

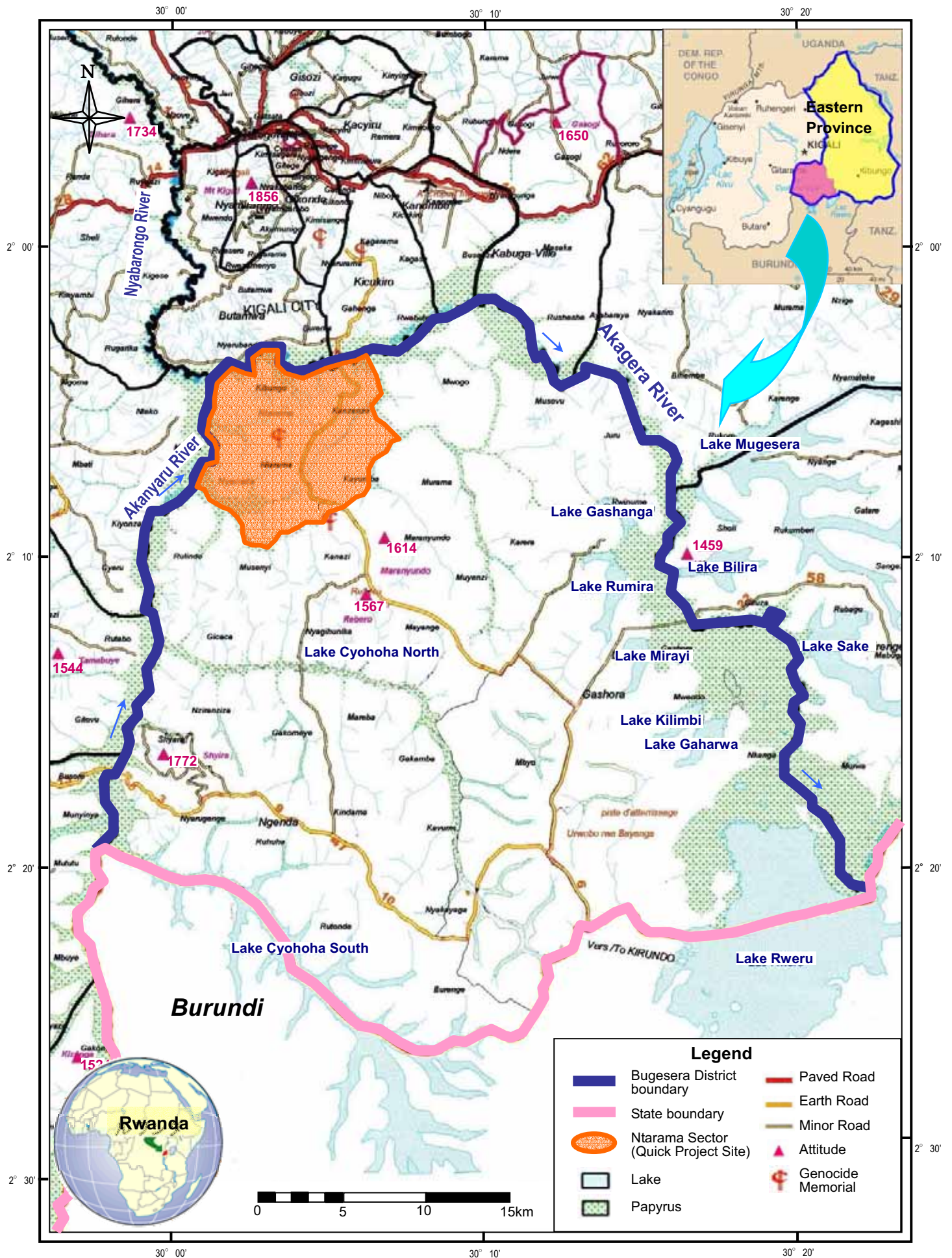
**Japan International Cooperation Agency
Ministry of Agriculture and Animal Resources
Republic of Rwanda**

**THE STUDY ON
SUSTAINABLE RURAL AND AGRICULTURAL
DEVELOPMENT
IN
BUGESERA DISTRICT, EASTERN PROVINCE
IN
THE REPUBLIC OF RWANDA**



**SANYU CONSULTANTS INC.
NIPPON KOEI CO., LTD.**

Location Map of the Study Area



Summary

The JICA Study Team has conducted the first fieldwork of Phase 1 for the Study in Rwanda from 17th April 2006 to 26th September 2006. Main activities during the period are summarized as below.

1. Discussion and explanation of the Inception Report

Explanation and discussion of the Inception Report with MINAGRI on 24th April 2006, Eastern Province in the morning and Bugesera District in the afternoon on 25th April 2006 were held at each headquarters respectively and Minutes of the Meeting (MM) between the JICA Study Team and MINAGRI was concluded on 27th April 2006. MM is shown on attached Appendix A

2. Attendance of the seminars

The Study members attend the following seminars.

- 3 May 2006: Agricultural Growth and Poverty Reduction Options in Rwanda by IFPRI
- 18 May 2006: land Use and Environment Sector Working Group on the Economic Development and Poverty Reduction Strategy (EDPRS)
- 29-30 May 2006: Review of Performance of PRSP/Agriculture Joint Sector (2002-2005)
- 21 June 2006: Explanation of EIA Regulation by REMA
- 14 July 2006: Project to Support Comprehensive Development & Management of Inland Lake by AfDB

3. Process of the Quick Project (QP)

Process of the implementation of the QP is shown as followings.

- (1) 25 April 2006, Meeting with the Governor of Eastern Province
- (2) 26 April and 5 May 2006, Meeting with the Mayor of Bugesera District
- (3) 9 and 10 May 2006, Interview survey with Cell officers of three Cells, Ntarama Sector
- (4) 12 May 2006, Proposal of QP components to Cell and Sector officers in Ntarama Sector
- (5) 17 May 2006, Feedback from the Cell officers on the results of discussions in terms of priority of QP components in each Cell

- (6) 18-19 May 2006, Investigation of other Sectors in Bugesera District
- (7) 22-25 May 2006, Collection of information in terms of project cost by component
- (8) 26 May 2006, Meeting with the Mayor of Bugesera District
- (9) 1 June 2006, Meeting with the Mayor of Bugesera District
- (10) Memorandum of Understanding on Selection of the Quick Project (QP) Sites and the QP Components for the Study between the Mayor of Bugesera District and the JICA Study Team was conducted on 4th July 2006.
- (11) 8 June 2006, Meeting with the Cell council members and Sector officers in Ntarama Sector
- (12) 15 June 2006, Meeting with the three Cell representatives and Sector officers in Ntarama Sector for prioritization workshop
- (13) Introduction of Modern Cow
 - 20, 22 and 23 June 2006, Kick-off Meeting at Cyugaro, Kanzenze and Kibungo Cell
 - 11 July 2006, Making a Plan of Operation with the 16 recipient candidates at Ntarama Sector
 - 1-3 August 2006, Technical training program by the RARDA-JICA joint team at Mandera Village in Ntarama Sector
 - 8 August 2006, Study Tour was carried out at modern dairy farm nearby Kigali and Cattle fattening farm in Ntarama Sector
- (14) Introduction of Household Rainwater Storage
 - 10, 11 and 13 July 2006, Lists of 30 recipients at each Cell were received.
 - 19,20,26 July 2006, Demonstration of the rainwater storage construction at each Cell was commenced and 17 rainwater storages in total were constructed.
- (15) Shallow Well Irrigation System
 - 28 June 2006, Kick-off Meeting at Cyugaro, Kanzenze and Kibungo Cell at Ntarama Sector and list of candidate sites was received.
 - 25 July 4 and 18 August 2006, Demonstration of the Shallow Wells were constructed at Kanzenze, Kibungo and Cyugaro Cell, respectively.

4. Preparation of the Pamphlet

In order to introduce and understand the objectives of the JICA Study countrywide in to Rwanda, Pamphlets by Kinyarwanda, English and French versions were made and distributed to the governmental organization of Rwanda and other Donors.

5. Baseline Survey for constrains and potential analysis

The baseline survey has commenced on 2 August 2006 with GTZ and completion of report for the survey will be scheduled at the end of September 2006.

6. Meeting with Working Committee

1st meeting for explanation on the progress of the Study to the Working Committee members at Bugesera District office by the Study Team was held on 4 August 2006.

7. Visiting the JICA Monitoring Team on the Study

Prof. Nishikawa (Nagoya Univ.) and Mr. Koinuma (JICA HQs) as monitoring team for the Study visited on 17– 22 August 2006 in Rwanda. Fields survey of QP sites as well as the Study area, meeting with MINAGRI, Bugesera District Mayor and other related agencies concerned were conducted.

Abbreviations and Acronyms

(E):English (F):French

A/P	(E) Action Plan
ACORD	(E) Agency for Cooperation and Research in Development, NGO
AfDB	(E) African Development Bank (ADB) (F) Banque Africaine de Développement (BAD)
ATDT	(E) Agricultural Technology Development and Transfer
CD	(E) Capacity Development
CDC	(E) Community Development Committee
CDF	(E) Common Development Fund
CDP (PDC)	(E) Community Development Plan (F) Plan de Développement Communautaire
CEPEX	(E) Central Public Investment and External Finance Bureau (F) Bureau Central des Investissements Publics et des Financements Extérieurs
CGIAR	(E) Consultative Group on International Agricultural Research
COMESA	(E) Common Market for Eastern and South Africa
DFID	(E) Department for International Development
EDPRS	(E) Economic Development and Poverty Reduction Strategy
EFU	(E) External Finance Unit
EIA	(E) Environmental Impact Assessment
EICV	(E) Household Living Conditions Survey (F) Enquête intégrale sur des conditions de vie des Ménages
EIS	(E) Environmental Impact Study
EMP	(E) Environmental Management Plan
EU	(E) European Union
FAO	(E) Food and Agriculture Organization of the United Nations
FARG	(E) Fund to Assist Genocide Survivors
FMD	(E) Foot and Mouth Disease
GoR	(E) The Government of the Republic of Rwanda
GDP	(E) Gross Domestic Product
HIMO	(E) High Intensity Manpower
ICT	(E) Technology of Information and Communication
IDA	(E) International Development Association
IEE	(E) Initial Environmental Examination
IFAD (FIDA)	(E) International Fund for Agricultural Development (F) Fonds International de Développement Agricole
IMF	(E) International Monetary Fund
IOO	(E) Implementation and Operation Order
ISAR	(E) Institute of Agronomical Sciences in Rwanda (F) Insitute des Sciences Agronomiques du Rwanda
KIST	(E) Kigali Institute of Science Technology and Management (F) Institut des Sciences Technologie et de Gestion de Kigali
KIST - CITT	(E) KIST Center for Innovations and Technology Transfer
LLDC	(E) Least less-developed countries
MINADEF	(E) Ministry of Defense
MINAFFET	(E) Ministry of Foreign Affairs and Cooperation

MINAGRI	(E) Ministry of Agriculture and Animal Resources
MINALOC	(E) Ministry of Local Government, Community Development and Social Affairs
MINECOFIN	(E) Ministry of Finance and Economic Planning
MININFRA	(E) Ministry of Infrastructure
MINISANTE	(E) Ministry of Health
MINITERRE	(E) Ministry of Land, Environment, Forestry, Water and Mines
MTEF	(E) Medium Term Expenditure Framework
M&E	(E) Monitoring and Evaluation
NAP	(E) National Agricultural Policy
NEPAD	(E) New Partnership for African Development
NIS	(E) National Institute of Statistics of Rwanda (F) Institut National de la Statistique du Rwanda
OCIR CAFE	(F) Office Des Cultures Industrielles du Rwanda - Café
OCIR THE	(F) Office Des Cultures Industrielles du Rwanda - Thé
OJT	(E) On the Job Training
PADEBL	(F) Projet d'Appui au Développement de l'Elevage Bovin Laitier
PAFOR	(F) Projet d'Aménagement des Forêts du Rwanda, NGO
PASAB	(F) Projet d'Appui à la Sécurité Alimentaire au Bugesera (Project of Caritas, NGO)
PCM	(E) Project Cycle Management
PDL-HIMO	(E) Labour Intensive Local Development Programme (F) Projet de Développement Local - Haute Intensité de Main d'œuvre
PDM	(E) Project Design Matrix
PO	(E) Plan of Operation
PP	(E) Pilot Project
PRSP	(E) Poverty Reduction Strategy Papers (F) Document de Stratégie pour la Réduction de la Pauvreté
PSTA	(E) The Strategic Plan for Agricultural Transformation
(SPAT)	(F) Plan Stratégique de Transformation Agricole
QP	(E) Quick Project
RADA	(E) Rwanda Agricultural Development Authority
RAQCA	(E) Rwanda Agricultural Quality Authority
RARDA	(E) Rwanda Animal Resources Development Authority
RDC	(E) Rural Development Cluster
REAP	(F) Responsable de l'eau et de l'Assainissement de Province
REMA	(E) Rwanda Environment Management Authority
RGPH	(F) Recensement Général de la Population et de l'Habitat
RNE	(E) Royal Netherland Embassy
RSSP	(F) Projet d'Appui au Secteur Rural (E) Rural Sector Support Project
Rwf	(E) Rwanda Franc (1 dollar US=560Rwf)
SWAP	(E) Sector Wide Approach
SWG	(E) Sector Working Group
SWOT	(E) Strengths, Weaknesses, Opportunities and Threats
UNCDF	(E) United Nations Capital Development Fund
UNDP	(E) United Nations Development Program

UNEP	(E) United Nations Environment Program
USAID	(E) United States Agency for International Development
WS	(E) Workshop

Glossary

Gacaca (Gacaca courts):

Participatory community based courts to prosecute and try genocide crimes. They have to reveal the truth about the 1994 Rwandan genocide, to punish perpetrators and to reconcile the torn out Rwandan Community. Effective trials have started countrywide from July 2006 and Gacaca trials take place once a week. Gacaca courts' activities are supposed to be completed by the end of 2007.

Ibimina (ikimina):

A private group whose members provide money every month and one member gets the gathered amount in turn.

Kugurizanya:

To lend money each other. It may be in kind or in terms of labor force meaning X can cultivate for Y on Monday and on Tuesday Y can do the same for X.

Nyumbakumi:

'Nyumbakumi' used to be an informal organ at the very grass root level, not a legal entity. As the Swahili name means, it comprises ten houses. It was initially established by the community for security purposes. Shortly after the genocide, there was much concern about security and each ten households had to organize themselves and control their security. The newcomer among those ten households had to report to the head of those ten households. This informal organ is realized to be helpful for cell and sector authorities in mobilizing the cell population for useful community activities such as Umuganda, elections and other administrative matters. The recent institution of Umudugudu entity under the cell comprising more than 50 households, will take over the community role formerly held by Nyumbakumi.

Ubudehe

Traditionally, Ubudehe consists of community mutual help through collective cultivation works. A villager who had a big plot to be cultivated could seek the help of his neighbors. Currently, such traditional system is not much still prevailing as laborers are often hired by wages. On the other hand, such scheme is promoted to allow collective activities within poverty alleviation among local community. In this development, with support of EU, MINECOFIN developed and piloted an approach for poverty alleviation through Ubudehe. Following successful implementation in Butare province, the Rwandan Government has now adopted it as a national scheme. (Source: Project for Support to Operationalisation of the Strategic Plan for Agricultural Transformation, Appraisal Report, Working Paper 3, Institutional Support to Agricultural Sector, IFAD, July 2005)

Umudugudu: (imidugudu) First of all, umudugudu is a mode of resettlement in agglomeration to avoid traditional scattered settlement in an effort to secure land use. The practice was widespread shortly after the genocide especially in eastern province. Today, with the territory reform, there is another concept of Umudugudu that is the smallest grassroots administrative Unit under the Cell, comprising at least 50 households.

Umuganda:

Community mobilization for manual works of public interest. Activities such as rehabilitation of roads, erosion control devices, tree planting among others are usually carried out within Umuganda framework. Currently, Umuganda takes place countrywide last Saturday of every month.

Umusanzu:

Any community contribution outside legalized taxes or other formally fixed and compulsory contribution. The Cell can mobilize the population for the rehabilitation of the meeting room for example. Each resident may contribute from 200 Rwf and above depending one's financial situation. The contributed amount is called Umusanzu. Likewise, apart from the recognized school fees, parents may decide to contribute *umusanzu* for the classroom construction. Membership fee for associations is as well called "Umusanzu in Kinyarwanda".

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CHAPTER 1 BACKGROUND TO THE STUDY

1.1 Background

The Republic of Rwanda (hereinafter referred to as Rwanda) is one of the most poverty-stricken LLDC in the world with a densely populated state in Africa where the total population, 8.2 million, resides in the total surface area, 26,338 km². Rwanda is often called "the state of thousand hills" consisting of hills and marshlands, where around 90% or more of the population residing in rural areas are engaged in subsistence farming. The Civil war from 1990-1994 that culminated in the genocide, caused a toll of massacre of more than one million people. Thus, huge human resources were lost who, otherwise, would contribute to the national development. The mainstay of the country is agriculture that employs 87% of labor population and produces 47% of the national GDP. Coffee and tea constitute major cash crops. Sorghum, maize and tuber crops account for 67% of the total agricultural production. They are planted in small-holder farm households with an average cultivated area as narrow as 0.76 ha. In addition to progressive land degradation due to vulnerable rain-fed and depriving farming, ever-increasing population has accelerated poverty so that 46%, on average, of the rural population has been impoverished, subject to lower food security (45,000 Rwf / capita / year).

The Study Area, i.e. Bugesera District, has abundant water resources in its lakes and rivers / streams, land resources like untapped marshlands. It is thus endowed with high potentiality of development and available resources, though prevailing farming practices remain at low level. The area has suffered from grave food shortage with a low line of food security, 52.8% in 2001, by far lower than the level of national average, owing due to the degradation of arable land by soil erosion and frequent drought in the hills.

With a view to improving such undesirable state, an action plan for agricultural and rural development that envisages poverty alleviation through the improvement of farming techniques on hillside has acutely been desired to harness food security in Bugesera District, and through soil conservation and exploitation of marshland and other means of improving livelihood against poverty and life style. Based on the request of the Government of Rwanda, JICA dispatched a preliminary and appraisal mission in March 2005, and decided to conduct a Study aimed at formulating a sustainable agricultural and rural development plan to support the Study Area. The Study commenced in April 2006 and will be completed after 31 months in November 2008. In the process of the Study, the Quick Project implementation at Ntarama Sector has been going on starting July 2006.

1.2 Study Objectives and Overall Goals

The proposed Study has the following objectives and overall goals:

(1) Objectives

- Formulating an action plan for agricultural and rural development that reflects real needs of the population in the Area and allows their own participation therein in a sustainable way.
- Building the capacity of the administrative staff (District and agricultural research institutes) and rural organizations through the implementation of a pilot project.

(2) Overall Goals

Rural and agricultural development is carried out through the initiatives of local people with the administrative support, hence, the condition of food security and poverty are improved. Approach to the goal is shown as below.

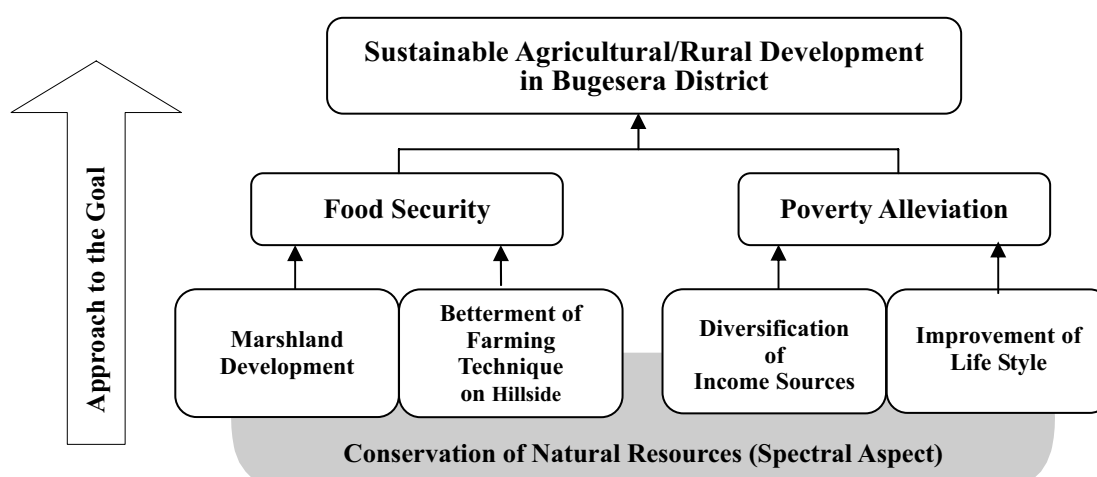


Figure 1.2.1 Approach to the Goal

1.3 Study Area

The Study Area encompasses Bugesera District of Eastern Province including three districts, i.e., Nyamata, Ngenda and Gashora in former Kigari Ngari Province with a population of about 300 thousand and a surface area of 1,333.9 km² where 15 Sectors and 72 Cells are distributed.

1.4 Organization Setup for the Implementation of the Study

So as to implement the Study, MINAGRI took initiatives to establish a steering committee having a coordinating role among concerned stakeholders of the Study, as agreed in the attachment of M/M of discussion / explanation of the Inception Report. In addition to the steering committee at the central administration level, working committee at the District level has been set up. The figure below indicates organisational structure of stakeholders in this Study.

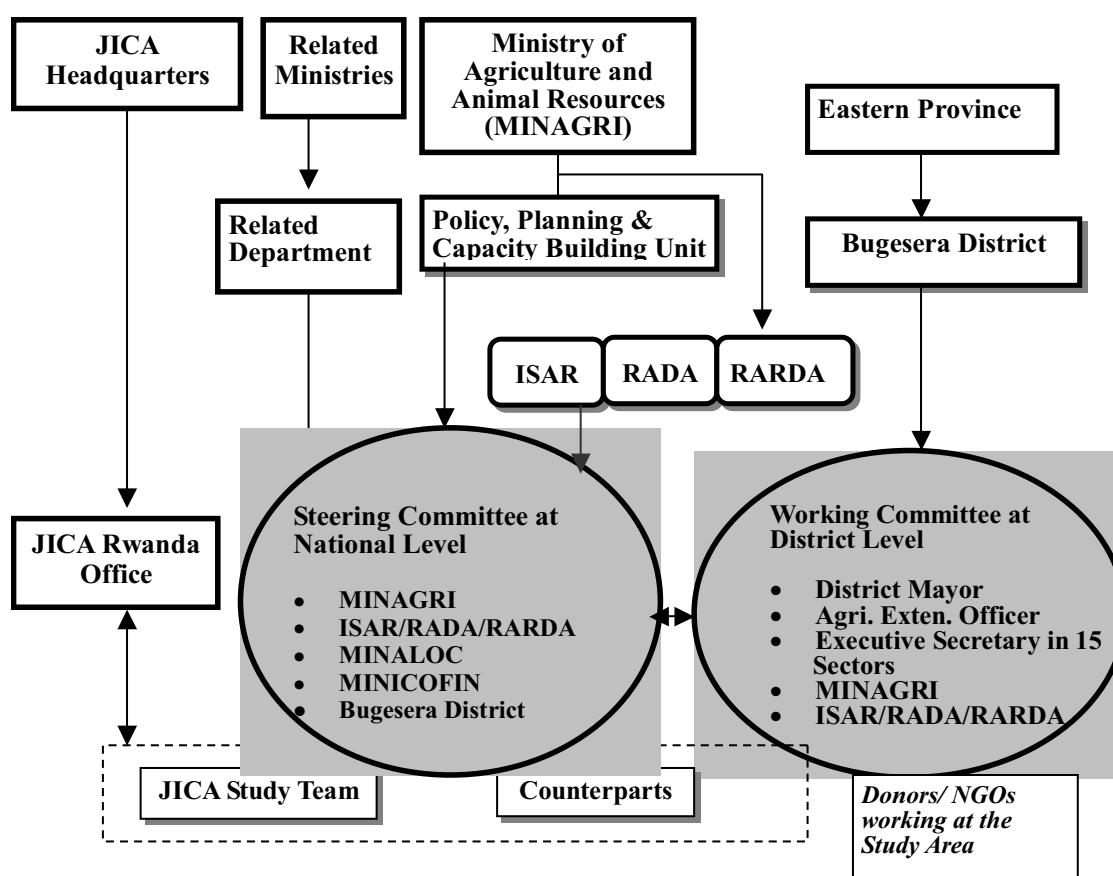


Figure 1.4.1 Organization Chart for the Implementation of the Study

CHAPTER 2 AGRICULTURAL AND RURAL DEVELOPMENT SECTOR IN RWANDA

2.1 Socio-economic and Financial Conditions

(1) Socio-economic Situation

The Rwandan economy is mainly based on agriculture. In 2002, the population engaged in agriculture was 87% and agriculture contributes 47% to GDP, accounts for 71% of the national export revenues and it constitutes the main source of income for 87% of the population.

Rwanda has had an annual GDP gross rate of 4.1% over the past five years, with a rate of 9.6% in 2002 due to sufficient rainfall and good harvest. On the contrary, the figure fell to 0.7% in 2003 as a result of a slump in the agriculture and industrial sectors. Poor rainfall in 2003 was the main reason in this economic growth drop. To fulfill the goals in Rwanda's Vision 2020 as well as PRSP, agriculture sector needs achieve an annual average growth rate of 5-8%. However agricultural sector had a poor growth rate, estimated at 1.4% in 2004. In 2005, estimated growth rate in the agricultural sector rose to 5.8%. As for GDP, despite the effects of electricity shortage, oil cost rise and poor rainfall, Rwanda's economic performance was strengthened in 2004. In 2004, growth in real GDP was 4.4%, while that of 2005 was estimated at 6.3%.

Table 2.1.1 Growth in the Agricultural Sector from 2001 to 2005

	2001	2002		2003		2004		2005		Av. Growth,	Total	Average
			growth		growth	est	growth	est	growth	1995 frncs	Growth	Growth
Food Crop	218.19	255.9	17.3%	243.42	-4.9%	241.79	-0.7%	259.43	7.3%	203.12	18.9%	3.5%
Export Crop	7.82	8.15	4.2%	6.02	-26.1%	8.96	48.8%	7.11	-20.6%	6.34	-9.1%	-1.9%
Livestock	23.94	24.66	3.0%	25.4	3.0%	28.01	10.3%	28.85	3.0%	21.81	20.5%	3.8%
Fisheries	1.96	1.98	1.0%	2	1.0%	2	0.0%	2	0.0%	1.65	2.0%	0.4%
Forestry	8.15	8.4	3.1%	8.65	3.0%	8.6	-0.6%	8.86	3.0%	7.11	8.7%	1.7%
Agric.total	260.06	299.09	15.0%	285.49	-4.5%	289.36	1.4%	306.25	5.8%	240.03	17.8%	3.3%
% to GDO	44.8%	47.1%	44.6%			43.3%		43.1%		44.5%		
GDP	580.16	635.60	9.6%	639.95	0.7%	668.35	4.4%	710.62	6.3%	539.11	22.5%	4.1%

Source: MINECOFIN MACRO UNIT Rwandan growth by sector, 2001-2005(1995 Rwf billion)

(2) Financial Situation

The financial situation from 2001 to 2004 is summarized on table below. The tax revenue shows strong and consistent improvement resulting from a growing economy plus improved revenue administration and tax reforms undertaken since 1997. Proportion of the grants to the revenue in total ranges from 37% to 46% and has been relying on the donors' support. As for the deficit, it was -50.7% lower in 2004 than in 2003.

Table 2.1.2 Key Developments in Fiscal and Financial Management

(billion Rwf)

	2001	2002	2003	2004	% change	
					2003	2004
Revenue and grants	148.19	160.26	195.40	274.86	21.9%	40.7%
Revenue	86.19	101.16	122.30	149.29	20.9%	22.1%
-Tax Revenue	79.50	94.60	114.60	134.56	21.1%	17.4%
-Non Tax Revenue	6.69	6.56	7.70	14.73	17.4%	91.3%
Grants	62.00	59.10	73.10	125.57	23.7%	71.8%
-Budget Support	33.90	39.30	51.00	90.77	29.8%	78.0%
-Project grants	28.10	19.80	22.10	34.80	11.6%	57.5%
% Grants of Revenue and Grants	41.84%	36.88%	37.41%	45.69%		
Total Expenditure and net lending	158.03	164.92	217.86	275.36	32.1%	26.4%
Current Expenditure	107.40	123.65	162.76	164.06	31.6%	0.8%
Capital Expenditure	50.00	40.70	51.10	89.70	25.6%	75.5%
Net Lending	0.63	0.57	4.00	21.60	601.8%	440.0%
Overall Deficit(inc. grants)	△ 9.84	△ 4.66	△ 22.46	△ 0.50	382.0%	-97.8%
Overall Deficit(ex. grants)	△ 71.84	△ 63.76	△ 95.56	△ 126.07	49.9%	31.9%
Change in arrears	△ 31.75	△ 1.70	△ 13.20	△ 17.07	676.5%	29.3%
Deficit	△ 41.59	△ 6.36	△ 35.66	△ 17.57	460.7%	-50.7%

Source: Annual Economic Report 2004 published by MINECOFIN, March 2005

2.2 Decentralization Policies and Administrative Reform

The National Decentralization Policy and Strategy was officially adopted in May 2000 under the responsibility of MINALOC. The overall objective of the Policy is to ensure political, economical, social, administrative and technical empowerment of the local population, to fight against poverty, and to participate in planning and management process of their own development. The three year implementation of the Decentralization Policy started in January 2001. The implementation progress was reviewed through a nationwide appraisal in 2003. But a number of interventions were still required such as a) Lack of capacity at District and Sector levels to develop well integrated development and A/Ps. b) Low awareness as regard national laws and by-laws among local government leaders. c) Lack of ownership of community development plans by local populations. d) Low access to basic services, e) Inadequate financial resources and lack of budgetary management. The results, lessons and challenges for the 1st phase are reflected in the Decentralization Implementation Program (2004-2008) as a second phase.

(1) Territorial Reform

In 2000, the country was divided into 11 provinces including Kigali City, 106 Districts, 1,545 Sectors and 9,165 cells. Subsequent to the latest territorial reform in 2005, with a view to using scarce financial and human resources more effectively, the country territory has have been restructured into 4 provinces plus Kigali city, 30 Districts, 416 Sectors and 2,148 Cells.

Table 2.2.1 Comparative table of Former Administrative Organization and New Organization

Organization	Number of admin. entities		Number of staff per entity	
	Former System	New System	Former System	New System
Province	11(+Kigali)	4(+Kigali)	58	12
District	106	30	8	35
Sector	1,545	416	1	9
Cell	9,165	2,148	1	10

(2) Responsibilities of the Central and Local government

Under the recent territorial reform, the new configuration of roles and responsibilities among levels is as follows.

Central Government: which has to design national policies and programs, mobilize local and external resources, ensure institutional and capacity building, and M&E.

Provincial Administration (PA): as a de-concentrated level of the Central Government, the PA is primarily responsible for ensuring that local government development planning is in line with the national policies and promoting socio-economic development of the province based on its resource endowment.

District: It is the legal entity that is responsible for overall coordination of economic development, and coordinating planning, financing and implementing service delivery at Sector level, as well as for promoting cooperation with other local governments. An elected Council, a Mayor and an executive committee will run the District.

Sector: It coordinates activities of Cells and ensures the management of a number of basic services such as local development planning, local tax collection, statistics, education and social affairs, land use planning, housing and other local infrastructure, etc.

Cell: Its main responsibilities are focused on community action mobilization.

2.3 Relevant National Plans and Programs

The Government long term development revolves around the “Vision 2020” framework and the Millennium Development Goals. In line with the Vision 2020, the Poverty Reduction Strategy has been adopted to effectively achieve local population-centered sustainable development through good governance and democratic decentralization. PRSP is implemented through sector policies and strategies, a process recently completed by MINAGRI. The National Agricultural Policy was revised by MINAGRI in 2004, and the Strategic Plan for Agricultural Transformation (PSTA) was

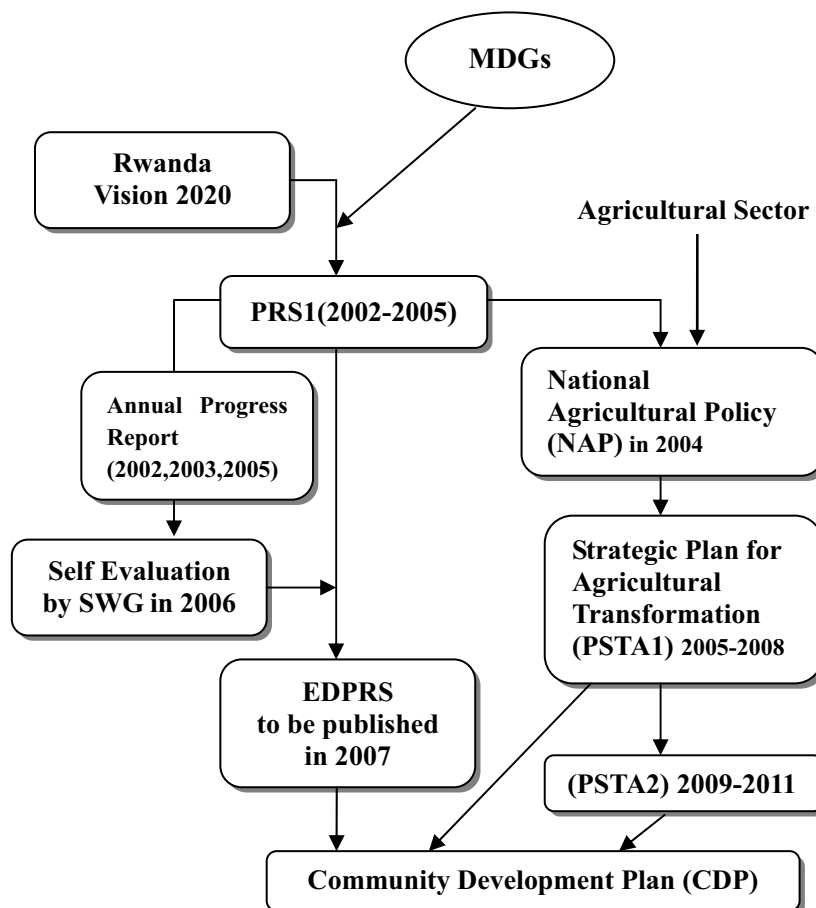


Figure 2.3.1 Relevant National Plan and Programs

adopted to implement the policy and strategy of the National Agricultural Policy (NAP), as well as PRSP in January 2005. Through the implementation of the PSTA programs, agricultural sector shall be transformed into a modern, professionally operated and market-oriented economic undertaking through the promotion of professionalism, specialization, technological innovations, and private-public partnerships. Currently, the Economic Development and Poverty Reduction Strategy (EDPRS), as well as PSTA2 have been developed to achieve the Vision 2020 goals building on the lessons learned from the PRS1 and PSTA1 respectively.

