Appendixes

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House
Plot 17, 19 & 21, Jinja Road
P.O. Box 22255, Kampala, Uganda
Tel: 256-41 - 251064/251065/251068
256-41 - 342758/342759/342717
Fax: 256-41 - 257521/232680
E-mail: info @ nemaug.org
Website:www.nemaug.org

NEMA/4.5

19 November, 2004

The Permanent Secretary,
Ministry of Agriculture, Animal Industry and Fisheries,
P.O. Box 102
ENTEBBE

Fax; 321047/321010/321255

RE: ENVIRONMENTAL IMPACT STUDY ON JICA STUDY ON POVERTY ERADICATION THROUGH SUSTAINABLE PADDY RICE IRRIGATION PROJECT IN EASTERN UGANDA

Reference is made to our letter of 7th October 2004 and yours of 21st October 2004 on the above subject. We have reviewed the response and this is **therefore to issue you with formal approval for the environmental aspects of the pilot demonstration/ study phase of the project.** During this phase, however, you will ensure that you follow the stipulated mitigation measures as contained in the Environmental Management Plan's in the Project Brief's.

I particularly wish to draw your attention to the need to ensure that;

- Studies are carried out to determine the hydrological impact to downstream water use through the diversion of water for irrigation from the rivers and streams feeding the wetlands;
- fertility and soil nutrients status prior to commencement of the pilot studies;
- Biodiversity studies are carried out to find out the baseline situation before the commencement of actual project implementation phase;
- Any chemicals to be utilized during the pilot/study phase, including fertilizers and any pesticides are those approved by the Agricultural Chemicals Board and that such chemicals are applied in accordance with recommended agronomic practices;
- You undertake periodic monitoring of water quality and keep records which should be submitted to this Authority and the Lead Agencies as required under Section 22 of the National Environment Act Cap ,153;
- You apply for and obtain permits for carrying out activities within regulated ecosystem as provided in the National Environment (Wetlands, Riverbanks and Lakeshores Management) Regulations, 2000;

- Liaise closely with the Wetlands Inspection Division on aspects of the project which involve further wetland utilization;

- Implement the Environment Management Plan (EMP) as contained in the Environmental Impact Report

- In accordance with Section 22 (4) of the National Environment Act Cap 153, any other undesirable environmental impacts that may arise due to implementing this project but were not contemplated by the time of undertaking this environmental impact assessment are mitigated.

I look forward to continued collaboration.

Dr. Gerald.M. Sawula
FOR: EXECUTIVE DIRECTOR

c.c: The Director,
Directorate of Water Development,
KAMPALA

The Ag. Assistant Commissioner,
Wetlands Inspection Division,
Ministry of Water, Lands and Environment,
KAMPALA

The District Environment Officer,
Bugiri District
P.O. Box 31
BUGIRI

The District Environment Officer,
Pallisa District
P.O. Box 14
PALLISA

The District Environment Officer,
Sironko District,
P.O. Box 776
MBALE

The District Environment Officer,
Kumi District,
P.O. Box 44
KUMI

RECORD OF DISCUSSION BETWEEN MAAIF, NEMA, WID, DWD and JICA STUDY TEAM
ON NEMA's RESPONSE
TO
THE STUDY ON POVERTY ERADICATION THROUGH SUSTAINABLE IRRIGATION
PROJECT IN EASTERN UGANDA

Entebbe, 22nd December 2004

Mr. J. B. Kalule Sewali
For Permanent Secretary
Ministry of Agriculture, Animal Industry
and Fisheries
The Republic of Uganda

Mr. Makoto Ishizuka
Leader of the Study Team,
Japan International Cooperation Agency
Japan

RECORD OF DISCUSSION BETWEEN MAAIF, NEMA, WID, DWD and JICA STUDY TEAM

ON NEMA's RESPONSE

TO

THE STUDY ON POVERTY ERADICATION THROUGH SUSTAINABLE IRRIGATION PROJECT IN EASTERN UGANDA

Entebbe, 22nd December, 2004

1. Venue: **Planning Department Board room, Ministry of Agriculture, Animal Industry and Fisheries**

2. Date: **22nd December, 2004**

3. Time: **10:00 AM – 1.00 PM**

4. Attendants: **refer to the attached list**

5. Background to the meeting

The Scope of Work for the Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda (hereinafter referred to as "the Study") was agreed upon between the Ministry of Agriculture, Animal Industry and Fisheries (hereinafter referred to as "MAAIF") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 24th April 2003. In accordance with the Scope of Work, the Government of Japan dispatched the Study Team (hereinafter referred to as "the JICA Study Team") to conduct the 2nd Field Work in Uganda, which ended on 7th September 2004. At the end of this period; 16th August 2004, MAAIF submitted project briefs to NEMA for scrutiny and approval. NEMA responded to the project briefs on the 7th of October; raising its main points on the necessity to conduct comprehensive assessment and that it discouraged opening up of new wetlands. On the 15th October 2004, MAAIF submitted counter-comments on NEMA's issues and awaited for reaction to the same, which came on19th November 2004, (see attached letter from NEMA).

At the beginning of the 3rd Field Work mission, it was agreed that a meeting be held on the 22nd of December 2004 between NEMA, MAAIF, DWD, WID and JICA Study Team to clarify some issues on NEMA's response. Below are the proceedings to the meeting.

6. Agenda

6.1. <u>Briefing from the Chair</u>

The meeting was chaired by Mr. J. B. Kalule Sewali, Commissioner Farm Development Department, MAAIF, who welcomed all the members present from different organizations. He then cited out his involvement in some of these organizations like NEMA and WID in the formulation of the Water Action Plan. He further emphasized on the main theme of the

meeting as "Wetlands" and commented that at one time the main idea was to get a research centre for wetlands at Kibimba and this had been seconded by the government. The present project would lead to a proper management study, since the above mentioned proposal was not initiated. He underscored the importance of the JICA Study which has main objective to guide on the wise use of wetlands; without net drainage thus leading to better management. He recalled some other studies conducted on Water Reform 2002-2004 which was an informative one, but would contribute to planning. He then pointed out that for such studies there is a need for quick response and cooperation among different affiliated organizations. The delay in feed back leads to many more constraints that were noted, which affect the project's proceeds like budgeting.

6.2. Presentation by Team Leader (JICA Study Team)

The team leader commenced his presentation by saying that there was a need for a clear understanding of the new NEMA position as suggested by JICA headquarters, Tokyo and the Japanese Embassy in Uganda. He then briefed the members by outlining the objectives and pointing out that there was need for sustainable management of these wetlands which is the focal point of the JICA Study. The team leader explained in details the study areas and the overall schedule of the project. He underscored the grouping of the districts in the project area and pointed out as to why each stage was important. He then elaborated on the development plan, the action plan and the pilot projects. He later summarized his presentation by pointing out the requests of JICA Study Team to NEMA.

6.3. General House Reactions

The chairman thanked the team leader for his presentation and opened the floor for discussion with a bias on sustainable use of the wetlands. He also pointed out that since we were following the PEAP and PMA, there was need to emphasize on the wise use as stated in the policies governing the wetland.

Mr. Paul Mafabi, Assistant Commissioner (WID) took up the first set of comments:

1) He wanted the team leader to clarify on whether it was wise to use all the 13 districts for the study at this stage.
2) Secondly he noted that according to his understanding the study only looked at the impact of the project to the environment, but said that there was also need to look at the impact to the down stream users.
3) He emphasized the fact that the need to know why people have continued to encroach on the wetlands required a much more holistic approach to poverty eradication. This holistic approach calls for a well guided approach which raises for questions like; what would the farmers use the money for after selling the crops? How do they diversify? Hence resulting into an integrated approach to food security.
4) The policies calling for wise use clearly advocate for not more than 25% of wetlands and also call for limited existing developments in these areas. This means that we need to look at what has been developed and include it into the 25%. Hence, the wish is that the team started with rehabilitation and not opening up of new sites.
5) The need to promote community based wetlands development.

The team leader clarified that at this stage only 4 pilot project sites were considered as demonstration plots with infrastructure development. Mr. Ogwang added that each of the 4 pilot projects represented a model for a particular group of districts; pointing out that all 13 districts were sub-divided into four groups which had been clearly illustrated by the team leader.

The team leader went on commenting that each of the pilot sites was selected based on the water availability to satisfy both rice production on the site and downstream users. He added that the project is monitoring water quality at both inlet and outlet so as to evaluate its condition/state before passing through the paddy rice fields and, after the rice fields at the outlets; still taking into consideration the down stream users.

In regard to the approach of the Study, he emphasized that the project has taken a holistic approach and has set a clear strategy with regard to poverty eradication that has been well illustrated in the progress report and subsequent reports.

Regarding the new land opening, he insisted that because of the lack of clearness in land policy, farmers are opening land every year without any formal approval from NEMA. Therefore, in the Pilot Projects, we are going to open new lands following the WID guidelines of wise use in order to demonstrate to the farmers the way to go about it. This includes organizing Community Based Wetland Management Associations and developing subsequently Community Based Wetland Management Plans.

Mrs. Namakambo (WID) wanted to see in place an effective water quantity monitoring and also have Community Wetland Management Plans (CWMP) for not the planned new developments of Kumi and Sironko P/Ps, but also for the already developed sites of Pallisa and Bugiri P/Ps. She suggested that in the monitoring phase, MAAIF should request the dispatch, from WID, a specialist dealing with monitoring and evaluation.

The chairman in his capacity as CFD immediately responded to this; saying that he would write a letter to WID requesting for a monitoring and evaluating officer.

The DWD representative clarified that water charges are mainly on motorized abstraction or diversion, but for effective monitoring on water quantity, there is need to establish gauges. The chairman added that on the question fees, the policy should be re-phased to benefit poor farmers.

However on monitoring the flow through measurements, the team leader pointed out that it would be a little bit difficult in most of the areas apart from in Sironko where measurements on Sipi River diversion flow could be possible.

Regarding the CWMP, the team leader pointed out that these plans would only be drawn for the newly established sites and it would be difficult to draw up plans for all the other areas due to limited resources/budget.

Mr. Ogwang added that based on the results of Kumi and Sironko, explanations sessions will be carried out in Pallisa and Bugiri.

Mr. Paul Mafabi informed the meeting that WID had developed a management planning manual which could be taken as a guideline.

Mr. Mafumbo (WID) suggested that WID expected the study to look at the wise-use concepts and other areas which would lead to formulation of guidelines for carrying out baseline surveys on socio-economic aspects.

On the issue of permits Mr. Waiswa (NEMA) clarified that any actions on wetlands would normally require permits. In the case of the study, however, he promised to consult and get back to MAAIF/Study Team in due course.

The Chairman thanked the members and requested for continuous collaboration before declaring the meeting closed at 1:00pm.

LIST OF ATTENDANTS AT THE MEETING
(December 22nd 2004)

I. Ministry of Agriculture, Animal Industry and Fisheries

Mr. J.B. Kalule Sewali	:	Commissioner Farm Development
Mr. J.M. Ogwang	:	Acting Principal Irrigation Agronomist/ Watershed Management Department of Farm Development
Mr. Maurice Okello Ocaya	:	Acting Asst. Commissioner (Farm Development)
Mr. Benon Byamugisha	:	Senior Economist MAAIF
Mr Frank Akena	:	SAO/Wetlands Management

II. National Environment Management Authority

Mr. Arnold Waiswa Ayazika	:	EIA Coordinator

III. Directorate of Water Development

Mr. Sowed Sewagudde	:	Senior Hydrologist.

IV. Water Inspection Division

Mr. Paul Mafabi	:	Acting Commissioner/Wetlands Division
Mrs. Norah Namakambo	:	Senior Wetland Inspector/Wetlands
Mr. Julius Mafumbo	:	RWC-E/Wetlands

V.JICA Study Team

Mr. Makoto Ishizuka	:	Team Leader/ Agricultural Development Planner
Dr. Gueye Massamba	:	Environmentalist
Mr. Masahito Miyagawa	:	Coordinator

JICA STUDY TEAM FOR
THE STUDY ON POVERTY ERADICATION THROUGH
SUSTAINALBE IRRIGATION PROJECT IN EASTERN UGANDA

P.O. Box 102, Entebbe Uganda
c/o Ministry of Agriculture, Animal Industry, and Fisheries
Telephone: 041-320983

Our Ref. LE-42/04
December 31, 2004

Permanent Secretary
MAAIF, Entebbe

Re: Request for Discussion with NEMA for Smooth Implementation of the Pilot Project during the Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda

The purpose of this letter is to request you to enhance continuous discussions with NEMA for smooth implementation of the Pilot Projects during the Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda.

As you are aware, NEMA issued its formal approval for the environmental aspects of the Pilot Projects in the letter dated November 19, 2004. In the approval, however, NEMA conditionally requested MAAIF to clear several other wetland issues. The implementation stages of these issues as stated in the NEMA comments were ambiguous in that they did not clearly indicate as to whether or not they were related to the Pilot Project (2005-2007); Action Plan (2008-2010), Development Plan (2008-2017) stages. Among others, the issue on MAAIF to obtain permits for carrying out activities within regulated ecosystem as provided in the National Environment (Wetlands Riverbanks and Lakeshores Management) Regulations, 2000 is considered the most important and delicate one. If such permits are requested to be obtained before the implementation of Pilot Project (in fact it was unofficially requested by NEMA), the Study Team is worried as to whether construction work would commence in the 4th Field Mission in which irrigation facility development would be carried out; covering 4 pilot project sites, i.e., Pallisa, Bugiri, Kumi and Sironko. It is foreseeable that the procedure to obtain permits may be cumbersome, since to-date MAAIF has not received NEMA's formal approval for the implementation of Pilot Project. You may note that the project briefs of the Pilot Project were submitted to NEMA by the middle of August 2004, and the first comments from NEMA was received very late; in spite of MAAIF continuous follow-up. As a result, construction works for 4 pilot project sites were delayed. On the other hand, JICA HQ requested us to prepare the cost estimate for the 4th Field Work by May 2005, at the latest (see attached schedule). This means that another delay from NEMA could all together jeopardise budget approval for the initiation of construction works, which are planned for the coming November 2005.

It is against the above background that the JICA Study Team would like to suggest that you enhance continuous discussions with NEMA so as to waive the issue on acquisition of permits. The exemption would be as a result of the following considerations:

(1) The Pilot Project will be implemented for verification of the Development Plan which has been formulated focussing on poverty eradication through wise-use of wetlands,

(2) The Development Plan has been formulated in line with the Poverty Eradication Action Plan; strictly focussing on the rural poor farmers, who are the main beneficiaries,

(3) The proposed 4 pilot project sites in which irrigation facility development will be carried out are very small in scales of about 16 ha in Pallisa, 11 ha in Bugiri, 9 ha in Kumi and 18 ha in Sironko, and the total area of 54 ha is less than 0.1% of the existing lowland paddy fields of 70,000 ha in the 13 districts,

(4) Activities to be taken in the Pilot Project will be monitored and evaluated. Since water quality and soil fertility will be also monitored and evaluated among others, the results will be valuable not only to MAAIF, but also to NEMA, .

(5) The operation of the pilot projects will provide the Study Team with MAAIF, including NEMA and WID, with valuable data on sustainable management of wetland ecosystems hence wise-use for posterity.

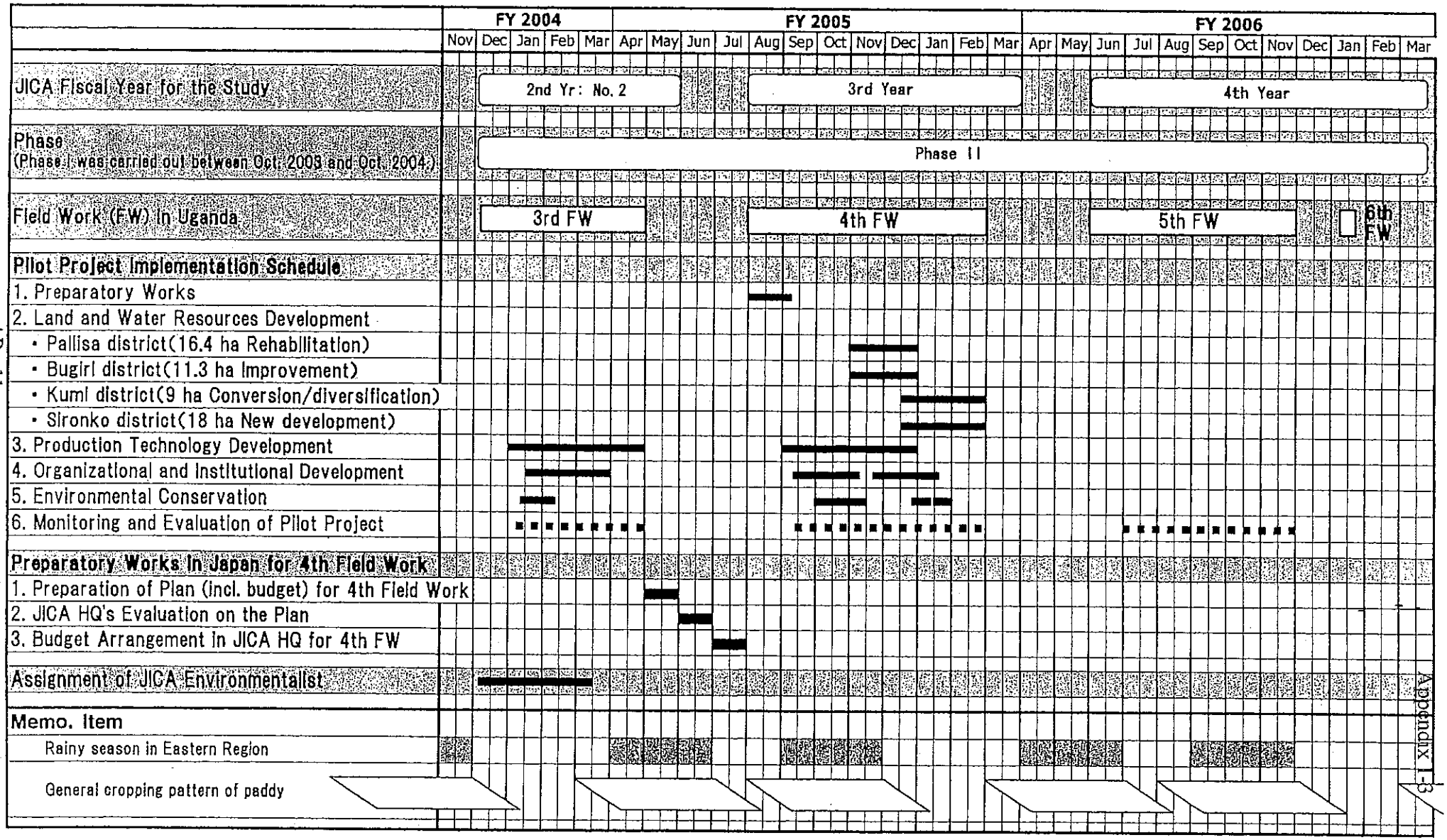
We would be grateful for the attention you would accord this communication as we target food security and increased household income.

Yours sincerely,

Makoto Ishizuka
Team Leader,
JICA Study Team

C.c Mr. J.B. Kalule Sewali
Commissioner Farm Development
C.c Mr. J.M. Ogwang
Acting Principal Irrigation Agronomist/
Watershed Management Div. of Farm Development
C.c Mr. M. Tomitaka
Advisor (JICA Expert)
Agricultural Planning Department

Schedule of Pilot Project Implementation and Preparatory Works for 4th Field Work



MINISTRY OF AGRICULTURE,
ANIMAL INDUSTRY AND FISHERIES
P.O BOX 102,
E-MAIL psmaaif@infocom.co.ug
WEBSITE www.agriculture.go.ug
TELEPHONE 320987/9, 320004, 320327/8
FAX 256-041-321047, 256-041-321010, 256-041-321255
ENTEBBE, UGANDA

Appendix 1-4

In any correspondence on this subject please quote No FDD/240/166/01

THE REPUBLIC OF UGANDA

January 7, 2005

The Executive Director
National Environmental Management Authority
P.O. Box 22255
KAMPALA

A REQUEST TO WAIVE OFF PERMIT ISSUES TO FACILITATE THE ESTABLISHMENT OF PILOT PROJECT SITES FOR A STUDY ON POVERTY ERADICATION THROUGH SUSTAINABLE IRRIGATION IN EASTERN UGANDA

You may recall Project briefs from the Ministry of Agriculture, Animal Industry and Fisheries and JICA Study Team whose response, of 19th November 2004, raised a number of issues. Salient of these was the application and acquisition of permits for carrying out activities within regulated ecosystem. This issue was exhaustively discussed in a joint meeting between NEMA, WID, DWD and MAAIF of 22nd December 2004 as it resulted into rescheduling of Project activities from January/March to October/December 2005. The meeting was left with no option other than a request to government to waive off the permit issue, which would facilitate the Study (limited time-frame) and enhance field investigations on increased incomes for the rural poor; eking their livelihoods in wetland cultivation.

You are also informed that the concern of the JICA Study Team has been heightened as the issue drags on into 2005 and yet by May this year, latest, the budget for construction work should have been drawn and approved by their headquarters (JICA) in Tokyo as per their correspondence to PS/MAAIF copy of which is attached for reference.

As pertinent stakeholders in PEAP, I therefore, take this opportunity to request you to seek exemption to the acquisition of permits for the study at hand since the resulting data will guide and benefit research in wetland use and all stakeholders targeting wetlands as sustainable production assets. However, additional consideration for permits will be made in future, 2008 onwards, in the course of Development Plan implementation.

I count on your consideration regarding the urgency and the importance of this matter.

G.P. Kasajja
For: **PERMANENT SECRETARY**

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House
Plot 17, 19 & 21, Jinja Road
P.O. Box 22255, Kampala, Uganda
Tel: 256-41 - 251064/251065/251068
256-41 - 342758/342759/342717
Fax: 256-41 - 257521/232680
E-mail: info @ nemaug.org
Website:www.nemaug.org

NEMA/4.5

12 January 2005

The Permanent Secretary,
Ministry of Agriculture, Animal Industry and Fisheries,
P.O. Box 102
ENTEBBE

RE: A REQUEST TO WAIVER OFF PERMIT ISSUES TO FACILITATE THE ESTABLISHMENT OF PILOT PROJECT SITES FOR A STUDY ON POVERTY ERADICATION THROUGH SUSTAINABLE IRRIGATION IN EASTERN UGANDA

Reference is made to the above subject and the formal approval for the environmental aspects of the pilot demonstration/study phase of the project issued on 19th November 2004 by this Authority.

I have studied your request and this is therefore **to grant** you a waiver for the permits during the study/pilot phase of this project. However, you will be required to apply for the permits during the wider project implementation which is expected to start in 2008. Furthermore, you should regularly submit to this Authority monitoring reports of the pilot project activities.

I look forward to continued collaboration.

