930	E 361124	1,004.62	93.2
PS-3	N 505920	E 361120	1,004.67	10.8
R-10	N 505917	E 361254	1,005.16	157.5
R-12	N 506063	E 361195	1,002.03	93.2
R-13	N 506069	E 361102	1,001.73	6.4
PS-4	N 506074	E 361098	1,001.90	6.4
R-12	N 506063	E 361195	1,002.03	83.2
R-14	N 506143	E 361172	999.57	10.0
PS-5	N 506146	E 361165	999.70	123.6
R-14	N 506143	E 361172	999.57	37.1
R-15	N 506264	E 361147	999.19	10.0
R-16	N 506281	E 361114	998.49	10.0
PS-6	N 506275	E 361109	998.67	143.1
R-3	N 505907	E 361275	1,005.13	11.0
R-4	N 506049	E 361293	1,002.57	63.3
PS-7	N 506048	E 361304	1,002.65	10.0
R-4	N 506049	E 361293	1,002.57	80.8
R-5	N 506112	E 361299	1,001.14	79.4
PS-8	N 506112	E 361294	1,001.22	10.2
R-5	N 506112	E 361299	1,001.14	166.6
R-6	N 506192	E 361288	997.79	16.2
R-7	N 506267	E 361262	997.63	146.6
PS-9	N 506269	E 361272	997.78	17.3
R-1	N 505756	E 361249	1,007.43	255.4
R-17	N 505590	E 361235	1,010.25	384.0
PS-10	N 505584	E 361220	1,010.34	84.5
R-17	N 505590	E 361235	1,010.25	2362.3
R-18	N 505550	E 361376	1,010.08	
PS-11	N 505567	E 361379	1,010.08	
R-17	N 505590	E 361235	1,010.25	
R-19	N 505337	E 361200	1,008.74	
R-20	N 504987	E 361042	1,007.75	
PS-12	N 504957	E 361121	1,009.19	
Total				