2.3.1 Poverty Reduction Strategy Paper (PRSP)

The National Strategy for Poverty Reduction (PRSP) was published in June 2002. This is one of several pillars of government policy framework to eradicate poverty through “rural development and agricultural transformation”. MINAGRI published its National Agriculture Policy (NAP) in early 2004, which was followed by PSTA in October 2004. Since 2002, GoR has produced 3 Annual Progress

Reports followed by the review of PRSP1 in 2005 and PRSP1 was found to be strongly relevant. The agricultural sector in PRSP1 was also evaluated by SWG. A second Poverty Reduction Strategy known as EDPRS is now under preparation and will be published in 2007.

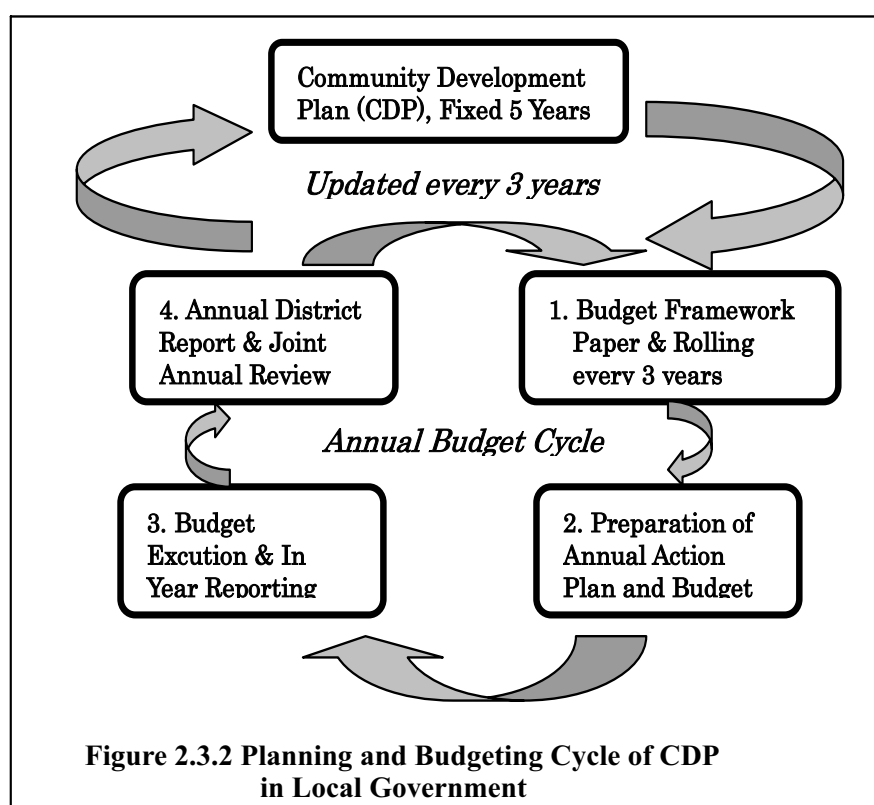
2.3.2 Strategic Plan for Agricultural Transformation (PSTA)

Basing on policy orientation provided by the NAP, PSTA was prepared in January 2005 with the support of IFAD, DFID and Royal Netherlands Embassy (RNE). The overall objective, that is to contribute in a sustainable manner to poverty reduction and to support the national economic growth through increased production, diversification of income opportunities and natural environment conservation and maintenance, is to be achieved through the implementation of over 30 projects. The PSTA's four programs are: 1. Intensification and Development of Sustainable Production System, 2. Promotion of Farmers' Organization and Strengthening the Capacity of Producers, 3. Promotion of Commodity Chains and Development of Agribusiness, and 4. Institutional Development. The program with the operational tools, partner and resource mobilization, the formulation of the specific policies, strategic legislation was refined in 2005 and implementing & testing, monitoring, reviewing and necessary adjustment to the PSTA programs have been executed. Funds needed for the above 4 programs for 4 years (2005-2008) are estimated at 167 million USD. The PSTA 2 formulation support comprising funds for a comprehensive consultation with the 30 Districts, as well as consultancy support for the revision of the PSTA Programs and Approach will be scheduled in the future.

2.3.3 Community Development Plan (CDP)

(1) Community Development Plan (CDP)

The role of Local Government is to deliver services within the context of national policies and guidelines aimed at responding to the needs of local population. To achieve these objectives, Planning and Budgeting Guidelines of Community Development Plan (CDP) for Local Governments have been prepared by MINECOFIN and MINALOC and will be applied to the Local Government in 2007. The CDP is a 5 year strategic planning instrument and sets forth the District long term vision, goals and explicit strategies geared towards achieving such goals within five years. The District CDP is intended to guide the identification of outputs and activities and the deployment of resources by the District in the Annual Action Plan and budget. It is prepared once every 5 years and updated every 3 years as shown below.



(2) District Performance Contract

The final annual action plan with the budget is approved by the District Council; the budget becomes a legal document by which the Council authorizes the District administration to spend money on its behalf in order to carry out the Council programs. The Mayor signs the performance contract with the President. By signing the performance contract, the Mayor commits the District to delivering specific services and investments to the population of the District, for which he or she, together with the Council would be held accountable.

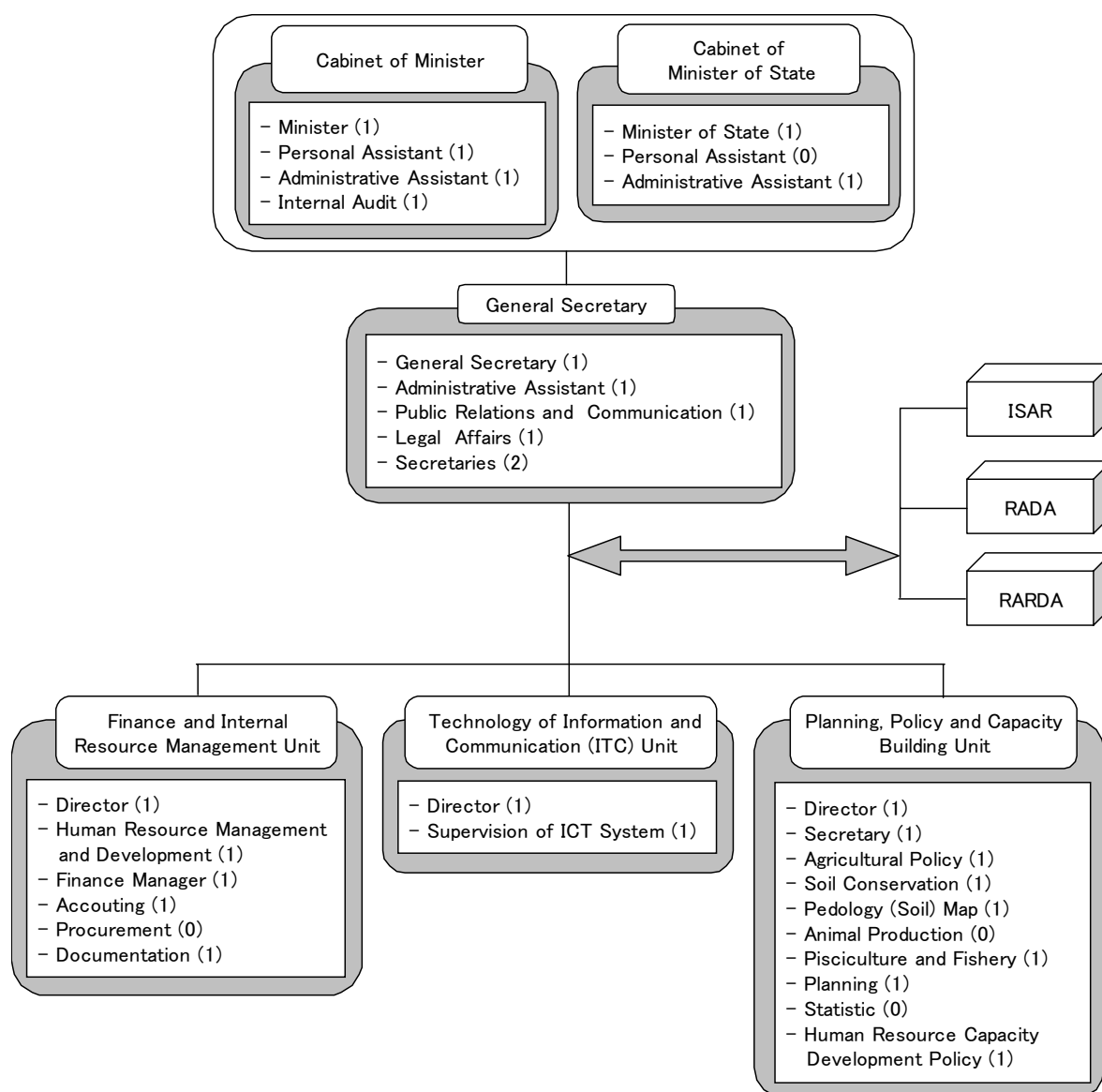
2.4 Governmental Organizations

2.4.1 MINAGRI

(1) Role and Staffing

Through the decentralization process started in 2001, the role of MINAGRI has become that of policy and strategy formulation for the PSTA's operational programs, with local authorities at decentralized levels. MINAGRI is responsible for planning and coordination, follow-up, evaluation and reporting. The responsibility for program implementation was transferred to the District. Accordingly, MINAGRI staff was reduced from 144 staff members in 2001 to 69 staff members in 2005 and only

31 staff members were remaining in July 2006. The restructuring was aimed at improving the capacity and performance of the Ministry on the selective basis so as to ensure a strong central system, orienting and ensuring sound, coherent, and effective sustainable implementation and practice at the decentralized level, as well as to reduce unnecessary hierarchy and bureaucracy with related delay. The organization chart of the MINAGRI is shown below.



Source: MINAGRI

Figure 2.4.1 Organization of MINAGRI

(2) Budget

The table below shows the MINAGRI's budget from 2002 to 2005. Within 5 years, MINAGRI's own

budget increased about 2 times from 2.60 billion Rwf in 2002 to 5.22 billion Rwf in 2006. On the contrary, the foreign supporting budget showed gradual increase from 6.95 billion Rwf to 8.05 billion Rwf, an increase of about 16% in 5 years. Ratio of the own budget against the foreign budget was about 30% and which is still low.

Table 2.4.1 MINAGRI Budget from 2003 to 2005

(Unit: Billion Rwf)

year	MINAGRI BUDGET			Ratio (4)=(2)/(3)	Total Budget in Rwanda (5)	Ratio (6)=(3)/(5)
	Foreign Budget (1)	Own Budget (2)	Total (3)			
2002	6.95	2.60	9.55	0.27	151.24	0.06
2003	7.42	2.37	9.79	0.24	252.03	0.04
2004	9.91	3.37	13.28	0.25	328.91	0.04
2005	7.95	4.71	12.66	0.37	374.32	0.03
2006	8.05	5.22	13.27	0.39	404.74	0.03

Source: MINAGRI Calculations based on MINECOFIN data 2005

Law Determining the State Finance for the 2006 Fiscal Year

2.4.2 MINAGRI Parastatal Agencies

(1) ISAR

A precursor of Institut des Sciences Agronomiques du Rwanda (ISAR) was born in Rubona in 1930 during the Belgian colonial administration and became ISAR following the legislative *ordonnance* no R /118/52 of June 22nd 1962. At present, ISAR is reorganized as an autonomous public institution under the law no 21/1982 of June 10th 1982.

1) Missions

ISAR aims at promoting the scientific and technical development of agriculture and animal resources in Rwanda and has the following tasks.

Table 2.4.2 Task Work of ISAR

No	Tasks
1	Transform agriculture through changing subsistence farming to commercial agriculture
2	Making agriculture more profitable and competitive
3	Increase agricultural activity
4	Promote the broad needs of food security

Source: ISAR: History, Achievements and Trends

2) Organization Structure and Staffing

As a public institution, MINAGRI supervises ISAR and the steering committee administers ISAR. The research framework of ISAR is comprised of the three regional centers, which are located in Karama,

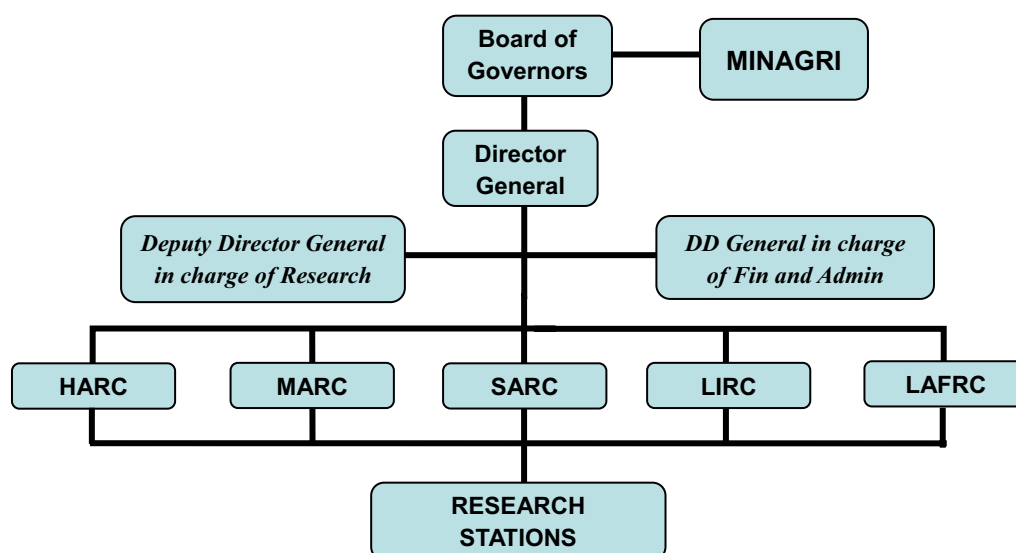
in Bugesera for the eastern lowlands (below 1400m), Rubona for the central plateau regions which ranges from 1400 m to 1800 m, and Ruhengeri for the highland region above 1800 m. In total, 12 stations are scattered all around Rwanda in an attempt to address the country's agro-ecological constraints (See Table 2.4.3 and Figure 2.4.2).

Table 2.4.3 ISAR Research Station by Agro-ecological Zone

No	Regional Center	Agro-ecology	Dependent Research Stations
1	Karama	<1,400 m	Karama, Kibungo, Nyagatare
2	Rubona	1,400 – 1,800 m	Rubona, Songa, Ruhande, Ntendezi
3	Ruhengeri	1,800 m <	Ruhengeri, Rwerere, Tamira, Gishwati, Gakuta

Source: ISAR: History, Achievements and Trends

As regards the number of staff as of May, 2004, ISAR had a total of 376 staff members, including 35 % in technical division and 65% in administration.



Note: Currently there are 15 research stations countrywide.

DD: Deputy Director
HARC: High Land Agricultural Research Centre based in RUHENGARI
MARC: Midland Agricultural Research Centre based in RUBONA

SARC: Semi Arid Agricultural Research Centre based in KARAMA
LIRC: Livestock Research Centre, based in NYAGATARE
LAFRC: Land and Forestry Research Centre based in RUHANDE

Figure 2.4.2 Organization of ISAR

3) Research Activities

ISAR has conducted three research programs, namely crop production, forestry and animal production either in on-station or on-farm trials involving the participation of beneficiary farmers. The research programs by ISAR are as follows:

Table 2.4.4 ISAR Research Program

Department	Program	Subprogram
Crop Production	Cereals	Maize, Rice, Sorghum, wheat
	Leguminous	Beans, soybean, garden peas
	Roots and tubers	Irish potato, cassava, sweet potato
	Industrial crops	Coffee, tea, pyrethrum,
	Horticulture	Banana, fruits, flours and vegetables
	Soil Conservation and Management	Watershed management, terracing combined with plants
Forestry	Forest management, agro-forestry and tree seed center	Agro-forestry, Natural forests, Tree seed centre, Afforestation
Animal Production	Cattle and small ruminant	Fodder crops and cattle feeding, crossbreeding,

Source: ISAR: History, Achievements and Trends

4) Research Fund

ISAR research budget highly depends on outside funding sources to finance its research activities that amount to around two million dollars annually. Meanwhile, the GoR can afford to pay salaries and small amount for research program not exceeding 400 million Rwf per year.

5) Research constraints

ISAR is faced with the following constraints in research activities.

Table 2.4.5 ISAR Major Research Constraints

1	Low funding for research (0.3 % AGDP) compared with countries with similar development (0.5-0.8 %) levels.
2	Lack of sufficient scientific staff
3	Need for strong capacity building
4	Difficulty to find regional adapted varieties

Source: ISAR: History, Achievements and Trends

6) New strategic Plan 2002-2007

So as to cope with the above constraints, a 7- year strategic plan (2002-2010) has been formulated in line with relevant national plans focusing on poverty reduction, food security and environmental sustainability as follows.

Strategy 1: Need to transform agriculture technology

Strategy 2: Focus on adaptive research

Strategy 3: Complete commodity-based research instead of biophysical research constraints

Strategy 4: Effective decentralization to bring research activity closer to the farming community

Strategy 5: More active in funding mobilization to cope with limited GoR budget

To successfully implement the above strategy, the vision of ISAR has been developed as follows:

Vision1. Partnership between researchers and research results users based on farmer-research

concept.

- Vision2. Adaptive or innovative research through strengthening partnerships with CGIAR and other regional research institutions, as well as national institutions.
- Vision3. Applied & Fundamental Research in very precise and justified case such as biotechnologies
- Vision4. Adaptive research in key sectors of economic growth
- Vision5. Complete chain commodity- based research
- Vision6. Effective decentralization of ISAR
- Vision7. ISAR must be more active in funding search

(2) RADA

Rwanda Agricultural Development Authority (RADA) was established in February 2005 in accordance with the organic law No 14/2004 of 26/5/2004. RADA has the mission to strengthen farmer's supporting activities, including improved farming practice to marketing aspect as an autonomous institution under the umbrella of MINAGRI.

1) Missions

The functions of the Authorities consist of the following 11 task forces.

Table 2.4.6 Task Work of RADA

No	Functions and Tasks
1	Implement the National Agricultural Policy
2	Facilitate Technology transfer to the farming community in order to improve their yields
3	Facilitate technology transfer to farmers and other s involved in agricultural activities and technology appropriate to ensure value addition to agricultural products.
4	Put in place systems to ensure service delivery to farmers of agricultural inputs, especially tools and fertilizers in a timely and cost effective manner.
5	Control disease and pests of crops
6	Ensure an efficient national storage program and availability of markets for agricultural products.
7	Sensitize farmers on good practices for soil and water conservation in order to improve productivity
8	Coordinate different actors involved in agriculture sector to ensure harmonization and complementarities
9	Facilitate the transfer of knowledge and skills to the farming community so that they can contribute to the transformation of their profession.
10	Consolidate agricultural statistics and information related to harvest and disease and pest situation in the country.
11	Implement the laws and decrees related to the agriculture sector.

Source: Proposed Law No --- of Instituting Rwanda Agricultural Development Authority

2) Organization Structure and Staffing

RADA is composed of six technical units with the administration and finance unit (Figure 2.4.3), and has the seed multiplication farms in Musenyi Sector for maize/cassava, and Gashora sector for cassava in Bugesera District, but there is no rice seed multiplication farm in that District. The authority has signed a performance contract with MINAGRI on the following points;

- i. The responsibilities of the management of the authority and other key positions.
- ii. The targeted outputs of the Authority.
- iii. The source of revenue to the authority, its utilization and the mechanism for monitoring.
- iv. The means that will be used by the supervising minister to reprimand the board of directors and the management of the authority.

Concerning the staff, RADA 87 staff members were initially proposed for seven units, namely administration, crop production, crop protection, rice development unit, seed Production, post harvest management and soil and water management units. However, RADA is compelled to reduce the number of staff down to the range of 40-50 staff members under the decentralization process.

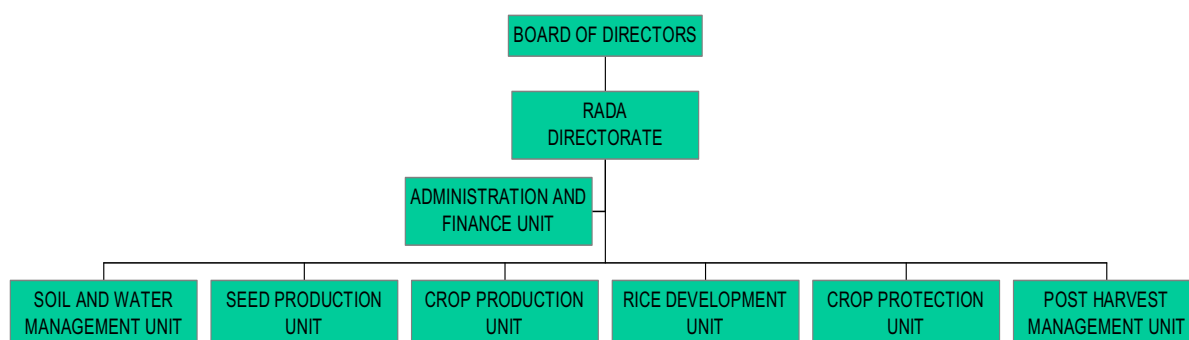


Figure 2.4.3 Organization of RADA

3) Budget

RADA has been newly created, thus its budget scale is not finalized yet except for a temporal budget and negotiation is underway with a draft budget of the three billion Rwf.

4) Strategy of Farmer Supporting Service

Strategy to implement RADA's mandate is basically focused on partnerships with local authorities, private sector and civil society for it to be implemented at grassroots level through service contract and performance contract system with proximity service providers such as private enterprises, NGOs, skilled farmer's organizations, cooperatives, etc.

(3) RARDA

Rwanda Animal Resource Development Authority (RARDA) was established in February, 2005 by detaching the three centers, namely the National Center for Artificial Insemination (CNIA), the

National Veterinary Laboratory in Rubirizi (LVNR) and the National Poultry Hatchery in Rubirizi (CNR) from MINAGRI as the stop centre to develop animal resources at national level.

1) Missions

The tasks assigned to its authorities comprise the following nine task forces.

Table 2.4.7 Task Work of RARDA

No	Tasks
1	Implement the national animal resources policy
2	Provide improved technology and extension services to farmers and other individuals dealing with products of animal origin in order to help them modernize their operations so as to increase marketing of products and raise their incomes
3	Provide farmers and individuals dealing with animal products improved technologies so that animal products fetch more on the market.
4	Monitor and control animal diseases and put in place measures that will ensure diagnosis and treatment of animal disease including those that are transmitted to man.
5	Coordinate activities of farmers and other individuals dealing with animal products.
6	Train farmers to allow them to play a significant role in their profession and in national development.
7	Coordinate activities aimed at improving animal resources so that they can complement each other.
8	Collect analyses and provide information and data on animal disease and animal products at national level.
9	Implement laws and regulations pertaining to animal resources.

Source: Draft Law No --- of ---- establishing RARDA

2) Organizational Structure and Staffing

RARDA Headquarters is located in Kigali and comprises four technical units with an administration and finance unit. The offices are scattered in three sites over Masaka and Rubirizi (See Figure 2.4.4). The authority is headed by the board of directors and signs a performance contract with MINAGRI based on the legislative document, and Memorandum of Understanding (MOU) with ISAR. The satellite laboratories pertaining to the Diagnostic & Epidemiology Unit are located at Nyagatare, Kibungo, Butare and Gishwati and they are responsible for diagnostic and curative work in each coverage area. Apart from satellite labs, control posts and quarantine posts are placed countrywide and one of the control posts is located at the Bridge of Nyabarongo River in Ntarama Sector, Bugesera District. As regards staffing, the initially proposed number of staff members has been reduced from 98 to the range 40-50 staff under the decentralization process. One RARDA staff member has been dispatched to Bugesera District Office for monitoring and surveillance of epidemic disease such as FMD in the coverage area.

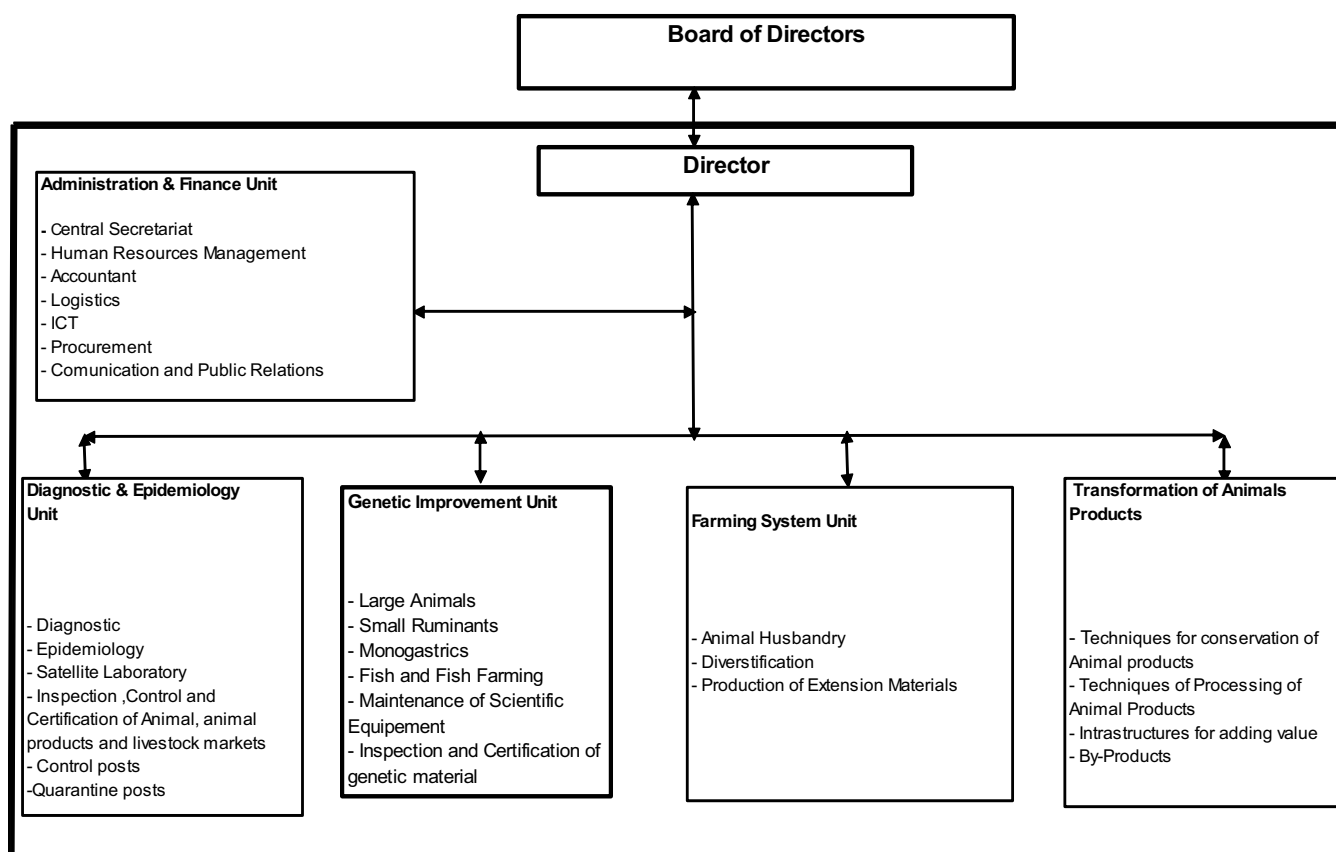


Figure 2.4.4 Organization of RARDA

3) Budget

The annual budget is not finalized yet as RARDA was just launched in last year and the draft budget of 8.1 billion Rwf is still under negotiation with MINECOFIN.

4) Strategy of Farmer Supporting Services

The support services to livestock farmers by RARDA are provided in collaboration with other partners that offer services in animal production, including research through contract with RARDA. This framework has been already partially implemented in small scale and RARDA has currently prepared this system to deploy support service countrywide through contract with nominated partners. At present, RARDA has established the partnership with 14 stakeholders countrywide, including ISAR.

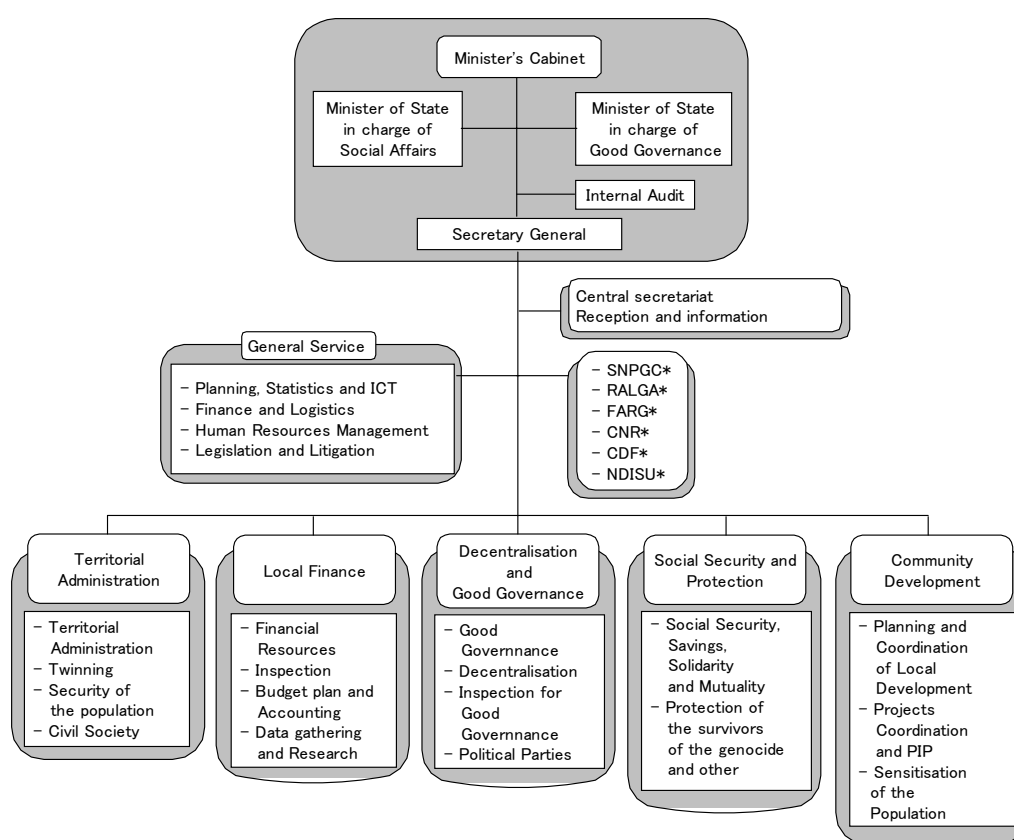
2.4.3 MINALOC

(1) Role and Staffing

The mission of the Ministry of Local Government, Good Governance, Community Development and Social Affairs (MINALOC) is "Promoting well-being of the population through good governance, community development and social affairs." And the key objectives of this ministry are (1)

Decentralization and Democratization, (2) Capacity Building, (3) Social well-being of the population, (4) Protection of vulnerable groups, (5) Management of risks and disasters, as well as supervising Province and District.

The organization chart is shown as below. The ministry functions in 6 units or departments: Territorial Administration, Local Finance, Decentralization and Good Governance, Social Security and Protection, Community Development, and General Service (Public Relations and Internal Resources Management). In addition, MINALOC has under its remit specific funds and organizations, especially CDF (Common Development Fund), FARG (Fund to assist Genocide survivors), RALGA (Rwanda Association of Local Government Authority), etc., which help the Ministry achieve its objectives.



*SNPGC = Secrétariat National pour la Prévention et la Gestion des Catastrophes
 *RALGA = Rwanda Association of Local Government Authority
 *FARG = Fond d' Assistance aux Rescapés du Génocide
 *CNR = Conseil National des Réfugiés
 *CDF = Common Development Fund
 *NDISU = National Decentralisation Implementation Support Unit

Source: MINALOC Home page

Figure 2.4.5 Organization of MINALOC

(2) Budget

The budget of MINALOC accounts for about 9% of the total GoR budget in 2006 as follows.