Aryamanya-Mugisha Henry
EXECUTIVE DIRECTOR

c.c. The Ag. Assistant Commissioner,
Wetlands Inspection Division,
Ministry of Water, Lands and Environment
KAMPALA

The District Environment Officer,
Bugiri District
P.O. Box 31
BUGIRI

The District Environment Officer,
Pallisa District,
P.O. Box 14
PALLISA

The District Environment Officer,
Sironko District,
P.O. Box 776
MBALE

The District Environment Officer,
Kumi District,
P.O. Box 44
KUMI

Irrigation Planning and Design

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Drainage Planning and Engineering

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Water Management, Operation and Maintenance

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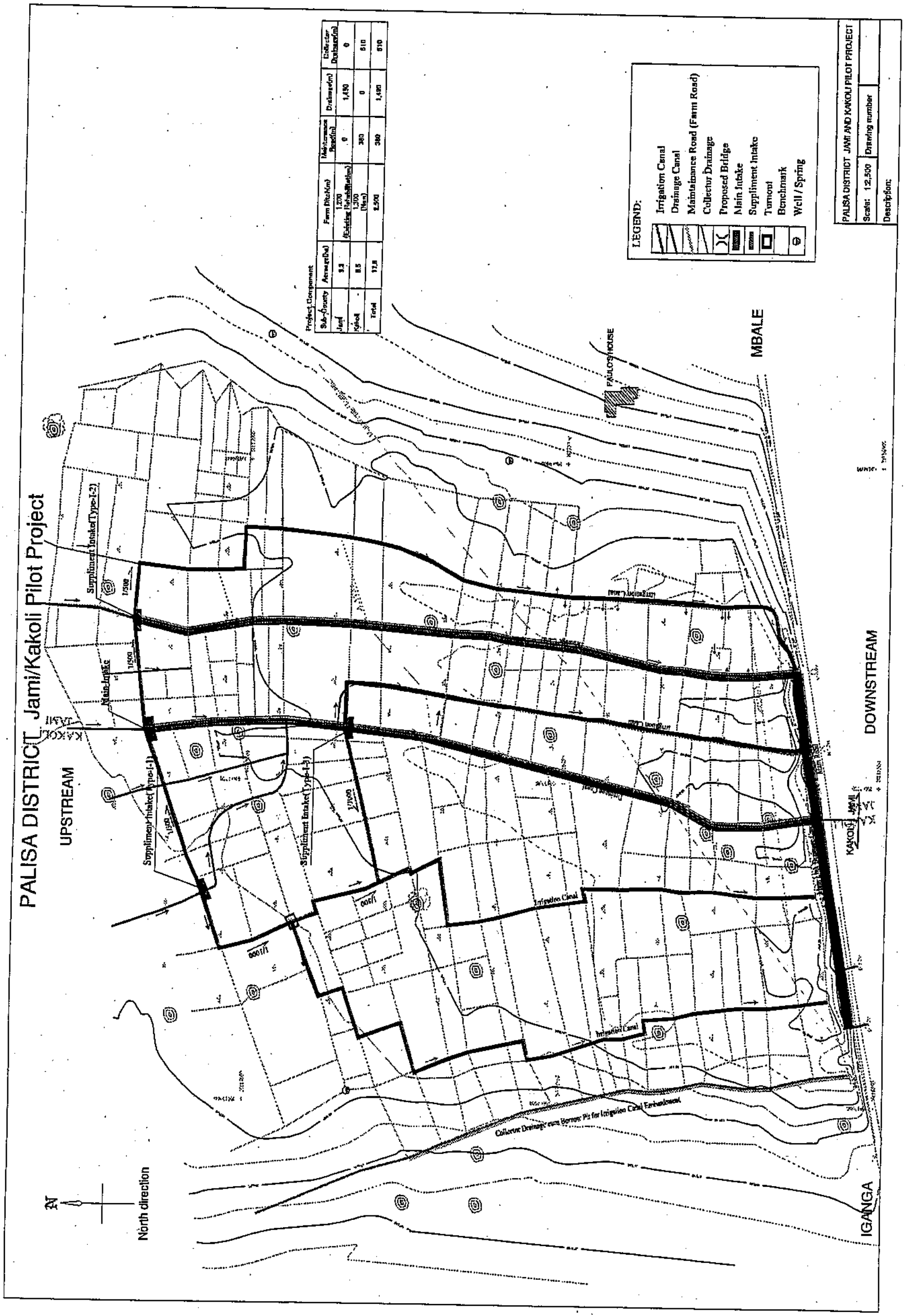
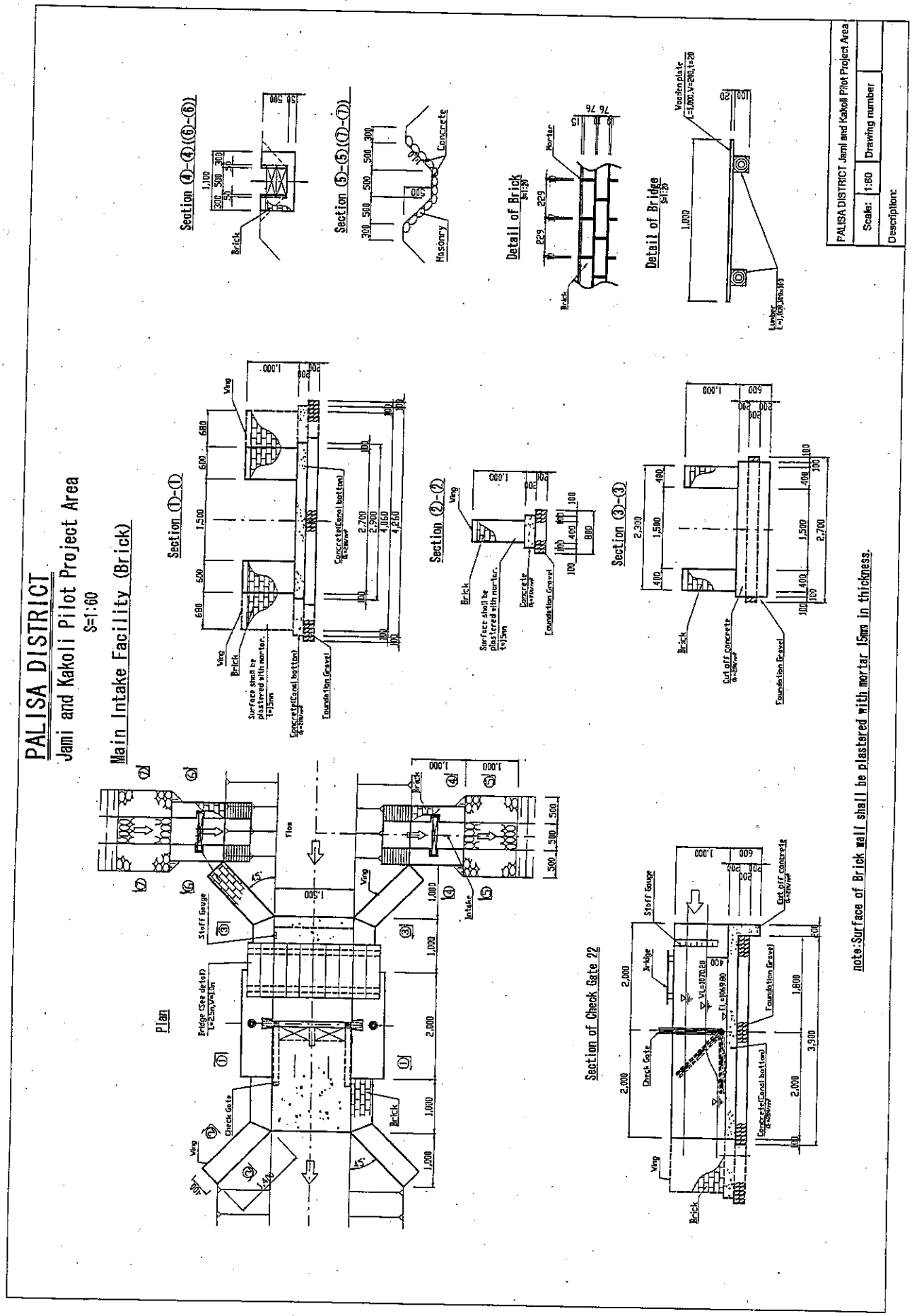
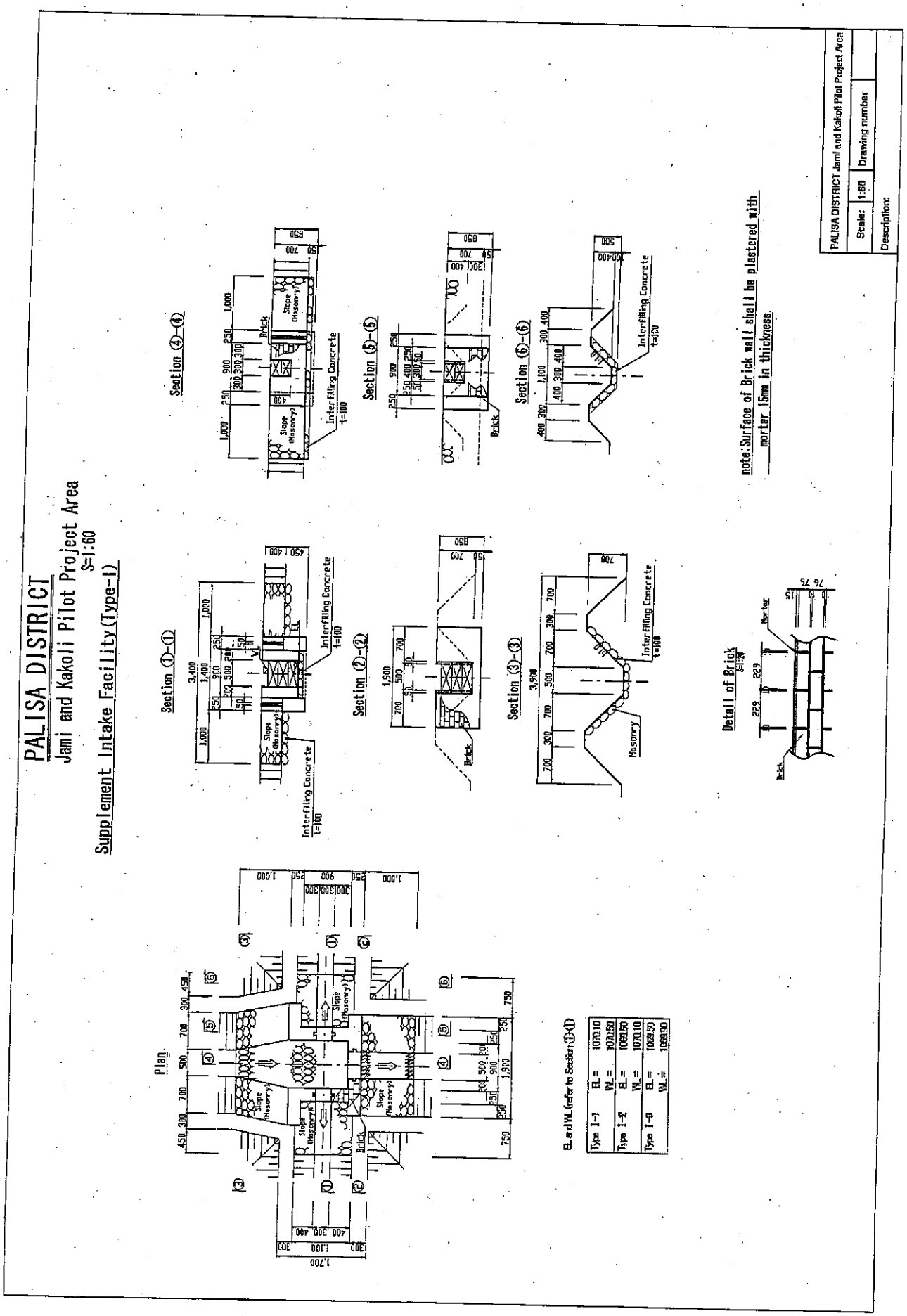

PALISA DISTRICT Jami/Kakoli Pilot Project
UPSTREAM
DOWNSTREAM
MBALE
IGANGA
PAULO'S HOUSE
North direction
Project Component
Sub-County | Acreage(ha) | Farm Ditch(m) | Maintenance Road(m) | Drainage(m) | Collector Drainage(m)
Jami | 9.3 | 1,200 (Existing Rehabilitation) | 0 | 1,450 | 0
Kakoli | 8.5 | 1,300 (New) | 380 | 0 | 510
Total | 17.8 | 2,500 | 380 | 1,490 | 510
LEGEND:
Irrigation Canal
Drainage Canal
Maintainance Road (Farm Road)
Collector Drainage
Proposed Bridge
Main Intake
Suppliment Intake
Turnout
Benchmark
Well / Spring
PALISA DISTRICT JAMI AND KAKOLI PILOT PROJECT
Scale: 12,500
Drawing number
Description:
Main Intake
Suppliment Intake(Type-I-2)
Suppliment Intake(Type-I-1)
Suppliment Intake(Type-I-3)
Irrigation Canal
Collector Drainage cum Borrow Pit for Irrigation Canal Embankment

TOPOGRAPHIC MAP OF JAMI / KAKOLI SITE IN PALLISA DISTRICT


PALISA DISTRICT
Jami and Kakoli Pilot Project Area
S=1:60
Main Intake Facility (Brick)
Plan
Section ①-①
Section ②-②
Section ③-③
Section ④-④(⑥-⑥)
Section ⑤-⑤(⑦-⑦)
Section of Check Gate 22
Detail of Brick
Detail of Bridge
Brick
Concrete
Masonry
Mortar
Wing
Steff Gauge
Check Gate
Bridge
Intake
Foundation Gravel
Surface shall be plastered with mortar. t=15mm
PALISA DISTRICT Jami and Kakoli Pilot Project Area
Scale: 1:60
Drawing number
Description:
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.


PALISA DISTRICT
Jami and Kakoli Pilot Project Area
S=1:60
Supplement Intake Facility(Type-I)
Section ①-①
Section ②-②
Section ③-③
Section ④-④
Section ⑤-⑤
Section ⑥-⑥
Plan
Detail of Brick
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.
Interfilling Concrete t=100
Slope (Masonry)
Brick
Masonry
Mortar
PALISA DISTRICT Jami and Kakoli Pilot Project Area
Scale: 1:60
Drawing number
Description:

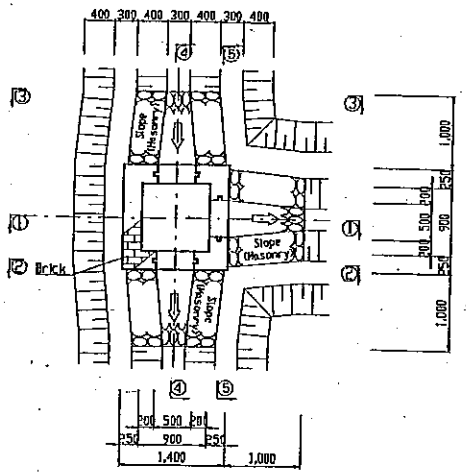
PALISA DISTRICT

Jami and Kakoli Pilot Project Area

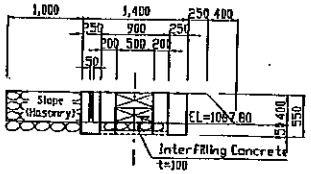
S=1:60

Turnout Structure

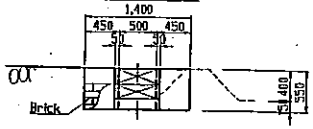
Plan



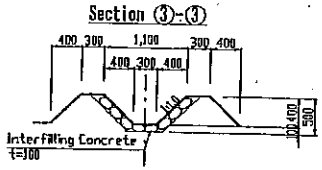
Section ①-①



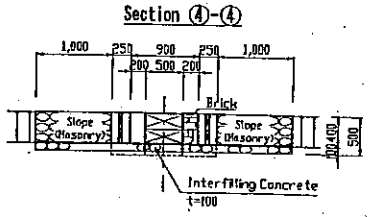
Section ②-②



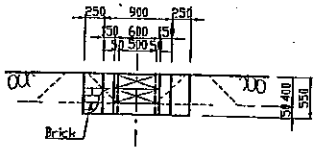
Section ③-③



Section ④-④

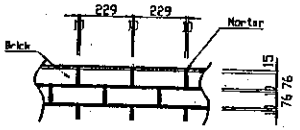


Section ⑤-⑤



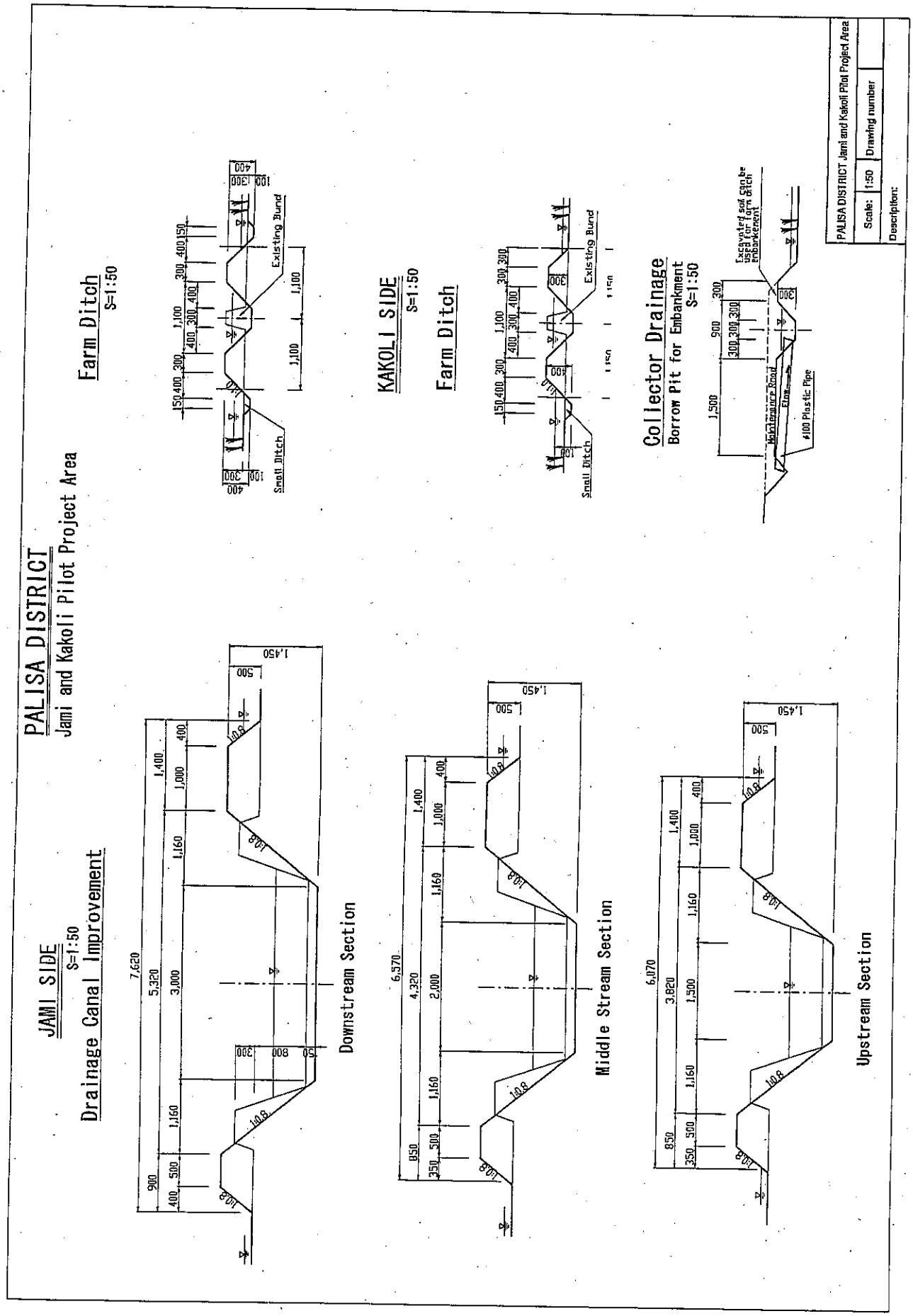
Detail of Brick

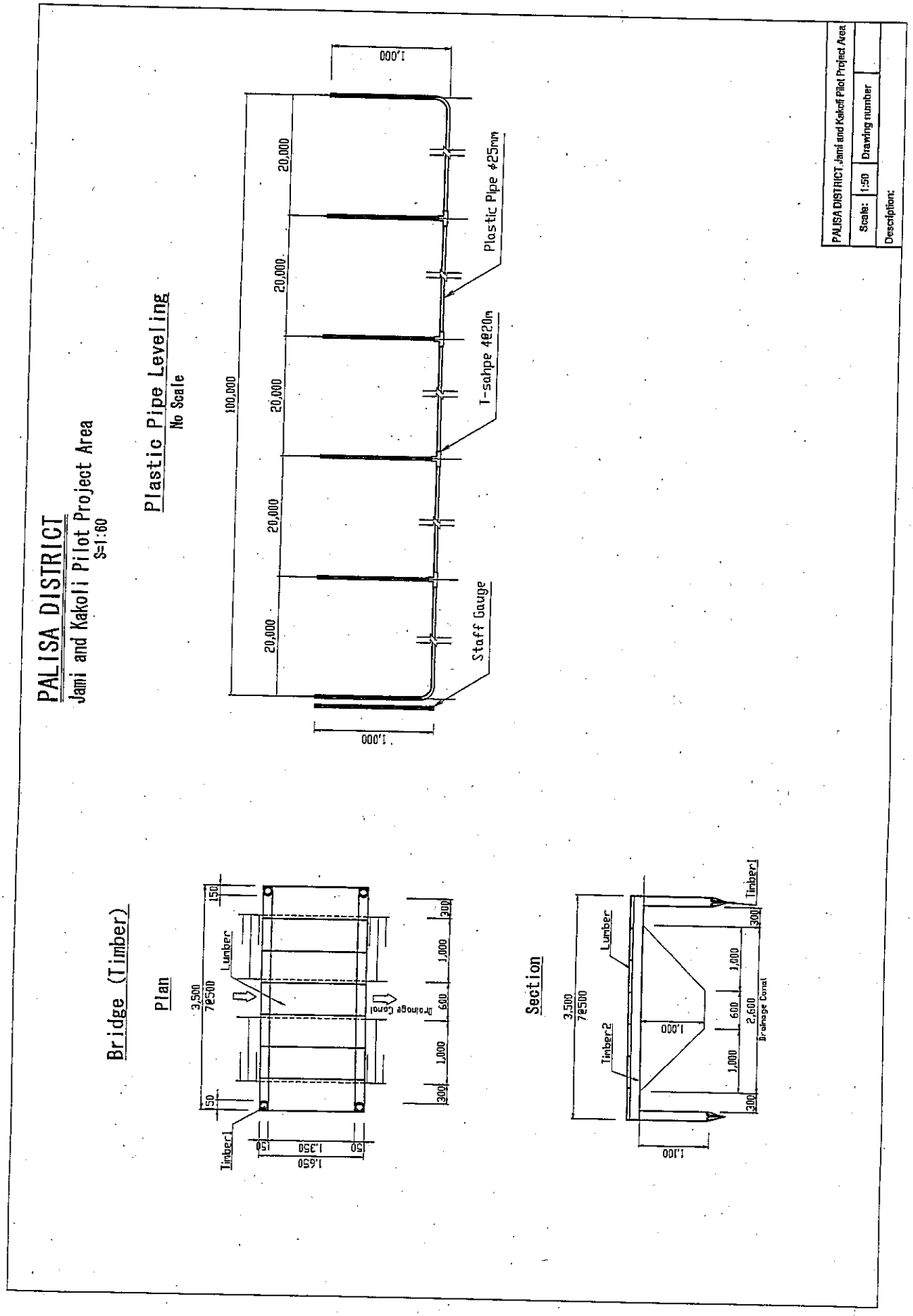
S=1:20

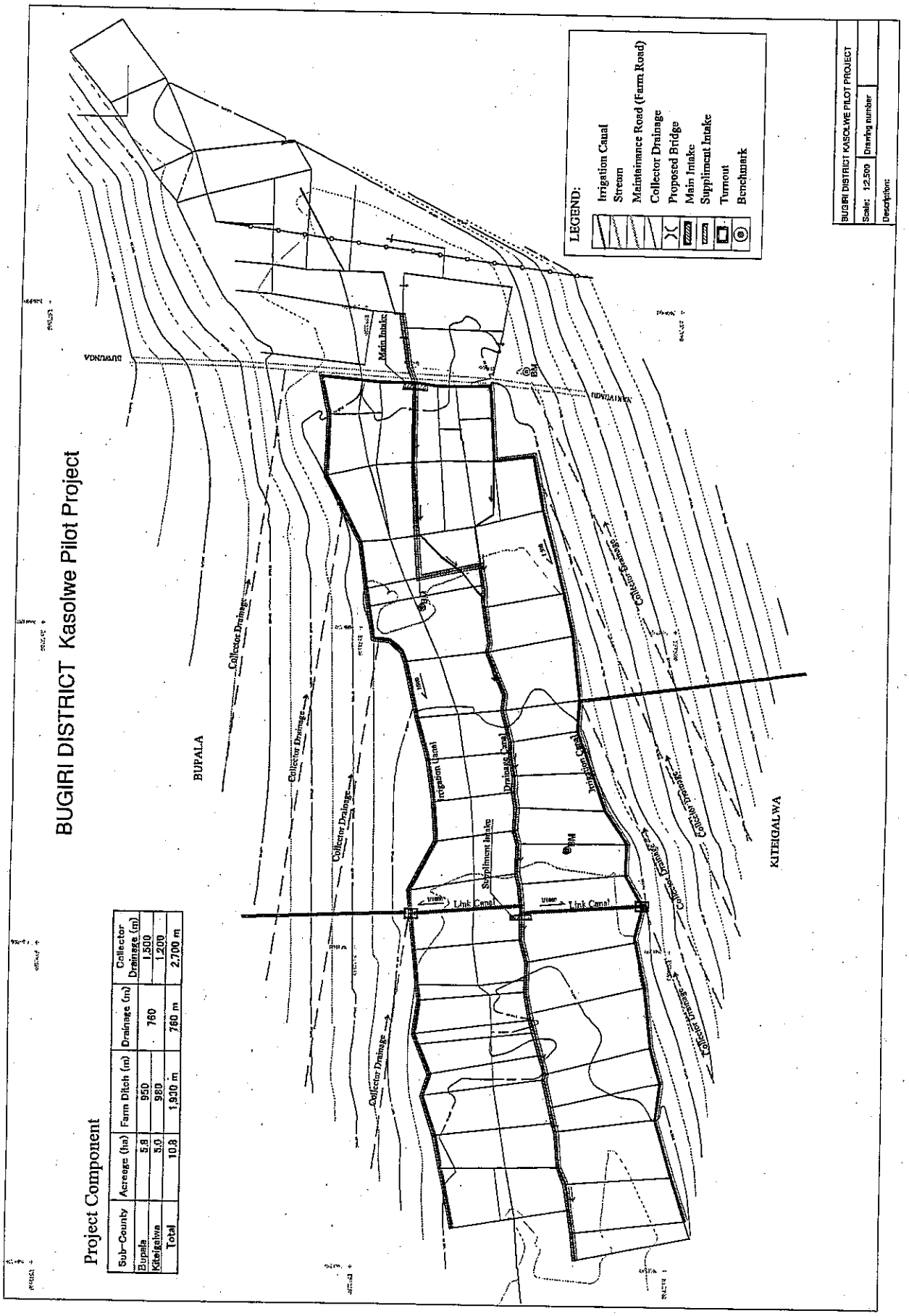


note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.