Adilang RGC Agago District



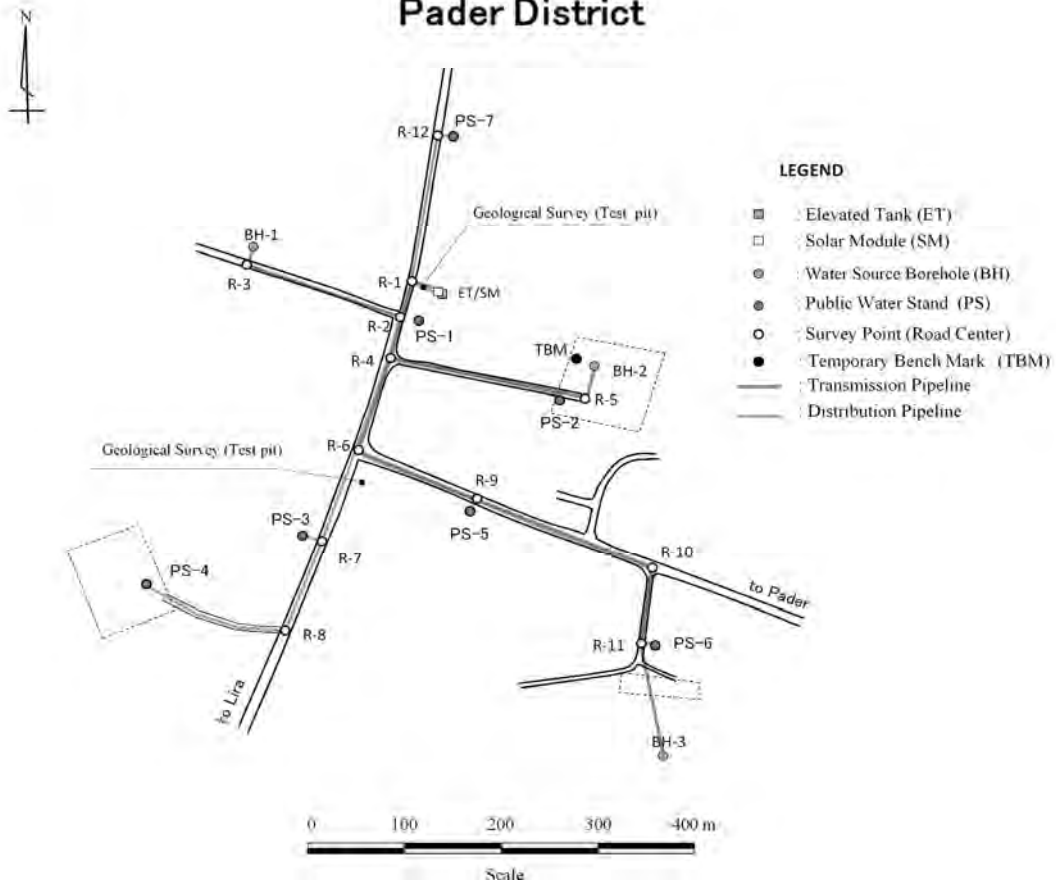
Transmission Pipeline

Point	Coordination	Elevation (m)	Distance (m)
TBM	N 552784 E 302917	1,114.00	-
BH-1	N 553599 E 303273	1,115.66	76.2
ET/SM	N 553569 E 303203	1,115.57	
BH-2	N 553859 E 302952	1,115.44	161.0
R-4	N 553828 E 303110	1,117.97	232.8
R-1-2	N 553600 E 303063	1,116.25	143.4
ET/SM	N 553569 E 303203	1,115.57	
BH-3	N 554039 E 303033	1,118.44	22.8
R-6	N 554019 E 303022	1,118.84	108.3
R-5	N 553946 E 303102	1,119.03	118.3
R-4	N 553828 E 303110	1,117.97	232.8
R-1-2	N 553600 E 303063	1,116.25	143.4
ET/SM	N 553569 E 303203	1,115.57	
BH-4	N 552638 E 303131	1,112.60	219.8
R-11	N 552856 E 303159	1,112.66	212.6
R-10	N 552895 E 302950	1,113.25	122.6
R-9	N 553017 E 302962	1,113.50	156.7
R-8	N 553172 E 302985	1,113.68	239.4
R-7	N 553409 E 303019	1,115.07	196.0
R-1-2	N 553600 E 303063	1,116.25	143.4
ET	N 553569 E 303203	1,115.57	
from BH-1 to ET			76.2
from BH-2 to ET			537.2
from BH-2 to ET			625.6
from BH-2 to ET			1,290.5
Total			2,529.5

Distribution Line

Point	Coordination	Elevation (m)	Distance (m)
ET	N 553569 E 303194	1,115.57	20.0
R-1-1	N 553571 E 303063	1,115.57	13.9
PS-1-2	N 553562 E 303191	1,115.57	
ET	N 553569 E 303203	1,115.57	123.4
R-1-2	N 553600 E 303063	1,116.25	196.0
R-7	N 553409 E 303019	1,115.07	12.2
PS-2	N 553411 E 303031	1,115.10	
R-7	N 553409 E 303019	1,115.07	239.4
R-8	N 553172 E 302985	1,113.68	22.5
PS-3	N 553184 E 303004	1,113.98	
R-8	N 553172 E 302985	1,113.68	156.7
R-9	N 553017 E 302962	1,113.50	19.0
PS-4	N 553018 E 302943	1,113.20	
R-9	N 553017 E 302962	1,113.50	122.6
R-10	N 552895 E 302950	1,113.25	64.8
R-12	N 552831 E 302940	1,113.31	44.9
PS-5	N 552847 E 302982	1,113.24	
R-12	N 552831 E 302940	1,113.31	52.3
R-13	N 552784 E 302917	1,113.33	92.3
PS-6	N 552792 E 302825	1,113.31	
R-13	N 552784 E 302917	1,113.33	240.5
R-14	N 552545 E 302890	1,113.09	10.0
PS-7	N 552546 E 302885	1,113.10	
R-8	N 553172 E 302985	1,113.68	111.7
R-15	N 553134 E 302880	1,113.20	129.1
R-16	N 553261 E 302857	1,114.17	13.0
PS-8	N 553260 E 302870	1,114.20	
R-15	N 553134 E 302880	1,113.20	123.2
R-17	N 553058 E 302783	1,112.88	16.8
PS-9	N 553042 E 302778	1,113.55	
R-1-2	N 553600 E 303063	1,116.25	38.1
R-2	N 553637 E 303072	1,116.34	10.0
PS-10	N 553639 E 303065	1,116.54	
R-2	N 553637 E 303072	1,116.34	143.2
R-3	N 553778 E 303097	1,117.97	10.0
PS-11	N 553780 E 303090	1,117.55	
R-3	N 553778 E 303097	1,117.97	51.7
R-4	N 553828 E 303110	1,118.50	118.3
R-5	N 553946 E 303102	1,119.03	16.1
PS-12	N 553954 E 303116	1,119.24	
Total			2,211.7

