

Appendices

Appendix- 1	Member List of Study Team.....	A 1-1
Appendix - 2	Study Schedule.....	A 2-1
Appendix - 3	List of Parties Concerned in the Recipient Country.....	A 3-1
Appendix - 4	Minutes of Discussions	A 4-1
Appendix - 4.1	Minutes of Discussion on 5th September, 2013	A 4-1
Appendix - 4.2	Minutes of Discussion on 15th May, 2014.....	A 4-12
Appendix - 5	Soft Component (Technical Assistance) Plan	A 5-1
Appendix - 6	Environmental and Social Considerations	A 6-1
Appendix - 6.1	Terms of Reference (TOR) for EIA Study.....	A 6-1-1
Appendix - 6.2	EIA Certificate	A 6-2-1
Appendix - 6.3	Resettlement Action Plan	A 6-3-1
Appendix - 6.4	Census Survey Questionnaires	A 6-4-1
Appendix - 6.5	Census Survey Results	A 6-5-1
Appendix - 6.6	Participants List of Public Consultation Meetings	A6-6-1
Appendix - 7	Other Relevant Data.....	A 7-1
Appendix - 7.1	Condition of Soil Layer at the Basement Of Dam	A 7-1
Appendix - 7.2	Result of in-situ Permeability Test in Test-pit	A 7-3
Appendix - 7.3	Results of Cone Penetration Test.....	A 7-5
Appendix - 7.4	Photos of Outcrops	A 7-7
Appendix - 7.5	Photos of Major Springs	A 7-9

Appendix-1 Member List of the Study Team

Name of Members	Position/Expertise	Affiliation
Hiroshi SUZUKI	Senior Advisor	Rural Development Department Japan International Cooperation Agency (JICA)
Kenichi MATSUMOTO	Program Officer	Rural Development Department Japan International Cooperation Agency (JICA)
Tatsuya IEIZUMI	Chief Consultant/Irrigation Facility Planner	SANYU Consultants Inc.
Motohisa WAKATSUKI	Irrigation Facility Engineer/Natural Conditions (Meteorological analysis)	SANYU Consultants Inc.
Haruo HIKI	Irrigation Facility Engineer/Natural Conditions (Topographic Survey)	SANYU Consultants Inc.
Ryouichi KAWASAKI	Geology	SANYU Consultants Inc.
Kensuke IRIYA	Agriculture/Economic evaluation/Organization Management	SANYU Consultants Inc.
Rie KITAO	Environment and Social Consideration	SANYU Consultants Inc.
Yoshihiro SAGAWA	Procurement/Cost Estimate/ Construction Planning	SANYU Consultants Inc.

Appendix-2 Study Schedule

Schedule of The Study Team

1/2

No	Name		Chief Consultant/Irrigation Facility Planner	Irrigation Facility Engineer/Natural Conditions	Irrigation Facility Engineer/Natural Conditions	Geology	Agriculture/Economic evaluation/Organization Management	Environment and Social Consideration	Procurement/Cost Estimate/Construction Planning
	Day		Tatsuya IEIZUMI	Motohisa WAKATSUKI	Haruo HIKI	Ryoichi KAWASAKI	Kensuke IRIYA	Rie KITAO	Yoshihiro SAGAWA
1	Aug.22	Thu	—	Departure from Kansai	Departure from Kansai	—	—	—	—
2	Aug.23	Fri	—	Arrival at Kigali	Arrival at Kigali	—	—	—	—
3	Aug.24	Sat	—	Team meeting	Team meeting	—	—	—	—
4	Aug.25	Sun	—	Team meeting	Team meeting	—	—	—	—
5	Aug.26	Mon	—	Courtesy call on JICA	Courtesy call on JICA	—	—	—	—
6	Aug.27	Tue	—	Courtesy call on MINAGRI	Courtesy call on MINAGRI Visit to EWSA	—	—	—	—
7	Aug.28	Wed	Meeting with JICA	Meeting with JICA	Meeting with JICA	—	—	—	—
8	Aug.29	Thu	Meeting with JICA	Meeting with JICA	Meeting with JICA	—	—	—	—
9	Aug.30	Fri	Meeting with MINAGRI	Meeting with MINAGRI	Meeting with MINAGRI	—	—	—	—
10	Aug.31	Sat	Organization of data	Organization of data	Organization of data	—	—	—	—
11	Sep.1	Sun	Organization of data	Organization of data	Organization of data	—	—	—	—
12	Sep.2	Mon	Stakeholder Meeting	Stakeholder Meeting	Stakeholder Meeting	—	—	—	—
13	Sep.3	Tue	Joint meeting with Rwanda side and JICA	Meeting with JICA	Meeting with JICA	—	—	—	—
14	Sep.4	Wed	Joint meeting with Rwanda side and JICA	Selection of survey company	Meeting with MINAGRI	—	—	—	—
15	Sep.5	Thu	Signing of Minutes	Selection of survey company	Signing of Minutes	Departure from Kansai	—	—	—
16	Sep.6	Fri	Meeting with JICA	Site survey	Courtesy call on Remera sector, Field survey	Arrival at Kigali	—	—	—
17	Sep.7	Sat	—	Organization of data	Preparation for investigation	Organization of data	—	—	—
18	Sep.8	Sun	—	Organization of data	Organization of data	Organization of data	—	—	—
19	Sep.9	Mon	—	Outline study, Negotiation with survey company	Courtesy call on Rurenge sector, Field survey	Collection of geological maps	—	—	—
20	Sep.10	Tue	—	Outline study, Negotiation with survey company	Survey on banking materials	Field survey	—	—	—
21	Sep.11	Wed	—	Outline study, Negotiation with survey company	Survey on banking materials	Field survey Collection of geological	—	—	—
22	Sep.12	Thu	—	Outline study, Negotiation with survey company	Survey on banking materials	Field survey	—	—	—
23	Sep.13	Fri	—	Outline study, Negotiation with survey company	Survey on banking materials	Field reconnaissance	—	—	—
24	Sep.14	Sat	—	Organization of data	Study of available water Excavation of test-pit	Organization of data	—	—	—
25	Sep.15	Sun	—	Organization of data	Planning of soil test Excavation of test-pit	Organization of data	—	—	—
26	Sep.16	Mon	—	Signing a contract with topographic survey	Study of available water	Checking of coordinate system	—	—	—
27	Sep.17	Tue	—	Signing a contract with soil testing company	Observation of test-pit Sampling of test materials	Examination of geological maps collected	—	—	—
28	Sep.18	Wed	—	Site survey	Site survey, Bearing capacity test on paddy field	Site survey on springs	—	—	—
29	Sep.19	Thu	—	Site survey	Site survey, Bearing capacity test on paddy field	Site survey, Bearing capacity test on paddy field	—	—	—
30	Sep.20	Fri	—	Signing a contract with boring company	Field survey on dam site and command area	Examination of geological maps collected	—	—	—
31	Sep.21	Sat	—	Organization of data	Field survey on dam site and command area	Organization of data	—	—	—
32	Sep.22	Sun	—	Organization of data	Field survey on dam site and command area	Organization of data	—	—	—
33	Sep.23	Mon	—	Outline design of irrigation facilities	Field survey on dam site and command area	Field survey on dam site and command area	—	—	—
34	Sep.24	Tue	—	Outline design of irrigation facilities	Field survey on dam site and command area	Field survey on dam site and command area	—	—	—
35	Sep.25	Wed	—	Outline design of irrigation facilities	Field survey on dam site and command area	Inspection of drilling survey	—	—	—
36	Sep.26	Thu	—	Signing a contract with soil testing company	Field survey on dam site and command area	Inspection of drilling survey	—	—	—
37	Sep.27	Fri	—	Outline design of irrigation facilities	Field survey on dam site and command area	Inspection of drilling survey	—	—	—
38	Sep.28	Sat	—	Organization of data	Planning of dam design	Inspection of drilling survey	—	—	—
39	Sep.29	Sun	—	Organization of data	Organization of data	Organization of data	—	—	—
40	Sep.30	Mon	Planning of irrigation facilities	Outline design of irrigation facilities	Analysis of investigation results	Organization of field survey result	—	—	—
41	Oct.1	Tue	Investigation of preceding project(Nyanza23)	Investigation of preceding project(Nyanza23)	Investigation of preceding project(Nyanza23)	Investigation of preceding project(Nyanza23)	—	—	—
42	Oct.2	Wed	Meeting with Rwanda side	Outline design of irrigation facilities	Analysis of investigation results	Inspection of boring core, Organization of data	—	—	—
43	Oct.3	Thu	Meeting with JICA	Outline design of irrigation facilities	Analysis of investigation results	Departure from Kigali	—	—	—
44	Oct.4	Fri	Planning of irrigation facilities	Outline design of irrigation facilities	Analysis of investigation results	Arrival at Kansai	—	—	—
45	Oct.5	Sat	Departure from Kigali	Organization of data	Organization of data	—	—	—	—
46	Oct.6	Sun	Arrival at Tokyo	Organization of data	Organization of data	—	—	—	—
47	Oct.7	Mon	—	Outline design of irrigation facilities	Analysis of investigation results	—	—	—	—
48	Oct.8	Tue	—	Outline design of irrigation facilities	Analysis of investigation results	—	—	—	—
49	Oct.9	Wed	—	Outline design of irrigation facilities	Analysis of investigation results	—	—	—	—
50	Oct.10	Thu	—	Outline design of irrigation facilities	Drawing up a report of field survey	—	—	—	—
51	Oct.11	Fri	—	Outline design of irrigation facilities	Drawing up a report of field survey	—	—	—	—
52	Oct.12	Sat	—	Organization of data	Organization of data	—	—	—	—
53	Oct.13	Sun	Departure from Tokyo	Organization of data	Organization of data	—	Departure from Kansai	Departure from Tokyo	—
54	Oct.14	Mon	Arrival at Kigali	Outline design of irrigation facilities	Drawing up a report of field survey	—	Arrival at Kigali	Arrival at Kigali	—
55	Oct.15	Tue	Meeting with Rwanda side	Outline design of irrigation facilities	Drawing up a report of field survey	—	Conference with RNRA about water fee	Data collection	—
56	Oct.16	Wed	TV conference	TV conference	Drawing up a report of field survey	—	TV conference	TV conference	—
57	Oct.17	Thu	Planning of irrigation facilities	Outline design of irrigation facilities	Drawing up a report of field survey	—	Study on production cost	Data collection about EIA	—
58	Oct.18	Fri	Planning of irrigation facilities	Outline design of irrigation facilities	Drawing up a report of field survey	—	Site survey (Ngoma 22)	Site survey (Ngoma 22)	—

Schedule of The Study Team

2/2

No	Day	Name	Chief Consultant/Irrigation Facility Planner	Irrigation Facility Engineer/Natural Conditions	Irrigation Facility Engineer/Natural Conditions	Geology	Agriculture/Economic evaluation/Organization Management	Environment and Social Consideration	Procurement/Cost Estimate/Construction Planning
			Tatsuya IEIZUMI	Motohisa WAKATSUKI	Haruo HIKI	Ryoichi KAWASAKI	Kensuke IRIYA	Rie KITAO	Yoshihiro SAGAWA
59	Oct.19	Sat	Organization of data	Organization of data	Departure from Kigali	—	Organization of data	Organization of data	—
60	Oct.20	Sun	Organization of data	Organization of data	Arrival at Kansai	—	Organization of data	Organization of data	Departure from Tokyo
61	Oct.21	Mon	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Investigation at NAEB, RAB	Data collection about EIA	Arrival at Kigali
62	Oct.22	Tue	Field reconnaissance(Ngoma)	Outline design of irrigation facilities	—	—	Survey on Ntende WUO	Meeting with Ngoma officials about	Field survey
63	Oct.23	Wed	Investigation of existing cooperatives(Twizamure)	Outline design of irrigation facilities	—	—	Investigation of existing cooperatives(Twizamure)	Data collection	Field survey
64	Oct.24	Thu	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Survey on Ntende, Kiba, Kanyonyoba dam	Data collection	Data collection
65	Oct.25	Fri	Meeting with Rwanda side	Outline design of irrigation facilities	—	—	Meeting with MINAGRI about project plan	Data collection	Data collection
66	Oct.26	Sat	Field reconnaissance(KWAMP)	Organization of data	—	—	Organization of data	Organization of data	Investigation of preceding project
67	Oct.27	Sun	Organization of data	Organization of data	—	—	Organization of data	Organization of data	Organization of data
68	Oct.28	Mon	Confirmation of beneficiaries at the site	Outline design of irrigation facilities	—	—	Visiting Kigarama Rice Farmer Cooperative	Collection of information about land acquisition	Data collection
69	Oct.29	Tue	Field reconnaissance(Mufunba)	Outline design of irrigation facilities	—	—	Survey on Muvumba dam	Collection of information about land acquisition	Data collection
70	Oct.30	Wed	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Survey on CPRIMWA coop. about fisheries	Survey on CPRIMWA coop. about fisheries	Data collection
71	Oct.31	Thu	Field reconnaissance (Karongi)	Outline design of irrigation facilities	—	—	Study on project evaluation	Collection of information about land acquisition	Data collection
72	Nov.1	Fri	Field reconnaissance (Karongi)	Outline design of irrigation facilities	—	—	Study on project evaluation	Drawing up a EIA draft report	Data collection
73	Nov.2	Sat	Organization of data	Organization of data	—	—	Organization of data	Organization of data	Organization of data
74	Nov.3	Sun	Organization of data	Organization of data	—	—	Organization of data	Organization of data	Organization of data
75	Nov.4	Mon	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Survey on Kanyonyoba Coop. about fisheries	Drawing up a EIA draft report	Data collection
76	Nov.5	Tue	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Study on production cost and evaluation	Drawing up a EIA draft report	Data collection
77	Nov.6	Wed	Meeting with JICA	Outline design of irrigation facilities	—	—	Explanation of farming plan to MINAGRI	Drawing up a resettlement plan	Data collection
78	Nov.7	Thu	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Explanation of farming plan to Ngoma district officers	Drawing up a resettlement plan	Data collection
79	Nov.8	Fri	Planning of irrigation facilities	Outline design of irrigation facilities	—	—	Study on production cost and evaluation	Drawing up a resettlement plan	Data collection
80	Nov.9	Sat	Organization of data	Outline design of irrigation facilities	—	—	Organization of data	Organization of data	Organization of data
81	Nov.10	Sun	Organization of data	Outline design of irrigation facilities	—	—	Organization of data	Organization of data	Organization of data
82	Nov.11	Mon	Planning of irrigation facilities	Drawing up a report of field survey	—	—	Confirmation of process of WUO establishment at Task	Drawing up a resettlement plan	Data collection
83	Nov.12	Tue	Meeting with Rwanda side	Drawing up a report of field survey	—	—	Collection of data about governmental organization	Drawing up a resettlement plan	Data collection
84	Nov.13	Wed	Planning of irrigation facilities	Drawing up a report of field survey	—	—	Estimation of project benefit	Explanation of project plan to MINIRENA	Data collection
85	Nov.14	Thu	Conference with residents (Ngoma)	Drawing up a report of field survey	—	—	Estimation of project benefit	Conference with residents (Ngoma)	Data collection
86	Nov.15	Fri	Meeting with Rwanda side	Drawing up a report of field survey	—	—	Estimation of project benefit	Explanation of project plan to RDB	Data collection
87	Nov.16	Sat	Test of hose irrigation	Organization of data	—	—	Test of hose irrigation	Organization of data	Test of hose irrigation
88	Nov.17	Sun	Organization of data	Organization of data	—	—	Organization of data	Organization of data	Organization of data
89	Nov.18	Mon	Test of hose irrigation	Drawing up a report of field survey	—	—	Survey on Nyanza23 dam site	Drawing up a report of field survey	Investigation of preceding project
90	Nov.19	Tue	Field reconnaissance with RDB staffs	Drawing up a report of field survey	—	—	Drawing up a report of field survey	Drawing up a report of field survey	Data collection
91	Nov.20	Wed	Meeting with Rwanda side	Drawing up a report of field survey	—	—	Meeting with JICA about project plan	Drawing up a report of field survey	Data collection
92	Nov.21	Thu	Meeting with Rwanda side	Drawing up a report of field survey	—	—	Explanation of farming plan to MINAGRI	Drawing up a report of field survey	Data collection
93	Nov.22	Fri	Explanation of project outline to Permanent	Explanation of project outline to Permanent	—	—	Explanation of project outline to Permanent	Explanation of project outline to Permanent	Data collection
94	Nov.23	Sat	Organization of data	Departure from Kigali	—	—	Drawing up a report of field survey	Organization of data	Departure from Kigali
95	Nov.24	Sun	Organization of data	Arrival at Kansai	—	—	Drawing up a report of field survey	Organization of data	Arrival at Tokyo
96	Nov.25	Mon	Drawing up a report of field survey	—	—	—	Departure from Kigali	Departure from Kigali	—
97	Nov.26	Tue	Irrigation forum	—	—	—	Arrival at Kansai	Arrival at Tokyo	—
98	Nov.27	Wed	Departure from Kigali	—	—	—	—	—	—
99	Nov.28	Thu	Arrival at Tokyo	—	—	—	—	—	—