PALISA DISTRICT Jami and Kakoli Pilot Project Area			
Scale:	1:60	Drawing number	
Description:			


PALISA DISTRICT
Jami and Kakoli Pilot Project Area
JAMI SIDE
S=1:50
Drainage Canal Improvement
Downstream Section
Middle Stream Section
Upstream Section
Farm Ditch
S=1:50
Existing Bund
Small Ditch
KAKOLI SIDE
S=1:50
Farm Ditch
Collector Drainage
Borrow Pit for Embankment
S=1:50
Excavated soil can be used for farm ditch embankment
Maintenance Road
Elev.
#100 Plastic Pipe
PALISA DISTRICT Jami and Kakoli Pilot Project Area
Scale: 1:50
Drawing number
Description:

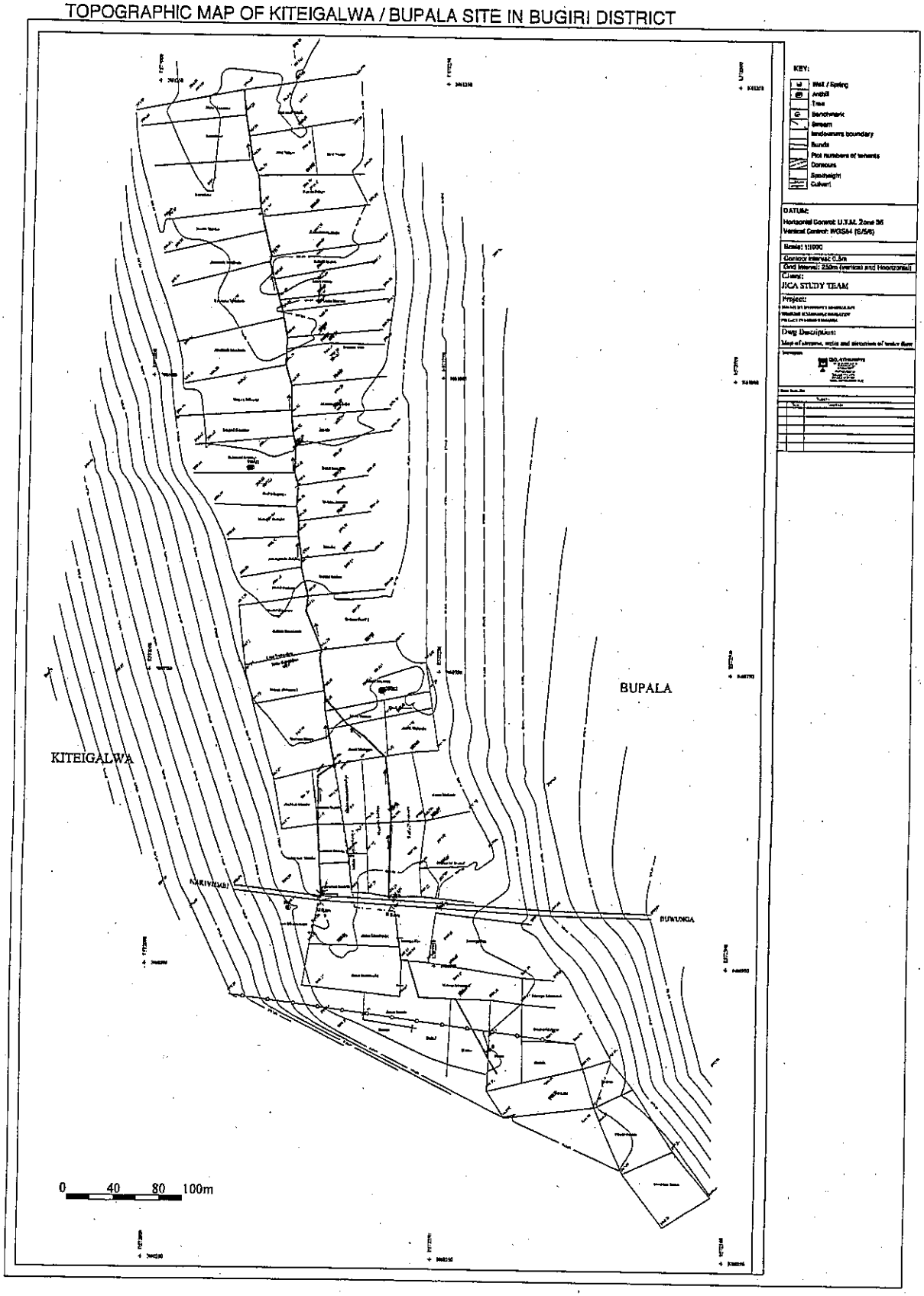

PALISA DISTRICT
Jami and Kakoli Pilot Project Area
S=1:60
Plastic Pipe Leveling
No Scale
1,000
20,000
20,000
20,000
20,000
20,000
100,000
Plastic Pipe φ25mm
T-sahpe 4@20m
Staff Gauge
1,000
Bridge (Timber)
Plan
3,500
78500
150
Lumber
Drainage Canal
300
1,000
600
1,000
300
50
Timber1
150
1,350
150
1,650
Section
3,500
78500
Lumber
Timber2
Timber1
300
1,600
600
2,600
1,000
300
Drainage Canal
1,000
1,100
PALISA DISTRICT Jami and Kakoli Pilot Project Area
Scale: 1:50
Drawing number
Description:

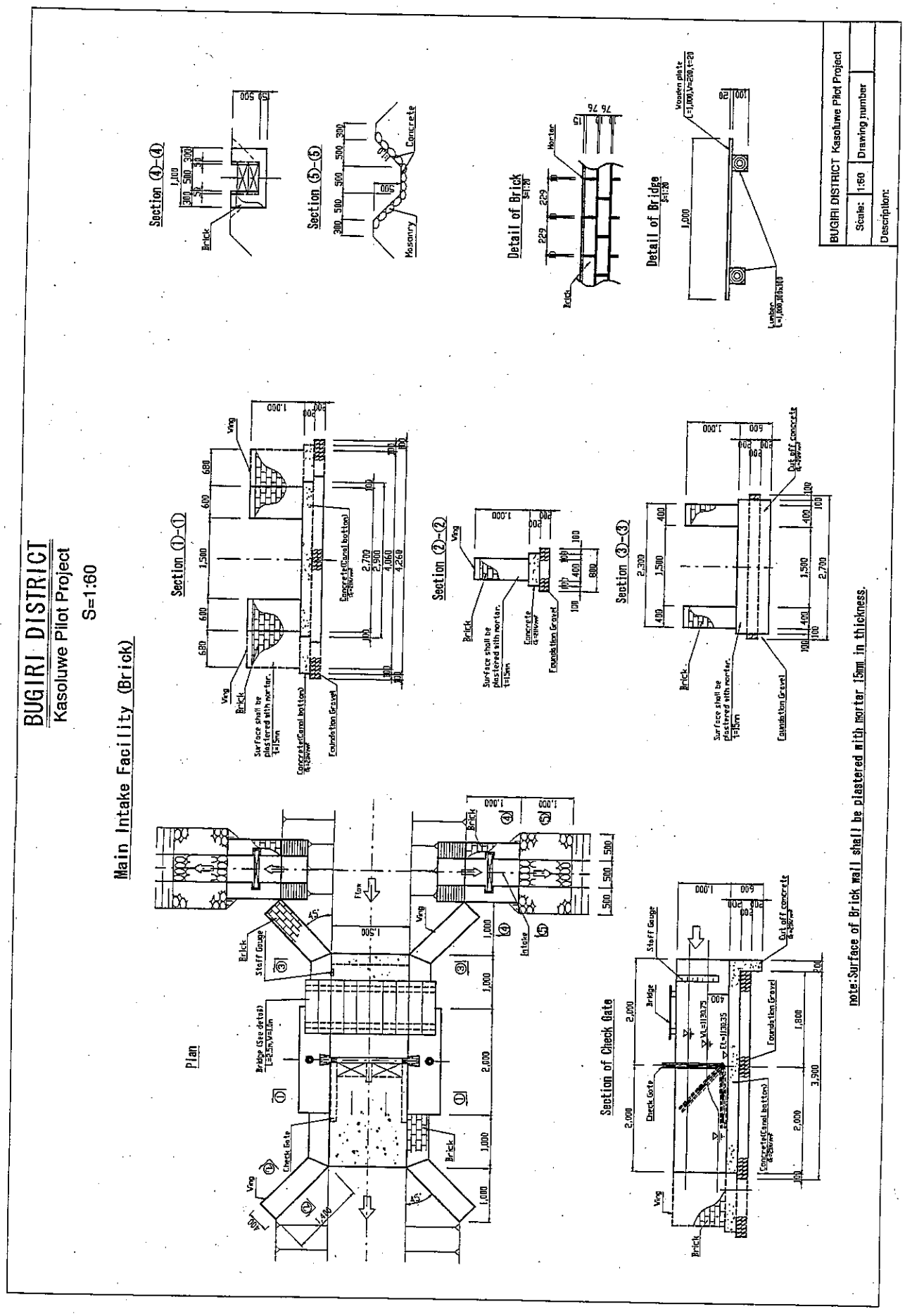


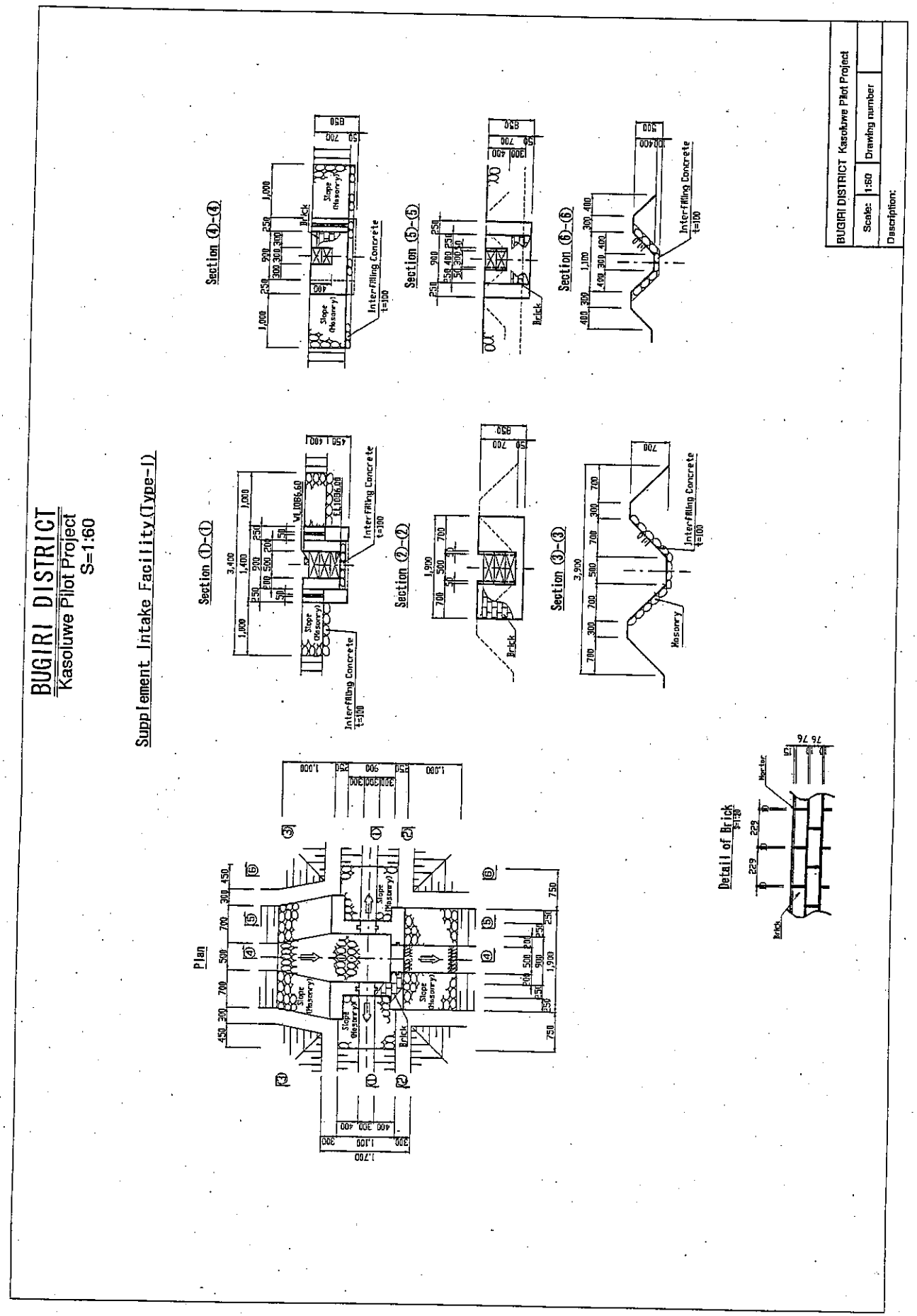
Project Component

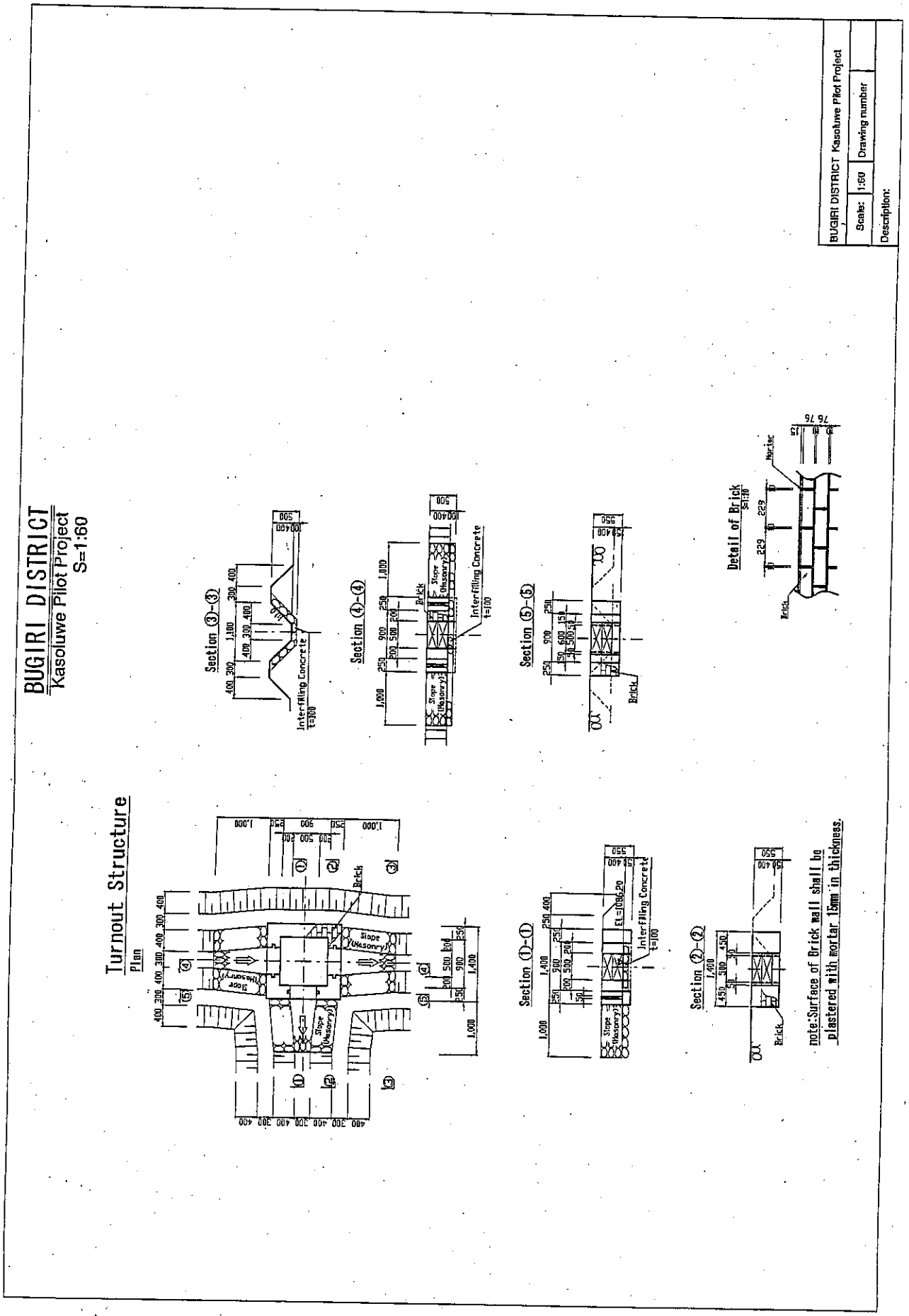
Sub-County	Acreage (ha)	Farm Ditch (m)	Drainage (m)	Collector Drainage (m)
Bupala	5.8	950	760	1,500
Kiteigalwa	5.0	980		1,200
Total	10.8	1,930 m	760 m	2,700 m

TOPOGRAPHIC MAP OF KITEIGALWA / BUPALA SITE IN BUGIRI DISTRICT




BUGIRI DISTRICT
Kasoluwe Pilot Project
S=1:60
Main Intake Facility (Brick)
Plan
Section ①-①
Section ②-②
Section ③-③
Section ④-④
Section ⑤-⑤
Detail of Brick
Detail of Bridge
Section of Check Gate
Brick
Mortar
Concrete
Masonry
Wing
Intake
Check Gate
Bridge
Steff Gauge
Foundation Gravel
Cut-off concrete
Surface shall be plastered with mortar. T=15mm
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.
BUGIRI DISTRICT Kasoluwe Pilot Project
Scale: 1:60
Drawing number
Description:


BUGIRI DISTRICT
Kasoluwe Pilot Project
S=1:60
Supplement Intake Facility(Type-I)
Section ①-①
Section ②-②
Section ③-③
Section ④-④
Section ⑤-⑤
Section ⑥-⑥
Plan
Detail of Brick
Inter-filling Concrete t=100
Slope Masonry
Brick
Masonry
Mortar
BUGIRI DISTRICT Kasoluwe Pilot Project
Scale: 1:60
Drawing number
Description:


BUGIRI DISTRICT
Kasoluwe Pilot Project
S=1:60
Turnout Structure
Plan
Section ③-③
Section ④-④
Section ⑤-⑤
Section ①-①
Section ②-②
Detail of Brick
S=1:20
Brick
Slope (Masonry)
Interfilling Concrete t=100
Interfilling Concrete t=300
Mortar
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.
BUGIRI DISTRICT Kasoluwe Pilot Project
Scale: 1:60
Drawing number
Description:

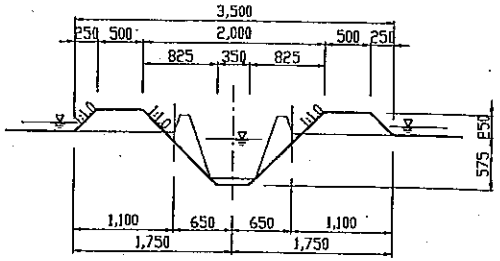
BUGIRI DISTRICT

Kasoluwe Pilot Project

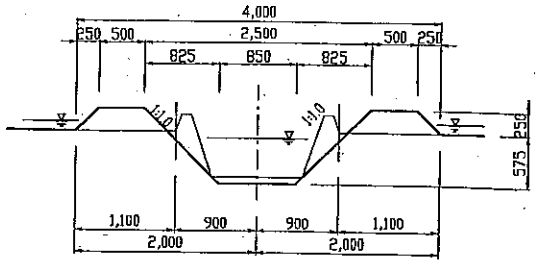
S=1:50

Drainage Canal Improvement

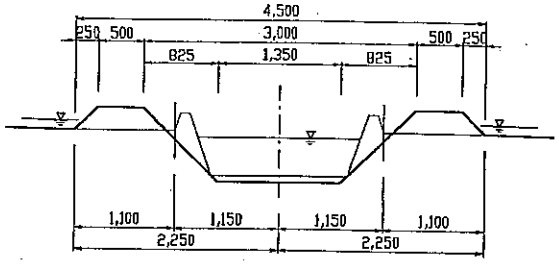
Upstream Section



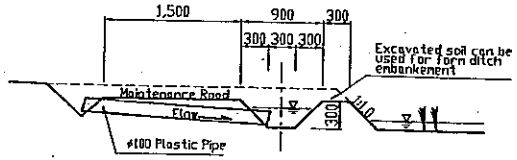
Middle Stream Section



Downstream Section

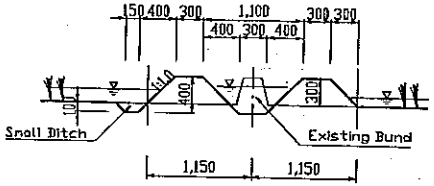


Farm Ditch

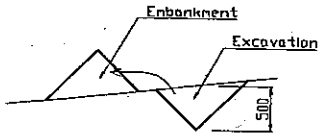


Farm Ditch

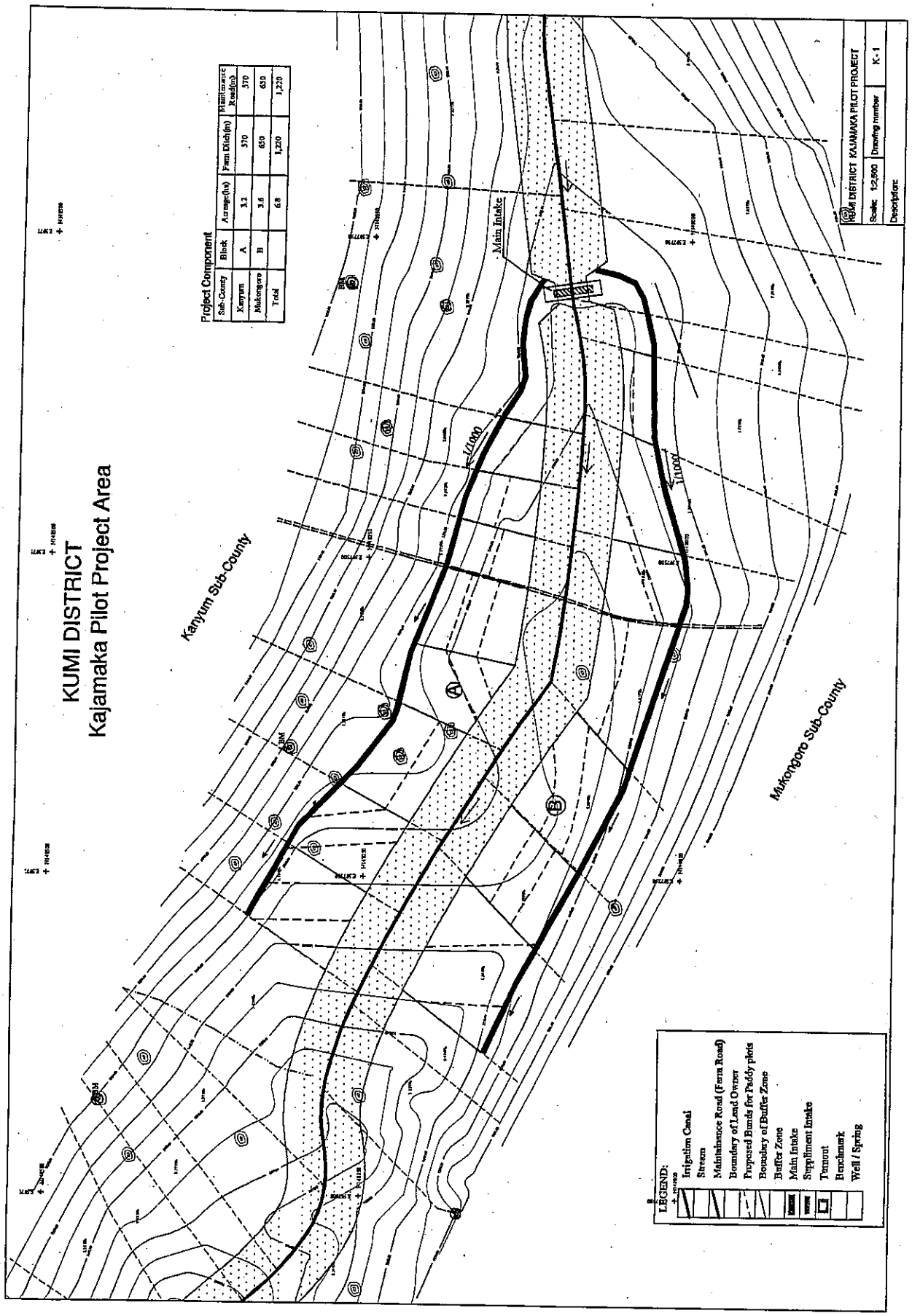
Link Canal

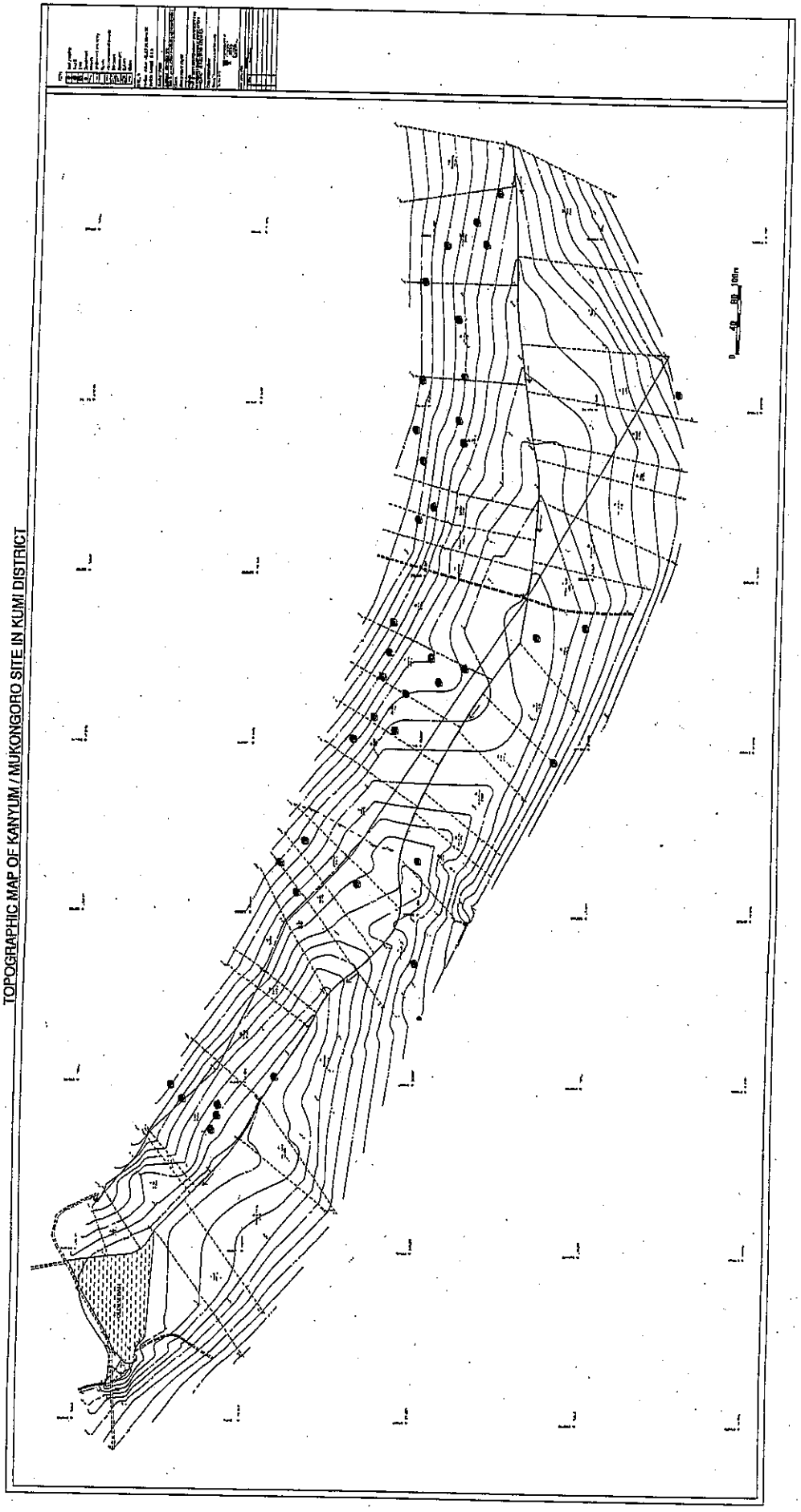


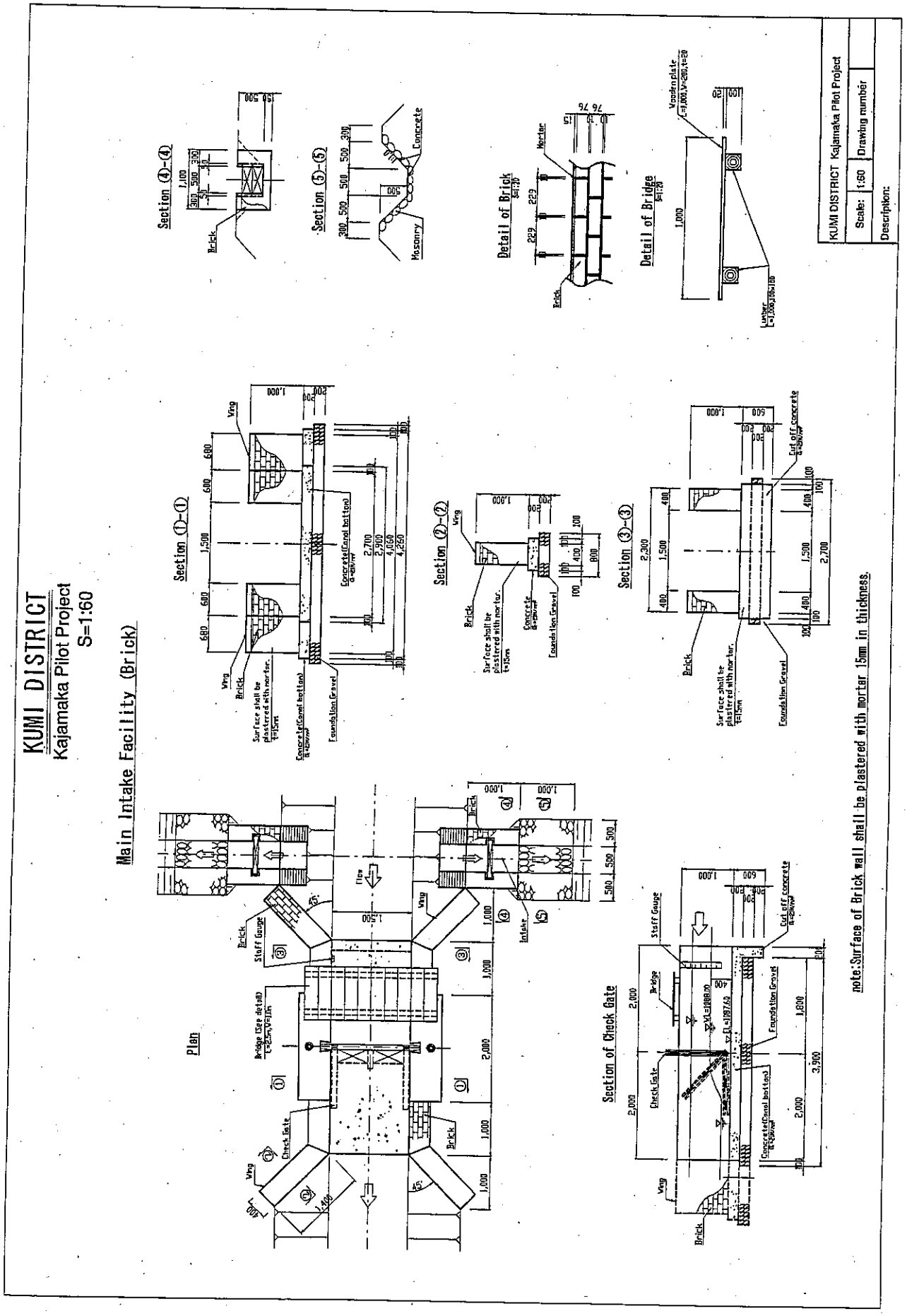
Collector Drainage

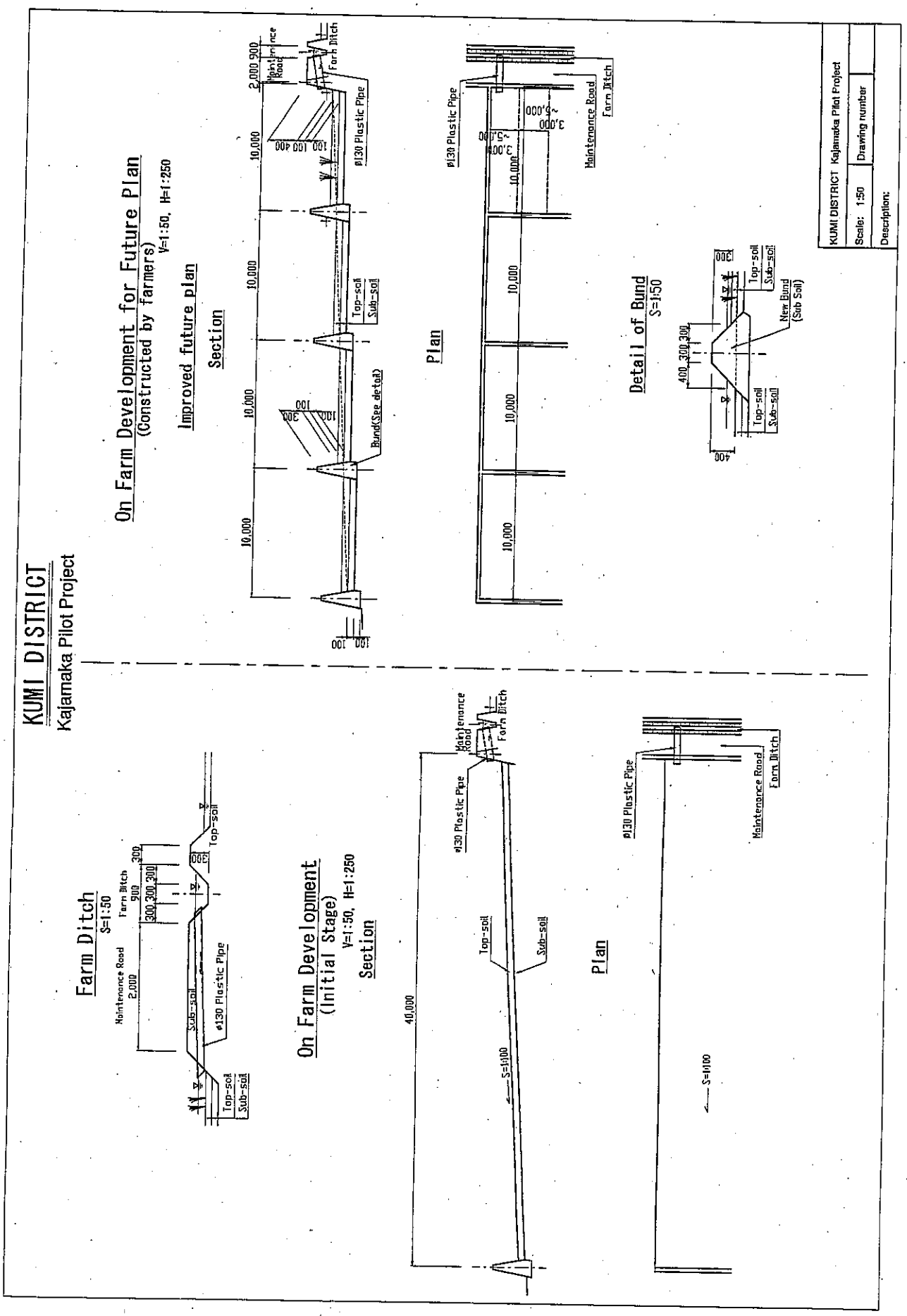


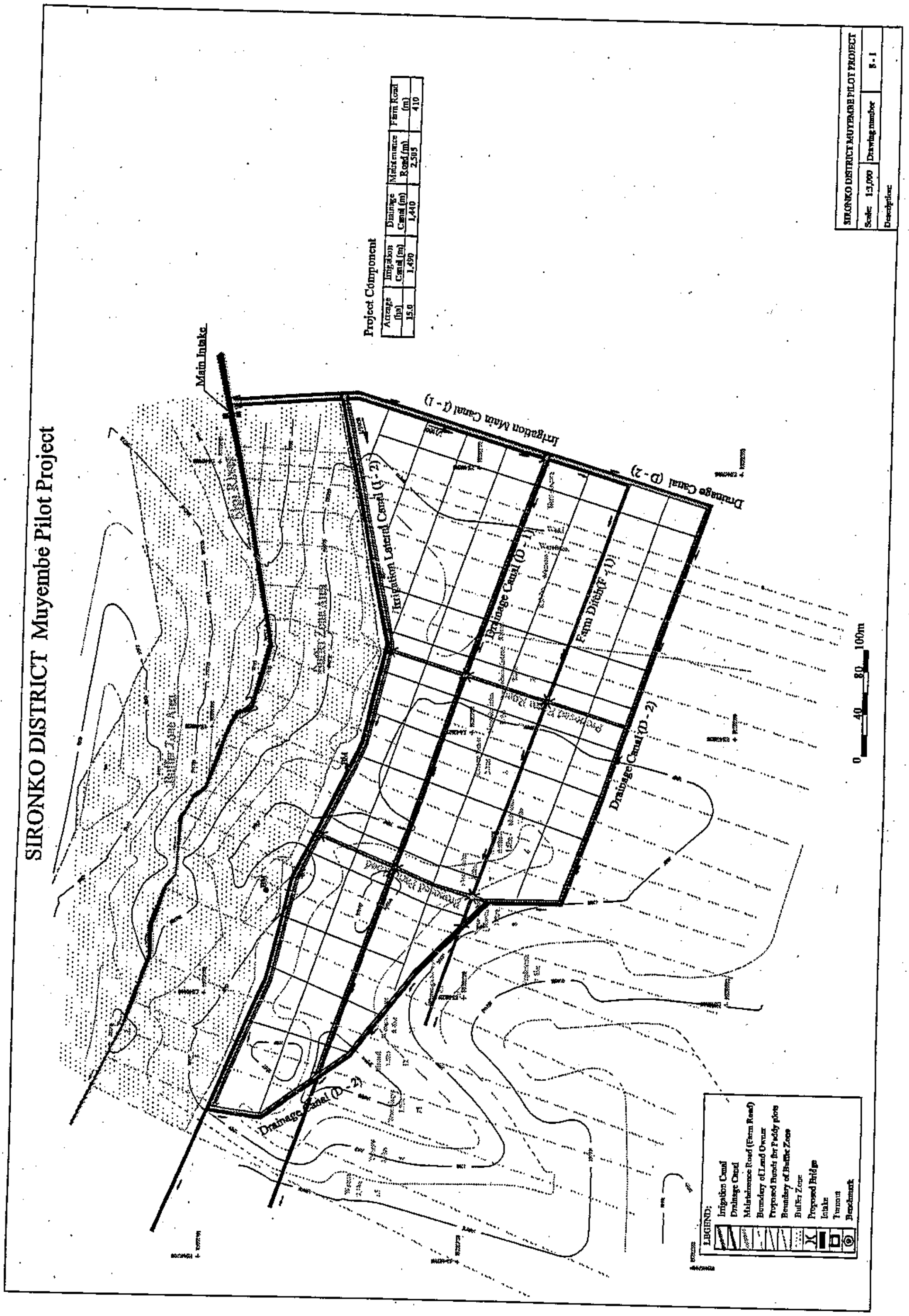
BUGIRI DISTRICT Kasoluwe Pilot Project			
Scale:	1:50	Drawing number	
Description:			


KUMI DISTRICT
Kajamaka Pilot Project Area
Kanyum Sub-County
Mukongoro Sub-County
Main Intake
Project Component
Sub-County | Block | Acreage(ha) | Farm Ditch(m) | Maintenance Road(m)
Kanyum | A | 3.2 | 570 | 570
Mukongoro | B | 3.6 | 650 | 650
Total | | 6.8 | 1,220 | 1,220
LEGEND:
Irrigation Canal
Stream
Maintenance Road (Farm Road)
Boundary of Land Owner
Proposed Bunds for Paddy plots
Boundary of Buffer Zone
Buffer Zone
Main Intake
Supplement Intake
Turnout
Benchmark
Well / Spring
KUMI DISTRICT KAJAMAKA PILOT PROJECT
Scale: 1:2,500
Drawing number
K-1
Description:

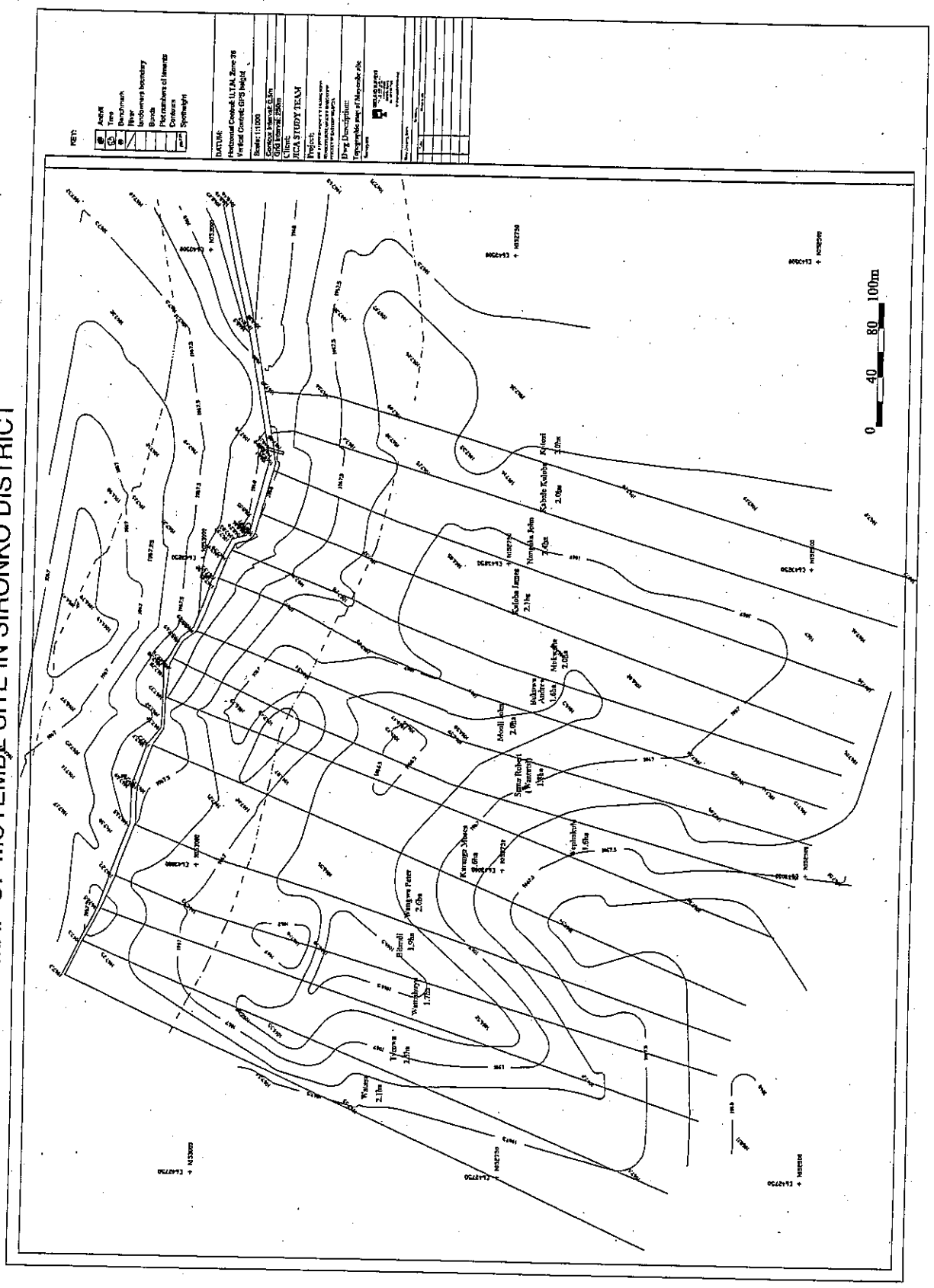

TOPOGRAPHIC MAP OF KANYUM / MUKONGORO SITE IN KUMI DISTRICT

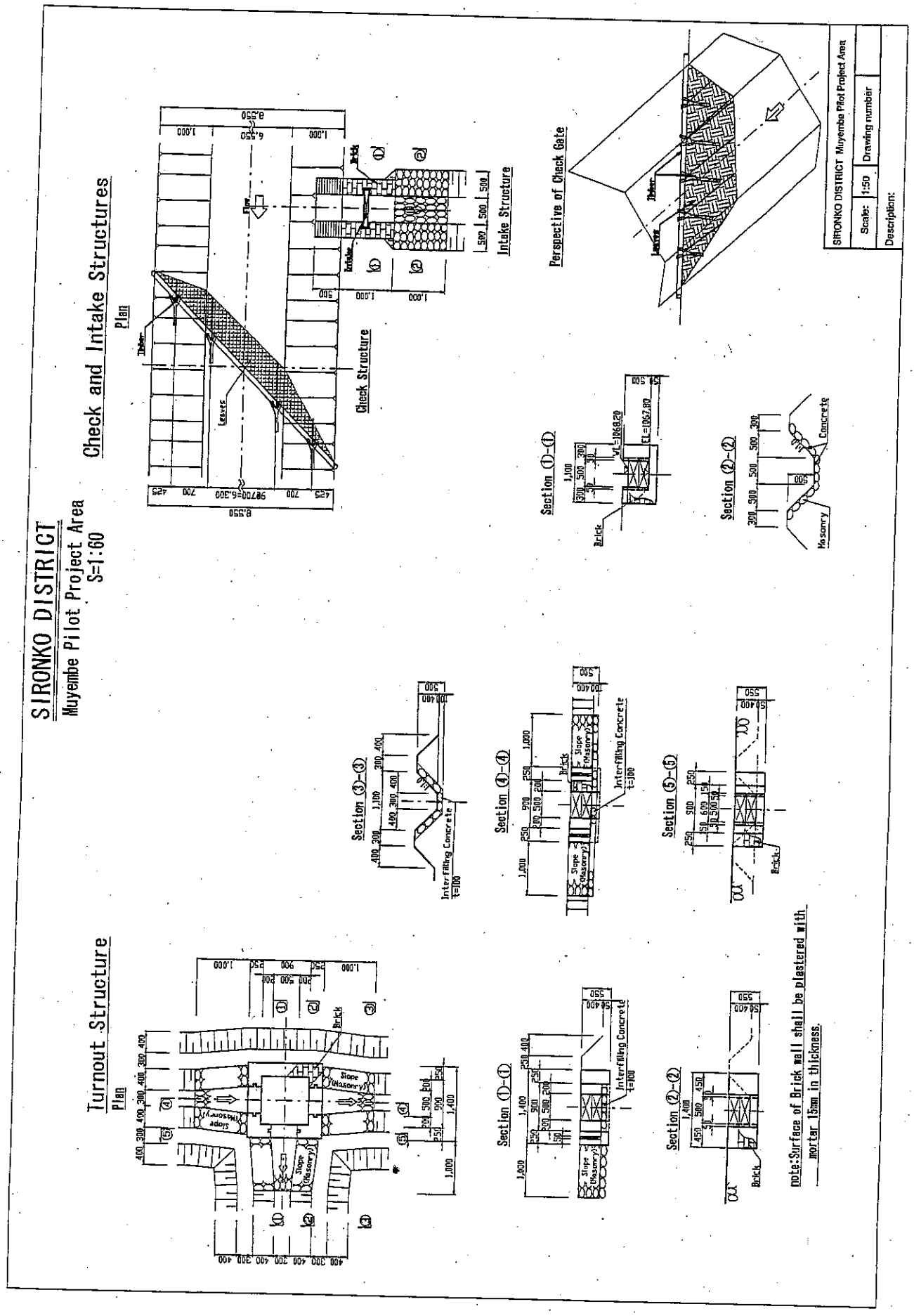

KUMI DISTRICT
Kajamaka Pilot Project
S=1:60
Main Intake Facility (Brick)
Plan
Section ①-①
Section ②-②
Section ③-③
Section ④-④
Section ⑤-⑤
Detail of Brick
Detail of Bridge
Section of Check Gate
Brick
Wing
Intake
Staff gauge
Check Gate
Bridge
Concrete
Mortar
Masonry
Foundation Gravel
Cut off concrete
Surface shall be plastered with mortar t=15mm
KUMI DISTRICT Kajamaka Pilot Project
Scale: 1:60
Drawing number
Description:
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.

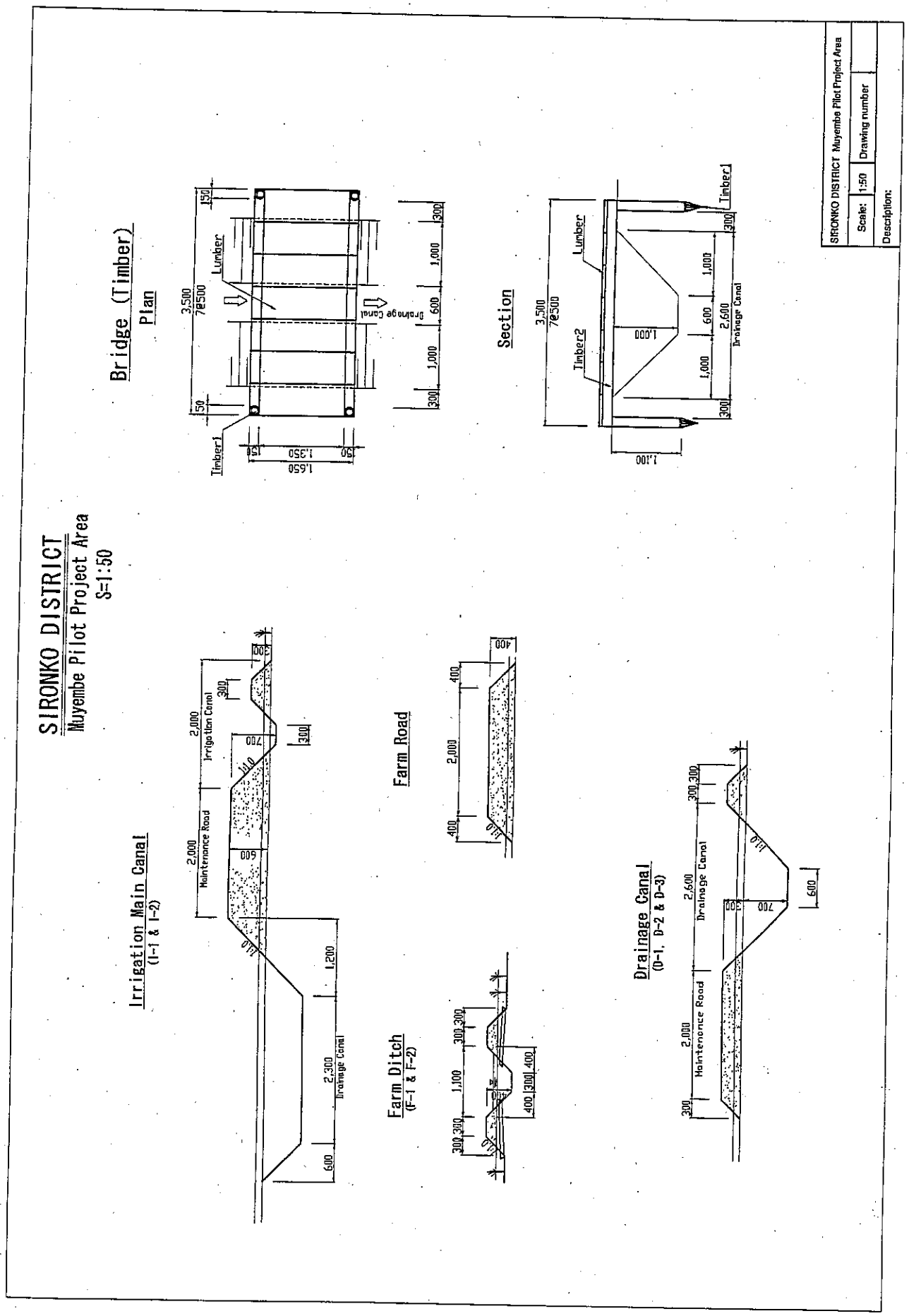

KUMI DISTRICT
Kajamaka Pilot Project
On Farm Development for Future Plan
(Constructed by farmers)
V=1:50, H=1:250
Improved future plan
Section
Plan
Detail of Bund
S=1:50
Farm Ditch
S=1:50
On Farm Development
(Initial Stage)
V=1:50, H=1:250
Section
Plan
Maintenance Road
Farm Ditch
Top-soil
Sub-soil
Bund(See detail)
New Bund
(Sub Soil)
#130 Plastic Pipe
S=1/100
KUMI DISTRICT Kajamaka Pilot Project
Scale: 1:50
Drawing number
Description:


SIRONKO DISTRICT Muyembe Pilot Project
Project Component
Acreage (ha) | Irrigation Canal (m) | Drainage Canal (m) | Maintenance Road (m) | Farm Road (m)
15.0 | 1,490 | 1,440 | 2,505 | 410
SIRONKO DISTRICT MUYEMBE PILOT PROJECT
Scale 1:3,000
Drawing number
B - 1
Description
Main Intake
Irrigation Main Canal (I - 1)
Irrigation Lateral Canal (I - 2)
Drainage Canal (D - 2)
Drainage Canal (D - 1)
Farm Ditch (F - 1)
Buffer Zone Area
0 40 80 100m
LEGEND:
Irrigation Canal
Drainage Canal
Maintenance Road (Farm Road)
Boundary of Land Owner
Proposed Bunds for Paddy plots
Boundary of Buffer Zone
Buffer Zone
Proposed Bridge
Intake
Turnout
Benchmark

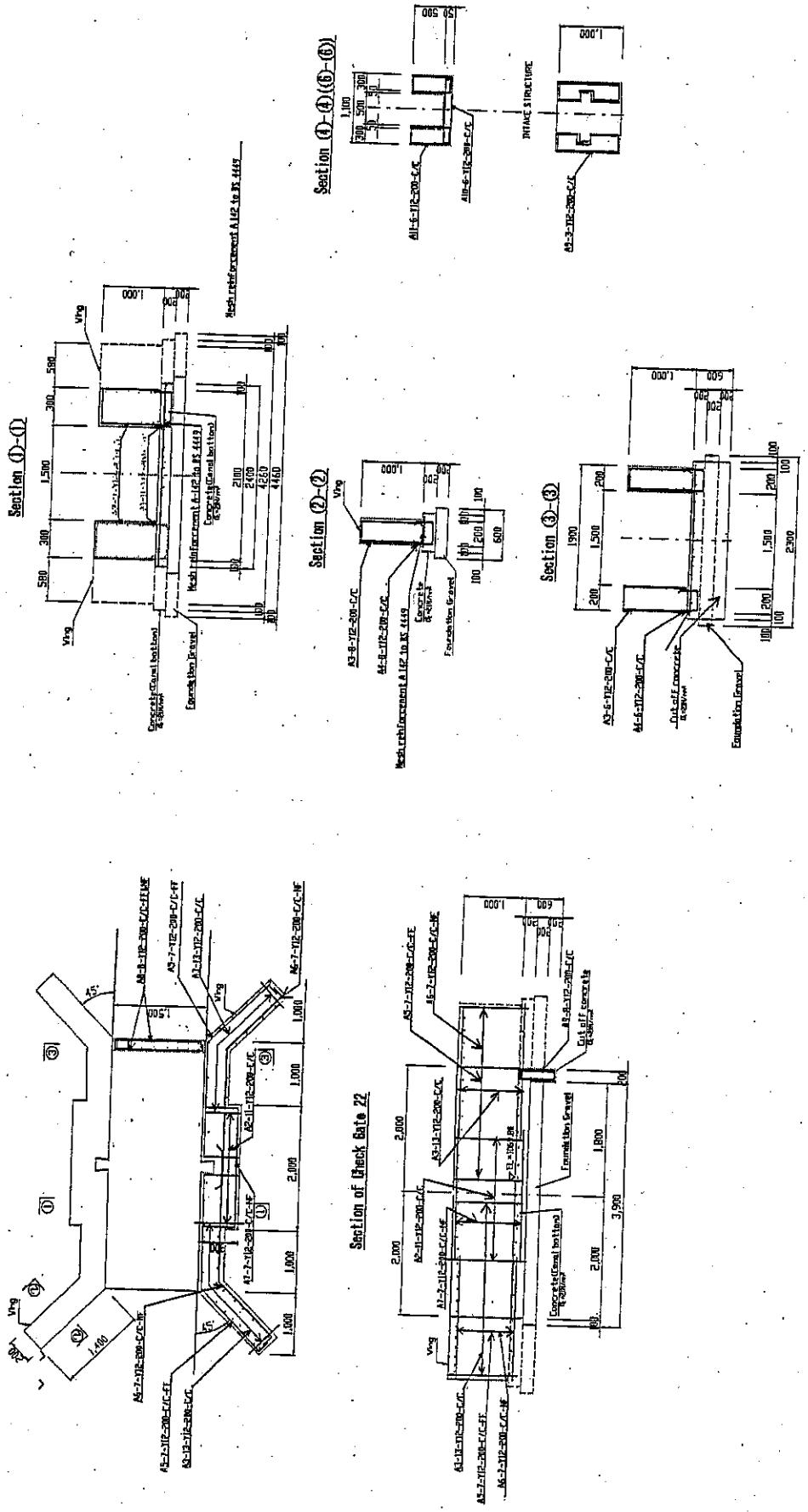
TOPOGRAPHIC MAP OF MUYEMBE SITE IN SIRONKO DISTRICT

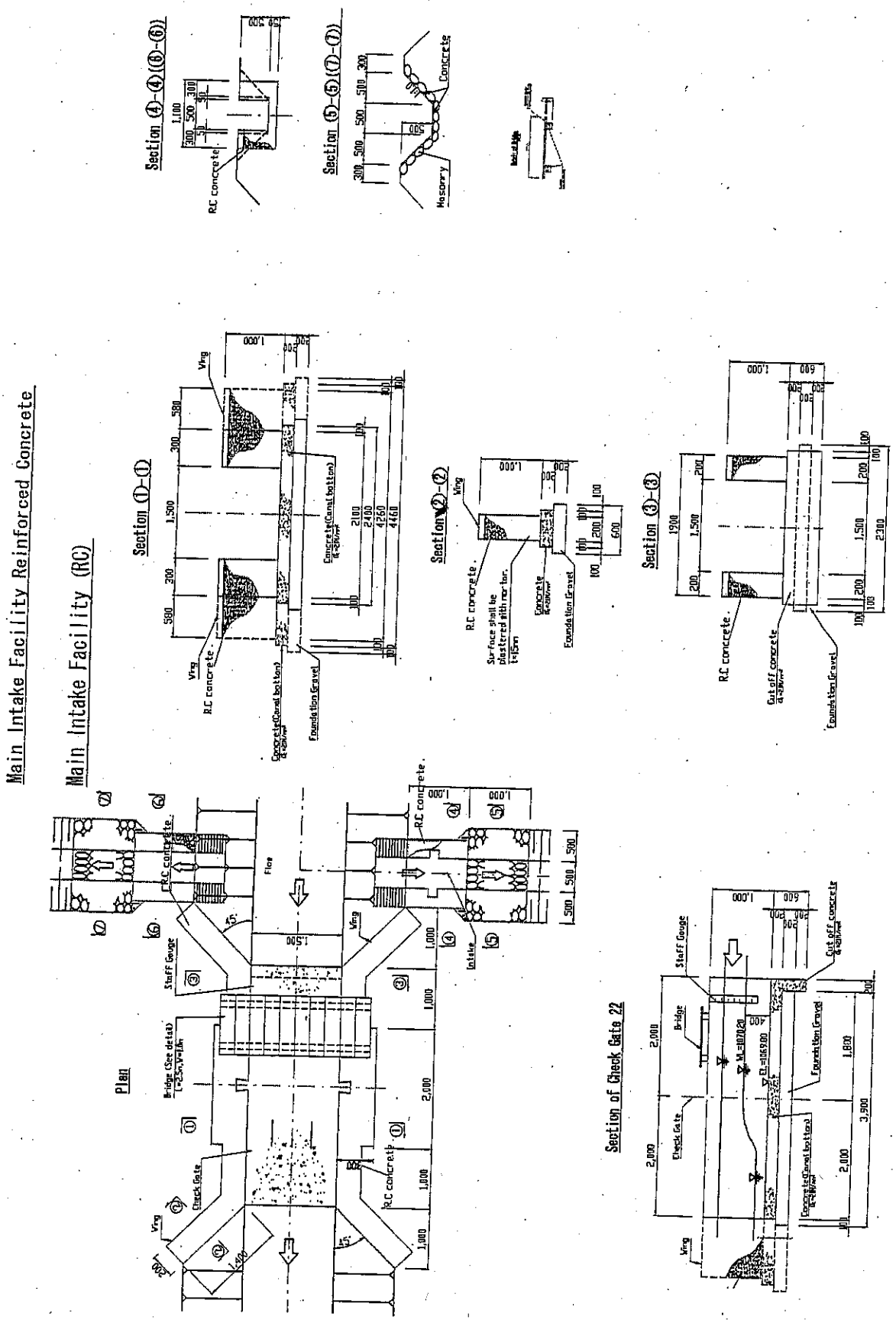



SIRONKO DISTRICT
Muyembe Pilot Project Area
S=1:60
Check and Intake Structures
Plan
Check Structure
Intake Structure
Perspective of Check Gate
Section ①-①
Section ②-②
Section ③-③
Section ④-④
Section ⑤-⑤
Turnout Structure
Plan
Section ①-①
Section ②-②
note:Surface of Brick wall shall be plastered with mortar 15mm in thickness.
SIRONKO DISTRICT Muyembe Pilot Project Area
Scale: 1:50
Drawing number
Description:

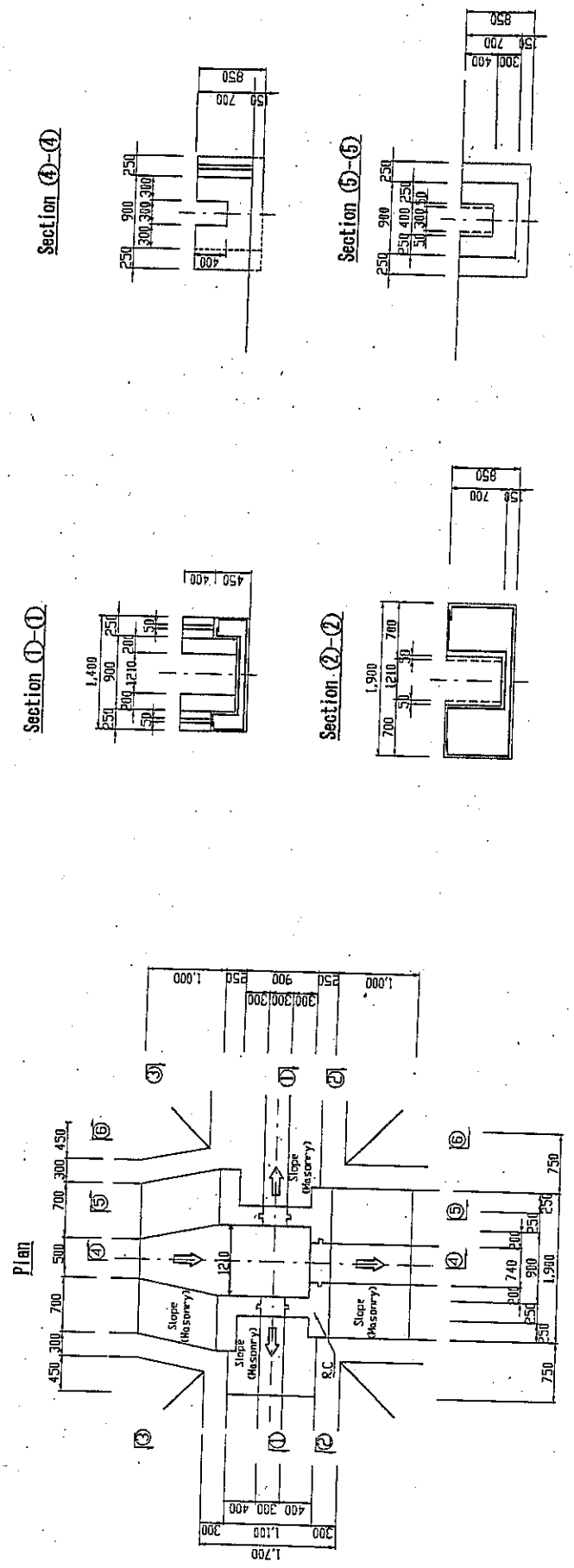

SIRONKO DISTRICT
Muyembe Pilot Project Area
S=1:50
Bridge (Timber)
Plan
Section
Lumber
Timber1
Timber2
Drainage Canal
Irrigation Main Canal
(I-1 & I-2)
Irrigation Canal
Maintenance Road
Drainage Canal
Farm Road
Farm Ditch
(F-1 & F-2)
Drainage Canal
(D-1, D-2 & D-3)
SIRONKO DISTRICT Muyembe Pilot Project Area
Scale: 1:50
Drawing number
Description:

Main Intake Facility Structural Drawings

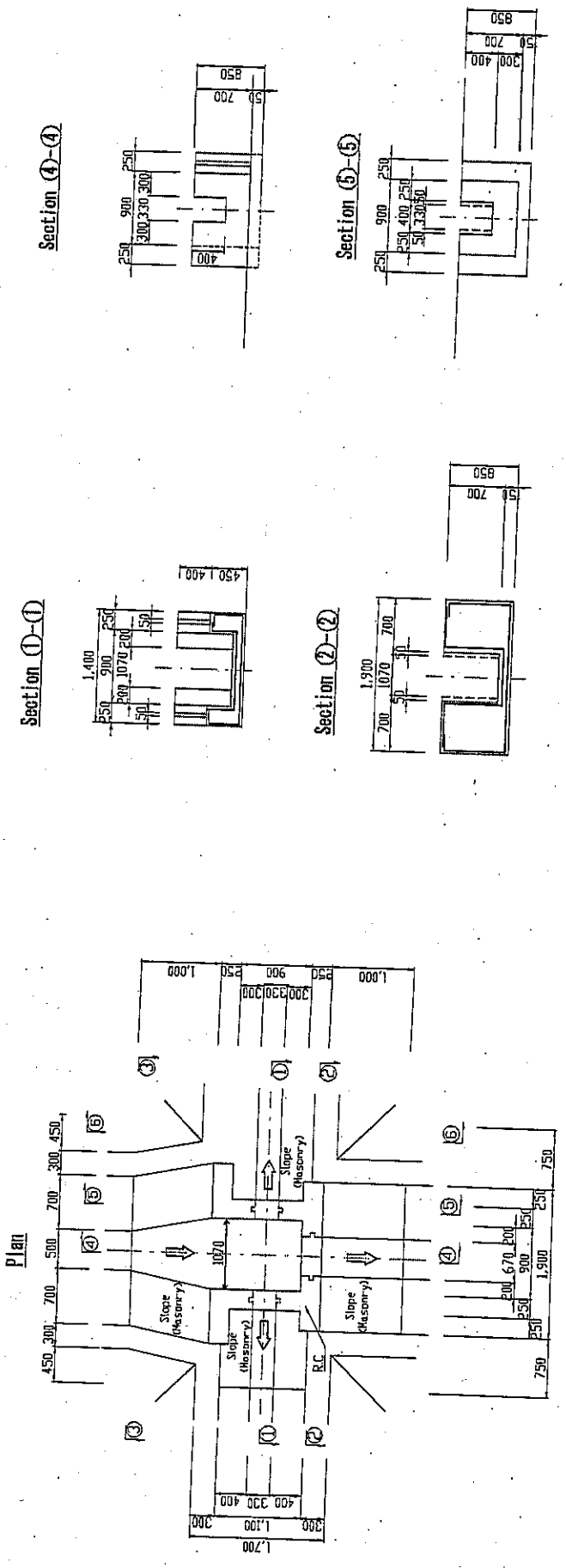



Main Intake Facility Reinforced Concrete
Main Intake Facility (RC)
Plan
Section ①-①
Section ②-②
Section ③-③
Section ④-④(⑥-⑥)
Section ⑤-⑤(⑦-⑦)
Section of Check Gate 22
R.C concrete
Wing
Staff Gauge
Check Gate
Bridge
Intake
Flow
Foundation Gravel
Cut off concrete
Concrete
Masonry
Surface shall be plastered with mortar.