Corner Kilak RGC Pader District



Transmission Pipeline

Point	Coordination		Elevation (m)	Distance (m)
TBM	N 495658	E 305941	1,062.00	—
BH-1	N 495342	E 306037	1,062.24	16.0
R-3	N 495340	E 306031	1,062.23	138.8
R-2	N 495472	E 305988	1,061.58	34.9
R-1	N 495480	E 306022	1,061.18	22.5
ET	N 495503	E 306009	1,061.85	34.2
BH-2	N 495658	E 305940	1,058.94	196.9
R-5	N 495654	E 305906	1,059.53	44.4
R-4	N 495461	E 305945	1,062.30	88.5
R-2	N 495472	E 305988	1,061.58	11.7
R-1	N 495480	E 306022	1,061.18	105.3
ET	N 495503	E 306009	1,061.85	155.6
BH-3	N 495716	E 305520	1,057.01	210.3
R-10	N 495727	E 305730	1,059.08	326.6
R-6	N 495424	E 305852	1,062.56	100.1
R-4	N 495461	E 305945	1,062.30	44.4
R-2	N 495472	E 305988	1,061.58	34.9
R-1	N 495480	E 306022	1,061.18	22.5
ET	N 495503	E 306009	1,061.85	212.2
from BH-1 to ET				212.2
from BH-2 to ET				332.9
from BH-3 to ET				738.8
Total				1,283.9

Distribution Line

Point	Coordination		Elevation (m)	Distance (m)
ET	N 495503	E 306009	1,061.85	22.5
R-1	N 495480	E 306022	1,061.18	34.9
R-2	N 495472	E 305988	1,061.58	10.0
PS-1	N 495477	E 305988	1,061.85	44.4
R-2	N 495472	E 305988	1,061.58	171.7
R-4	N 495461	E 305945	1,062.30	100.1
PS-2	N 495628	E 305905	1,059.53	88.5
R-4	N 495461	E 305945	1,062.30	11.7
R-6	N 495424	E 305852	1,062.56	105.3
R-7	N 495396	E 305768	1,061.75	155.6
PS-3	N 495385	E 305772	1,061.85	11.7
R-7	N 495396	E 305768	1,061.75	105.3
R-8	N 495360	E 305669	1,061.61	155.6
PS-4	N 495213	E 305720	1,060.70	145.2
R-6	N 495424	E 305852	1,062.56	145.2
R-9	N 495558	E 305796	1,060.41	10.0
PS-5	N 495554	E 305787	1,060.51	181.4
R-9	N 495558	E 305796	1,060.41	181.4
R-10	N 495727	E 305730	1,059.08	88.4
R-11	N 495719	E 305642	1,058.93	7.1
PS-6	N 495726	E 305641	1,058.93	106.0
R-1	N 495480	E 306022	1,061.18	106.0
R-12	N 495505	E 306125	1,059.27	10.0
PS-7	N 495511	E 306124	1,059.40	10.0
Total				1,292.8