Table 2.4.8 Budget of Related Organizations in 2006 (Billion Rwf)

Name	Budget	Ratio (%)
Rwanda	404.74	100.00
MINALOC	35.71	8.82
MINAGRI	13.27	3.28
Eastern Pro.	0.19	0.05
Bugesera	1.12	0.28

Source: Law Determining the State Finance for the 2006 Fiscal Year

According to Bugesera District Action Plan in 2006, there are 4 services funded by MINALOC whose funds do not pass thorough CDF. Construction of shelters for needy people absorbs the big share of the budget allocated to those 4 services.

Table 2.4.9 Services in Bugesera District funded by MINALOC (except for CDF)

Category	Service	Local Target 2006	Available Resources (Rwf)	Source of Funds
Good Governance	Training for elected organs	Organize training for all elected organs	20,000,000	District budget and MINALOC
Good Governance	Civil Status	Identify people reaching the required age to get ID Card	1,350,334	District budget and MINALOC
Social affairs	Construct shelters for needy people	100 shelters will be constructed for needy people	300,000,000	FARG, MINALOC, Umuganda (Community works), TIG (Community service by released prisoners to serve part of their penalty)
Social affairs	Register needy people	100% of needy people are identified	1,000,000	FARG, MINALOC
Total			322,350,334	

Source: Annex I.1 Bugesera District Action Plan till 2006

2.4.4 CDF

(1) General

So as to implement decentralization policy, the government of Rwanda through law No.20/2002 of 21st May 2005, put in place the Common Development Fund intended to consolidate one of the three pillars of that policy, which is increasing means and capacity for local governments.

In this context, CDF contributes to poverty reduction by creating employment and funding developmental projects across the country. Furthermore, local government capacity is reinforced through support to basic infrastructure and funding income generating projects.

The mission entrusted to the CDF is as follows:

- To finance development projects; to distribute among the Districts, Towns and Kigali City funds allocated to those projects and to ensure these funds are equitably distributed to those entities.
- To monitor the use of the funds allocated to development projects in Districts, Towns and Kigali City.
- To serve as intermediary between the Districts, Towns and Kigali City, and donors who are specifically involved in funding development projects within these entities, though such entities may have direct partnership with donor community.

The GoR has decided to integrate Labor Intensive Public Works – Local Development Programs (PDL-HIMO) and Ubudehe Program at the level of the implementation of projects and approaches.

The advantages of this initiative are as follows:

- Harmonizing mechanisms to fund projects from decentralized entities
- Integrating HIMO and Ubudehe approaches in the process of identification and implementation of projects
- Reducing recurrent costs in favor of costs for development actions;
- Putting in place security mechanisms to ensure the safe management of funds from donor community.

MINALOC is the line Ministry for CDF and PDL-HIMO and Ubudehe programs. The role of the Ministry, as regards this integration, is to ensure that decentralization, good governance and community development policies are implemented.

The Board of Directors ensures that funds, which are put at the disposal of CDF, PDL-HIMO and Ubudehe, are allocated to decentralized entities in accordance with community development plans and provisions of partnership agreements signed with donors.

(2) Financing and allocating development funds to Districts, Towns and Kigali City Council

Funding process and allocation of development funds is as follow.

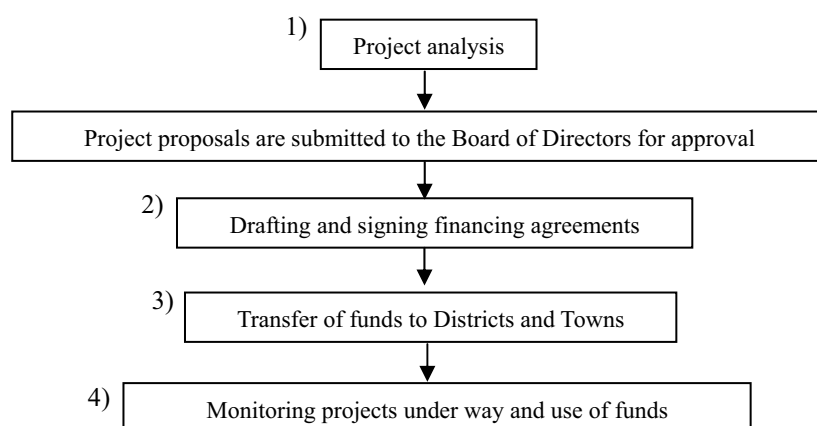


Figure 2.4.6 Funding Process and Allocation of Development Funds

1) Project Analysis

Districts, Towns and Kigali City Council development projects are formulated basing on the following priorities (for year 2004):

- Production and income generating infrastructure to improve financial capacities for Districts and Towns
- Socio-economic infrastructure mainly communication infrastructure (roads and bridges)
- Energy (solar energy, hydroelectric energy, connection to ELECTROGAZ existing cables)
- Drinking water
- Environment protection (fight against erosion, reforestation, etc.);
- Promotion of tourism
- Rural telecommunication
- Administrative infrastructure (Sector office)

The project analysis is based not only on the respect of priorities but also on the assessment criteria (See Annex I.2 CDF: The Assessment Criteria for the Project proposed)

2) Drafting and Signing Financing Agreement

After the approval of projects by the Board of directors, CDF drafted and signed agreement with Districts and Towns, each party having to respect and comply with rights and obligations specified therein. Hence, the agreement clearly determines the following:

- Cost for projects and their nature;
- Project implementation timeframe and place;
- Practical modalities for funds transfer , considering that amounts are disbursed by installments, per project progress ;
- Fund allocation in case possible interests are made on installments granted to Districts to implement projects;
- Bookkeeping for funds transferred;
- Monitoring system regarding the use of funds;
- Tender award procedures;
- Reporting system and to whom reports must be submitted;
- Rights and obligations for all contracting parties;
- Sensitization and mobilization of the population to involve them in the project implementation ;
- Behavior of contracting parties in case of modifications to the agreement, delays or litigation.

3) Funds Transfer to Districts and Towns

After signing the financing agreement with the concerned District / Town and for a given project, the District issues tender invitation for tender award process. Once tender is awarded to the contractor in charge of the project implementation, the District signs the implementation contract. It is upon receipt of the report from the District that CDF transfers funds following the modalities hereunder:

- The amount for the project cost is transferred to the District in different installments as per activity progress and after justification of the preceding installment;
- First, CDF disburses to the District/Town, the first installment of an agreed percentage of the total cost of the project upon the presentation of the three documents, namely the tender award report, National Tender Board non-objection and the agreement between the District and the beneficiary of the contract;
- Thereafter, CDF provides to the District two other installments upon the presentation of the progress report and a report justifying the use of the previous installment, 40% for each installment.
- The percentage of installments is calculated basing on the total project cost as specified in the implementation agreement signed between the District and the contractor minus the value in Rwanda Francs for local contribution.

4) Monitoring projects

CDF ensures the monitoring of projects under implementation as follows:

- Prior the project approval by the Board of directors, CDF organizes visits in Districts/Town to better understand the project implementation site and to assess beforehand the relevance of the project, as well as possible effects on environment and local communities.
- After the approval of the project, it is necessary to provide Districts/Towns authorities with consultancy services as regards invitation to tender and tender awarding procedures, as well as financial and project management in order to rectify in time possible mistakes or errors.

(3) Funds transferred to Bugesera District (from year 2003 to 2006)

Table 2.4.10 CDF Transferred to Bugesera District during the Last three Years

Year: 2006		
Former Dist.	Name of Project	Amount ('000Frw)
1 Nyamata	Resettlement at Nyamata center	41,400
2 each District	Solar energy (Funded by CDF+District)	20,000
3 each District	One computer set (Funded by CDF+District)	15,000
Total amount to Bugesera		76,400
As % of total amount of funds transferred:		N/A

Year: 2004		
The total number of project: 140		
The total amount of funds transferred: 1,885,940 ('000Frw)		
Former Dist.	Name of Project	Amount ('000Frw)
1 Ngenda	Project to expand Ruhuha market	20,577
2 Ngenda	Ngenda afforestation project (HIMO)	35,865
3 Nyamata	Rehabilitation of Nyamata slaughter house	943
4 Nyamata	Project to plant trees alongside sectors' trails	117,745
5 Nyamata	Rural telecommunication project	7,119
Total amount to Bugesera		182,249
As % of total amount of funds transferred:		9.7%

Year: 2003		
The total number of project: 149		
The total amount of funds transferred: 830,999 ('000Frw)		
Former Dist.	Name of Project	Amount ('000Frw)
1 Ngenda	Project to expand Ruhuha market	4,092
2 Nyamata	Installation of 13 drinking water sources in Kayumba, Kanzenze Mayange and Nyamata slaughter house	1,744
3 Nyamata	Rehabilitation of Nyamata slaughter house	404
4 Nyamata	Rational development of a 12 ha swamp in Karugenege, Kanz	2,916
Total amount to Bugesera		9,156
As % of total amount of funds transferred:		1.1%

Source: TF and CDF Annual Report (2003,2004)

(4) Constraints

The CDF operational constraints are as follows:

- District and Towns submit project proposals along the year after the planning phase. Therefore, the project implementation timeframe often goes beyond the financial year and causes difficulties as regards the budget management vis-à-vis project costs.
- Some contractors do not abide by agreement provisions, and fail to show professional expertise while implementing the projects.
- Districts and Towns need close assistance and coaching from provincial department;
- The project implementation pace still remains slow and, therefore, causes low absorption capacity for funds allocated to Districts, Towns and Kigali City Council.

- Price fluctuations significantly impact on project costs during the implementation process.

2.4.5 REMA

(1) Objectives

So as to implement the “Organic Law No. 04/2005 of 08/04/2005 determining Modalities of Environment Protection and Conservation in Rwanda” (hereinafter referred to as “Environmental Law”), the Rwanda Environmental Management Authority (REMA) was established under the Ministry of Land, Environment, Forestry, Water and Natural Resources (MINITERRE) in April 2006. REMA will enjoy financial and administrative autonomy.

To fulfill its mandate, the legislator provides REMA with powers and assigns to it the following tasks:

- To implement Government environmental policy and decisions of the Board of Directors;
- To advice the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements in the field of environment, as the case may be;
- To take stock and conduct comprehensive environmental audits and investigations, to prepare and publish biannual reports on the state of natural resources in Rwanda;
- To review and approve environmental impact assessment reports of any field of socio-economic activities undertaken by any agency;
- To undertake research, investigations, surveys and such other relevant studies in the field of environment and disseminate the findings;
- To ensure monitoring and evaluation of development programmes in order to control observance of proper safeguards in the planning and execution of all development projects, including those already under way, that have or are likely to have significant impact on the environment;
- To participate in setting up of procedures and safeguards for the prevention of accidents and phenomena, which may cause environmental degradation and propose remedial measures where accidents and phenomena occur;
- To render advice and technical support, where possible, to entities engaged in natural resources management and environmental protection;
- To provide awards and grants aimed at facilitating research and capacity-building regarding environmental protection;
- To publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.

(2) Roles and Functions

In June 2006, REMA had fifteen (15) staff members, consisting of five (5) Directorates as shown in Figure 2.4.7. The roles and functions of each Directorate are as follows:

1) Directorate of Finance & Administration

The Directorate is to render supportive administration, management of human resources, finances, procurement, logistics, security and maintenance of the Authority’s equipment.

2) Directorate of Research, Environmental Planning & Development

The Directorate has to prepare and document the plans of the Authority, disseminate it to all stakeholders/partners. It develops and manages environmental projects.

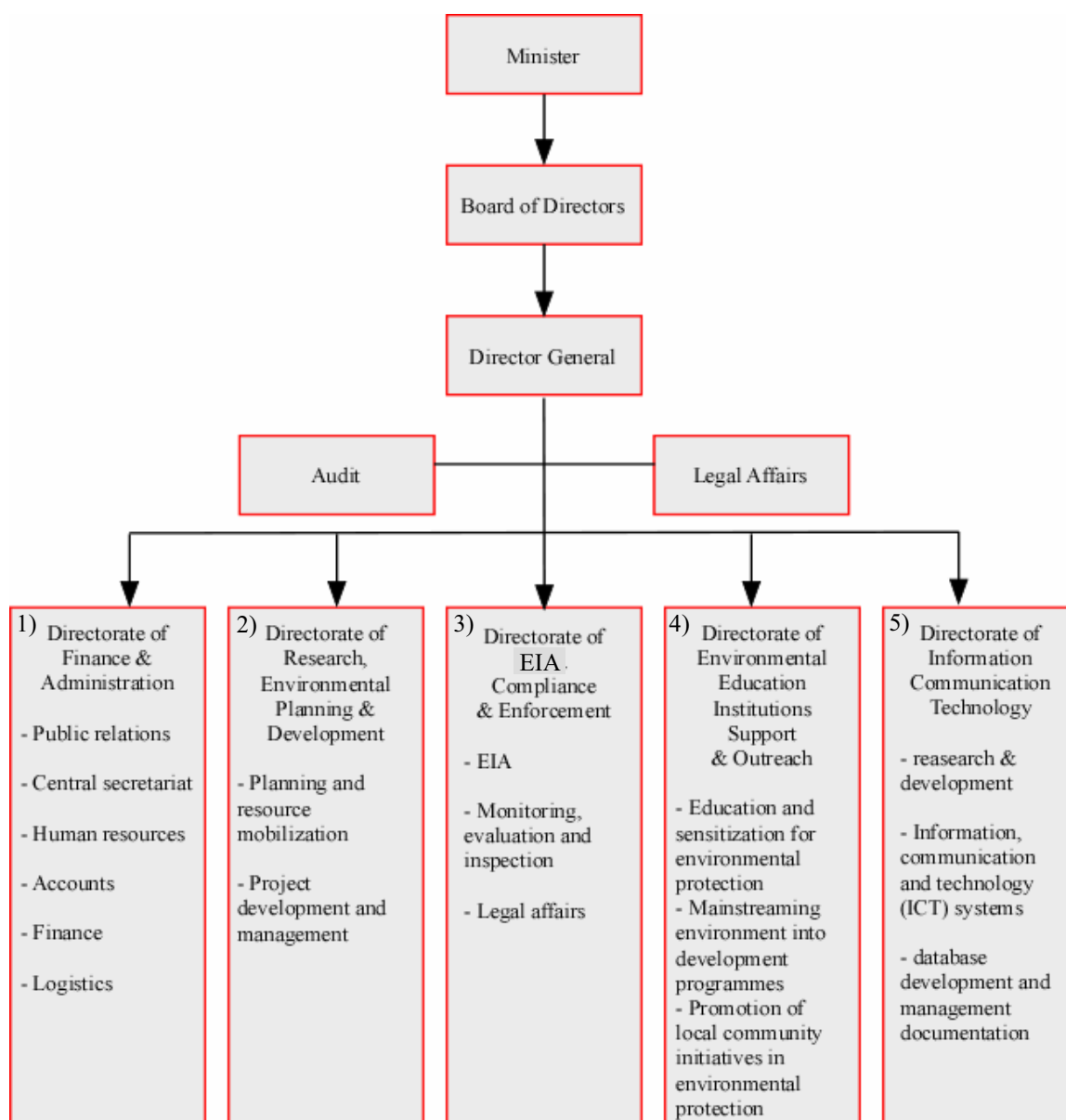


Figure 2.4.7 Organization of REMA

3) Directorate of EIA Compliance & Enforcement

The Directorate has to conserve, preserve, monitor and to manage the environment, putting emphasis on natural resources. To achieve this, it has to conduct studies and find out the impact a given project or activity may have on the environment with a view to minimizing the negative impacts. Those studies are carried out during the project conception and design stage, so that arisen issues can be

taken into consideration during the financial planning stage. It provides guidelines in the Environmental Impact Assessment (EIA) and issues enable its developers, monitors to ensure that mitigation measures are implemented and environmental standards are adhered to. It implements the environmental legislation and advises the government on the legislative matters in international agreements on the environment. It periodically conducts environmental inspections and audits including their costs, prepares and produces biannual reports on the environment status in the country and liaises with other Agencies involved in the environment management.

4) Directorate of Environmental Education Institutions Support & Outreach

The Directorate supports and coordinates Institutions (including Provinces / Districts) in identifying their priorities in environmental management, gives technical advice regarding the support and promotion of community initiatives, ensures that environment is integrated at all levels of planning in the Provinces / Districts, carries out environmental education, collects and disseminates environmental information.

5) Directorate of Information Communication Technology

The Directorate in liaison with other research institutions conducts strategic research, surveys and investigations in the relevant field of environment to address priorities and disseminate the findings. It also provides technical assistance in the project development.

(3) The Project “Integrated Ecosystem Assessment (IEA)” in Bugesera District

REMA is implementing the project in collaboration with UNDP and UNEP. This project is being planned for the period of February 2006 to September 2006 and will be conducted focusing on Bugesera District. According to the interview survey to the local consultant in this project, the latter practically started in June 2006 and it will be completed by the end of 2006.

Bugesera was selected as the project site since the District has experienced a steady decline in the level of ecosystem services from being the food basket of the country in the 1960s with widespread forest area and plenty of rainfall to its current status of frequent drought, soil erosion and lack of grazing land. Better understanding the links between ecosystem services and human well-being in Bugesera, the outcome of the project is expected to provide useful lessons for decision-making for sustainable natural resources management in both Bugesera and the rest of the country.

The outline of the project is as follows:

<u>Purpose of the project</u>
1. To improve the information based on the linkages between ecosystem services and human well-being with a view to informing and influencing PRSP II and improving environmental

decision-making in Rwanda

2. To provide policy options for improved environmental management in Bugesera
3. To identify actors of change, which can inform the development of a monitoring and evaluation framework focusing on poverty and environment
4. To build Rwandese capacity to undertake Integrated Ecosystem Assessments
5. To demonstrate the advantages of the MA approach with a view to mobilizing funds for a national assessment in the future.

Main Tasks

1. To conduct analysis of the linkage between human well-being and ecosystem services at two scales, including to identify actors of change and scenarios for the future
2. To evaluate and propose policy options for sustainable environmental management and improved human well-being in Bugesera

2.5 Rural Development Cluster (RDC)

In the evolution of the PSTA, the Rural Development Cluster (RDC) plays an increasingly important role regarding harmonization and alignment among the Development Partners (DP). The objective is to improve the effectiveness; efficiency and mutual accountability of aid in the rural development sectors and to better align development partners behind the relevant sector strategies. At present, 11 donors with approximately 20 projects have been engaged in the sector 4 of which support the sector budget (See figure right). The RDC is co-chaired by the Ministry / Secretary General of MINAGRI and a representative of the lead DP, currently the World Bank.

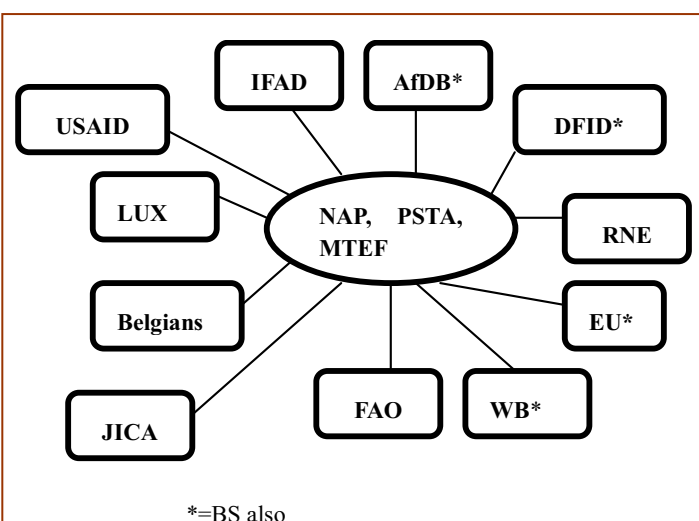


Figure 2.4.8 Diagram of Rural Development Cluster

CHAPTER 3 PRESENT CONDITIONS IN BUGESERA DISTRICT

3.1 Natural Environment

3.1.1 Topography and Geology

(1) General

Rwanda is a small, mountainous, landlocked and densely populated Central African country, generally known as “a land of 1,000 hills” with a total area of about 26,338 km² of which 14,000 km² are arable. The country is characterized by uneven mountainous terrain whose average altitude is 1,500 m above the sea level. The country extends between 1 degree and 3 degrees south of the equator, 29 degrees and 31 degrees east of Greenwich (Longitude). It enjoys a mundane tropical climate. The climate is moderate and characterized by temperate conditions, especially in higher altitudes in the northwest of the country. Today, about 80% of arable land is always under cultivation and the soil degradation has attained alarming levels. There exist important natural forest regions, lowland and wetland areas, but they are not exploited and put to use in an effective manner.

(2) Bugesera District as Study Area

Bugesera District, which belongs to Eastern Province, is located at southeast of Kigali, the capital city of Rwanda with a distance of 35 km to Nyamata center where is the seat of a District government. The District is natural region with 1,333.9 km² of surface area.

Topography and geology of Bugesera is summarized as follow:

Table 3.1.1 Summary of Topography and Geology in Bugesera District

Former District	Topography/Vegetation	Geology
Nyamata	Steep to gentle sloping undulating hills with thicker vegetation on the hill tops and scattered shrubs on the slopes and lands.	Granitic intrusions, in Central and Eastern parts. Meta-sedimentation and quartzite horizons in the northern and western parts of the District with regional fractures.
Ngenda	Undulating steep to gentle sloping hills with scattered shrubs.	Pre-cambrian granitic rocks, fractured in some valleys. Quartzite horizons overlying in a few places.
Gashora	Steep to gentle sloping undulating hills with thicker vegetation on the hill tops and scattered shrubs on the slopes and lands.	Granitic intrusions, in Central and Eastern parts. Meta-sedimentation and quartzite horizons in the northwestern and southeastern parts of the District with regional fractures.

(3) Relief

The relief of Bugesera has a succession of subsided plateaus whose altitude varies between 1,100 m and 1,780 m approximately. Bugesera is also characterized by an undulating plain of hills dominated

by some mounts: Shyara Mount (1,772 m the most culminating of the District), Juru Mount (1667 m), Maranyundo Mount (1,614 m), and Mwendo Mount (1575m). The relief is also constituted by a succession of low-plateaus with old mounts, hills and dry valleys and some marshes due to tectonic collapse.

(4) Soil

General:

The soils of the District are generally sandy with a low quantity of humus and are very permeable. They dry quickly even after a great rain. The summits of some plateaus located in the center and the north of the District, the soils are often made of ochre clay, whereas the sides and the tops of the plateaus are made up of rocks and schist which contain gravel, laterite and quartz. They give quarry stones for construction works. In general, soils are more or less fertile but permeable and fragile.

Around lakeshore:

The shores of the lakes and marshes give, in some areas, clay used in making bricks, tiles and traditionally-made pottery. Moreover, there are many kind of sand used for construction of houses.

In the valley:

The soil in the valley are characterized by their richness in nutritious minerals but often with low content of organic elements and materials. They are hard during the dry season and muddy in the rainy season. They are made up of fine jointing elements which retain water and do not let pass air discouraging the vegetable to take roots.

(5) Existing of Marshland

Topography of Bugesera District is characterized by its existence of marshlands where are located along rivers and in land. The total area of marshlands in Bugesera is estimated to 6,100 ha approximately, whereas the exploited area is of 2,830ha (Source: Community Development Plan of Bugesera District). There are soils with more humus which are more fertile because of silts periodically deposited by the floods of Akagera (Nyabarongo) and Akanyaru River. The marshlands give good harvests during the dry season (June, July, August). It could say that the marshlands have high potential for cultivation, therefore, there are a series of development plans formulated, some of them were already implemented, by MINAGRI, RSSP, LUX-Development, and so on. Location of those marshland development plans is shown on Figure 3.1.1.

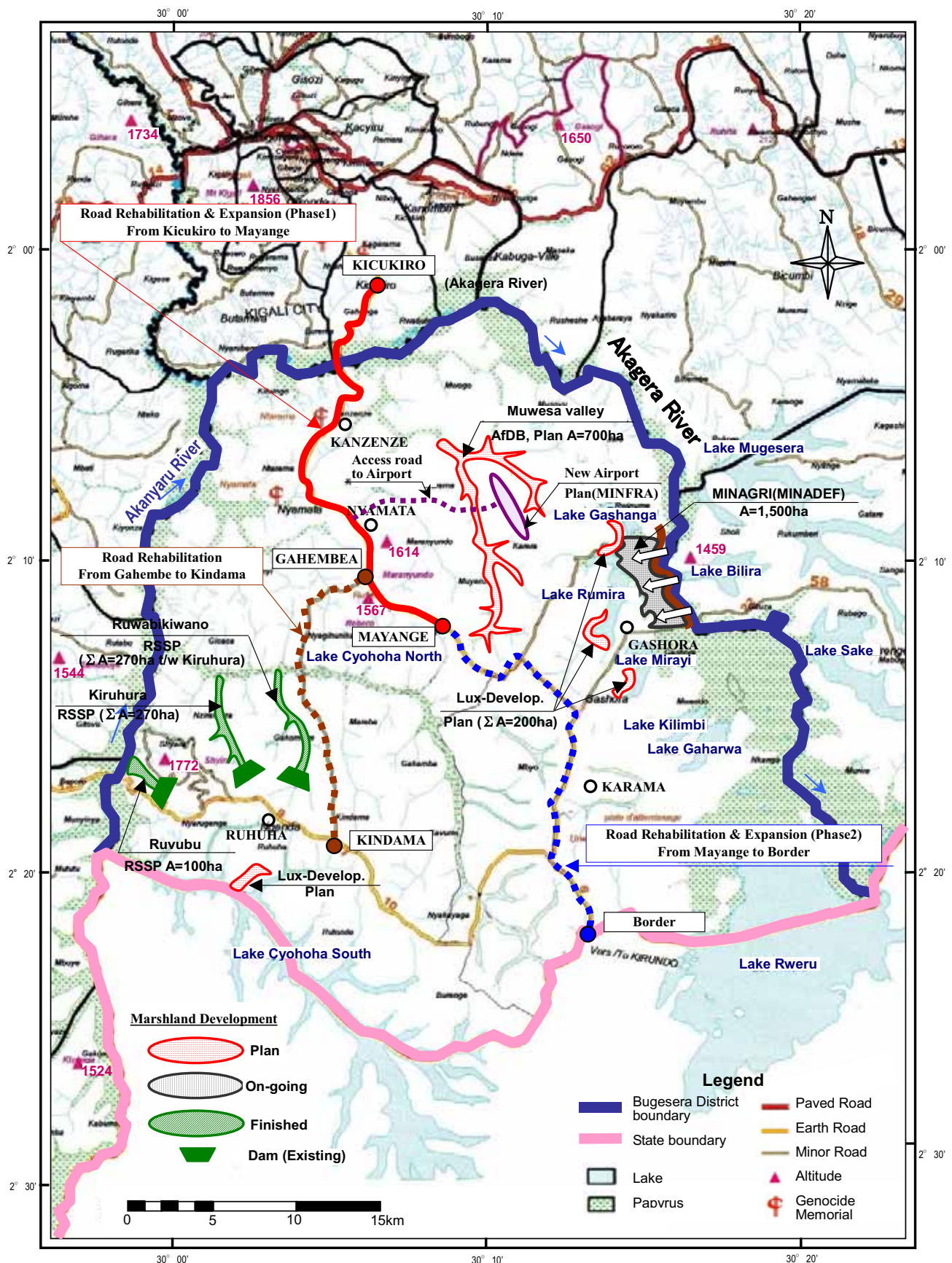


Figure 3.1.1 Location Map of Marshland Development and Road Rehabilitation Programs

(6) Utilization of marshland (wetland)

As mentioned in previous section, it is noteworthy of potentialities of the marshland in Bugesera, essentially during the third cultural season lasting from June to October (Season C). The population, therefore, has been cultivating at some places in marshland so far. However, marsh floods and whim/scarcity of rain causes the great losses of harvesting in the marshes. For this reason, the Community Development Plan of Bugesera District says that it is important to take necessary measures to encourage the peasants to exploit the marshes by means of:

- Irrigation and draining;
- Distribution of fertilizers near the marshes and campaign of seeds on the local market;
- The means to fight against the attack of worms, wild animals which damage to crops.

The following table shows the name and area of available marshland for cropping in former Nyamata District:

Table 3.1.2 Marshland in former Nyamata (their surface area and major crops)

Name of Sector	Name of Area	Available Area (ha)	Arable Area (ha)	Major crop
KANZENZE	Muzi, Karugenge, Nyamabue, Karumuna	501	300	Tomato, carrot, onion, cabbage, eggplant, chilly
KIBUNGO	Rusekera, Nyarunazi, Kagoma, Kiganwa	484	100	the same as above
NTARAMA	Cyato, Kingabo, Kidudu, Rugenge, Rutovu, Akanyaru	470	120	the same as above
MWOGO	Rugunga, Kageyo	705	532	the same as above
MWAMA	Umwesa	350	150	the same as above
Total		2,510	1,202	

Source: District agricultural report, Sept. 2003

Rice Growing Project in Gashora (by MINAGRI and MINADEF)

With funding from the MINAGRI, June 2006, the Ministry of Defense (MINADEF) has earmarked over 1,500 ha in Gashora Sector for rice farming through development of marshland. The project, under which a water reservoir (embankment of 8 km from Gashora to Rilima) is currently being constructed along Akagera River to provide water to the area over 2,000 ha, is expected to be completed by December 2006. The total marshland area covers over 2,000ha but only 1,500 ha will be reclaimed leaving the other area for environmental interests (Refer to Figure 3.1.1).

Apart from the project mentioned above, there are some development activities and projects of marshlands, which is mentioned in Chapter 3.4, Development Activities.

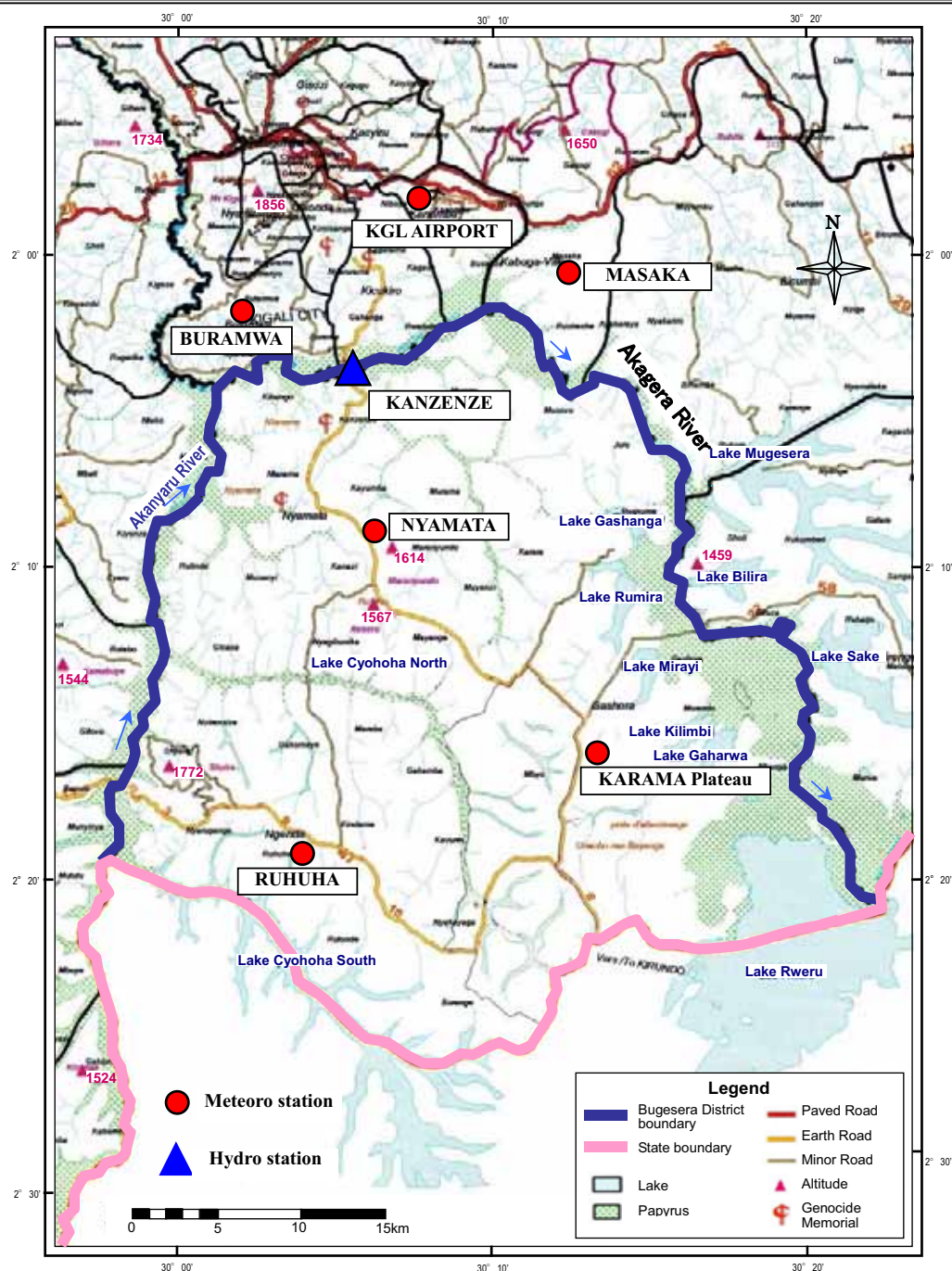


Figure 3.1.3 Network of Meteorological and Hydrological Stations

Measuring devices are not functioning.