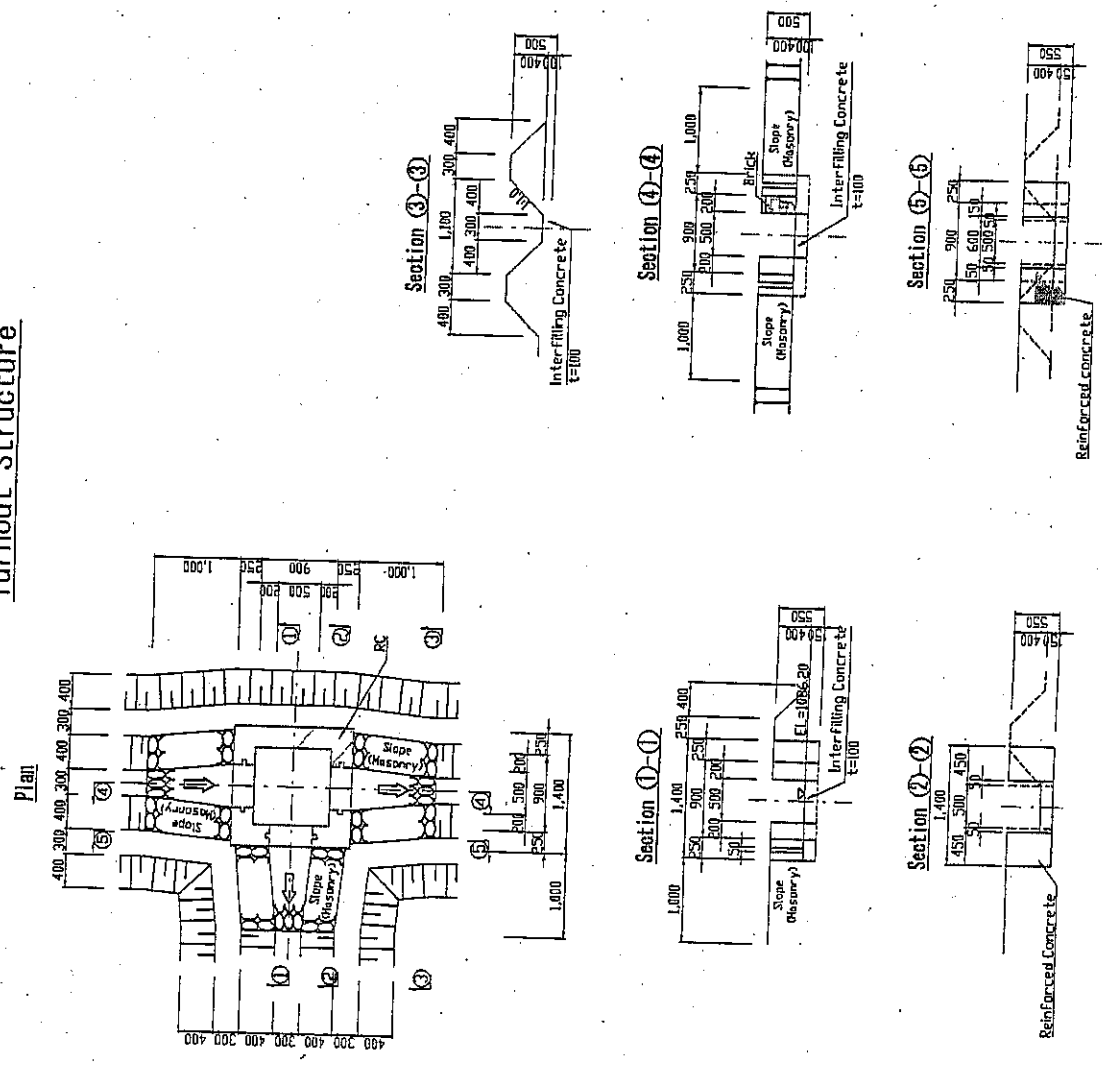
Supplimentary intake facility type 1-1-Structural Drawings



Supplimentary intake facility type 1-2-Structural Drawings



Turnout Structure



JICA STUDY TEAM

In collaboration with

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES
GOVERNMENT OF THE REPUBLIC OF UGANDA

CONSTRUCTION OF FOUR PILOT IRRIGATION PROJECTS IN PALLISA, BUGIRI, KUMI AND SIRONKO DISTRICTS.

FIELD TRAINING MANUAL
FOR
IRRIGATION, DRAINAGE AND MANAGEMENT TECHNOLOGY

January 2006

Selwa Uganda Limited
P.O.Box 816
Tel. (256) 043-120295
Jinja-Uganda

TABLE OF CONTENTS

Detailed Curriculum for Technical Training for Extension Service Staff and Seed Growers

Date		Morning Programme (from 9:00 a.m. to 12: 00 a.m.)		Afternoon Programme (from 1:00 p.m. to 4:30 p.m.)	
First Session: at Transplantation Stage					
1/9	Sun		Mobilisation of Trainees to Mbale		
1/10	Mon	09:30 – 09:50	Ceremony for Opening of Staff Training Course (1) Opening address by the Commissioner, MAAIF	13:30 – 16:00	Field orientation on Irrigated Paddy Cultivation (site seeing in the Doho Irrigation Scheme)
		09:50 – 11:00	(2) Speech by the Leader of JICA Study Team (3) Speech by the Chief Counterpart, MAAIF (4) Speech by Chairman of Doho Rice Irrigation Scheme		
		11:00 – 12:00	Orientation on the Overall programme on Training Course		
		12:00 – 13:30	Lunch break		
1/11	Tue	09:00 – 10:30	Lecture on plant physiological feature//characteristics of paddy plant	13:30 – 16:00	Field exercise in field layout//preparation of the testing plots and application of fertilisers
		10:40 – 12:00	Lecture on what are major factors for determination of paddy yield		
		12:00 – 13:30	Lunch break		
1/12	Wed	09:00 – 11:00	Lecture on the standard farming practices in paddy cultivation (Nursery Work)	13:30 – 16:00	Field exercise in up-rooting of seedlings and regular transplantation in the buffer area
		11:10 – 12:00	Lecture on the scheduled experimental work on paddy		
		12:00 – 13:30	Lunch break		
1/13	Thu	09:00 – 11:00	Lecture on the standard farming practices in paddy cultivation (Main Field Work)	13:30 – 16:00	Field exercise in up-rooting of seedlings and regular transplantation in the buffer area
		11:10 – 12:00	Current rice production technology in the advanced rice producing countries		
		12:00 – 13:30	Lunch break		
1/14	Fri	09:00 – 11:00	Lecture on the essential up-keeping work on paddy plant at vegetative and generative growth period	13:30 – 16:00	Up-rooting of seedlings and regular transplantation of seedlings to each testing plot
		11:10 – 12:00	Lecture on the organic farming to be applicable to paddy cultivation		
		12:00 – 13:30	Lunch break		
1/15	Sat	9:00 – 12:00	Orientation on establishment of Technical Demonstration Farm Plots in the pilot project area of each district, including Orientation about Key farmers' training programme// demonstration farm plots	13:30 – 14:30	Group discussion about paddy rice cultivation technology
		12:00 – 13:30	Lunch break	14:40 – 16:00	Group discussion about Guideline of Paddy Rice Cultivation Technology
1/16	Sun	9:00 – 12:00	Field inspection in paddy cultivation area outside of the Doho Rice Irrigation Scheme, i.e., small scale paddy cultivation scheme in Pallisa, Iganga, etc.	13:30 – 16:00	Continuation of field inspection, covering advanced small scale rice schemes in Bugiri and large scale rice scheme at Kibinba
		12:00 – 13:30	Lunch break at Iganga		

Date		Morning Programme (from 9:00 a.m. to 12: 00 a.m.)		Afternoon Programme (from 1:00 p.m. to 4:30 p.m.)	
Second Session: at Active Tillering Stage					
1/24	Mon	9:00 – 10:30	Guidance on how to observe field data on paddy growing conditions as well as up-keeping practice at active tillering stage	13:30 – 14:30	Guidance on how to process//analyse field data, and then, exercise analysis of field data
		10:45 – 12/00	Exercise of field measurement on paddy growing conditions	14:40 – 16:00	Discussion about the paddy growing conditions according to the field data observed//analysed
		12:00 – 13:30	Lunch break		
1/25	Tue	9:00 – 12:00	Field exercise of the first weeding and identification of weeds	13:30 – 16:00	Continuation of weeding work in testing plots
		12:00 – 13:30	Lunch break		
1/26	Wed	9:00 – 10:30	Lecture on crop//soil fertilisation technology, and the fertilisation effect in paddy production	13:30 – 16:00	Field exercise on fertiliser application
		10:40 – 12:00	Exercise on how to plan and design dosage of fertilisers		
		12:00 – 13:30	Lunch break		
1/27	Thu	9:00 – 12:00	Within the Doho Rice Irrigation Scheme area, field inspection and identification of pest and diseases to be appeared during the most active tillering stage	13:30 – 15:00	Discussion and identification of pest and diseases
		12:00 – 13:30	Lunch break		
1/28	Fri	9:00 – 12:00	Group discussion and assessment of the present training programme on the following issues: ① Interest on topics ; ② Effectiveness of training method; ③ Helpfulness of training materials; ④Appropriateness of training period (session)		Paper test for assessment of degree of technical capacity building
Third Session: at maximum Tillering//Neck-node Differentiation Stage					
2/7	Mon	9:00 – 10:30	Field guidance on up-keeping practice at the maximum tillering & reduction division stage	13:30 – 14:30	Analysis of field data and compilation of field observation
		10:45 – 12/00	Field observation and measurement on paddy growing conditions	14:40 – 16:00	Discussion about the paddy growing conditions according to the field data observed//analysed
		12:00 – 13:30	Lunch break		
2/8	Tue	9:00 – 12:00	Field exercise of the second weeding and identification of weeds	13:30 – 16:00	Continuation of weeding work in testing plots
		12:00 – 13:30	Lunch break		
2/9	Wed	9:00 – 10:30	Lecture on NAADS Programme and essential function of the Extension Service Providers	13:30 – 16:00	Field exercise on application of additional fertilisers
		10:40 – 12:00	Lecture on wetland environment		
		12:00 – 13:30	Lunch break		
2/10	Thu	9:00 – 12:00	Doho Rice Irrigation Scheme area, field inspection, identification of pest and diseases that will be appeared during the maximum tillering to neck-node differentiation stage	13:30 – 15:00	Discussion and identification of pest and diseases
		12:00 – 13:30	Lunch break		

Date		Morning Programme (from 9:00 a.m. to 12: 00 a.m.)		Afternoon Programme (from 1:00 p.m. to 4:30 p.m.)	
Fourth Session: at Reduction Division Stage					
2/21	Mon	9:00 – 10:30	Guidance on up-keeping practice at the reduction division stage	13:30 – 14:30	Exercise on analysis of field data
		10:45 – 12/00	Field measurement on paddy growing conditions	14:40 – 16:00	Discussion about the paddy growing conditions according to the field data observed//analysed
		12:00 – 13:30	Lunch break		
2/22	Tue	9:00 – 12:00	Field exercise of the third weeding and identification of weeds	13:30 – 16:00	Continuation of weeding work in testing plots
		12:00 – 13:30	Lunch break		
2/23	Wed	9:00 – 10:30	Lecture on Wise Use of Wetland, including necessity of wetland conservation	13:30 – 16:00	Field exercise on application of additional chemical fertilisers and agro-chemicals if required
		10:40 – 12:00	Field inspection in wetland and discussion how to conserve wetland environment		
		12:00 – 13:30	Lunch break		
2/24	Thu	9:00 – 12:00	Field inspection, identification of pest and diseases to be appeared during the booting stage	13:30 – 15:00	Discussion and identification of pest and diseases
		12:00 – 13:30	Lunch break		
Fifth Session: at Full Heading Stage					
3/14	Mon	9:00 – 11:00	Field guidance on up-keeping practice at the heading// flowering to full heading stage of paddy	13:30 – 14:30	Field observation and measurement on paddy growing conditions
		11:10 – 12:00	Field measurement on paddy growing conditions	14:45 – 15:30	Analysis of the field data collected
		12:00 – 13:30	Lunch break	15:30 – 16:00	Discussion and assessment of paddy growing conditions according to the results of field data analysis
3/15	Tue	9:00 – 12:00	Field exercise of the fourth weeding especially control of sedge and wild millets, and variety purification practices	13:30 – 16:00	Continuation to the field exercise on weeding and variety purification practices
		12:00 – 13:30	Lunch break		
3/16	Wed	9:00 – 12:00	Field inspection and identification of pest and diseases to be appeared during the heading//flowering stage		Continuation to the field exercise on weeding and variety purification practices
		12:00 – 13:30	Lunch break		
3/17	Thu	9:00 – 12:00	Lecture on when and how number of panicles as well as number of grains per panicle is determined		Field exercise on application of fourth additional fertilisers, and agro-chemicals if required
		12:00 – 13:30	Lunch break		
3/18	Fri	9:00 – 12:00	Group discussion and assessment of the present training programme on the following issues: ①Interest on topics; ②Effectiveness of training method; ③Helpfulness of training materials; ④Appropriateness of training period (session)	13:30 – 14:30	Paper test for assessment of degree of technical capacity building
		12:00 – 13:30	Lunch break		

Date		Morning Programme (from 9:00 a.m. to 12: 00 a.m.)		Afternoon Programme (from 1:00 p.m. to 4:30 p.m.)	
Sixth Session: at Yellow Ripening Stage					
4/18	Mon	9:00 – 10:30	Lecture on when and how 1000 grains weight and percentage of ripened grains are determined	13:30 – 15:00	Field observation and measurement of paddy growing conditions at the yellow ripening stage
		10:45 – 12:00	Field guidance in assessment//identification of an adequate timing of harvesting	15:10 – 16:00	Analysis of field data, and assessment of the growing conditions
		12:00 – 13:30	Lunch break		
4/19	Tue	9:00 – 11:00	Lecture on how to plan cropping schedule and design dosage of farm inputs so as to obtain a target yield, successfully	13:30 – 16:00	Exercise on field assessment of paddy yield on the bases of the conditions of four elemental components of paddy yield, i.e., ①number of panicles per hill//unit area; ②number of ripened grains per panicle//hill//unit area; ③ percentage of ripened grains per panicles//hill/unit area; and ④1000 grain weight specified for each variety
		11:10 – 12:00	Exercise on preparation of cropping plan and design of farm inputs application		
		12:00 – 13:30	Lunch break		
4/20	Wed	9:00 – 12:00	Field exercise on panicle harvesting in each testing plots for collection of the basic seeds for preservation	13:30 – 16:00	Continuation of panicle harvesting in each testing plot
		12:00 – 13:30	Lunch break		
4/21	Thu	9:00 – 10:30	Paper test for assessment of degree of technical capacity building	13:30 – 16:00	Continuation of panicle harvesting in each testing plot
		10:10 – 12:00	Continuation of panicle harvesting in each testing plot		
		12:00 – 13:30	Lunch break		
4/22	Fri	9:00 – 12:00	Finishing of the Training Course and presentation of the Certificate of Completion of the Training Course		
		12:00 – 14:00	Completion Lunch		

Summary of the Analytical Methodologies Used for the Various Water Quality Parameters

Parameter	Principle	Instrument
PH	This was done using the electrometric method, which is the determination of the activity of the H+ ions, by potentiometric measurement using a glass electrode and a reference electrode. The electromotive force emf produced in the glass electrode system varies linearly with pH.	Water Checker U-10 Field Multiprobe
	Electrical conductivity is obtained by direct measurement with a conductivity meter. The physical measurement made is directly related to the concentration of ionic solutes in the water. Conductivity was measured at a reference temperature of 25°c with a standard conductivity cell.	Water Checker U-10 Field Multiprobe
Nitrate	Nitrite reacts in strongly acidic medium with sulfanilamide. The resulting diazo compound is coupled with N-1-naphthylethylenediamine In the automated method for the determination of Nitrate and Nitrite, the sample is passed through a column containing granulated copper-cadmium to reduce the nitrate to nitrite. The nitrite (originally present plus reduced nitrate) is determined by diazotizing with sulfanilamide and coupling with N- (Naphthyl) - ehtylenediamine dihydrochloride to form an intensely red-coloured azo dye, which is measured at 540nm. Nitrate is obtained by difference from the unreduced sample.	UV Spectrophotometer
Phosphates	Ammonium molybdate and potassium antimonyl tartrate react in acid medium with orthophosphate to form an antimony-phospho-molybdate complex. This complex is reduced to an intensely blue-coloured complex by ascorbic acid. The complex is measured at 880nm. The acid conditions may cause partial hydrolysis of condensed phosphates and/or some more labile organic phosphates, if present. For this reason the determinant is referred to as reactive phosphorus instead of orthophosphate.	Skalar Segmented Automatic Flow Analyser
Total Phosphorous	The sample is digested with potassium persulphate, which converts all the phosphorous forms into orthophosphates. This is then determined spectrophotometrically as detailed above.	Skalar Segmented Automatic Flow Analyser

Parameter	Principle	Instrument
Sodium	Sodium is determined by Flame emission photometry at a wavelength of 589 nm. The sample is sprayed into a gas flame and excitation is carried out under carefully controlled and reproducible conditions. The desired spectral line is isolated by the use of a filter. The intensity of light at 589nm is approximately proportional to the concentration of the element.	Flame photometer
Potassium	Dissolved Potassium is determined using a flame photometer at a wavelength of 766.5nm. The sample is aspirated into a flame of sufficient thermal energy to cause any potassium present to emit its characteristic radiation. The intensity of the light isolated by a filter is proportional to the concentration of potassium in the original sample.	Flame photometer
Total Hardness, Ca, Mg	Total Hardness is determined by the complexometric titration of an aliquot of the sample using ethylene diamine tetra-acetic acid (EDTA) in the presence of a suitable indicator. When the indicator Eriochrome Black-T is added to a solution containing calcium and magnesium ions at pH 10±0.1 the solution will be pink to wine-red. On titrating with EDTA the solution will turn blue when sufficient EDTA has been added to complex all the calcium, magnesium and other reactive ions present. Calcium hardness is obtained by selectively masking complexation of magnesium and magnesium is obtained by difference	Digital burette titrator
Ammonia	The automated procedure for Ammonia is based on the modified Berthelot (Indophenol) method. Ammonia is chlorinated to monochloramine which reacts with alkaline salicylate to 5 - aminosalicylate. After oxidation and oxidative coupling a green coloured complex is formed. Sodium nitroprusside is used to catalyse the reaction.	Skalar Automated flow analyser
Temperature	Linear thermal expansivity of mercury	Mercury filled Celsius thermometer
Biocides	Scan UV Spectrophotometry after extraction	Shimadzu model 601

Summary of the Analytical Methodologies Used for the Various Soil Quality Parameters

Parameter	Principle	Instrument
Available Phosphorus	The Olsen method was used. The soil is extracted with a 0.5M sodium bicarbonate solution at PH 8.5. In calcareous soils and alkaline or neutral soils containing calcium phosphates, the extraction solution decreases the calcium concentration in solution by precipitation of calcium as $CaCO_3$, which results in an increase of phosphate in solution. In acid soils containing aluminium and iron phosphates the phosphate concentration increases due to the high pH. Because of high pH, a part of the organic phosphate is also hydrolysed and analysed. The low level at which the calcium, aluminium and iron concentrations are kept in the extract, prevents precipitation of dissolved phosphate. By prolonging the extraction period of the regular Olsen method (30min) up to 2 hours, more phosphate is dissolved. Especially the contribution of organic phosphates from soils poor in phosphate is increased. With an acid molybdate solution, phosphate forms phosphomolybdenic acid, which can be reduced to phospho-molybdenic-blue by ascorbic acid. The acid molybdate solution contains also antimony, which accelerates the development of the blue colour and keeps it stable for at least 24 hours. The intensity of the blue colour is dependent on the phosphate content and can be measured with a spectrophotometer. With this method there is no interference of Si.	Spectrophotometer, equipped with a flow – through cuvette of 20 mm Φ and a filter adjustable to a wavelength of 880nm.
Available Nitrogen	The Kjeldahl method was used in the determination of Available nitrogen. Nitrogen components in the soil, which are not present in the crystal lattice of soil minerals or in heterocyclic compounds, are reduced to ammonium compounds by a Kjeldahl digestion procedure using sulphuric acid and a mixture of selenium, copper sulphate and sodium sulphate. Sulphuric acid is a dehydrating as well as an oxidizing agent and Se, $CuSo_4$ are catalytic agents and NaSO4 increases the boiling temperature. However, only a part of the nitrate-N will be reduced and the rest will evaporate. Therefore soils with high nitrate content are digested with a mixture of diluted Sulphuric acid and salicylic acid. The addition of salicylic acid promotes the reduction of nitrate N so that nearly all the nitrogen will be determined. Diluted sulphuric acid is used to avoid a temperature raise with the addition of the mixture to the soil sample. Since the rise in temperature would result in the loss of nitrated salicylic acid. After the digestion a subsample is taken to which an excess of NaOH is added to release nitrogen as NH_3. The NH_3 is subsequently distilled over into boric acid and then titrated with potassium biiodate.	Digestion equipment Buchi model B-426 Distillation unit, Buchi model B-316
Exchangeable potassium and sodium	The amount potassium and sodium is determined on a flame photometer and calculated by comparing the intensities of radiation, emitted by K and Na atoms with respect to a series of standard solutions.	The apparatus used include: Flame photometer Atomic absorption spectrophotometer
Exchangeable calcium and magnesium	The amount of calcium and magnesium is determined on an atomic absorption spectrophotometer and calculated by comparing absorbance of Ca and Mg atoms with respect to a series of standard solutions. To avoid interference by the formation of refractory compounds lanthanum is added as a releasing agent.	The apparatus used include: Flame photometer Atomic absorption spectrophotometer

Monitoring of Water Quality and Soil Fertility Program
(A presentation at the district workshops Feb. 2005)

Introduction:

The monitoring of water quality and soil fertility Programme is to be undertaken by MAAIF/JICA study team together with the DAO and farmers in the 4 pilot districts of Bugiri, Pallisa, Kumi and Sironko during the study stage or pilot project and is to be continued by the DAO and farmers after that. The Programme is an input into 'the study on Poverty eradication through sustainable irrigation project in Eastern Uganda.

