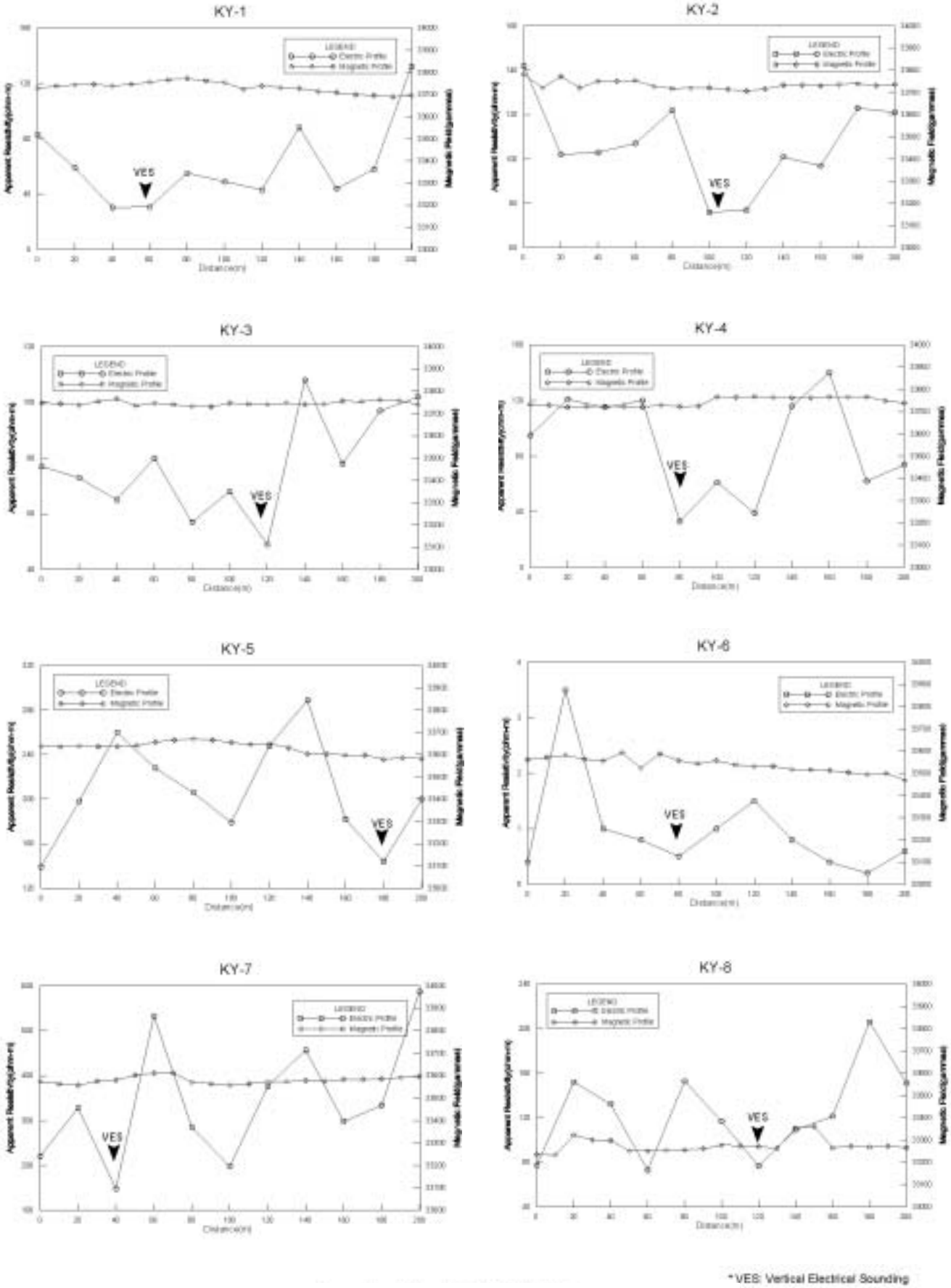
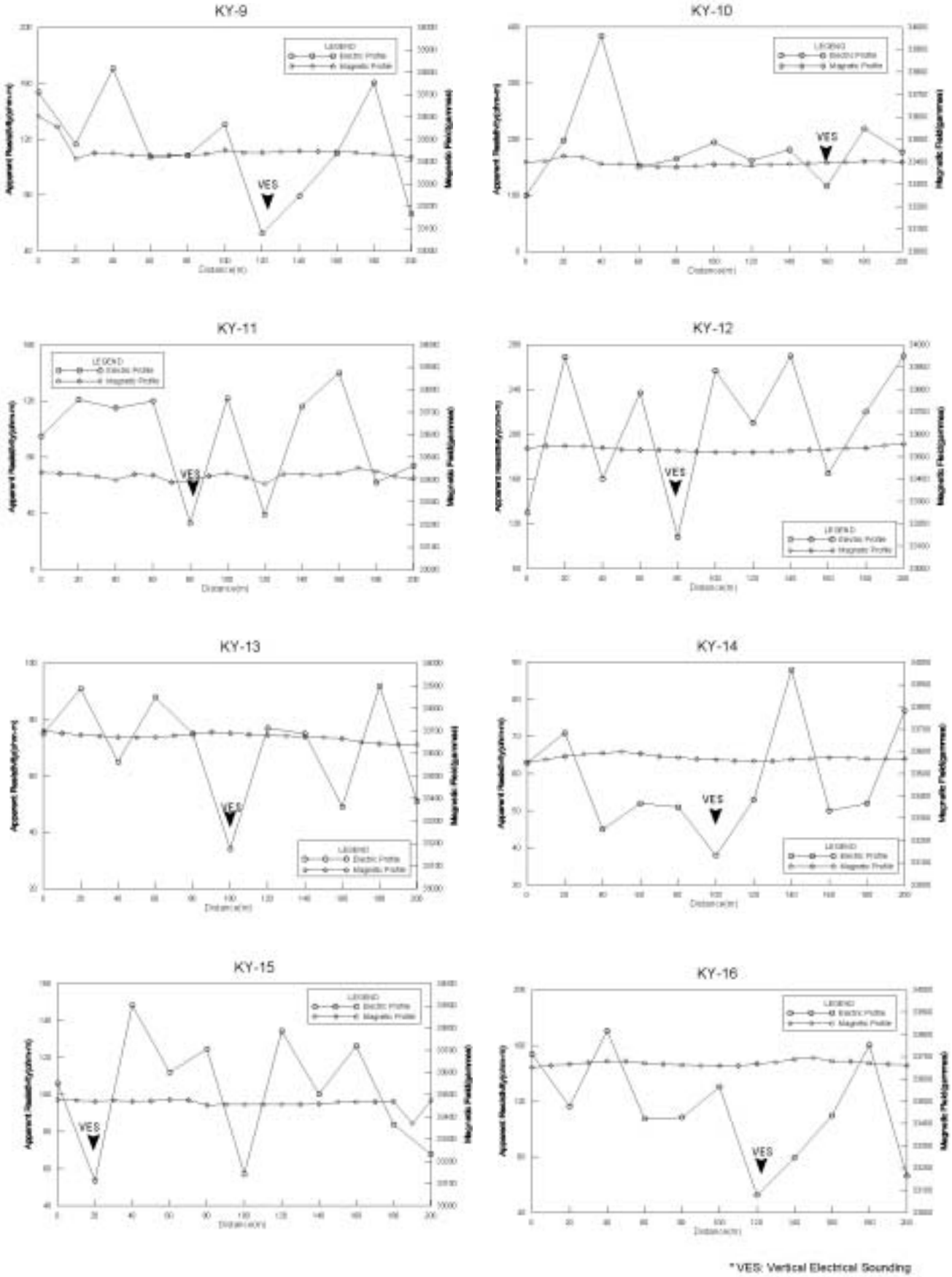


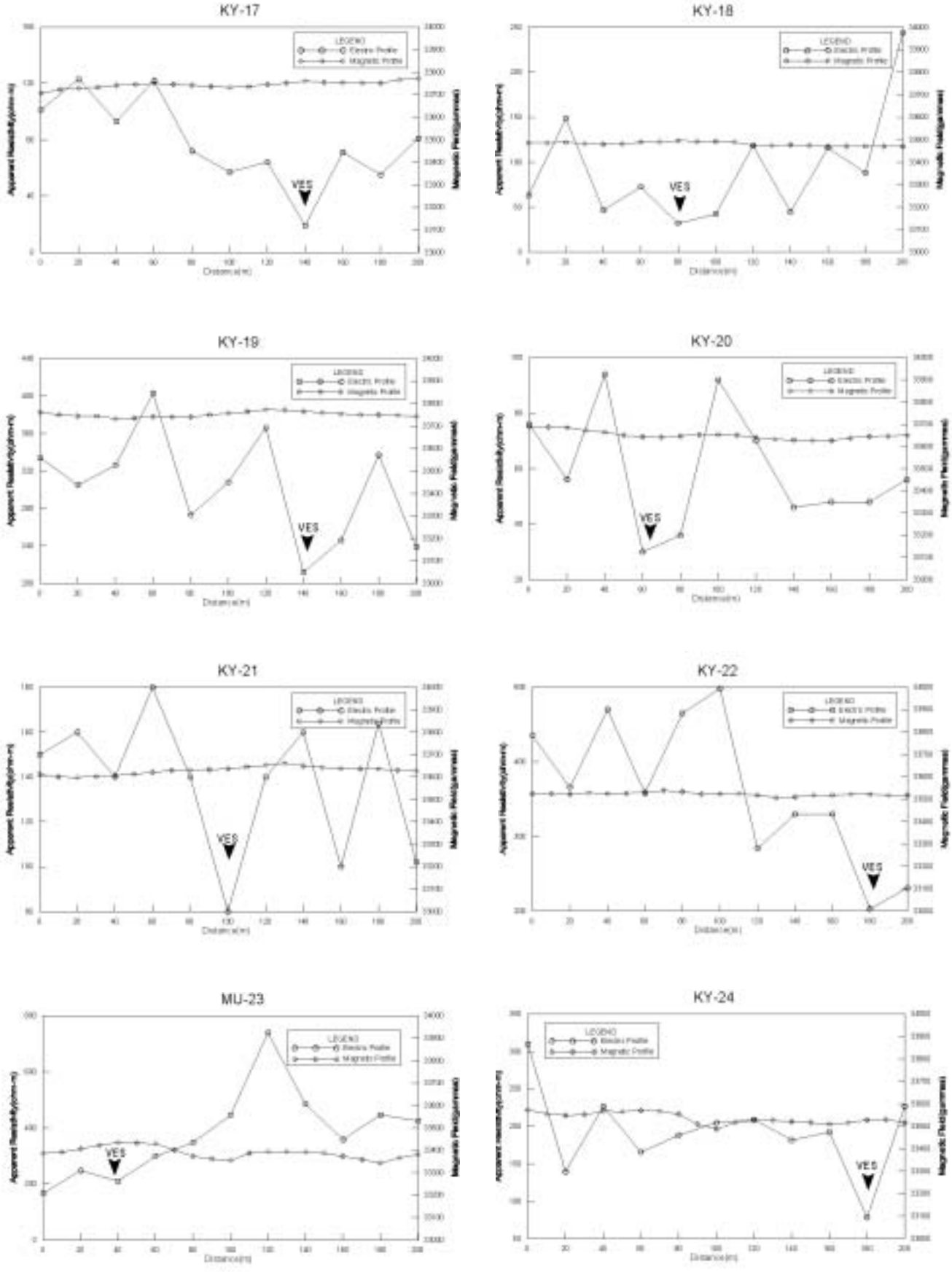
*VES: Vertical Electrical Sounding

Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING **(15/20)**



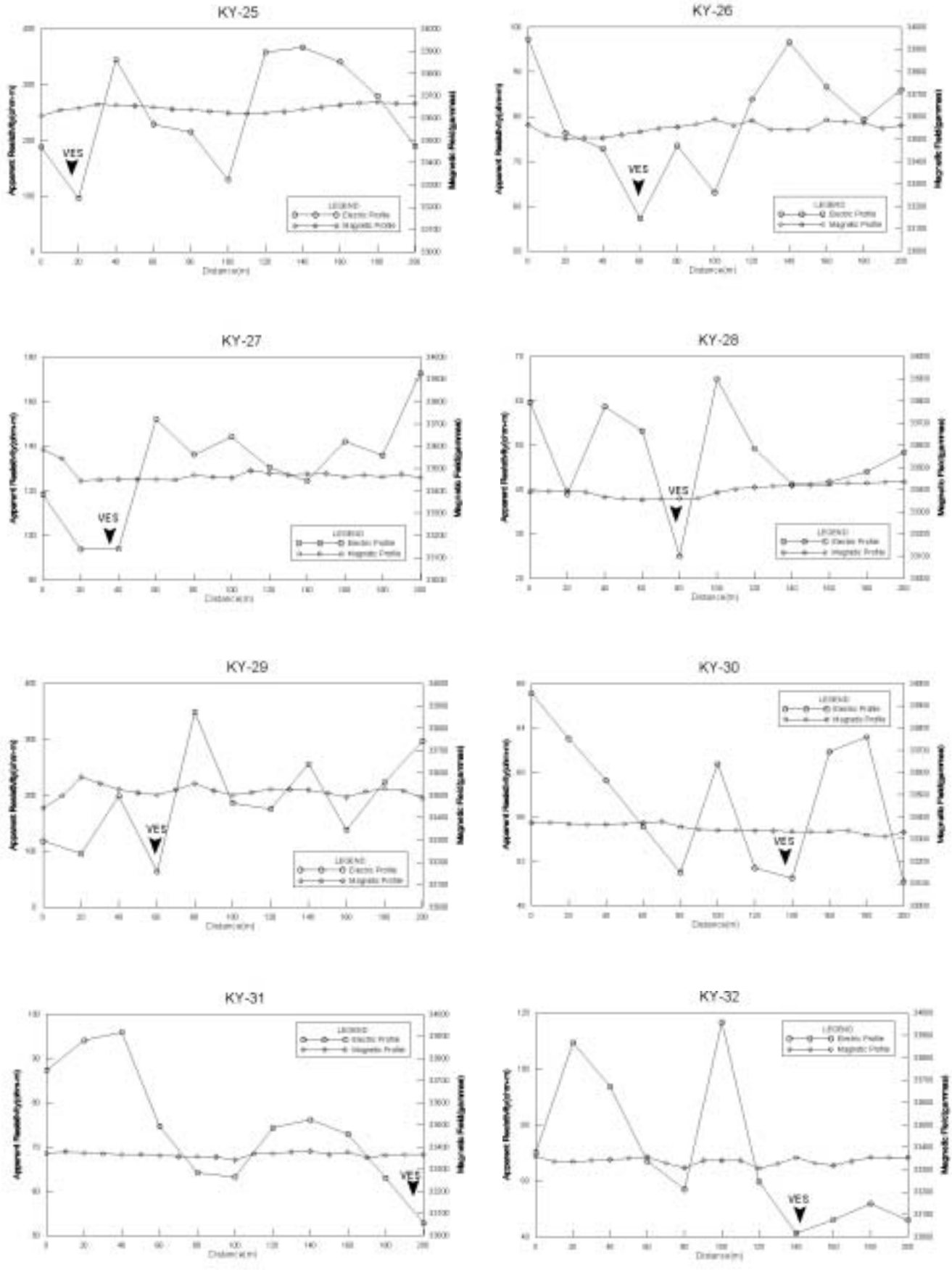
*VES: Vertical Electrical Sounding

Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING (16/20)



* VES: Vertical Electrical Sounding

Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING (17/20)



* VES: Vertical Electrical Sounding

Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING (18/20)

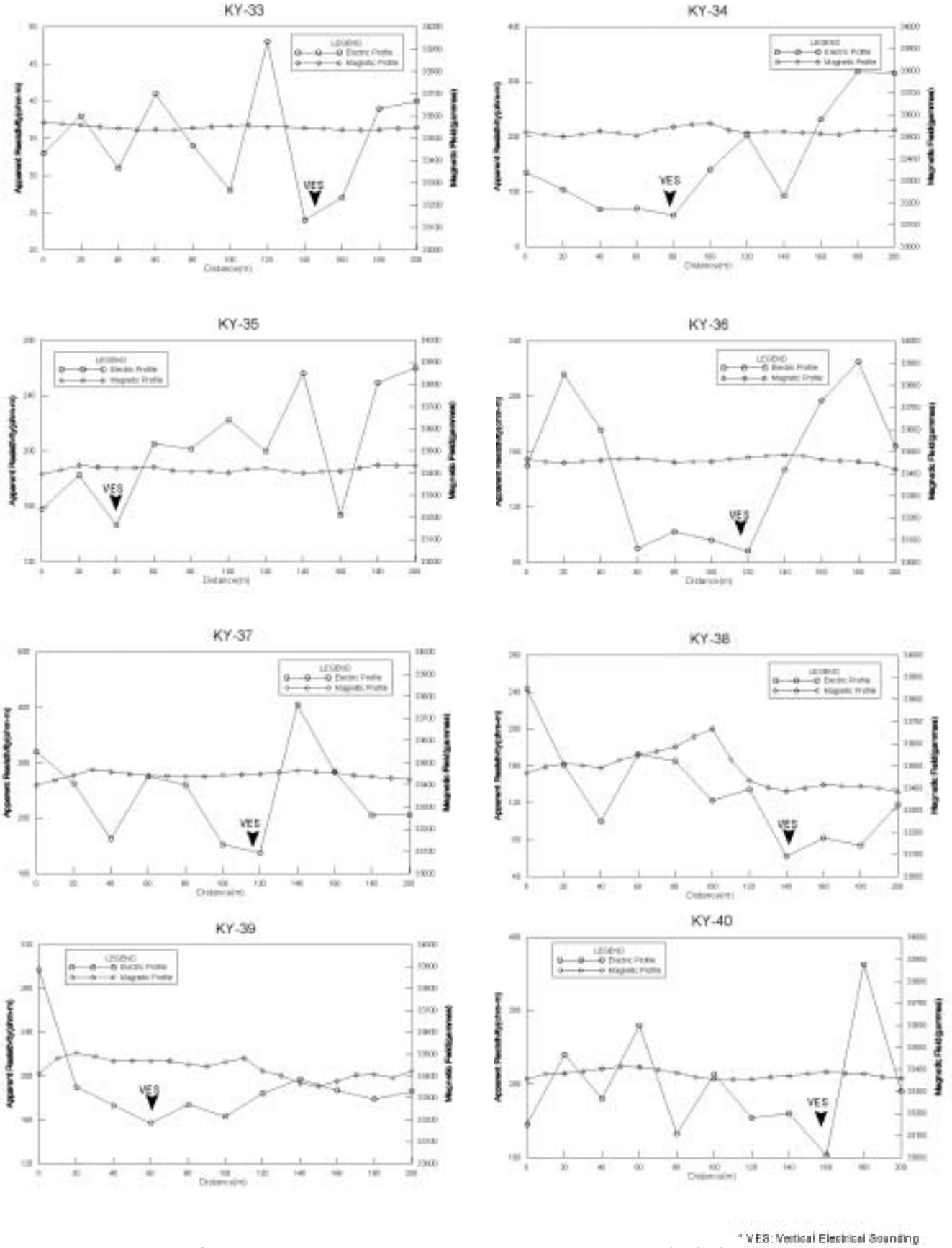


Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING (19/20)

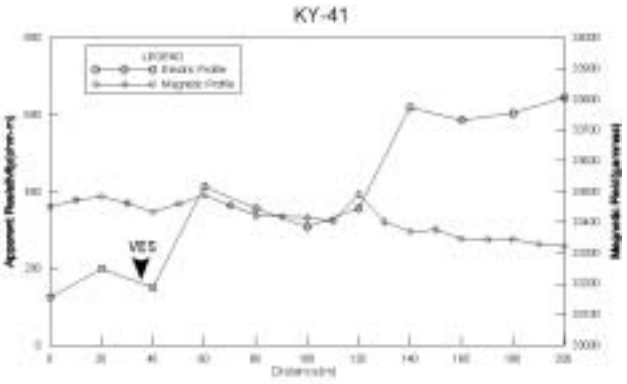
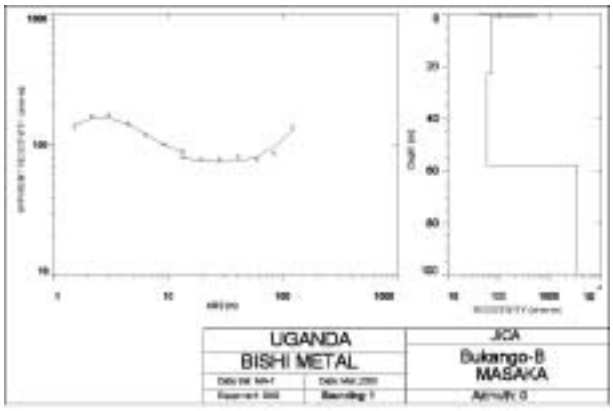
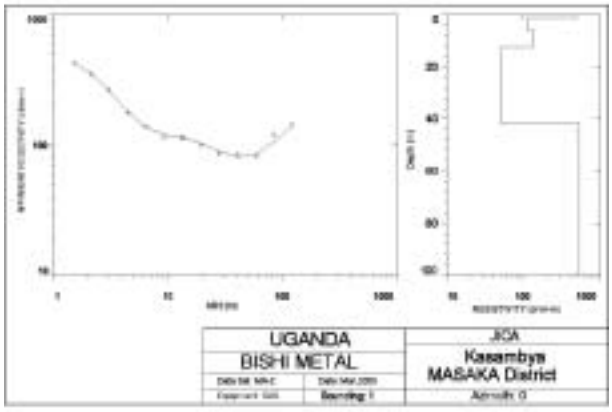
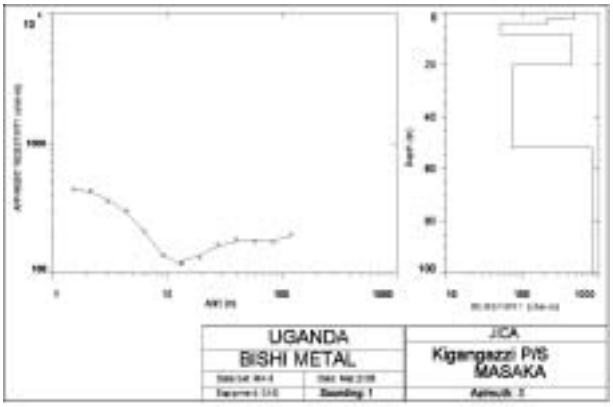
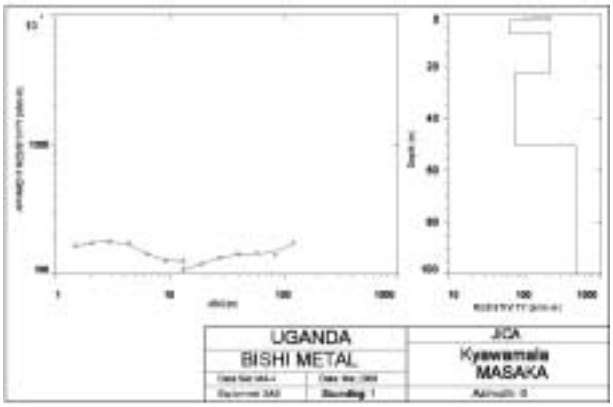


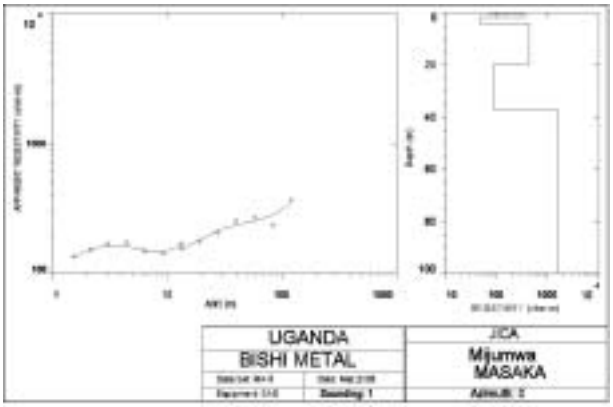
Fig. A6.3 MAGNETIC AND RESISTIVITY PROFILING (20/20)