Appendix-3 List of Parties Concerned in the Recipient Country

Name	Position
1. Ministry of Agriculture and Animal Resources (MINAGRI)	
Mr. Ernest Ruzindaza	Permanent Secretary
Mr. Nzeyimana Innocent	Chairman of Task Force for Irrigation and Mechanization
Mr. Jean Claude	Member of the Task Force
Mr. Ngarukiye Blaise	Contract Manager, GFI Nasho, C/P of the Task Force to the Team
Mr. Habakubaho Theogene	Social Safeguard Specialist, Single Project Implementation Unit /LWH
Mr. Musabyimana Emmanuel	Head of Water Users Organizations Department, MINAGRI
Mr. Uwitonze Theogene	WUOs Supporting Unit, MINAGRI
Mr. Takuji Tanaka	Irrigation adviser, JICA expert
Mr. Akihisa Nakano	Irrigation adviser, JICA expert (Former)
Mr. Nzabonimana Jules	Assistant of Mr. Tanaka
2. RSSP, LWH/MINAGRI	
Mr. Ramazani Bizimara	RSSP member
Mr. Dan Flota	LWH Irrigation Expert
Mr. Hadush	LWH Dam Expert
3. Ministry of Natural Resources (MINIRENA)	
Ms. Nyirakamana Jacqueline	NBI National Focal Point Officer/MINIRENA Environment and Forest Unit
Mr. Alphonse Hishamunda	Environmental Protection Professional/MINIRENA
Mr. Karuranga Dismas	Water Resource Expert/MINIRENA
4. Rwanda Development Board (RDB)	
Mr. Pierre Andre Mutabaruka	Crops and Plants Business Development Officer, Agriculture Development Department
Mr. Sezibera Alain	Environmental Analyst/Investment Division
5. Rwanda Natural Resources Authority (RNRA)	
Ms. Kandema Agathe	Water permit Administrator, RNRA/WRD
6. National Agricultural and Export Board (NAEB)	
Mr. Ngendo Martin	Agronomist, Coffee Processing Officer, NAEB
7. Rwanda Agriculture Board (RAB)	
Mr. Martin Busohozi	Agronomist

Name	Position
8. EWSA	
Mr. Larry Vincent Mpaka	Ag. Director of Electricity
Mr. Clement Rushingabi Gvu	Network Electricity Manager, Ngoma Branch
9. Ngoma District Office	
Mr. Mupenzi Georges	Vice Mayor in charge of Finance and Economic Development
Mr. Nsanzuwera Michel	Land officer
Mr. Niyongabire Jan Vier	District Agronomist
Mr. Mutabaruka Sematabaro	District Environment Officer
10. Remera Sector Office	
Ms. Mukarkundo Victoir	Executive Secretary
Mr. Nzabonimpa Eraste	Sector Agronomist
Mr. Rurangirwa Shabani	Acting Executive Secretary
11. Rurenge Sector Office	
Mr. Muragijemwabo Arcade	Executive secretary
Mr. Nzabirinda Damien	Agronomist
Mr. UWIMANA J.M.V	Acting Executive Secretary
12. Rujambara Cell	
Mr. Nzahabwanayo Gaspard	Social Economic and Development Officer
13. Ndekwe Cell	
Mr. Singirankabo Jean Claude	Executive Secretary
14. Rwikubo Cell	
Mr. Makerera Alexandre	Executive Secretary
15. Rugera Cell	
Mr. Tumushime Joseph	Social Economic and Development Officer
16. Muhurire Cell	
Ms. Nfitimana Regina	Executive Secretary
17. Bugera Cell	
Ms. Ufitikirezi Colleta	Executive Secretary

Appendix-4 Minutes of Discussions

Appendix-4.1 Minutes of Discussion on 5th September, 2013

Minutes of Discussions
on
Preparatory Survey
on
“Land-husbandry, Water-harvesting and
Hillside-irrigation project”
in
the Republic of Rwanda

In response to a request from the Government of the Republic of Rwanda (hereinafter referred to as "GoR"), the Government of Japan decided to conduct a Preparatory Survey on Land-husbandry, Water-harvesting and Hillside-irrigation project, (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to GoR the preparatory survey team (hereinafter referred to as "the Team"), which is headed by Mr. Hiroshi SUZUKI, executive technical advisor to the director general, JICA, and is scheduled to stay in the country from 28th August to 6st September, 2013.

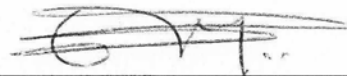
The Team held discussions with the officials concerned of the GoR and conducted a field survey at the study area.

As a result of discussions and a field survey, both parties confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Kigali, 5 September, 2013



Mr. Hiroshi SUZUKI
Leader,
Preparatory Survey Team,
Japan International Cooperation Agency



Mr. Ernest RUZINDAZA
Permanent Secretary
Ministry of Agriculture and Animal Resources,
Republic of Rwanda

ATTACHMENT

1. Objective of the Project

The Project aims to increase sustainable agricultural production.

2. Project site

After discussion with the Team, GoR side understood that only 'Ngoma 22' is recognized as suitable for Japan's grant aid among those requested from GoR.

The Project site, Ngoma 22, is located in Ngoma District, Eastern Province as indicated in the **Annex 1**.

3. Responsible and implementing agency

The responsible and implementing agency of the Project is the Ministry of Agriculture and Animal Resources (MINAGRI). The organization charts are provided in the **Annex 2**

4. Items requested by GoR

The items requested for the Project is as shown in the **Annex 3**.

GoR also requested plot construction (land consolidation) of command area in marshland which is located downstream of dam for efficient use of water resources and better water management.

5. Environmental and social considerations

In order to ensure that appropriate environmental and social considerations are to be made for the Project, GoR agreed to abide by 'JICA Guidelines for Environmental and Social Considerations' in addition to the national environmental laws and regulations in the Republic of Rwanda.

It was affirmed that MINAGRI will take charge of conducting the Environmental Impact Assessment and obtain an environmental certificate from Rwanda Development Board (RDB) for the Project before the implementation of the Project.

6. Stakeholder consultation

A stakeholder consultation meeting was held on 2nd September, 2013 at Ngoma District Office by inviting representatives from farmers, rural communities and relevant local government authorities. In the meeting, participants were informed of the proposed development plan of the Ngoma 22 site, which could affect their agricultural practices related to the construction.

7. Japan's Grant Aid Scheme

GoR understood the Japan's Grant Aid Scheme explained by the Team as described in the **Annex-4**. GoR shall take the necessary measures as described in the **Annex-5** for smooth implementation of the Project.

8. Further schedule of the Study

Based on the survey results, JICA will prepare the draft outline design report and dispatch a mission to explain its contents in February, 2014.

Once both sides agree in principle on the contents of the report, JICA will finalize the report and send it to Kigali by June, 2014.

9. Other relevant issues

9-1. Expropriation and compensation

It was explained that site expropriation and compensation will be one of measures to be taken by GoR, which shall include expropriation of land, removal of trees and/or perennial crops, temporal occupation of land for installation, etc. It was confirmed that MINAGRI is responsible for expropriation and compensation according to Rwandan Legislation and 'JICA Guidelines for Environmental and Social Considerations'.

9-2. Development and construction permission

Prior to the implementation of the Project, it is necessary that construction permission is attained from the RDB, process of which involves the Environmental Impact Assessment.

9-3. Range of the Grant Aid

As for construction works, the Project will cover only dam and irrigation facilities, and NOT land husbandry works. The designing part of the Project, however, shall include land husbandry in command area of the Project.

9-4. Utilization of water resources

In order to realize efficient use of water resources in the whole command area, both hillside and marshland, the preparatory survey shall examine necessary measures(both hard and soft).

Both side agreed that MINAGRI shall take necessary measures and/or procedures to ensure that the beneficiaries of the Project have legal access to irrigation water. These shall include the water right as authorization and concession for the utilization of water.

9-5. Water Users Organizations

The Team requested GoR to establish Water Users Organizations(WUOs) before the commencement of construction work, and GoR promised to do so.

9-6. Operation and maintenance plan

Both side confirmed that soft component for strengthening WUOs for sustainability of the Project would be proposed during the Preparatory Survey, if necessary.

GoR agreed to make efforts for providing their staff for necessary arrangements, if soft component is proposed.

9-7. Asset management

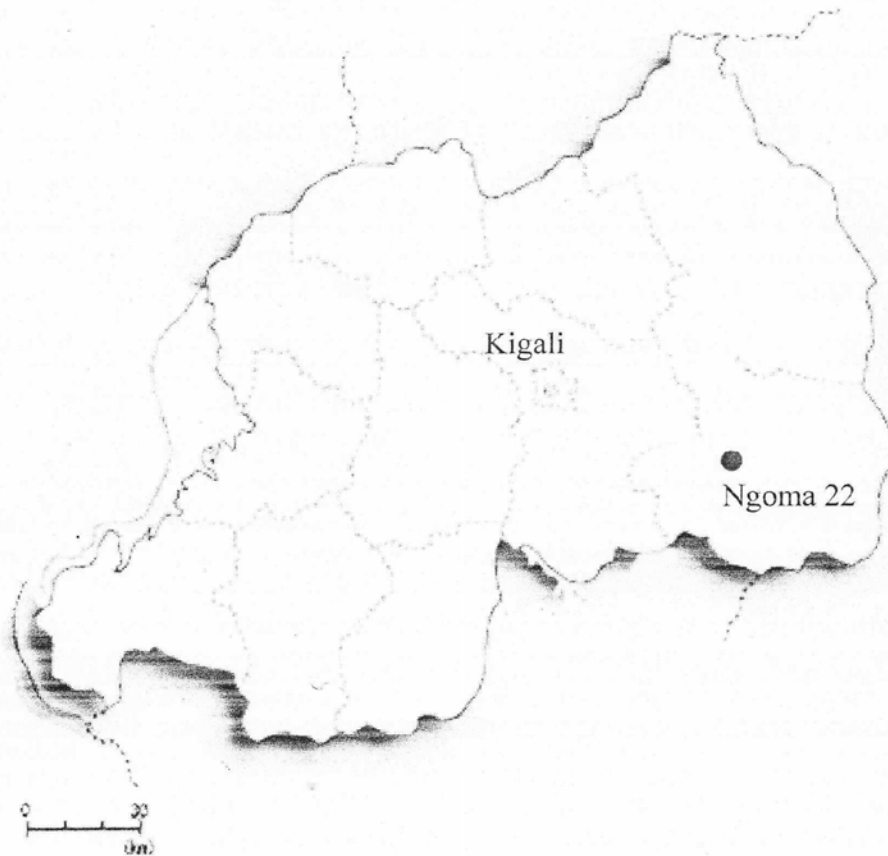
MINAGRI will be responsible for the operation/management issues beyond the control of WUOs as the owner of government's property.

9-8. Completion of necessary procedures

GoR understood that completion of necessary procedures such as expropriation and compensation, Environmental Impact Assessment, etc is pre-condition of Japan's Grand Aid.

- Annex-1 Site map (Ngoma 22)
- Annex-2 Organization charts of MINAGRI
- Annex-3 Items requested by GoR
- Annex-4 Japan's Grant Aid Scheme
- Annex-5 Major undertakings to be taken by each government

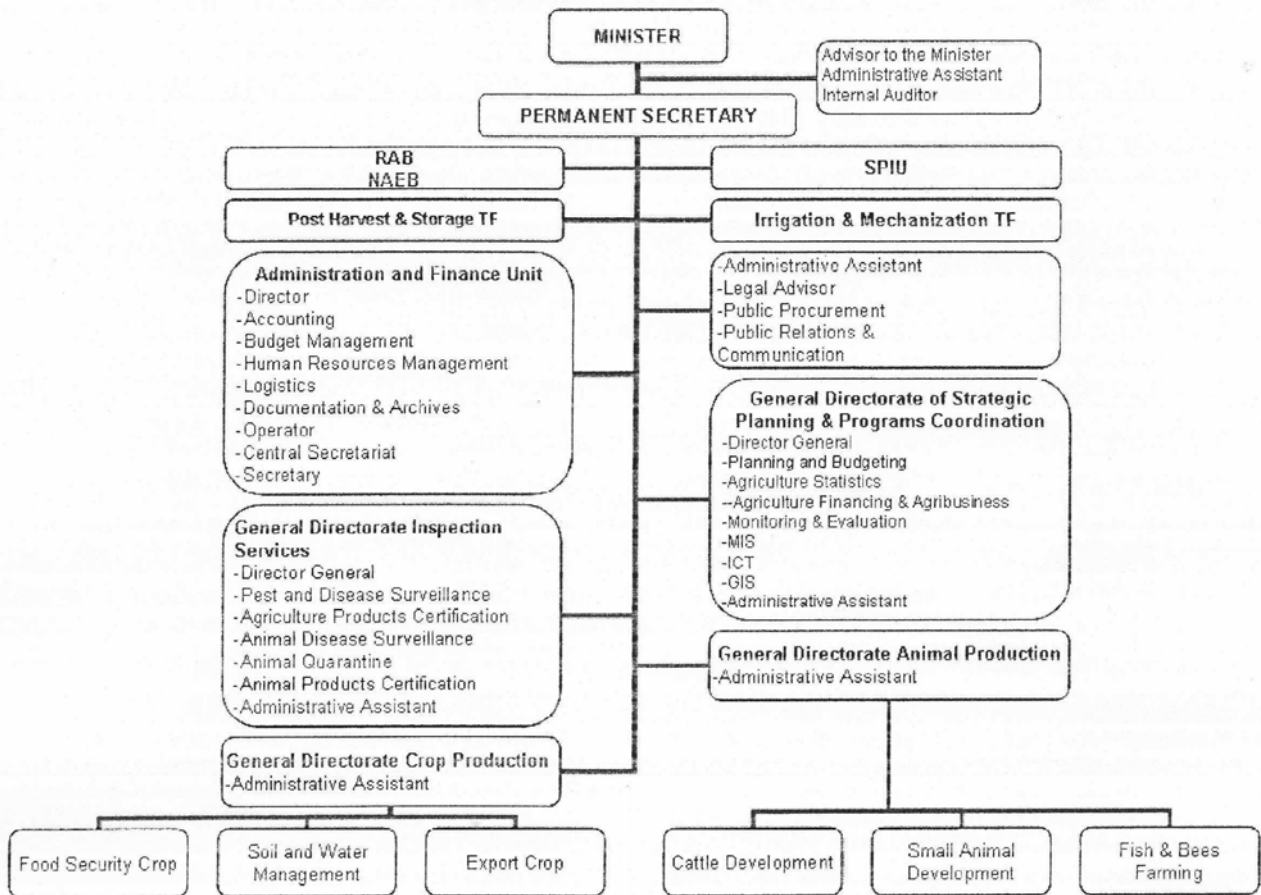
Site Map (Ngoma22)



H.S.

h

Organization charts of MINAGRI



H.S.

by

Items requested by the GoR

No.	Items requested
1	Dam and water reservoir
	1) Dam
	2) Supplementary water reservoir
2	Irrigation Facilities
	1) Main and secondary canals for hillside
	2) Intake gate and canals for paddy field
3	Equipment
	1) Solar panel
	2) Pump
	3) Hose
4	Technical assistance (Soft-component)
	1) Technical assistance to WUOs
	2) Water management

JAPAN'S GRANT AID SCHEME

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on the law and the decision of the Government of Japan (hereinafter referred to as "the GOJ"), JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is conducted as follows-

- Preparatory Survey (hereinafter referred to as "the Survey")
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by The GOJ and JICA, and Approval by the Japanese Cabinet
- Determination of Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide a basic document necessary for the appraisal of the Project by JICA and the GOJ. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the implementation of the Project.

- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

The Report on the Survey is reviewed by JICA, and after the appropriateness of the Project is confirmed, JICA recommends the GOJ to appraise the implementation of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a plea for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

The consultant firm(s) used for the Survey will be recommended by JICA to the recipient country to also work on the Project's implementation after the E/N and the G/A, in order to maintain technical

consistency.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated

authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(10) Social and Environmental Considerations

A recipient country must ensure the social and environmental considerations for the Project and must follow the environmental regulation of the recipient country and JICA socio-environmental guideline.

End.

Major Undertakings to be taken by Each Government

NO	Items	To be covered by the Grant	To be covered by Recipient side
1	To secure land necessary for the implementation of the Project		●
2	To construct following facilities		
	1) The roads	●	
3	To provide facilities for distribution of electricity, water supply and other incidental facilities necessary for the implementation of the Projects		
	1) Electricity		
	a. The distributing power line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply	●	
	3) Telephone System	●	
	4) Project Equipment	●	
4	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	●
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●
10	To give due environmental and social consideration in the implementation of the Project		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

Minutes of Discussions
on
The Preparatory Survey
on
“Land-husbandry, Water-harvesting and Hillside-irrigation project”
in the Republic of Rwanda
(Explanation of Draft Report)

In September, 2013, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on Land-husbandry, Water-harvesting and Hillside-irrigation project, (hereinafter referred to as "the Project"), in response to a request the Government of the Republic of Rwanda (hereinafter referred to as "the Government of Rwanda"). Through discussions, field survey and technical examination of the results in Japan, JICA prepared the draft report of the survey.

In order to explain and to discuss with the concerned officials of the Government of Rwanda on the components of the draft report, JICA sent the Preparatory Survey Team (hereinafter referred to as "the Team"), from 10th May to 18th May, 2014 headed by Mr. Takahiro MORIYA, Chief Representative of JICA Rwanda Office, to the Republic of Rwanda.

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

Kigali, 15th May, 2014



Mr. Takahiro MORIYA
Leader,
Preparatory Survey Team,
Japan International Cooperation Agency
Japan



Mr. Tony NSANGANIRA
Permanent Secretary
Ministry of Agriculture and Animal
Resources,
Republic of Rwanda



ATTACHMENT

1. Components of the Draft Report

The Government of Rwanda side agreed and accepted in principle the components of the draft report explained by the Team. Through the explanation made by the Team on the draft report, the Government of Rwanda side understood that the requests such as a change in above-mentioned components of the Project or the addition of components will not be accepted basically. In addition, the Government of Rwanda side confirmed that the components of the Project could be subject to change according to the results of the tender to be carried out in the implementation stage.