The study follows an agreement on the scope of work between MAAIF and JICA on April 24,2003. The study area covers 13 districts including Iganga, Mayuge, Bugiri, Tororo, Mbale, Kamuli, Sironko, Pallisa, Kumi, Soroti, Katakwi and Kaberamaido.

The project intends to promote irrigation development on small rice plots of 9-18 ha. It also aims to improve existing conditions through development of infrastructure and strengthening of farmers groups by raising farm yields, water and soil management and wise use of wetlands. It is the wise use concept of the project that the water quality and soil fertility-monitoring Programme has been proposed.

What is monitoring?

Monitoring is the systematic collection of potentially large quantity of information over a long period.

Objective of the Monitoring

1. To ensure wise use of the wetland through regular monitoring of waterquality and soil fertility.
2. To acquire data necessary to address environmental issues of water quality and soil fertility.
3. Identifying the baseline data of each of environmental issues on water quality and soil fertility to act as benchmark.

For any development activity there are impacts that are either adverse or beneficial. In the case of the rice cultivation projects both biophysical, and socioeconomic impacts have been identified below:

Biophysical impacts

1. Deterioration of water quality is possible (agrochemical use eutrophication and proliferation of aquatic plants)
2. Ecological changes (changes in species diversity and abundance)
3. Land degradation (soil erosion, loss of fertility, soil salinisation)

Socioeconomic impacts

1. Disease incidences (malaria, bilharzias)

2. Health hazards (misuse of agrochemicals and improper handling of chemical containers)
3. Increased incomes to community through increased crop production
4. Increased incomes through construction work
5. Food security

Wise use /Sustainable use of wetlands

Sustainable use of a wetland means utilization, which ensures that the products or services derived from that use are available at the same level for the foreseeable, future.

To ensure wise/sustainable use of wetlands the following will be undertaken:

1. Proper use of pesticides
2. Proper use of fertilizers
3. Prevention of soil erosion (land degradation)
4. Maintenance of ecological balance
5. Monitoring (water quality, soil fertility)

Proper use of pesticides will include:

1. *use of only those pesticides approved by MAAIF*
   i.e
   Herbicide: Basagran, Ronstar
   Insecticide: Dusban, Furadan
   Fungicide: Diathene
2. *Knowledge of*
   Name of the pesticide to use
   Date when to use pesticide
   Dosage of pesticide
3. *Seek advise from MAAIF and the JICA study team on the type of chemicals to use on any particular plant disease.*

Proper use of fertilizers (inorganic)

1. *Use only fertilizers approved by MAAIF*
   i.e.
   Single Super Phosphate (SSP)
   Nitrogen -Phosphate-Potassium (NPK) Calcium Ammonium Nitrate
2. *Knowledge of*
   Name of the fertilizer to use
   Date when to apply fertilizer
   Rate of application of fertilizer

NB: use fertilizer only in the nursery

For sustainable soil fertility use composite and green manure

Prevention of soil erosion (Land degradation)

The sloppy edges of wetlands may be eroded.

- Wise use of wetland will require use of collector drains

Ecological balance

Loss of biodiversity due to clearing of vegetation when constructing canals.

- Wise use will require providing for buffer zones from central canal where possible.

Monitoring

Monitoring will be carried out on water quality and soil fertility in the pilot areas, Data will be generated on environmental issues related to both water quality and soil fertility.

Water quality monitoring

This will be initially carried out at the start (NOW) of the project.

At which points will water be monitored?

1. Upstream of the main intake gate
2. Downstream at the main outlet of drainage canal.

When will monitoring be carried out? Every year and three times a year

i.e

1. End of February (before rain and around land preparation)
2. August (at harvest)
3. January (end of rains and 2nd harvest)

Soil fertility monitoring

This will be initially carried out at the start (NOW) of the project

At which points will soil fertility he monitored?

1. Upstream of the main intake gate- at the extreme end of the rice plot
2. Mid-stream
3. Downstream at the edges of the rice field.

When will monitoring be carried out? Every other year and twice a given year;

1. One prior to the 1st growing season
2. One at its end to provide data for the 2nd season.

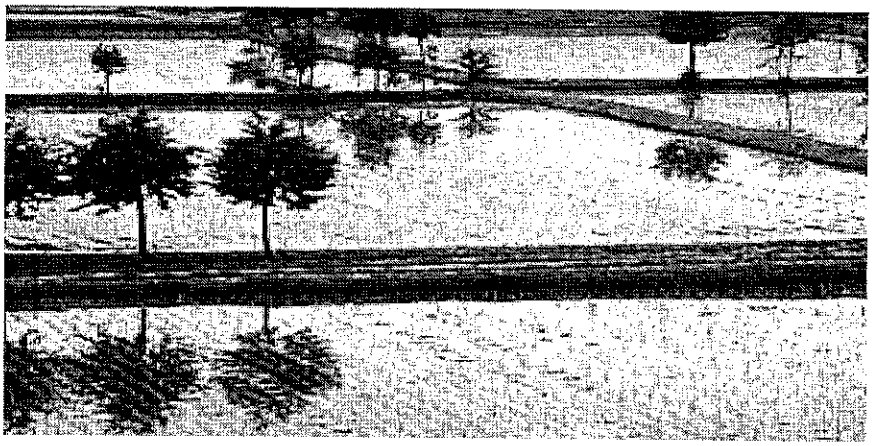
Paddy fields store rainwater temporarily. This function prevents a rapid rainwater flow, by which the damage caused by flooding in the surrounding or the downstream area can be prevented or reduced.

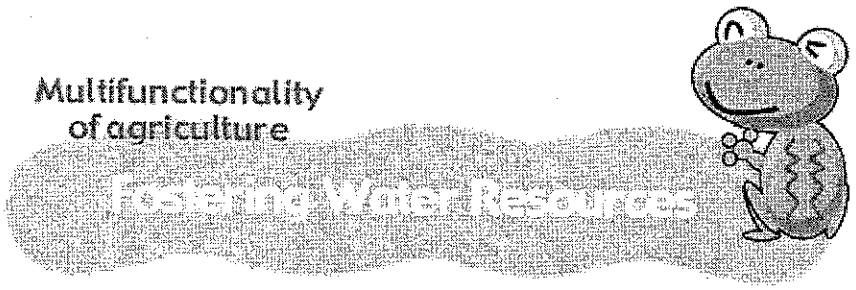
Moreover, fields also have a function to prevent disasters such as landslides.

Agriculture is thus contributing greatly to the conservation of land.

"Paddy fields inTanba, reflecting (the figure of black alders)."

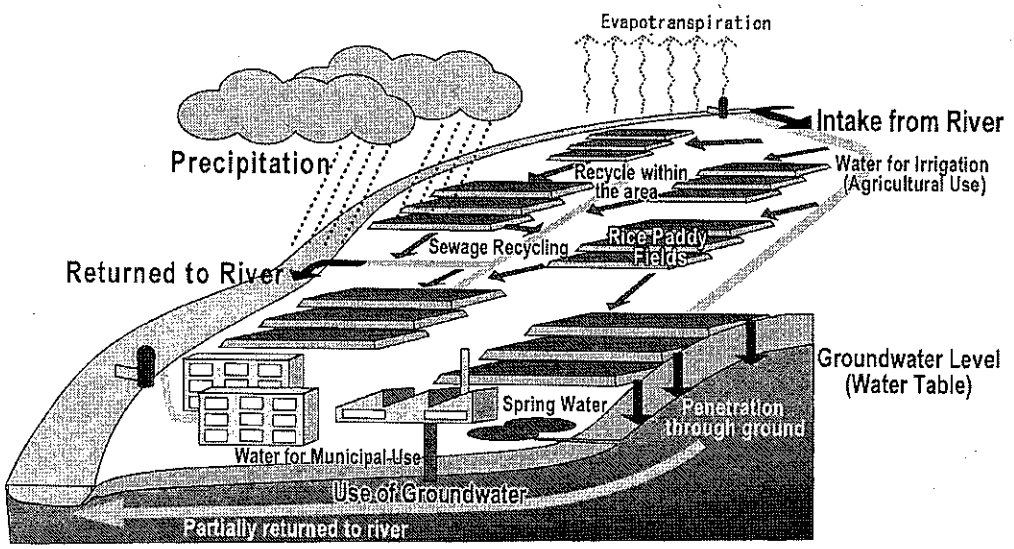
Kameoka City, Kyoto Prefecture

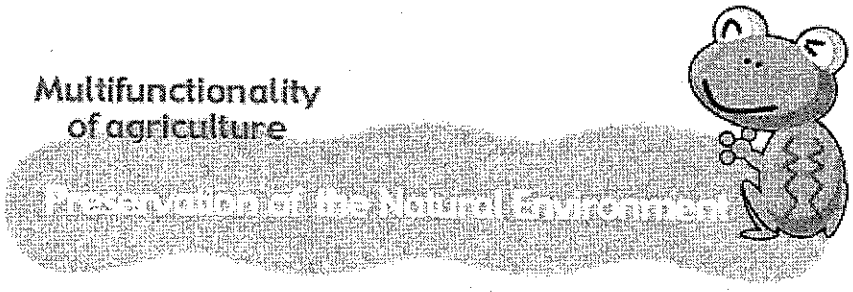




A large volume of water is stored both within and underneath paddy fields.

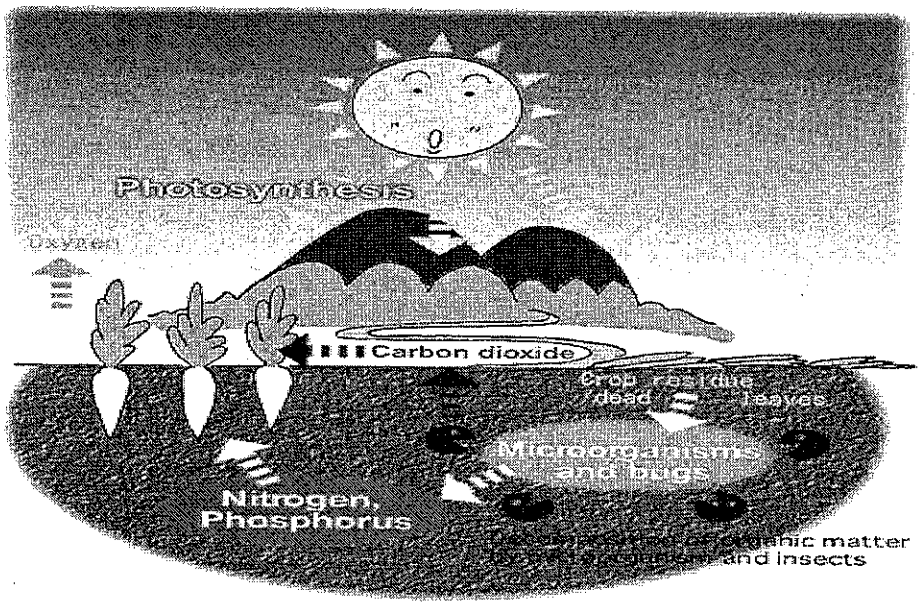
Water led into and stored in paddy fields gradually penetrates into the ground and become groundwater,a part of which is slowly returns to the downstream than flowing directly through the river.
Thus, paddy fields have functions to foster groundwater, an essential water resource, as well as to stabilize river stream.
Moreover, both paddy fields after harvest and other fields also contributes to foster groundwater by penetration of rainwater into the ground.





There are a vast number of microorganisms such as bacteria living in farmland, including paddy fields and other farmland.

Organic wastes such as garbage and livestock excretion are composted and recycled efficiently as resources.
The existence of an enormous number of microorganisms and bacteria which exist in the farmland enable plants to absorb decomposed organic matter easily through cultivation of farmlands.
Moreover, the plants that are grown in the fields maintain the air essential for the living of the people and animals, by absorbing carbon dioxide and emitting oxygen.
In addition, fields and farm ponds greatly contribute to the preservation of the natural environment, by providing favorable habitats for various life.



WORKSHOP

New Development in Irrigation Systems and Wetland Environmental Conservation

END OF WORKSHOP EVALUATION

Just tick [√] on your choice

I am a Resource Person / Jica Study Team Member/ District Officer / Farmer

1. How have you understood current laws and Regulations on wetlands? **Very well / well/fair / not understood?**
2. Did you understand sections of laws / Regulations which are directly related to wetland use? **All sections / some sections / none of the sections.**
3. Have you understood other environmental management regulations which also concern wetlands users ? **YES all regulations /Some regulations/ No**
4. Have you understood Sections of law and regulations which are difficult to implement by rice farmers ? **YES: All Sections / Some things /No**
5. Did you learn new things on rice cultivation from Sironko pilot project (demonstration site) ? **YES: A lot/some thing/ No**
6. Did you learn new things from films on rice growing in Kumi Pilot Project ? **YES: A lot /something/ No**
7. (To farmers) would you be able to apply what you learnt from Sironko and films to your rice field? **YES: Everything/some few things/ No**
8. Have you understood the term " wise use" of wetlands **YES: Well/ Fairly well/ No**

9. Have you understood what the term "monitoring" means? **YES: Well/ Fairly well/No**
10. Have you understood what the term "water quality" is and what to keep checking in water from rice fields ? **YES : All/few /No**
11. Have you understood what the term "soil fertility" and what is checked ? **YES: All / Few/No**
12. Do you know what agrochemicals to use and from where to get correct information ? YES: **All agrochemical / Few / No**
13. Do you know what fertilizers to use and use of organic manure? **YES: All fertilizers/ Few/ No**
14. Do you know when and where to monitor water quality of the rice field? **YES/ No**
15. Do you know when and where to monitor soil fertility in the rice field ? **YES/ No**
16. What has been the content of this workshop? **Very good/good/fair /poor**
17. Are you happy with the facilitation provided? **Happy / fairly happy/ not happy**
18. Are you happy with presentations at the workshop? **Happy/fairly happy/not happy**
19. Will you be able to use knowledge acquired from the workshop? **YES /Not All /No**

Answers to the above questions are presented in **Tables 2.4.3** and **2.4.4.**
It is important to note that in **Table 2.4.3** only where negative answer **(No)** and no choice made(**x**) have been marked. Blank cells mean **YES.** Read first the question before reading the response.

AGENDA

Of

WORKSHOP ON NEW DEVELOPMENT OF IRRIGATION SYSTEMS AND WETLAND ENVIRONMENTAL CONSERVATION

Venue: Wash & Wills Country Home Ltd., Mbale

Period: From January 30, 2006 to February 1st, 2006

DATE	TIME	ITEM
30- 01- 06 (Monday)	9.00 - 9.30	Opening of the Workshop (MAAIF)
	9.30 - 10.00	Presentation on the Four Pilot Projects (JICA Study Team)
	10.00 - 10.30	Presentation on Wetlands Conservation (WID)
	10.30 - 11.00	Tea break
	11.00 - 11.30	Presentation on Wetlands Conservation (NEMA)
	11.30 - 12.30	Presentation on Uganda Wetland Laws (Local Consultant)
	12.30 - 13.30	Lunch Break
	13.30 - 15.00	Group Discussion
	15.00 - 15.30	Tea Break
	15.30 - 17.00	Response from Discussion Groups
	17.00 - 17.30	Film on Rice Growing (50 years ago in Japan)
	17.30 - 18.00	Preparatory work for Tuesday
31- 01 – 06 (Tuesday)	7.00 - 8.00	Breakfast
	8.00 - 8.30	Leave for Sironko
	8.30 - 9.30	Arrival at the site
	9.30 - 11.30	Pilot Project site inspection(walk)
	11.30 -12.00	Refreshment/Break

AGENDA

Of

WORKSHOP ON NEW DEVELOPMENT OF IRRIGATION SYSTEMS AND WETLAND ENVIRONMENTAL CONSERVATION (Continued)

Venue: Wash & Wills Country Home Ltd., Mbale

Period: From January 30, 2006 to February 1st, 2006

DATE	TIME	ITEM
	12.00 - 13.00	Exchange views with local farmers
	13.00 - 14.00	Travel back to Mbale (Hotel)
	14.00 - 15.00	Lunch
	15.00 - 15.15	Film on Kumi P/P site
	15.15 – 16.00	Kaberamaido success story (experience)
	16.00 - 17.00	Film on old methods of rice growing (final part)
	17.00 - 17.30	Film on modern methods of rice growing
	17.30 - 18.00	Evening Tea
01-02-06 (Wednesday)	9.00 - 10.30	Feedback from field trip (Sironko)
	10.30 - 11.00	Tea Break
	11.00 - 12.00	Presentation on sustainable use of wetlands (Local Consultant)
	12.00 - 13.00	Response to presentation on wetland wise use
	13.00 - 14.00	Lunch break
	14.00 - 15.00	Continuation of response to presentation
	15.00 - 16.00	Workshop evaluation using questionnaires
	16.00 - 16.30	Tea break
	16.30 - 17.00	Closing of the workshop
	17.00 -	Return of some participants

PARTICIPANTS OF THE WORKSHOP ON NEW DEVELOPMENT OF IRRIGATION SYSTEMS AND WETLAND ENVIRONMENTAL CONSERVATION

Central Government Officers

No.	Name	Ministry/Department/Other
1.	Charles Rusoke	MAAIF
2.	Frank Akena	MAAIF
3.	George Lubega M	NEMA
4.	Julius Mafumbo	WID
5.	Anthony Mugenyi(Dr.)	NAADS

Local Government Officers

No.	Name	Title/Position	District
1.	Egenu V.	District Environ. Officer	Pallisa
2.	Mandu Robert	District Agric. Officer	Pallisa
3.	Massa R.	Ass.District Agric.Offiffer	Pallisa
4.	Nakeno K	District wetland officer	Pallisa
5.	Opio Moses	District Wetland officer	Kumi
6.	Ikanut Micheal	District Environ. Officer	Kumi
7.	Etiang Joseph	District Agric. Officer	Kumi
8.	Namono M.	District Environ. Officer	Sironko
9.	Wagoli Geofrey	District Wetland officer	Sironko
10.	Nangai Geofrey	District wetland officer	Sironko
11.	Mayende E.	District Environ. Officer	Bugiri
12.	Charles Mutemo	DNAADS Coordinator	Bugiri
13.	Kaisuka Sulaiman	Rice agronomist	Bugiri
14.	Sagula Wilberforce	District Agric.Officer	Doho rice scheme
15.	Ajotu B	District Forest Officer	Soroti
16.	Emasu Ogwella	Ass.District Agric.Offiffer	Katakwi
17.	Anyumel F	District Forest Officer	Soroti
18.	Eroku Martin	Ass.District Agric.Offiffer	Katakwi
19.	Eboku A	District Environ.Officer	Kaberamaido
20.	Alilim Cate	District Forest Officer	Kaberamaido
21.	Opolot Francis	District Wetland officer	Soroti
22.	Ekosile Deo	District Forest Officer	Katakwi
23.	Ebinu Denis	Ass.District Agric.Offiffer	Kaberamaido

Key Farmers

No.	Name	Title/Position	District
24.	Dhamusanga Issa	Key farmer	Bugiri
25.	Emuye Patrick	Key farmer	Bugiri
26.	Mutonyi Lakeri	Key farmer	Sironko
27.	Pepere Abdednego	Key farmer	Sironko
28.	Nangotsa Paul	Key farmer	Pallisa
29.	Wadugu Yona	Key farmer	Pallisa
30.	Amukun Joseph	Key farmer	Kumi
31.	Asio Hellen	Key farmer	Kumi
32.	Mr. Ojupa Richard	Key farmer	Kaberamaido
33.	Mrs. Eswitu W	Key farmer	Kaberamaido
34.	Alyoto Jane	Key farmer	Kaberamaido
35.	Odong James	Key farmer	Katakwi
36.	Atan Emmanuel	Key farmer	Katakwi
37.	Ojulong M	Key farmer	Katakwi
38.	Apiyo Emaculate	Key farmer	Soroti
39.	Ocegere Shem	Key farmer	Soroti
40.	Ogisa Herbert	Key farmer	Soroti
41.	Dauson Malinga Haperi	Doho rice scheme	Butaleja
42.	Kanyama Mensulamu	Doho rice scheme	Butaleja

JICA Study Team

No.	Name	Title
1.	Ishizuka Makoto	Team Leader
2.	Kobayashi Toshimasa	Irrigation Engineer
3.	Ebato Michiko	Sociologist
4.	Homma Susumu	Agronomist
5.	Gueye Massamba	Environmentalist
6.	Sako Masato	Agro-economist
7.	Matsuura Natsuno	Coordinator

QUESTIONNAIRE FOR OFFICERS AND FARMERS

MONITORING OF WATER QUALITY AND SOIL FERTILITY PROGRAM (August, 2006)

.....District, ... Pilot Project

Name .....DAO/ DAAO/ DEO/ DWO

Please choose and tick (√) to answer

I. QUESTIONS FOR ONLY DEO/ DWO

1. Have you been conducting
   a) Water quality monitoring? YES/ NO
   b) If YES
      i. For what purpose?
      ii. In what frequency?
      iii. Any other comments regarding the activity?

II. QUESTIONS FOR ONLY DAO/DAAO

1. After these few experiences in monitoring water quality and soil fertility
   a) Would you be able to conduct it alone with farmers, if funds were made available? YES/NO
   b) If NO
      i. Do you still need additional training? YES/NO
      ii. Any other comments regarding the question?

III. QUESTIONS FOR ALL DISTRICT OFFICERS

1. Do you know agro-chemicals (pesticides) and fertilizers recommended by MAAIF for rice cultivation?
   a) Agro-chemicals: YES/NO
   b) Fertilizers: YES/NO
2. Do you have the lists of agro-chemicals and fertilizers recommended by government in your office now?
   a) Agro-chemicals: YES/NO
   b) Fertilizers: YES/NO
3. Can you differentiate between agro-chemicals recommended by government for upland and lowland paddy rice? YES/NO
4. What does wise use of wetland mean?
   a) Protection of the wetland
   b) Sustainable use of the wetland
5. Why do you have to monitor water quality?

a) Keep it safe for my own use and for others downstream
b) Know chemicals in it
c) Know nutrients in it
d) Know chemicals and nutrients in it

6. Why do you have to monitor soil fertility?
   a) Know if it is necessary to add fertilizers
   b) Maintain Soil fertility
   c) Know what has been added to the soil
   d) Know mineral requirements
   e) Generate data for environmental monitoring
7. When do we have to monitor the quality of water passing through the rice plot?
   a) Before planting
   b) Around harvest time
   c) The two above
8. When do you have to monitor soil fertility?
   a) Once a year
   b) Once every other year
9. Mention (tick) what you receive from MAAIF and state how many times:
   a) Approved lists of agrochemicals for farmers
   b) Progress reports/recommendations on pilot projects (by JICA study team)
   c) Facilitation funds for water and soil fertility monitoring
   d) Nothing from MAAIF but received.....(state).....from (state organization).....
10. Do you pass on what you receive from MAAIF to farmers? YES/ NO/ SOMETIMES
11. In your opinion, state what you need most to make paddy rice growing become successful in this district?