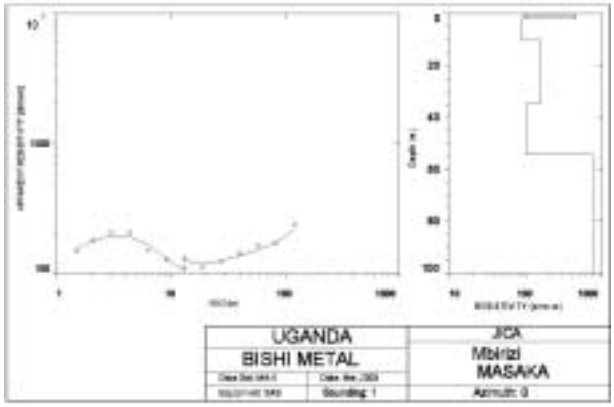


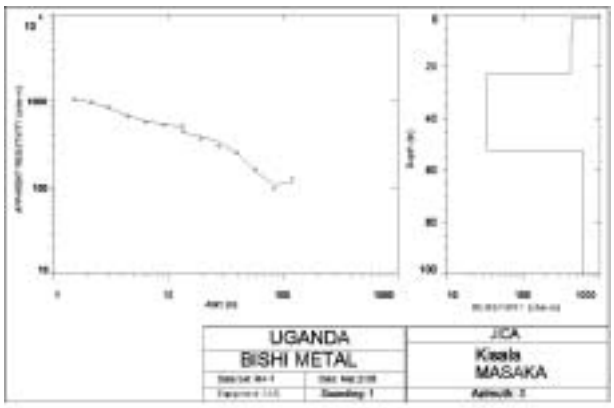












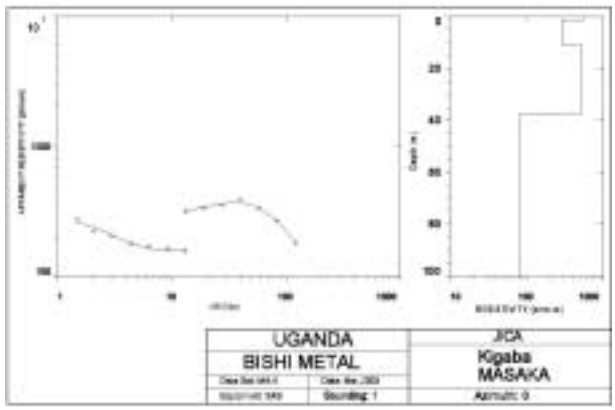
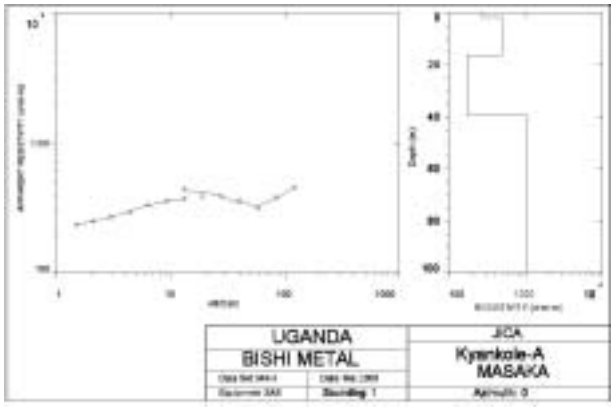
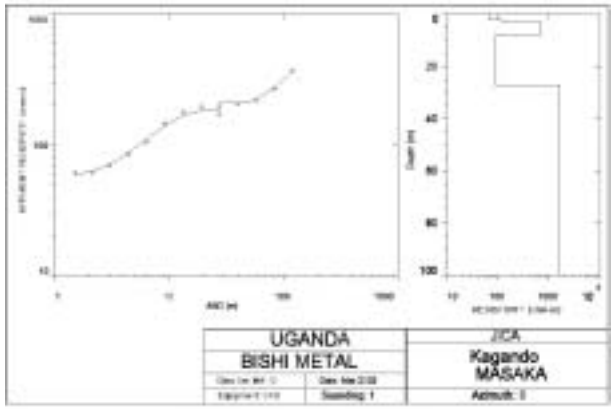
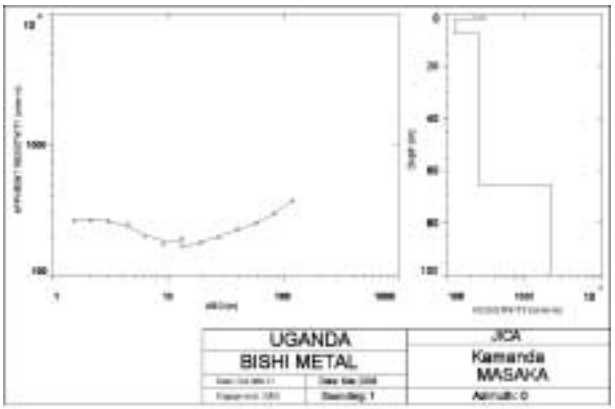
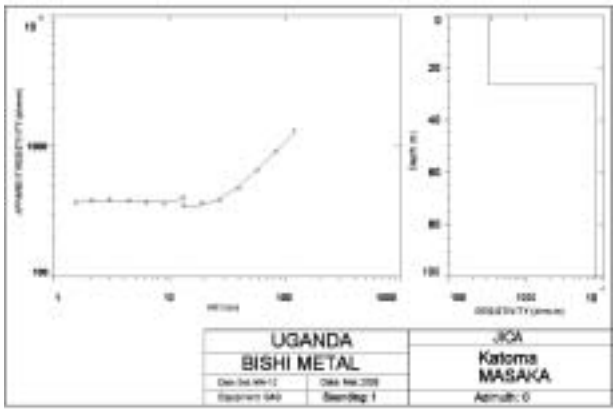


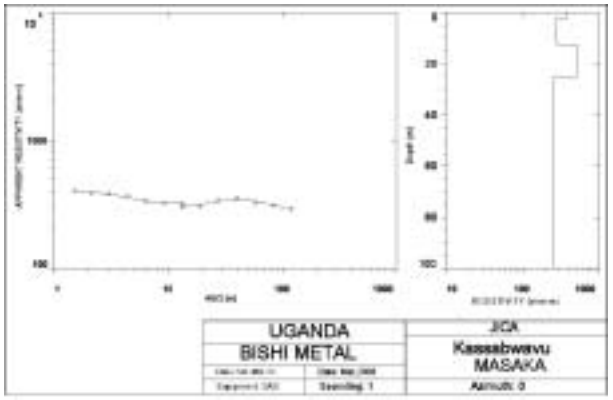
FIG. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (1/20)

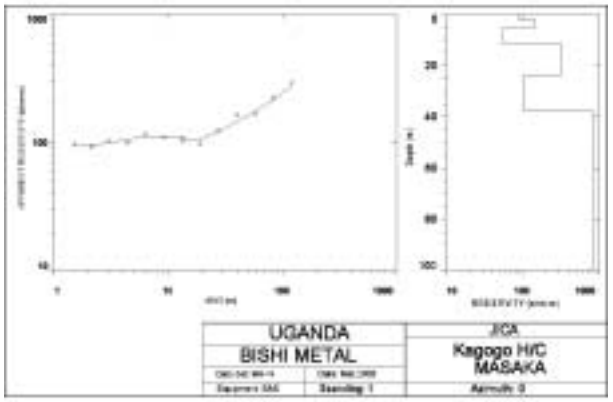


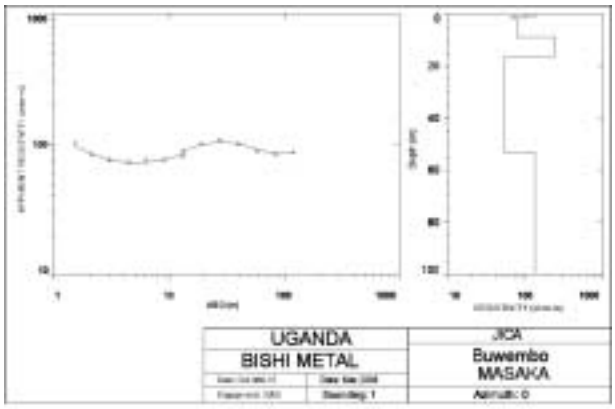












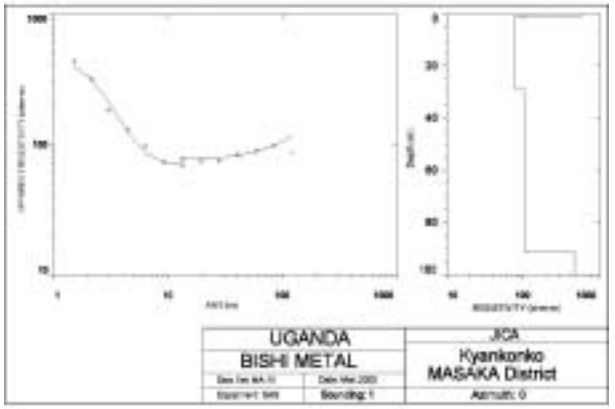
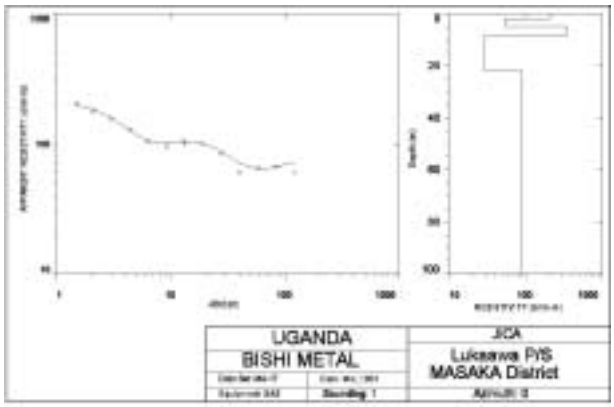
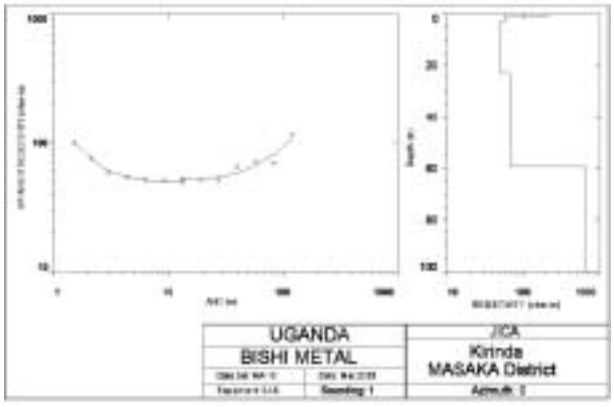
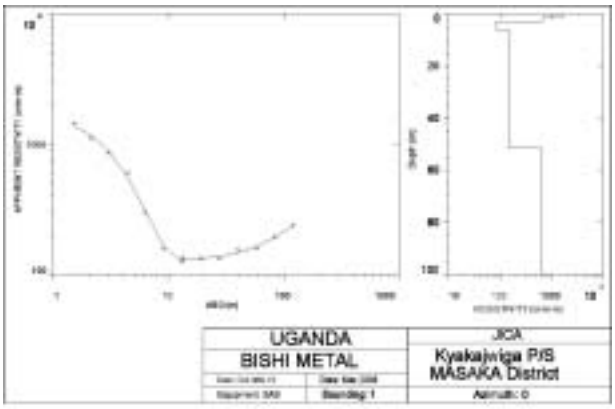
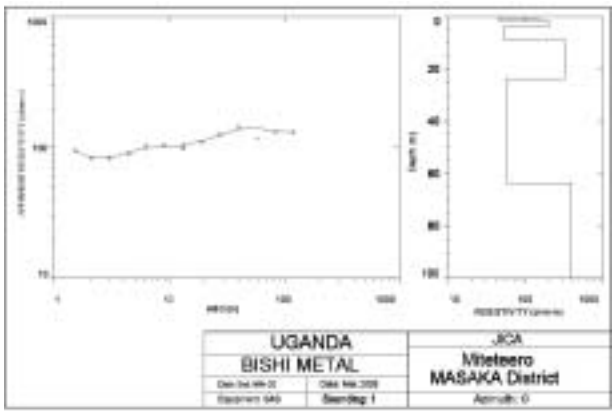


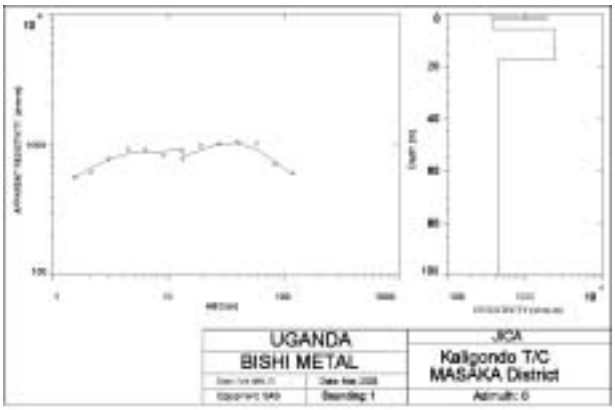
FIG. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (2/20)

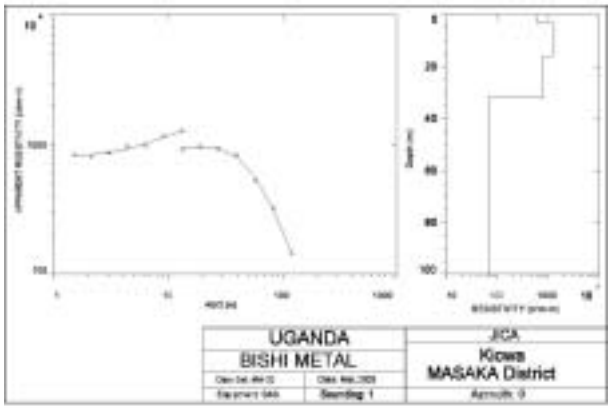


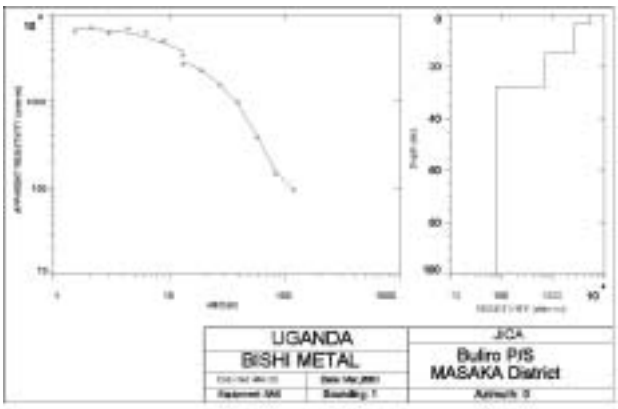












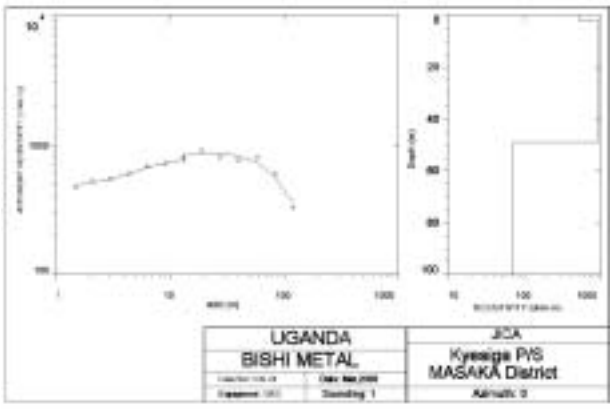
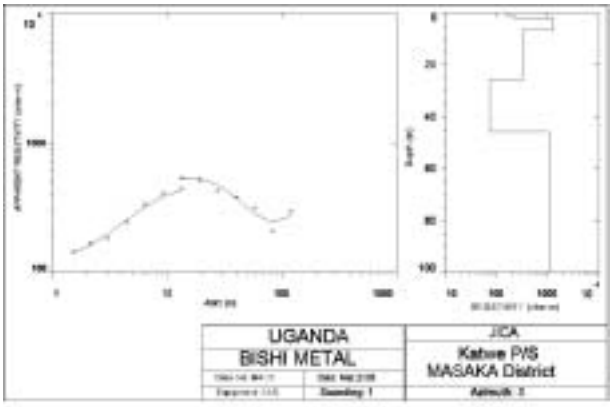
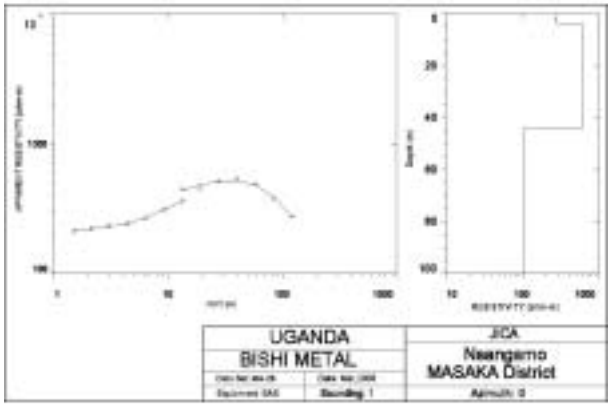
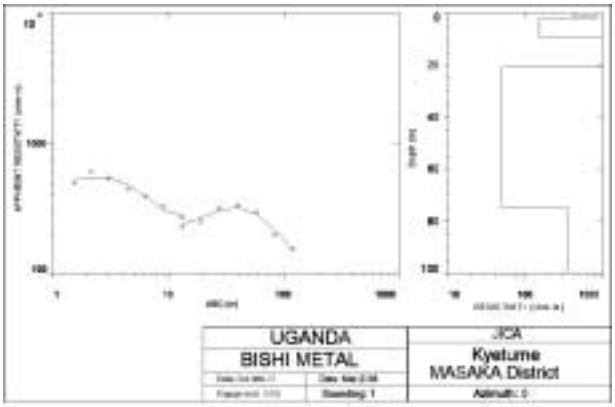
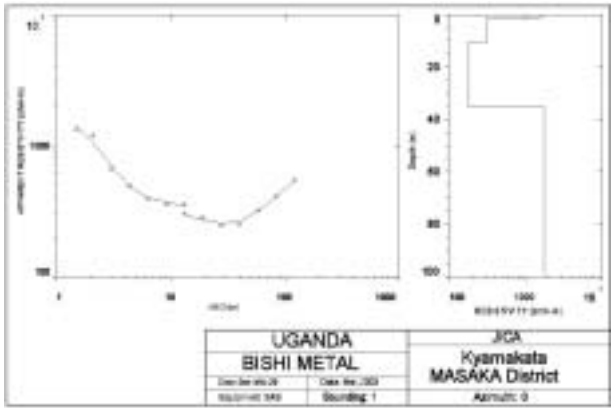


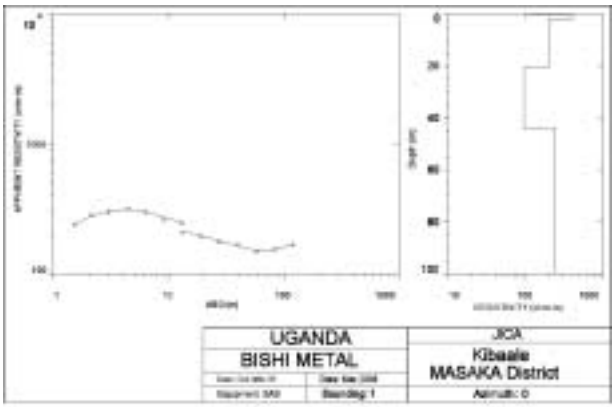
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (3/20)

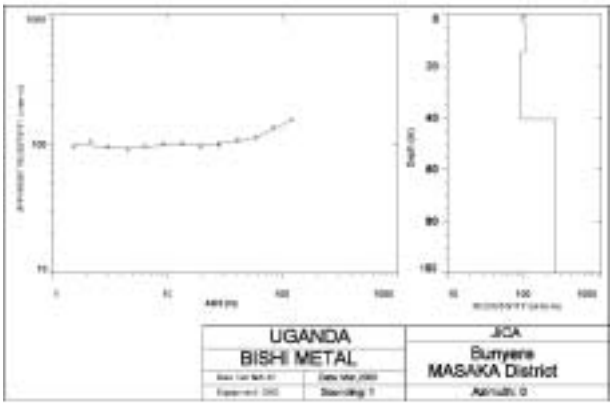


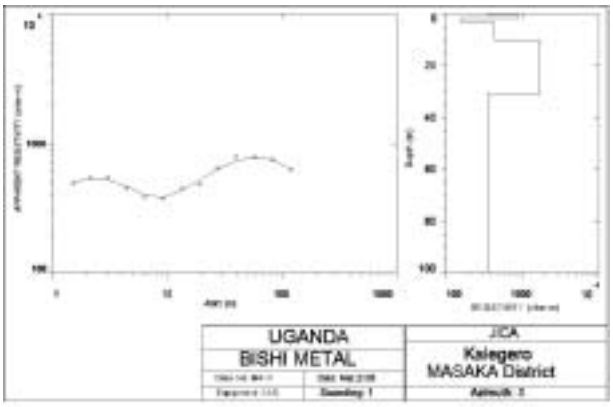












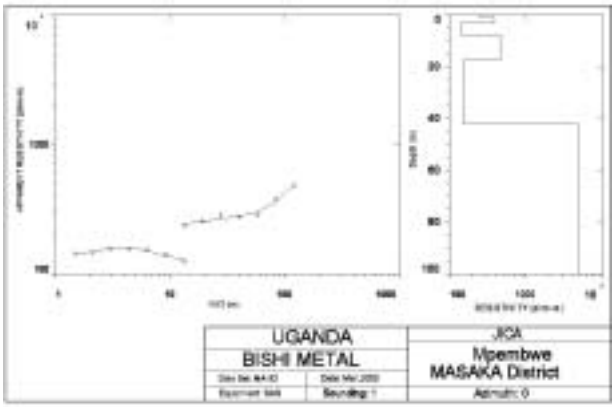
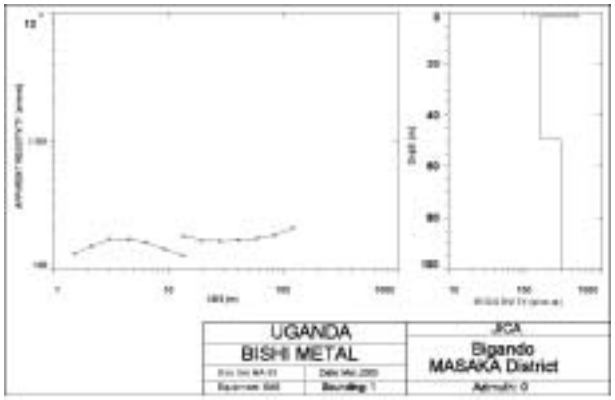
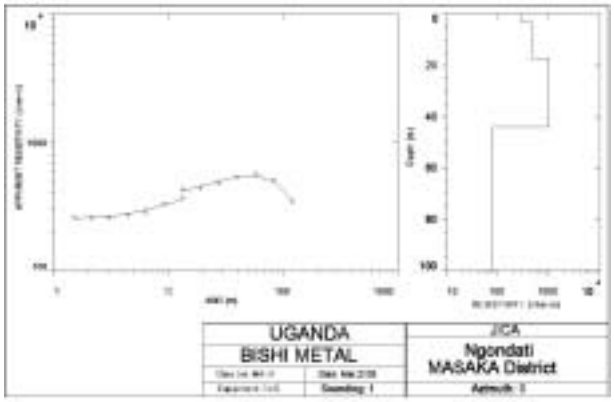
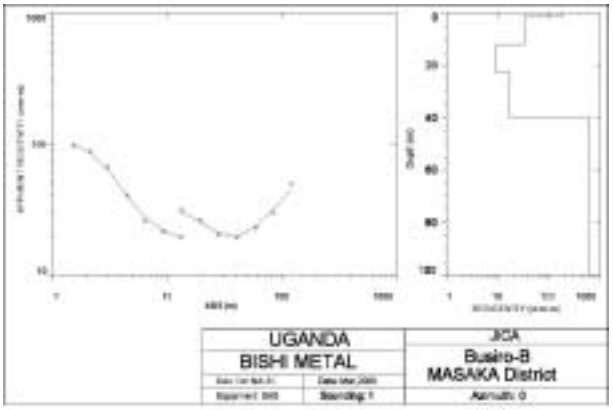
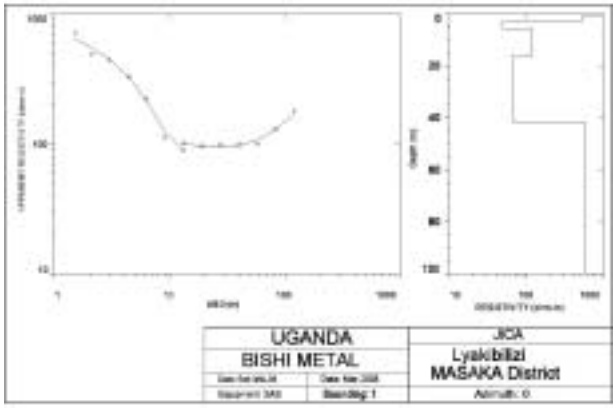


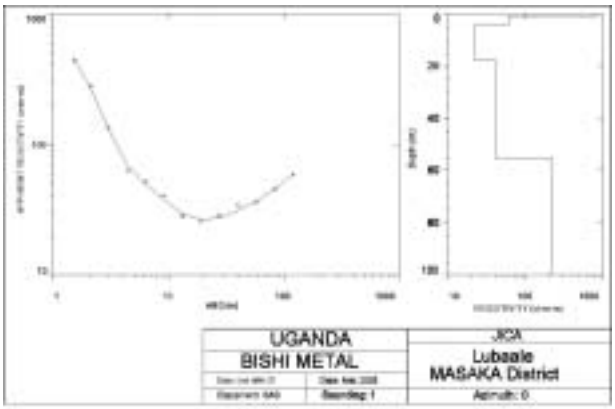
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (4/20)