2. Japan's Grant Aid Scheme

- 2-1. The Government of Rwanda confirmed the Japan's Grant Aid scheme as explained by the Team which is described in Annex-4 of the Minutes of Discussions signed by both sides on 5 September, 2013. The flow chart of Japan's grant aid procedures is given in the Annex 1.
- 2-2. The Team explained the major undertakings to be taken by each Government for smooth implementation of the Project as a condition for the Japan's Grant Aid, which is described in Annex-5 of Minutes of Discussions signed by both sides on 5 September, 2013, as a condition of the Japan Grant Aid to be implemented, except 'distributing power line to the site'.
- 2-3. Both sides agreed that they will take necessary actions to implement the above measures as described in Annex I.

3. Schedule of the Survey

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Rwanda by the end of June, 2014.

4. Estimated cost of the Project

- 4-1. The Team explained the cost estimation of the Project as described in Annex-II and Annex-III.
- 4-2. Both sides agreed that the Project Cost Estimation should never be duplicated or released to any outside parties before signing of all the contract(s) for the Project.
- 4-3. The Government of Rwanda understood that the Project cost estimation described in Annex-II and Annex-III is a provisional one as a result of the survey and could be subject to change according to further examination by the Government of Japan.

5. Environment and Social Considerations

5.1 Categorization and its reason

1) Category: B

Insignificant social and environmental impacts are foreseen except for some negative



impacts that may emerge from land usage and construction work.

- 2) Reason: The Project is not considered to be a large-scale “Agriculture involving large-scale land-clearing or irrigation” and “Hydropower, dams and reservoirs” project, is not located in a sensitive area, and has none of the sensitive characteristics under the JICA guideline (April, 2004), it is not likely to have significant adverse impact on the environment.
- 3) Environmental Checklist
The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex-IV.

5-2. Environmental Impact Assessment

The Government of Rwanda side has completed necessary procedure to issue an environmental certificate. The certificate of approval of Environmental Impact Assessment was issued on 5th February, 2014.

5-3. Monitoring for Environmental and Social Considerations

Monitoring will be conducted by Ministry of Agriculture and Animal Resources (MINAGRI) in accordance with the Monitoring Plan for the Project. The results of monitoring will be provided to JICA on a quarterly basis until the completion of the Project by filling in the Monitoring Forms which are shown in the section 1-3 of the draft report.

5-4. Disclosure of Monitoring Results

- 1) The Government of Rwanda agreed that JICA may disclose the part of the monitoring results conducted by MINAGRI in JICA website. JICA also explained that it is better to disclose those results to local stakeholders at implementation stage.
- 2) JICA explained that JICA will disclose further information, when third parties request, subject to approval of The Government of Rwanda side.

6. Confidentiality of the Project

The Government of Rwanda agreed that all the information related to the Project such as detailed drawings, specifications, and the result of cost estimate shall not be released to a third party before conclusion of all the contract(s) for the Project, because they are confidential documents that contain information related to the tender.

7. Other Relevant Issues

- 7-1. The Government of Rwanda explained the difficulty in preparing budget for extending three phase power line to the site, whose distance was learnt during the course of survey. The three phase power line is normally extended to those areas where many houses, public facilities or commercial activities exist, thus different government bodies concerned share total cost of extension. The power line for this project is, however, solely



used for irrigation system, and no other government body, except MINAGRI, will share the cost. Japanese side understood the explanation from the Government of Rwanda, and both side agreed that the cost of extending three phase power line to the site will be covered by Japan's Grant Aid.

7-2. Cost of Operation and Maintenance of the irrigation facilities to be constructed under the Japan's Grant Aid

The Team explained the necessary cost for the operation and maintenance of irrigation facilities to be constructed as shown in the section 5-2 of the draft report. The Government of Rwanda side agreed to ensure that WUO will allocate necessary budget for the operation and maintenance of the facilities to be constructed as described in Annex-V.

7-3. Timely fulfillment of obligations of the recipient country

It was assured that the Government of Rwanda take necessary measures to fulfill those obligations, including major ones listed below, with due observations of respective time limit, a summary table of which is given in the Annex-VI.

- 1) Implementation of compensation and expropriation for affected people on the Project site.
- 2) Implementation of tree cutting and transplanting in the Project area.
- 3) Provision of alternative land or compensation for land owners during construction period.
- 4) Application and acquisition of the water right to RNRA.
- 5) Implementation of support for establishment of WUO.
- 6) Construction of fences around Discharge Tank (No. 1, No. 2, No. 3) and the Regulating Tank (No.2, No. 3).
- 7) Plot construction of downstream paddy field.
- 8) Commission for Banking Arrangement (B/A) and Authorization to Pay (A/P).

7-4. Nomination of counterpart personnel for the soft component

MINAGRI shall nominate officers in charge of the implementation of the soft component.

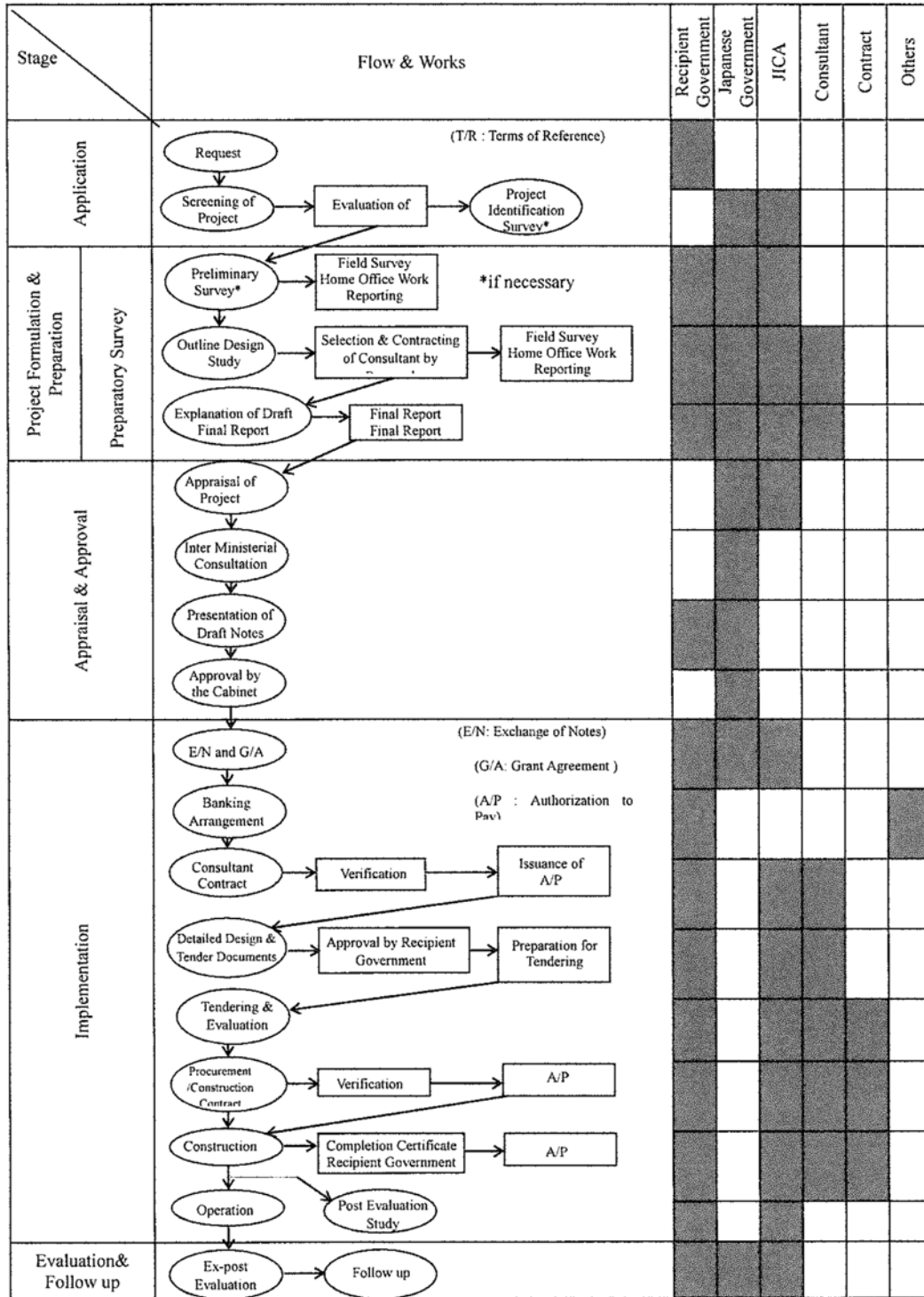
ANNEXES:

- Annex -I Flow Chart of Japan's Grant Aid Procedures
- Annex -II Project Cost to be borne by Japan's Grant Aid
- Annex- III Project Cost to be borne by the Governments of Rwanda
- Annex-IV Environmental Checklist
- Annex -V Cost of Operation and Maintenance of the Facilities
- Annex-VI Summary of Major Undertakings to be implemented by Government of Rwanda



Annex-I Flow Chart of Japan's Grant Aid Procedures

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



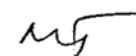
Annex- III Project Cost to be borne by the Governments of Rwanda

(1) Project Cost

Item of Rwanda's Responsibility	Amount of Share (1000 Rwf)	Yen equivalent (1000 yen)	Remarks
Implementation of compensation and expropriation for affected people on the project site	26,365.8	3,902.1	
Implementation of tree cutting and transplanting in the project area	12,823.0	1,897.8	
Application and acquisition of the water right to RNRA	35.0	5.2	
Assignment of counterparts personnel to the project and expenses	2,992.0	442.8	
Construction of fences around the structures like the discharge tank and the regulating tank	5,000.0	740.0	
Plot construction of downstream paddy field	27,000.0	3,996.0	
Implementation of support for establishment of WUO	790.0	116.9	
Commission for Banking Arrangement (B/A) and Authorization to Pay (A/P)	4,700.0	695.6	
Implementation of Land Husbandry design and construction (except design in the command area, which is to be done by Japan side)	311,000.0	46,028.0	
Implementation of environmental monitoring after completion of construction period	2,772.0	410.3	

(2) Estimation Conditions

- a) Date of estimation : November, 2013
- b) Foreign exchange rates : US\$ 1.00 = JPY99.27
:Local currency Rwf1.00 = JPY0.148
- c) Implementation schedule: Referred to "Implementation Schedule" specified in the PREPARATORY SURVEY REPORT (DRAFT)
- d) Others : The cost estimation shall be based on the framework of Japanese Grant Aid Assistance

Annex-IV Environmental Checklist

Category	Environmental Item	Main Check Items	Yes (Y) No (N)	Confirmation of Environmental Considerations
1. Permits and Explanation	(1) EIA and Environmental Permits	(a) Has EIA report been officially completed? (b) Has EIA report been approved by authorities of the host country's government? (c) Has EIA report been unconditionally approved? If conditions are imposed on the approval of EIA report, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Y (b) Y (c) N (d) N	a) and b) EIA report has been completed and approved by RDB. c) It was approved under the conditions that the developer shall conform minimum basic safety, health, operational and environmental protection and to present its commitment. d) No other permit is needed. However, water use permit shall be gotten.
	(2) Explanation to the Public	(a) Are contents of the Project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? b) Are proper responses made to comments from the public and regulatory authorities?	1) Y 2) Y	1) Affected persons have been already informed of the Project. They welcome the Project. 2) MINAGRI officers responded to their questions properly.
	(3) Examination of alternatives	(a) Have alternative plans of the Project been examined with social and environmental considerations?	1) Y	At first, head works construction was examined as an alternative for irrigation program. However, it cannot be recommended in terms of cost-effectiveness. At next stage, locations of irrigation canal construction were examined considering Eucalyptus forests and houses located in the area. It is proposed to avoid constructing canal nearby such forests and houses to minimize damages to assets of the people.
2. Mitigation measures	1) Water Quality	(a) Does water quality of dam pond/reservoir comply with the country's ambient water quality standards? Is there a possibility that proliferation of phytoplankton and zooplankton will occur? (b) Does the quality of water discharged from the dam pond/reservoir comply with the country's ambient water quality standards? (c) Are adequate measures, such as clearance of woody vegetation from the inundation zone prior to flooding planned to prevent water quality degradation in the dam pond/reservoir? (d) Is there a possibility that reduced the river flow downstream will cause water quality degradation resulting in areas that do not comply with the country's ambient water quality standards? (e) Is the discharge of water from the lower portion of the dam pond/reservoir (the water temperature of the lower portion is generally lower than the water temperature of the upper portion) planned by considering the impacts to downstream areas?	(a) Y (b) Y (c) Y (d) N (e) Y	The water source of the proposed dam is spring, which is used for drinking water of the people at present. Therefore, the dam water will comply with irrigation water quality standard (FAO). There is no source of eutrophication around the proposed, and no eutrophication is expected. (d) Water springs from the ground in and around the site, no severe water deterioration is expected. (e) It is not thought that water temperature of lower part of dam is very lower than others. The water temperature will be confirmed at the detail design stage.
		(2) Waste	(a) In the case of that large volume of excavated/dredged materials are generated, are the excavated/dredged materials properly treated and disposed of in accordance with the country's standards? (a) Is the Project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the Project will affect the protected areas?	(a) Y (a) N
3. Natural Environment	(1) Protected Areas	(a) Is the Project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the Project will affect the protected areas?	(a) N	Protected areas are far away from the construction sites and no damage is expected to such protected areas.

4. Social Environment	(2) Ecosystem	<p>(a) Does the Project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?</p> <p>(b) Does the Project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?</p> <p>(c) Is there a possibility that the Project will adversely affect downstream aquatic organisms, animals, plants, and ecosystems? Are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>(d) Is there a possibility that installation of structures, such as dams will block the movement of the migratory fish species (such as salmon, trout and eel) that move between rivers and sea for spawning? Are adequate measures taken to reduce the impacts on these species?</p> <p>(a) Is there a possibility that hydrologic changes due to the Project will adversely affect surface water and groundwater flows?</p>	(a) N (b) N (c) - (d) N	(d) There is no migratory fish.
	(3) Hydrology	<p>(a) Is there a possibility that reductions in sediment loads downstream due to settling of suspended particles in the reservoir will cause impacts, such as scouring of the downstream riverbeds and soil erosion? Is there a possibility that sedimentation of the reservoir will cause loss of storage capacity, water logging upstream, and formation of sediment deposits at the reservoir entrance? Are the possibilities of the impacts studied, and adequate prevention measures taken?</p>	(a) N	Since 20% of basic flow will be discharged into the downstream, no significant impact for surface water and ground water is expected. Proposed borrow pit will be submerged in the dam. No big-scale geological change is expected.
	(4) Topography and Geology	<p>(a) Is involuntary resettlement/land expropriation caused by Project implementation? If the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socio-economic studies on resettlement?</p> <p>(d) Is the compensations going to be paid prior to the resettlement and land expropriation?</p> <p>(e) Is the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	(a) Y (b) Y (c) Y (d) Y (e) Y (f) Y (g) N/Y (h) Y (i) Y (j) N	<p>(a) No resettlement will be caused while land expropriation will be done. It was examined to minimize the land to be expropriated and to avoid relocation.</p> <p>(b) Consultation meeting to explain basic compensation package for the affected persons was done.</p> <p>(c) Compensation cost for land and standing crops is estimated following the governmental regulations, which considers market price. In addition, support for livelihood recovery for farmers who cultivated in the marshland is proposed.</p> <p>(d) Prior to land expropriation, compensation shall be paid.</p> <p>(e) It is included in the report.</p> <p>(f) It is planned to give high priority to vulnerable groups for employment of labors.</p> <p>(g) At the consultation meeting, the representatives of affected people welcomed the Project. It is Outline Design stage of the Project, therefore, after official approval of the Project by both government, final census and asset survey will be done. After that, final agreement on the compensation will be exchanged.</p> <p>(h) Resettlement and Compensation Committee will be established based on the regulations. Training cost of the committee and monitoring cost by the committee are included in the budget.</p> <p>(i) A proposed monitoring plan is documented in the report.</p> <p>(j) Resettlement and Compensation Committee will handle complaints in collaboration with traditional</p>