As mentioned in main text, meteorological and hydrological measuring stations which are in and around Bugesera district have not been functioning except Kigali-Airport. When some certain action plans such as agricultural development plan are formulated, meteorological and hydrological data which are recorded for long years are essential. It is, therefore, recommended to re-start operating these measuring.

(at the right of Photos: The divides for measuring river water level at Kanzenze of Akagera river. They have been left as they are for long years.)



(3) Climate and rainfall

Climate

With comparison to other regions of the country, Bugesera District is characterized by a dry and very warm climate resulting from absence of mounts, relatively low altitude, scarcity of rain and excessively long period of drought. The mean atmospheric temperature varies with time but normally between 21° C and 23° C, also the maximum ranges 26° C and 29° C, whereas the minimum remains in the order between 13° C and 15° C.

The District presents four seasons characterized by alternate falling of dry and rainy seasons as table below.

Table 3.1.3 The Seasons through a year in Bugesera

Month	Jan.	Feb.	Mar.	Apr.	May	Ju.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Season	Small dry season (Urugaryi)			Large rainy season (Itumba)		Large dry season (Impeshyi)			Small rainy season (Umuhindo)			

The agricultural year starts by mid September and ends in mid September of the next year. The seasons of cultivating are divided into A,B and C (See figure 3.3.1). These seasons, however, capriciously change both the beginning and the duration. Besides, the last 12 years (1992-2004) have been characterized by many climatic irregularities and even less favorable rainfall condition with frequent long period of drought over all the area in Bugesera.

(4) Variation in rainfall intensity and climatic change

The District has been affected by a period of poor rains. In particular, serious drought hit that area in 2000 and 2003 as the latest. According to the Kigali Airport rainfall record shown in Figure 3.1.4, annual rainfall is divided into 2 patterns from 1977 to 1991 (15 years) and from 1992 to 2004 (12 years). Average annual rainfall for former case is estimated at 1,061mm and later one at 926mm. The difference between 2 patterns shows around 140 mm in annual. Rainfall pattern shows a tendency not only to reduce amount of rainfall but also to fluctuate from year to year remarkably.

Compare the difference between second in maximum and second in minimum (maximum and minimum values are dismissed as abnormal value), the former shows 258mm/year and later 572mm and annual variation from year to year becomes bigger and bigger. Under these circumstances, last 5 years severe droughts ranged 710 mm/year in 2000, 800 mm/year in 2003 and 810 mm/year in 2004. According to the survey by the Study Team, some people at Kidudu village, Cyugaro Cell where QP is under implementation died from starvation. On the contrary heavy intensified rain took place in Rweru Sector in May 2006 and some houses were damaged and the farmlands were eroded. These phenomena show examples of climate change (see Annex II-1).

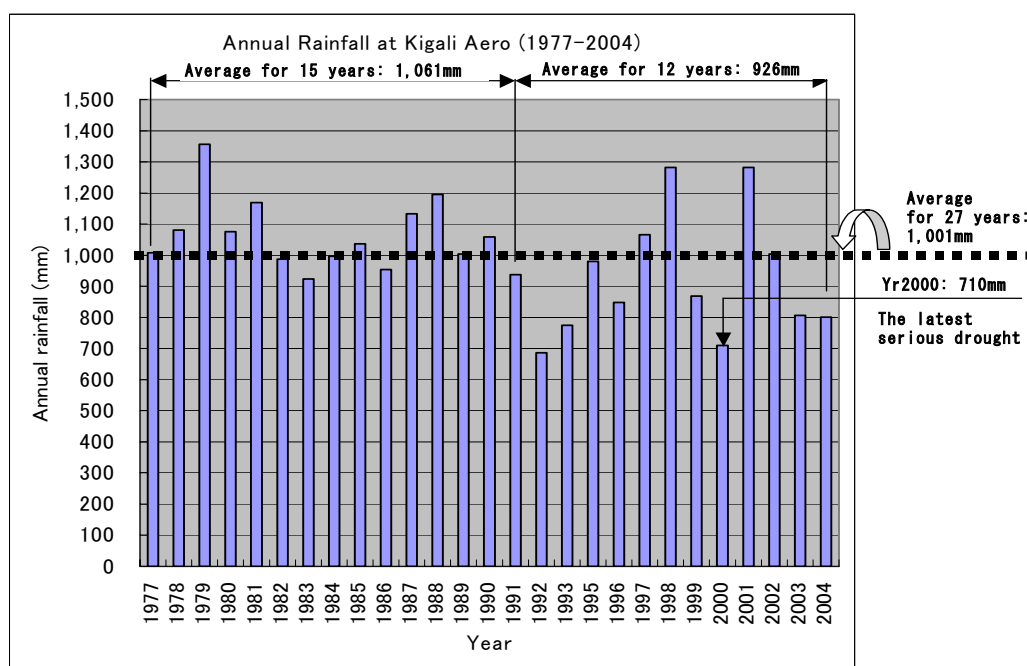


Figure3.1.4 Annual Rainfall Record at Kigali Airport (1977-2004)

(5) Hydrology

The hydrographic network of Bugesera is mainly characterized by 3 rivers, namely Akanyaru, Akagera and Nyabarongo.

Those rivers constitute its borders (i) in the West with the Districts of Kamonyi, Ruhango and Nyanza of the Southern Province, and (ii) in the North with the Districts of Kicukiro and (iii) Nyarugenge of Kigali City Council and (iv) in the East with the Districts of Rwamagana and Kibungo of the Eastern Province. In the South, the River of Akagera constitutes the border with the Republic of Burundi.

Note: Nyabarongo River changes its name after the confluence of two rivers, namely, Nyabarongo and Akanyaru.

The typical pattern of Akagera and Akanyaru River flow appears the peak discharge (water level) from the beginning to middle of May with discharge of about 250 m³/sec and the minimum discharge (water

Heavy intensified rain hit rural people

Evening on 21st May 2006, an unprecedented rainfall took place in Rweru, southern part of Bugesera. It was started at 6 PM, then continuously poured by midnight. When a resident felt an extraordinary outside, the flood was already closing in on the part of her dwelling with about 1.0 depth of flood water. At last, her properties, household effects, foods, livestock, and even dwelling, flashed away in no time. Such heavy intensified rainfall in May was first time in my life so far, she said. This may be a phenomenon example of climate change.



level) in September with discharge of about 50 – 100 m³/sec (see Annex II-2).

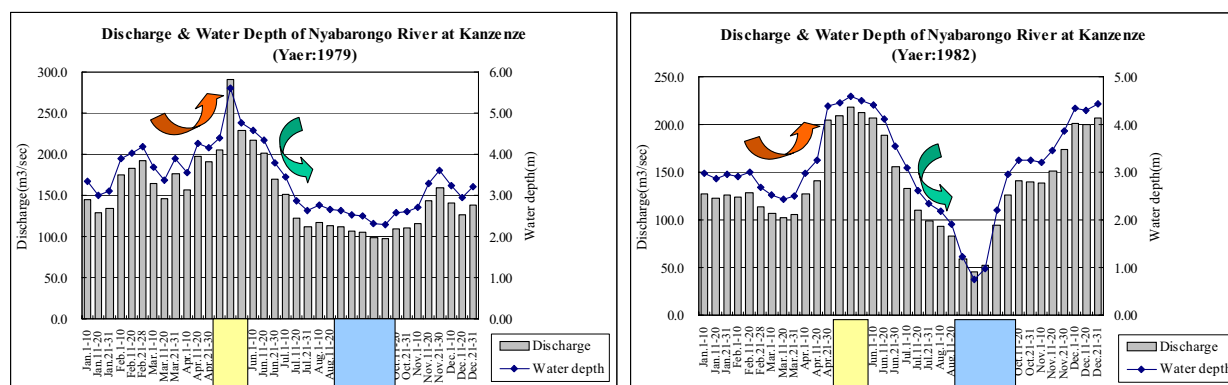


Figure 3.1.5 Typical pattern of Discharge and Water Depth of Akagera River

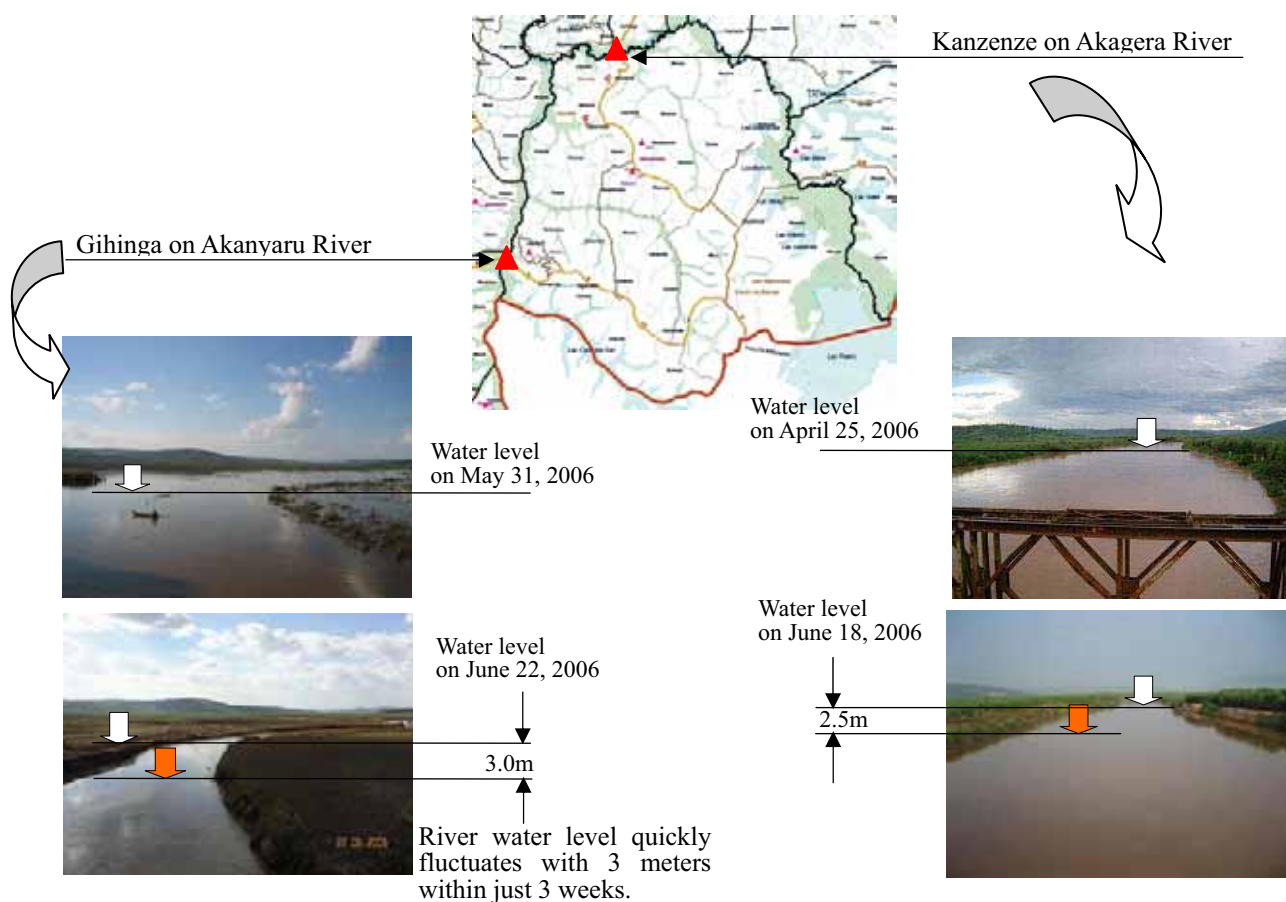


Figure 3.1.6 Actual Situation of River Flow

3.1.3 Water Resources

Water resources in Bugesera District are divided broadly into three (3) categories, namely, river, lakes (and marshes), and ground water. There are few springs of water in the District and some intermittent courses risen from streams, but they are evaporated during the dry season.

1) Rivers

The river of Akagera resulting from the junction of the rivers of Nyabarongo and Akanyaru runs a part of the circumference of Bugesera, deposits fertile soil to marshlands in flood season and supplies in the same time the multitude of lakes of the southern basin.

The course of Akagera River runs with a weak slope, where the existence of infinity of meanders marking along its majestic course. The river takes many directions, goes and comes back and finally rushes into the great cataracts of Rusumo, from there takes the direction of North making the border of Rwanda with the Republic of Tanzania. The average width is approximately of 4 meters whereas the depth is also of 4 metres during the dry season. The table below indicates annual discharge record of Akagera River at Kanzenze from year 1971 to 1988. The average discharge for 18 years is estimated at 3,960 MCM. This means that there could be very possibility of utilizing the marshland area and potentiality of river water resources in the Bugesera.

Table 3.1.4 Annual Discharge of Akagera River at Kanzenze (Year: 1971-1988, unit: MCM)

Period/Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Average
Jan.1-10	0.00	0.00	87.76	95.00	76.74	90.31	81.88	143.65	125.38	110.08	131.58	110.36	161.45	119.40	104.94	124.94	85.40	86.38	108.45
Jan.11-20	0.00	84.53	95.54	86.52	91.92	92.16	71.46	124.39	110.97	95.59	109.33	105.70	124.38	126.82	88.83	124.37	72.34	92.76	99.86
Jan.21-31	0.00	79.58	96.03	87.09	84.02	74.91	96.45	145.68	126.96	118.80	117.37	120.30	108.09	134.51	94.90	128.80	107.20	95.40	106.83
Feb.1-10	0.00	81.28	75.32	85.50	75.84	80.62	104.14	103.66	150.85	111.31	97.90	106.93	93.09	127.47	118.33	131.98	82.45	103.91	101.80
Feb.11-20	0.00	90.18	88.74	77.87	83.43	88.13	89.49	105.53	158.19	121.75	107.13	110.49	111.21	114.31	114.11	120.49	119.78	125.85	107.45
Feb.21-28	0.00	111.54	75.07	59.00	52.71	72.11	73.24	107.33	132.50	105.74	87.53	78.67	92.94	98.27	84.81	69.64	95.05	93.57	87.63
Mar.1-10	59.62	138.96	80.67	76.71	72.56	81.23	85.88	159.65	141.77	121.36	100.78	92.63	97.98	113.97	108.48	120.46	91.89	110.24	103.05
Mar.11-20	62.90	119.78	78.78	72.41	86.20	72.61	89.79	175.26	126.73	114.13	113.00	88.61	98.45	126.93	86.05	125.37	129.02	130.27	105.35
Mar.21-31	73.34	131.60	98.88	104.51	92.63	88.05	96.41	202.03	167.22	116.13	148.13	100.70	130.69	140.83	124.89	112.75	140.65	161.71	123.95
Apr.1-10	81.70	98.39	98.24	153.04	94.63	104.63	103.72	180.61	135.56	114.68	146.60	110.26	138.14	142.61	124.79	130.16	110.84	145.77	123.02
Apr.11-20	0.00	137.26	113.44	170.27	115.71	107.36	144.37	178.87	170.70	132.17	169.46	121.99	129.74	143.82	164.49	195.72	127.76	184.22	147.49
Apr.21-30	0.00	152.32	162.06	181.14	163.44	110.59	148.32	187.62	164.97	149.79	211.91	176.70	173.34	137.94	215.32	203.09	131.69	217.83	169.89
May.1-10	185.79	135.59	175.87	174.12	131.52	108.25	158.15	203.32	176.88	154.47	182.91	180.40	212.28	144.05	204.90	205.44	130.00	229.95	171.88
May.11-20	182.29	132.86	185.72	169.40	108.00	97.44	178.84	212.96	250.93	179.06	183.52	188.37	184.29	115.15	183.19	187.57	0.00	226.93	174.50
May.21-31	209.79	165.53	204.73	177.20	144.79	141.00	166.56	199.46	218.12	204.36	188.57	201.94	181.89	108.44	175.94	201.15	0.00	193.00	181.32
Jun.1-10	172.03	133.96	172.36	166.16	116.27	125.28	132.22	0.00	187.16	184.20	156.82	178.64	142.18	91.29	123.07	169.83	0.00	123.51	148.44
Jun.11-20	138.67	117.80	152.15	142.29	79.11	93.64	135.87	0.00	174.18	149.51	135.68	162.93	108.72	85.34	100.13	144.93	0.00	95.36	126.02
Jun.21-30	108.49	115.05	119.88	124.03	66.12	75.45	105.09	0.00	146.85	112.06	100.21	134.55	104.15	83.76	93.55	118.57	115.66	82.84	106.25
Jul.1-10	90.58	97.84	95.45	141.91	60.22	62.27	94.09	0.00	130.46	97.60	98.71	114.42	94.35	86.02	85.16	67.70	74.76	78.32	92.34
Jul.11-20	79.48	82.14	73.90	151.44	57.04	61.32	87.46	0.00	105.20	92.65	100.69	95.67	88.06	73.73	62.34	59.88	63.09	73.88	82.82
Jul.21-31	80.17	71.40	70.92	115.48	74.64	60.45	90.21	0.00	106.07	93.93	102.31	93.75	95.86	102.91	46.13	62.46	61.83	85.17	83.16
Aug.1-10	60.42	56.95	63.17	78.18	58.99	51.56	82.72	105.19	100.88	80.32	81.48	80.12	91.10	78.66	37.32	55.23	52.43	74.09	71.60
Aug.11-20	53.98	52.97	62.49	68.96	52.68	60.87	79.61	99.82	97.46	80.84	106.17	71.24	95.40	63.90	35.48	51.95	53.70	80.85	70.46
Aug.21-31	77.27	61.37	61.78	70.80	56.68	70.43	95.32	100.23	106.18	89.70	118.81	56.18	100.38	83.46	0.00	54.28	56.68	106.61	80.36
Sep.1-10	68.56	62.42	79.06	69.79	59.61	64.13	95.19	87.81	92.46	85.02	115.74	39.18	89.60	94.85	40.12	50.31	48.50	98.13	74.47
Sep.11-20	63.60	60.79	85.06	83.43	66.21	62.20	86.27	90.75	91.24	91.58	103.77	45.38	95.60	72.35	50.82	50.59	53.70	73.12	73.69
Sep.21-30	58.52	58.75	90.91	78.15	76.15	68.68	98.32	94.02	84.75	98.18	103.31	81.57	91.88	45.19	0.00	43.88	66.93	99.95	78.77
Oct.1-10	72.40	67.79	108.96	63.49	71.50	75.55	85.51	107.77	84.23	112.22	112.32	109.06	105.76	63.25	66.03	45.00	92.74	140.69	88.02
Oct.11-20	57.22	62.93	85.10	63.43	94.88	63.04	82.33	100.41	94.69	106.37	92.27	121.65	133.31	110.40	55.64	63.05	66.64	148.59	89.00
Oct.21-31	67.44	93.46	95.74	68.93	134.75	64.47	110.40	104.79	105.09	118.60	112.04	133.34	135.34	104.04	69.41	65.85	96.10	114.39	99.68
Nov.1-10	76.70	77.76	96.55	72.65	91.40	54.56	116.13	103.45	99.91	108.02	108.37	119.99	123.02	93.91	94.66	96.43	84.37	107.62	95.86
Nov.11-20	91.28	107.43	133.09	84.41	79.04	68.09	129.35	101.68	123.58	113.86	112.04	130.76	145.36	113.05	105.24	88.09	175.11	128.85	112.80
Nov.21-30	82.24	120.63	144.22	101.30	80.54	76.50	174.40	115.63	137.27	123.42	117.64	150.02	153.53	125.41	125.80	82.15	179.37	145.21	124.18
Dec.1-10	86.27	100.17	111.56	89.16	91.36	75.46	156.01	114.69	121.32	134.02	103.21	174.22	125.13	125.27	114.85	73.87	168.12	121.22	115.88
Dec.11-20	67.06	96.42	96.34	89.75	118.54	58.76	138.77	127.19	108.89	141.90	103.97	172.46	117.26	125.48	106.45	95.12	139.23	99.13	111.26
Dec.21-31	91.16	101.91	111.58	80.95	106.64	68.68	167.07	145.32	131.18	158.07	123.20	196.89	138.87	130.99	112.33	101.71	112.07	110.14	121.60
Total Disc.	2,598.95	3,459.34	3,739.39	3,679.48	3,089.78	2,780.47	3,949.14	3,885.10	4,661.43	4,211.42	4,272.90	4,245.69	4,251.40	3,728.37	3,413.55	3,697.89	3,099.72	4,299.08	3,959.15

2) Lakes

Bugesera District has many lakes among which nine (9) are located in the Valley of Akagera, Rweru Lake and North and South Cyohoha Lake. However, as consequence of prolonged drought, the Lake of Cyohoha North has been on the point of drying up from severe drought which occurred in year 2000. The lakes of Gashanga, Kidogo, Rumira, Mirayi, Kirimbi and Gaharwa have been formed by the floods of Akagera and the lake of Rweru.

The dimensions of each lake are summarized as table below. According to the data of table, the total capacity of the lakes as potentiality of water resources is estimated at 987 MCM.

Table 3.1.5 Characteristics of Lakes at Akanyaru = Akagera Complex

Name of the lake	Total surface area watershed	Surface area of streaming basin	Surface area marshland	Surface area of stretch of free water (lake)	Average depth	Average volume
	km ²	km ²	km ²	km ²	m	MCM
1 Cyohoha South	508.0	424.0	2.0	82.0	3.0-4.0	287.0
2 Cyohoha North	337.0	327.0	2.0	8.0	1.4	11.2
3 Gashanga	56.0	53.3	NA	2.7	2.5	6.8
4 Rumira	29.0	24.5	NA	4.5	3.0	13.5
5 Mirayi	} 77.0	} 68.4	NA	3.5	3.5-4.0	12.5
6 Kirimbi				2.3	2.5	5.9
7 Gaharwa				2.6	2.5	6.3
8 Kidogo	2.3	NA	NA	2.3	2.5	5.6
9 Rweru	1,036.0	860.0	NA	116.0	5.0-6.0	638.0
Total	2,045.3	1,757.2	4.0	223.9	-	986.7

* Cyohoha Sud and Rweru are bordered on the south by Burundi.

* The surface area of Cyohoha Nord is decreasing due to ecological problem. The original surface area is said 13 km².

3) Ground water

The potentialities of ground water in Bugesera is not clear at this moment in time because of no data and/or study available so far, but there is certain data in terms of the type of water source in the District as below (see Annex II-3).

Table 3.1.6 List of Water Sources in Bugesera District

Type of Source	Former District			Total
	Nyamata	Ngenda	Gashora	
Borehole	0	20	8	28
Dug well	20	0	23	43
Pump station	0	0	2	2
Spring	16	17	5	38
Tank	122	11	82	215
Tap	210	69	91	370
Water Hole	3	0	0	3
Total	371	117	211	699

Data source: Final Report of "Hydrological Mapping of Bugesera Region" compiled by ZOA, February 2002
According to the table, as of year 2002, there were 699 various water sources such as boreholes, dug wells, springs, water holes, tanks, taps, and pump stations in Bugesera District. The status of these water sources varied from dry, non functional, functional, under construction, to under rehabilitation

and so on.

Among the type of sources, those which are understood that it is obviously utilizing ground water are borehole, dug well, spring, and water hole. Then, the total number of these types of source is only 103 places out of 699 (The water resources of the others, namely, pump station, tank, tap, are not clear). Based on this fact, one could say that there may be more room to utilize the ground water in wetland and along the shore of marshland while there are fewer potentialities on hilly land. To grasp the potentialities of ground water in Bugesera, anyhow, is essential to study and/or analyze the estimated amount of ground water deposits, movement of ground water, and so on.

3.2 Socio-economic Conditions

3.2.1 Local Administration

(1) Administrative Reform

The local administrative system in Rwanda significantly changed based on the “Territorial Reform Act” approved by the Parliament, December, 2005, and enforced in January, 2006. The number of Provinces, Districts and Sectors in the country decreased as shown below.

Table 3.2.1 Number of Local Administrative Units in Rwanda

Unit	Province	District	Sector
Before (until 2005)	11 (+ Kigali City)	106	1,545
Present (after 2006)	4 (+ Kigali City)	30	450

Source: Report on Decentralization in Rwanda (in Japanese), JICA Rwanda Office, Jan. 2006

In accordance with the reform, the local administration system in Bugesera region changed, and Bugesera District was established, consisting of former three districts (Gashora, Ngenda and Nyamata). The table below summarized the number change of local administration units and the following map shows the location of 15 new Sectors in Bugesera District.

Table 3.2.2 Number of Local Administrative Units in Bugesera

Unit	Province	District	Sector	Cell
Before (until 2005)	Kigali-Ngali Province	3	36	391
Present (after 2006)	Eastern Province	1	15	72

Source: Data obtained from MINALOC

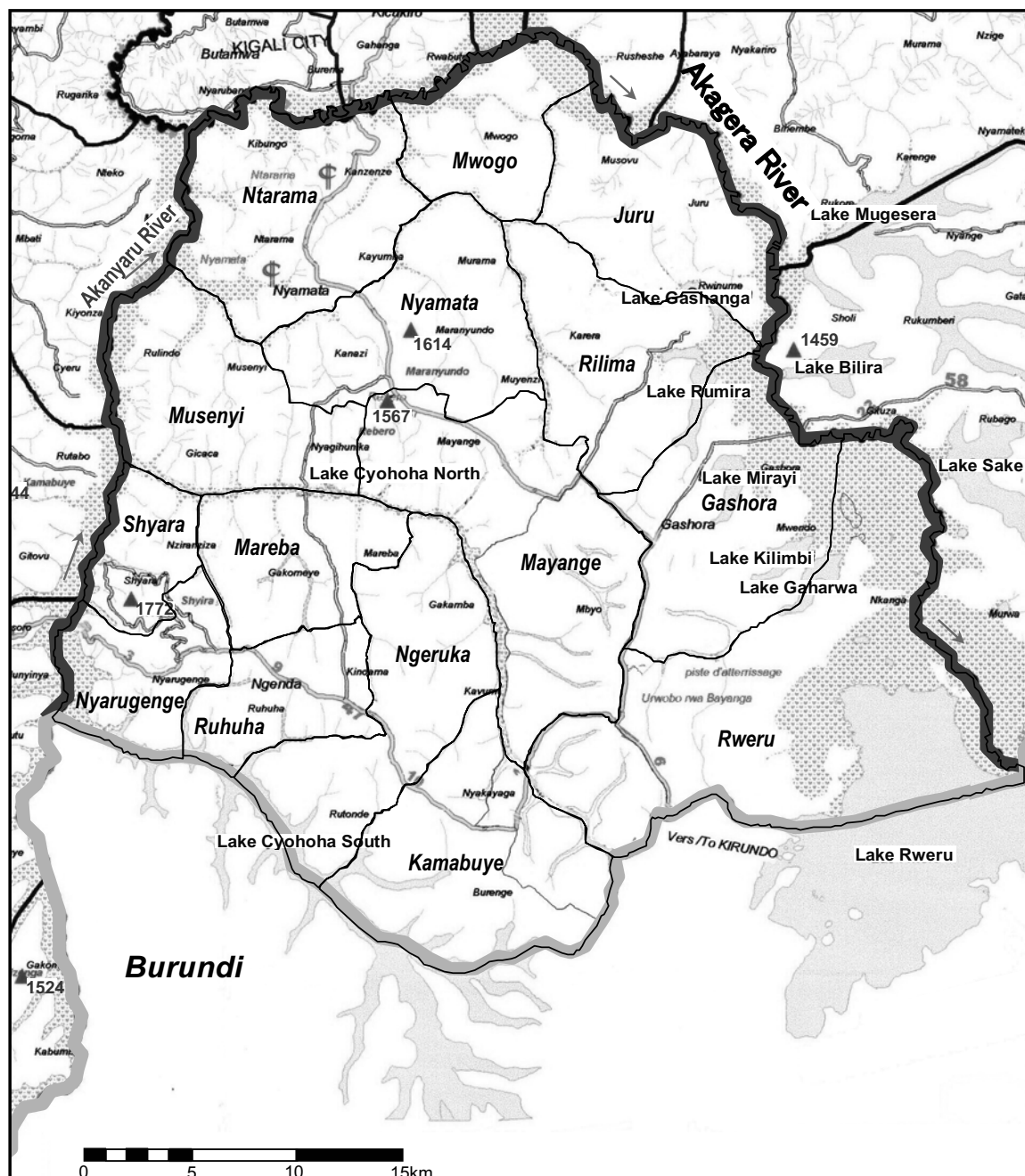


Figure3.2.1 Location of 15 Sectors in Bugesera District

With the local administration reform, many officers who formerly worked at provincial offices were transferred to District offices. The District offices are, therefore, supposed to coordinate the provision of administrative services, which had been done by former provincial offices. The Sector which generally consists of 7 staff (executive secretary, accountant, agronomist, development planning, land/housing/infrastructure) is supposed to be an interface with local people and to work as a main actor at the field level. Roles of local administrative units are summarized in the table below.

Table 3.2.3 Roles of Local Administrative Units

District: District is an autonomous administrative structure with a legal status and financial autonomy and its structure includes, the District Council, which elaborates the District policy, approves the District budget, mobilizes the population for development, and controls the activities of the Executive Committee of the District. The District Executive Committee recruits the District Executive Secretary, who is a technical officer responsible for coordinating all the technical and administrative units of the central and local administration that operate at District level. He/she is to ensure that the units effectively implement the directives of the Executive Committee, as approved by the District Council, in compliance with the legislation and Government's policies.
Sector: Sector is the next level of the democratic local government, and it includes, several Cells. Cells development plans are coordinated by the Sector Development Committees, who have been elected by members of the Cell Community Development Committees (CDCs). Members of the Sector CDCs elect their representative in the District CDC.
Cell: Cell is the grass-roots local government organization, administered by a freely elected Executive Committee. Each Cell elects a Cell CDC responsible for planning social and economic development activities. Cells are usually comprised of 100 to 200 households, and through Ubudehe the communities come together to identify their problems, prioritize them, find solutions and eventually implement the retained approach, and this is all in a participatory way.

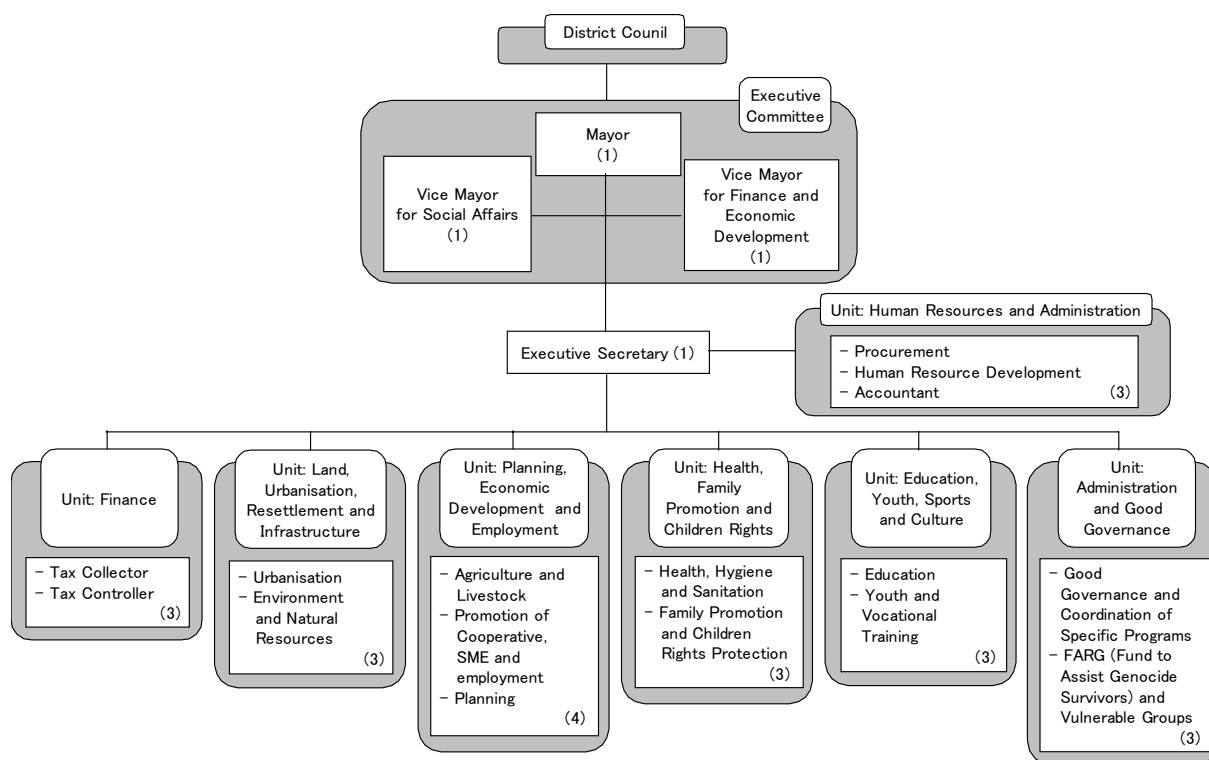
Source: Project for Support to Operationalisation of the Strategic Plan for Agricultural Transformation, Appraisal Report, Working Paper 3, Institutional Support to Agricultural Sector, IFAD, July 2005

According to the Sector office interviewing survey conducted by the Study Team in May 2006, all of the Sectors don't have expected full human resources and, on average, there are only 5 staffs in each Sector. Moreover, the financial situation at a Sector level is unstable since all the Sector offices in Bugesera District receive only operational budget (normally, Rwf 300,000 per 3-month) without any other budgets related to development.