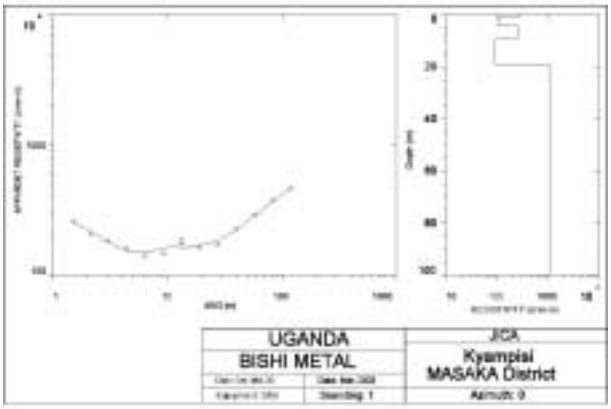


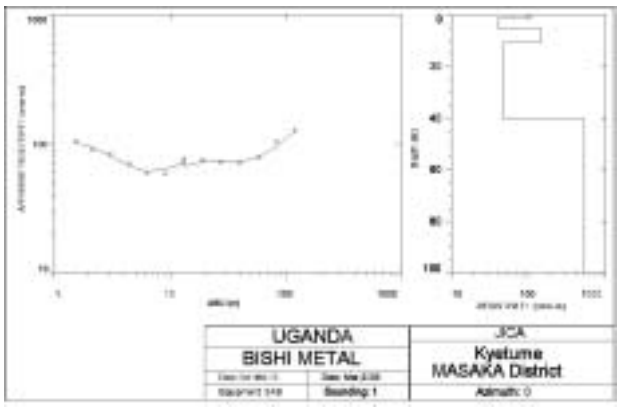












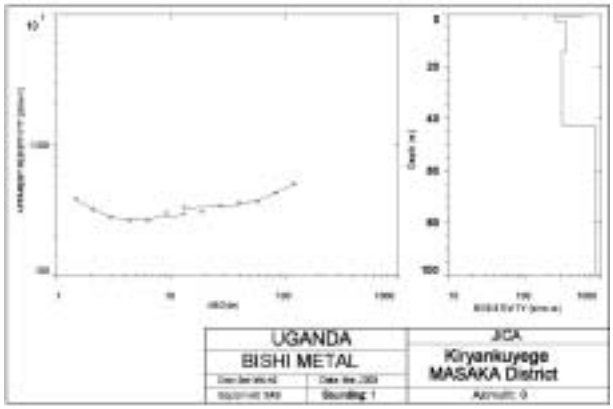
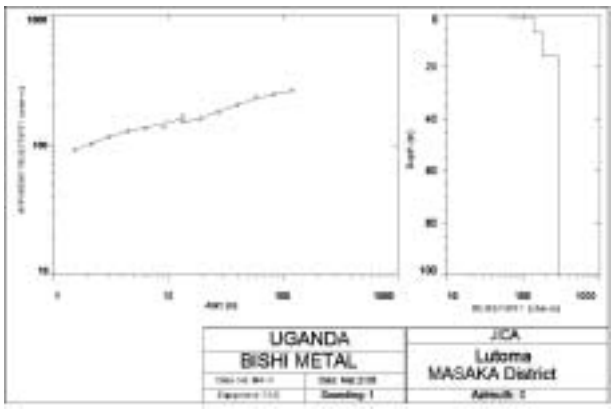
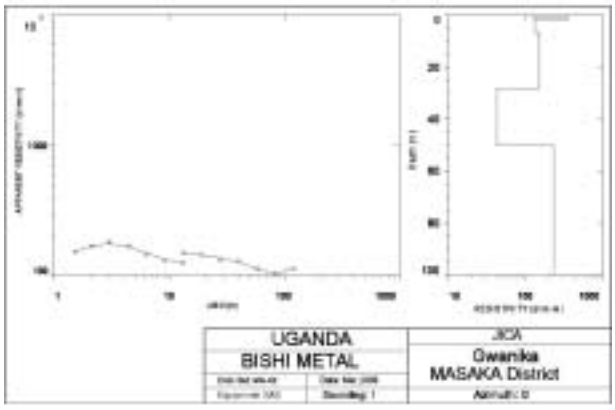
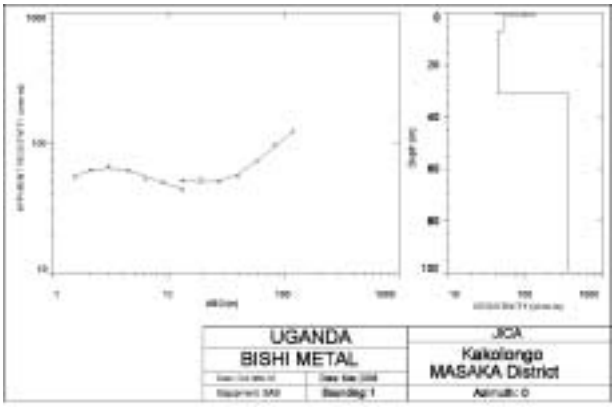
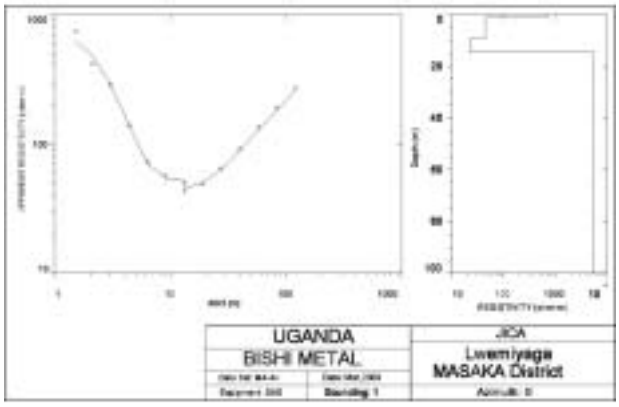


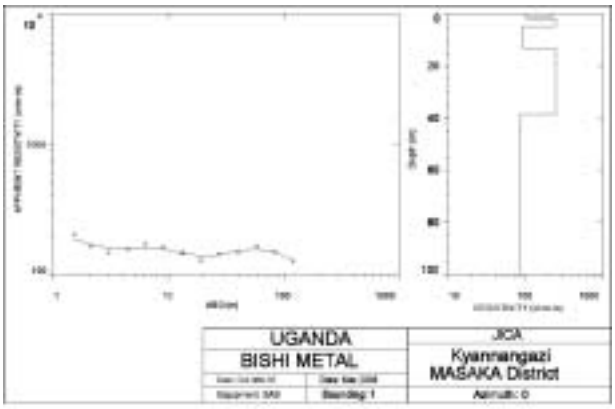
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS **(5/20)**

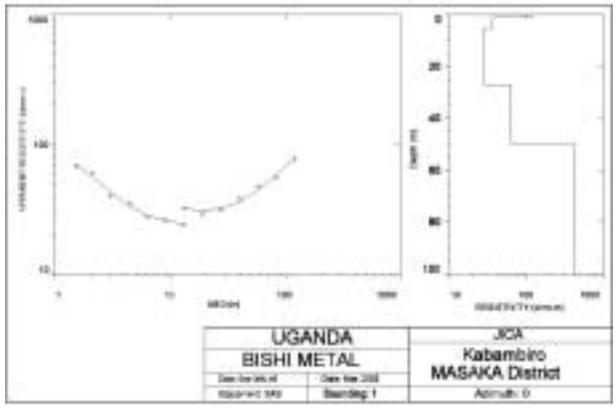


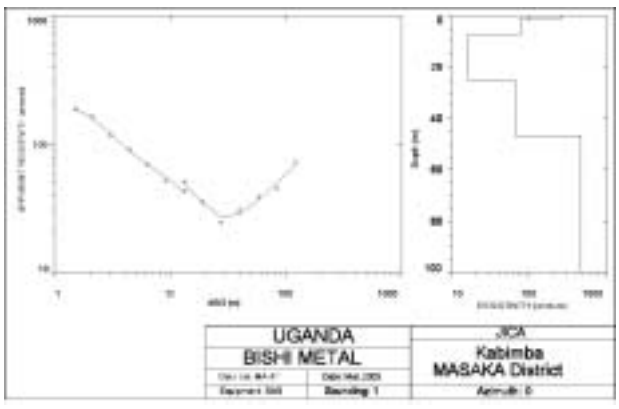












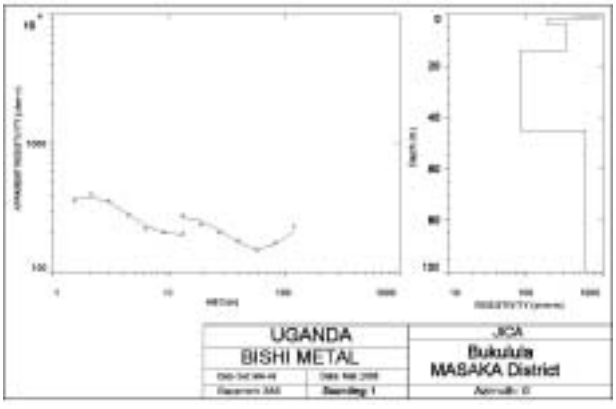
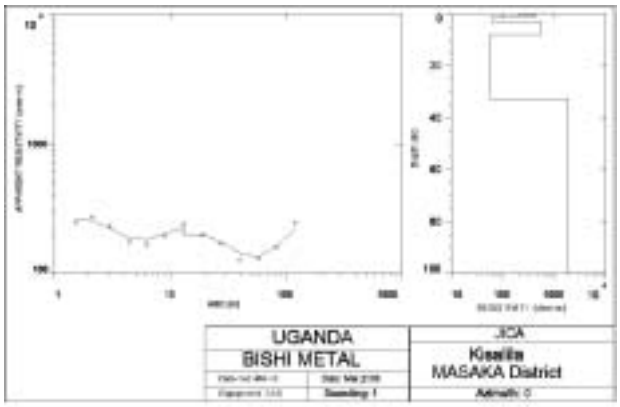
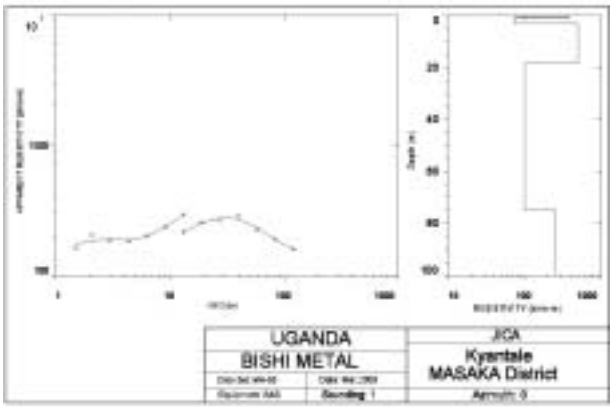
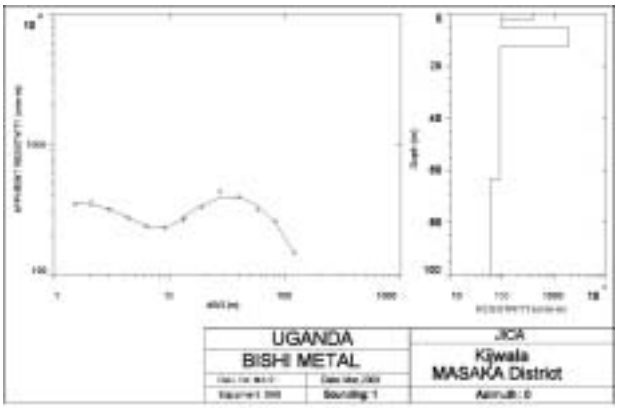
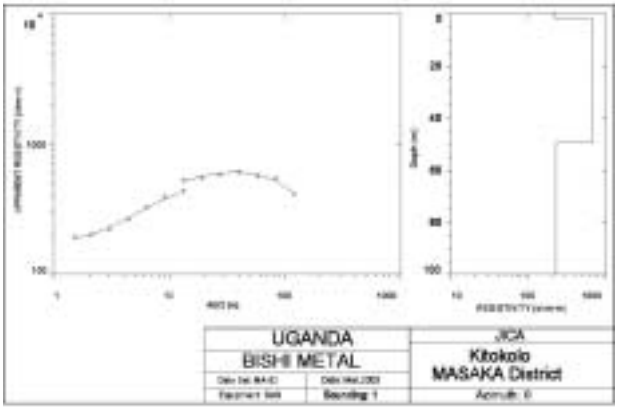


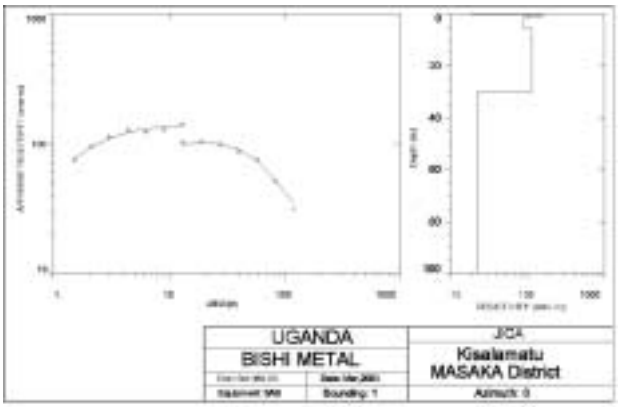
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (6/20)

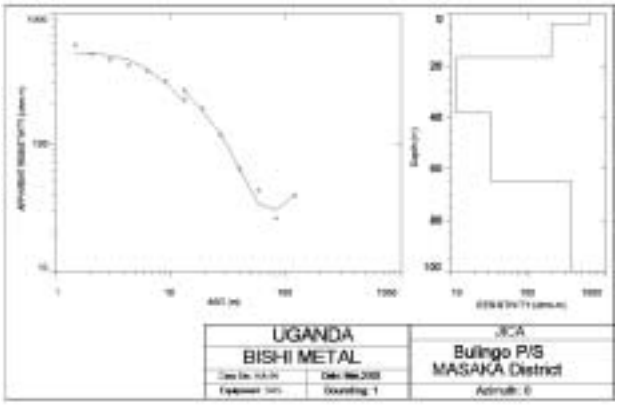


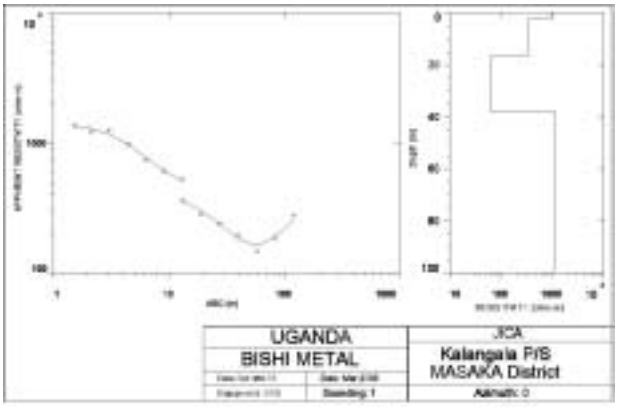












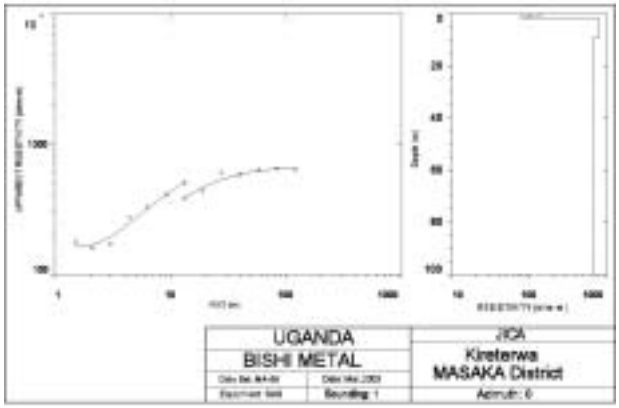
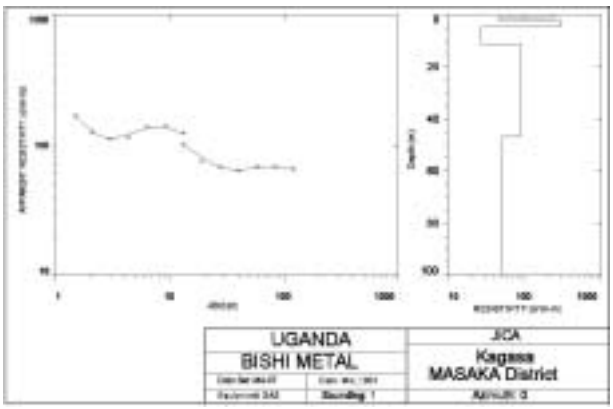
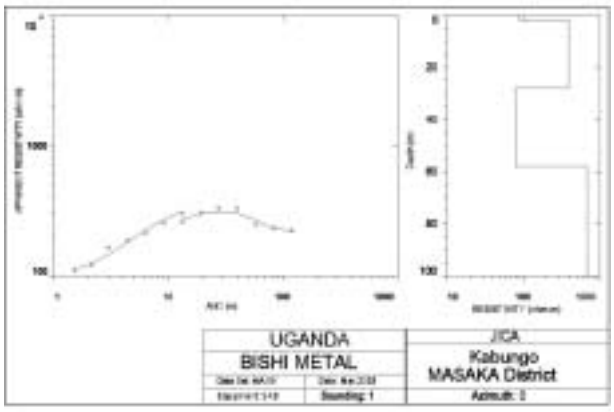
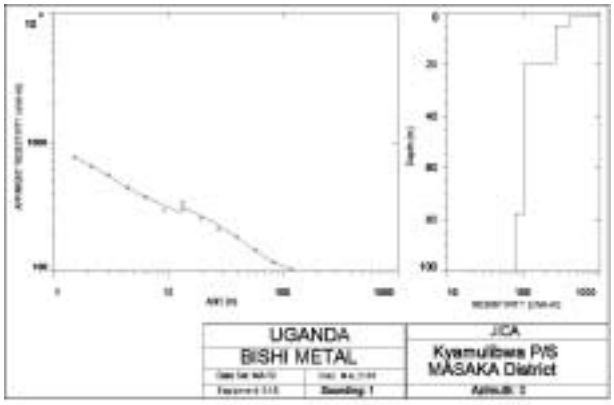
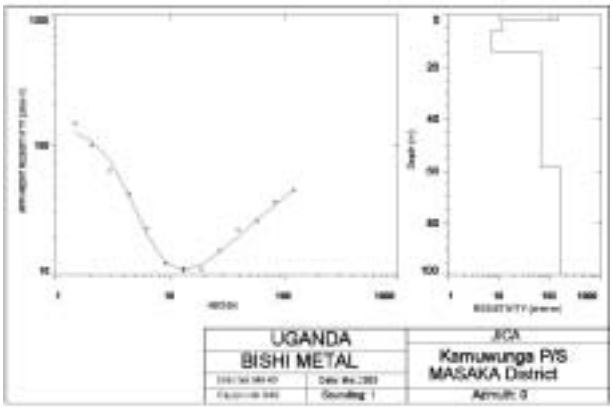


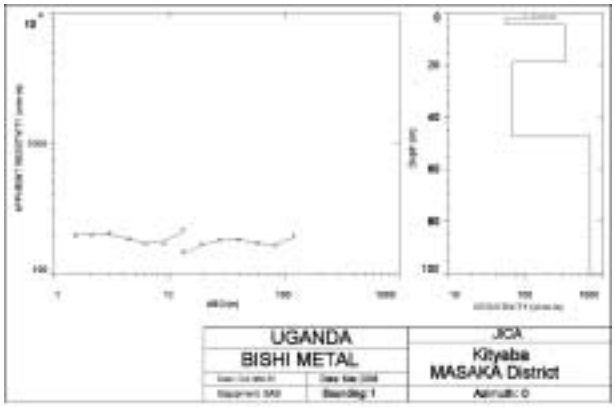
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (7/20)

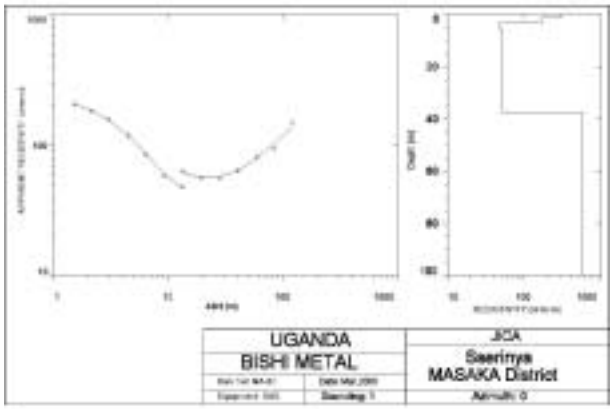












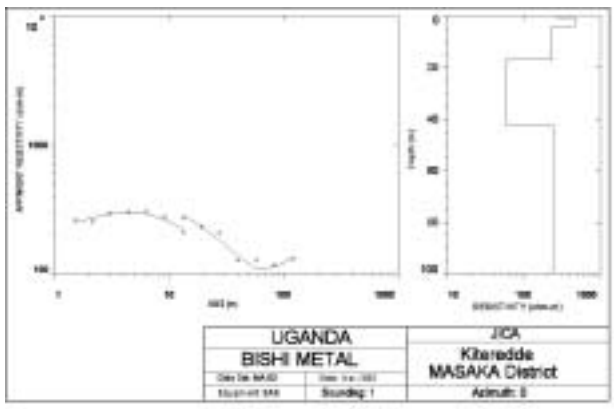
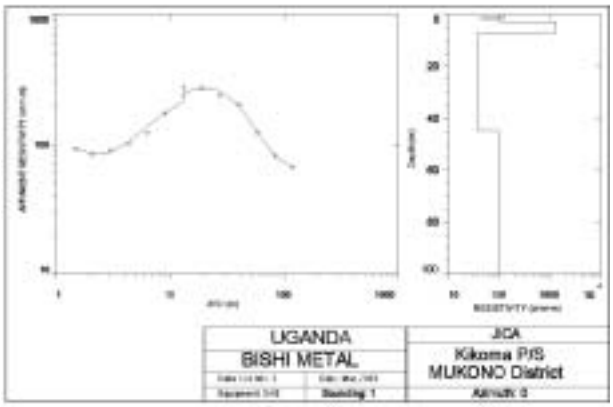
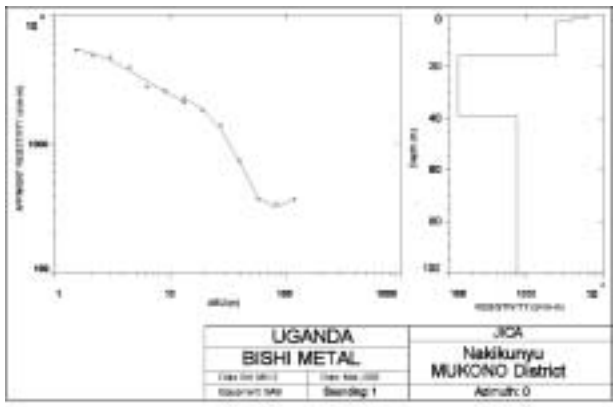
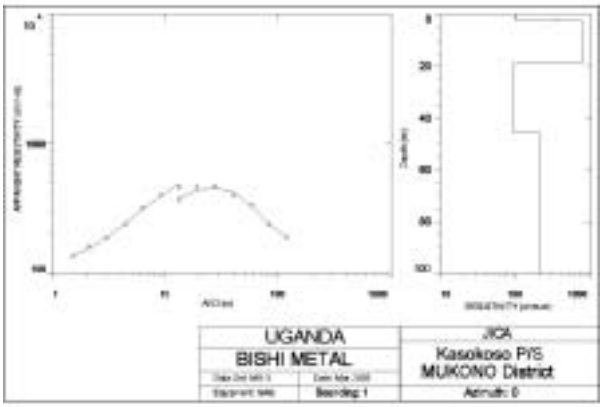
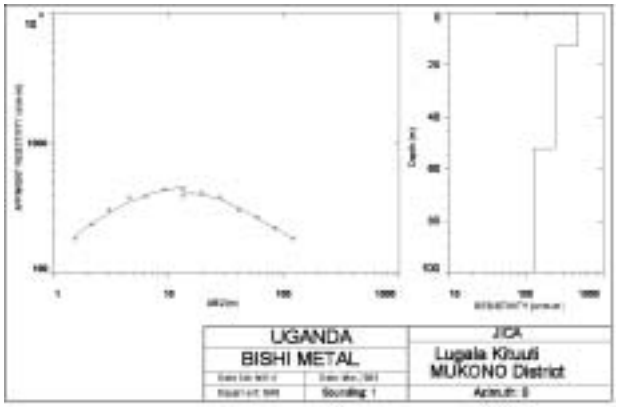