		<p>(a) Is there a possibility that the Project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(b) Is there a possibility that the Project will adversely affect the downstream land uses? In particular, is there a possibility that reductions in the supply of fertile soils to downstream areas will adversely affect agricultural production?</p> <p>(c) Is sufficient infrastructure (e.g., hospitals, schools, roads) available for project implementation? If existing infrastructure is insufficient, is a plan developed to construct new infrastructure or improve existing infrastructure?</p> <p>(d) Is there a possibility that diseases, including communicable diseases, such as HIV will be introduced due to immigration of workers associated with the Project? Are adequate considerations given to public health, if necessary?</p> <p>(e) Is there a possibility that the existence of the dam will cause impacts on water navigation, such as limitations of vessel traffic and water area uses by local inhabitants?</p> <p>(f) Is the minimum flow required for maintaining downstream water uses secured?</p> <p>(g) Is there a possibility that reductions in water flow downstream or seawater intrusion will cause impacts on downstream water uses and land uses?</p> <p>(h) Is there a possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced?</p>	<p>(a) Y (b) Y (c) N (d) N (e) N (f) Y (g) N (h) Y</p>	<p>mediator.</p> <p>(a) It was examined to minimize the land to be expropriated and to avoid relocation. (b) Farmers who cultivate in the downstream can access to the stable irrigation water while some of them will be expropriated. (c) The Project site is located on farmland, there is no hospital or school. (d) It is planned to employ local residents as much as possible, such adverse effect will be limited. (e) There is no navigation in and around the site. (f) 20% of basic flow shall be discharged into the downstream. (g) There is no sea in the country. (h) Probably, it can be caused, Ministry of Health has a program to reduce Malaria by distribution of mosquito net free of charge.</p>
(2) Living and Livelihood		<p>(a) Is there a possibility that the Project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?</p> <p>(a) Is there a possibility that the Project will adversely affect the local landscape? Are necessary measures taken?</p>	<p>(a) N</p>	<p>There is no heritage in and around the site.</p>
(3) Heritage		<p>(a) Does the Project comply with the country's laws for rights of ethnic minorities and indigenous peoples?</p> <p>(b) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p>	<p>(a) (b) N</p>	<p>There is no special and esthetic land scape in and around the site. There is no minority people</p>
(5) Ethnic Minorities and Indigenous Peoples		<p>(1) Impacts during Construction</p> <p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p> <p>(d) In the case of the Projects including borrow sites, if construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>(e) If necessary, is health and safety education (e.g., traffic safety, public health) provided for Project personnel, including workers?</p>	<p>(a) Y (b) - (c) Y (d) - (e) Y</p>	<p>(a) Some mitigation measures such as water spray to reduce dust are proposed. (b) Severe negative impact on the natural environment is not expected. (c) Due to land expropriation, some damages to social environment are expected, however, supports to restore their living standard are proposed. (d) The Project site has been already developed for farming. There is no primordial nature. (e) It is planned to provide as needed.</p>
5. Others		<p>(2) Accident</p> <p>(a) Are adequate contingency plans and mitigation measures developed to cover both the soft and hard aspects of the Project, such as accident prevention programs, installation of prevention facilities and equipment, and safety education for workers? Are adequate measures for emergency response to accidental events considered?</p> <p>(b) Is a warning system established to alert the inhabitants to water discharge from the dam?</p>	<p>(a) Y (b) N</p>	<p>(a) It is planned to present safety instruction and practice regular maintenance of equipment and vehicles. (b) Warning system has yet to be established, however, WUO will be responsible for the water management.</p>
(3) Monitoring		<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) Are the items, methods and frequencies of the monitoring program adequate?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(d) Are any regulatory requirements pertaining to the monitoring report system</p>	<p>(a) Y (b) Y (c) Y (d) Y</p>	<p>(a) Monitoring parameters are proposed. (b) Practical methods are proposed. (c) It is included in the report. (d) Draft monitoring format is attached in the report.</p>

6. Note	Note on Using Environmental Checklist	identified, such as the format and frequency of reports from the proponent to the regulatory authorities? (a) If necessary, the impacts to trans-boundary or global issues should be confirmed (e.g., the Project includes factors that may cause problems, such as trans-boundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N	(a) Such big scale of environmental impact is not anticipated and the construction site is enough far away (longer than 30km) from the international boundary.
---------	---------------------------------------	---	-------	--




Annex-VI Summary of Major Undertakings to be implemented by Government of Rwanda

Items	Implementation Procedures	Implementation Schedule	Responsible Organization	Expenses needed (Rwf)	Budget Preparation
1) Implementation of compensation and expropriation for affected people on the project site	1. Final asset survey 2. Compensation for the affected persons 3. Training of local level officers for grievance settlement	1. After official decision of the project 2. Within 4 months after the final census survey 3. Before compensation	MINAGRI /District	1. 1,210,700 2. 24,213,500 3. 941,600	MINAGRI
2) Implementation of tree cutting and transplanting in the project area	1. Final asset survey 2. Compensation for the affected persons who planted trees 3. Clearance of trees will be done by the contractor	1. After official decision of the project 2. Within 4 months after the final census survey 3. After payment of compensation at the end of Dec. 2013	MINAGRI/District	1. 610,600 2. 12,212,400 3. Included in the construction cost	1. MINAGRI 2. MINAGRI 3. Contractor
3) Implementation of EIA and acquisition of approval by RDB	Submission of EIA report		MINAGRI	None	-
4) Provision of alternative land or compensation for land owners during construction period	No temporary land loss	None	None	None	-
5) Formulation of environmental checklist and environmental monitoring sheet	1. Formulation of environmental checklist 2. Monitoring sheet is prepared in the EIA report and RAP in collaboration with MINAGRI	After EIA report submission Monitoring sheet is included in EIA report and RAP	MINAGRI and JICA study team	None	-
6) Application and acquisition of the water right to RNRA	Application and acquisition of the water right to RNRA	After approval of EIA report by RDB	MINAGRI	35,000 as application fee to RNRA	MINAGRI
7) Distribution of power line to the project site	1. Power sources of pump are solar and commercial power 2. Extension of commercial power line about 6 km away from the dam construction site is born by Japan side. 3. Extension work is to be carried out by EWSA. 4. Solar panel will be procured from Rwanda or third countries MINAGRI allocates the counterparts for implementation of the soft-component of the project	1 Extension works to be done by EWSA should be complete until the commencement of construction period.	MINAGRI EWSA	(around 94 million Rwf)	(Japan side)
8) Assignment of counterparts personnel to the project and expenses	MINAGRI allocates the counterparts for implementation of the soft-component of the project	Feb.2015 - Apr. 2016(14 months)	MINAGRI NAEB NAEB	2,992,000	MINAGRI
9) Implementation of operation and maintenance on irrigation facilities after completion of construction period	1. WUO will get Certificate of Legal Personality (Registration Certificate) to be issued by Ministry of Justice 2. MINIRENA will give the water permit to WUO 3. and, irrigation facilities will be transferred to WUO from GoR	During the period of operation and maintenance	MINAGRI WUO	O&M cost will be born by WUO	MINAGRI WUO
10) Implementation of environmental monitoring after completion of construction period	1. Monitoring of project affected persons due to land expropriation 2. Monitoring of number of malaria patients 3. Monitoring of chemical and fertilizer use condition	For two years after project completion	1. District/MINAGRI 2. Ministry of Health/Sector/C 3. Sector	1. 2,772,000 2. Regular budget 3. Regular budget	1. MINAGRI 2. Ministry of Health 3. District /Sector

11) Implementation of Land Husbandry design and construction(except design in the command area, which is to be done by Japan side)	MINAGRI will start preparation works of terracing construction when the decision of project implementation is made between GoJ and GoR.	May 2016 – Jan. 2017(9 months)	MINAGRI	311,000,000	MINAGRI
12) Implementation of support for establishment of WUO	1. WUO will get Certificate of Legal Personality (Registration Certificate) to be issued by Ministry of Justice 2. MINIRENA will give the water permit to WUO 3. and, irrigation facilities will be transferred to WO from GoR	Feb.2015 – May 2015(4 months)	WUO Supporting Unit	Rwf790,000	MINAGRI
13) Construction of fences around the structures like the discharge tank the regulating tank.	MINAGRI will construct fences around the concrete structure like the discharge tank the regulating tank.	By March 2016	MINAGRI	5,000,000	MINAGRI
14) Plot construction of down stream paddy field	Demo plot construction will be covered by Japanese side and remaining part will be covered by Rwandan side by using construction machines like tractor and laser-leveler which will be provided by Japanese side.	During irrigation facility construction	MINAGRI	27,000,000	MINAGRI
15) Commission for Banking Arrangement (B/A) and Authorization to Pay (A/P)	Rwanda will open an account under the name of the Government of the recipient country in a bank in Japan. Rwanda should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.	After 1 month of EN,GA exchanged	MINAGRI MINECOPIN	4,700,000	MINAGRI MINECOPIN

Appendix-5 Soft Component (Technical Assistance) Plan

MINISTRY OF AGRICULTURE AND
ANIMAL RESOURCES
THE REPUBLIC OF RWANDA

**PREPARATORY SURVEY
ON
PROJECT FOR LAND HUSBANDRY,
WATER HARVESTING AND
HILLSIDE IRRIGATION
DEVELOPMENT
IN
REPUBLIC OF RWANDA

SOFT COMPONENT PLAN**

June 2014

SANYU CONSULTANTS INC.

CONTENTS

1.	Background of the Soft Component	A5-3
1-1.	Components of the Main Project	A5-3
1-2.	Current Conditions of the Project Area.....	A5-4
1-3.	Farming Status and Farmer's Organizations.....	A5-5
1-4.	Necessity for Implementation of the Soft Component.....	A5-10
1-5.	Problems to be Solved	A5-10
2.	Goals of the Soft Component	A5-11
3.	Outputs of the Soft Component.....	A5-12
4.	Verification Methods of Output Accomplishment.....	A5-17
5.	Activities of the Soft Component (input plan)	A5-20
6.	Procurement Methods of Resources for the Soft Component	A5-22
6-1.	Japanese Experts.....	A5-23
6-2.	Local Resources.....	A5-24
7.	Schedule of the Soft Component.....	A5-30
8.	Results of the Soft Component.....	A5-30
9.	Cost Estimation of the Soft Component.....	A5-30
10.	Obligation of the Rwanda Sides	A5-31
10-1.	Sustainable Activities by Rwanda Government and Regional People.....	A5-31
10-2.	Possibility for Execution.....	A5-31
10-3.	Predictable Limiting Factors.....	A5-31
10-4.	Countermeasures to be Taken When Obstructed	A5-32

1. Background of the Soft Component

1.1 Components of the Main Project

The component of the main Project is shown on the following Table 1.1, in which dam and water reservoir will be constructed at the upstream of the valley of the Ngoma 22 site to irrigate hillside and existing paddy field through the year. Irrigation methods for hillside will be divided into gravity irrigation and pump irrigation depending on elevation linked with water level of the projected reservoir. At paddy field, about two (2 ha) shall be consolidated as a model of land consolidation. All the irrigation facilities shall be constructed newly because no irrigation facilities such as reservoir and others have been provided at the site at present.

Table 1.1 Project Components

Item	Component	Plans
0. Beneficial area	<ul style="list-style-type: none"> • Hillside irrigation • Paddy field irrigation 	<ul style="list-style-type: none"> • Total beneficial area : 300ha <p><u>Breakdown</u></p> <ul style="list-style-type: none"> • Upland irrigation with gravity : 165ha • Upland irrigation by pump : 100ha • Paddy field : 35ha
1. Dam and reservoir	1) Reservoir for irrigation	<ul style="list-style-type: none"> • Annual available water : 1,111,000m³ • Storing capacity : 960,000m³ • Type : Fill dam • Bank height : 14.9m
	2) Reservoir	<ul style="list-style-type: none"> • Number : 3 • Storing capacity : 1,950m³
2. Irrigation facilities	1) Main and secondary canals for hillside irrigation	<ul style="list-style-type: none"> • Length of the main canal : 28km <p><u>Breakdown</u></p> <ul style="list-style-type: none"> • Open canal : 20km • Pipeline : 8km <ul style="list-style-type: none"> • Length of Secondary canal (PVC) : 26km
	2) Water division gates and canals for paddy field irrigation	<ul style="list-style-type: none"> • Divisional gates : 12 places • Length of canal, drainage and O&M road : 3.9km each
3. Equipment	1) Solar panels	<ul style="list-style-type: none"> • Capacity : 45kW
	2) Pumps	<ul style="list-style-type: none"> • Pumps : 5 • Outlets : 140m³/hr/unit • Pumping height : 25m
	3) Hoses for tail end irrigation	<ul style="list-style-type: none"> • Hose & watering can : LS
4. Land consolidation	1) Land consolidation of the existing paddy field	<ul style="list-style-type: none"> • Paddy field consolidation (Jpn) about 2ha • Ditto (Rwd) about 30ha
	2) Provision of agricultural machinery for the land consolidation	<ul style="list-style-type: none"> • Tractor and laser leveler etc. (Jpn) one each

1.2 Current Conditions of the Project Area

1.2.1 Administrative Division

The site of Ngoma22 is located at Ngoma District of Eastern Province distant about two hours by car from Kigali, capital of Rwanda. The Project site is divided into Rurenge sector and Remera sector, and the former is composed of five villages and the latter of four villages. Every village is placed on hilly area with above 1,400m, therefore, no house is submerged by construction of the projected dam.

1.2.2 Population

Following tables show population and number of households in the concerning nine (9) villages. The averaged family member per household is estimated at from 2.6 to 4.6 based on administrative statistics, meanwhile, the one based on the baseline survey conducted by JICA Survey Team is estimated at 5.18 per household and 2.54 persons of which are working in agricultural sector.

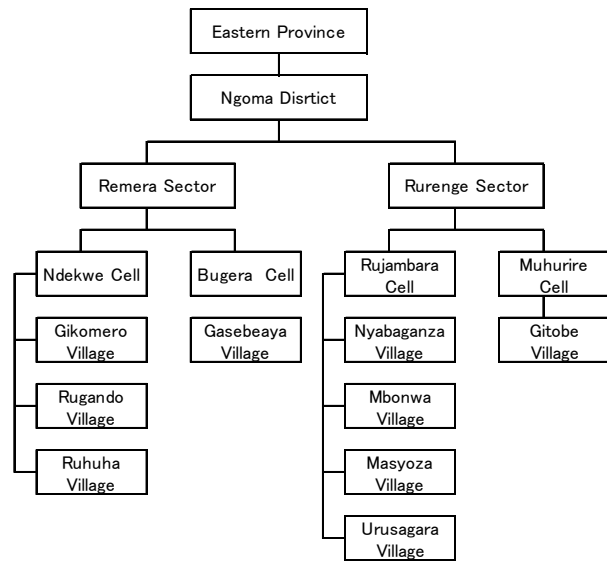


Figure 1.1 Administrative Division of the Site

Table 1.2 Populations at the Project Site

Ndekwe Cell					
Village	Population			Household	Average Family Member
	Male	Female	Total		
Gikomero	298	335	633	168	3.8
Rugando	551	613	1,164	294	4.0
Ruhuha	562	382	944	208	4.5
Total	1,411	1,330	2,741	670	4.1

Rujambara Cell					
Village	Population			Household	Average Family Member
	Male	Female	Total		
Nyabaganza	257	215	472	123	3.8
Mbonwa	319	236	555	201	2.8
Masyoza	487	368	855	206	4.2
Urusagaya	224	203	427	167	2.6
Total	1,287	1,022	2,309	697	3.3

Bugera Cell					
Village	Population			Household	Average Family Member
	Male	Female	Total		
Gasebeaya	344	215	559	215	2.6

Muhurire Cell					
Village	Population			Household	Average Family Member
	Male	Female	Total		
Gitobe	354	215	569	123	4.6

Source. Sector Offices in Remera and Rurenge, 2012

1.2.3 Roads and Transportation Means

A paved main road with double lane is consolidated from Kigali to Ngoma District. However, feeder road from the main road to the Project site is not paved, and therefore the road become muddy and slippery during rainy season due to the clayey soil, and approach to the site by car also becomes difficult.

As a public transportation means to the District, line buses connecting between the District and metropolitan area are available and motor cycle taxis and bicycles taxis are popularly used in the areas.

1.2.4 Electrification and Communication

The areas nearby the main road between Remera sector and Kibungo have been already electrified. The ration of electrification is estimates at 20% based on the results of the baseline survey. The non-electrified households use kerosene lamp or paraffin lamp for lighting. .

Table 1.3 Electrification Status

Electrified (household)	Not-electrified (household)
41	163
20%	80%

Source: Baseline Survey, October 2013, JICA Survey Team

The rapid IT innovation has extended to local areas even in rural areas, and mobile phone has been extending rapidly, by which communication between capital and local areas and rural areas have been becoming easier. Mobile phone service shops are often found at the major points and users of mobile phone have been extending rather than fixed/line telephones.

1.2.5 Domestic Water Sources

Domestic water sources at the site is tabulated as shown in Table 1.4 based on the baseline survey by JICA Team. It is implied that many farmers are relying on rain water or spring water. During wet season, combined use of rain water and spring water is predominant, and spring water followed by tap water in the dry season.

Table 1.4 Water Sources at Present

Domestic Water Source	Wet season (households)	Dry season (households)
Rain water +spring	66	0
Well+spring+rainwater	1	0
Tap water+rain water+spring	8	0
Tap water+spring	0	8
Rain water	89	0
Rain water +well	11	0
Tap water +rain water	18	0
Tap water	6	46
Well	1	38
Well+spring	1	13
Spring	3	99
Total	204	204

Source: Baseline Survey October 2012, JICA Survey Team

1.3 Farming Status and Farmers Organizations

1) Present Land Use

The site is surrounded by hilly area of Gikomero village of Remera sector at the north, Gitobe village at the east and Rurenge sector at the south. Vertical drop between the marshland located at the lowest part of the site and highest hill top is about 200 m. Sweet potatoes, sugarcane, carrot and pulses are planted at the marshland located at the planned dam site under irrigated condition, meanwhile maize, sorghum, potatoes and tomatoes with a focus on pulses/beans are cultivating at the gently sloped hillside, and plantain/banana, coffee, mango, and avocado are cultivated at the upper part of the hillside. Cultivation at the hillside is mostly in rain-fed condition except for the lowest parts where is near to the stream. Monoculture and mixing culture are observed for maize and sorghum to make use of limited farmlands. Following figure shows the cross section view of the land use at the Ngoma22 site.