(2) Human Resources

1) District Level

The number of appointed staffs of Bugesera District is 26 at present (May 2006), which is only 70% of the number planned, 35 according to MINALOC. The organization chart of Bugesera District is as follow.



*The parentheses means the number of staff

Source: Bugesera District

Figure 3.2.2 Organization Chart of Bugesera District

Mayor, 2 vice-mayors and the District council members are elected for 5years term. The number of the District council members is 28 (May 2006) that consist of 15 representatives from each Sector and 8 from women and 5 from youth. The District council has a competence to relieve post of mayor and vice-mayors during their tenure of office.

There are many kinds of meetings held in the District office. Among them the District plans regular meeting once a month with Sector representatives. However, especially the District Mayor and Executive Secretary, who have most important roles in the District are always busily occupied and that meeting is sometime postponed or cancelled. In addition, the District representatives attend a meeting held at the Eastern Province office once a month.

The District budget in 2006 is as table below. More than 60% of the income depends on donors and NGOs. Therefore, there is an anxiety that the activities of the District staffs are driven by initiative of outsiders and the opportunity to improve their capacity for planning and implementing by themselves is reduced. In addition, expenditure for human resources development is only 3.5% of the total.

Table 3.2.4 Budget Data of Bugesera District in 2006

Income from:

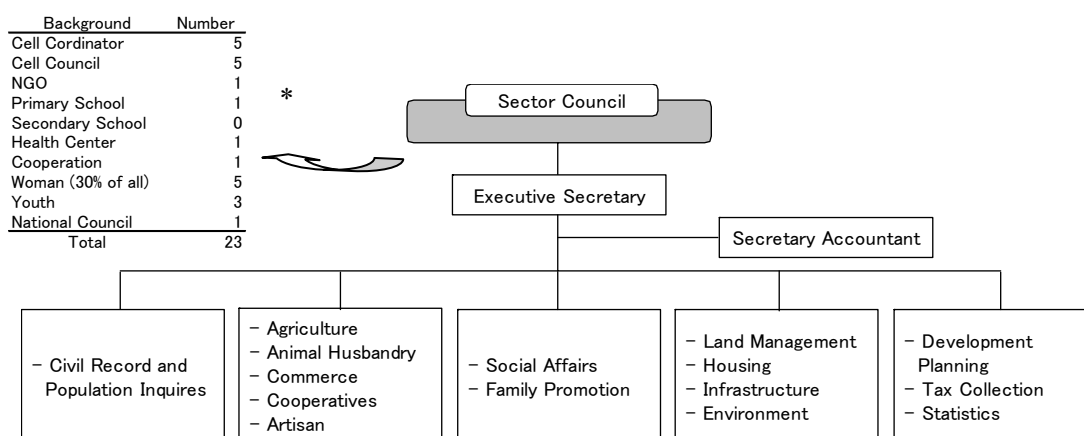
Items	Frw	%
Central Government	1,178,725,929	24.3
Taxes in District	133,932,542	2.8
Donors and NGOs	3,247,295,900	67.1
CDF	205,294,548	4.2
Others	76,894,491	1.6
Total	4,842,143,410	100.0

Expenditure for:

Items	Frw	%
Salary for District Staff	1,290,630,521	32.3
Allocation for 15 Sectors	40,389,309	1.0
Infrastructure development	1,023,769,950	25.6
Medical and education development	292,341,557	7.3
Human Resources Development	139,860,451	3.5
Others:		
Finance and Resources mobilization	95,554,735	2.4
Good Governance	300,743,056	7.5
Prison of Rilima	311,688,472	7.8
Planning and economic development	310,457,455	7.8
Coordination of District	190,230,721	4.8
Total	3,995,666,227	100.0

2) Sector Level

The organization chart of Sector is as follow. There is a Sector Council under which 7 specific positions are arranged by the government. In case of Kamabuye Sector, there are 23 members in its Sector Council, whose backgrounds are categorized into 10 including Cell Coordinators, Cell Council members, women (30% of all members) and so on.



Source: Organization chart: MINALOC

*Background and numbers of Sector council members: Kamabuye Sector

Figure 3.2.3 Organization Chart of Sector

Regarding to the staff appointed by the government, however, there are only about 5 staffs in each Sector office although its number planned to be appointed is 9 as shown in the table below. Therefore,

there are many cases that one Sector staff holds more than 1 post. Especially many Agriculture/animal husbandry/commerce/cooperative/artisan staffs hold other positions such as Land management/housing/infrastructure/environment and Development planning/tax collection/statistics.

Table 3.2.5 Number of Staff of Each Sector of Bugesera District

Sector of Bugesera District	KAMABUYE	RUHUHA	NYARUGENGE	MUSENYI	MAREBA	SHYARA	NGERUKA	GASHORA
(a) Executive Secretary	1	1	1	1	1	1	1	1
(b) Secretary Accountant	1	1	1	1	1	1	1	Staff (a) also holds this role
(c) Civil Records and Population Inquires	1	1	1	1	1	1	1	1
(d) Agriculture, Animal Husbandry, Commerce, Cooperatives, Artisan	1	1	1	1	1	1	1	1
(e) Socila Affairs, Family Promotion	1	1	1	1	1	1	1	1
(f) Land management, Housing, Infrastructure, Environment	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	-	Staff (d) also holds this role	Staff (d) also holds this role
(g) Development Planning, Tax collection, Statistics	Staff (d) also holds this role	Staff (d) also holds this role	-	-	Staff (d) also holds this role	-	Staff (d) also holds this role	-
Total	5	5	5	5	5	5	5	4

Sector of Bugesera District	MAYANGE	NYAMATA	RILIMA	JURU	MWOGO	RWERU	NTARAMA	Plan*
(a) Executive Secretary	1	1	1	1	1	1	1	1
(b) Secretary Accountant	1	1	1	1	1	1	1	1
(c) Civil Records and Population Inquires	1	1	1	1	1	1	1	1
(d) Agriculture, Animal Husbandry, Commerce, Cooperatives, Artisan	1	1	1	1	1	1	1	2
(e) Socila Affairs, Family Promotion	1	1	1	1	1	1	1	2
(f) Land management, Housing, Infrastructure, Environment	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	-	1
(g) Development Planning, Tax collection, Statistics	Staff (d) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	Staff (e) also holds this role	Staff (d) also holds this role	Staff (d) also holds this role	-	1
Total	5	5	5	5	5	5	5	9

*According to MINALOC

Source: Study from each Sector Office on May 2006 and *MINALOC

Moreover, almost all staffs were appointed on January or February 2006 based on the local administration reform so that they are not familiar with responsible area. Nevertheless, their field works tend to be prevented because they don't have any transportation means such as motorcycle or bicycle and Sector office budget is too small (normally Rwf 100,000/month) to provide enough transportation fees to its officers.

3) Cell Level

Administrative activities in Cell are actually carried by 2 main positions: Executive Secretary appointed by District (paid) and Cell Coordinator (volunteer) elected by local population. Cell Coordinator is a leader of Cell Council, which consists of 2 committees. One committee is CPA (Administrative political committee), which has 4 members including Cell Coordinator and the other is CDC (Community Development Committee), which has 6 members. Those members are elected

and have each own role shown in the figure below. However, they work without any payment.

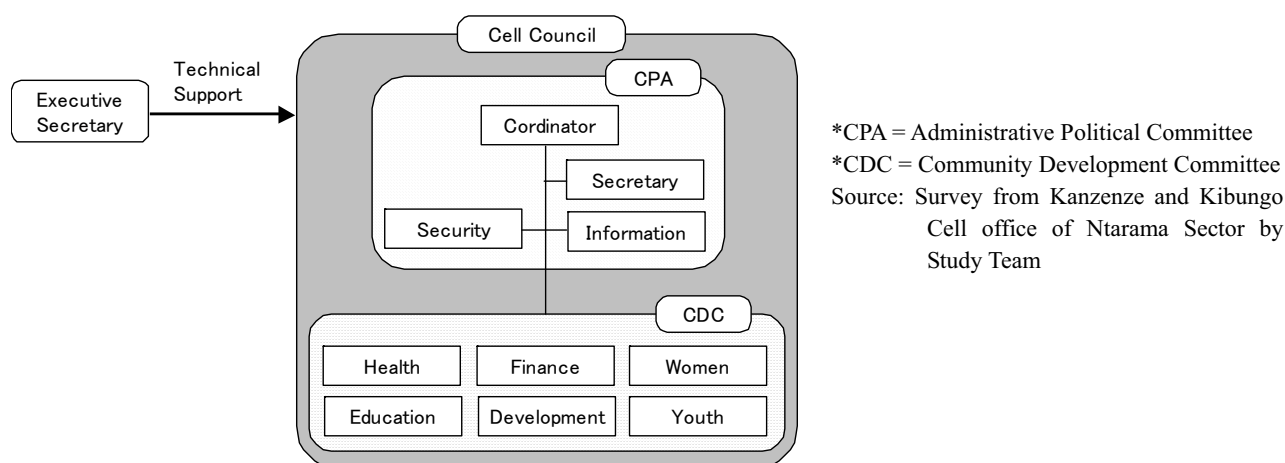


Figure 3.2.4 Organization Chart of Cell

Same as Sector officers, almost all Cell Executive Secretaries were appointed on January or February 2006. And due to little budget as well as no transportation, they haven't gotten enough information about their service areas.

3.2.2 Demography

In August 2002, national census ("Recensement Général de la Population et de l'Habitat" in French, RGPH) was conducted in Rwanda and it is the official statistics presently available. According to the report ("National Census of the Population and Settlement (August 2002), Final Statistics: Sector Level, Volume 1: City of Kigali, Kigali Rural, Gitarama, Butare", MINECOFIN 2005), there is a population of 266,775 people in Bugesera District.

Average population density of the District is 200 persons/km² while there are big differences among the 15 Sectors. In the Sectors located in south-western part of the District surrounded by two lakes, Cyohoha North and Cyohoha South Lakes, and Akanyaru River, population density is relatively high compared to other Sectors. Due to the existence of prison, the population density of Rilima is also high.

Table 3.2.6 Population and Population density at Each Sector in Bugesera District

New Organization		Former Organization		Area (km ²)	Population			Population Density Persons/km ²
UMURENGE SECTOR	AKAGARI CELL	UMURENGE SECTOR	AKAGARI CELL		Male	Female	Total	
GASHORA	5	2	26	100.38	7,183	8,065	15,248	152
JURU	5	3	28	82.97	9,050	10,161	19,211	232
KAMABUYE	5	2	26	104.86	8,217	9,187	17,404	166
MAREBA	5	2	25	58.13	8,750	10,350	19,100	329
MAYANGE	5	2	27	130.98	7,018	7,374	14,392	110
MUSENYI	4	4	42	86.43	9,814	11,026	20,840	241
MWOGO	4	1	20	53.78	5,614	6,548	12,162	226
NGERUKA	5	3	32	95.65	12,003	13,897	25,900	271
NTARAMA	3	4	25	101.41	6,783	7,194	13,977	138
NYAMATA	5	4	36	87.19	8,749	10,217	18,966	218
NYARUGENGE	5	1	16	48.01	7,051	8,292	15,343	320
RILIMA	5	2	39	84.89	16,431	10,915	27,346	322
RUHUHA	5	2	21	44.94	7,882	9,434	17,316	385
RWERU	6	2	15	221.25	9,223	10,414	19,637	89
SHYARA	5	2	17	33.03	4,678	5,255	9,933	301
Total	15	72	36	395	128,446	138,329	266,775	200

Note: 1) Based on the Census 2002, population at each Sector is calculated.

2) Area at each Sector is estimated by Study Team

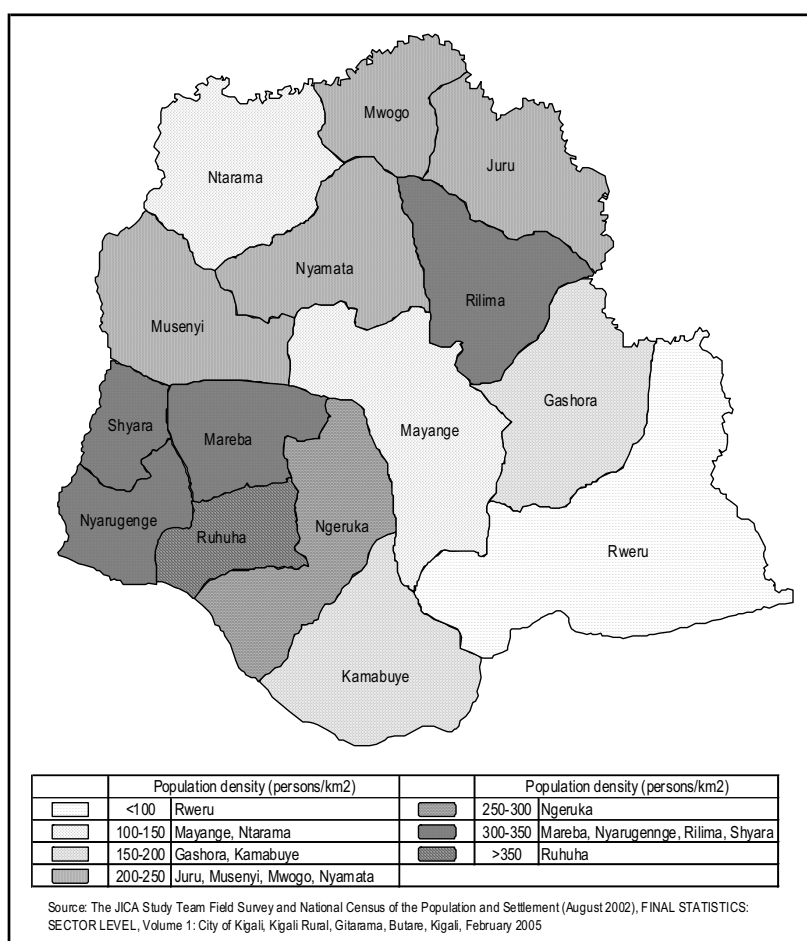


Figure 3.2.5 Population Density by Sector

Assuming that the population growth rate has ranged between 2.5% (Strategic Plan for Agricultural Transformation in Rwanda, MINAGRI 2004) and 2.9% (Vision 2020, MINECOFIN 2003) for the recent four years, present population in Bugesera District can be estimated between 294,500 and 299,000. Hence, the present population density could be 220-224 persons/km².

Rilima, Ngeruka and Nyamata are the top three Sectors where more people live among the 15 Sectors. In general, male population in each Sector is less than that of female population. In Rilima Sector, male population is far larger than female because a male-dominated prison exists there.

As for average family size, there are not so big differences among the 15 Sectors, ranging between 4.18 and 4.86 persons per household except for Rilima. Because it doesn't seem that the number of households data consider the prisoners in Rilima, the average number of male per household there (3.87 males per household) becomes far bigger than others which range from 1.89 to 2.37.

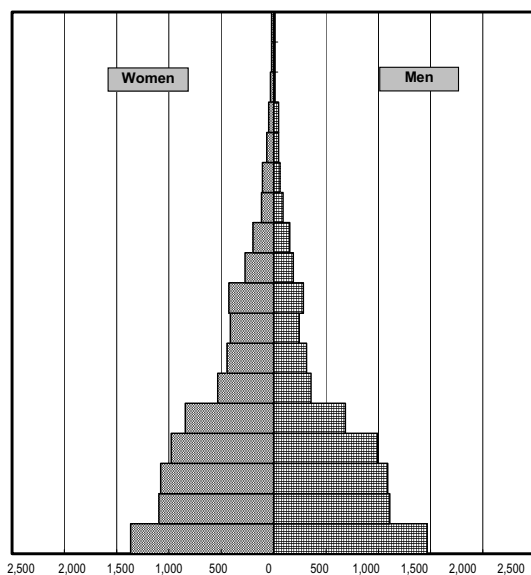
Table 3.2.7 Demographic Data of 15 Sectors

Sector	Number (households, persons)				Proportion (%)				Average Family size
	House holds	Population			House holds	Population			
		Male	Female	Total		Male	Female	Total	
Gashora	3,420	7,183	8,065	15,248	5.9	5.6	5.8	5.7	4.46
Juru	4,124	9,050	10,161	19,211	7.1	7.0	7.3	7.2	4.66
Kamabuye	3,788	8,217	9,187	17,404	6.5	6.4	6.6	6.5	4.59
Mareba	4,482	8,750	10,350	19,100	7.7	6.8	7.5	7.2	4.26
Mayange	2,964	7,018	7,374	14,392	5.1	5.5	5.3	5.4	4.86
Musenyi	4,722	9,814	11,026	20,840	8.1	7.6	8.0	7.8	4.41
Mwogo	2,810	5,614	6,548	12,162	4.8	4.4	4.7	4.6	4.33
Ngeruka	5,965	12,003	13,897	25,900	10.2	9.3	10.0	9.7	4.34
Ntarama	1,994	4,067	4,499	8,566	3.4	3.2	3.3	3.2	4.30
Nyamata	5,318	11,465	12,912	24,377	9.1	8.9	9.3	9.1	4.58
Nyarugenge	3,735	7,051	8,292	15,343	6.4	5.5	6.0	5.8	4.11
Rilima	4,248	16,431	10,915	27,346	7.3	12.8	7.9	10.3	6.44
Ruhuha	3,891	7,882	9,434	17,316	6.7	6.1	6.8	6.5	4.45
Rweru	4,475	9,223	10,414	19,637	7.7	7.2	7.5	7.4	4.39
Shyara	2,377	4,678	5,255	9,933	4.1	3.6	3.8	3.7	4.18
Average	3,888	8,563	9,222	17,785	-	-	-	-	-
District	58,313	128,446	138,329	266,775	100.0	100.0	100.0	100.0	4.57

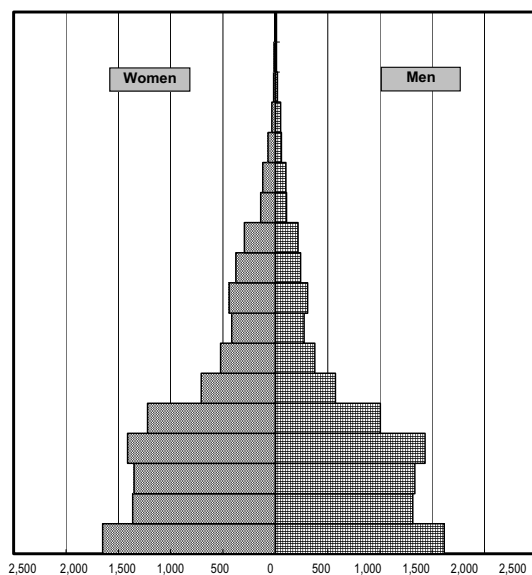
Source: "National Census of the Population and Settlement (August 2002), Final Statistics: Sector Level, Volume 1: City of Kigali, Kigali Rural, Gitarama, Butare", MINECOFIN 2005

As the population pyramids of the 15 Sectors clearly indicate, cohorts under 20 years of age predominantly represent the population in every Sector except for Rilima. Young generations (0-17 years old) occupy a half of the population (49.6-56.7%), but, again in Rilima, the existence of prisoners differentiates its population pyramid from others, where the proportion of young generations is only 39.7%.

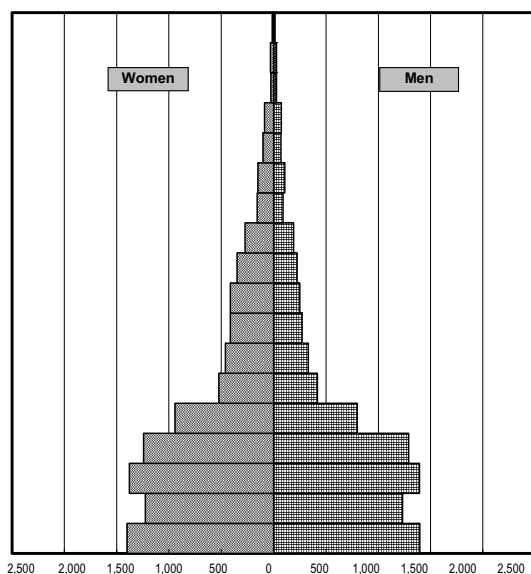
01 Gashora Sector



02 Juru Sector



03 Kamabuye Sector



04 Mareba Sector

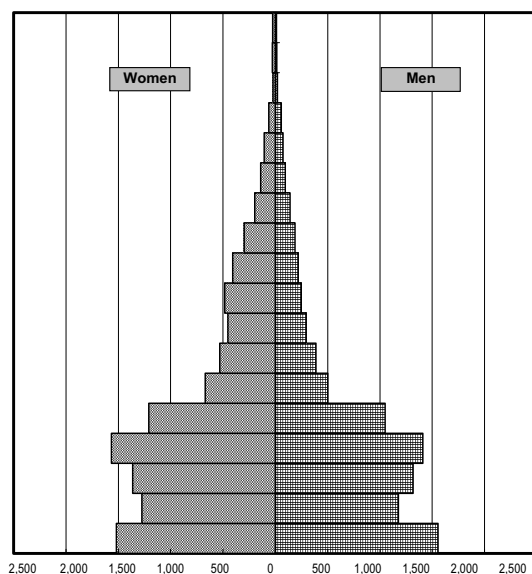
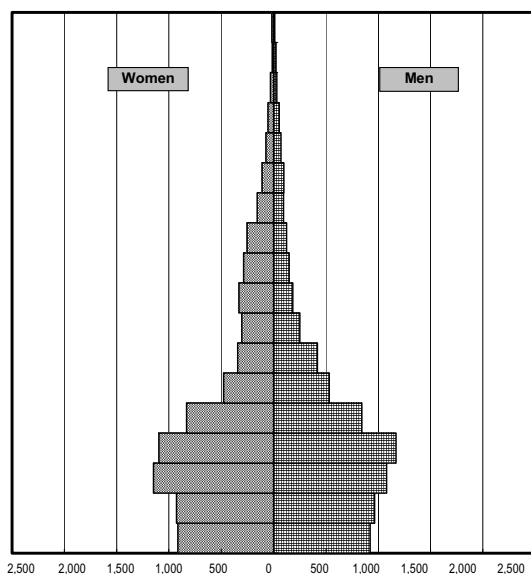


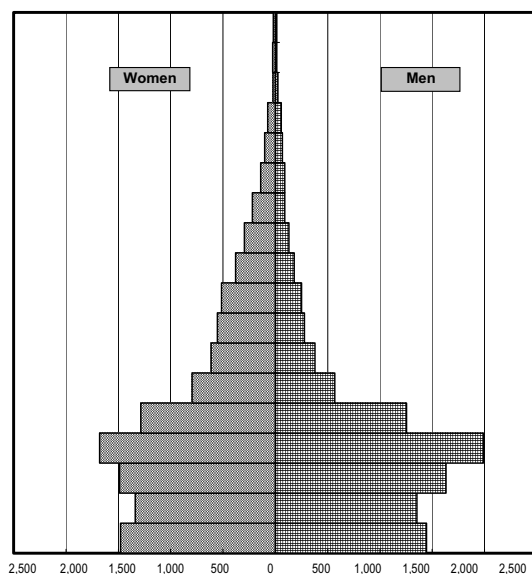
Figure 3.2.6 Population Pyramids by Sector

Source: "National Census of the Population and Settlement (August 2002), Final Statistics: Sector Level, Volume 1: City of Kigali, Kigali Rural, Gitarama, Butare", MINECOFIN 2005

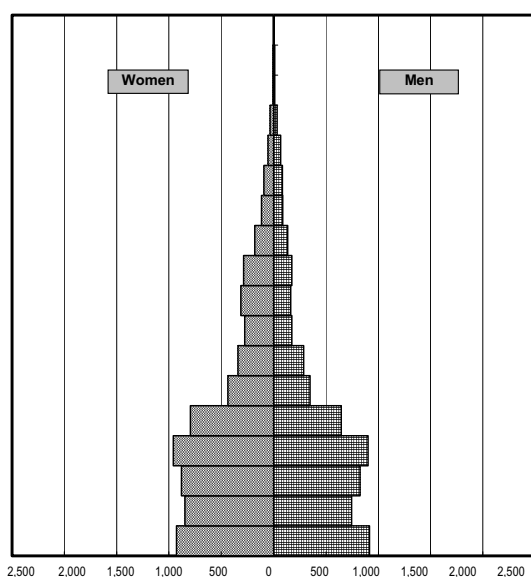
05 Mayange Sector



06 Musenyi Sector



07 Mwogo Sector



08 Ngeruka Sector

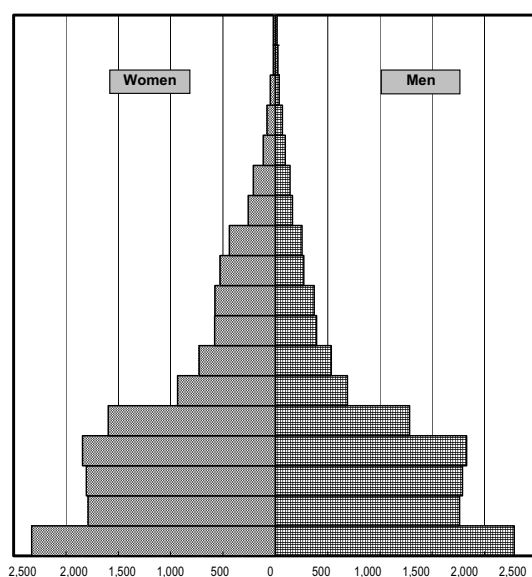
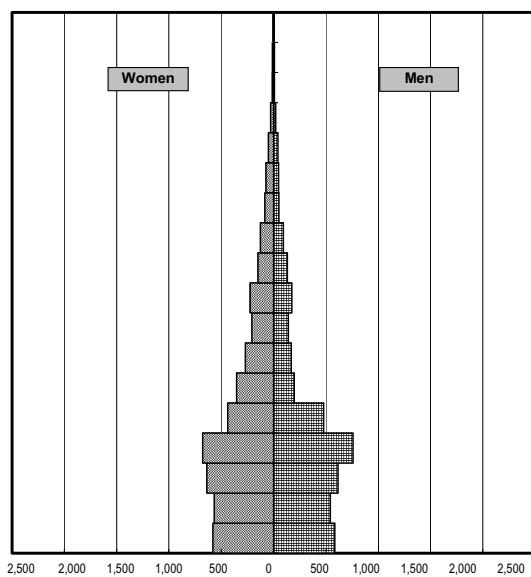
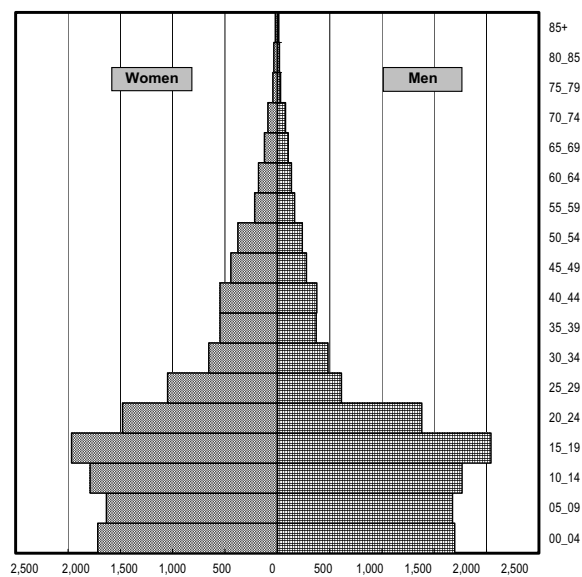


Figure 3.2.6 Population Pyramids by Sector (continued)

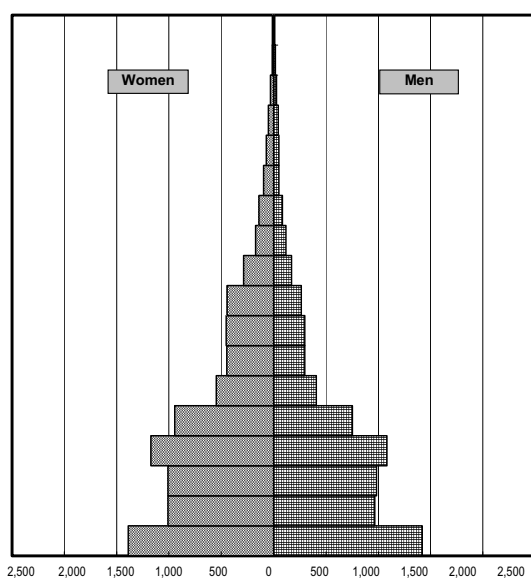
09 Ntarama Sector



10 Nyamata Sector



11 Nyarugenge Sector



12 Rilima Sector

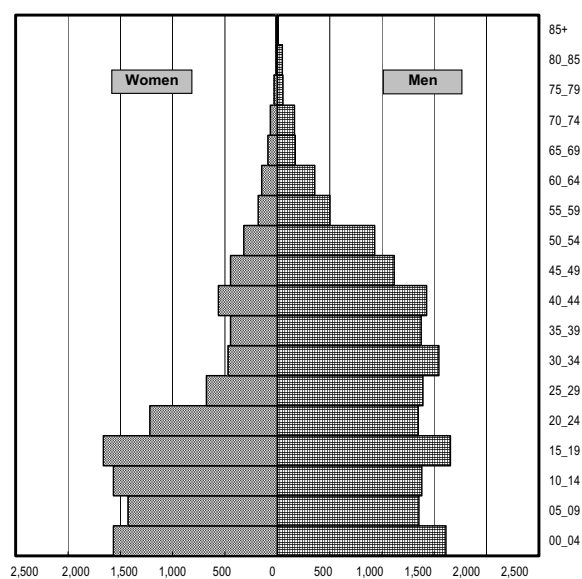
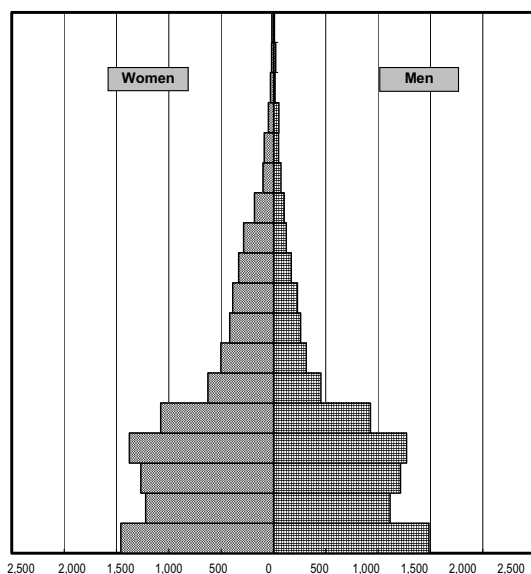
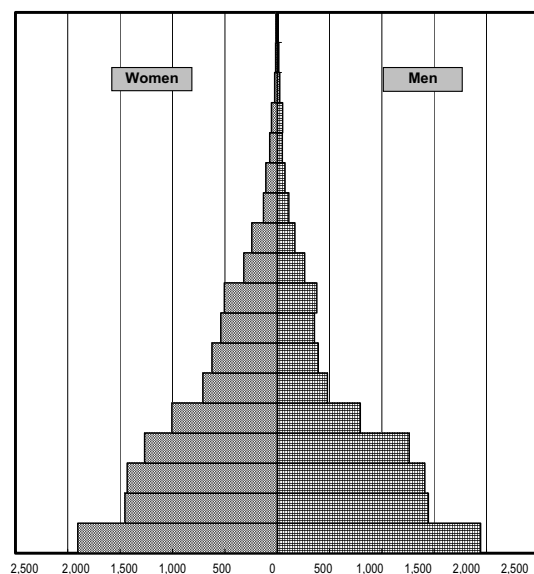


Figure 3.2.6 Population Pyramids by Sector (continued)

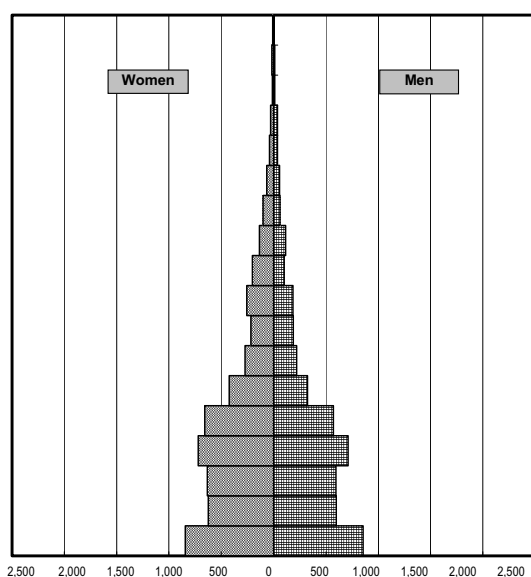
13 Ruhuha Sector



14 Rweru Sector



15 Shyara Sector



Bugesera District

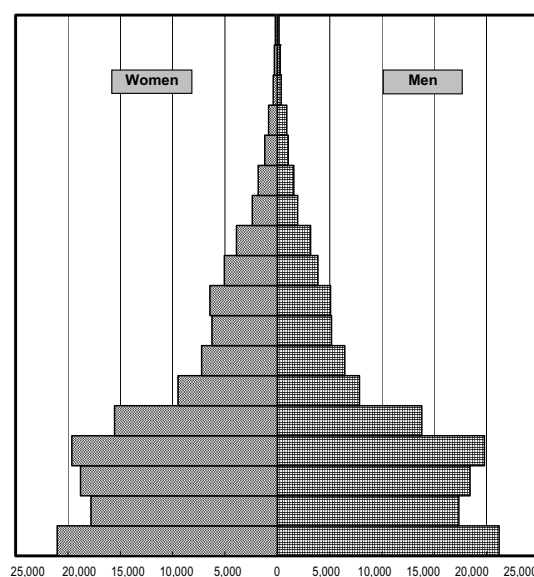


Figure 3.2.6 Population Pyramids by Sector (continued)

Proportions of people engaged in economic activities out of total population vary from 33.7% in Rilima to 54.5% in Mwogo. In Rilima, men's proportion is exceptionally high probably due to the existence of many prisoners. In general, proportion of women engaged in economic activities is higher than that of men in all the Sectors.