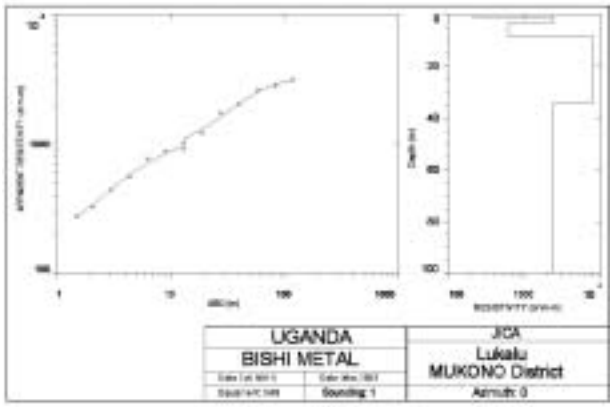
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS **(8/20)**

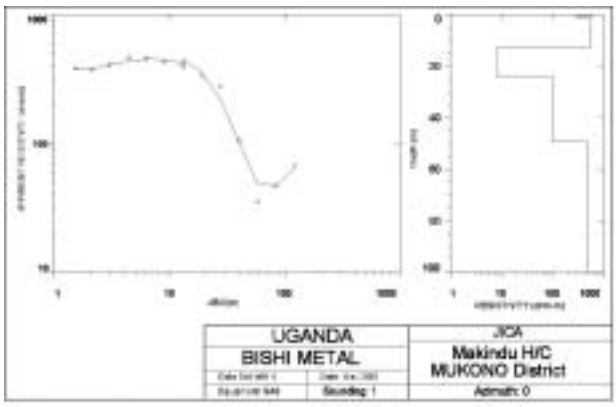


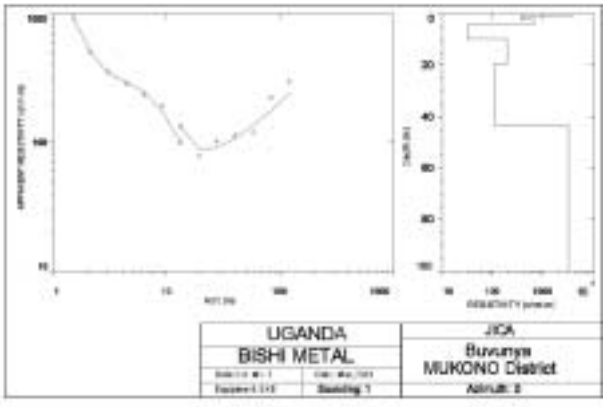












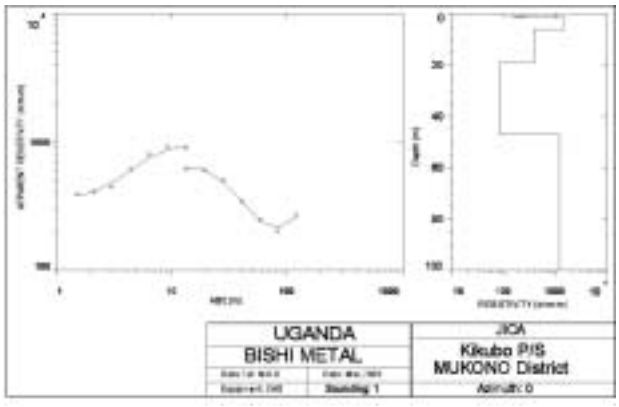
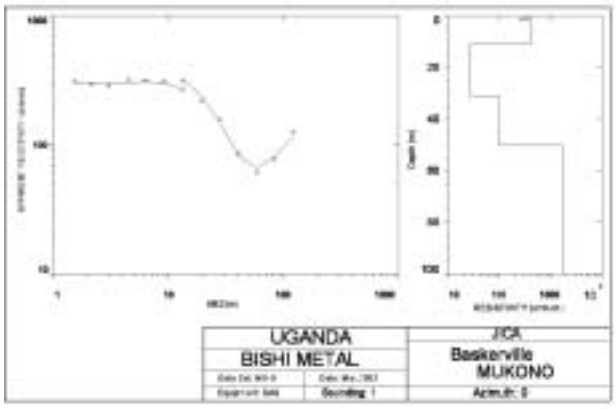
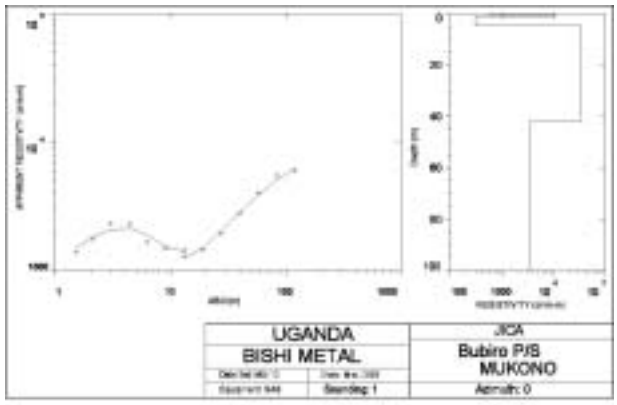
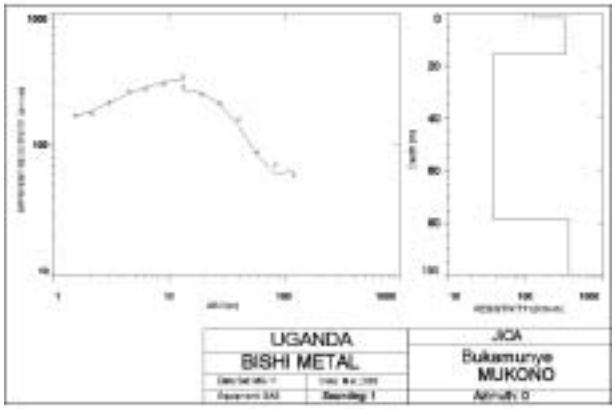
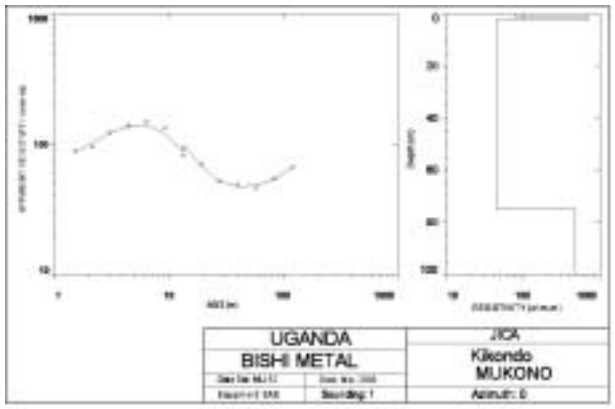


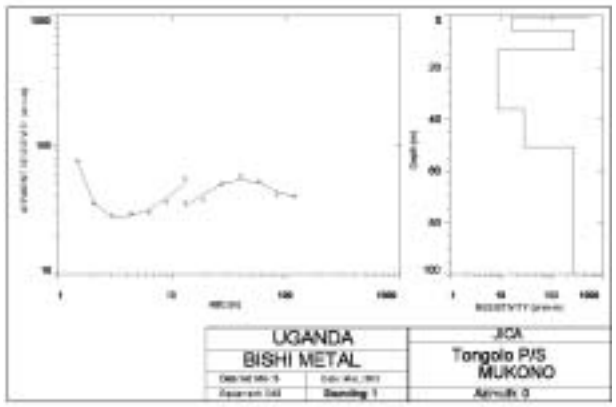
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (9/20)

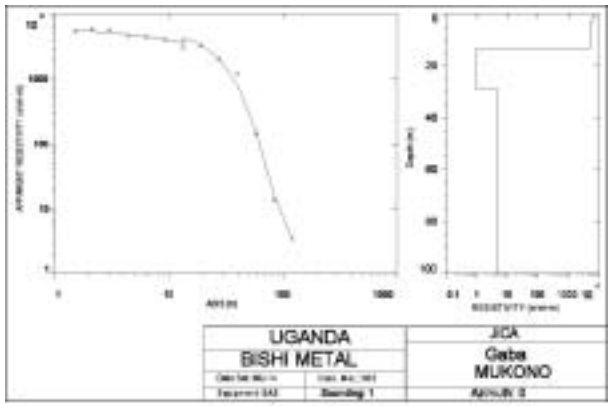


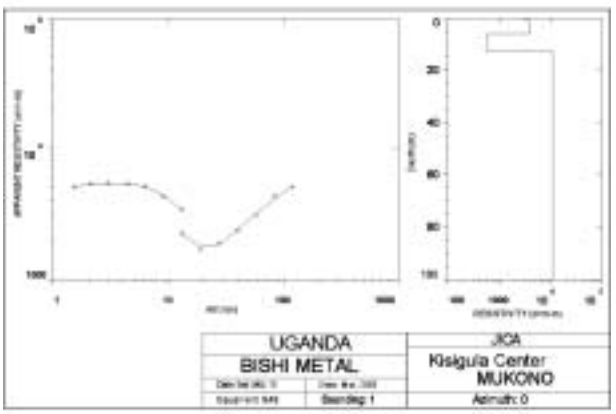












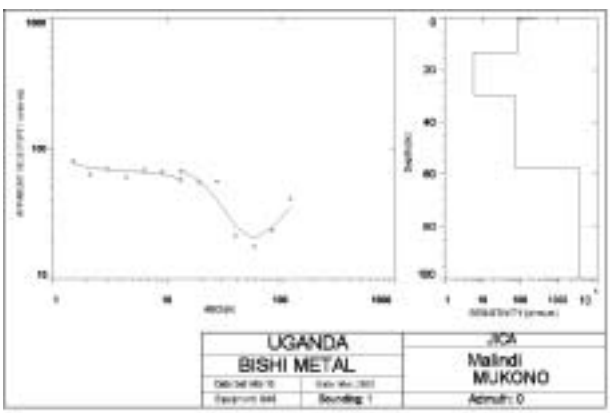
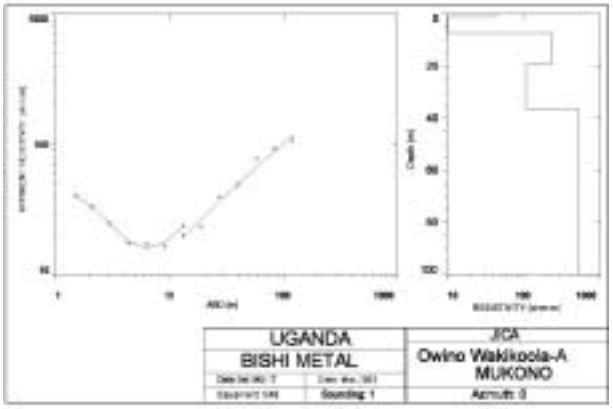
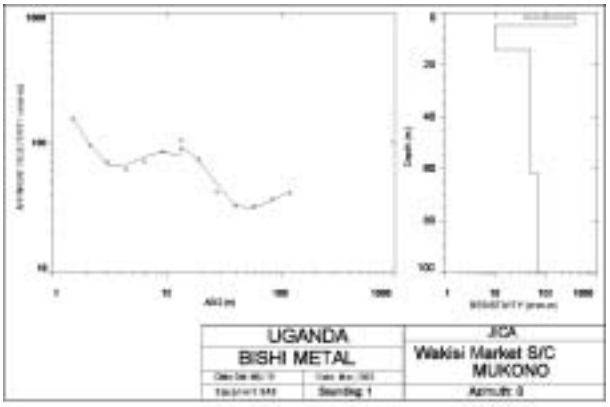
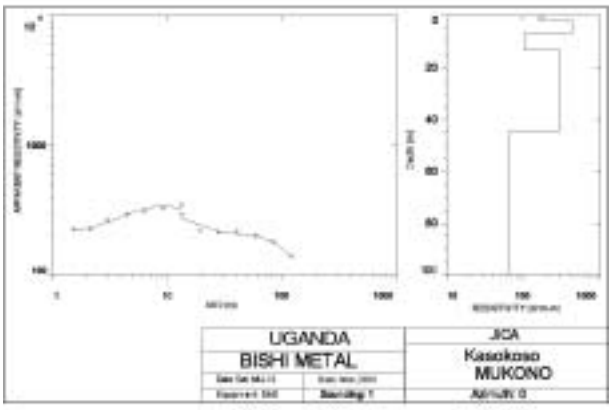
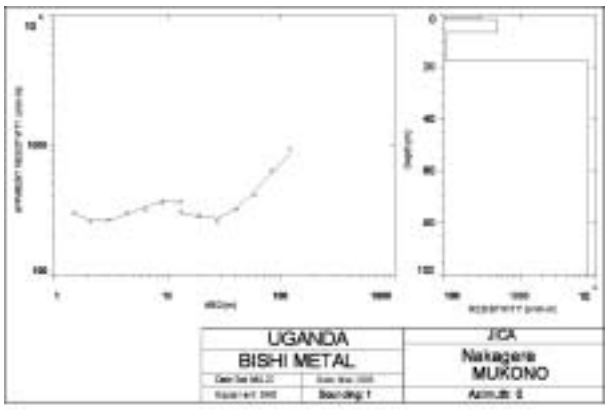


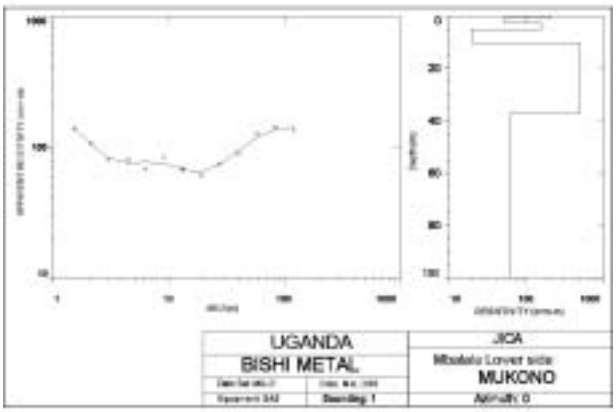
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (10/20)

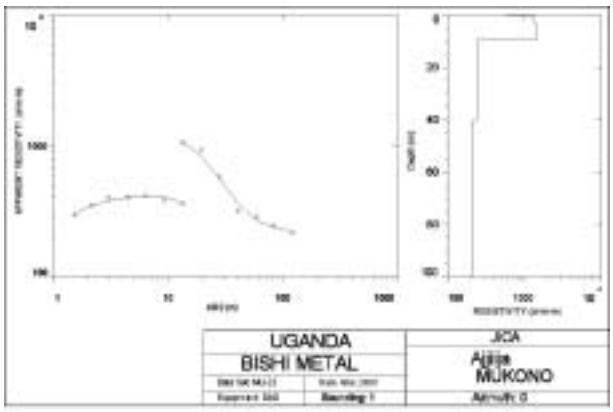


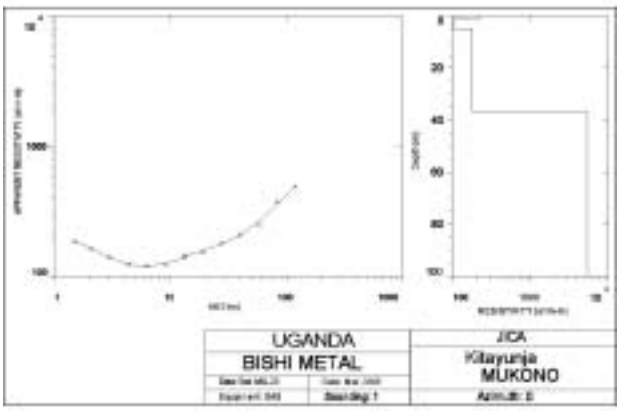












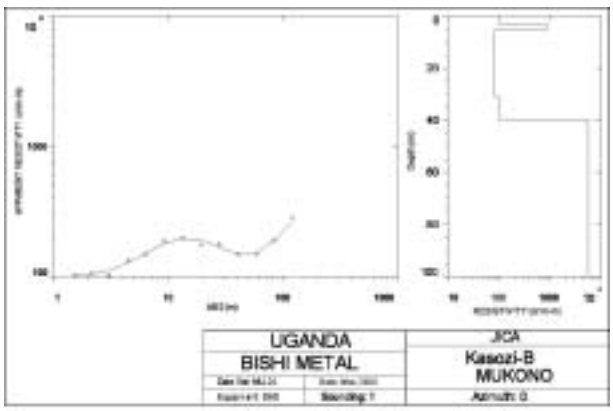
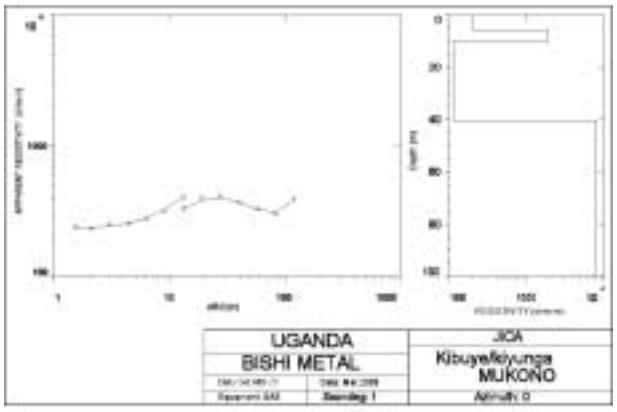
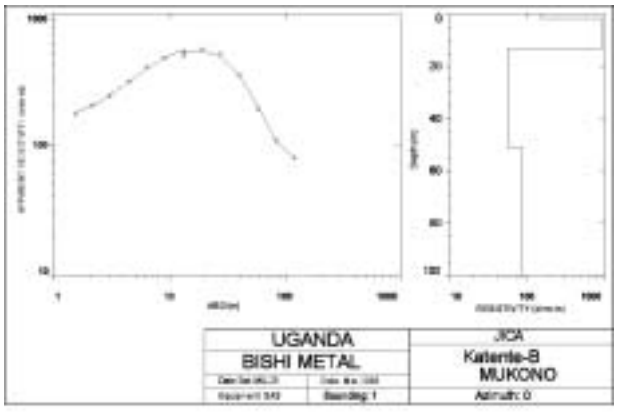
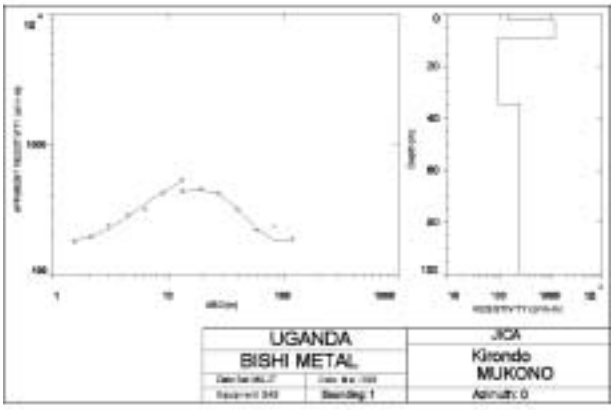
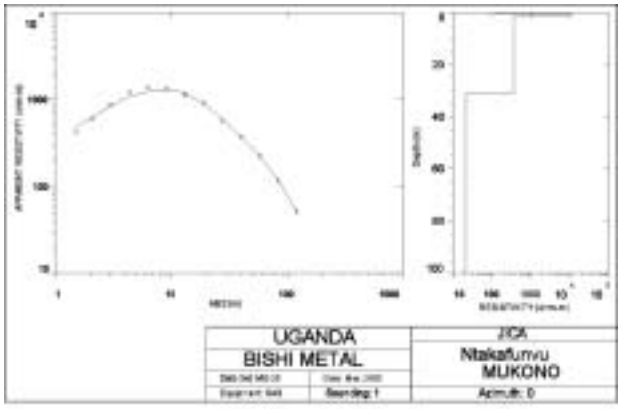


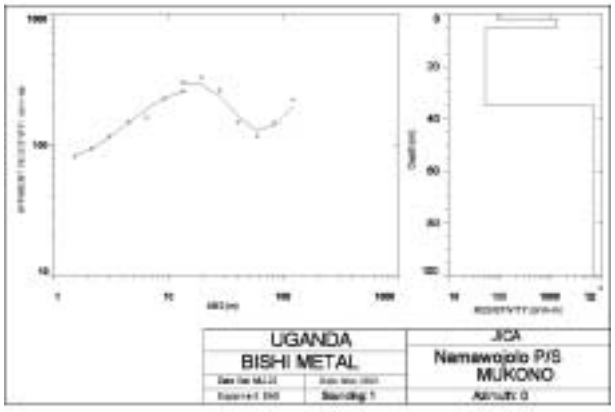
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (11/20)

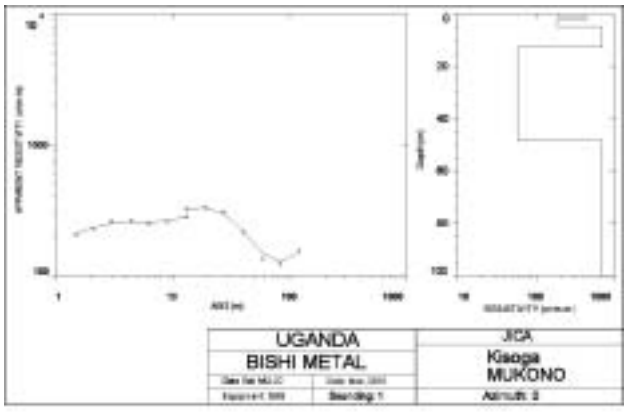


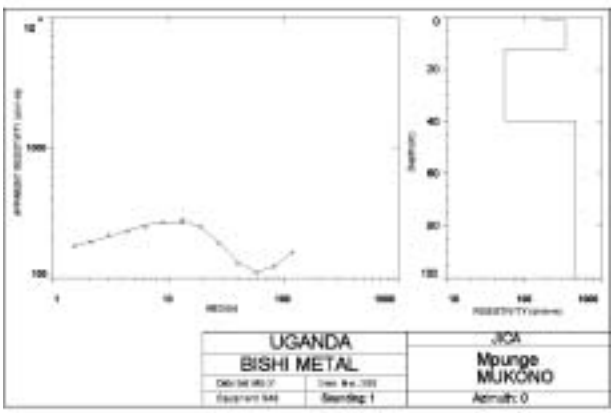












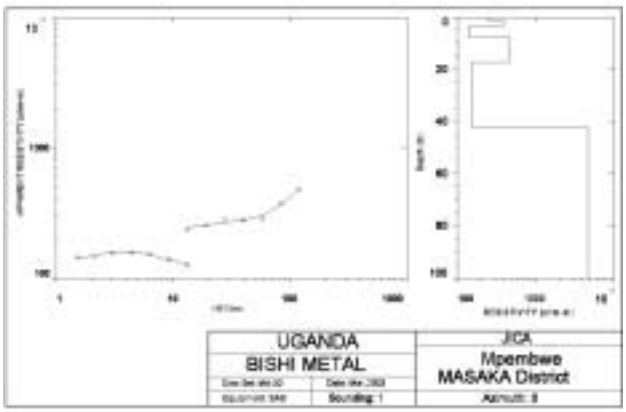
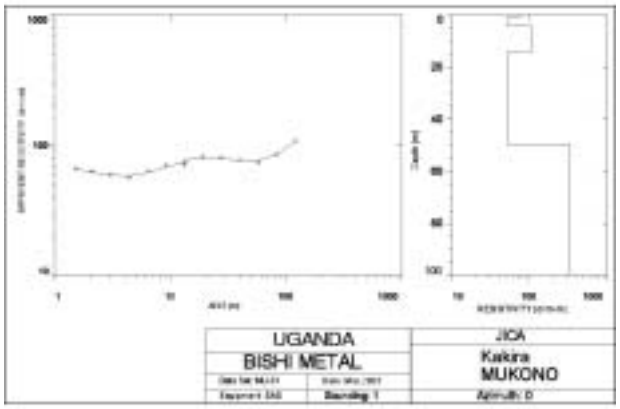
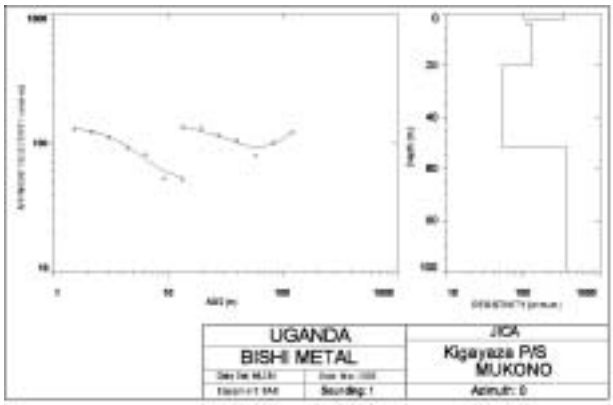
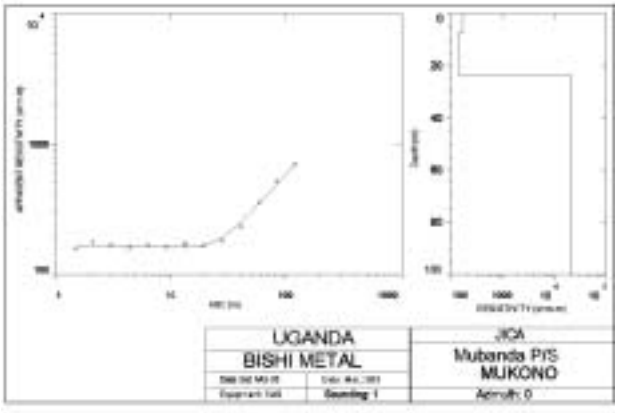
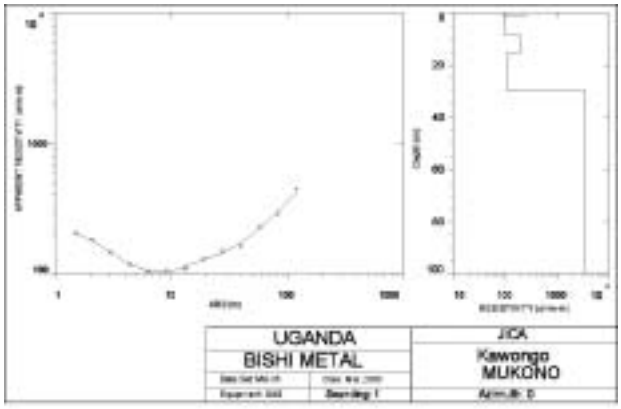