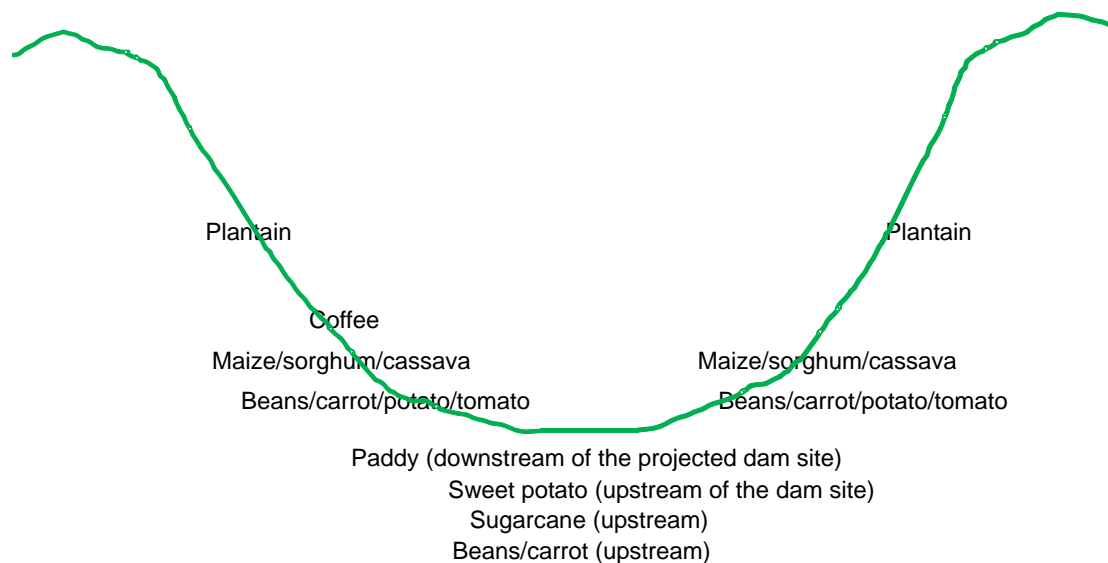


Figure 1.2 Cross Section of Land Use at Ngoma22 Site

Cultivated area by crop based on land form survey conducted by JICA Survey Team is as shown below, which is roughly divided into 35ha of paddy field and 240ha of hillside upland. The major crops occupying wider area are maize, sorghum and pulses/beans.

Table 1.5 Planted Area by Crop at the Site

Crop	Area (ha)
Maize/Sorghum	136.83
Beans	14.59
Sorghum/Maize + beans	19.02
Grassland	8.86
Plantain	24.98
Mix cropping with beans & cassava	27.72
Forest	8.00
Paddy	35.0
Total	275.0

Source: Land Form Survey, JICA Survey Team

2) Land Holding and Farm Size

According to the Land Law, the marshland is owned by the government, and therefore Kigarama Rice farmers Cooperative is leased the land to cultivate. Meanwhile, hillside upland is privately owned by individual farmers.

The averaged farm sizes of paddy field and hillside are 11.7 are per farm for the former and 34 are for the latter respectively, which are smaller than 76 are of the national average and also smaller than 50 are (0.5ha) that is minimum requirement of farm size to feed a family, implying that living standard of farmers at the site are not with ease.

3) Farming Features

Double cropping of paddy cultivation is done at existing paddy field through a year, and beans/pulses sometimes mixed with maize, coffee, and plantain/banana are planted at hillside to make use of limited farm areas. Tomatoes and cabbage can be harvested three times a year due to temperate climate conditions, however their traditional technology is extensive as seen in indefinite planting interval of

tomatoes without supporting rods.

The lower parts of hillside form slightly higher furrow and stream forming a net work of water way flows between small scale plots. Terracing has not yet been implemented as of November 2013, and hillside upland expands on gently sloped areas. Only paddy in marshland area at the lowest area and coffee at the higher area are being planted with constant intervals, and others such as pulses, maize and tomatoes are planted with broadcasting system.



4) Farming Practices

Daily farming practices are done generally from early morning of seven o'clock to one o'clock in the afternoon. There is no farm house around the farmlands and farmers go for cultivation every day. There are a few field huts beside the paddy field. All the farming practices from plowing to harvesting are done by manual labour of men and women using spade. Draft cattle are never used for farming and transportation, but only for producing milk and meat.



Threshing of paddy is also done by manual by beating, and then dried on drying platform under the sun but Kigarama Rice Farmers' Cooperative has no drying platform yet as well as winnower, thresher and warehouse to store paddy collected from members.



Irrigation for vegetables are done using plastic jerry can with 25 lit size (right picture) and plastic watering can. For paddy cultivation, gravity irrigation is applied. For banana/plantain, coffee and cassava etc. are rain-fed dominantly. Mulching is practiced mainly for vegetables using byproduct of sorghum and wild grasses.

5) Living Standard of Farmers

According to the result of the baseline survey conducted by JICA Survey Team, the averaged household income of 204 sample farmers is estimated at Rwf 308,696 per year, consisting of Rwf 190,122 crop income, Rwf 54,525 livestock income and Rwf 61,127 of non-farm income respectively.

The poverty profile of JICA estimates poverty line in the country based on the EICV3 (Integrated Household Living Condition Survey 3) at Rwf 118,000/adult/year. Assuming that average family size of 5.18 persons/family, which is the result of the baseline survey, can be converted into 3.66 adults $((2 \times 1.0) + (2.18 \times 0.65) + (1 \times 0.24))$ per family, and poverty line for a family is estimated at Rwf 431,880 per year. Therefore, Rwf 308,696 per family per year of the sampled 204 farmers is considered to be lower than the estimated poverty line of Rwf 431,880. The reasons for the background of poverty will be resulted from small farm size, extensive farming technology, lack of irrigation facility, road infrastructure and less employment opportunity at the site.

6) Procurement of Agricultural Materials

Paddy seed and fertilizers are procured and distributed to members through cooperative, and the cost for them is collected when paddy is marketed through cooperative and the remaining profit is distributed to cooperative members. This system is mostly applied in other cooperatives, too. However, there are farmers who procure seeds from own farms, RAB and local markets according to the result of the baseline survey by JICA Survey Team.

7) Marketing

Cooperatives, middlemen and individual farmers are concerning to marketing of products. Paddy is collected and marketed to the winning bidder through cooperative, however, Kigarama Rice Farmers' Cooperative cannot sell paddy in bulk as cooperative basis because of lack of own warehouse.

The neighboring local markets are located at Kibungo, Karemba, Ngoma and Mutenderi, and Kibungo market is known as collecting and distributing local market in the District. Among them Ngoma market is nearest to the site. Paddy is collected by cooperative and transported by the winning bidder. As to horticulture farming, there are cooperatives organized by crop to sell with cooperative basis but individual marketing is still carried out. Transportation methods are different depending on marketing volume and distance to a market, manpower and bicycles for near markets, bicycles, hired trucks and line buses for distant markets are generally used. Sometimes buyers come to the site to purchase tomatoes etc. though it is depending on market price situation.

The Result on marketing condition at the project site is summarized as shown below;

Table 1.6 Marketing Method of Crops

Method	Paddy	Cereals /pulses	Vegetables	Fruits	Plantain /banana	Others
Through cooperative	68	0	0	0	1	1
Individual	7	54	14	8	10	49
Union	1	0	0	0	0	0
Middlemen	15	149	11	0	30	93
N/A	113	1	179	196	170	61
Total	204	204	204	204	211	204

Source: Baseline Survey October 2013, JICA Team

8) Livestock

At the villages around the site, cattle, goats and poultry are raised. For cattle, native and crossbreed of Holstein are observed mainly for milk production, not for drafting purposes. However, every livestock are kept in small scale, therefore number of livestock is not so many despite abundant feed source of grasses. Cattle are kept in shed beside home and fed reaped fresh grasses. Goats are fed grasses grown beside the road with tethering system. Following table shows the averaged number of livestock of sampled 204 farmers based on the baseline survey by JICA Survey Team.

Table 1.7 Number of Livestock per Farm

	Cattle	Sheep	Goats	Pigs	Chicken	Rabbit
No. of head/birds per Farm	0.99	0.27	1.14	0.14	1.05	0.09

Source: Baseline Survey October 2013, JICA Team

9) Soil

When the feasibility study was conducted in 2012, soil survey was carried out at upstream, midstream and downstream of the project site by digging pits. According to the result, surface layer(1st layer) at the upstream is composed of loam with 40cm thickness containing from 25.0% to 37.5% of clay, silty loam at midstream with 37 cm thickness containing from 0 to 15% of clay and clay loam at downstream with 22 cm thickness containing from 37.5% to 50.0% of clay respectively. At the upstream, the soil of black color contains humus, reddish-brown at midstream, and darkish brown at the downstream, and the soil at mid and downstream is acidic.

Table 1.8 Result of Soil Test

Upstream: Ascent 5', former crop: sweet potato

Layer	Depth (cm)	Density(mm)	Color	Character	Coarse fragment	Grave shape	Grave size	Plasticity	Adherence	Pore	Porosity	Dry/wet	Roots
I	40	4.0	blackish brown	loam	contained	round shape	1~5cm	middle	middle	abundant	middle	wet	abundant
II	40	13.8	dull redish brown	clay loam	contained	round shape	<1cm	middle	middle	abundant	middle	wet	abundant
III	<80	17.1	dull redish brown	clay loam	contained	none	-	middle	middle	abundant	abundant	wet	abundant

Upstream: Ascent 10', former crop: sorghum

Layer	Depth (cm)	Density(mm)	Color	Character	Coarse fragment	Grave shape	Grave size	Plasticity	Adherence	Pore	Porosity	Dry/wet	Roots
I	37	14.0	dull redish brown	silty loam	-	none	-	weak	weak	abundant	middle	slightly wet	abundant
II	32	25	light brown	clay loam	abundant	round shape	1~5cm	middle	strong	contained	fine	wet	none
III	<69	28	light redish brown	clay loam	abundant	round shape	1~5cm	strong	strong	contained	fine	slightly wet	none

Downstream: Flat, former beans + sorghum

Layer	Depth (cm)	Density(mm)	Color	Character	Coarse fragment	Grave shape	Grave size	Plasticity	Adherence	Pore	Porosity	Dry/wet	Roots
I	22	8.4	dark brown	clay loam	abundant	square	1~5cm	weak	meddle	abundant	middle	wet	abundant
II	28	19.1	grayish brown	clay loam	abundant	square	5~10cm	middle	middle	contained	middle	wet	contained
III	<50	21.7	light redish brown	clay loam	abundant	square	5~10cm	middle	middle	contained	fine	wet	none

Source: FS Report JICA 2012

10) Farmers Organizations

(1) Cooperative

There exists Kigarama Rice Farmers Cooperative at the site established in 2007. The Cooperative functions to collect and sell the products on group basis as well as agricultural materials such as seeds and fertilizers for members. Income is distributed to each rice growers depending on their shipment volume. Cooperatives' functions are similar to those of Japanese agricultural cooperative, however, the Cooperative cannot serve for group basis marketing because of lack of warehouse at the moment. Also the Cooperative does not collect water charge, and only member fee was collected when members has joined in the Cooperative. Representatives of the Cooperative have been provided training on paddy cultivation by technical cooperation under JICA. Following shows the organization chart of the Cooperative.

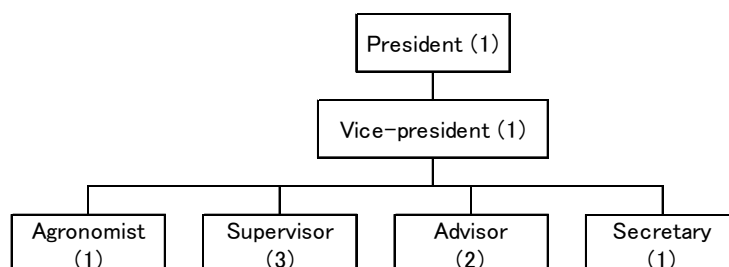


Figure 1.3 Kigarama Rice Farmers' Cooperative

(2) WUO (Water Users Organization)

At present, November 2013, no WUO is established at the site. According to the president of Kigarama Rice Farmers Cooperative, they will have meeting at the end of the year 2013 to select board members of WUO. Demarcation between WUO and cooperative is prescribed, thus they are independent organization, namely, production is managed by cooperative and O&M of facilities and water management are covered by WUO. However, members of them are mostly common. The neighboring Chinese dam's WUO has been stagnant its function for long time.

(3) Ibmina

Ibmina is the small scale organization for informal loan being carried out by villager group in rural areas. Each member pays small amount and one member receives it in rotation to spend it for several purposes like repair house, urgent expenditures and so on. Five to 10 farmers pay about Rwf 200 each per week.

(4) Umganda

Umganda is the traditional labour service system by people for public project, which is nearly compulsory to people. People serve their labor to clean, repair, weeding and dredge canals etc. in their areas. These activities will be done in the site too to maintain irrigation facilities. People in the preceding projects serve for Umganada once a week or once a month.

(5) Gacaca

In the past time Gacaca had worked in rural societies before the genocide, which is the informal conciliation organization to solve conflict, and functioned to judge criminal offences.

(6) Ubudehe

Ubudeha is the traditional mutual organization in rural areas that works for mutual farming practices at a cell basis.

11) Agricultural Extension Services

An agronomist is deployed at District office, Sector Offices of Remera and Rurenge to serve for agricultural services for farmers. However, the number of agronomist is absolutely inadequate as they visit villages once a month to once per three months only. In addition to official agronomists, there are agronomists hired in cooperative to serve for cooperative members. Kigarama Rice Farmers' Cooperative hires an agronomist.

1.4 Necessity for Implementation of the Soft Component

In order to make irrigated agriculture sustainable and secure irrigation benefits, 1) supporting for WUO management, 2) supporting for O & M of facilities and water management along with supporting for improved farming technologies, 3) supporting for water storage test are required in the soft component.

Proposed Components of the Soft Component

[1] Supporting for WUO establishment and strengthening including aquaculture training,

[2] Supporting for O&M of the facilities, water management and farming technologies, and

[3] Supporting for the test filling of the reservoir.

The issue of [1] indicated above is how to secure necessary amount of revenue for O&M of irrigation facilities through water charge collection. The revenue of WUO is only from water charge being collected from members but WUO has not been organized yet at the Project site. Therefore, it is necessary to organize a WUO newly under the support of WUOs Supporting Unit of MINAGRI immediately and then human resources for the soft component will be inputted to strengthen WUO and O&M of irrigation facilities on the above mentioned [2]. As to [2], training on improved farming technologies for upland crops and paddy will lead to sustainable management of irrigation facilities through stable crop production, which is expected to result in 100% of water charge collection.

And as to [3], WUO members and MINAGRI staff who have less experience of water storing test shall be trained about method of the water storing test, its procedures and data recording method etc.

1.5 Problems to be solved

1) Problems on WUO management

Followings could be indicated on this matter;

- WUO has not been organized yet at the Project site,
- Necessity for systematic management of basic data of the WUO,
- Securing water charge collection from paddy and upland farmers and its management,
- Transparent financial affairs,
- Preparation of the own by-law agreed among the members,
- Cooperativeness between paddy farmers and upland farmers,
- Ownership of the irrigation facilities as their property, and
- Close linkage between WUO and Cooperative in water use and management.

2) Problems on O&M of the facilities

Followings could be indicated on this matter;

- Lack of experience and techniques concerning O&M of irrigation facilities,
- Necessity of establishment of the even water distribution system,
- Lack of on-time water management technology based on planned cropping calendar and equitable water distribution,
- Lack of operational technology of operators,
- Lack of repairing technology of canal and others,
- Necessity for systematic recording regarding operation, power consumption and so on,
- Necessity for regular maintenance of facilities by members, and
- Necessity for strengthening technologies for MINAGRI staff on filling the reservoir at the constructed dam.

3) Problems on faming technologies

Following matters could be indicated;

- Low yields due to extensive farming technologies on paddy and upland crops,
- Difficulty in irrigation on steep hillside,
- Water leaking caused from lack of leveling and ridge-coating,
- Difficulty in expansion of farmlands and small farm size,
- Lack of agronomist for agricultural extension services,
- Low land use ratio, and
- Lack of warehouse, thresher, and drying yard at Kigarama Rice Farmers Cooperative

2. Goal of the Soft Component

The goal of the soft component is to realize the positive cycle as show on Figure 2.1, namely, to manage WUO wholesomely with water charge collection and sustainably, to conduct on-time and on-demand water distribution to meet farmer's demand through

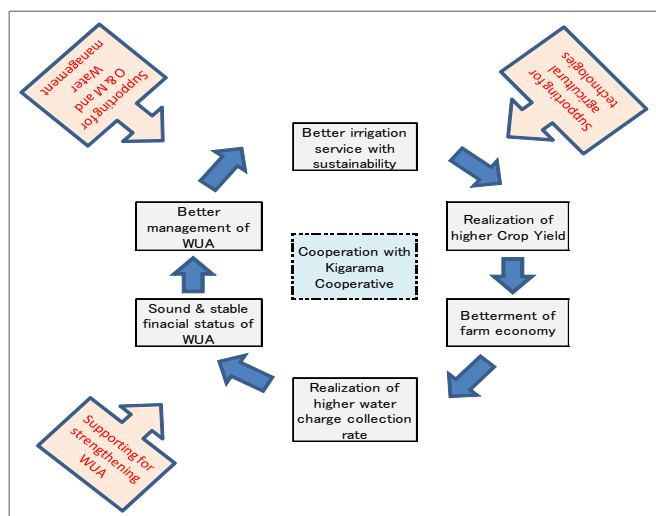


Figure 2.1 Positive Cycle of WUO Management

cooperation with MINAGRI, DISC (District Irrigation Steering Committee) and other concerning agencies to manage the reservoir, pumps, main and secondary canals and tail end farms. The projected goal will be accomplished by the cores of the soft component mentioned above, 1) supporting WUO establishment and management, 2) supporting O&M capacity, water management and farming technologies, 3) strengthening of water storage test.

3. Outputs of the Soft Component

The projected outputs through implementation of the planned components for the soft component will be able to describe as shown below;

Output ①:

Capability of the WUO will be built up and fixed, and its management will become stable by crediting income of aquaculture for O&M of irrigation facilities and pump operation.