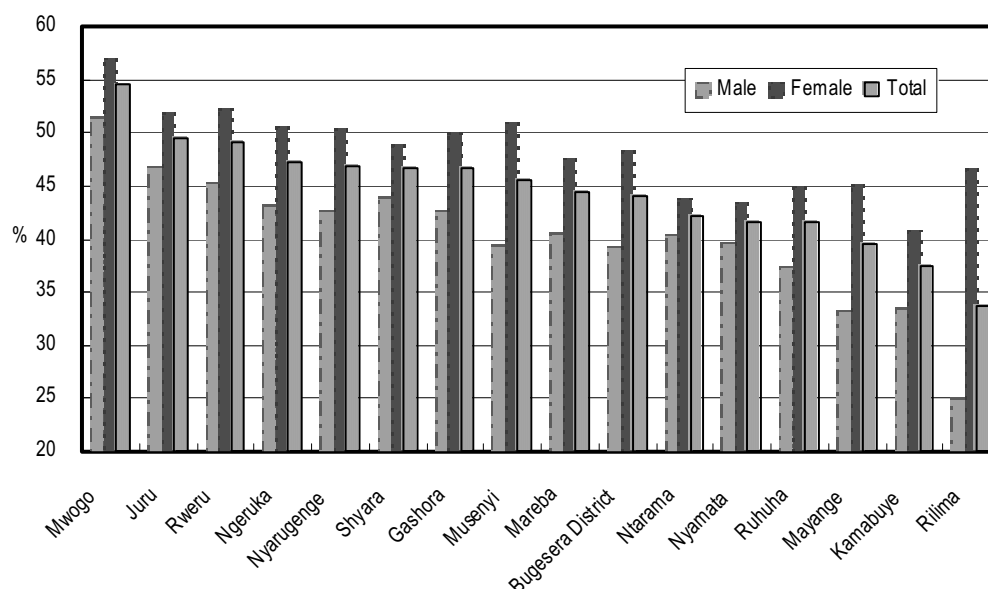


Figure 3.2.7 Proportions of People Engaged in Economic Activities by Sex

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

Among the total population who engaged in economic activities, women represent more than a half in all the Sectors, ranging from 54.5% (Ntarama) to 59.3% (Musenyi). Although these facts may not imply that women get more income than men, it is quite clear that women's role is very important for livelihood in every Sector. Women headed families correspond to more than one third of households in all the Sectors. Musenyi, Ntarama and Mayange are the top three Sectors with more than 43 % of women headed households.

Table 3.2.8 Some Gender Related Indicators by Sector

Sector	Gashora	Juru	Kamabuye	Mareba	Mayange	Musenyi	Mwogo	Ngeruka
Families ¹	37.0	33.2	37.1	37.7	43.4	45.3	35.0	36.6
Labors ²	56.8	55.4	57.7	58.0	58.8	59.3	56.3	57.5
Sector	Ntarama	Nyamata	Nyarugenge	Rilima	Ruhuha	Rweru	Shyara	District
Families ¹	44.3	41.2	37.6	35.1	40.9	35.2	32.8	38.1
Labors ²	54.5	55.2	58.2	55.2	59.0	56.5	55.5	57.0

Note: Families¹ denote the proportions of women headed families among the total households. Labors² denote the proportions of women among the total person who engaged in economic activities.

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

3.2.3 Road Networks

(1) General

One could say that the road networks in Bugesera District are relatively well spread in every corner

over the whole District. The District has many roads reaching all Sectors. They allow to link the Sector offices to the District office located in Nyamata center and to reach the public facilities such as the main trading centers, schools, community health centers, and so on. Bugesera is in communication with other regions by main roads. Those are the roads Kigali-Nyamata-Ngenda-Butare, Kigali-Nyamata-Nemba to Kirndo (Burundi), Mirenge (Kibungo)-Gashora-Ramiro.

The cumulative length of roads and communal passable paths for vehicles reach about 3,500 km with high road density comparatively. In spite of this fact and even though there developed vary good routes before 1994, these roads are now actually in miserable conditions.

In general, each Sector or Cell relies on one primary or secondary route that is unfortunately poorly maintained. Although this is on account of public works of development (Umuganda) they are neglected in most of the Sectors. These routes are gnawed in some places (very often observed) by farmers and by this reason have become muddy and slippery everywhere during rainy season. The most serious problem however is found in defective state in which commercial circuit remains in underdeveloped stage for agricultural products, in particular vegetables that are mainly cultivated in marshlands.

The poor condition of roads affects development preventing accessibility of some areas. This constitutes a negative impact on trading of local products, communication and those areas become more isolated compared to other regions. The difficult access to these areas harms their potential and consequently the investments.

Many transportation means are used for transporting goods and people (motor vehicles, bicycles, motorcycles, canoe). Bicycles are mainly used, which mainly belong to the private operators as association.

As for the trunk road which is connecting Bugesera District with Kigali, the public bus which commute from Kigali to Nyamata are operated. These roads, however, have also been in poor condition due to erosion, worn-out of road surface, and so on as well as rural roads and trails. Under the circumstances, the rehabilitation/expansion programs of road networks for trunk road are intensively in progress now.

(2) Road rehabilitation program

There are some rehabilitation programs of road networks in Bugesera District as follow:

Road Rehabilitation Program from Kigali to Border in Burundi

Table 3.2.9 Road Rehabilitation Program from Kigali to Border in Burundi

Phase	Phase 1 (on going)	Phase2 (Plan)
Distance	Kigali-Mayange, 40 km	Mayange-Border in Burundi, 20 km

Dimension	Effective width 6m, Total width 10 m	Same as left
Total cost	22million EURO	11million EURO (plan)
Funded by	OPEC and Saudi fund	AfDB
Implementation period	2006.May – 2007.July	From 2006.Dec (12 months)
Contractor	STRABAG	

Road Rehabilitation Program from Gahembe to Kindama

Table 3.2.10 Road Rehabilitation Program from Gahembe to Kindama

Items	Discription
Distance	Gahembe - Kindama, 20 km
Dimension	Total width 5 m, laterite pavement Reshaping. Drainage facilities
Total cost	n.a.
Funded by	Luxemburg
Implementation period	On going

A Plan of Access Road to of New International Airport

Apart from the plans mentioned above, a connecting road has been planned to access to the new international airport which is planned to construct at KARERA by MININFRA where is in former Gashora Sector. The route of access road to the airport is planned with Nyamata center as the starting point (Refer to Figure 3.1.1 as shown in Chapter 3.1.1 Topography and Geography).

3.2.4 Energy and Water Supply

(1) General

With a per capita income of approximately \$260, the typical Rwandan lives below the \$1 per day poverty line. Approximately 90% of Rwandans are engaged in subsistence agricultural and only 6 % have access to electricity and clean water. Wood, charcoal, and biomass are the main fuel sources, even for many middle class urban Rwandans. As a result, deforestation and soil erosion are serious concerns.

2004 witnessed a severe electricity crisis which took the form of regular and long lasting power cuts across the country. The crisis resulted simply from the network which has not been able to supply enough electricity to meet demand. This problem arose due to two main reasons, first, years of under investment in the network infrastructure and, second, due to low rains reducing the water level in the lakes and hence the productivity of the hydro power plants.

The Government has worked closely with its development partners and ELECTROGAZ to find a solution. During 2005 ELECTRIGAZ imported and began operating several generators to boost domestic supply and by the end of the year the number of power cuts had been significantly reduced. The budget for 2005 has also made provisions for network rehabilitation amounting to 14 billion Rwf.

ELECTROGAZ has seen its operational costs increase since it has had to import generators and increasingly more expensive fuel to power them. Therefore the decision was made towards the end of 2004 to increase the cost of electricity to all users, be they residential or business.

On the other hand, water from heavy rains cascades down the hills and mountains, washing away farms and increasing soil erosion. Then, people who go to fetch water, spend hours every day hauling drinking water back up the hills and mountains, even in rainy seasons, which are experienced twice a year in Rwanda, there are no simple technologies to tap and preserve water both in towns with a middle class population and in villages with a poorer population.

Furthermore, recent cyclic draught gives an additional difficulty of getting water to local population. And also, even he/she is living close to piped water, he/she do not access that water due to its cost. They still get the water from marshland, lake, and so on, despite duty water.

As such, water crises are experienced at all levels of society.

(2) Energy

1) Energy saving practices

Almost of population in Bugesera are said that they do not use any energy saving implements. The general failure to use energy saving implements in Bugesera means that the population relies largely on wood fuel. And given that the environment of Bugesera is generally dry and frequently stricken by drought, the continued encroachment on the environment poses a threat to the already fragile state. Therefore, It is important that the population be encouraged to adoption appropriate energy saving technologies and implements for more sustainable environmental management.

Like every where in Rwanda, the most used energy in Bugesera come from wood and 99% of the population use this kind of energy. The population and the institutions located in the centres of Ruhuha and Nyamata uses electricity. The solar energy and generators are only used in community health centres and by some individuals. The insufficiency of electricity is still a big matter to the economic development of the District.

2) Field of energy: difficult access to electricity

Electricity installations are found in some centres but do not cover whole of the District as mentioned above. The blame goes to ELECTROGAZ which is slow in supplying electricity even if installations are in place. However, electricity is only used by rich people and the majority of Bugesera population is poor. The office of Sectors, the community health centres, the schools and some trading centres are connected to electricity. It seems that impact of electricity is not ignored on the

development of activities even Cell level including solar energy.

(3) Water Supply

Access to safe drink water is also another development handicaps for Bugesera District as well as the others. In the District, rare water sources make potable water supply difficult. Major part of the inhabitants do not have access to potable water, many people still use marshes and lakes water. This water shortage is attributable to many constraints, namely:

- Lack of water sources and the existing ones have not been improved or been depleted during dry season,
- Remoteness of water sources and / or of fountain taps,
- Water pipeline facilities are not in operation and need rehabilitation,
- Feeble water pressure to Sectors located in higher altitude

Again, population in Bugesera has been suffering from securing safe water. Although the pipe water systems are there, there are a lot of residents who can not access the clean water due to the water fee, a long distance to public tap, etc. They are fetching water almost every day with spending time.

Furthermore, those who are taking water from river, swamp, marshland, and so on use the water for domestic without boil. It is not very clear a causal relationship between taking non-boiled water and disease like diarrhea, but it is true that there are people who are affected with abdomen problem.

Problem on potable water is, anyhow, directly related to health and heavy labor. Here, it is attributable to various causes such as the very nature of the region with very limited resources, limited measures to convey water over a long distance or to maintain and utilize already constructed tap-water installations. This problem is worrying because it may endanger human life and health, may affect livestock and agriculture and so on..

Under this circumstance, water supply system is now on-going to cover whole area of Bugesera, which funded by EU with 18 Million EURO. The dimensions of this water supply system are as below:

Table 3.2.11 Dimensions of Bugesera Water Supply System

Items	Description
Water resource	Lake Cyohoha-South
Water delivery system	Pump with pipeline
Amount of water lifted up	2,200 m ³ /sec
Total length of pipeline	291 km
Total number of fountain	43 nos.
Total number of public tap	157 nos.
Construction cost	18 million EURO by EU
Construction period	18 months (Sep. 2006-Feb. 2007)

Contractor	SOGER-SATOM
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Remarks;

- 1) Water supply system in former Ngenda District was installed by year 2005.
- 2) Apart from Bugesera system, Karange system in Kibungo District to has been planed, too. This system will be constructed to convey water to Karenga are and also Kigali City from Mugesera Lake by pump system.

Construction of water supply system in progress



People suffer from water

To get water is one of serious problem for population. Their water recourses are river, lake, marshland, etc. Residents, who are living in even the areas where are close to center of town which equips water supply system, spend several hours every day to fetch water due to the cost for pipe water, namely, 15 Frw/jerican is not affordable for them. To make matters worse, quality of water resource has been deteriorating in some places. In case of the photo below, it may be able to say that environment of Lake Cyohoha-North has been drastically changed sine year 2000 which is the year of serious draught. From at that time, quality of lake water has been apparently changed, residents are complaining.



Source: Surveyed by JICA Study Team

Safe water supply

A survey was conducted by World Vision, which focused on the sources of water for households during dry and rainy seasons in Nyamata area, in August 2005. Data was collected in regard to; distances to the water points in kilometers, time taken to and from the water points, method of supply-whether the water is sold or free, and where the commodity is bought, the cost per 20 liter jerrican or whatever other means used to measure, and so on. The results of survey is summarized as follows:

There are formidable challenges in accessing the commodity particularly in terms of distances covered to and from the water points, and time spent waiting at those water points. The distances to the water points vary between 4 km and 8 km two-way. The average time taken to get water is 1.5 hours to 7

hours. The longer duration is spent waiting in the cue to fetch the water, although the length of waiting time depends on the number of people at the water points. Some people prefer to pay someone to forfeit their jerrican of water at Frw 100 other than wait for long hours.

The water sources are managed and controlled communally, thus no fees is levied on users. However, some wells have management committees constituted by the community to manage and maintain the resource on its behalf. In such organized groups, the community contributes nominal fees for maintaining the wells and paying some allowance to the committee members.

One big constraint is the quality of the water especially during the dry season. Some swamps have dirty water throughout the year while others get dirty during the dry season. The volume of water in the fountains also gets low during the dry periods meaning that fetchers spend more time at the water point. Thus, the available water is often unsafe for use without treatment or boiling.

About 29.1 % of the women reported that their children have had diarrhea within the last one-month prior to the survey. Actions taken by mothers to address the problem ranged from "no-action" reported by 11.0 % of the women, 2 % gave home made fluids, 48 % gave a pill or syrup, 5% were injected and another 10% were given intravenous fluids. 37 % of the respondents reported giving home herbal remedies.

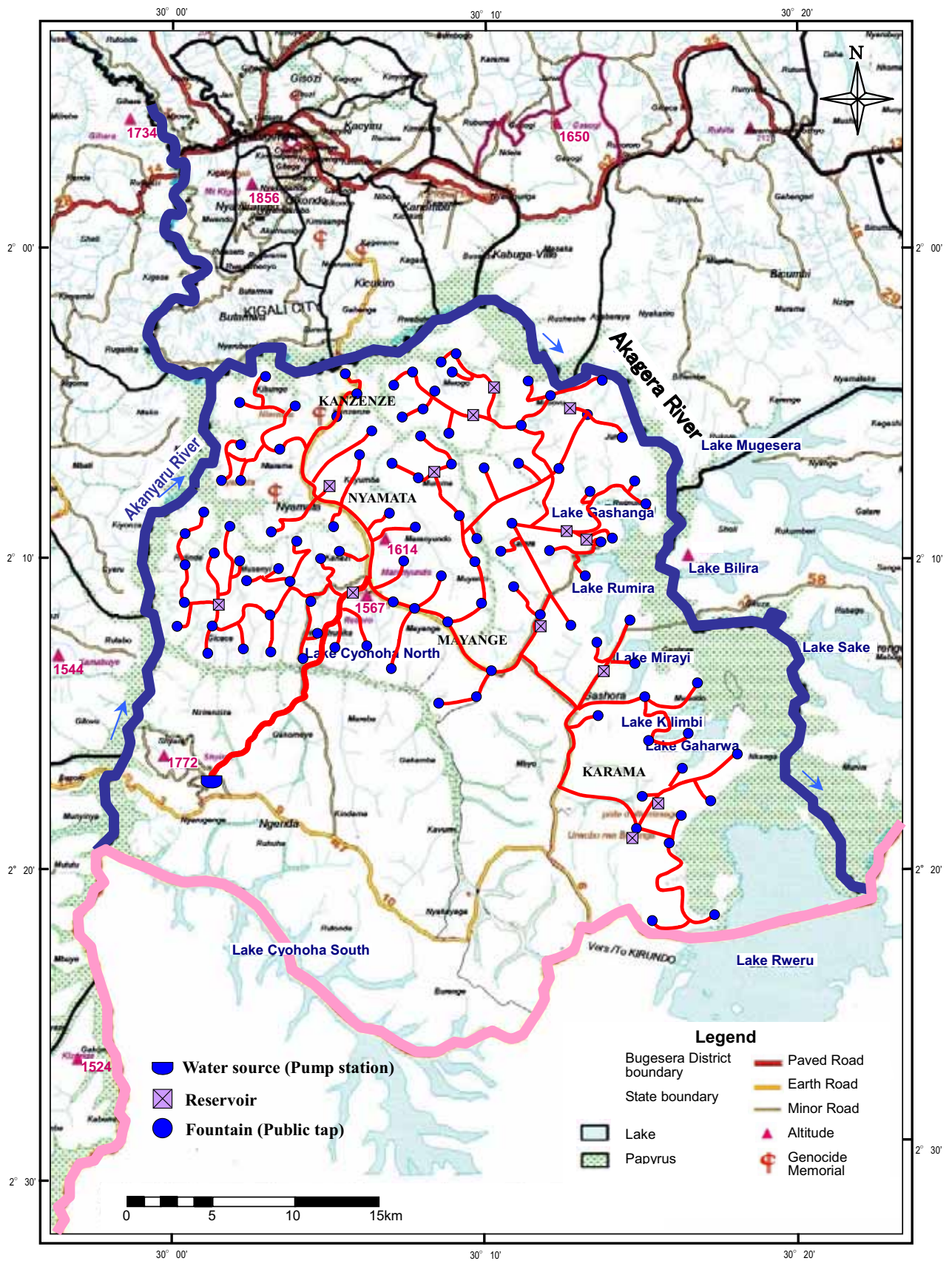
The Price of Safe Water

As an example, in the area of former Ngenda district, the Rwandan and Germany cooperation framework, a project of canalization of water and electrification started in 1996. This project has installed a water treatment plant at the Lake of Cyohoha South and from there many fountains have been installed in many areas. The distance for drawing water is inferior to one kilometer.

However, the drinking water is not accessible for almost of population because the price of one jerry can still exceed its financial ability. It varies between 15 and 20 francs. For this reason, the purchasing power of the peasant does not allow him to use drinking water even if it is available next to him/her. In this way, due to the lack of financial means, the great part of the population still uses water from marshes and lakes.

In addition to the high cost, the ignorance of the population handicaps the use of drinking water. The majority of the population does not understand the importance of the use of drinking water. Even if they have money, some people prefer to use water from marsh instead of using drinking water. Also, the long distances to go to draw water constitute another handicap to be considered.

Source: Surveyed by JICA Study Team



3.2.5 Education and Health Conditions

(1) Education

According to the field survey conducted by the Study Team, there are 43 primary and 11 secondary schools in Bugesera District. Comparing among the Sectors, there are the most schools in Nyamata, 5 secondary/high schools and 10 primary schools, but there are only 2 primary schools in Mwogo and Nyarugenge Sectors. In general, there exist more schools in the capital town of former three districts (Nyamata in Nyamta District, Gashora in Gashora District and Ruhuha in Ngenda District). There was one vocational center in Ruhuha, but it is not functional any more because initial support from an NGO finished and tuition collected from students was not enough to continue its operation.

School lunch is provided to pupils in primary schools, and even breakfast is given in some schools. Basically, free school meals are supported by the World Food Program.

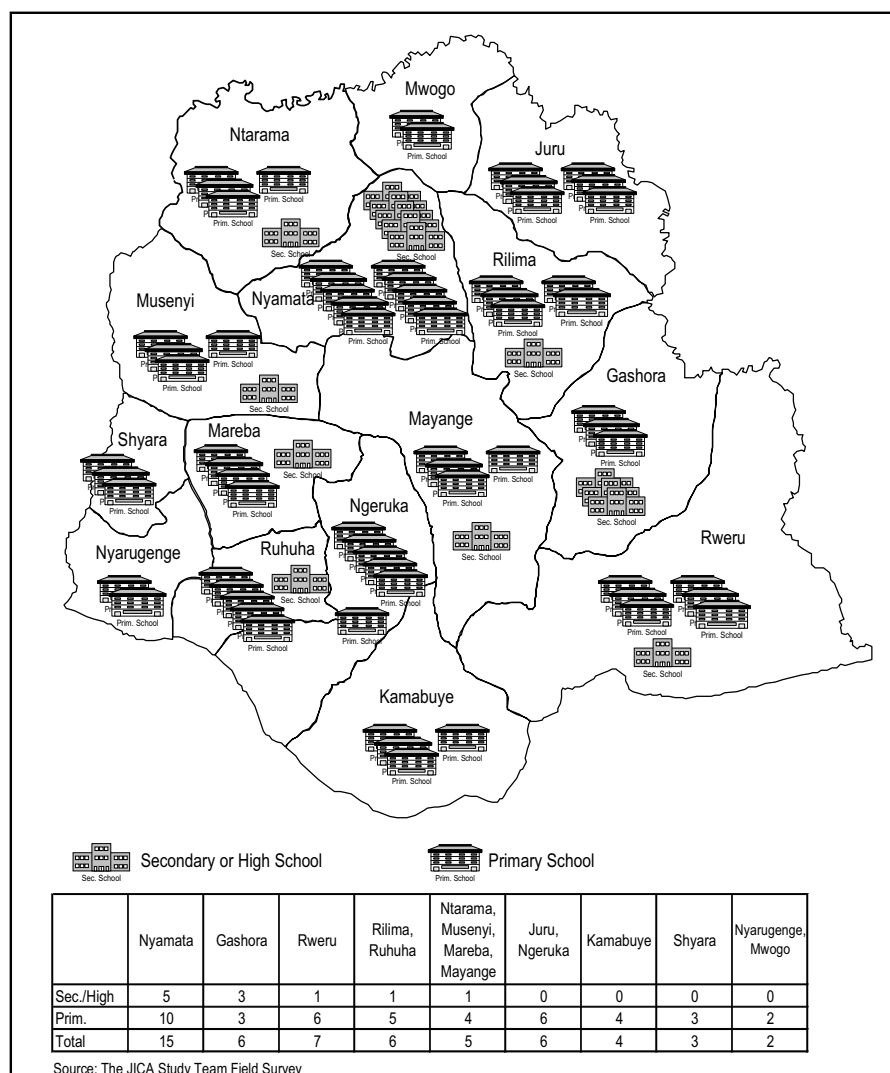


Figure 3.2.9 Distribution of Schools in Bugesera District

According to the baseline survey conducted by World Vision in 2005, there were 21 schools in the former Nyamata District jurisdiction with 19,110 pupils (male: 46%, female: 54%). The number of pupils who proceed to secondary schools were very limited, less than 2 %. There were a total of 272 teachers who were basically all trained. The average number of pupils per one teacher varied very much from 23 in Nyamata High School to 105 in Kanazi Primary School.

Table 3.2.12 Some School Data in the Former Nyamata District

Name of school	Enrollment			No. of those proceeding to secondary school			No. of trained teaching staff	No. of pupils per teacher
	M	F	Total	M	F	Total		
Cyugaro	280	283	563	5	3	8	9	62.6
Gicaca	508	576	1,084	14	14	28	17	63.8
Giktagata	352	350	702	7	7	14	7	100.3
Gitwe	160	169	329	3	2	5	6	54.8
Kagasa	739	867	1,606	20	17	37	18	89.2
Kagerero	387	523	910	8	8	16	11	82.7
Kanazi	355	381	736	2	1	3	7	105.1
Karambi	124	156	280	2	1	3	6	46.7
Kibungo	419	544	963	10	9	19	14	68.8
Kigusa	370	467	837				13	64.4
Maranyundo	363	391	754	5	3	8	14	53.9
Mayange A	851	1,018	1,869	16	16	32	24	77.9
Mayange B	253	261	514				7	73.4
Murama	392	587	979	6	6	12	11	89.0
Musenyi	653	739	1,392	13	10	23	19	73.3
Muyenzi	692	814	1,506	8	7	15	20	75.3
Nyagihunika	385	344	729	5	4	9	11	66.3
Nyamata	766	885	1,651	23	20	43	29	56.9
Nyiralukobwa	232	371	603	2	1	3	8	75.4
Rulindo	409	535	944	4	4	8	14	67.4
Nyamata High	79	80	159	2	2	4	7	22.7
Total	8,769	10,341	19,110	155	135	290	272	70.3

Source: "BASELINE SURVEY REPORT FOR NYAMATA AREA DEVELOPMENT PROGRAM CONDUCTED IN JULY- AUGUST 2005", World Vision

Based on the development plan of the former Nyamata district, the average rate of primary school attendance was 67.1% in the educational year 2002/2003. On the other hand, the mean drop-out rate was 11.1%. On the whole, primary education faces several serious problems as followings:

- ♦ Insufficient classrooms: It is noted that increase in number of school-aged children has not been followed by consequent increase in number of classrooms and this led to overpopulated condition in some classes. (Typical examples exist in Mayange and Mwogo where pupils attend classes under tree shade and, in Rulindo, school buildings are too old.)
- ♦ Shortage of teaching material: desks, books and writing utensils etc.
- ♦ Far schools: Pupils have to walk to schools long distance in some places. (This problem exists in Marunyundo, Mwogo, Kanazi, Musenyi and Kibungo.)

- ♦ The parents have serious difficulty to pay schooling material costs for their children (chalk, stone plates, notebooks, textbooks, etc.).

Table 3.2.13 Attendance and Drop-out Rate in the Former Nyamata District

Grade	1st	2nd	3rd	4th	5th	6th	Average
Attendance rate	69.6	77.0	75.4	62.3	71.3	47.3	67.1
Drop-out rate	11.0	10.1	14.0	12.1	11.3	7.9	11.1

Source: "Plan de Développement du District de Nyamata (Plan Trienal 2004-2006)", Décembre 2003, District de Nyamata

Although it was surveyed four years ago (August 2002), national census (RGPH) results include various important data in terms of education. In Bugesera District, about 93 % of people have only primary level of education. In Mwogo, the rate is the highest (97.4 %), but the figures are almost near except for two Sectors: Mayange (82.5 %) and Nyamata (84.7 %). In these two Sectors, those who have secondary level of education account for 12 % as compared to low figures (1.8 – 5.9 %) in other Sectors. As for the higher education level, it is observed the similar situation that higher rates can be seen in Mayange (1.8 %) and Nyamata (0.9 %) while other Sectors range from 0 to 0.4 %.

On average, 57.4 % of the people over 15 years of age can both read and write in Bugesera District, but there are big differences among Sectors; namely from 46.5 % in Nyarugenge and to 71.7 % in Nyamata. The District average is the same as the national literacy data for rural area (55.8 %) surveyed in 2003 (QUIBB - 2003)¹. There are some 5 % of people who can read only in all the Sectors. Hence, the illiteracy rates (those who can neither read nor write) of Sectors range 25.0 % in Nyamata to 46.5 % in Nyarugenge. Females are commonly more illiterate than males.

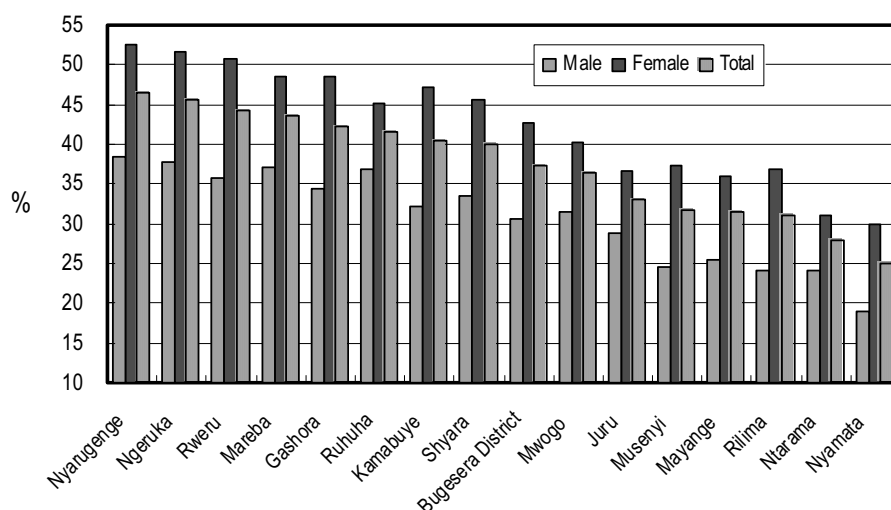


Figure 3.2.10 Illiteracy Rate by Sex and Sector

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

¹ ENQUETE SUR LES INDICATEURS DE BASE DU BIEN-ETRE (QUIBB-2003), RAPPORT D'ANALYSE DES RESULTATS, MINECOFIN, Mars 2004

In the former Nyamata District, adult education was functioning according to the “Plan de Développement du District de Nyamata (Plan Trienal 2004-2006)”. There were 150 literacy schools with 150 teachers who had been trained for teaching in these schools. Women and men over 45 years old can learn to read and write.

It can be estimated that people between 10 and 17 years old occupy 22 % of the District total population. All of them are supposed to be literate if they go to school earnestly, but some 18 – 48 % of them are illiterate. It seems that some Sectors located in the southern part of District such as Rweru, Nyarugenge and Shyara have higher illiteracy rates than the Sectors located in the northern part. In addition, the tendency of differences among the Sectors seems to be similar to the adult illiteracy rate, hence, the literacy/illiteracy of parents may relate to their children’s literacy.

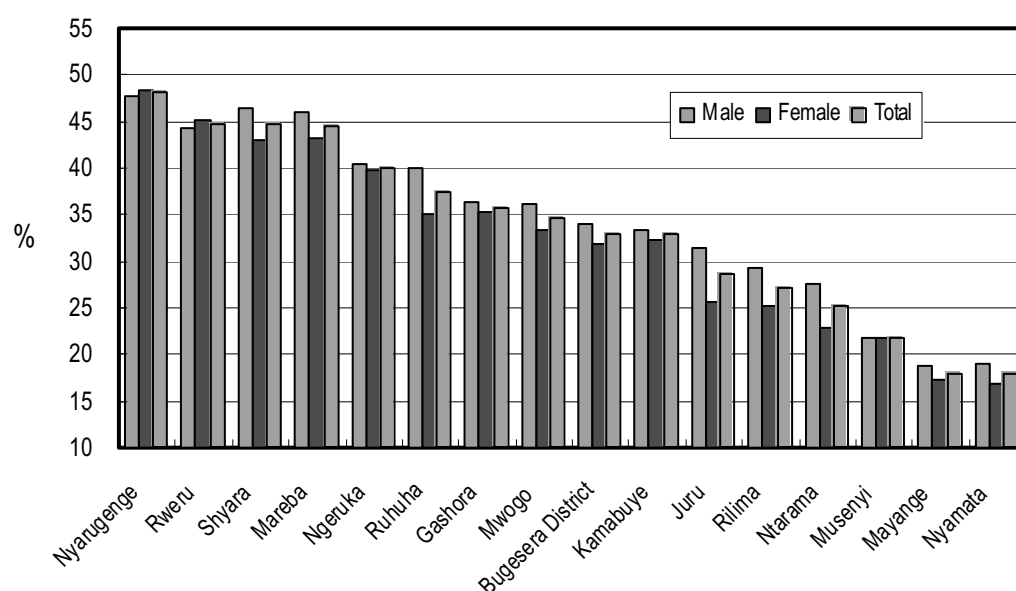


Figure 3.2.11 Illiteracy Rate of Pupils (10-17 years old) by Sex and Sector

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

(2) Health

The health level, especially in the field of infant disease control, reproductive health, malnutrition, access to medical care and malaria, is still low in Bugesera District. There is almost no system of solid waste management or waste water treatment in the District. Many residents use river/wetlands water for domestic water including drinking without treatment. This is the cause of many water borne diseases. The inadequate disposal of wastewater becomes the favorable sites for the breeding of

mosquitoes and other vectors of human and animal diseases.

The numbers of health facilities, such as hospital, rural clinic, and health center, in Bugesera District are shown in the table in Figure 3.2.12. The Sector which established hospital is only two, such as Nyamata and Rilima, out of fifteen Sectors. The Sectors, which have more than two health facilities, are only four Sectors. There are two Sectors which have no health facility, such as Ntarama and Nyarugenge.

The condition of health facility is poor from the point of view of not only quantity but also quality. Most of health facilities have some problems, such as lack of doctors/ nurses/ staff, equipments, medicine, and budgets. The improvement of health system is required in Bugesera District.

Regarding to more details, they are described in Chapter 3.2.4, (3) Energy and Water Supply.