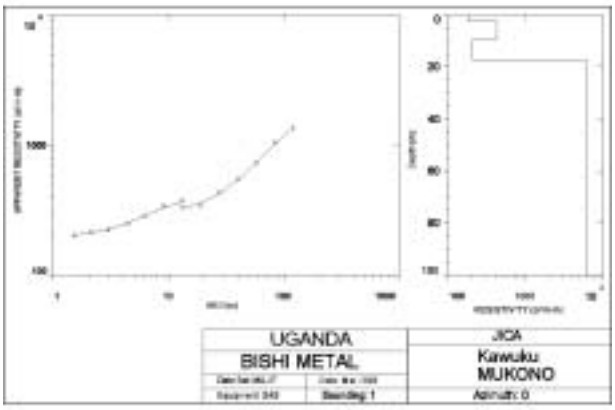
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (12/20)

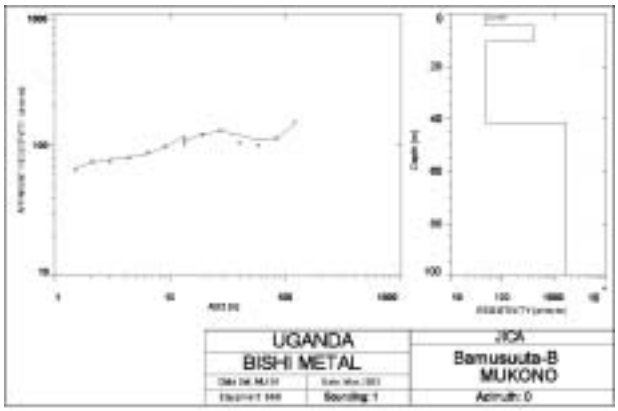


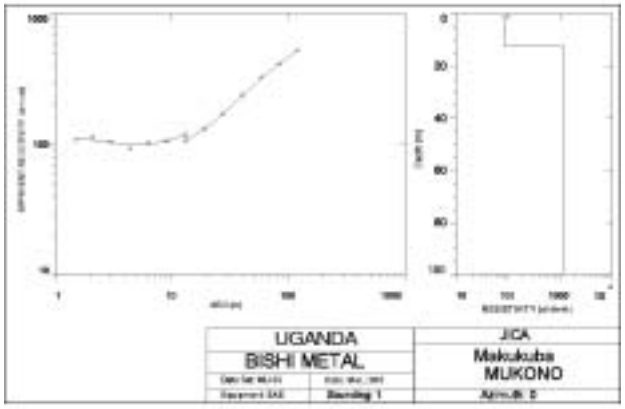












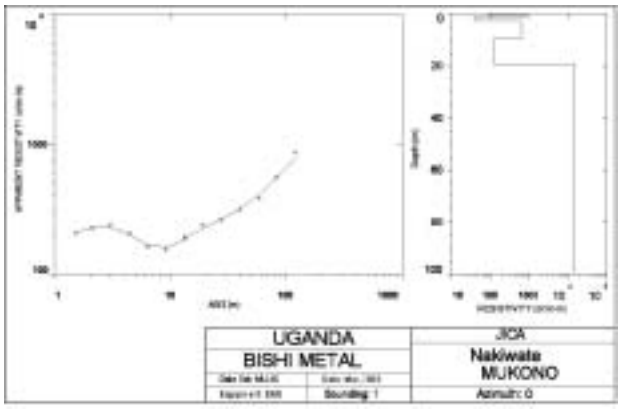
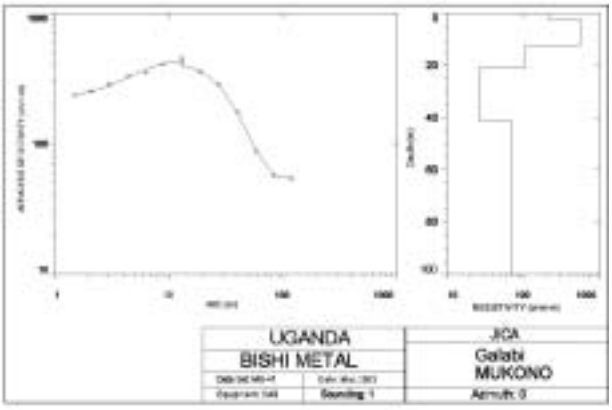
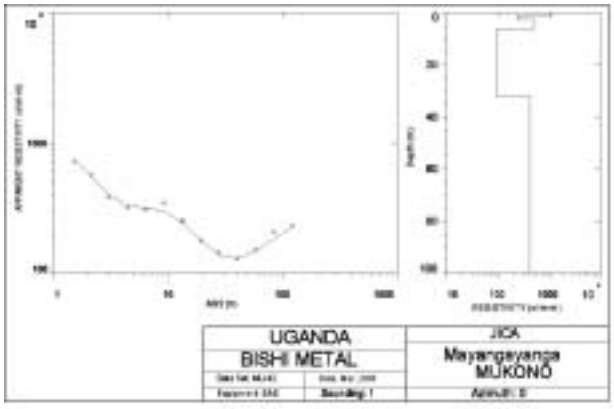
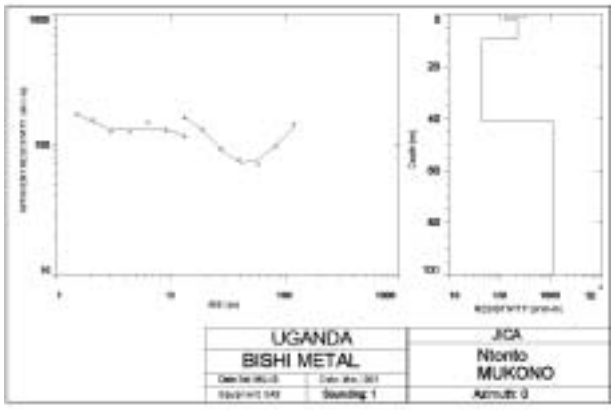
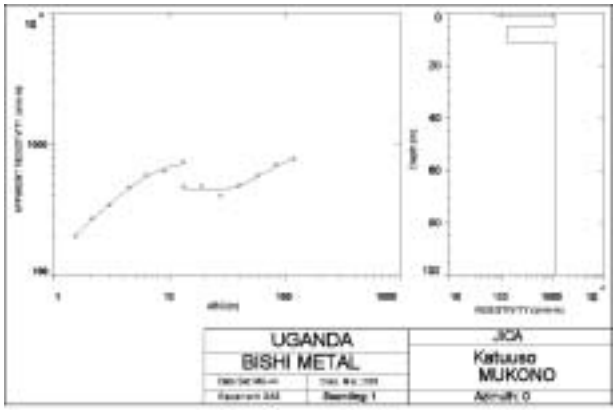


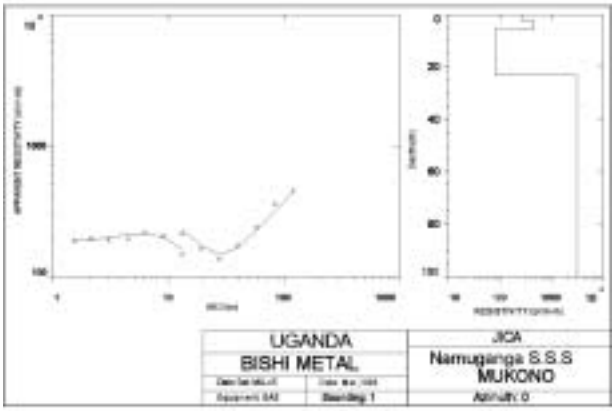
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (13/20)











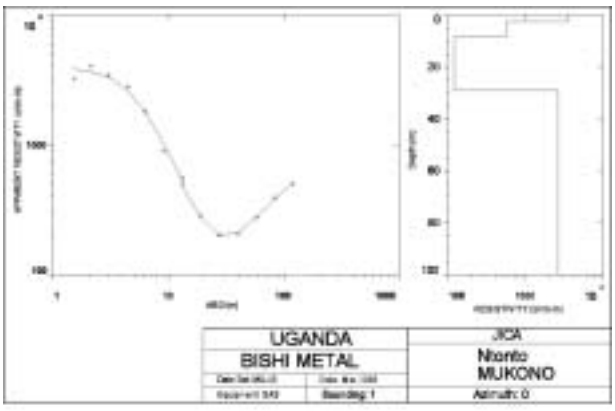
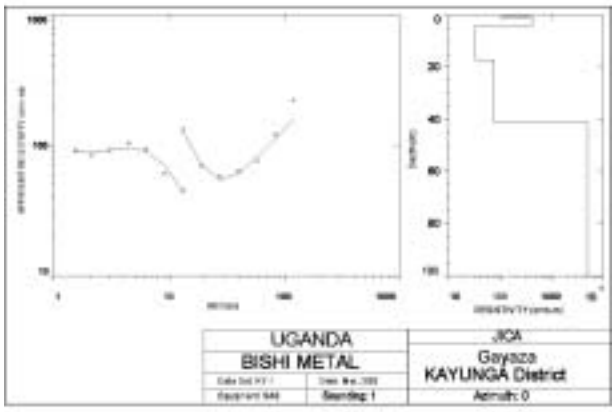
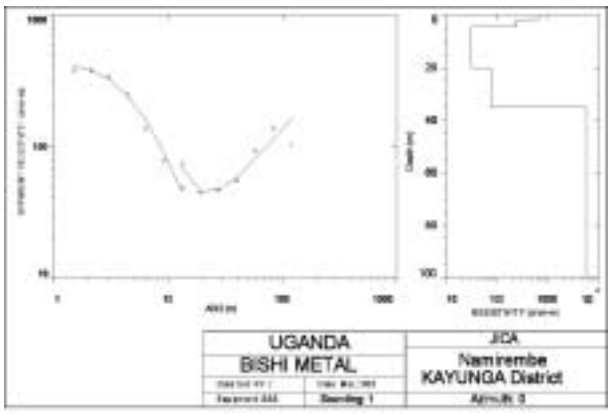
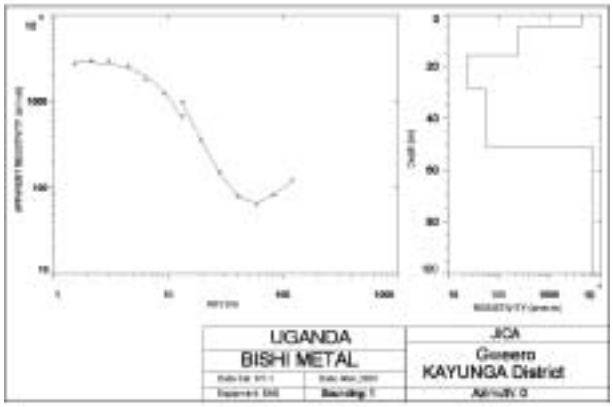
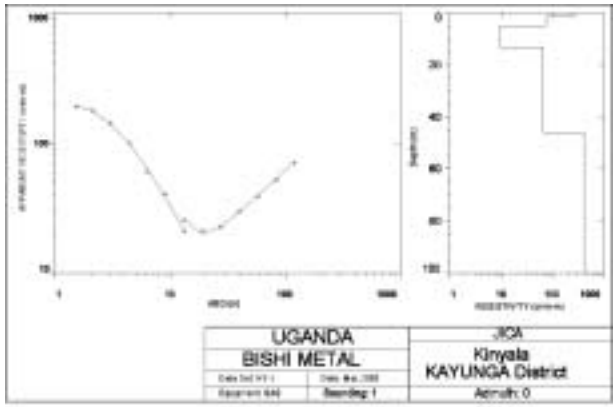


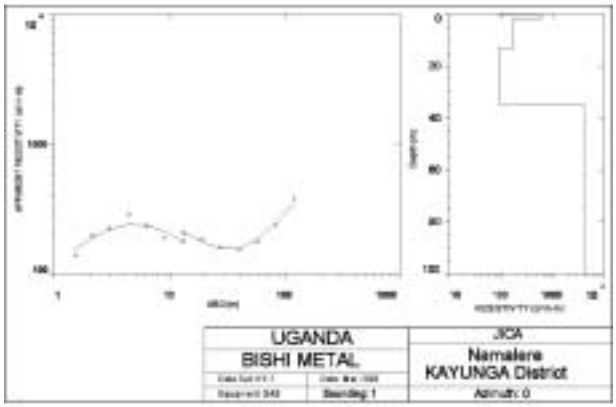
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (14/20)

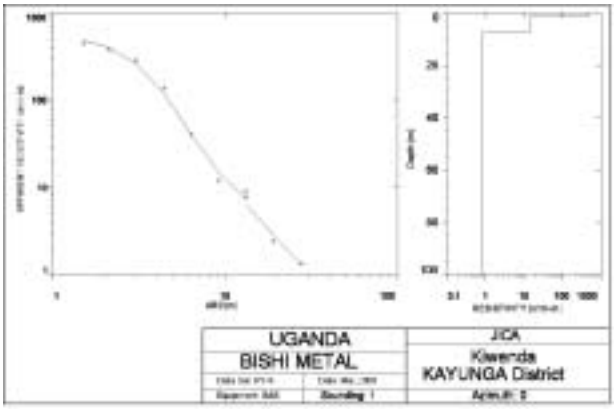


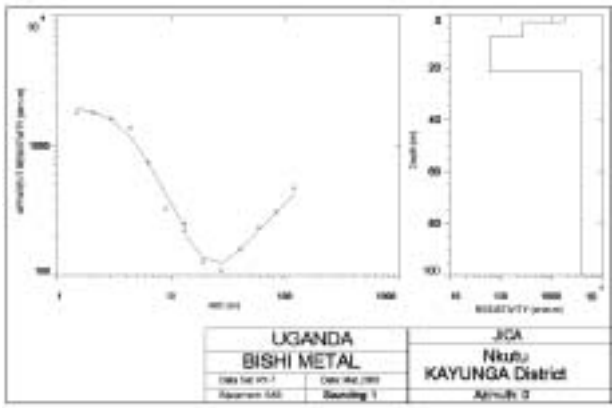












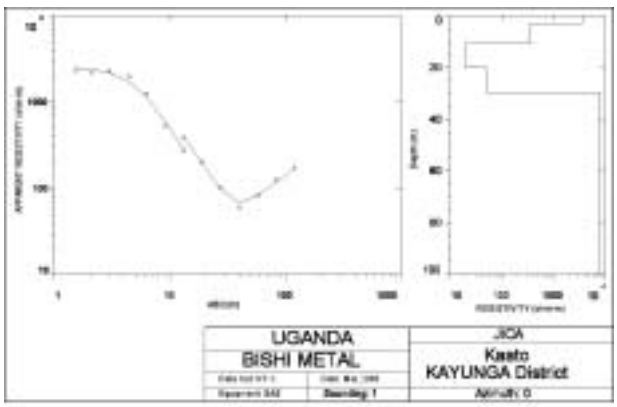
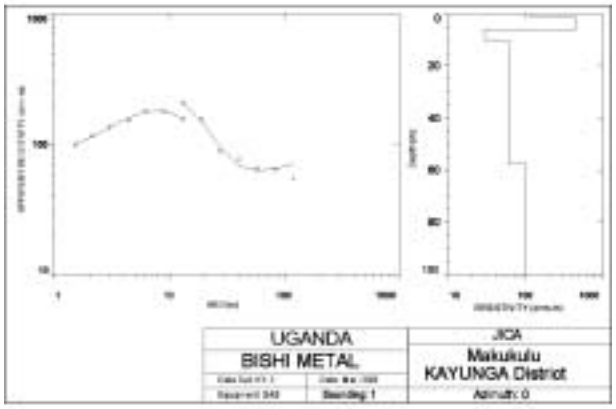
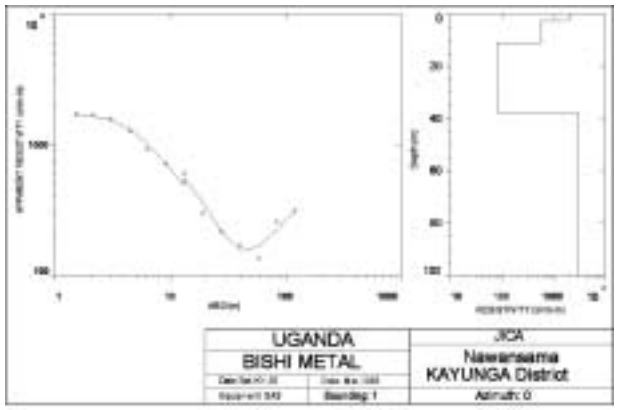
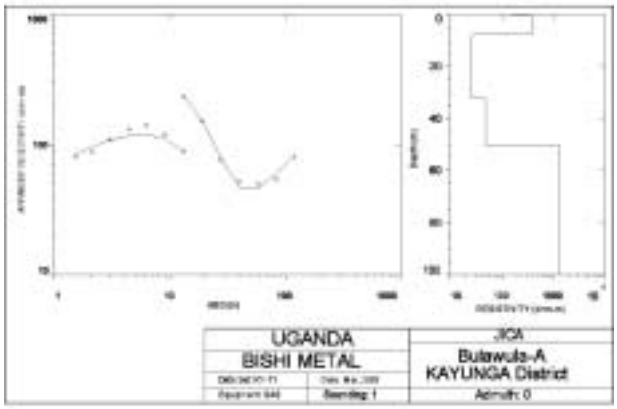
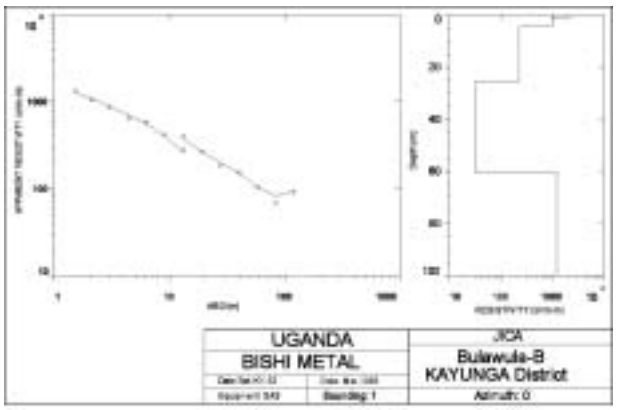


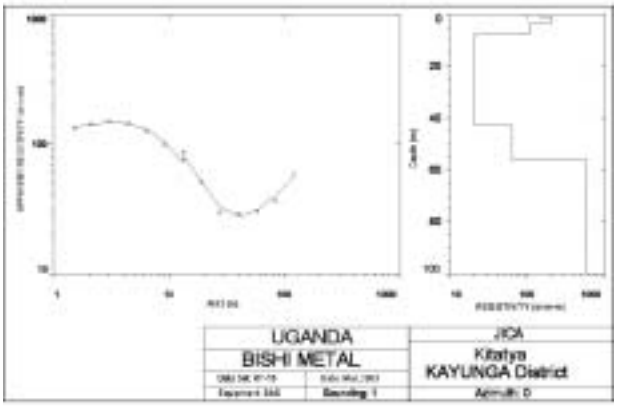
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (15/20)

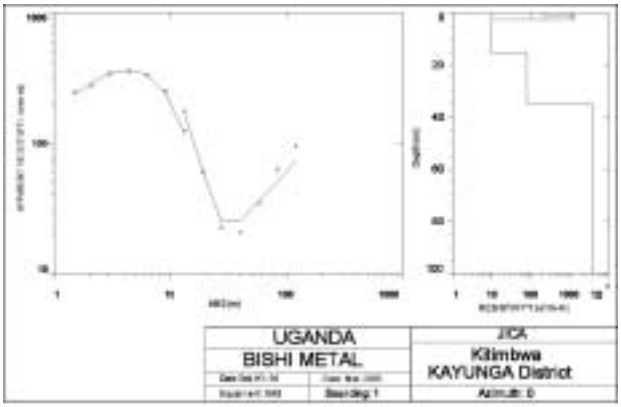


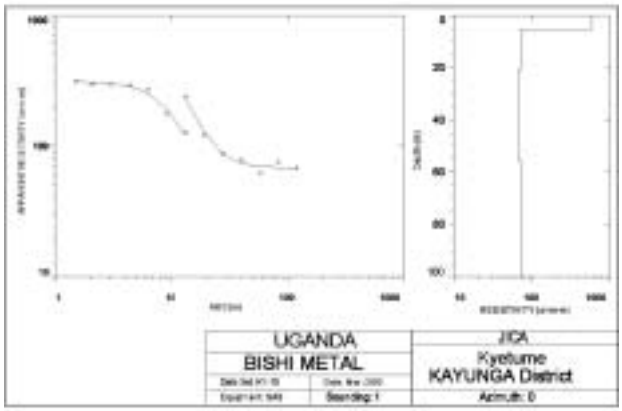












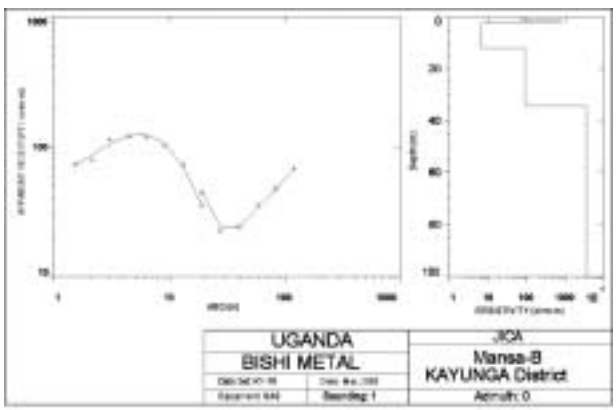
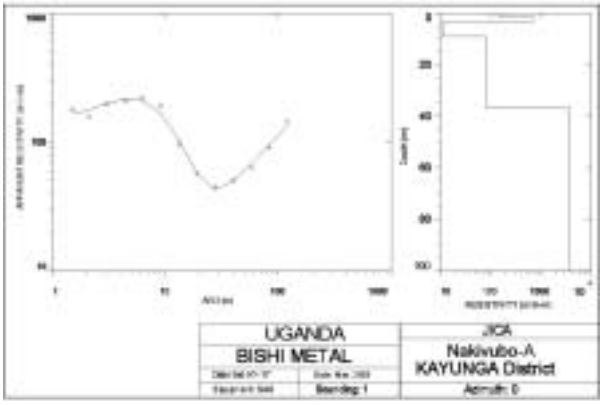
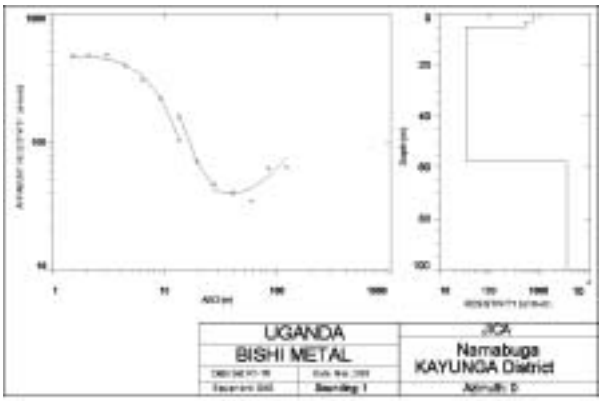
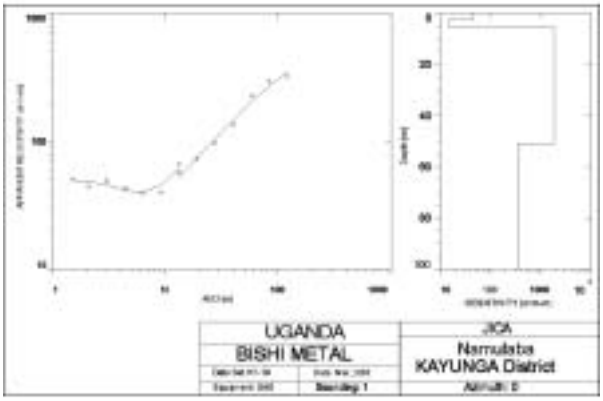
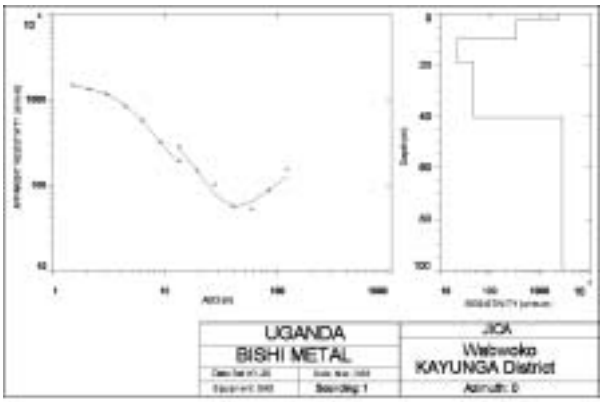