Activities: Strengthening of WUO Management

(1) Fostering leadership

WUO will be managed well in irrigation services and O&M under the excellent leader, which will lead WUO to sustainable management and stable crop production to improve farm economy.

(2) Compilation and management of basic data of members

Basic data on WUO such as cadastral maps, acreage by land use, number of beneficial farmers, projected irrigable area and actual irrigated area, cultivated area by crop and its production, marketed volume etc. will be compiled and managed with provided computers to be provided by the Project. Analysis time-series on trend of WUO management will become easier for the better management.

(3) Training on WUO management

Coordination between cooperative, WUO and DISC (District Irrigation Steering Committee), and decision process will be built. WUOs' board members and representatives of farmers will acquire the methods of grasping farmers' demand, problem solution, effective water charge collection, preparation of budget document, auditing, value chain analysis, preparation of action plan and business plan etc. for the better and sustainable management of WUO.

(4) Concept of PIM (Participatory Irrigation Management)

Ownership of irrigation facilities as the community's property will be fostered based on PIM (Participatory Irrigation Management) concept.

(5) Preparation of by-law

Internal regulations of the WUO in response to the site condition will be prepared based on agreement among members, especially focusing on participation of hillside farmers, water charge to be imposed upon upland farmers and rice farmers, equitable water distribution, prohibition of stealing water, water charge collection system, members' duties and penalties, and procedure of decision-making etc.

(6) Training on needs assessment of farmers

WUOs' board members and agronomists will acquire techniques for needs assessment of the WUO members by means of some methods, e.g. Project Cycle Management, Participatory Rural Appraisal and Rapid Rural Appraisal so on, which will lead to higher crop yields and higher water charge collection.

(7) Training on Value Addition

WUO members and representative of farmers will understand importance of quality of crops and processing in order to add value to the original products of crops for more advantageous marketing, and farmers' income will be increased.

(8) Acquisition of the Methods for Build-up of Water Charge Collection System and Its Management and Recording

Along with construction of irrigation facilities, water charge collection system and its status by irrigation block and individual members will become possible by using provided computers, and the results will be fed back to water distribution system by analyzing them.

(9) Preparation of Annual Action Plan and Business Plan

Annual action plan linked with cropping plan of the WUO covering irrigation schedule, meeting, training, mutual work for O&M, business plan will be prepared and make use it for the better management.

(10) Acquisition of the Methods for Assembly, Monthly Meeting and Minutes Preparation

WUO members and board members will understand and acquire the methods for preparation of agenda for the assembly and monthly meeting for smooth and democratic proceeding.

(11) Training on the Management of ledger, checks, receipts

WUO board members, accountants and persons in charge of auditing will acquire how to manage documents on accounting management to realize transparent and sound financial affairs of the WUO.

(12) Preparation of Monthly Report of Accounting

Members' reliability of WUO management will become higher by securing transparency of financial affairs such as documents of production, marketed amount, amount of distributed agricultural materials, unit prices, revenue from water charge and expenses etc. prepared by trained board members, accountants and auditors.

(13) Training for Accountants and Auditors to Secure Transparency of Financial Affairs

Accountants and auditors, DISC members will acquire the points for auditing accounting of the WUO.

(14) Recording Method of Crop Prices and Fertilizers etc.

WUO board members and member farmers will have a sense of management to sell products more advantageously.

(15) Study Tour to the Preceding Projects

Activities: Aquaculture Training

Aquaculture of Tilapia at the proposed dam is planned as well as those in Chinese dam, Kiliba dam and Kanyonyomba dam. Cooperative will be in charge of management according to the by-law. The training on aquaculture will be conducted by the local resources.

(1) Purpose of aquaculture

WUO members will understand the purpose of fish culture, merits and profitability for WUO management.

(2) Input fingerlings

WUO member will study on how to procure fingerlings and proper input of it per unit area of water surface.

(3) Fish management technology

WUO members will acquire technologies on feeding, interval of feeding, growing period, and marketing size etc.

(4) Catching technology

WUO member will acquire the technologies on catching using net and boats, and transportation methods.

Output ②:

WUO's capacity for O&M of irrigation facilities, water management will be built up together with improvement of farming technologies to increase crop yields, and building up of water storage test technology.

Activities: O&M of Irrigation Facilities and Water Management

(1) Preparation of inventory of the irrigation facilities

Various information on irrigation facilities such as number, capacity, constructed and repaired year, degree of superannuation, construction and repairing costs will be managed on computers to be provided by the Project for the better management.

(2) Understanding of legislations and regulations on WUO and cooperative

Not only WUO board members but also representatives of farmers will understand legislations and regulations on WUO and cooperative for the better management.

(3) Preparation of cropping calendar

Cropping calendar for on-time/on-demand water distribution will be prepared.

(4) Acquisition of recording method of pump operation

Prescribed format for recording operation will be prepared and water manager and his staff will acquire its method to manage them on provided computers in order to make use it for the better water management and O&M of facilities.

(5) Training for water manager and other members

Water manager and his/her staff will acquire technologies to handle facilities to distribute water on time and on demand by block according to water availability. In addition, they will be able to record data on water level and volume etc.

(6) Preparation of plan for annual O&M

The annual O&M Plan will be prepared to maintain irrigation facilities such as canals, pumps, gates etc. taking into consideration the prepared irrigation schedule linked with cropping calendar and O&M from upstream to tail-end canals will be done as well. Regular maintenance of canal will be done by member themselves, namely, *Umganda* according to the traditional custom in the area.

(7) Training on broad-based water management

Suitable water management based on land use, crops and cropping period will be done on farm level and crop yield will be increased.

(8) Acquisition of monitoring and feedback methods of the annual O&M activities

The annual O & M mentioned above in 5) will be monitored and its result will be reflected for the O &

M plan based on the discussion in WUO for better O & M and sustainable use of the facilities.

(9) Training on personal computers for water managements

Water requirement according to the cropping calendar and pump operation will be done using provided computers and make use its results for on-time and on-demand irrigation.

(10) Equitable water distribution

Internal rules for equitable water distribution will be prepared in the discussion of members, and equitable water distribution on farm level will be realized by improvement of excessive irrigation and prioritized intake of water at upstream. As the result, the ratio of water charge collection will be increased, and financial status of the WUO will become sounder.

(11) Handling and O&M of pumps

Installed pumps will be operated and maintained properly based on the provided O&M manual of pumps when installment.

(12) Training on canal repairing technology:

Member of the WUO will acquire necessary masonry technology to repair canals by themselves to save the cost for maintaining canals.

(13) Paddy Field Consolidation Technologies

According to the model of land consolidation technology done for about two hectare by the Project, the remaining 33 ha will be suitably consolidated and leveled for effective paddy farming.

(14) Study tour to preceding project

The trainings mentioned above will be carried out for representatives of Kigarama Rice Farmers Cooperative, agronomists of District and Sector Offices, and conducted before finishing filling the storage in order to transfer facilities smoothly to users/WUO.

Activities: Farming Technology (upland crops)

(1) Points to realize higher yield

WUO members will acquire the technologies on soil improvement, and other technologies from seed selection to harvesting in order to attain higher crop yields.

(2) Technologies on rotation and inter cropping

WUO members will acquire technologies on rotational cropping, intercropping and suitable profitable crop selection to increase productivity in parallel with maintaining soil fertility.

(3) Proper input

WUO members will study and acquire knowledge about crop management such as seeds, seedlings, compost, chemical fertilizers (basal and top dressing), weeding and pest and insect control applicable in response to growing stage of crops.

(4) Intervals of plants

WUO members will acquire technologies on suitable intervals of plants to cope with disease and insect control and promotion of crops' growing.

(5) Irrigation

WUO members will acquire proper quantity of irrigation and its interval taken into consideration soil moisture, and in addition water-saving irrigation on hilly area using hoses.

(6) Mulching technology

WUO member will acquire mulching method to control evaporation of water from soil surface and to maintain soil moisture by using locally available materials.

(7) Technologies on prevention of soil erosion and water harvesting

WUO members will acquire technologies on soil erosion prevention as well as water harvesting.

(8) Organic fertilizer and rice husk charcoal making

WUO members will acquire technologies on how to make and make use of organic fertilizers using IMO(Indigenous Micro Organism) and rice husk charcoal.

(9) Market and marketing information

In order to sell products at higher prices as far as possible, WUO members will study knowledge about marketing inclusive of pricing depending on quality of crops.

Activities: Farming Technology(paddy)

(1) Points to realize higher yield

WUO members will acquire the technologies on soil improvement, and other technologies from seed selection to harvesting in order to attain higher paddy yield.

(2) Seed selection using salty water

WUO members will acquire technology on how to select quality seed using salty water and a egg.

(3) Labour-saving seedling making

WUO members will acquire technology to make seedlings with labour-saving method of the Dapog method.

(4) Intervals of plants

WUO members will acquire technologies on suitable intervals of plants to cope with disease and insect control and promotion of growing paddy.

(5) Technology on leveling and ridge coating

WUO members will acquire technologies on land leveling and ridge coating to prevent water leaking and maintain proper water depth suitable for growing stages.

(6) Proper input

WUO members will study and acquire knowledge about paddy management such as seeds, seedlings, compost, chemical fertilizers (basal and top dressing), weeding and pest and insect control applicable in response to growing stage of paddy.

(7) Water depth suitable for growing stages

WUO members will get knowledge about suitable water depth in response to growing stages of paddy to increase yield.

(8) Post harvest technologies

WUO members will acquire the post harvest technologies covering from threshing to storing and marketing.

Activities: Water storage test

MINAGRI staff and WUO members will acquire technologies on how to conduct water storage test at the

reservoir.

4. Verification Methods of Output Accomplishment

Verification methods of outputs mentioned above are shown below. Each outputs shall be verified based on the proposed indices.

Table 4.1 Verification Methods of Outputs

Output①	Capability of the WUO will be built up and fixed, and its management will become stable by crediting income of aquaculture to O & M and pump operation.	
Indices	WUO Management:	
	(1)	Above 30 members of WUO including candidates of leader will have training and acquire knowledge.
	(2)	Basic data will be input and managed on computers using prepared formats, and always replaced.
	(3)	All board members and representatives of members will participate in the training and acquire technologies on WUO management.
	(4)	All board members and above 30 members will participate in the training and understand regulations on WUO, roles of members and linkage with cooperative.
	(5)	All board members and more than 30 members will participate in the training and understand water fee to be imposed on paddy and upland and its collection system.
	(6)	All board members and above 30 members will participate in the training and acquire technologies on equitable water distribution, cropping calendar for water management.
	(7)	All board members and all district and sector agronomists will participate in the training to acquire technologies to grasp farmers' needs and conflict resolution methods.
	(8)	All board members, all district and sector agronomists and more than 30 members will participate in the training and acquire knowledge about value addition and marketing.
	(9)	All board members will participate in the training and acquire the technologies on how to prepare action plan and business plan.
	(10)	All board members and representatives of members will participate in the training and acquire technologies on how to manage assembly and monthly meetings.
	(11)	All board members and accountants, auditors including DISC members will participate in the training and acquire technologies on how to compile and prepare accounting documents.
	(12)	All accountants and board members, DISC member will participate in the training and acquire technologies on preparation of monthly report of account of the WUO.
	(13)	All board members and accountants and auditors including DISC members will participate in the training and acquire technologies on auditing.
	(14)	All board members and all district and sector agronomists will participate in the training and acquire the technologies on marketing, recording of prices of crops sold and distributed materials, market prices at local markets etc.
	Aquaculture:	
	(1)	All board members of WUO and cooperative and more than 30 members will participate in the training and understand purpose of aquaculture, merit, profitability and utilization of it.
	(2)	All board members of WUO and cooperative and more than 30 members will participate in the training and get knowledge about input of fingerlings procurement and its quantity, and release to the reservoir.
(3)	All board members of WUO and cooperative and more than 30 members will participate in the training and acquire technology on how to manage fingerings to grow.	
(4)	All board members of WUO and cooperative and more than 30 members will participate in the training and acquire the technologies practically on catching fishes.	
Verification Methods	WUO Management:	
	(1) :	Number of actual participants to targeted number, and result of the post test and discussion among the participants.
	(2) :	Result of inquiry survey
	(3)~(14) :	Result of the post test and discussion among the participants.

	Aquaculture:
	(1)~(4) : Number of actual participants to targeted number, and result of the post test and discussion among the participants.
Output②	WUO's capacity for O & M, water management will be built up together with improvement of farming technologies to increase crop yields, and building up of water storage test technology.
Indices	O&M of Facilities and Water Management:
	(1) All board members and more than 50 members inclusive of DISC members will participate in the training and understand the component of irrigation facilities and their functions.
	(2) All board members and more than 30 members will participate in the training and acquire the technologies on how to prepare inventory documents and O & M using provided computers.
	(3) All board members and more than 30 members will participate in the training and acquire regulations on irrigation.
	(4) All board members and operators under water manger, and more than 30 members will participate in the training and acquire the method of recording pump operation.
	(5) All operators under water manger will participate in the training and acquire the technologies on operation of division works and gates, and recording.
	(6) All board members and more than 30 members will participate in the training on preparation of O & M planning of the facilities.
	(7) All board members and operators under water management will participate in the training and acquire the knowledge and technologies on broad-based water management.
	(8) All board members and more than 30 members will participate in the training and acquire knowledge about monitoring and feedback methods.
	(9) All board members and water manager will participate in the training and acquire technologies on water distribution and management, pump operation hours etc. based on the cropping calendar using provided computers.
	(10) All board members and more than 50 members inclusive of all DISC members will participate in the training and prepare the rule on equitable water distribution in the discussion.
	(11) All operators under water manager will participate in the training and acquire completely the technologies on handling and operating that they have taught at the initial training.
	Farming technology (Horticulture):
	(1) All board members and more than 50 upland farmers will participate in the training and acquire important technical points to increase productivity of upland crops.
	(2) All board members and more than 50 upland farmers will participate in the training and acquire the technologies on rotational and intercropping.
	(3) All board members and more than 50 upland farmers will participate in the training to get knowledge and technologies about proper input for crops.
	(4) All board members and more than 50 upland farmers will participate in the training to acquire the technologies on intervals of plants, productivity, and insect and disease control.
	(5) All board members and more than 50 upland farmers will participate in the training and acquire the technologies on suitable quantity of irrigation and water-saving irrigation using hose.
	(6) All board members and more than 50 upland farmers will participate and acquire mulching technology.
	(7) All board members and more than 50 upland farmers will participate in the training and acquire soil erosion prevention technology and water harvesting technology.
	(8) All board members and more than 50 upland farmers will participate in the training and acquire the technologies on how to make organic fertilizers and rice husk charcoal as well as their utilization.
	(9) All board members and more than 50 upland farmers will participate in the training and acquire knowledge about market information collection to sell at higher prices advantageously.
	Farming technology (Paddy):

	(1)	All board members and more than 50 paddy farmers will participate in the training and acquire important technical points for paddy farming.
	(2)	All board members and more than 50 paddy farmers will participate in the training and acquire the technology on seed selection using salty water and an egg.
	(3)	All board members and more than 50 paddy farmers will participate in the training and acquire the technology on Dapog seedling making method.
	(4)	All board members and more than 50 paddy farmers will participate in the training and acquire the knowledge about proper plant intervals.
	(5)	All board members and more than 50 paddy farmers will participate in the training and acquire the technology on land leveling and ridge coating to prevent water leaking.
	(6)	All board members and more than 50 paddy farmers will participate in the training and acquire technology on proper input requirement by crop.
	(7)	All board members and more than 50 paddy farmers will participate in the training and acquire technology on proper water depth in response to growing stages of paddy.
	(8)	All board members and more than 50 paddy farmers will participate in the training and acquire the post-harvest technologies.
	Test Filling of the Reservoir:	
	(1)	MINAGRI staff and all board members including more than 30 members will participate in the training and acquire technologies on water storage test.
Verification	O&M of Facilities and Water Management:	
Methods		Number of actual participants to targeted numbers, and result of the post test, and result of discussion among the participants.
	Farming technology (Horticulture):	
		Number of actual participants to targeted numbers, and result of the post test, and result of discussion among the participants.
	Farming technology (Paddy):	
		Number of actual participants to targeted numbers, and result of the post test, and result of discussion among the participants.
	Test Filling of the Reservoir:	
		Number of actual participants to targeted numbers, and result of the post test, and result of discussion among the participants.

Did the necessary technologies and organization for the Project have already been set up?

i) Organizational Aspects

In principle, one (1) WUO is to be established in a marshland. No WUO for O&M of facilities, however, has been existed in the site as of November 2013 so that a new WUO should be established in the Ngoma22 site according to this principle. It is reported that existing Kigarama Rice Farmers' Cooperative is going to select board members of the newly establishing WUO, and there is possibility that WUO may be established within 2014 coincidentally with starting of mobilization activities by of MINAGRI.

The soft component of the Project will be commenced to implement following to the mobilization stage by the WUOs Supporting Unit, and organizing WUO necessary will have finished after finishing the soft component (temporarily planned on March 2016) and will be provisionally ready to operate irrigation water services from May 2017. In parallel with the establishment of the WUO, DISC has to be established in Ngoma District Office to support the WUO.

In Rwanda, cooperative is established by crop basis in principle. Beneficiaries of the Project are hillside farmers and paddy farmers. Therefore, if according to the principle, four (4) types of cooperative will be established to cover vegetables, horticultural crops, cereals and paddy, which may rather make WUO management complicate.

In addition, since there is no integrated cooperative in Rwanda to date, new cooperative for the Project is not planned. Kigarama Rice Farmers' Cooperative will function to collect and sell paddy with conventional method, and meanwhile hillside farmers will sell products through the cooperatives that they have been belonging or sell individually by crop.