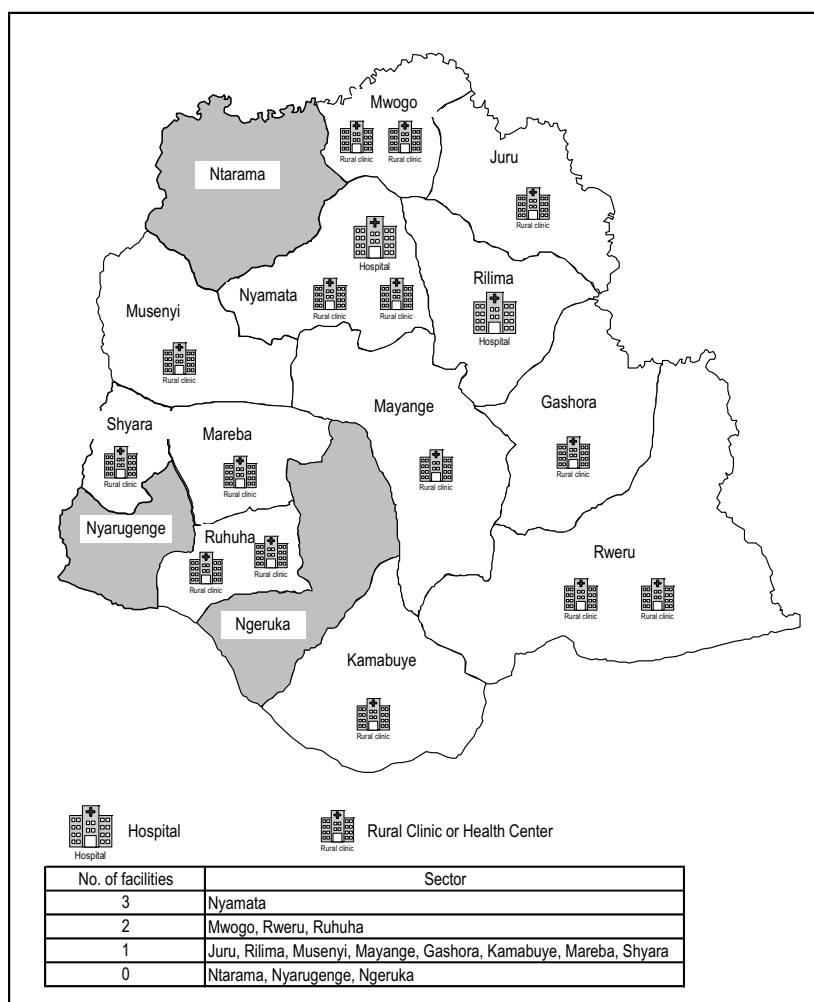


Figure 3.2.12 Distribution of Hospital / Rural Clinic / Health Center in Bugesera District

3.2.6 Rural Society

(1) Living conditions

According to the national census conducted in 2002, people generally live in ordinary houses while a few people (3.4 % of District population) in some Sectors live in collective houses. In Rilima, statistically, 26.6 % of Sector population live in collective houses probably due to the existence of a prison. In Musenyi and Mayange, about 5 % of Sector population live in collective houses. In other two Sectors, Nyamata and Ruhuha, less than 1 % of population live in collective houses, but there are no other Sectors where people live in collective houses.

As for type of housing, more than half of the households live in isolated houses as a whole. In some Sectors such as Ntarama and Gashora, about 40 % of households live in Umudugudu². In Rilima, nearly a half of households live in former grouped residences.

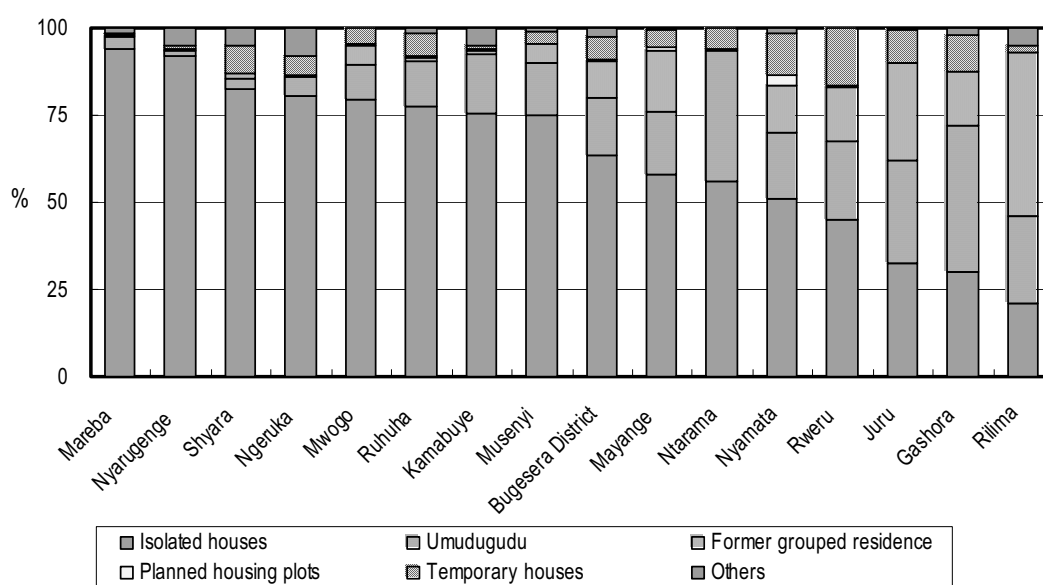


Figure 3.2.13 Distribution of Households by Type of Housing

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

For roof material, zinc is the most popular in Bugesera since it accounts two thirds of total households. In Juru, Rilima and Ntarama, it represents more than 85 % of households. It is normally assumed that

² Umudugudu is the plural form of 'imidugudu'. The Rwandan Government launched its new human settlement policy in December 1996. This new policy, called 'imidugudu', called for houses to be constructed in settlement sites as opposed to being dispersed on hillsides in the way Rwandans have traditionally lived. The point of departure for this policy was the Arusha Accords of 1993, which stipulated that returnees to Rwanda who had been in exile for more than 10 years would be settled in grouped villages. (Source: BROOKINGS INITIATIVE IN RWANDA: LAND AND HUMAN SETTLEMENTS, November 2001, Ministry for Lands, Human Resettlement & Environmental Protection)

people who live in grass roof houses are relatively poor. In Bugesera, one fourth of people live in the grass roof houses on average. However, in the following five Sectors, Rweru, Ruhuha, Ngeruka, Gashora and Kamabuye, more than one third of families live in grass roof houses, and these Sectors are mainly located in southern part of Bugesera.

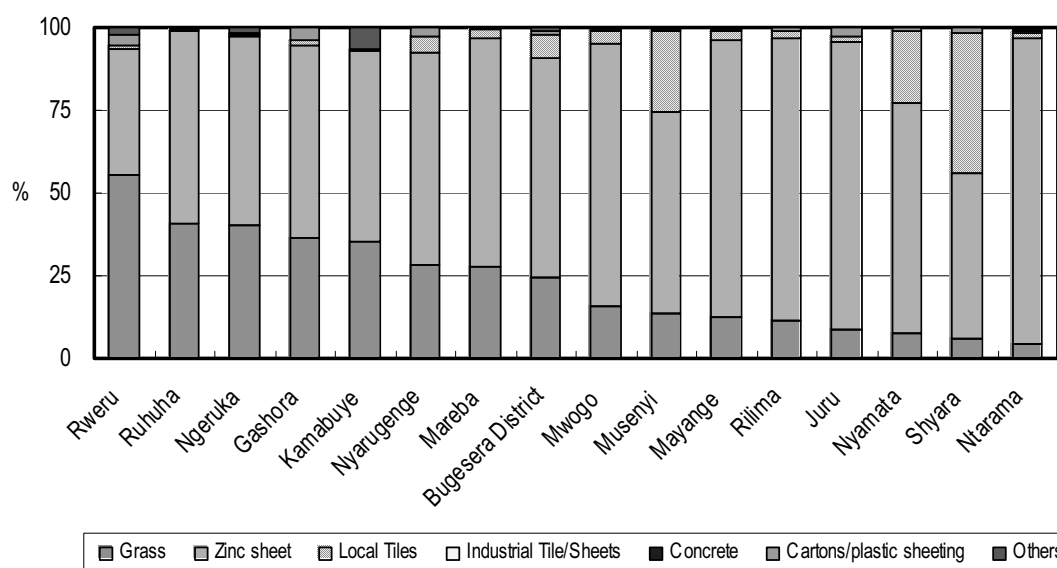


Figure 3.2.14 Distribution of Households by Type of Roof Material

Source: Recalculated data from Monographie du Ditric de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Nyamata, Edition 2005, Province de Kigali-Ngali

In Bugesera, people normally use lump for lighting since it occupies 80 % of households. Electricity is available only in limited areas such as a center of Nyamata (0.6 % of households). As for the main source of energy for cooking, firewood is predominantly used, counting 95.4 % of District households. In Nyamata where many shops and offices are there, 11.5 % of households use charcoal while firewood users still occupy 84 %. In every Sector, more than 90 % of people use tree materials, either firewood or charcoal.

Either private or public latrine is widely equipped in households and it accounts for 94 % of households in Bugesera. In the four Sectors, namely Juru, Mwogo, Ngeruka and Ruhuha, private latrine is installed in more than 90 % of houses.

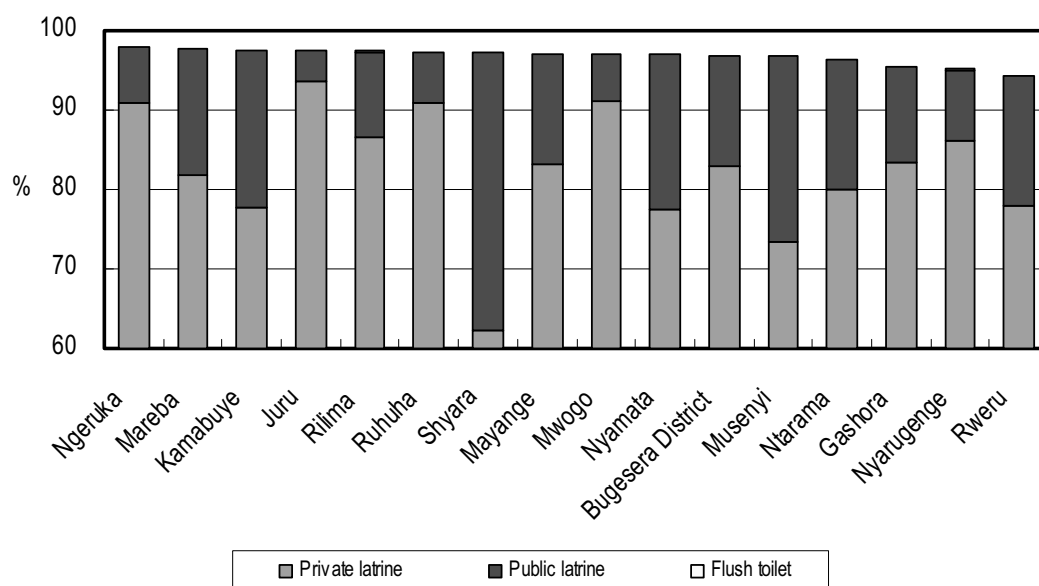


Figure 3.2.15 Distribution of Households with Latrines

Source: Recalculated data from Monographie du Ditrict de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditrict de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditrict de Nyamata, Edition 2005, Province de Kigali-Ngali

Information and communication equipments are still limited. Those households who own TV and/or radio are less than a half of the District households. In the four Sectors, Ntarama, Nyamata, Mayange and Rilima, more than half of households own TV and/or radio set. In the southern Sectors such as Nyarugenge, Rweru and Ngeruka, those who own TV and/or radio set represent less than 40 %.

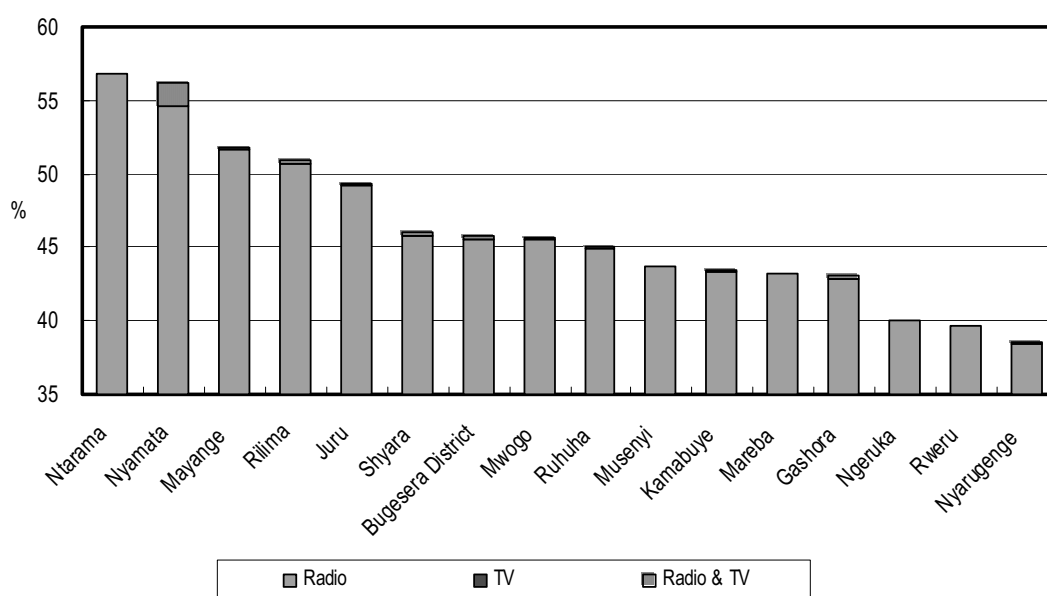


Figure 3.2.16 Distribution of Households with TV and/or Radio Set

Source: Recalculated data from Monographie du Ditric de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Nyamata, Edition 2005, Province de Kigali-Ngali

(2) Communal Activities

In rural areas in Rwanda, it is general that well-organized information dissemination system exists at a Cell and/or community level. Followings are the summary of interview survey conducted in three Cells in Ntarama Sector, namely Cyugaro, Kanzenze and Kibungo, where quick projects (QP) would be implemented in the course of the Study. Information is normally disseminated through either Nyumbakumi³ or Umudugudu systems.

Table 3.2.14 Decision Making System in three Cells in Ntarama

Cell	CYUGARO	KANZENZE	KIBUNGO
Information dissemination system	The people receive the information through the Nyumbakumi system. There are 33 Nyumbakumi at present. In June 2006, they will have election for the Umudugudu system (a unit of 100-150 households).	The information is disseminated through Umudugudu system (8 Umudugudu comprising 100-150 households as compared to 50 Nyumbakumi in the past).	The information is disseminated through Umudugudu system (7 Umudugudu comprising 70-150 households as compared to 48 Nyumbakumi in the past), which was organized in the end of May. Churches and school kids are also utilized.
Decision making system	Firstly, executive committee of the Cell (Cell council meeting), composed of 10 elected members, discusses the issues. Secondly, general assembly is held to discuss the results of the committee meeting and the final decision is made there. Average attendant rate is about 50%. This year, they had 4 general meetings.	For the final decision making, general assembly is held. If the issues are related to large number of population, Cell council meeting is held before the general assembly. Average attendant rate is about 60%. Basically once a month general assembly is held. One term of council member is 5 years. Executive secretary is appointed by MINALOC.	In the meeting with local people in general assembly, everyone has a chance to speak out and many kinds of ideas are there. After the assembly, council member meeting (12 members) makes the final decision in accordance with the discussion of the assembly.
Umudugudu	There are 6 sites of Umudugudu. People are mixture of returnees and former residents. The former residents use the land which they cultivated previously.	There are 8 sites of Umudugudu with 930 households. People are mixture of returnees and former residents. Recent returnees don't have land and	There are 7 sites of Umudugudu (size: 138 households, 72, 136, 148, 93 and two around 100). People are mixture of exiles in 1954, before 1994 and after 1994.

³ 'Nyumbakumi' is an informal organ at the very grass root level, not a legal entity. As the Swahili name means, it comprises ten houses. It is initially established by the community for security purposes. Shortly after the genocide, there was much concern about security and each ten households had to organize themselves and control their security. The newcomer among those ten households has to report to the head of those ten households. This informal organ is realized to be helpful for cell and sector authorities in mobilizing the cell population for useful community activities such as Umuganda, elections and other administrative matters. For example, for passport application, he/she have to seek Nyumbakumi authorisation.

Cell	CYUGARO	KANZENZE	KIBUNGO
	New comers are allocated 2 ha of land from the government, hence, there are no problems between them.	they have to rent land from others. In Umutugudu area, security is much easily maintained, erosion control is much easier and living conditions are better compared to conventional scattered houses. However, farming is not easy because transportation of farm produce and manure is difficult.	Among them, there are no problems. In principle, the exiles after 1994 can claim their properties which they had in the past, while the exiles in 1954 cannot them.

There are also various kinds of communal activities in rural areas such as Umuganda, Umusanzu, Kugurizanya and Ubudehe. Among them, Ubudehe, which originally means collective/community action, now becomes the title of program supported by EU: the Ubudehe program⁴. Followings are typical examples observed in Ntarama Sector.

Table 3.2.15 Community Activities in three Cells in Ntarama

Cell	CYUGARO	KANZENZE	KIBUNGO
Umuganda	It is a monthly communal work (last Saturday of the month). Executive committee of the Cell takes initiatives to implement Umuganda. For example, they did erosion control works, small path repairing and tree nursery preparation, recently. (The nursery is near swamp and managed by the Cell.) The information is disseminated through the Nyumbakumi system.	There are 2 types of Umuganda. Monthly Umuganda: Participants discuss and decide on the Umuganda day for the next month activity. In May, they cut bushes to clear the roads. Weekly Umuganda: Chief of Umutugudu decides the activity together with local people. Recently, they constructed drainage at field to conserve soils. Emergency Umuganda: It is initiated by Cell Council if it is necessary. (e.g. Erosion site rehabilitation)	Cell coordinator decides what kind of activities is done. In May, all the people in Kibungo Cell prepared tree nursery for the monthly Umuganda. For weekly Umuganda done on Tuesday, road repairing and cleaning Cell office are often done. Next week, they will do on-field drainage making. Someone who doesn't participate the Umuganda, will be fined Rwf 500 per person. However, if the cause of absence is reasonable, it is not applied.
Umusanzu	This is a kind of contribution for public benefits. Both financial donation and labor provision are possible in various occasions such as wedding reception and the repair of the Sector Office.	This is a small amount of fund raising for mutual help. Collected money will be used for disease cases, latrine construction and so forth. No money will be paid back.	People donate small amount of money for public benefits such as repairing office facilities and schools. This year, they raised money but not yet decided how to use it because of local administrative restructuring.

⁴ With support of EU, MINECOFIN developed and pilot tested an approach for poverty alleviation through Ubudehe. Following successful implementation in Butare province, the Rwandan Government has now adopted it as a national scheme. (Source: Project for Support to Operationalisation of the Strategic Plan for Agricultural Transformation, Appraisal Report, Working Paper 3, Institutional Support to Agricultural Sector, IFAD, July 2005)

Cell	CYUGARO	KANZENZE	KIBUNGO
Kugurizanya	This is a kind of mutual loan system, hence, repayment is necessary.	This is a kind of mutual loan system among the participants without interests.	This is a kind of mutual loan system by 7-10 people. Beneficiary rotates among them.
Ubudehe	A poverty reduction scheme with a collective work at Cell level. The fund comes from the EU project through District and MINALOC. An ad hoc committee at Cell level controls the fund distributed in the Cell within the project framework. For instance, a group of people (70 members) buys food crops at harvesting season to store and then sells them during off-season to earn money. The Cell committee basically supervises these activities.	This is a kind of community work to create something good for better development of the Cell. As for the goat provision they did recently with Ubdehe fund, goats are distributed to each household and then either the new born goat or the equivalent money of one goat price would be returned later for the continuation of the activity. The fund is controlled by the Cell in a bank account and there have been no problems so far.	The system was made by the government 2 years ago. For instance, they had a goat distribution project with Ubdehe fund. Recipient farmers needed to return the new-born goat or repay the equivalent amount of goat after getting money to continue the activity.

(3) Association Activities

There are many associations at a community level. They cover various activities including the genocide victim support, productive activities, mutual help, etc. One of the common characteristics among these associations is that many offer a kind of health insurance to member families on credit basis. In short, members pay fixed regular membership fee and can borrow money for medical treatment from their association when someone in their families gets sick. Even though the main objective of the association is not related to health issues such as farming, there are many cases that associations provide this credit support for emergency medical expenses.

As for the genocide victim support, the activities cover assistance of women headed households and orphans, promotion of reconciliation, assistance for judgment processes, etc. For the productive activities, support for farming (seeds distribution, expansion of new technology, etc.), bicycle taxi and handicraft making are examples. Transportation of sick people is a typical case of mutual help association.

Some of the associations receive financial assistance from local and/or international NGOs, mainly located in Nyamata Town, but many of them are independent and self-supporting. The outlines of some associations are shown in the following Table.

Table 3.2.16 Outlines of Some Interviewed Associations in Bugesera

Name:	BENISHYAKA (In English, courageous people group)	DUHOZANYE (don't worry)	TWITEZEIMBERE (Let's go forward)	TURENGERE ABAGENZI (assistance for people)
Place:	Nyamata, Narama and Mayange (Nationwide org.)	Ruhuha	Nyamata	Mbyo, Mayange
No. of members:	195 (Nyamata: 133, Narama: 30, Mayange: 32)	69 women (not only Ruhuha)	200 (men, women, orphans in several sectors)	25 members (both male and female)
Established in:	1995 (Nyamata)	May 2003	2001 (since 2005, more active)	2005
Executive members:	President, Vice-president, Secretary, Treasurer, 2 advisors (6 members in each office)	President, Vice president, 2 Secretaries, Treasurer (5 executive members)	President, Vice president, Secretaries, Treasurer, 4 Advisors (8 executive members)	President, Vice president, Secretary, Treasurer (4 members)
Objectives:	1. Help widows and orphans who are victims of the 1994 genocide by improving poverty situation 2. Mobilize widows and orphans to participate small works to fight poverty 3. Mobilize all the Rwandans in the reconciliation process (try to unite people together) 4. Fight against AIDS and help AIDS people	1. Poverty eradication among the members who survived the 1994 genocide 2. Bring back happiness (Due to the war in 1994, many people got suffered and traumatized.) 3. Have a plan to introduce modern cultivation (tomato, pineapple) and cow keeping.	1. Assist orphans and people living with AIDS 2. Bring back the mental health (Recover from traumatization of genocide)	1. Provision of transport labors if someone gets sick (human and bicycle ambulance).
Activities:	1. Farming (cultivation of soybean and maize, seed distribution and technical training, 4 ha of land will be given soon.) 2. Operation of 2 grain mills at its office building 3. Sponsor orphan students (tuition, school requirements such as pen, uniform, books, etc.); 2 university students, 82 secondary students, 5 technical training (tailoring and hair dressing) 4. Renting building space 5. Assisting 14 people living with AIDS (Collect money from members, Rwf 100 per 3-month) (Since March 2006, receive assistance from Scottish International Agency Fund)	1. Collect money from the members (Rwf 800/person for registration and Rwf 100/month) and help the members if they need money (e.g. repairing house and going to hospital). 2. Assist members if they have troubles 3. Help to identify the suspect who raped during the war time by giving transportation fee 4. Give assistance for the implementation of trial	1. Goat distribution to members with assistance from RWAF (NGO) and distribute babies to other members. 2. Together with RAP (NGO, Rwandans and Americans Partnership), mobilize people and train them. 3. Handicraft making (luncheon mat, milk bin, etc.) 4. Will start school of tailoring for 40 people soon. (At first, its activity was small with Rwf 5,000/month membership fee, and gradually expanded with getting assistance from RWAF and RAP and handicraft sales. Presently, no membership fee is collected.)	1. Buying crops and distribute them to members. 2. Members can repay later. (Membership fee: Rwf 5,000/week/member)
Advantages:	1. Orphans can go to school. 2. Modern farming is extended through their agronomist. 3. Members can receive training. 4. Knowledge dissemination on AIDS	1. Poverty can be eradicated. (Before some could not buy soap, but now can buy.) 2. Credit is available among members. 3. Traumatized people are cured. 4. Those who have diseases by raping can receive assistance.	1. Quick assistance (credit) is available in case of emergency. 2. Vulnerable people like people living with AIDS are encouraged. 3. Vocational training will be provided to young people. 4. School uniform can be made by themselves.	1. Can bring sick people to hospital in Nyamata and/or rural clinic in Mayange (30 minutes by bicycle).
Problems:	1. About half of members don't have houses. 2. Assistance for people living with AIDS is not enough. 3. Cannot assist all the orphans.	1. Lack of finance 2. Lack of people who assist the association 3. They have no office spaces.	1. Members live in different places, hence cannot give information immediately. 2. Don't have adequate office equipments like computers.	1. Bad road conditions 2. Lack of bicycles 3. Lack of money to buy neither crops nor a motor bike
Wemen	X	X		
Orphans	X		X	
HIV/AIDS people	X		X	
Farming	X	X		
Post harvesting	X			
Credit		X		
Reconciliation		X	X	
Handicraft			X	
Food				X
Transport				X

Table 3.2.16 Outlines of Some Interviewed Associations in Bugesera (continued)

Name:	ISHINGIRO (farmers)	TURENGERE UBUZIMA (assistance for health)	IMUYEBAHINZI (growing crops)	DUTERE IMBERE (growing fast)
Place:	Kiruhura, Gashora	Kiruhura, Gashora	Gashora	Juru
No. of members:	20 members	84 members	about 840 (united association of 28 small ones)	40 women
Established in:	1997	2002	2005	2000
Executive members:	President, Vice president, Secretary, 3 advisors, 2 securities, Treasurer (9 members)	President, Vice president, Secretary, Treasurer, 2 Advisors (6 members)	President, Vice president, Secretary, Treasurer, 2 Advisors, 2 Inspectors (8 members)	President, Vice president, Secretary, Treasurer (4 members)
Objectives:	1. Growing crops 2. Keeping cows	1. Provision of transport labors if someone gets sick. (human ambulance, it takes 1 hour to a clinic in Gashora and 3 hours to a hospital in Rilima.) 2. Provision of credit for schooling and medical expenses	1. Selling their farm produce collectively. 2. Provision of credit in case of emergencies	1. Schooling children 2. Improving poverty conditions 3. Keeping money for sick people 4. Keeping money for future use
Activities:	1. After harvesting crops (beans, maize and sorghum), grains are collectively sold. (beans sales price: Rwf 1,000/100kg, maize: Rwf 13,000/100kg, sorghum: Rwf 10,000/100kg) 2. The money is saved in their bank account in Gashora. 3. If members have troubles, credit is provided from the money saved in bank account. (interest: 5% per month) (Registration fee: Rwf 500/person, Monthly membership fee: Rwf 50/person)	1. Collection of membership fee, Rwf 50 per month.	1. Under the WFP's food for work program (cooking oil: 4 liters/month, maize: 50kg/month, beans: 25kg/month), members plow farmlands. 2. With assistance from MINIMEX (a factory of maize) such as seeds of maize and sunflower, members grow crops. 3. After harvesting, members sell them collectively. 4. The money is kept in bank and will be provided for emergencies, children schooling and training of farmers.	1. Growing crops (maize and pineapple) 2. Selling them collectively (higher prices are expected) 3. Keeping money for provision of credit (interest: 10% per month) 4. Keeping goats (Registration fee: Rwf 5,000/person, Monthly membership fee: Rwf 1,000/person but some cannot pay monthly)
Advantages:	1. Members can send their children to school. 2. Medical services can be provided if some members are sick.	1. With the collected money, children can go to school. 2. With the collected money, medical expenses can be paid. 3. With the collected money, other financial problems can be solved.	1. It is good to work together. 2. Harvesting is more safe.	1. Members can send their children to schools. 2. Members can get various ideas when they work together. 3. Can get money from new-born goat sales
Problems:	1. Lack of assistance 2. Lack of goats and cows 3. Shortage of fodder crops	1. Someone cannot repay according to the rule (take long time). 2. Rilima Hospital is very far. 3. Lack of transportation (only by foot)	1. Nothing	1. Lack of assistance (any assistance) 2. Lack of money to avoid poverty 3. Lack of maize seeds
Type of Activity				
Women				X
Orphans				
HIV/AIDS people				X
Farming			X	
Post harvesting	X			
Credit	X	X	X	X
Reconciliation				
Handicraft				
Food				
Transport		X		

Table 3.2.16 Outlines of Some Interviewed Associations in Bugesera (continued)

Name:	KAUM (youth)	COVIKABU (Coop. Vision Kamabuye Bugesera)	DUFATANYE (Let's collaborate)	URAMULI (light) Nyarugenge
Place:	Murama, Nyamata	Kamabuye	Nyeruka	Nyarugenge
No. of members:	17 members (both males and females)	20 at present (40 near future) (both male and female)	50 members (both male and female)	4,913 members (Cooperative of 81 groups)
Established in:	1984	15 Jun 2006	1995	Apr. 2006 (Coop. approved, but since 2004 been
Executive members:	President, Vice president, Secretary, Treasurer, 2 Inspectors (6 members)	President, Vice president, Secretary, Treasurer, Inspector, Advisor, Cashier (7 members)	President, Vice president, Secretary, Treasurer, Inspector, Cashier (6 members)	President, Vice president, Secretary, Treasurer, 3 Inspectors, 3 Advisors (10 members)
Objectives:	1. Alleviation of poverty 2. Schooling children 3. Keeping money for future use	1. To help the population in Kamabuye through development	1. To help each other 2. To have storage of agricultural produce against hunger	1. Multiplication of maize seeds 2. Fight against hunger 3. Income generation
Activities:	1. Keeping goats (After the 1994 genocide, less people keep them.) 2. Growing crops (sorghum, beans, cassava, maize, coffee) 3. Some of the members sell their farm produce collectively, but others sell individually (sell in Nyamata). (Membership fee: Rwf 1,500/person after selling their produce)	1. Buying crops (beans, soya bean, sorghum and maize) from farmers (inc. non-members) and store them. 2. Resale them to marchants who have business in Kamabuye. (They sell crops with Rwf 10/kg margin.) 3. Resale them to people directly at low price when hunger occurs. 4. For the purchase of grains, borrow Rwf 5 million from local authority. (Repayment: Rwf 1.2 million) 5. In near future, the cooperative want to expand its activities: (agriculture, livestock and commercial). (Membership fee: Rwf 50,000 for registration, monthly fee Rwf 6,250)	1. Work together for agricultural production. (cassava, sweet potato on association land in marshland, Chohoha North) 2. Store a part of harvest and sell them at low price in case of hunger. 3. Goat keeping and distribute new born babies among members. (Membership fee: Rwf 3,000 for registration)	1. Cultivation of maize and beans (some work together but some work individually.) 2. Try to find good market and if good buyer is found, sell the harvest together. 3. If good buyer is not found, sell the harvest individually. 4. Provision of credit to members in case of emergency (2 % interest per month) (Membership fee: Rwf 1,000 per year)
Advantages:	1. Can send their children to schools. 2. Can get credit in case of emergencies. 3. Can provide assistance to sick people. 4. Can buy cloths.	1. Development of unity against hunger Crops Purchase price Resale price Sorghum Rwf 100 / kg Rwf 110 / kg Beans Rwf 150 / kg Rwf 160 / kg Maize Rwf 150 / kg Rwf 160 / kg Soya Rwf 150 / kg Rwf 160 / kg	1. Members can survive if hunger occurs. 2. Members can earn money from their harvest (e.g. if they harvest 10 tons of beans, 6 tons are for self consumption and 4 tons are for sale. They share the sale amount among the members.) 3. Members can get credit in case of emergency.	1. Coop. can procure chemicals at low price. 2. Coop. can procure better seeds from RADA. 3. Coop. can find buyers for grains at better price. 4. Members can share the annual benefit at the end of fiscal year.
Problems:	1. Lack of assistance (e.g. chemical fertilizer) 2. 3. Shortage of rainfall	1. Because many farmers came to sell their crops, their available cash is not enough. (May use micro-finance)	1. Some of their maize field was planted with trees by the HIMO project. 2. Sometimes drought occurs.	1. Flood often occurs on marshland along Akanyaru. 2. Tax rate often changes. (large amount of tax) 3. No roads around marshland 4. No proper place/way to store harvest individually 5. Training/study tour is necessary to learn new technology.
Wemen				
Orphans				
HIV/AIDS people			X	X
Farming	X		X	X
Post harvesting		X	X	X
Credit	X		X	
Reconciliation				
Handicraft				
Food		X	X	
Transport				

Table 3.2.16 Outlines of Some Interviewed Associations in Bugesera (continued)

Name:	GIRAUBUMWE (have union)	HAGURAKA (Stand up)
Place:	Shayara	Mareba
No. of members:	420 members (Cooperative of 12 assoc./groups)	28 members (male only)
Established in:	May 2006	2002
Executive members:	President, Vice president, Secretary, Treasurer, 3 Inspectors, 3 Advisors (10 members)	President, Vice president, Secretary, Treasurer, 2 Inspectors, 2 Advisors (8 members)
Objectives:	1. Fight against poverty and hunger 2. Promote rice cultivation 3. Income generation	1. To improve lives of members 2. Develop country through tax paid
Activities:	1. Cultivation of beans, soya, peanuts and maize (Farmland is located on marshland owned by governemnt along Akanyaru River in Ruvubu and Kibumba and individually cultivated.) 2. Sell the harvest collectively 3. Buy rice from members and resale them 4. Provision of credit to members (interest for economic activities: 10 % per month, for schooling: 3 % per month) (Membership fee: After harvest, Rwf 500 per person)	1. Transport people and goods by bicycle (Bicycles are either owned or rented. Rent fee is Rwf 2,500/month.) 2. They open at AM5:00 and close at PM 6:00. 3. They have a plan to open a bicycle repair shop. 4. Provision of credit to members: For any activities, 5 % per month
Advantages:	Since the coop. is quite new, there are no tangible advantages so far.	1. Can get income. (Rwf 700-1,500 per day) 2. Can save money for future. 3. Can rent farmland to cultivate crops.
Problems:	1. Disease of crops 2. Not enough fertilizer nor chemicals 3. Not sufficient water	1. Robbery sometimes happens (once a year).
Type of Activity	Wemen	
	Orphans	
	HIV/AIDS people	
	Farming	X
	Post harvesting	X
	Credit	X
	Reconciliation	
	Handicraft	
	Food	
	Transport	X

(4) Vulnerable People

As for the marital situations (aged over 12 years old), there is a big difference between the male and female proportions of the widowed: 2.1% of male and 13.9% of female. In Ntarama, 18.5% of women are widowed, the highest among the 15 Sectors. This might be attributed to the fact that the damage caused by the 1994 genocide was very severe there. For male, Rilima records the highest proportion, 5.7%, following 2.6% in Ntarama.