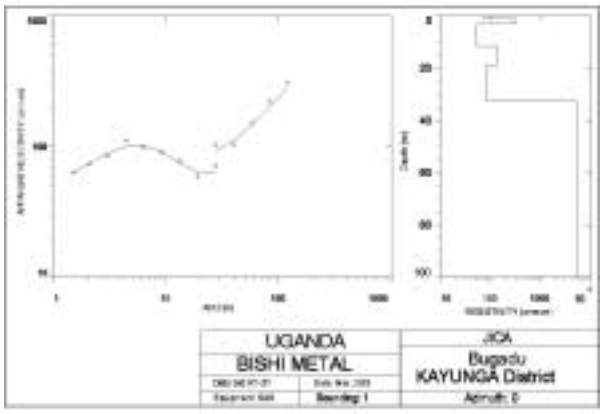
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (16/20)

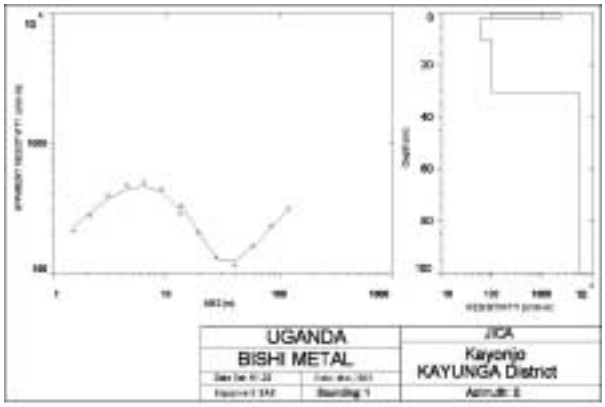


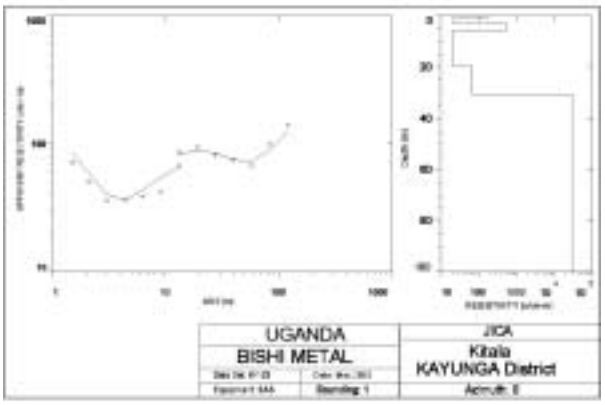












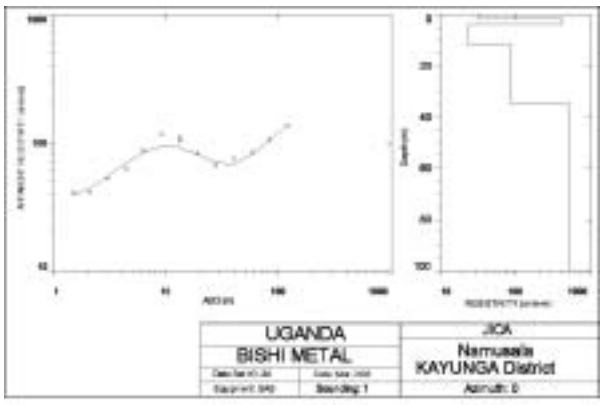
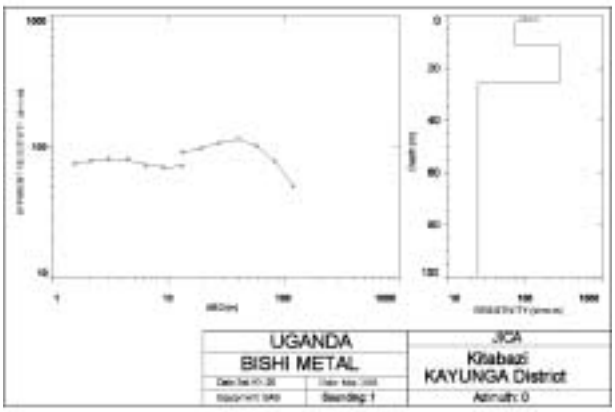
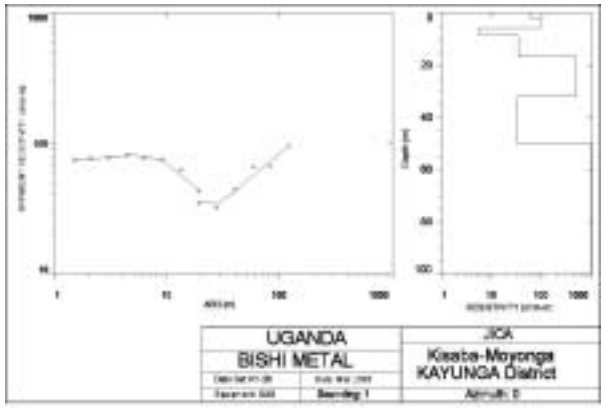
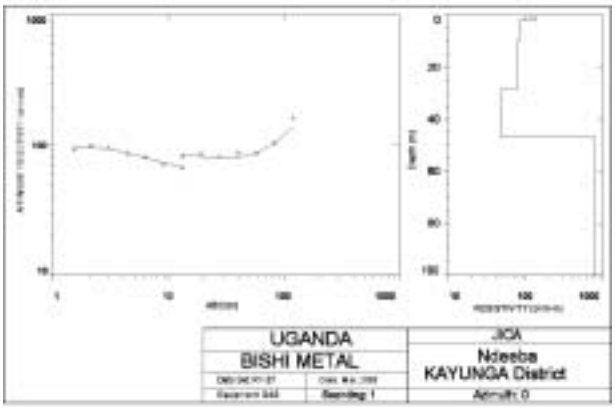
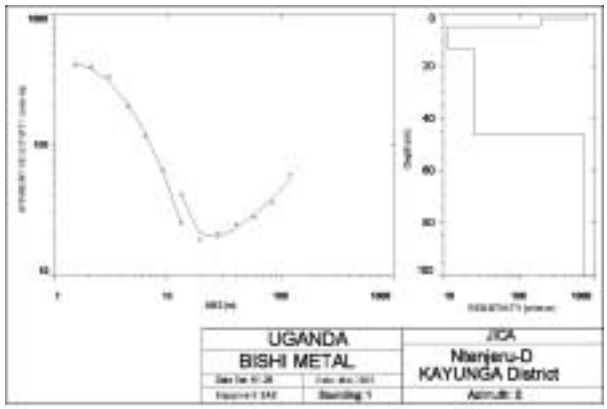


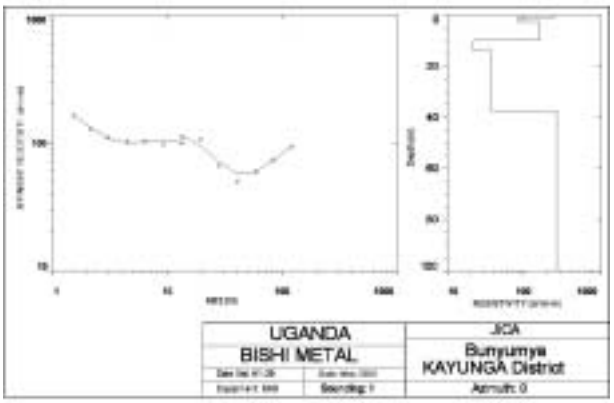
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (17/20)

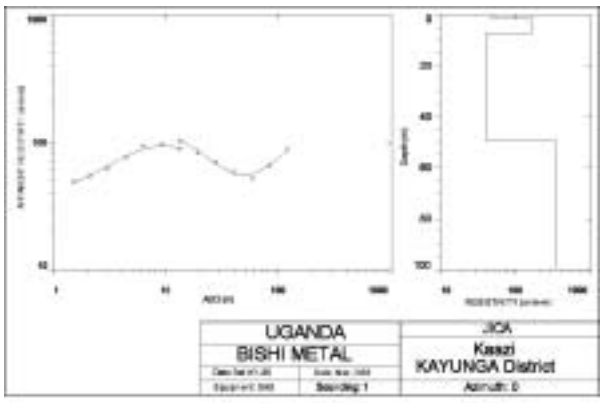


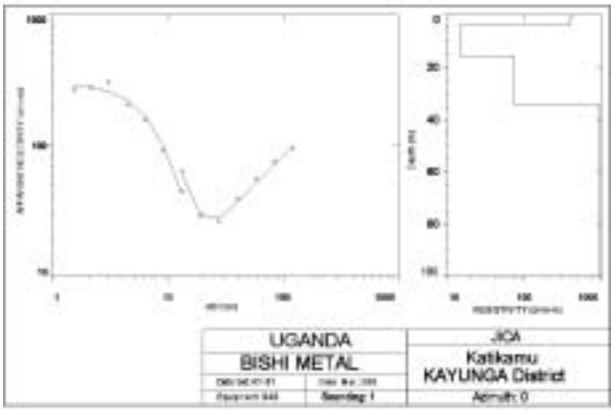












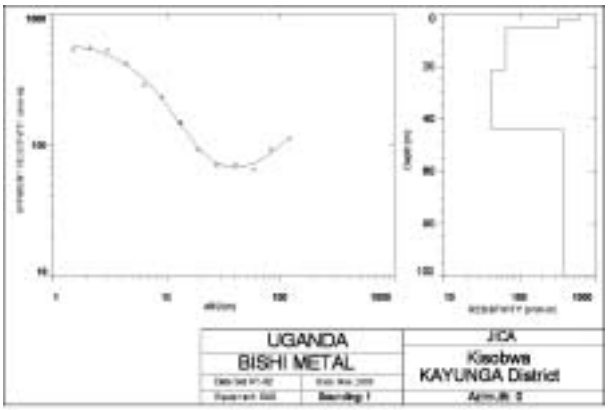
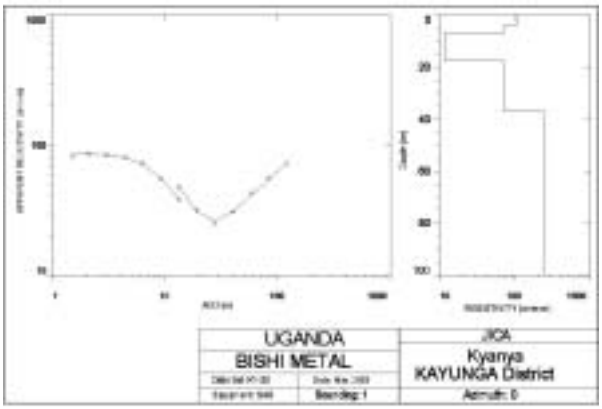
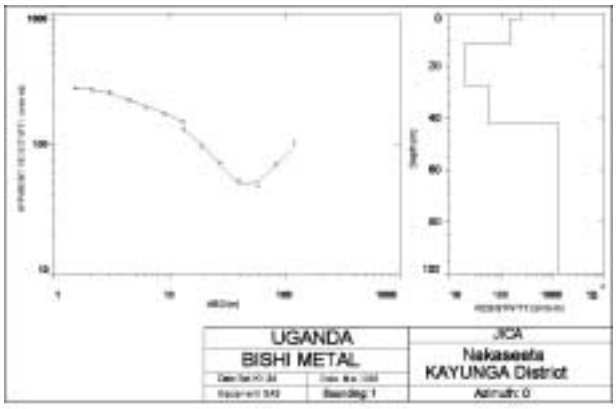
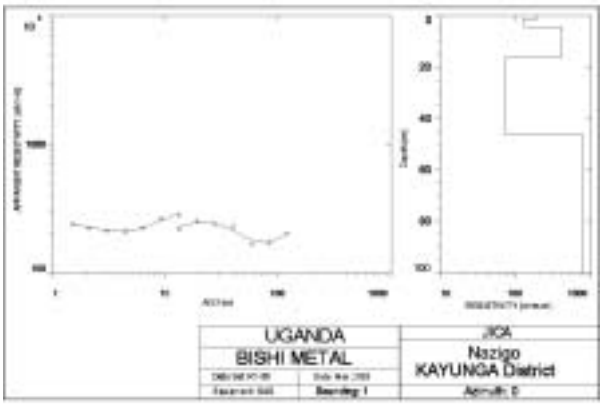
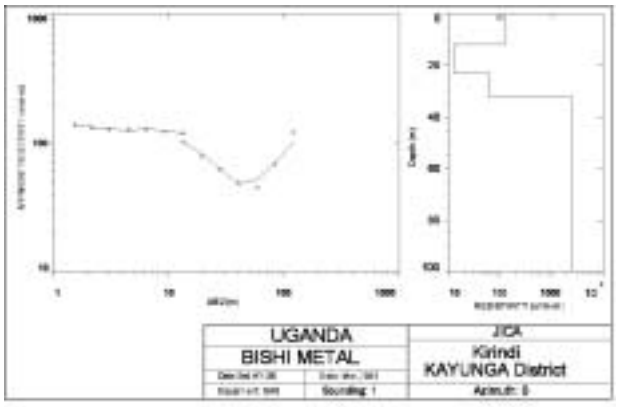


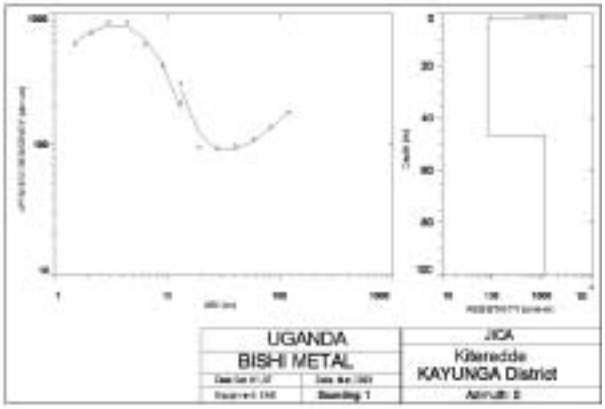
Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (18/20)

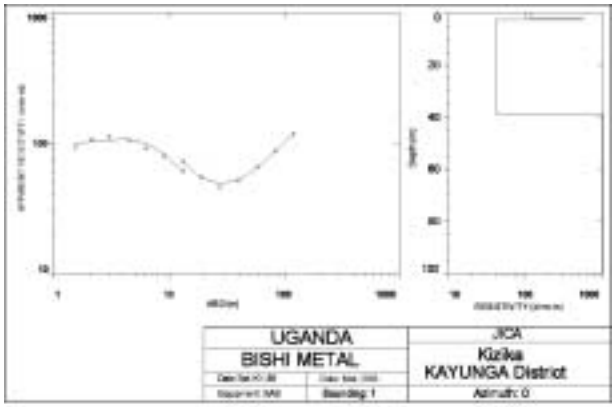


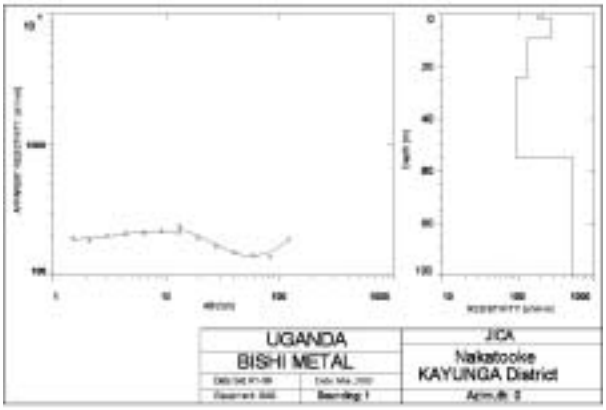












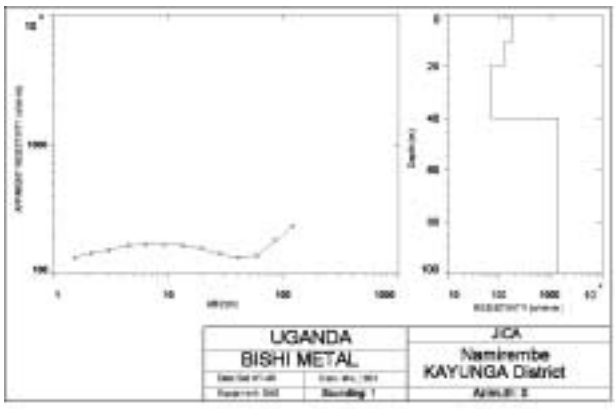


Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (19/20)

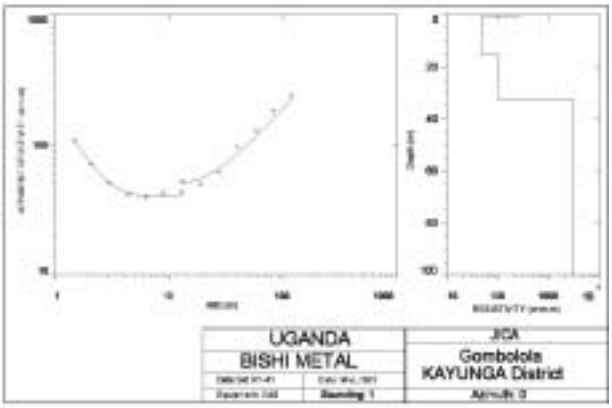


Fig. A6.4 VERTICAL SOUNDING LAYER ANALYSIS (20/20)

Appendix-7 Socio-economic Survey Result

1. Survey Overview

Three sets of survey were conducted in the project villages as follows:

Survey Overview

Survey		Method	Place & Respondents	Contents / Topics
1	Village Survey	Questionnaire	2 respondents per village (150 villages X 2)	Social conditions, Health, sanitation and hygiene, Existing water sources, WSC and O&M fee, Water problems, Fear and expectation toward the project / new hand pumps
2	Household Survey	Questionnaire	4 households （2 males & 2 females）per village (600 households)	Household socio-economic conditions, Water sources, Health conditions, Problems of water and sanitation, WSC and O&M fee, Fear and expectation toward the project
3	Supplementary Survey	Interview Discussion Observation	16 villages in 3 Districts	Living conditions, Health and sanitation, Existing water sources, WSC and O&M fee, Problems of water, Social conditions, Economic conditions, Conditions of women

Village and household surveys were carried out by local enumerators who interpreted the questions on the questionnaires into the local language, and recorded the respondents' answers in English. Respondents of the village survey were village leaders including village chiefs, village committee members, and the elders who knew about their villages well. Village survey questions were set up to obtain quantitative variables such as time people spent on water fetching, distance to water sources, and the number of non-functioning boreholes which can serve as indicators of the project effects. The survey also included qualitative items such as what villagers feel and think about water fetching.

Two men and two women, representing 4 households, from each village took part in the household survey so that it would be possible to examine gender differences on ideas and perspectives toward problems of water and family life. Compared to the village survey which focused on broader aspects of water fetching, the household survey included specific questions on such topics as the number of times per day for water fetching, the main person(s) to fetch water, household income sources, and income and expenditure on water and sanitation.

Sixteen project villages in Masaka, Mukono and Kayunga districts were visited for the supplementary survey with a DWD counterpart individual and officers from the District Water Offices. As the schedule of the visits had not been notified to the villages, interviews and discussions were done with village men and women who happened to be there at the time of the visits. In some villages, interviews were done individually. In some other villages, a group of villagers came and started a discussion. The men and women interviewed included village leaders, health assistants and ordinary villagers. Using the most appropriate survey methodology for each situation, the supplementary survey made it possible to listen to the voices of villagers which sometimes do not reflect well in questionnaires. Water sources, water fetching, housing conditions, and water usage and storage were also observed in person.

2. Survey Results

a. Project Areas and Project Villages

The project villages are in three districts; Masaka, Mukono and Kayunga, which have their own distinctive characteristics. Masaka is a large district with scattered villages. The southern part of Masaka is a dry area with difficult access to water. In villages near the main roads in Mukono, people sell their agricultural crops to sugar (cane), beer and other factories in the district. In such villages some men go to the factories to work and women tend agricultural fields.

Unlike Masaka, Mukono and the southern part of the district, the northern part of Kayunga has only one rainy season a year. Banana trees are not seen there, and it is very difficult to get water because natural water springs do not exist due to its topography. A housing compound called a homestead which consists of several houses of related families is often seen. Such grouping may be an adaptive strategy toward harsh climate and living conditions. In northern Kayunga, many round, traditional houses with thatched roofs are seen, and its latrine coverage rate as well as the average amount of income are low compared to other project areas.

Village population ranged between 110 and 2,400 with the average of 779. Although the question on village population by sex was often unanswered, the size of female population was almost always larger than that of male population in the answers obtained. This may be due to men's living and working away from home, the spread of AIDS, and a customary practice in which men leave their parents' home before marriage, but women stay at home until they marry.

On the average, a project village had 187 households, and a household was made up of 4.2 members. According to the 1999/2000 Uganda National Household Survey conducted by the Uganda Bureau of Statistics, the average sizes of household in Masaka and Mukono (including Kayunga) are 5.3 and 5.2 respectively, which shows that the average household size in the project villages is rather small.

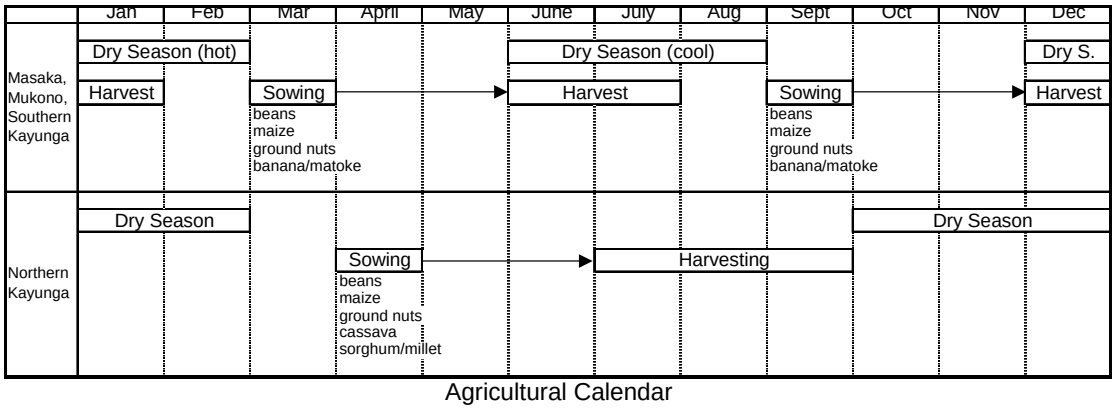
Daily Tasks

Male 1	Male 2		Female
Get up Go to field	Get up Go to Town to sell matoke	6:00	Get up Take care of children / Get children ready for school Make tea Go to field with livestock
Agricultural work	Sell matoke	7:00	Agricultural work
Agricultural work	Sell matoke	8:00	Agricultural work
Agricultural work	Sell matoke	9:00	Agricultural work
Agricultural work	Sell matoke	10:00	Agricultural work Collect firewood
Go back home	Sell matoke	11:00	Go back home Make tea Water fetching Cleaning
Rest	Sell matoke	Noon	Prepare lunch
Lunch	Go back home Lunch	1:00	Lunch Wash dishes
Rest	Go out to look for and pick up matoke	2:00	Give water to livestock Wash clothes Water fetching
Go to field	Search for matoke	3:00	Rest
Agricultural work	Search for matoke	4:00	Go to field with livestock Agricultural work
Agricultural work	Search for matoke	5:00	Agricultural work
Go back home	Search for matoke	6:00	Go back home Feed pigs
Rest	Go back home	7:00	Wash children Prepare for supper
Supper	Supper	8:00	Supper Wash dishes
Go to sleep	Go to sleep	9:00	Go to sleep

In the project villages, about one third of the members of the Local Council committee, a village political body, are women.

b. Life of Villagers

The life of villagers in the project villages centers around agricultural tasks. Except for the northern part of Kayunga, there are two farming seasons in a year. The northern part of Kayunga has a long dry season and one farming season in a year. During the survey period in March 2003, agricultural crops in some parts of northern Kayunga were damaged by hail.