.....

.....

.....

THANK YOU

QUESTIONNAIRE FOR OFFICERS AND FARMERS

MONITORING OF WATER QUALITY AND SOIL FERTILITY PROGRAM (August, 2006)

.....District, ... Pilot Project

Name ..... (Farmer)

Please choose and tick (√) to answer

IV. QUESTIONS FOR FARMERS

1. After these few experiences in monitoring water quality and soil fertility

   Would you be able to conduct it alone with District Officers, if funds were made available? YES/NO

   If NO

   i. Do you still need additional training? YES/NO

   ii. Any others comments on the question

2. Are there farmers who have experienced in use of agro-chemicals? YES/NO
3. If YES
   a) What are the names of these agro-chemicals?
   b) Where did they get/buy the agro-chemicals?
   c) Do you know the name of agro-chemicals recommended by the government?
      i. For upland crops: YES/NO
      ii. For lowland paddy rice: YES/NO
4. If NO
   a) Why don't you use agro-chemicals? Because _____

   _____

   b) Are you using other means to improve your soil fertility? YES/NO, If yes, what are they?_____

   _____

5. Do you know agro-chemicals (pesticides) and fertilizers recommended by MAAIF for rice cultivation?
   a) Agro-chemicals: YES/NO
   b) Fertilizers: YES/NO
6. What does wise use of wetland mean?
   a) Protection of the wetland
   b) Sustainable use of the wetland
7. What do you have to do before using pesticides on your plot?
   a) Seek advice from agricultural officer
   b) Seek advice from extension workers
   c) Get the right pesticide & right dose

8. What do you have to do before using fertilizers on your rice plot?
   a) Seek advice from extension workers
   b) Identify the right fertilizer
   c) Seek advice from MAAIF
   d) Fertilizer has to be recommended by MAAIF
9. When do you have to monitor the quality of water passing through the rice plot?
   a) Before planting
   b) Around harvest time
   c) The two above
10. When do you have to monitor soil fertility?
   a) Once a year
   b) Once every other year
11. Do you burn the bush to clear your plot and burn rice straws? YES/NO
12. How are you going to utilize the lessons learnt after this workshop?
   a) Practice what has been taught
   b) Sensitize other farmers
   c) Protect the wetlands
13. Mention (tick) what you receive from Districts Officers
   a) Advices on recommended agrochemicals for use in your plots
   b) Advices on how to maintain good water quality
   b) Advices on how to maintain good soil fertility
   c) Feedback on the Monitoring results
   d) No advices
14. Are there good working relationships between you and
   a) District Agricultural Officers YES/NO, and give some comments_____
   _____
   b) District Environmental Officers/Wetland Officers, YES/NO, and give some comments_____
   _____
15. In your opinion, state what you need most to make paddy rice growing become successful in this district?

.....

.....

.....

THANK YOU

Workshop Evaluation/ Analysis: Percentage of those who answered correctly

A: District Officers

No.	Question	Pallisa (4 people)	Bugiri (3 people)	Kumi (3 people)	Sironko (1 person)
I.	FOR ONLY DEO/ DWO 1. Have you been conducting a) Water quality monitoring? b) If YES i. For what purpose? ii. In what frequency? iii. Any other comments regarding the activity?	a) **(0)** N/A N/A N/A	a) **(0)** N/A N/A N/A	a) **(0)** N/A N/A N/A	NB: Only DEO attended a) **(0)** N/A N/A N/A
II.	FOR ONLY DAO/DAAO After these few experiences in monitoring water quality and soil fertility, would you be able to conduct it alone with farmers, if funds were made available?	2 **(50)**	2 **(100)**	0**(0)**	NB: None attended
III 1.	FOR ALL DISTRICT OFFICERS Do you know agro-chemicals (pesticides) and fertilizers recommended by MAAIF for rice cultivation? a) Agro-chemicals: b) Fertilizers:	a) 4 **(100)** b) 4 **(100)**	a) 3 **(100)** b) 3 **(100)**	a) 3 **(100)** b) 3 **(100)**	a) 1**(100)** b) 1**(100)**
2.	Do you have the lists of agro-chemicals and fertilizers recommended by government in your office now? a) Agro-chemicals: b) Fertilizers:	a) 3 **(75)** b) 4 **(100)**	a) 0 **(0)** b) 0 **(0)**	a) 2 **(67)** b) 1 **(33)**	a) 0 **(0)** b) 0 **(0)**
3.	Can you differentiate between agro-chemicals recommended by government for upland and lowland paddy rice?	4 **(100)**	2 **(67)**	0 **(0)**	0 **(0)**
4.	What does wise use of wetland mean? b) Sustainable use of the wetland	4 **(100)**	3 **(100)**	3 **(100)**	1**(100)**

Workshop Evaluation/ Analysis: Percentage of those who answered correctly

A: District Officers

No.	Question	Pallisa (4 people)	Bugiri (3 people)	Kumi (3 people)	Sironko (1 person)
5.	Why do you have to monitor water quality? a) Keep it safe for my own use and for others downstream	4 (100)	2 (67)	3 (100)	1(100)
6.	Why do you have to monitor soil fertility? a) Know if it is necessary to add fertilizers	2 (50)	3 (100)	2 (67)	1(100)
7.	When do we have to monitor the quality of water passing through the rice plot? a)&b) Before planting and Around harvest time	1 (25)	3 (100)	3 (100)	1(100)
8.	When do you have to monitor soil fertility? b) Once every other year	3 (75)	0 (0)	3 (100)	1(100)
9.	Mention (tick) what you receive from MAAIF and state how many times: a) Approved lists of agrochemicals for farmers b) Progress reports/recommendations on pilot projects (by JICA study team) c) Facilitation funds for water and soil fertility monitoring d) Nothing from MAAIF but received (state) from (state organization).	a): 4 (100) b): 0 (0)	d):3(100) but: -WID; -AICAD; -JICA & FITCA	b): 1 (33) d): 1 (33) – Training from JICA	b): 1(100) – 2 times
10.	Do you pass on what you receive from MAAIF to farmers? YES	4 (100)	2 (67)	3 (100)	1(100)

Workshop Evaluation/ Analysis: Percentage of those who answered correctly

A: District Officers

No.	Question	Pallisa (4 people)	Bugiri (3 people)	Kumi (3 people)	Sironko (1 person)
11.	In your opinion, state what you need most to make paddy rice growing become successful in this district?	**DEO:** -Farmers need to be aware of and appreciative of wetland wise use concepts; -Constant monitoring and supervision of the farmers by district staff; -Facilitation to field staff; -MAAIF should consider integrating wetland management in its work plans and also have it budgeted for since paddy rice growing is the major activity in the district wetlands. **DAAO:** -Improve on extension staff facilitation to reach all farmers; -Technical back up to extension staff by MAAIF. **DAO:** -Improved facilitation for field staff; -Constant monitoring and supervision by MAAIF **Facilitator:** -District officers need to read progress reports of JICA study team and demand from MAAIF lists of Argo-chemicals and other kind of facilitation instead of waiting to be given; -District officers need to be more active with farmers; -Community Wetland Management plans and their implementation is very important; -Water management upstream needs to be checked **For DWO:** -I need knowledge on irrigation techniques and guidelines on paddy rice growing in wetlands. **DAO:** -Operational funds. **DAAO:** -Know the wise use of wetlands **DAAO:** -Frequent training for farmers growing paddy rice on wise use of wetland; -Facilitation for staff in terms of funds organized by the District			

Workshop Evaluation/ Analysis: Percentage of those who answered correctly

B: Farmers

No.	Question	Pallisa (15 people)	Bugiri (25 people)	Kumi (17 people)	Sironko(12 people)
IV 1.	After these few experiences in monitoring water quality and soil fertility Would you be able to conduct it alone with District Officers, if funds were made available?	15 (100)	21 (84)	17 (100)	10 (83)
2.	Are there farmers who have experience in use of agro-chemicals?	13 (87)	5 (20)	9 (53)	0 (0)
3.	If YES (to question 2) a) What are the names of these agro-chemicals? b) Where did they get/buy the agro-chemicals? c) Do you know the name of agro-chemicals recommended by the government? i. For upland crops: ii. For lowland paddy rice:	a) Ronstar, Dusban , Dithane b) MAAIF (6) Shops, super maket c) i 5 (33) ii 11 (73)	a) Butani, Salani , Muzani; b) Shops c) i 1 (4) Dithane ii 1 (4)	a) Ronstar, Dusban (1), Dithane (6); Basgran, Ronstar (2) b) MAAIF(7); Shops, super markets (4) District trained officers (2); Mbale farm supply shop (2); Open market; c) i 9 (53) ii 9 (53)	N/A N/A c) i 2 (17)
4.	b) Are you using other means to improve your soil fertility? YES. If yes, what are they?	b) Compost fertilizer; Apply organic fertilizer; Use industrial and organic fertilizers	b) Organic matter and good farming; Compost manure; Cow, goat and hen dung	b) Organic fertilizers like cow dung and urine and rice straws (6); Compost manure (2); Leave it to fallow and use of organic fertilizers (1);	b) Cow dung & urine
5.	Do you know agro-chemicals (pesticides) and fertilizers recommended by MAAIF for rice cultivation? a) Agro-chemicals: b) Fertilizers:	a) 12 (80) b) 11 (73)	a) 1 (4) b) 1 (4)	a) 10 (59) b) 11 (53)	a) 1 (8) b) 0 (0)
6.	What does wise use of wetland mean? b) Sustainable use of the wetland	8 (53)	20 (80)	9 (53)	12 (100)
7.	What do you have to do before using pesticides on your plot? a) Seek advice from agricultural officer	9 (60)	16 (64)	9 (53)	4 (33)

Workshop Evaluation/ Analysis: Percentage of those who answered correctly

B: Farmers

No.	Question	Pallisa (15 people)	Bugiri (25 people)	Kumi (17 people)	Sironko(12 people)
8.	What do you have to do before using fertilizers on your rice plot? a) Seek advice from extension workers	10 (67)	13 (52)	10 (59)	4 (33)
9.	When do you have to monitor the quality of water passing through the rice plot? a)&b) Before planting and around harvest time	7 (47)	19 (80)	10 (59)	9 (75)
10.	When do you have to monitor soil fertility? b) Once every other year	14 (93)	10 (40)	5 (42)	12 (100)
11.	Do you burn the bush to clear your plot and burn rice straws? No	14 (93)	8 (32)	2 (12)	12 (100)
12.	How are you going to utilize the lessons learnt after this workshop? Practice what has been taught	10 (67)	12(48)	15 (88)	9 (75)
13.	Mention (tick) what you receive from Districts Officers: a) Advices on recommended agrochemicals for use in your plots b) Advices on how to maintain good water quality c) Advices on how to maintain good soil fertility d) Feedback on the Monitoring results e) No advices	a) 5 (33) b) 1 (7) c) 2 13) d) 7 (47) e) 0 (0)	a) 7 (28) b) 4 (16) c) 1 (4) d) 1 (4) e) 0 (0)	a) 7 (41) b) 2 (12) c) 5 (42) d) 0 (0) e) 0 (0)	a) 4 (33) b) 4 (33) c) 0 (0) d) 0 (0) e) 0 (0)
14.	Are there good working relationships between you and a) District Agricultural Officers YES, and give some comments? b) District Environmental Officers/Wetland Officers, and give some comments?	a) 13 (87) b) 12 (80)	a) 20 (80) b) 13 (52)	a) 11(53) b) 11 (92)	a) 12 (100) b) 10 (83)

Workshop for Mid-term Evaluation of the Pilot Projects
AGENDA

Date: From February 1st to 3rd, 2006
Place: Wash & Wills Country Home Limited, Plot 37 Mbiro Road (contact: 256-45-36446 / 077-518675)

February 1		
Before 18:00	All participants are mobilized to Mbale.	
February 2		
07:30 - 08:30	Breakfast	
09:00 - 09:30	Opening of the workshop	MAAIF
09:30 - 09:45	Introduction	Self
09:45 - 10:30	Presentation of Pilot Project progress & monitoring results (1)	JICA Study Team
10:30 - 11:00	Tea break	
11:00 - 11:30	Explanation on the group work	Ugandan consultants
11:30 - 13.00	Group discussion/evaluation of monitoring results (1)	All participants assisted by Ugandan Facilitators
13:00 - 14:00	Lunch break	
14:30 - 15:30	Continue group discussion/evaluation of monitoring results (1)	All participants assisted by Ugandan Facilitators
15:30 -16:30	Presentation of outputs from the group discussion/evaluation	All participants
16:30 -17.00	Presentation of monitoring results (2)	JICA Study Team and Ugandan Facilitators
17:00 - 17:30	Evening tea	
17:30 - 18:30	Video/photos	All participants
February 3		
07:30 - 08:30	Breakfast	
09:00 - 10:00	Summary of the results of the Day 1 (Feb. 2)	Ugandan Facilitators
10.00 - 10:30	Explanation on the group work for monitoring result (2)	Ugandan Facilitators
10:30 - 11:00	Tea break	
11:00 -12:00	Group discussion/evaluation of monitoring results (2)	All participants assisted by Ugandan Facilitators
12:00 -12:30	Presentation of outputs from the group discussion/evaluation on monitoring result (2)	All participants
12:30 - 13:00	Explanation on group work for development of sustainability plan	Ugandan Facilitators
13:00 - 14:00	Lunch break	
14:00 - 15:00	Preparation of plan for further operation of pilot project (group work)	All participants assisted by Ugandan Facilitators
15:00 - 16:00	Presentation of the work plan	All participants
16:00 - 17:00	Discussion on the work plan	All participants
17:00 - 17:30	Evening tea	
17:30 -18:30	Evaluation of the workshop	All participants assisted by Ugandan Facilitators
18:30 -19.00	Closing of the workshop	MAAIF

Workshop for Mid-term Evaluation of the Pilot Projects

List of Participants

No	Name	District	Title	Tel/contact address
(1) Farmers				
1.	Wadugu Yona	Pallisa	Key farmer	----------
2.	Nangosya Paul	Pallisa	Key farmer	078-285241
3.	Wandera Patrick	Pallisa	Key farmer	----------
4.	Gadala Richard	Pallisa	Key farmer	----------
5.	Dhamusanga Issa	Bugiri	Key farmer	----------
6.	Mulondo Faruk	Bugiri	Key farmer	----------
7.	Emuye Paytrick	Bugiri	Key farmer	----------
8.	Eremye Juma	Bugiri	Key farmer	Kiteigalwa
9.	Amukun Joseph	Kumi	Key farmer	078-810077
10.	Okalang Patrick	Kumi	Key farmer	----------
11.	Asio H	Kumi	Key farmer	----------
12.	Ononge Sam	Kumi	Key farmer	----------
13.	Mutonyi Agatha	Sironko	Key farmer	078-186937
14.	Mooli John	Sironko	Key farmer	078-186937
15.	Pepera A	Sironko	Key farmer	078-534435
16.	Mutonyi Lakeli	Sironko	Key farmer	----------
(2) Local Government				
17.	Iceduna Christine	Pallisa	DAO	077-2565834
18.	Kerebba Sam	Pallisa	Sub county chief	078-2420762
19.	Maasa Reuben	Pallisa	Agric Officer	078-965838
20.	Mandu Robert	Pallisa	Agric Officer	0772918508
21.	Mayende Ebwoni	Bugiri	DNC	077-2660750
22.	Kaisuka Sulaiman	Bugiri	DAO	077-2675804
23.	Egibwa P	Bugiri	Agric Officer	077-2577041
24.	Etiang Joseph	Kumi	Agric Officer	075-2452606
25.	Asege o. Janet	Kumi	D.N.C	078-2415810
26.	Nangai G	Sironko	Agric Officer	077-2879252
27.	Makabayi M	Sironko	D.A.O	077-2532650
(3) Community development staff				
28.	Katusiime Enid	Bugiri	C.D.A	077-330803
29.	Okello Mark	Kumi	C.D.A	----------
30.	Nabwire Damalie	Sironko	C.D.O	078-2140300
(4) Central government (MAAIF and NARO)				
31.	Frank Akena	MAAIF EBB	SAO/WSM	071-2700572
32.	J.M Ogwang	MAAIF	chief counterpart	077-2613054
33.	Charles Rusoke	MAAIF	SAO/SWC	077-2480062
34.	George Bigirwa	NARO	Head cereals	077-2405600
35.	Motonori Tomitaka	JICA/MAAIF	JICA expert	077-2937350
(5) JICA Study Team				
36.	Makoto Ishizuka	JICA study team	Team leader	
37.	Kobayashi Toshimasa	JICA study team	Irrigation Engineer	
38.	Sasumu Homma	JICA study team	Agronomist	
39.	Michiko Ebato	JICA study team	Sociologist	
40.	Massamba Guete	JICA study team	Entebbe	078-2404997
41.	Masato Sako	JICA study team	Agro-economist	
42.	Natsuno Matsuura	JICA study team	Coordinator	078-2308657
(6) Agrudas				
43.	Kigongo Rashid	Agrudas	Facilitator	075-2897087
44.	Gidoi Charles	Agrudas	Facilitator	077-2443583
45.	Clet Wandui	Agrudas	Facilitator	075-2631046

Workshop for Final Evaluation of the Pilot Projects
AGENDA

Date: From October 1st to 3rd, 2006
Place: Mt. Elgon Hotel, Mbale

Day 1 (Oct. 1)		
Before 18:00	All participants are mobilized to Mbale. Registration	Assisted by Ugandan Facilitators
Day 2 (Oct. 2)		
07:30 - 08:30	Breakfast	
09:00 - 09:15	Introduction	Self
09:15 - 09:45	Opening of the workshop	MAAIF
09:45 - 10:30	Presentation of the Study	JICA Study Team
10:30 - 11:00	Tea break	
11:00 - 12:40	**Evaluation of previous plan**	
11:00 - 11:20	Explanation on the group work	Ugandan Facilitators
11:20 - 12:00	Group work	All participants, assisted by Ugandan Facilitators
12:00 - 12:40	Presentation of outputs from the group	All participants
12:40 - 13:40	Lunch break	
13:40 – 14:20	Video Show-Kumi and Bugiri P/Ps	JICA Study Team
14:40 - 15:20	**Factor analysis of previous plan**	
14:40 - 15:00	Explanation on the group work	Ugandan Facilitators
15:00 - 15:40	Group work	All participants, assisted by Ugandan Facilitators
15:40 - 16:20	Presentation of outputs from the group	All participants
16:20 - 16:50	Tea break	
16:50 - 17:10	Summary of Day 2	Ugandan Facilitators
17:10 - 17:30	The Study and JICA's Cooperation	JICA Uganda Office
17:30 - 18:00	Explanation of Day 3 agenda	Ugandan Facilitators
Day 3 (Oct. 3)		
07:00 - 08:00	Breakfast	
08:00 – 09:00	Video show-Pallisa and Sironko P/Ps	JICA Study Team
09:00 - 09:20	Introduction of the day	Ugandan Facilitators
09:20 - 15:00	**Preparation of plan for further dev.**	
09:20 - 09:40	Explanation on the group work	Ugandan Facilitators
09:40 - 10:30	Group work	All participants, assisted by Ugandan Facilitators
10:30 - 11:00	Tea break	
11:00 - 13:10	Continuation of group work	All participants, assisted by Ugandan Facilitators
13:10 - 14:10	Lunch break	
14:10 - 15:00	Presentation of outputs from the group	All participants
15:00 - 15:40	Evaluation of the workshop	All participants assisted by Ugandan Facilitators
15:40 - 16:10	Tea break	
16:10 - 16:30	Closing of the workshop	MAAIF

Workshop for Final Evaluation of the Pilot Projects

List of Participants

No	Name	District	Title	address
(1) Farmers				
1.	Wadugu Yona	Pallisa	Key farmer	-------
2.	Nangosya Paul	Pallisa	Key farmer	078-285241
3.	Deborah Kawiso	Pallisa	Key farmer	----------
4.	Gadala Richard	Pallisa	Key farmer	----------
5.	Jacob Mayiso	Pallisa	Key farmer	Tentative
6.	Dhamusanga Issa	Bugiri	Key farmer	Bugiri
7.	Mulondo Faruk	Bugiri	Key farmer	Bugiri
8.	Kanunu Musa	Bugiri	Key farmer	Kiteigalwa
9.	Emuye Paytrick	Bugiri	Key farmer	----------
10.	Amukun Joseph	Kumi	Key farmer	078-810077
11.	Okalang Patrick	Kumi	Key farmer	--------
12.	Asio Hellen	Kumi	Farmer	----------
13.	Okitoi Apollo	Kumi	Chairperson	0782768804-
14.	Mutonyi Agatha	Sironko	Key farmer	078-186937
15.	Mooli John	Sironko	Key farmer	078-186937
16.	Mutonyi Lakeli	Sironko	Key farmer	----------
17.	Pepera A	Sironko	Key farmer	078-534435
18.	Haperi Dawson Malinga	Doho	Seed grower	
19.	W. Abubaker	Doho	Seed grower	
(2) Local Government				
20.	Maasa Reuben	Pallisa	Agric officer	078-965838
21.	Mandu Robert	22. Pallisa	Agric Officer	0772918508
23.	Hamba Bumali	Pallisa	LC III Chair	0782113874
24.	Kerebba Sam	Pallisa	Sub county chief	0782420762
25.	Kaisuka Sulaiman	Bugiri	DAO	0772675804
26.	Mugoya Moses Ibudi	Bugiri	LC III Chair	0772670453
27.	Mugabi Nimmy	Bugiri	AO	0712687243
28.	Ebokorant Abdallah	Kumi	LC III	0782931115
29.	Asege o. Janet	Kumi	NAADS Cordinator	0782415810
30.	Nangai G	Sironko	Agric officer	0772879252
31.	Makabayi M	Sironko	D.A.O	0772532650
32.	Wambi Kibaale	Sironko	LC V Chair	0752628070
(3) Community development staff				
33.	Katusiime Enid	Bugiri	CDO	077-330803
34.	Okello Mark	Kumi	C.D.A	.....
35.	Mazina Michael	Sironko	C.D.O	0772930183
(4) Central government (MAAIF and NARO)				
36.	Mr. Dradjo	MAAIF	Commissioner	
37.	J.M Ogwang	MAAIF	chief counterpart	0772613054
38.	Charles Rusoke	MAAIF	SAO/SWC	0772480062
39.	Frank Akena	MAAIF	SAO/WSM	0712700572
40.	Sagula Wilberforce	Doho	Agronomist	0782653056
41.	Ochola Dennis	NARO	Researcher	0712301290
(5) JICA Uganda Office				
42.	Kohei Yoshida	JICA Uganda Office	Assistant Resident Representative	
43.	Hiromichi Kano	JICA Uganda Office	Assistant Resident Representative	
44.	Shiwa Nobohito	Doho	JICA volunteer	

(6) JICA Study Team				
45.	Makoto Ishizuka	JICA study team	Team leader	
46.	Kobayashi Toshimasa	JICA study team	Irrigation Engineer	
47.	Susumu Homma	JICA study team	Agronomist	
48.	Michiko Ebato	JICA study team	Sociologist	
49.	Massamba Guete	JICA study team	Environmentalist	
50.	Masato Sako	JICA study team	Agro-economist	
51.	Akio Yamashita	JICA study team	Coordinator	
(7) Agrudas				
52.	Clet Wandui	Agrudas	Facilitator	0752-631046
53.	Gidoi Robert	Agrudas	Facilitator	0752-479617
54.	Gidoi Charles	Agrudas	Facilitator	0772-443583