Hillside farmers are main beneficiaries of the Project because of its bigger number than those of paddy farmers cultivating 35ha, and they will be required to pay water charge as a member of the hillside farmers group belonging to the new WUO. Therefore members of the WUO will be composed of those of Kigarama Rice Farmers' Cooperative and those of the hillside farmers group. It will be a plan to set up paddy farmers section, upland farmers section with gravity irrigation and upland farmers section with pump irrigation in the WUO to coordinate water management and water charge collection etc.

ii) Technical Aspects

The new WUO consisting of hillside farmers and paddy farmers have no experience of managing and operating irrigation facilities to date such as reservoir, irrigation and drainage canals, pumps, regulating tank, solar panels and irrigation hoses, implying that they need basic trainings on O&M, operation, water distribution, repairing methods etc. The initial training on handling and O&M by equipment makers is indispensable.

Necessary organization and O&M technologies will be secured by the projected soft component, in which various trainings shall be provided to strengthen capability of WUO for O&M of facilities and management of WUO.

Can WUO and beneficiaries of villagers hold and manage organization etc. in cooperation for O&M by themselves?

As mentioned above, WUO who will be responsible for operation of the irrigation facilities has not yet been established as of November 2013. However, there exists Kigarama Rice Farmers' Cooperative established in 2007 at the site and they have already experiences of six (6) years that will work advantageously to manage WUO properly. In addition, maintenance of canals will be done by making use of Umuganda (Community Labour Day) as conducted in the preceding projects. DISC (District Irrigation Supporting Committee) is responsible to support WUO from technical and financial point of views inclusive of monitoring and evaluation of WUO.

5. Activities in the Soft Component (input plan)

Following is proposed components of the soft component of the Project;

Table 5.1 Component of Activities

Component	Supporting for WUO Management Strengthening	
Target	WUO board members, Representatives of WUO members, DISC members, Agronomists of District and Sectors	
Present Technical Level	WUO Management:	
	(1)	WUO has not yet been organized
	(2)	It is necessary for sustainable WUO management to compile and manage basic data of WUO in computers to facilitate analysis of trend and current status.
	(3)	Insecure transparency of financial affairs of WUO
	Aquaculture:	
(1)	No experience of aquaculture	
Necessary Technical Level	WUO Management:	
	(1)	WUO has to be managed sustainably. It is necessary to compile all data by computers to take over it to the next president of WUO.
	(2)	Grasping of farmers' needs
	(3)	Capability for documentation

	(4) Transparent financial management
	(5) Good irrigation service to realize higher rate of water charge collection
	Aquaculture:
	(1) Aquaculture technology from production to marketing of fishes.
Activity	WUO Management:
	(1) Fostering of leadership
	(2) Compilation and management of basic data
	(3) Training on WUO management
	(4) Training on grasping of farmers' needs
	(5) Training on value addition
	(6) Establishment of water charge collection system and recording of it.
	(7) Preparation of cropping calendar
	(8) Method of documentation of annual action plan and business plan etc.
	(9) Method of holding assemble and meetings, and documentation of minutes etc.
	(10) Management of checks, ledgers, receipts etc.
	(11) Documentation of monthly report of accounting
	(12) Training for accountants and auditors to strengthen their capability for securing transparency.
	(13) Recoding and management of market prices of crops and agricultural materials.
	Aquaculture:
	(1) Purpose of fish farming.
	(2) Input of fingerlings.
	(3) Techniques for growing and management of fishes.
	(4) Techniques of catching fishes.
Component	Supporting for O & M, water management, farming technologies and water filling test of the reservoir
Target	WUO board members, Representatives of WUO members, Agronomists of District and Sectors, Operators of facilities of WUO, DISC members
Present Technical Level	O&M of Facilities and Water Management:
	(1) New WUO is in experience of O & M and repairing of irrigation facilities.
	(2) No experience of water distribution and water management.
	Farming technology (Horticulture):
	(1) Proper input has not been practiced.
	(2) Disunity in planting intervals.
	(3) Inadequate irrigation.
	(4) Inadequate renewal of seeds.
	Farming technology (Paddy):
	(1) Disunity of varieties in the site.
	(2) Disunity in planting intervals.
	(3) Proper input has not been practiced.
	(4) Inadequate land leveling.
	(5) Inadequate ridge coating that causes water leak for ridges.
	(6) Renewal of seed has not been extended.
	Test Filling of the Reservoir:
	(1) No experience of the test.
Necessary Technical Level	O&M of Facilities and Water Management:
	(1) Calculation of water requirement according to cropping pattern, and pump operation using computers.
	(2) Broad-based water management.
	(3) Equitable water distribution.
	(4) Monitoring and feedback.
	(5) Regular maintenance of canals etc.
	(6) Needs to recording on pump operation, canal repairing, costs, and record management after the Project.
	Farming technology (Horticulture):
	(1) Proper input

	(2)	Proper planting intervals
	(3)	Tomato cultivation with supporting poles
	(4)	Irrigation system to meet farmers' demand
	(5)	Annual renewal of seeds
		Farming technology (Paddy):
	(1)	Unity of paddy seed in the site
	(2)	Proper planting intervals considering growing conditions
	(3)	Proper input necessary for growing
	(4)	Land leveling and ridge coating
	(5)	Annual renewal of seeds
		Test Filling of the Reservoir:
	(1)	Knowledge and technologies on water storage test
Activity		O&M of Facilities and Water Management:
	(1)	General explanation about irrigation facilities in the Project.
	(2)	Formatting of inventory table and its management
	(3)	Understanding of regulations, by-laws of WUO and cooperative
	(4)	Recoding method of pump operation.
	(5)	Strengthening of Water manager and his staff to operate facilities properly.
	(6)	Documentation of annual action plan etc.
	(7)	Training on broad-based water management
	(8)	Monitoring and feedback of the annual action plan
	(9)	Water distribution and water management using computers
	(10)	Equitable water distribution
	(11)	Handling and O & M of pumps
		Farming technology (Horticulture):
	(1)	Technical points to realize higher yields of crops
	(2)	Rotational and intercropping technologies
	(3)	Proper inputs
	(4)	Planting intervals
	(5)	Irrigation
	(6)	Mulching
	(7)	Soil erosion prevention and water harvesting technologies
	(8)	Organic fertilizers and rice husk charcoal making
	(9)	Market information
		Farming technology (Paddy):
	(1)	Technical points to realize higher paddy yield
	(2)	Quality seed selection using salty water
	(3)	Labor-saving seedling making
	(4)	Planting intervals
	(5)	Leveling, ridge coating technologies
	(6)	Proper input
	(7)	Proper water depth according to growing stages
	(8)	Post-harvest technologies.
		Test Filling of the Reservoir:
	(1)	Preparation of the manual for water storage test and guidance based on it

6. Procumbent Methods of Resources for the Soft Component

Necessary resources for the projected soft component are, 1) WUO strengthening, 2) O&M of facilities and water management, 3) water filling test of the reservoir, 4) improved farming technologies on horticulture and paddy, 4) aquaculture training. Japanese experts and local resources will be procured as shown below.

Table 6.1 Input of Resources for the Soft Component Plan

Component	Japanese Experts			Local Experts		
	Field	Person	Month	Field	Person	Month
1. WUO Strengthening including aquaculture training	Organization	1	3	Organization	1	3
	-	-	-	Aquaculture	1	2
2. O & M of facilities and water management, and improved farming technologies	Irrigation	1	3	Irrigation	1	3
	Horticulture	1	3	Horticulture	1	3
	Paddy	1	3	Paddy	1	6
3. Water filling test of the reservoir	Dam	1	1	Dam	1	1
Total		5	13		5	18

Only Kinyarwanda language is available when communicating villagers at the site. Therefore, training materials in English are necessary to translate into Kinyarwanda by local staff.

As mentioned in the table above, experts covering 1) WUO establishment and strengthening and 2) aquaculture, 3) O&M of facilities and water management, 4) Improved farming technologies on hillside crops and paddy, and 5) Test for filling the reservoir will be assigned. Japanese experts will manage for 1), 3), 4), and 5) out of them, while local resources will cover 2) mentioned above.

There are local consulting companies (service providers) on the soft component sub-sector in Rwanda, but, Japanese experts and local resources of concerning agencies will be procured for the implementation of the soft component of the Project taking into consideration quality of trainings and saving times.

The target people of the trainings will be WUO board members, representatives of farmer (hillside and paddy farmers), including farmers who will be affected by the Project implementation, District and Sector agronomists, DISC members and so on. Taking account of efficiency of the training, 30 to 40 trainees shall be invited per time. Period of a training will be three to four days and tried to hold often as far as the time is allowed so that many beneficiaries can participate in it. The timing of the training will be planned taken into account the progress of construction work of irrigation facilities so as to permit the trainees can see and touch the constructed facilities. As to hose irrigation, practical training will be provided on farm level to use it on hilly areas properly.

6.1 Japanese Experts

(1) Strengthening of WUO Management: 1 person

The relevant engineer shall have capability for leading local resources, knowledge, technologies and experiences on fostering leadership, basic information management using computer, PCM to grasp farmer's needs, improved water charge collection methods, documentation of annual action plan, business plan, and financial management, which are necessary for sustainable O & M of the WUO. The expert will organize system necessary for the soft component through the discussion with Rwanda side, WUO, DISC members, District and Sector agronomists and local resources etc. and prepare training materials including schedule.

(2) Strengthening of O&M of irrigation facilities, water management: 1 person

The relevant engineer will have capability for formatting of inventory of irrigation facilities, water balance calculation, pump operation hours, broad-based water management, on-farm water management, monitoring and feedback using computers to train local resources.

(3) Supporting paddy farming technologies: 1 person

The relevant engineer will be an agronomist who is familiar with paddy farming covering seed

selection, nursery making, land preparation, insect and pest control, on-farm water management, and post-harvest technologies, especially with locally adaptable paddy farming technologies.

(4) Supporting horticultural farming technologies: 1 person

The relevant engineer will be an agronomist who has knowledge and technologies on general upland farming covering seed and seedlings selection, nursery making, land preparation, pest and insect control, water-saving technology, post-harvest technologies, and organic fertilizer making etc.

(5) Water filling test of the reservoir: 1 person

The relevant engineer will be a dam engineer in principle, who can analyze stability analysis, handle water level of the reservoir by storing and releasing water before starting irrigation services and verify safety of dam body, basement, discharge facility and the areas around the reservoir. In addition, the expert will instruct how to record data necessary for judging safety of the said facilities by inundation test. For the purpose, the expert will prepare the training material on water storage test and explain it to MINAGRI staff and WUO members.

6.2 Local Resources

Local resources who will work together with Japanese experts for the soft component will be, 1) expert for WUO management, 2) O&M of irrigation facilities, water management, 3) advanced farming technology of hillside crops, 4) expert for farming technology of paddy, 5) aquaculture, and in addition one local staff for translation and interpretation and two drivers will be procured.

Japanese experts will prepare training materials in consultation with these local resources who know agricultural conditions of the site and then local resources will translate it into Kinyarwanda language. Through these procedures the local resources will understand the contents of trainings and lecture to trainees to assist Japanese experts.

Table 6.2 Resources and Component of the Soft Component (1/5)

Program	Activity	Target Group	Executant	Contents	Days for Activity	
					Japanese	Local Resources
1.Supporting for WUO Management, and Aquaculture	(1) Fostering of leadership	WUO board members, representatives of WUO members, DISC members, District & Sector agronomists	Japanese	Data collection and compilation	2.0	-
				Preparation of training materials	2.0	-
				Discussion with C/P agencies and modification	1.0	-
				Implementation of the training on fostering leadership	2.0	-
				Compilation of the results of the training	1.0	-
			Local resources	Assistance to preparation of training materials and arrangement	-	1.0
	Assistance to the training	-	2.0			
	Assistance to compilation of the training results	-	1.0			
	(2) Compilation and management of the basic data of WUO	WUO board members, Cooperative board members, Representatives of WUO members, District and Sector agronomists	Japanese	Preparation of format and information for it	2.0	-
				Information collection and compilation	1.0	-
				Preparation of training materials	2.0	-
				Practical training of handling computers	2.0	-
				Training using computers	2.0	-
				Discussion with C/P agencies and modification	2.0	-
		Local resources	Compilation of the results of the training	1.0	-	
		Provision of basic data of WUO	-	1.0		
		Arrangement to the training	-	1.0		
		Assistance to the computer training	-	1.0		
		Follow up training	-	4.0		
		Assistance to compilation of the training results	-	1.0		
	(3) Training on WUO management	WUO board members, cooperative board members, representatives of WUO members, District & Sector agronomists, DISC members	Japanese	Information collection and compilation	2.0	-
				Preparation of training materials	2.0	-
				Implementation of the training	2.0	-
				Discussion with C/P agencies and modification	2.0	-
				Compilation of the results of the training	1.0	-
			Local resources	Arrangement for the training	-	1.0
	Assistance to the training	-	2.0			
	Assistance for compilation of the training results	-	1.0			
(4) Training on grasping farmer's needs	WUO board members, cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Preparation of training materials	2.0	-	
			Implementation of training on PCM and RRA	2.0	-	
			Compilation of the results of the training	1.0	-	
			Arrangement for the training	-	1.0	
			Assistance to the training	-	2.0	
		Local resources	Assistance for compilation of the training results	-	1.0	
(5) Training on value addition	WUO & cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Study on value addition by crop	2.0	-	
			Preparation of the training materials	2.0	-	
			Implementation of the training	2.0	-	
			Compilation of the results of the training	1.0	-	
			Local resources	Assistance to study on value addition by crop	-	1.0
		Assistance to the training	-	2.0		
(6) Training on water charge collection system and its management	WUO board members, cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Study on water charge collection system in the preceding WUOs	2.0	-	
			Establishment of water charge collection system	1.0	-	
			Implementation of the training using computers	2.0	-	
			Compilation of the training results	1.0	-	
			Local resources	Arrange for beneficiary meeting, holding meeting and formulation of agreement	-	1.0
		Assistance to compilation of the training results	-	1.0		
	Assistance to the training	-	2.0			
	Follow up training	-	2.0			
	(7) Preparation of cropping calendar	WUO board members, cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Water requirement by crop	2.0	-
Rainfall and irrigation				1.0	-	
Preparation of drafted cropping calendar				2.0	-	
Local resources				Assistance to preparation of present and planned cropping calendar	-	1.0
Assistance to the training			-	1.0		
Assistance for compilation of the training results	-	1.0				

Table 6.2 Resources and Component of the Soft Component (2/5)

1.Supporting for WUO Management, and Aquaculture	(8) Documentation of annual action plan and business plan	WUO board members, cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Data and information collection concerned	2.0	-
				Preparation of the training materials	2.0	-
			Local resources	Implementation of the training	2.0	-
				Assistance to prepare annual action plan and business plan of WUO	2.0	-
				Compilation of the training results	1.0	-
	(9) Training on management of assembly and meeting, and their recording	WUO board members, cooperative board members, DISC members, District and Sector agronomists	Japanese	Information and data collection concerned	2.0	-
				Preparation of the training materials	2.0	-
			Local resources	Implementation of the training	2.0	-
				Compilation of the training results	1.0	-
				Provision of materials on assembly, meetings, and extraordinary gathering	-	1.0
	(10)Management method of ledgers, checks, receipts and their recording	WUO members, cooperative members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Assistance to the training	-	2.0
				Assistance for compilation of the training results	-	1.0
			Local resources	Collection of existing materials concerned and its compilation	2.0	-
				Preparation of the training materials	2.0	-
Implementation of the training				2.0	-	
(11) Preparation of monthly report of accounting	WUO and cooperative board members, accountants, representatives of WUO members, DISC members	Japanese	Compilation of the training results	1.0	-	
			Collection and provision of financial materials of the preceding WUOs	-	1.0	
		Local resources	Assistance to the training	-	2.0	
			Assistance for compilation of the training results	-	1.0	
			Follow up training	-	3.0	
(12) Training on accounting, audit for transparent financial management	WUO board members and accountants, cooperative board members and accountants, representatives of WUO members, DISC members	Japanese	Materials collection and its compilation	1.0	-	
			Preparation of the training materials	3.0	-	
		Local resources	Implementation of the training	2.0	-	
			Provision of information on accounting reports of the existing WUOs	-	1.0	
			Assistance to the training	-	2.0	
(13) Formatting of marketing data and its management	WUO board members, cooperative board members, representatives of WUO members, DISC members	Japanese	Follow up training	-	2.0	
			Discussion with WUOs Supporting Unit and information collection	2.0	-	
		Local resources	Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
			Provision of existing auditing materials and reports concerned	-	1.0	
(14) Aquacultural technologies	WUO and cooperative board members, representatives of WUO members, DISC members	Japanese	Assistance to the training	-	2.0	
			Follow up training	-	4.0	
		Local resources	Preparation of format to input marketing data	1.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
WUO management (Japanese 1 person, C/P 1 person)				90.0	66.0	
		Local resources	Data and information collection concerned	-	3.0	
			Preparation of the manuals on fish farming	-	5.0	
			Implementation of the training on general consideration of fishfarming	-	3.0	
			Training on proper release of fingerlings and its management	-	4.0	
			Training on fish management, feeding and management until marketing	-	4.0	
			Practical training on fish catching at the preceding projects	-	8.0	
			Study tour	-	7.0	
			Follow up training	-	5.0	
			Compilation of the results of the training	-	2.0	
			Aquaculture (C/P 1 person)			
Sub-total : 1. WUO management (Japanese 1 person, C/P 1 person) & aquaculture(C/P 1 person)				90.0	107.0	

Table 6.2 Resources and Component of the Soft Component (3/5)