Agricultural Calendar

As the table in the previous page shows, men and women in the project villages lead different lives. Women have many more daily chores than men while a day of a man seems to be rather monotonous compared to the women. Men as well as women were asked about men's daily chores and tasks, but the results were more or less the same.

c. Village & Household Problems

More than half of the village leaders answered that the problems of their villages were those of water and poverty, and the problems of sickness and health services came next. In Kayunga, 91.5% of the respondents answered water as their largest problem, reflecting the difficulty they experienced in obtaining safe water. (See Fig.A7.1)

The result of the household problems asked in the household survey was about the same as that of the village problems. While the largest village problem was water, the largest household problem was poverty. Bigger ratio of women than men considered water, sickness, food and education as their problems. (See Fig.A7.2)

d. Existing Water Sources and Water

The average distance from a home to a water source, and time for a roundtrip for water fetching in the project villages were 1,548 meters and 81 minutes respectively. District-wise, people in Kayunga had the most difficult access to water as their averages were 2,137 meters and 104 minutes. Mukono and Masaka were similar in terms of distance and time; 1,298m / 71min. for Mukono and 1,242m / 69 min. for Masaka. (See Fig.A7.3)

People in the project villages used boreholes (hand pumps), springs, rivers, shallow wells, river dams / valley tanks and gravity schemes. Water from boreholes was used in about one third of the project villages while water from springs and dam/valley tank were used in about a quarter of the project villages each. (See Fig.A7.4)

Although the farthest water source was a river (2,460m), the water source that required the longest time for fetching water was a borehole (104 minutes for a roundtrip). Boreholes were used in many of the project villages, but the access to the boreholes seems to be difficult as it took more time. (See Fig.A7.5)

A household in the project village made 2.6 roundtrips every day between their home and a water source to fetch water. Taking this into consideration, an average household spent a total of 152 minutes (= 2 hrs. 32 min.) per day in rainy season and 199 minutes (=3 hrs. 19 min.) per day in dry season to get water; a considerable amount of work. To get water from a river a household spent more than 4 hours a day both in rainy and dry seasons. (See Fig.A7.6)

According to the survey, water from boreholes had the best water quality. Water from dams / river tanks, on the other hand, had the worst water quality. In terms of water amount, the best water source was a protected spring, and the worst was a dam / river tank. (see Fig.A7.7)

Each water source has both positive and negative aspects. The following is a brief description of each water source in the project villages revealed by the survey:

Water Sources in the Project Villages

Water Source	Characteristics
Borehole	Good water quality and quantity, but requires considerable time for a roundtrip
Shallow Well	Above average in terms of time, distance, water quality and quantity
Protected Spring	Good water quality and quantity
Unprotected Spring	Water quality and quantity are acceptable, but takes some time for a roundtrip
Gravity Scheme	Short time for a roundtrip, and acceptable water quality and quantity although the sample size is too small to draw any conclusions
Dam / Valley Tank	Very bad water quality, and requires a long time for a roundtrip
River	Located far away and requires very long time for a roundtrip, bad water quality as well

The main persons to fetch water were found to be women followed by boys, and then girls. In numerous occasions during the visits, children were witnessed to fetch water. A man said, “In my family, kids fetch water. I know where the water source is, but I don’t know how long it takes to go to fetch water and come home. Fetching water is a kind of play for kids. They never go straight to a water source or come home straight as they play around on their ways.” Children fetch water in the morning before going to school and in the afternoon after coming back from school. When men fetch water, they tend to use bicycles as they are the ones to fetch water from far away and/or engage in the business of selling water.

Water is not always free or abundant to many of the villagers. A woman said, “During dry season, we must go far, far away to get water, and the water is very dirty. So we buy drinking water from water sellers.” A container of water is sold between 300 and 400 Shillings.

To carry water a yellow plastic 20-liter container is most often used in the project villages. In addition to those yellow containers, there are smaller containers for children and bigger ones which can probably hold 25 to 30 liters of water. At home people use water directly from the containers, and do not transfer to storage tanks. According to the supplementary survey, if a child is calculated as 0.5 person, an average person uses 18 liters of water a day, which is slightly less than one container of water.

During a visit, a villager showed us water that had been fetched in that morning, taking two hours. The water was obviously impure with a muddy color. Water fetching is a time-consuming and backbreaking labor. Even if people spend much time and energy, they cannot always get safe water. In this aspect needs and expectations for hand pumps in this project are high.

e. Boreholes

Information on 41 non-functioning boreholes was collected by the village survey. The main reason for the breakdown was due to spare parts, and the reasons for not having a repair were mostly financial.

Reason for Borehole Breakdown

Rank	Reason	No. of Responses
1	Spare parts' breakdown	11
2	Construction not completed	7
3	Well dried up	4
4	Handpump overused	2
	Tree fell over	2

Reason for No Repair

Rank	Reason	No. of Responses
1	Cannot pay for repair	10
2	Villagers uncooperative	7
3	High cost of repair	5
4	Have other plans	3
5	Cannot obtain spare parts	2

Seventy seven (77) boreholes were reported to be functioning. For 35 of the boreholes in operation (45%), villagers paid O&M fees. The average amount of the O&M fee they paid was 410 Shillings per month.

f. WSC and O&M Fee

Water and Sanitation Committees are organized by not only borehole users, but also users of other water sources. A village with several water sources may have several WSCs, and even if a village has a WSC, it does not necessarily mean that all the villagers belong to that WSC.

WSC is not a new community organization in the project villages. About a half of the project villages already have WSCs. Six percent (6%) of the villages used to have WSCs, but they no longer exist. Forty two percent (42%) of the villages never had WSCs in the past. Half of the project villages in Mukono and Kayunga have WSCs, and in Masaka WSCs exist in one third of the villages. (See Fig.A7.8)

In the household survey, 27% of the respondents answered that they had paid initial contributions for water supply facility construction and 21% answered that they paid O&M fees at the time of survey. Those who paid O&M fee were from 52 villages (= 35% of all the project villages). From this we can conclude that even though one in two project villages has a WSC, not many WSCs are active, collecting O&M fee and managing their water facilities. The average amounts of initial contribution and monthly O&M fee that the respondents had paid were 1,648 Shillings and 570 Shillings respectively. (See Fig.A7.9)

Eighty nine percent (89%) of the respondents answered that they were willing to pay O&M fee for the project hand pumps. The average amount they were willing to pay was 529 Shilling per month. (See Fig.A7.10)

In the villages visited for the supplementary survey, most people said they were able and willing

to pay 300 to 400 Shillings a month for operation and maintenance of new hand pumps. Some villagers in northern Kayunga where the access to water was difficult said they would pay 500 to 1,000 Shillings. In villages where needs and expectations for hand pumps are high, villagers are willing to pay a large sum for O&M fee, and sustainability of the project hand pumps is likely to be achieved.

Considering the amount collected in the other PAF projects, the amount of initial contribution is set at 100,000 Shillings per household. The collected amount per household is 800 Shillings because the said amount is collected from the households consisting of six members for three months. It is considered that the amount will be payable.

The rate of payment, i.e. percentage of hand pump users who pay O&M fee, depends much on villagers' capability to pay an initial contribution and O&M fee as well as their willingness to pay. In addition to these, traditions of mutual assistance among community members as well as compassion toward their neighbors are also important factors to influence the rate. All the households paying the same amount may not seem to follow the principle of equality nor embrace compassion toward neighbors. From such viewpoints, many different ways for payment can be established. For example, a large household with many members and a rich household may pay more; a poor household may pay less; a poor household may pay after their agricultural harvest when they have money. Such payment methods as well as the amount of fees need to be decided by the villagers. If the villagers have a will to engage in O&M of their hand pumps, they will find the most appropriate ways to collect and manage O&M fees through facilitation in the project's mobilization/sensitization workshops.

Thirty nine percent (39%) of the project villages received visits by water officers from the district water offices and CD officers / assistants who were in charge of various extension activities in communities. Twenty six percent (26%) of the villages received service by HPMs. District-wise, the villages in Masaka received the visits by the officers the least while about a half of the project villages in Kayunga received such visits. (See Fig.A7.11)

HPMs were interviewed for the supplementary survey. According to them, the work as a HPM is not their main occupation or full-time job. They have their main jobs, and work as HPM on the side. The main obstacles in carrying out their tasks are the difficulties in going to remote villages, that is, the lack of their own mode of transportation, and obtaining spare parts. HPMs belong to the private sectors, and government agencies do not provide cars or motorcycles to them. Many hand pump spare parts are unavailable in the three districts, and HPMs must go to Kampala to obtain them, which makes HPMs add transportation and other costs to spare parts' prices. Because some villagers do not exactly know the meaning and importance of regular maintenance as well as change of spare parts on regular basis, HPMs are often misunderstood that they are trying to make a large profit and deceive the villagers by pretending a normal hand pump to be out of order, and selling them expensive spare parts. Such misunderstanding is said to be causing frictions between HPMs and villagers.

g. Health, Hygiene and Sanitation

According to the village survey, the latrine coverage rates in Masaka, Mukono and Kayunga were 86%, 91% and 72% respectively. The latrine coverage rates of village leaders in Masaka,

Mukono and Kayunga, who are to set good examples to villagers, were 89%, 91% and 95%. The 1999/2000 Uganda National Household Survey also reports that more than 95% of the households in Masaka and Mukono (including Kayunga at the time of survey) have latrines. The largest constraints to latrine construction and usage were found in the village survey to be costs, materials (availability) and people's attitude. (See Fig.A7.12)

In the village survey, more than half of the respondents answered that sickness, distance to water sources, crowded water sources (too many people using the same water source), and water quality were water and sanitation problems of their villages. (See Fig.A7.13)

In the household survey, on the other hand, 79% of men and women considered crowded water sources as the largest water and sanitation problem. Distance to water sources and children's sickness were the second and the third largest water and sanitation problems. Answers to the questions on water and sanitation problems in the household were not much different between men and women. (See Fig.A7.14)

Among sickness, malaria among children was considered to be the largest problem. Diarrhea, respiratory disease, worms/parasites were considered to be problems as well. Children with large, bulging bellies due perhaps to worms/parasites were witnessed in the visits to villages. (See Fig.A7.15)

Considerable number of villagers said that they drank water straight from a source without boiling. Boiling water requires extra amount of firewood, time and labor, and thus, increases the amount of women's tasks. Although it is relatively easy to make people memorize a slogan, "Drink Boiled Water", it will take some time to change their behavior to a new one because this process of change entails change of attitudes, thinking and life ways. This is why mobilization and sensitization activities require time and patience, and should continue slowly and steadily.

Eighty two percent (82%) of the project villages have access to modern and traditional medical care in their villages. Less than half of the project villages have modern medical facilities such as hospital, clinic and health post. (See Fig.A7.16)

Together with access to safe water, sickness is a large problem in the project villages. Usage of water from the project hand pumps will surely reduce the number of water-borne disease cases, but dirty water is not the only cause of villagers' sickness. Dung of livestock lies near and around houses in some villages, and many people use yellow water containers whose inside walls turned black. More sanitary and hygienic environment needs to be created by villagers, for which new, concrete, and easy-to-understand behaviors should be introduced one by one through community awareness education.

h. Household Income and Expenditure

According to the 1999/2000 Uganda National Household Survey, the average monthly household income in Uganda is 141,000 Shilling. The average for Kampala is 397,000 Shillings, while the average monthly household income for Masaka and Mukono (including Kayunga) is 136,100 and 142,300 Shillings. In 67% of the households examined by this project's household survey, agriculture was the main source of household income. Eight percent (8%) and 3% of the

households answered that their main source of income was physical labor and livestock respectively. Sources of income did not vary much among the three districts. (See Fig.A7.17)

Cash crops which are the main source of agricultural income include maize, beans, coffee, banana/matoke, and potatoes. Villagers earn income from sales of several crops rather than relying solely on one crop. (See Fig.A7.18)

Physical labor includes work at construction sites and plantations as well as agricultural labor on the farms of the rich. Livestock that brings household income includes pigs, poultry, cows and goats. Other income sources are stores, fishing, remittance, trading, handicraft, etc.

The average monthly household expenditure is as follows; a) on water including purchase of water and water containers, and O&M fee for water facilities – 1,295 Shillings, b) on sanitation and hygiene including purchase of soap and detergent, and cost for latrine construction – 3,271 Shillings, and c) on health including purchase of medicine and cost of medical treatment – 7,747 Shillings. As latrine construction and medical treatment are not done regularly, the values of sanitation and hygiene expenditure are thought to vary. The large expenditure on health seems to reflect bad health conditions of the villagers. (See Fig.A7.19)

In the households of those who were interviewed in the supplementary survey, people regularly purchase soap, cooking oil, and paraffin for their light. On average a household spends every week 600 Shillings on soap, 1,000 Shillings on paraffin, and 200 Shillings on cooking oil. If these items are considered to be the necessities of life, it would be possible for them to pay about 400 Shillings per month for another necessity; water, i.e. O&M fee.

3. Expectation and Fear toward New Hand Pumps

One third of the village leaders answered that they expected improvement of water quality and reduction of labor on water fetching by the new hand pumps. Only a handful of the leaders answered what they feared. This is probably because well construction by the project has not been confirmed in any of the villages. Among the small number of answers on fear, the most popular answer was hand pump breakdown followed by economic/financial burden. Village leaders, thus, hope that people in their villages would be able to get safe water in a shorter time at a shorter distance, and be healthier. At the same time, they fear or feel uneasy about hand pump breakdowns and cost for repair and maintenance.

Expectation

Rank	Item/Topic	%
1	Water quality (safe and clean)	32
2	Reduction of time and distance for water fetching	30
3	Health, sanitation and hygiene	13
4	Enough amount of water	12
5	Water for agriculture and livestock	4
6	Benefits to children (health, water fetching, etc.)	2

Fear

Rank	Item/Topic	%
1	Hand pump breakdown	12
2	Economic burden (repair cost and O&M fee)	9
3	Not knowing the correct usage of hand pumps (manners)	2

Respondents: village leaders

The same questions on expectation and fear were asked in the household survey. Except that a much-larger number of men expected shorter distance and safe/clean water, expectation of men and women were very similar. Like village leaders, ordinary villagers expected reduction of

time and distance for water fetching, safe water, and improved health. Because the villagers do not seem to know much about the differences between a deep well and a shallow well or some specific ways of operation and hand pump maintenance, some of their fear may be vague. However, their concern for hand pump repair and repair cost is obvious, which shows their understanding of the importance of O&M. (See Fig.A7.20 and Fig.A7.21)

4. Summary

What is most evident from the three sets of survey is extreme difficulty and toil of fetching water as well as difficulty or non-existence of access to safe water. Children and women in the project villages spend more than one hour every day to fetch water, and it does not necessarily mean that the water they fetch is safe and clean. In dry season, they must go farther and farther away from their homes for water because many water sources dry up or the amount of water at the sources decreases. When it is hard to obtain safe water, they buy water from water sellers.

Villagers have a strong desire to obtain water from water sources nearby with less labor. Their conditions of health and sanitation/hygiene also show their strong need for safe water. They understand that hand pumps improve their lives, and that they must pay for O&M costs by themselves. Some of those who live in villages with extremely difficult access to safe water express their desire by saying that they want water source for safe water at a short distance even if they must pay more for O&M.

Plans for community mobilization and sensitization activities which start before well construction should be based on what was made clear by the three sets of survey such as the access to water in the project villages, villagers' health condition, and their expectations and hopes. Also, mobilization and sensitization activities should aim to reduce villagers' anxiety and uneasiness about hand pump operation and maintenance by giving them clear and easy-to-understand information. Making villagers understand HPM's tasks, roles and responsibilities is also important in causing no frictions between them and HPMs. Mobilization and sensitization activities which conform to villagers' ideas and living conditions will result in bringing new activities for hand pump O&M and new actions for improved health, sanitation and hygiene, and will make them sustainable.

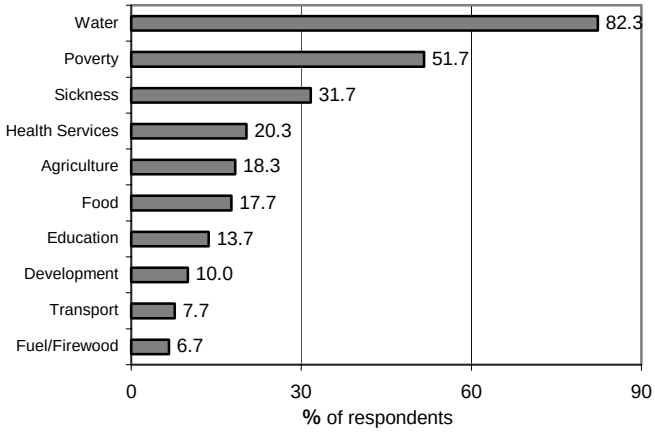


Fig.A7.1 Village Problems

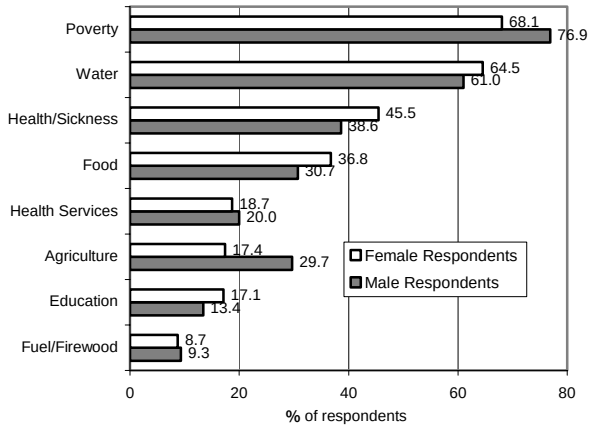


Fig.A7.2 Household Problems

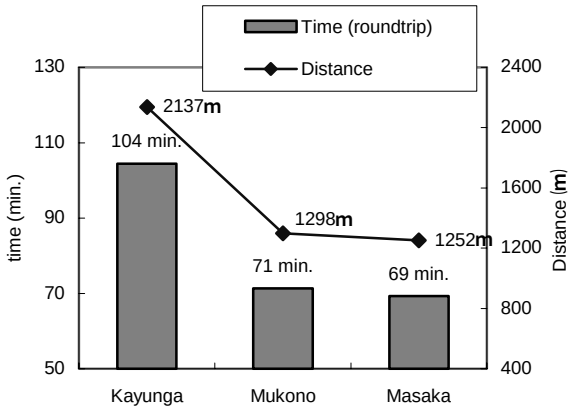


Fig.A7.3 Time and Distance to Water Source

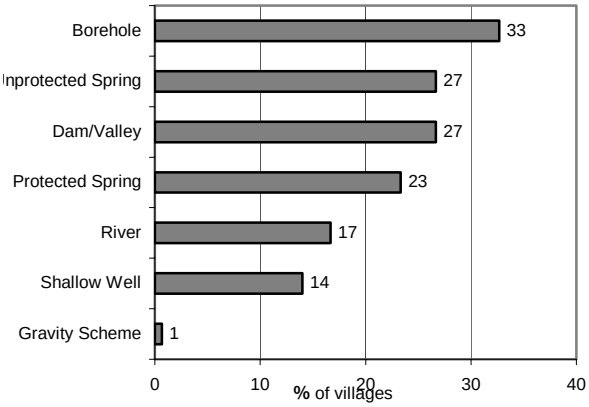


Fig.A7.4 Existing Water Sources

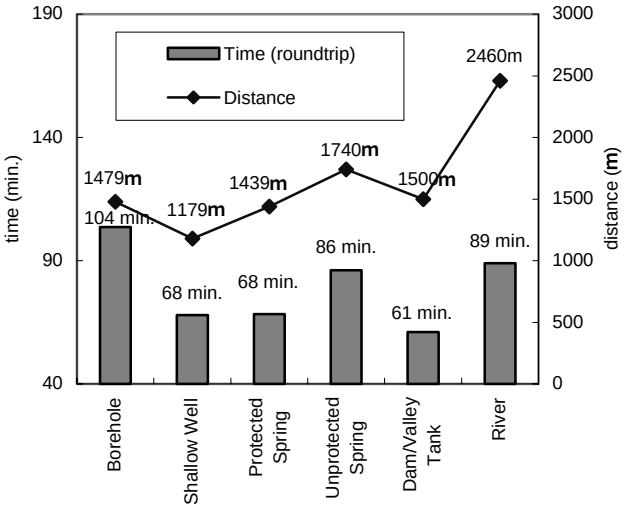


Fig.A7.5 Time and Distance to Existing Water Source

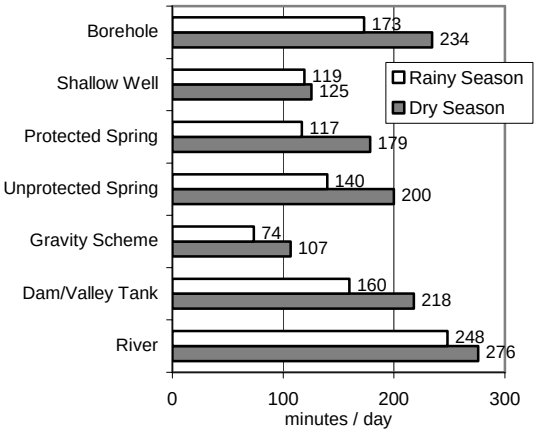


Fig.A7.6 Time Spent to Get Water (per household)

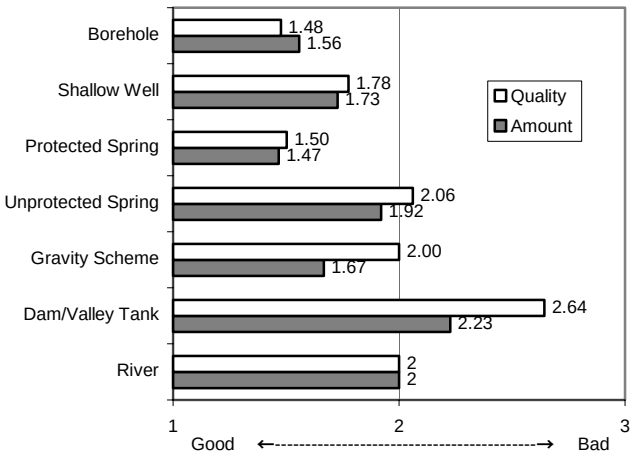


Fig.A7.7 Water Amount and Quality

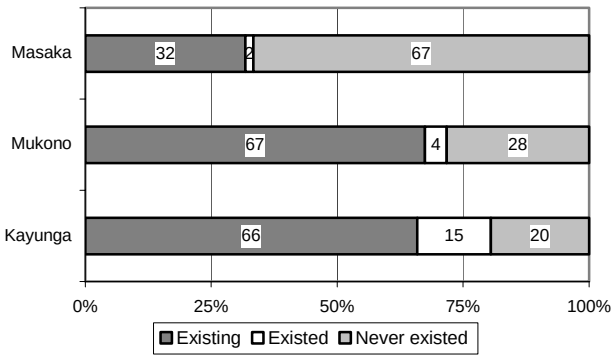


Fig. A7.8 Presence of WSC

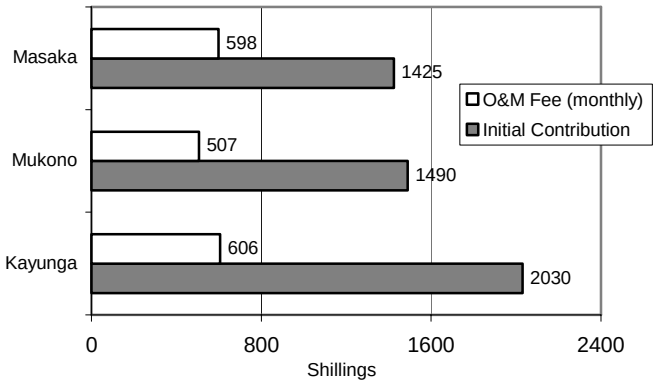


Fig.A7.9 Experience of WSC Payment
(O&M Fee & Initial Contribution)

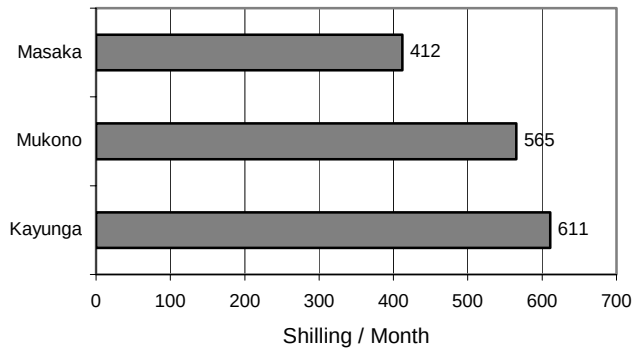


Fig.A7.10 Willingness to Pay O&M Fee
(Amount per Month)

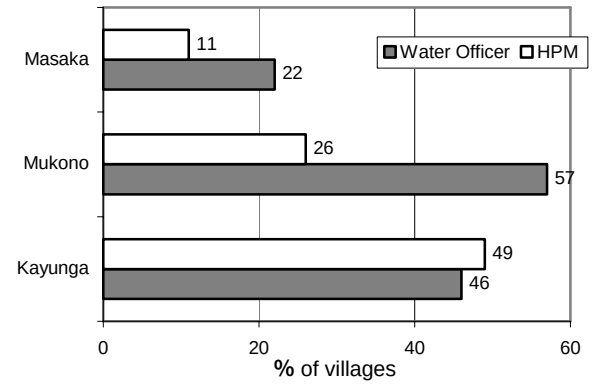


Fig.A7.11 Visits to Water Source / Village by Officers

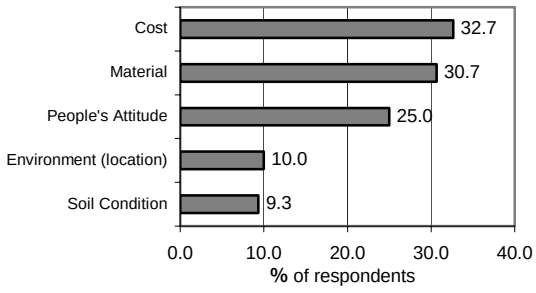


Fig.A7.12 Constraints to Latrine Construction and Usage

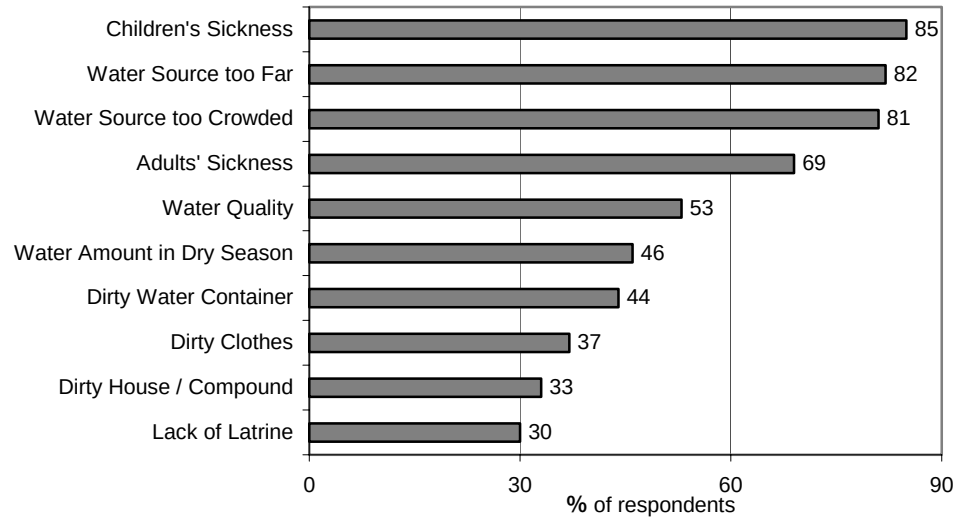


Fig.A7.13 Water and Sanitation Problems in Village

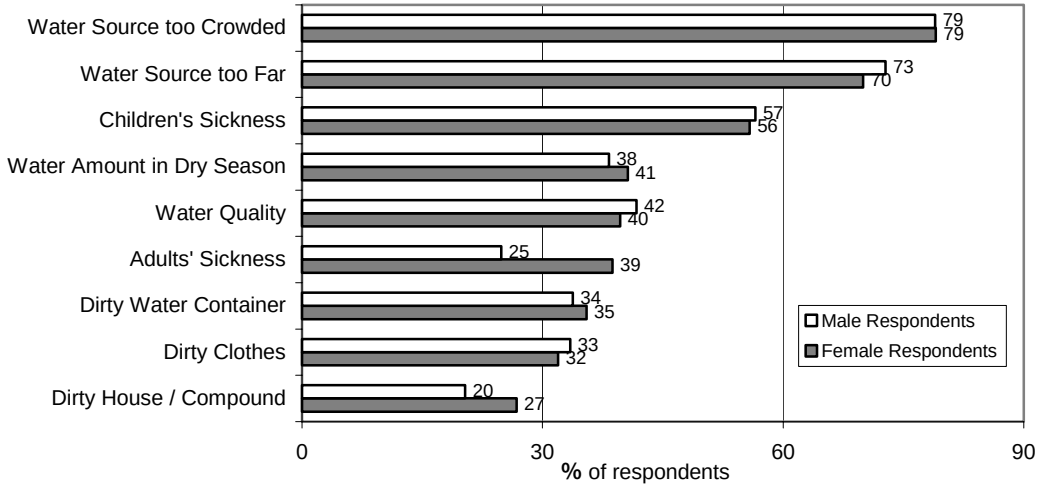


Fig. A7.14 Water and Sanitation Problems in Household

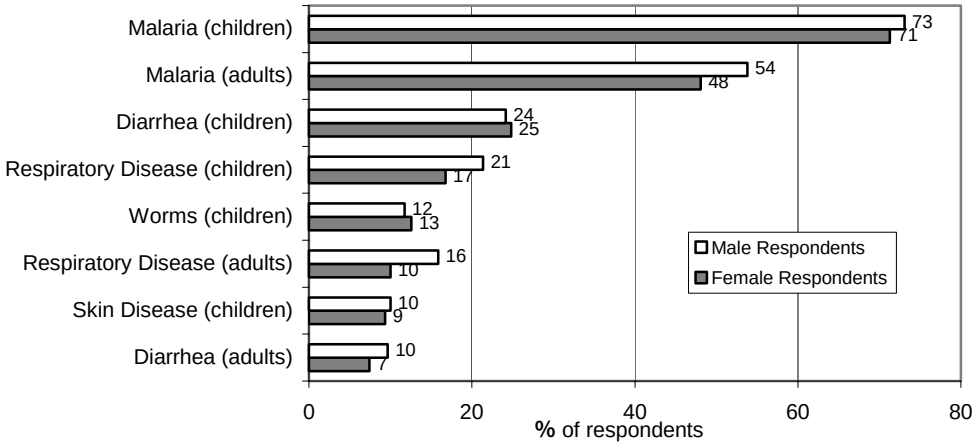


Fig.A7.15 Sickness Considered as Problem

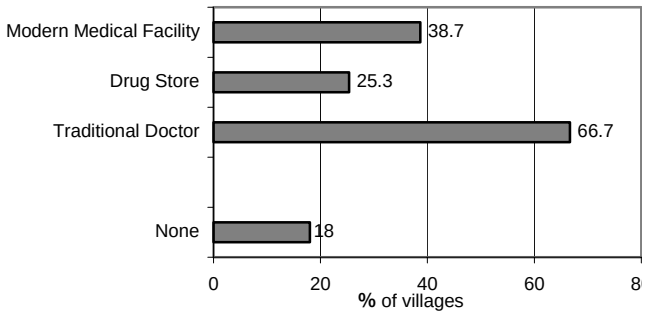


Fig.A7.16 Medical / Health Facility in Village

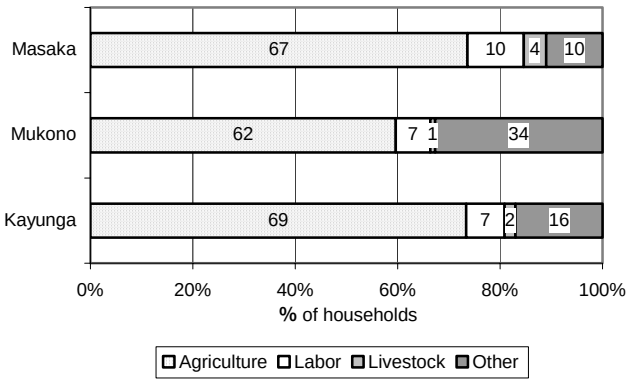


Fig.A7.17 Main Income Sources

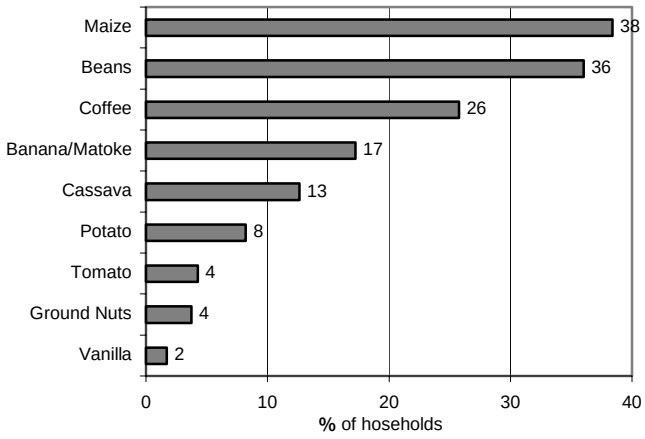


Fig.A7.18 Cash Crop

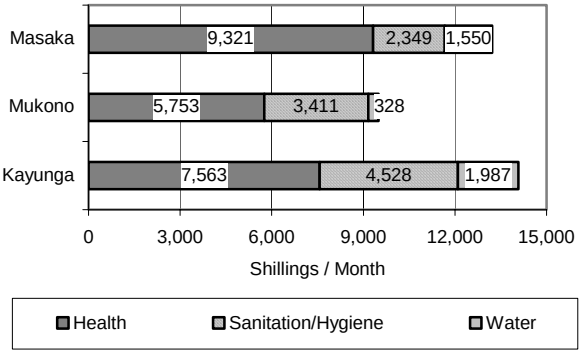


Fig. A7.19 Water, Sanitary & Health Expenditure

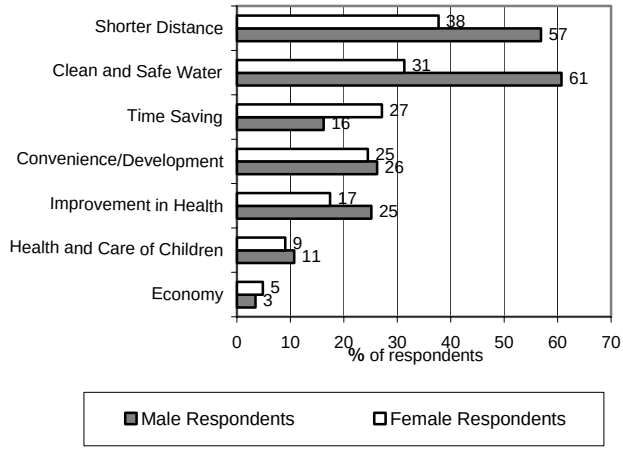


Fig.A7.20 Expectation toward New Hand Pumps

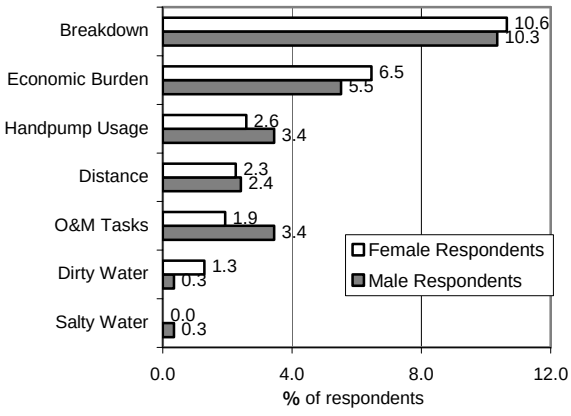


Fig.A7.21 Fear toward New Hand Pumps

Village Survey

Date_____

Village _____ Vill. number _____ District_____ County_____
Sub-County_____
Enumerator _____ Respondent _____
(respondent's)Position_____

Village Population: Total _____ male ( ) : female ( )
Total number of households:_____
Percentage of women in LC1 committee: _____%

A. What are the problems that people in this village are facing every day? (Rank: 1=biggest problem, 5=least problem)

1._____ 2._____
3._____
4._____ 5._____

B. Health/Sanitation/Hygiene in the Village

B1. Number of

i) Hospitals_____ ii) Clinics_____ iii) Dispensaries_____ iv)Health Centers_____
v) Drug Shops_____ vi) Traditional Doctors_____

B2. Types of household latrine in use (Answer either number or percentage)

Type	No. of households in village	% of all the existing households
Traditional Pit Latrine		
Improved Traditional Pit Latrine		
Ventilated Improved Pit Latrine		
Other (Specify:)		

B3. Latrine coverage rate for village leaders _____%

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 Village

	Disease	Prevalence 1. very common 2. common 3. rare 4. very rare	Comment (if any)
a.	Malaria/fever	1 , 2 , 3 , 4	
b.	Diarrhea	1 , 2 , 3 , 4	
c.	Skin Disease	1 , 2 , 3 , 4	
d.	Respiratory Disease	1 , 2 , 3 , 4	
e.	Worms	1 , 2 , 3 , 4	
f.	Eye Disease/Infection	1 , 2 , 3 , 4	
g.	Intestinal Infection	1 , 2 , 3 , 4	
h.	Typhoid	1 , 2 , 3 , 4	
i.	Other (Specify_)_	1 , 2 , 3 , 4	

C. Water and Sanitation Committee Experiences, etc.

C1	Did/Does the village have Water and Sanitation Committee (WSC) ?	1. was/were organized in _____ (year) and is still existing 2. was/were organized in _____(year), and lasted for _____ years (It does not exist now) 3. never had WSC – Skip to C6			C1
C2	How much money did a household pay as an initial contribution?	1. _____ Sh.	2. None	3. don't know	C2
C3	How much money does/did each household pay regularly for O&M?	1. _____ Sh.	2. None	3. Other (specify)	C3
	How often does/did each household pay the above amount?	1. monthly	2. weekly	3. Other (specify)	
C4	(If money is collected regularly) Who collects the money for WSC?	Ans. _____			C4
C5	(If money is collected regularly) Where is the money kept?	Ans._____			C5
C6	Does the village have by-laws?	1. Yes		2. No	C6
C7	(If the by-laws exist) Are they in operation?	1. Yes		2. No	C7
C8	Does the village receive service of HPM?	1. Yes		2. No	C8
C9	(If HPM exists) Was he/she trained?; Does he/she have enough experiences and qualifications?	1. Yes		2. No	C9

C10	What kind of repair did the HPM do in the village?	Ans. _____			C10
C11	What kind of construction materials are available locally? ; What kind of construction materials can the village contribute for water facility construction?	1. sand	2. gravel	3. water	4.other specify: C11
C12	If WSC is going to be organized in the village, do you think villagers will be willing to pay money or in-kind regularly for WSC / O&M?	1. Yes	2. No	3. don't know	C12
C13	(If villagers will be willing to pay) How much money will they pay?	1. _____ Sh.	2. don't know		C13

D. Existing Water Sources

D1. Existing Water Supply

	Source	No.	**Average distance from home; one way (m)**	**Average time to fetch water; round-trip (min)**	Main persons 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	Rainy Season Water Amount	Color	Smell	Taste	Dry Season Water Amount	Color	Smell	Taste
							1. good 2. o.k./so-so 3. bad							
a	Borehole (functioning)				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
b	Shallow Well				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
c	Protected Spring				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
d	Unprotected Spring				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
e	Gravity Flow Scheme				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
f	Dam/Valley Tank				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
g	River				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
h	Other; specify ____				1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

D2. Functioning Boreholes

	Function-ing Boreholes	**Year Constructed**	Use of Facility 1.all season 2.dry season only 3.rainy season only	Constructed By 1.Government 2.NGO 3.UNICEF 4.Individual 5.other (specify) 6.don't know	O/M by 1.Government 2.NGO 3.UNICEF 4.Owner 5.Other (specify) 6.None 7.Don't know	**Water Charge if any (Sh. per month)**	Satisfaction 1.very satisfied 2.satisfied 3.o.k. / so-so 4.not satisfied 5.disgusted
1	Borehole 1		1 2 3	1 2 3 4 5( ) 6	1 2 3 4 5( ) 6 7		1 2 3 4 5
2	Borehole 2		1 2 3	1 2 3 4 5( ) 6	1 2 3 4 5( ) 6 7		1 2 3 4 5
3	Borehole 3		1 2 3	1 2 3 4 5( ) 6	1 2 3 4 5( ) 6 7		1 2 3 4 5
4	Borehole 4		1 2 3	1 2 3 4 5( ) 6	1 2 3 4 5( ) 6 7		1 2 3 4 5
5	Borehole 5		1 2 3	1 2 3 4 5( ) 6	1 2 3 4 5( ) 6 7		1 2 3 4 5

	Functioning Boreholes	**No. of Times Broken**	**Reason for Having been Broken (spare parts)**	**Spare Parts Changed**	**Repair Done by Whom**	**Cost for Repair (Sh.)**	**Method for Collecting Money for the Repair**
1	Borehole 1						
2	Borehole 2						
3	Borehole 3						
4	Borehole 4						
5	Borehole 5						

Functioning Boreholes (continued)

D2-1 Has a water officer and/or CD Assistant ever visited the village? 1. Yes 2. No

If Yes, what for? 1. monitoring and evaluation 2. major repair 3.other (specify_____)

Who visited? 1. Dist. Water Officer 2. County Water Officer 3. CD Assistant 4. Other: Specify_____

D3. Non-Functioning Boreholes

	Non-Functioning Boreholes	**Year Constructed**	**Constructed By** 1. Government 2. NGO 3. UNICEF 4. Individual 5. other (specify) 6. don't know	**Year Broken**	**Reason for being broken, if known** (spare parts)	**Reason for no repair**
i	Borehole I		1 2 3 4 5( ) 6			
ii	Borehole II		1 2 3 4 5( ) 6			
iii	Borehole III		1 2 3 4 5( ) 6			
Iv	Borehole IV		1 2 3 4 5( ) 6			
v	Borehole V		1 2 3 4 5( ) 6			

E. Development Projects in Village

Organization	**Water-Related Activities**	**Other Activities**	**Year Started**	**Year Ended**
UNICEF				
UNDP				
NGO (Specify)				
Government				
Other (Specify)				
Other (Specify)				

F. Village Organization / Association / Self-Help Group

F1. Organizations and Activities

	Organization/Group	Water-Related Activity	Other Activity	Comments (if any)
1	Women's Organization			
2	Youth Organization			
3	Other: Specify_____			
4	Other: Specify _____			
5	Other: Specify _____			

F2. Collective Water-Related Activities (if any)

	Water-Related Activity	Participants

F3. Other Collective Activities (if any)

	Activity	Participants

G. Economic Activities

G1 Income

Sources of Income	1. Many Villagers 2. Some 3. A few 4. None			
selling animals (specify:_____)	1	2	3	4
selling agricultural crops (specify:_____)	1	2	3	4
selling labor (specify:_____)	1	2	3	4
other (specify:_____)	1	2	3	4
other (specify:_____)	1	2	3	4
other (specify:_____)	1	2	3	4

G2 Health and Sanitation Expenditure

A. on water-related issues/matters (O&M, jelly can, water, etc.)

payment	% of all the village households
Nothing: Never pays	
A little	
In between a little and a lot	
A lot	

B. on sanitation- and hygiene-related issues/matters (latrine const. soap, etc)

payment	% of all the village households
Nothing: Never pays	
A little	
In between a little and a lot	
A lot	

C. on health (medicine, hospital visit, etc.)

payment	% of all the village households
Nothing: Never pays	
A little	
In between a little and a lot	
A lot	

H. Water and Sanitation Problems (Circle ○ the ones that apply. For the ranking, put "a" through "n")

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 dis., d. skin infection, e. eye infection, f. worms, g. other: specify_____
i. Many adults are sick a. diarrhea, b. malaria, c. respiratory dis., 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_____

Rank (1=biggest problem)	1:	2:	3:

I. Expectation and Fear *(Please do not feed "the Right Answers" to the respondent. We want to know what people in communities think.)*

1. In what ways will a handpump well improve people's lives in your village? What (good things) do you expect from a handpump well?
2. What kind of difficulties/problems will a handpump well bring to the villagers? What do you fear about a handpump well?

1. Expectation	**2. Fear**
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

****

To be filled out by the enumerator:

Village Observations

Items to be checked	**Observations / Comments**
Safe/clean/used latrines	
Clean water containers	
Clean clothes	
Clean house / housing compound	
Drying Racks	
Bath Shelters	
Hand-Washing Facilities	
Existence of Human Feces	
Boiling Water to Drink	
Living with Animals	

Household Survey

Date_____

Village _____ Vill. number ____ District_____ County_____ Sub-County_____ Enumerator_____
Respondent_____ Age____ Sex: 1. female 2. male

A. Household Composition (numbers) Men_____ Women_____ // Boys_____ Girls_____

B. 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._____

C. Water-Related Issues

C1 Main source(s) of water

		a. borehole	b. shallow well	c. protected spring	d. unprotected spring	e. gravity flow system	f. dam/ valley tank	g. river	h. other: specify _____
Dry Season	Number of roundtrips per day								
	Distance (m)								
	Time for one roundtrip (min)								
	Method of water transport								
	Person to fetch water (1=most) M: men W: women B: boy G: girl	1	1	1	1	1	1	1	1
		2	2	2	2	2	2	2	2
		3	3	3	3	3	3	3	3

		a. borehole	b. shallow well	c. protected spring	d. unprotected spring	e. gravity flow system	f. dam/ valley tank	g. river	h. other: specify _____
Rainy Season	Number of roundtrips per day								
	Distance (m)								
	Time for one roundtrip (min)								
	Method of water transport								
	Person to fetch water (1=most) M: men W: women B: boy G: girl	1	1	1	1	1	1	1	1
		2	2	2	2	2	2	2	2
		3	3	3	3	3	3	3	3

C2 Water-Borne Disease in the Family/Household

	Disease	**Prevalence** 1. very common 2. common 3. rare 4. very rare	**Main Cause** (Why do you get sick?)	**Remedy/ Coping Method** (What do you do when you get sick?)	**Prevention** (What do you do not to get sick?)
a.	Malaria/fever	1 , 2 , 3 , 4			
b.	Diarrhea	1 , 2 , 3 , 4			
c.	Skin Disease	1 , 2 , 3 , 4			
d.	Respiratory Disease	1 , 2 , 3 , 4			
e.	Worms	1 , 2 , 3 , 4			
f.	Eye Disease/Infection	1 , 2 , 3 , 4			
g.	Intestinal Infection	1 , 2 , 3 , 4			
h.	Typhoid	1 , 2 , 3 , 4			
i.	Other : Specify _____	1 , 2 , 3 , 4			

C3 Water and Sanitation Problems of the Family (Circle ○ the ones that apply. For the ranking, put "a" through "n")

o. Water source is too far

p. Little water at the source in dry season

q. Little water at the source even in rainy season

Rank (1=biggest problem)	**1:**	**2:**	**3:**

r. Water quality is bad; a. smell, b. color, c. taste, d. other: specify_____

s. Too many people use the same water source

t. Poor water drainage

u. Broken / stolen handpump

v. Many children are sick; a. diarrhea, b. malaria, c. respiratory dis., d. skin infection, e. eye infection, f. worms, g. other: specify_____

w. Many adults are sick a. diarrhea, b. malaria, c. respiratory dis., d. skin infection, e. eye infection, f. worms, g. other: specify_____

x. No / too few latrines

y. Not clean clothes

z. Not clean water drawing containers

aa. Not clean houses / compounds

bb. Other; specify_____

D. Household Income

Sources of Income	**Ratio** (% of hh income)
selling animals (specify:_____)	
selling agricultural crops (specify:_____)	
selling labor (specify:_____)	
other (specify:_____)	
other (specify:_____)	
other (specify:_____)	

E. Expenditure on Water

How much does your household spend for;

E1. water-related issues/matters? (O&M, water, jelly can, etc) _____ Sh./month

E2. sanitation- and hygiene-related issues/matters? (latrine construction, soap, etc.) _____ Sh./month

E3. health-related issues/matters? (medicine, hospital visit, etc.) _____ Sh./month

F. WSC/O&M Experience, etc.

F1	Have you ever paid for water?	1. Yes		2. No	F1
F2	How much money did you pay as an initial contribution?	1. _____ Sh.	2. None	3. don't know	F2
F3	How much money did you pay every month for O&M?	1. _____ Sh.	2. None	3. don't know	F3
F4	How much money do you pay every month for O&M?	1. _____ Sh.	2. None	3. don't know	F4
F5	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 handpump well is constructed?	1. Yes		2. No	F5
	(If yes) How much will they be willing to pay?	1. _____ Sh.		2. None / 3. don't know	
F6	Will you pay for O&M?	1. Yes		2. No	F6
	(If yes) How much will they be willing to pay?	1. _____ Sh.		2. None / 3. don't know	
F7	Do you know of any handpumps or water facilities that are out of order?	1. Yes		2. No	F7
	(If yes) Why has nobody repaired it?	Ans.			

H. Expectation and Fear *(Please do not feed "the Right Answers" to the respond ent. We want to know what people in communities think.)*

1. In what ways will a handpump improve people's lives in your village? What (good things) do you expect from a handpump?
2. What kind of difficulties/problems will a handpump bring to the villagers? What do you fear about a handpump?

1. Expectation	**2. Fear**
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

****

To be filled out by Enumerator:

	Items for Observation	**Answer; Existence**	**Comment**
1	Safe/clean/used latrine	1. Yes 2. No	
2	Clean clothes	1. Yes 2. No	
3	Clean water drawing containers	1. Yes 2. No	
4	Clean house / housing compound	1. Yes 2. No	
5	Bath shelter	1. Yes 2. No	
6	Drying racks	1. Yes 2. No	
7	Hand-washing facilities	1. Yes 2. No	
8	Others / Comments		

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