2.1 O&M of Irrigation Facilities and Water Management	(1) General consideration about the irrigation facilities constructed by the Project	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Discussion with MINAGRI about irrigation facilities and schedule	2.0	-
				Study of existing materials	1.0	-
				Preparation of the training materials	2.0	-
				Implementation of the training	2.0	-
				Compilation of the training results	1.0	-
		Local resources		Assistance to the training	-	2.0
				Assistance to compilation of the training results	-	1.0
	(2) Preparation of format for inventory and its management	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Study on formatting of inventory of irrigation facilities	2.0	-
				Preparation of format for inventory	2.0	-
				Preparation of the training materials	2.0	-
				Implementation of the training	2.0	-
			Compilation of the training results	1.0	-	
	Local resources		Provision of information of preceding WUOs	-	2.0	
			Assistance to the training	-	2.0	
			Follow up training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(3) Understanding of regulations on WUO and Cooperative	WUO board members, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Study on existing irrigation law and cooperative law	2.0	-	
			Preparation of the training materials	2.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of the existing laws on irrigation and cooperatives	-	1.0	
			Assistance to the training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(4) Recording of pump operation	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Preparation of format and information to be input	3.0	-	
			Preparation of the training materials	2.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of data and information about pump operation and its recording	-	1.0	
			Assistance to the training	-	2.0	
			Follow up training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(5) Training for water manager and operators	WUO board members, Water Manager, Cooperative board members, representatives of WUO members	Japanese	Study of the existing materials	2.0	-	
			Preparation of the training materials	3.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of information about the roles of water manager and his staff	-	2.0	
			Follow up training	-	4.0	
			Assistance to the training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(6) Preparation of annual O & M activity plan	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Review of the existing annual action plan in the preceding projects	3.0	-	
			Study and preparation of the training materials	3.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of the existing annual action plan in the preceding projects	-	2.0	
			Follow up training	-	2.0	
			Assistance to the training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(7) Training on broad-based water management	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Review of the current broad-based water management	3.0	-	
			Preparation of the training materials on broad-based water management	3.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of the current broad-based water management	-	2.0	
			Assistance to the training	-	2.0	
			Follow up training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(8) Monitoring and feedback of the annual O & M activity plan	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Study on monitoring and feedback methods	3.0	-	
			Preparation of the training materials	3.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of some examples in the preceding projects	-	2.0	
			Assistance to the training	-	2.0	
			Follow up training	-	2.0	
			Assistance to compilation of the training results	-	1.0	
(9) Calculation of water balance & management using computers	WUO board members, Water Manager, cooperative board members, representatives of WUO members	Japanese	Study and review of water balance calculation in the preceding projects	2.0	-	
			Study on calculation methods of water balance etc	3.0	-	
			Implementation of the training on water balance/water management using	3.0	-	
	Local resources		Assistance to the training	-	3.0	
			Follow up training	-	3.0	
			Assistance to compilation of the training results	-	1.0	
(10) Equitable water distribution	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Data and information collection concerned	2.0	-	
			Preparation of the training materials	3.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of existing data and information about water distribution	-	2.0	
			Assistance to the training	-	2.0	
			Assistance to the compilation of the training results	-	1.0	
(11) Pump operation and is O & M	WUO board members, Water Manager, Cooperative board members, representatives of WUO members, DISC members, District and Sector agronomists	Japanese	Collection and study of the existing information	2.0	-	
			Training to strengthen capacity for pump operation	2.0	-	
			Implementation of the training	2.0	-	
			Compilation of the training results	1.0	-	
	Local resources		Provision of information about pump operation in the preceding projects	-	2.0	
			Follow up training	-	2.0	
			Assistance to the compilation of the training results	-	1.0	
O&M and Water Management					90.0	67.0

Table 6.2 Resources and Component of the Soft Component (4/5)

2.2 Farming Technologies (paddy)	(1) Technical points to realize higher yields	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Site survey	9.0	-			
				Discussion with NAEB, RAB, District & Sector Agronomists	5.0	-			
				Collection of existing manuals for crops and its review	5.0	-			
				Preparation of the training materials	3.0	-			
			Local resources	Implementation of the training	4.0	-			
				Provision of handbooks for farming	-	4.0			
				Assistance to the training	-	3.0			
				Follow up training	-	9.0			
				(2) Quality seeds selection using salty water	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Implementation of the training using salty water and an egg	5.0	-
							Local resources	Assistance to the training	-
Follow up training	-	9.0							
(3) Labour saving seedlings making	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Preparation of the training materials on seedling making	5.0	-				
			Implementation of the training	5.0	-				
		Local resources	Assistance to the training	-	5.0				
			Follow up training	-	9.0				
(4) Planting intervals	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Implementation of the training	5.0	-				
			Local resources	Assistance to the training	-	5.0			
				Follow up training	-	9.0			
(5) Levelling and ridge coating	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Implementation of the training on levelling and ridge coating	7.0	-				
			Local resources	Assistance to the training	-	6.0			
				Follow up training	-	10.0			
(6) Proper input	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Preparation of the training materials on proper input	5.0	-				
			Preparation of manual to make organic fertilizers and provision of the training	7.0	-				
		Local resources	Implementation of the training on proper input	5.0	-				
			Assistance to the training	-	5.0				
Follow up training	-	10.0							
(7) Proper water depth according to growing stages	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Implementation of the training on water depth depending on growing stages	5.0	-				
			Local resources	Assistance to the above	-	5.0			
				Follow up training	-	9.0			
(8) Post-harvest technologies	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Training on drying, threshing, measuring and storing	5.0	-				
			Local resources	Assistance to the above	-	5.0			
				Follow up training	-	8.0			
(9) Study tour	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Study tour to the preceding projects	5.0	-				
			Local resources	Assistance to the above	-	5.0			
				Follow up training	-	9.0			
(10) Compilation of the training		Japanese	Compilation of the training results	5.0	-				
			Local resources	Assistance to compilation of the training results	-	4.0			
Farming technologies (paddy)					90.0	134.0			

Table 6.2 Resources and Component of the Soft Component (5/5)

2.3 Farming Technologies (Hillside crops)	(1) Technical points to realize higher yields	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Site survey	9.0	-			
			Local resources	Discussion with NAEB, RAB, District and Sector Agronomist Collection and review of existing handbooks for farming Preparation of the training materials Implementation of the training	9.0 3.0 7.0 4.0	- - - -			
	(2) Rotational and intercropping	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Training on rotation and intercropping	3.0	-			
			Local resources	Provision of existing handbooks prepared by NAEB, RAB etc. Assistance to the training Follow up training	- - -	2.0 4.0 7.0			
	(3) Proper input	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Training on proper input by crop	3.0	-			
			Local resources	Assistance to the above	-	7.0			
	(4) Planting intervals	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Implementation of the training on proper planting intervals	3.0	-			
			Local resources	Assistance to the training Follow up training	- -	7.0			
	(5) Irrigation	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Practical training on irrigation on farm level (paddy and upland crops)	3.0	-			
			Local resources	Assistance to the above	-	3.0			
	(6) Mulching	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Practical training on mulching	3.0	-			
Local resources			Assistance to the above	-	3.0				
(7) Soil erosion prevention and water harvesting technologies	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Practical training on soil erosion prevention and water harvesting	4.0	-				
		Local resources	Assistance to the training Follow up training	- -	5.0				
(8) Organic fertilizers and rice husk charcoal making	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Preparation of training material to make organic fertilizers Practical training on organic fertilizer making	5.0 15.0	- -				
		Local resources	Assistance to the above Follow up training	- -	7.0 7.0				
(9) Market and marketing information	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Collection and study on marketing and prices Implementation of the training	6.0 3.0	- -				
		Local resources	Assistance to the above	-	3.0				
(10) Study Tour	Representatives of WUO & Cooperative members, board members of WUO & cooperative, DISC members, District and Sector agronomists	Japanese	Study tour	5.0	-				
		Local resources	Assistance to the above	-	5.0				
(11) Compilation of the training		Japanese	Compilation of the training results	5.0	-				
		Local resources	Assistance to compilation of the training results	-	3.0				
Farming technologies (Hillside crops)				90.0	66.0				
sub-total : 2.1 O&M, Water Management (Japanese: 1person, Local: 1person), 2.2 Paddy farming (Japanese: 1person, Local: 1person) , 2.3 Hillside crops (Japanese: 1person, Local: 1person)				270.0	267.0				
3. Water Storage Test	(1) Training on water storage test	Task Force on Irrigation & Mechanization, WUO board members, water manager, representatives of WUO members, DISC members, District & Sector Agronomist	Japanese	Site survey	4.0	-			
			Local resources	Preparation of the training materials on the water storage test Installation of necessary equipment at the site Preparation of training materials Implementation of the training Data analysis Compilation of the training results	10.0 3.0 4.0 2.0 4.0 3.0	- - - - - -			
				Local resources	Assistance to the site survey Assistance to prepare training materials and provision of information Assistance to install equipment Assistance to the training Assistance to recording data of water storage Practice of data analysis Assistance to compilation of the training results	- - - - - - -	3.0 7.0 2.0 2.0 3.0 3.0 2.0		
				Sub-total : 3. Water Storage Test (Japanese 1 person, C/P 1 person)				30.0	22.0
				Total				390.0	396.0

Grand total

		Experts	
		Japanese	Local resources
Activities in Rwanda	1. Supporting for WUO management (Japanese 1person, Local 1person), Aquaculture (Local 1person)	90.0	107.0
	2. O&M of irrigation facilities and water management, farming technologies (Japanese 1person each, Local 1person each)	270.0	267.0
	3. Water storage test (Japanese 1person, Local 1person)	30.0	22.0
Total		390.0	396.0
		(13.0MM)	(18.0MM)

※: Net Working Rate for local resources (1/(22days/30days))=

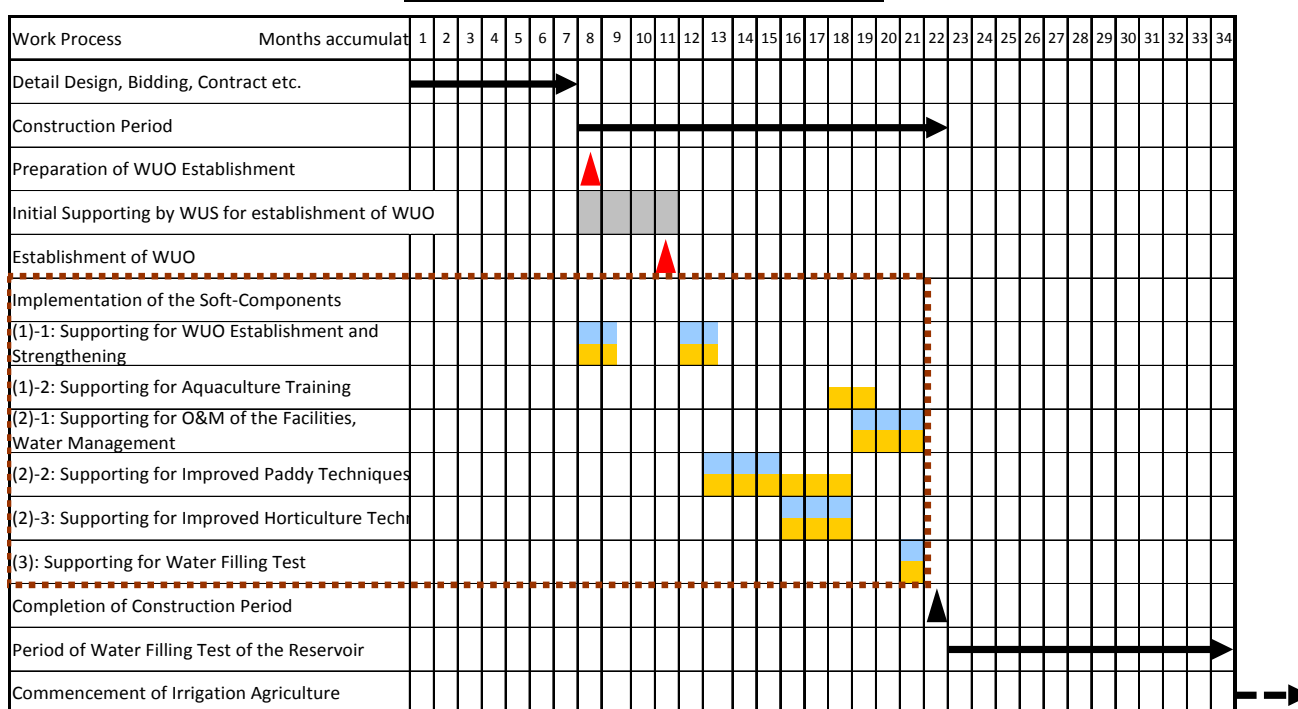
1.36

7. Schedule of the Soft Component

The activities of the soft component will be tentatively planned to commence from May 2015 when the construction work will start as shown on Table 7.1, in time with mobilization by WUO's Supporting Unit of MINAGRI. The training on O&M of irrigation facilities and water management are planned to carry out at the latter part of the construction work so that WUO members can try to use the consolidated facilities practically.

Therefore, the soft component of the Project will start from "(1)-1 Supporting for WUO Management" followed by "(2)-2 Supporting for improved paddy farming" and "(2)-3 Supporting for improved horticulture" and "(1)-2 Aquaculture" and after that "(2)-1 Supporting for O&M, Water Management" and "(3) Supporting for Water Storage Test" as shown below table. All the soft component activities shall be finished before the completion of the construction work.

Table 7.1 Schedule of the Soft Component



(Note)

1) WUS: Water Users Organization Supporting Unit, MINAGRI, 2) Blue: Japanese expert, Yellow: Local resource

8. Results of the Soft Component

As the results of the soft component of the Project, 1) completion report of the soft component, 2) manual for WUO management, 3) manual for O&M, water management, 4) manual for farming technologies of horticultural crops and paddy, 5) manual for water filling test of the reservoir and 6) manual for aquaculture shall be prepared. In addition, the results of the post tests will be attached. These reports shall be submitted to Rwanda government and JICA.

9. Cost Estimation of the Soft Component

The cost for the soft component of the Project is estimated as shown below;

	Item	Cost (Rwf: million)
1	Direct personnel cost	***

Item		Cost (Rwf: million)
2	Direct cost	***
3	Indirect cost	***
Total		***

10. Obligation of Rwanda Side

10.1 Sustainable Activities by Rwanda Government and Regional People

Irrigation is indispensable for the stable agricultural production in the Ngoma22 site where annual rainfall condition has been fluctuated year by year. Many farmers are living on agriculture at the site though their farm sizes are generally small. Therefore, coming irrigation services has to be sustainable to support farmer's livelihood and to secure food security of the region and the country.

The new WUO, executing body of the Project, is required to maintain facilities by collecting water charge through quality irrigation services for beneficial farmers and manage the WUO with sustainability. Meanwhile, member farmers are also required to pay imposed water charge by benefited crop yields and to maintain the facilities like dredging and weeding of canal as regular mutual works.

WUOs Supporting Unit of MINAGRI and DISC (District Irrigation Steering Committee) are required to support the WUO from technical and financial point of views to assure sound management of WUO through regular supervision, auditing etc.

Quality irrigation services from upstream to tail-end farms will be performed smoothly only after concerning agencies achieve each duty without fail.

10.2 Possibility for Execution

The Rwanda government has been promoting to construct about 100 reservoirs/dams to irrigate 10,000 ha based on LWH Project under MINAGRI, leading agency of the Project in her policy. The Ngoma22 project is a part of the LWH Project and has a higher exigency from political point of views. Other than the Project, the preceding projects such as Nyanza23 are under construction, and judging from that WUOs have been establishing in various regions, the possibility for execution is considered to be very high. In addition, it can be also implied from the existence of WUOs Supporting Unit in MINAGRI and WUO by-law. It shows that the activity for the establishment of a WUO is beginning to even at the site under the leadership of the president of Kigarama Rice Farmers Cooperative. However, in fact, WUO has not yet been established for the time being, and needs supporting for establishment and its management.

10.3 Predictable Limiting Factors

(1) Unification of the WUO

According to the principle of "One WUO in One Marshland", it is desirable to establish one (1) WUO at the project site. Assuming that plural WUO will be established at the site, water distribution and its management will become more complicate and it is afraid that conflict of interest may cause and will hinder the WUO from sound management, although the Project beneficiaries are composed of hillside farmers and paddy farmers. It is desirable that the issue on one (1) WUO will be fixed and agreed among beneficiaries before starting the soft component under the mobilization activities by WUOs Supporting Unit of MINAGRI.

(2) Water Charge

The beneficiaries of the Project will be divided into hillside farmers and paddy farmers roughly, and

hillside farmers will be divided again into beneficiaries of gravity irrigation and pump irrigation. As compared to O&M cost for gravity irrigation, pump irrigation is require more cost for electricity for pump operation, though the pump can be operated by solar generating system. However, it will be undesirable for the WUO management to impose different water charge on the beneficiaries depending on water use condition because conflict or disharmony may arise among members.

Therefore, it is proposed to impose unified water charge both for hillside farmers and paddy farmers, and it is desired that water charge will be fixed before commencement of the soft component under the guidance and instruction by WUOs Supporting Unit of MINAGRI and DISC as well as the said (1) above.

10.4 Measures to be taken When Obstructed

If the WUO will not be unified and water charge will not be uniformed, WUOs Supporting Unit of MINAGRI is required to give guidance and instructions until agreement will be obtained among members.

Water charge is only the financial source for O&M of facilities and management of WUO. The WUO will be able to collect water charge steadily by providing quality irrigation services such as on-time and on-demand irrigation for farmers.

However, as seen in the preceding WUOs, they have been facing with issues on water charge collection more or less in fact. DISC is required to guide the WUO properly through regular inspection on management conditions before the WUO will become malfunction as seen in Chinese dam.