Table 3.2.17 Proportions of Widowed by Sex and Sector

Sector	Gashora	Juru	Kamabuye	Mareba	Mayange	Musenyi	Mwogo	Ngeruka
Male	1.1	1.4	1.9	1.5	1.2	1.3	1.7	1.4
Female	14.9	10.5	15.5	15.4	12.4	12.8	11.5	14.6
Total	8.8	6.3	9.3	9.3	6.9	8.0	7.2	8.7
Sector	Ntarama	Nyamata	Nyarugenge	Rilima	Ruhuha	Rweru	Shyara	District
Male	2.6	1.7	1.2	5.7	1.2	1.1	1.9	2.1
Female	18.5	13.8	14.4	12.8	16.4	12.6	13.4	13.9
Total	11.2	8.3	8.7	8.2	9.9	7.5	8.3	8.4

Source: Recalculated data from Monographie du Ditric de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du Ditric de Nyamata, Edition 2005, Province de Kigali-Ngali

From the viewpoint of an orphan issue, it is more serious again in Ntarama Sector than in other Sectors. Among the children between 0 and 17 years of age, only 57.1% of them have both parents in Ntarama, while it records 76.9% in Juru and the District average rate is 70.5%. Those who lost both parents and father in Ntarama occupy 9.7% (District average: 4.8%) and 27.6% (District average: 20.2%), respectively, and the figures are both highest among the 15 Sectors.

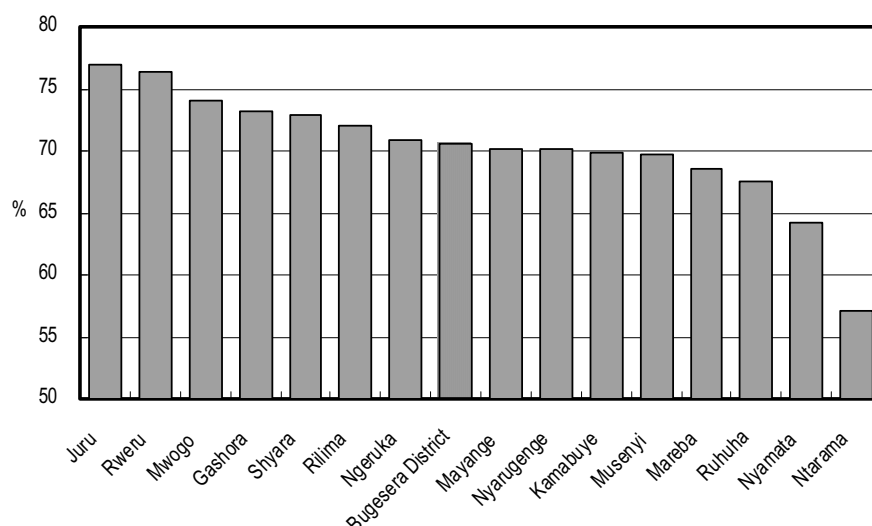


Figure 3.2.17 Proportions of Children whose Parents are Both Alive

Source: Recalculated data from Monographie du District de Gashora, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Ngenda, Edition 2005, Province de Kigali-Ngali ; Monographie du District de Nyamata, Edition 2005, Province de Kigali-Ngali

Moreover, on average one percent of households were child-headed families (6-17 years old) when the survey was conducted in 2002. There are not big differences of percentage according to locality. In the former three districts in Bugesera, the child-headed families account for 1.0 % in Nyamata, 0.9 % in Gashora, and 1.0 % in Ngenda, respectively.

3.3 Agriculture

3.3.1 Agro-ecological Zone

(1) Agro-climatic Characteristics

Bugesera District is located in the South East of Kigali City and ranges from 1,110 m to 1,772 m.a.s.l. where is the highest point in Shyara Sector, in combination with hilly terrain, lowland (*Akabande*) and flood plain (*Igishanga*) along to the Akanyaru and Akagera Rivers. Dominant vegetation like woody savanna and steppe is expanded in the Northwest to the South West. Meanwhile, the east and south area consist of two vegetations like thickly shrubby savanna covering hills and grassy savanna covering dry valley and hilly plateaus. Further, marsh vegetation, namely *Cyperus papyrus* is widely expanded along to both river-flood plains.

Rainfall is bimodal with the long rainy season from February to May, and the short rainy season from September to December. Meanwhile a rainfall pattern is characterized as an erratic, unreliable and varied with year to year, ranging from 761 mm to 1,192 mm at Ruhuha observation station in the North West area, 671 mm to 1,524mm at Nyamata, and 671 mm to 1082 mm at Karama in Gashora. Generally, it tends to more precipitation in the North West than that of the South East area such as Reweru and Kamavue where occur explicitly severe drought problem. Therefore, a food famine is frequently happened in Bugesera District; however, wetland and marshland play an important role as a buffer function to mitigate food famine problems, i.e, the five Sectors (Nyarugenge, Shyara, Musenyi, Ntarama and Mwogo) along to Akanyaru and Akagera Rivers as well as Gashora Sector where many wetlands (hill-bottom) exist are no severe food famine because of planting food crops such as sweet potato in the wetland during the drought year and appear to be less famine compared to other Sectors.

(2) Soil

Parent rock in Bugesera is dominantly expanded with granite followed by schists and mylonitic phyllite which are expanded in the Northwest area and the East side along to Akanyaru and Akagera Rivers. Soils in the remaining whole area are dominantly based on parent rock of granite. Thus, soils on hilly side are dominantly expanded with sandy loamy soils containing gravels, partially laterite soils. Meanwhile, soils on wetland and marshland are clayey with relatively fertile. Therefore, soils on hillside are fragile with low organic content and need measures of soil erosion protection.

(3) Land Use

No data on present land use is available, but prevailing land use in the Study Area is observed as the seven categories mentioned below and the farming activity on land use is closely related to flood cycle

of wetland/marshland and the bimodal rainy season. Residential area is located in hillside, and where farmland is expanded over the boundary to wetland and marshland. Moisture tolerant crops such as sorghum, cassava and sweet potato are generally cultivated in the hillside, while sensitive crops to moisture stress such as banana and vegetables are allocated in around of the hill bottom where soil moisture is relatively high compared to hillside, and irrigation practice is observed for vegetable production as well. Concerning wetland and marshland in the Study Area, both terms are generally defined as follows.

Table 3.3.1 Land Use Category

-Wetland (*Akabande* in Kinyarwanda) is defined as lowland in between hills without linkage of water system to river water flooding.

-Marshland (*Igishanga* in Kinyarwanda) is defined as lowland along to river floodplain including lowlands linked to river water

flooding system where Papyrus vegetation is predominant.

No	Land Use Category
1	Forest and bush land
2	Water body (lake, river)
3	Road and residential area
4	Farmland in hillside
5	Wetland (Akabande)
6	Marshland (Igishanga)
7	Wasteland

Source: JICA Study Team

Both wetland and marshland are not systematically utilized in large scale and a big potential of crop production remains in food security view point.

3.3.2 Farming System

The prevailing farming system in the Study Area is more or less a livestock based mixed-farming system in a family labor on small plots, using hoe and machetes. A livestock-crop linkage is interactively influenced each other in terms of manure supply to crop cultivation and feeding stuff supply to livestock. However, livestock is rarely used for animal traction purpose, and which dose not result from religious custom or traditional culture. According to interview survey on farmers, an animal traction technology is not well aware among the farmers. No actors taking initiatives of this technology transfer is observed in the Study Area. Production systems, which are overwhelmingly small holder in nature, can be characterized an intensive organic systems and involved the combination of food, fodder and tree crops. Intercropping, crop rotation and use of some soil and water conservation techniques are typically practiced. Number of crops cultivated in small holder ranges from two to ten such as sorghum, maize, banana, beans, sweet potatoes, cassava, and so on. Market oriented farming system is also practiced along to the boundary zone between hillside and marshland in Ntarama Sector, cultivated with vegetables and maize. Meanwhile, the sugarcane plantation, around of 2,000 ha involving 1,500 farm households in the sugarcane associations supervised by Kabuye Sugar Works Co., Ltd is largely established in the marshland along to Nyabarongo River, adjacent to North west boundary of Ntarama Sector. Coffee plantation (*Coffea Arabica L*) in small scale is also prevailing, mainly in Musenyi and Shyara Sectors supported by

OCIR.

Concerning prevailing farming systems in the Study Area, typical farming systems among the small holders are tentatively categorized the 10 types as below. Finalization of the farming system in the study area is expected to be made based on the output of the baseline survey by GTZ-JICA joint survey. This tentative category is not related to the six categories of poverty of households based on livestock and land ownership mentioned in the PSTA.

Table 3.3.2 Type of Farming System in Bugesera District

	Farming Type	Remark
1	Landless FH	No land, just work as casual worker
2	Self subsistence FH	No livestock kept + small farmland
3	Self subsistence FH	With small livestock + small farmland
4	Market oriented farming FH	Sugarcane in marshland + Food Crop in Hillside
5	Market oriented farming FH	Beekeeping + Food crop in hillside
6	Market oriented farming FH	Vegetable production in boundary zone between hillside and marshland + food crops in hillside
7	Market oriented farming FH	Vegetable production in the boundary zone between hillside and wetland, and rice in wetland + food crops in hillside
8	Market oriented farming FH	Fruit crops like banana/pineapple + Food crops in hillside
9	Livestock keeper	Food crops and small scale of cattle keeping including local and crossbred cows
10	Livestock keeper	Large scale of beef cattle or dairy farm

Source: Field Survey by JICA Study Team, 2006, Note: FH refers to Farm Household.

3.3.3 Land Tenure System

In Rwanda, except for lands title owned in accordance with written law, all lands belong to the Government. In rural area, the right to use land is still regulated by a combination of customary law and modern regulation. The traditional way confers the usufruct right on his/her cultivated land and allow making his/her offspring to inherit the land properties.

In Bugesera District, a land sharing system known as “*Paysannat* “ was practiced over 1960 to 1970s and the GoR conferred immigrants on usufruct right to cultivate a plot of 2 ha equally. These plots were not allowed to be subdivided and sold. Further the GoR could reserve the right to take back usufruct of the plots by compensating the usufruct holder. The land belonging to the District such as grazing land, marshland/wetland, etc could be used by the GoR without any compensation, and most of the lands in Bugesera are used under the customary law.

At present, the land holding sizes among the farmers in the Study Area vary from landless to more than 2 ha, and which resulted from out of control in the said land sharing system of “*Paysannat*”. Therefore, collection of land by some land holders with financial ability has occurred through buying and selling business under out of surveillance by the local administration, and land price is increased. Lending and renting farm land are also widely practiced in the Study Area and lease agreement is

mainly annual basis but no fixed price by land size and lease agreement period appears to be existed.

In last July, 2005, the organic law on determining the use and management of land in Rwanda has been proclaimed. In accordance with this written law, registration of land a person owns is stipulated as obligation.

3.3.4 Crop Production

(1) Cultivated Crops

Based on the reconnaissance survey and the sampling farm household survey of Bugesera District by MINGAGRI, major cultivated crops observed by the land use in the Study Area are summarized as below;

Table 3.3.3 Cultivated Crops in the Study Area

	Land Use		Cultivated Crops
1	Hillside	Crops	Sorghum, Maize, Sweet potato, Potato, Sunflower, Haricot Bean, Peanut, Peas, Cassava, Yam, Taro, Vegetables (tomato), Fodder crop (<i>Pennisetum</i> , <i>Tripsacom</i>),
		Fruits/Tree crops	Coffee, Mango, Orange, Pineapple, Banana, Guava, Lemon, Avocado
2	Marshland, Wetland		Sorghum, Maize, Sweet potato, Rice, Potato, Vegetable (tomato, cabbage, onion, eggplant, carrot, cucumber, pumpkin)

Source: JICA Study Team, 2006

As mentioned in 3.3.2, the cultivated crops in the Study Area are characterized as well diversification. Also, banana variety is differentiated in accordance with purpose of its utilization such as fresh fruit, cooking and brewing banana beer. Similarly, sorghum variety is differentiated for porridge and sorghum beer as well.

(2) Cropping Pattern

Under the bimodal rainy season and flooding cycle of wetland and marshland, the cropping pattern in Rwanda is generally categorized into the following three cropping seasons as below. The cropping season starts from September and end in July in hillside, while in marsh and wet lands a cropping season ranges from June to next March depending on flood cycle of applicable area.

Season B (long rains)								Season A (short rains)				
Plantings			Harvesting					Planting	Harvesting			
Feb	Mar	Apr	May	Jun	Jul	Aug		Sep	Oct	Nov	Dec	Jan
				Planting				Harvesting				

Source: WFP news, April 28, 2006

Figure 3.3.1 Normal Seasonal Calendar

Below figure shows the cropping pattern in the Study Area. Short matured crops like haricot bean and sweet potato are usually cultivated twice a year as double cropping in the hillside, while long matured crops like sorghum and cassava are single cropping by planting either beginning of the A or B seasons in the hillside. Meanwhile, rice is mainly cultivated in the wetland of ex-Ngenda district where includes Ruvubu, Gatare, Kiruhura, Nyaburiba, Kibaza and Rwabikwano wetlands, as double cropping system under irrigation by constructing valley dams. On the other hand, vegetables are cultivated in the marshland and its boundary zone in the hillside from July to next March until next flooding cycle. Fluctuation of water level along to the boundary from hillside to marshland varies from site to site, and practice of recession cultivation is observed in Kibungo Cell of Ntarama Sector. That is, vegetable cultivation on marshland is extended along to recession of flood water and vice versa.

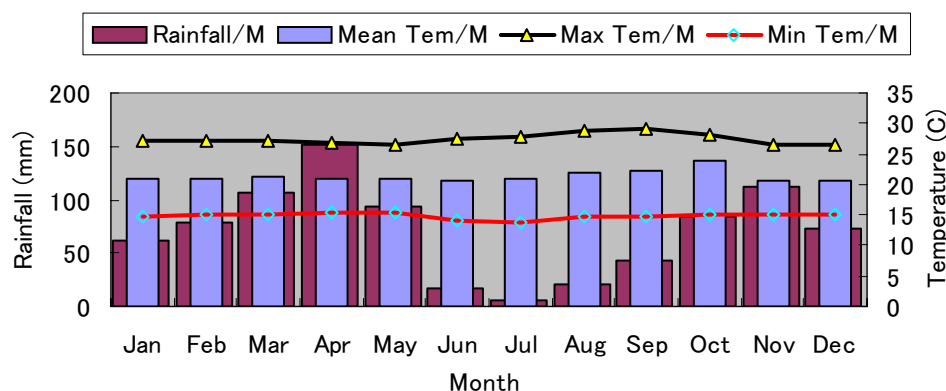


Figure 3.3.2 Monthly Precipitation, Temperature Condition in the Study Area

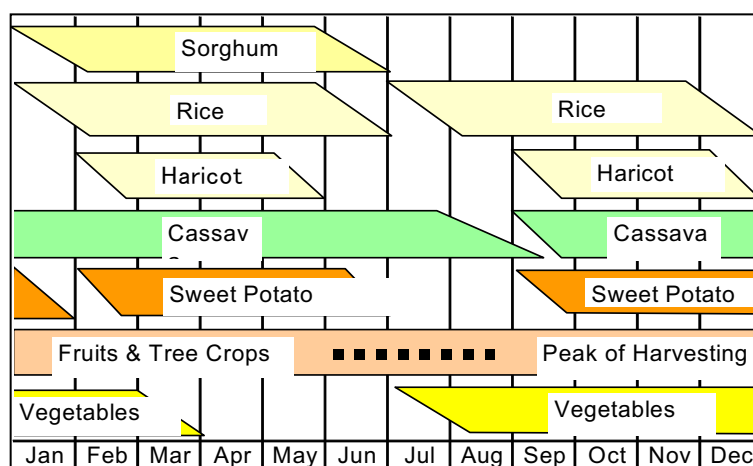


Figure 3.3.3 Cropping Pattern in the Study Area

(3) Crop Production

Statistical data on crop production in the Study Area is not available. The agricultural statistics in Rwanda is compiled in province-base by enumerating crop harvest (tons) without enumeration of cultivated area by crop. Further, Rwanda has culturally no metrology unit in terms of area and weight

in rural area which could be convertible to internationally common unit such as hectare and kilogram. On the other hand, an administrative structure in the country has just been changed since this January, and the data accumulated in the ex-three districts in the Study Area has completely been missing through restructuring process. Thus, estimation of crop production with cultivated area in the Study Area is impossible. The data on crop production shall be expected to the outcome of the baseline survey of the whole household survey on the Study Area by the GTZ – JICA joint survey, starting from this July, 2006.

3.3.5 Traditional Farming Technology

The prevailing farming practice in the Study Area is highly relied on labor intensive farming practice based on machete and hoe, that plowing, weeding, transportation of farm produce and threshing operations highly depend on almost manpower, and nothing observed in animal traction as well as motor driven farm machinery. Farm inputs on self-consumed food crops are mainly seeds, and cow dung manure when it is available, and no application of agro-chemical inputs such as fertilizer and chemicals. On the other hand, farm inputs such as agro-chemicals and chemical fertilizers are usually applied to vegetables and other cash crops like maize and rice among the group farming or farmer's association. The sequence of the farming practices prevailing in the study area is generally summarized below.

(1) Land Preparation and Plowing Operation

Land preparation and plowing operation are always practiced by machete, and hoe with labor intensive manpower (See **right Figure**). Plowing operation is usually practiced in either collective way like farmer's association group or hiring labor at wage rate of 400 Rwf per day.



Plowing by Hoe

(2) Sowing Operation

Sowing is manually done. Most of food grain and leguminous crops are either broadcasting or random drilling method, and rare case in line sowing by using line maker made of wood. In case of rice, transplanting in line is well adopted.

(3) Weeding, Fertilizer and Herbicide

Weeding practice is exclusively done by uprooting weeds by hand in combination with hoeing and no chemicals like herbicide used. Two types of chemical fertilizer are used in the Study Area, namely urea and NPK compound fertilizer (17-17-17), but which confines to mostly market-oriented vegetable and

other grain crop farming like rice and maize cultivation. Meanwhile, food crops for self-sufficiency are rarely applied with chemical fertilizers except for cow dung manure when it is available.

(4) Harvesting, Transportation, Threshing and Winnowing Operations

After harvesting grain and leguminous crops, the harvests are transported to homestead by hand or on head so as to dry them under sunlight, and then threshing is practiced. Threshing operation is usually done by beating heaps of grain heads or pods with stick, and then winnowing them with *Urutaro* or *Intara* (conventional weaved basket) under natural wind blow.

(5) Storage Method

Leguminous and cereal grains are usually kept in their farm houses either in bag or as it are. Some interviewed farmers in Ntarama Sector replied to using DDT for spraying grains by dissolving it with water for prevention from pest damage, and washing out the grains when cooking at home. However, the agro-shop in Nyamata does not sell any DDT chemicals because of banning of DDT use in Rwanda and displays only two powder type pesticides such as Malathion and Actellic 50 % EC for grain storage. Thus farmer appears to take actellic 50 % EC for DDT because of it widely used before. Apart from the above method, a traditional storage bin called “*Ikigega*” which is made of woven wood and bamboo with cow dung is not observed in the Study Area. This is inferred that the production in the most of household level do not require big storage because of small harvest due to small arable land size. Meanwhile, tuber crops like sweet potato and cassava are harvested when family needs, thus field is played as storage function.

(6) Utilization of Crop Residue and Cow Dung Manure

In accordance with the Action Plan for Bugesera District till 2006, the District has promoted a pair of soil pits excavation in farmyard for making compost and damping rubbish which are not easily decomposed, separately. Thus, organic matter such as crop residue, cutting weed are observed in the pit of Umdugudu village. On the other hand, grain stalk like maize, sorghum are fed for cattle, meanwhile sorghum stalk and napier grass are used for mulching materials for vegetable cultivation (See right Figure).



Sorghum Stalk used for mulch

Rice straws in Ruhuha Sector is widely used for mulching materials of tomato cultivation during the C season by shallow well irrigation. Cow dung manure is usually applied to banana, bean and vegetable field when it is available. Aquatic weed, *Papyrus* is used as compost materials for vegetable

production in some boundary zone between hillside and marshland in Kanzenze Cell in Ntarama Sector.

(7) Crop Rotation and Mixed Cropping

Crop rotation is generally observed in hillside in a sequence of bean and grain crops like sorghum. Mixed cropping is widely prevailing in hillside in various combinations, i.e. a. beans and sorghum, b. cassava and sweet potato, c. cassava and banana with beans, d. coffee, napiergrass and beans, e. maize, bean and grevillea (tree spp.) or f. maize, cassava and bean, g. banana and taro, and so on. In wetland or marshland, monoculture is dominantly common practice. Most of the farmers interviewed gave the reason why they practice a mixed farming was just following to their parent way and no logical theory was given. Mixing crops with tree species like *Grevillia* and *Cedrela* appear to be mainly reflection of agro-forestry in a view of environmental sustainability under promotion of planting tree seedlings to farmers through the Cell Office.

(8) Soil Conservation

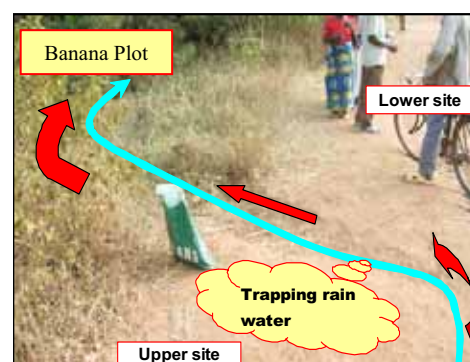
Specific soil conservation measures are not widely taken in the hillside farming, and gully erosion on feeder roads to downhill toward wetland or marshland are usually observed. Sparse planted cassava field is usually planted with other crops like sweet potato or beans, and bare land surface area is less than monoculture of cassava crop, thus soil erosion seems to be mitigated in hillside.



Large scale of soil conservation measure is not widely taken in the Study Area and most common measures observed in the hillside are field reclamation at original slope. Further, napiergrass is usually planted along to the control line to protect soil erosion purpose (See above Figure).

(9) Water Harvesting

Bugesera area is prone to drought due to erratic rain, and securing water for crop production is vital; however, water harvesting measure is not widely observed in the hillside. Only a few farmers apply this practice to banana fields to trap rain water by making ditch along to downhill feeder road(See right figure). Rainwater flows into depression made around banana planting hill, and then flow into next



banana plant hill through gravity. Farm pond on the hillside is rarely observed except for the government work or donor project including valley dam for paddy field in Ngenda Area.

(10) Agro-processing

Major agro-processing activities in the Study Area consist of the five activities. The first is milling on cereal and leguminous crops like maize, sorghum, soy bean and dried cassava at several flour mills in each Sector. Milling price on grains ranges from 10 Rwf to 30 Rwf per kg depending on type of grains and milling machine is either electric or diesel engines. Apart from the above flour mill, home-milling is also practiced at farm household level by using traditional manual tools like *Urusyo* (milestone), and *Isekuro* (mortar) and *Umuhini* (mallet) (See right Figure). The second and third are brewing banana and sorghum beers at household level. The former is very common agro-processing activity among the rural communities for income generation.



The fourth is coffee bean washing center in private basis to produce green coffee beans in Shyara Sector where coffee beans are collected from the major production area such as Musenyi and Sharya Sectors. The last one is rice milling activities handled by rice cooperatives in the ex-Ngenda district.

(11) Rice Cultivation

1) Prevailing Farming Practice of Rice

Rice is widely cultivated in the ex-Ngenda district, South-west of the Study Area. Several rice farmers and supporting NGO to rice farmers were interviewed. Common farming practice of rice cultivation and production constraints are interviewed. Perception of the interviewed farmers and supporting NGO about paddy plot size, seed rate and fertilizer dosage per unit area is differed each other. From the interview results, most common practice in the area is summarized as follow.

Table 3.3.4 Farming Practice on Rice Cultivation in Ngenda Area

	Operation	Details of Farming Practice
1	Cropping Pattern	1 st : September (transplanting) – December (Harvesting) 2 nd : January (Transplanting) - April (Harvesting) Nursery : Sowing seeds on the nursery bed one month before transplanting Plot size: Each plot size is demarcated to 5 are (1 block)
2	Nursery	-Establishment of nursery bed in the edge of paddy field by making rectangle shape Size: width = around 1.0 m Seed: Pre-germinated seed (24 hours soaked to water for pre-germination treatment) Seed rate: 5 kg of paddy for 4 blocks (measured by balance)
4	Land preparation	-Plowing is done by manpower with hoe, and then irrigation is made. -Leveling (puddling)is done by using rake Whole operation (plowing and puddling) is done by manpower with hoe and rake

		only.																							
5	Transplanting	- 3 seedlings (30 days seedlings) are transplanted in square of finger span spacing.																							
5	Fertilizer	-Chemical fertilizer (type is unknown: because FH purchased 1 kg bag without any label). -1 st : 1 kg of NPK (17-17-17) is applied to one block at transplanting time. -2 nd : 1 kg of Urea is applied at 4 weeks after transplanting.																							
6	Water management	-After transplanting, no additional water applied for a week and keep water depth around of 5 cm. -Water is applied every 2 week up to ripening stage when irrigation is ceased.																							
7	Weeding	-1 st practice: one month after transplanting -2 nd practice: two month after transplanting																							
8	Harvesting	-Cutting at bottom of rice plant by sickle and bring them to their homestead. -Sun-drying of rice bundle for 1 day in homestead after reaping. -Time to harvest is decided based on changing of panicle color into brown without green portion -5 months duration from nursery to harvest																							
9	Post harvesting	-Threshing: Beating rice heads by stick -Winnowing: done by using “ <i>Urutaro</i> ” ,a traditional plate.																							
10	Yield	-Around of 350 kg per 4 blocks. -If one block is 5 are (= 500 m2), this yield is equivalent to 1,750 kg/ha, which is very low yield level.																							
11	Harvest Sharing	-A member of the rice association has to pay a 10 % of his/her harvest either in kind or cash to the rice association, and the remaining could be managed by member in free hand. -Most of the members manage their harvest as self-consumption.																							
12	Pest& disease control	1. <i>Cyumya</i> (disease): Leaves are dried up at growth stage from one to two months after transplanting. 2. <i>Isazi</i> (Pest): Spiklet (milky stage) is sucked by insect and become empty grain. Symptom of damage seems to be caused by sting bug FH sprays Benlet (Fungicide) and Simikombe (Pesticide) by mixing them, which are purchased in the association shop. 3. Bird damage: Scaring birds by making noise via beating tin and throwing stones to bird flight during the ripening stage.																							
13	Prevailing rice varieties	Six rice cultivars are prevailing in Ngenda wetlands as follows: <table><tr><td>No</td><td>Cultivar</td><td>Popularity of rice variety by area basis</td><td>Sale price at farm gate</td></tr><tr><td>1</td><td>Shinwa (Chinese)</td><td>80 %</td><td>200 Rwf/kg</td></tr><tr><td>2</td><td>Umutara</td><td>15 %</td><td rowspan="4">180 Rwf/kg</td></tr><tr><td>3</td><td>Kigoli</td><td rowspan="3">} 5 %</td></tr><tr><td>4</td><td>Yuni</td></tr><tr><td>5</td><td>Madagascar</td></tr><tr><td>6</td><td>Markasi</td><td></td><td>150 Rwf/kg</td></tr></table> <p>Most of the rice cultivars mature around of 5 months and not different each other.</p>	No	Cultivar	Popularity of rice variety by area basis	Sale price at farm gate	1	Shinwa (Chinese)	80 %	200 Rwf/kg	2	Umutara	15 %	180 Rwf/kg	3	Kigoli	} 5 %	4	Yuni	5	Madagascar	6	Markasi		150 Rwf/kg
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3	Kigoli	} 5 %																							
4	Yuni																								
5	Madagascar																								
6	Markasi		150 Rwf/kg																						

Source: Interview results by JICA Study Team, June/2006

2) Pest and Disease

The symptom explained by agronomist in the NGO appears to be panicle blast and usually damages about 60 % of paddy plot annually. With this disease, fly also cause severe damage on rice plant

annually.

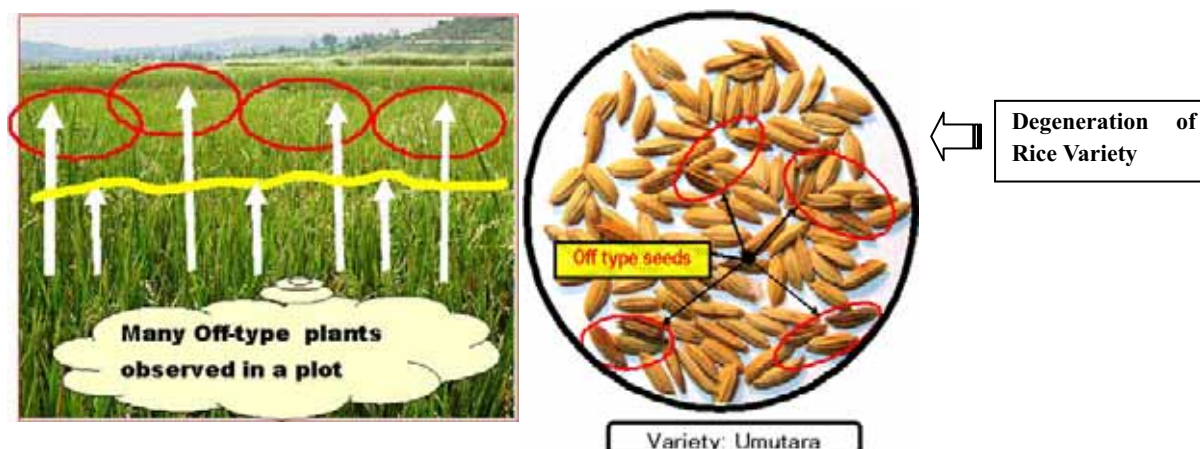
3) Production Constraints in Rice Production

The interview results to a board member of the rice cooperatives are summarized as below.

Table 3.3.5 Production Constraints of Rice Production in the Cooperatives

	Constraints	Details
1	Seed	Degeneration is ongoing and renewal of seed should be done.
2	Drying place	At present, paddy is dried by spreading on the ground directly for 4 days under sun light. Concrete drying place is necessary.
3	Rice mill	Broken rice is severely generated via milling process.
4	New rice variety	Marketable rice variety like Basmati is needed in stead of local rice variety.
5	Transportation	Paddy fields of 418 ha are scattered and difficult to collect harvest
6	Grain storage	The rice storage of the cooperatives is not enough space to accommodate the paddy harvest (at present only 30 t cap storage only)
7	Threshing	There is no threshing machine and doing it by using stick
8	Agro-chemicals	Agro-chemicals to control <i>Cyuma</i> and <i>Isaz</i> are short.

Source: Interview result to a cooperative board member by JICA Study Team, 2006



The above figures show on-going degeneration of rice variety in the farmer's field. Most of rice farmers in the Study Area uses own harvest for the next year seeds without any practice to remove off-type, thus several varieties within a plot are grown and result in degeneration of rice variety.

3.3.6 Livestock

(1) General view

The major domestic animals raised in the Study Area consist of cattle, goat, sheep, poultry, pig, rabbit, and so on. The statistical data of livestock by animal is not available and expected to acquire an output

of the baseline survey of Bugesera District at the end of September, 2006 by GTZ-JICA joint survey.

Among the livestock, cattle, local species of *Ankole*, well adapted to Bugesera climate conditions is dominant, and number of heads in Kigali Ugari including the Study Area is reported second to Umutara in the country. However, lactation of *Ankole* is extremely low level like 2 liter per day compared to *fresian* spp., 22 liter per day, and MINAGRI has promoted “One cow One family” policy to replace *Ankole* with exotic or crossbred cows in order to improve food security conditions through income generation via sale of milk, manure supply to crop production and improvement of nutrition via milk consumption. This policy is aimed at distributing modern cow to poor family who meets preconditions stipulated by MINAGRI-RARDA under zero-grazing system.

In early 2006, the President has granted 100 crossbred cows to the Study Area, specifically Musenyi, Mareba and Ruhuha Sectors. This project has involved the various stakeholders including RARDA, District-Sector-Cell level office concerned personnel, private vet-technicians, and the 100 recipients formed the farmer’s associations to make it possible. So far, four crossbred cows in the project were reported to death and two of them due to poor animal health care in Musenyi. Concerning small livestock, no commercial farm is observed so far. Meanwhile, small to medium scale of dairy farming by rearing crossbred cows or exotic cows is mainly observed in the ex-Nyamata District. Some small landholder who has prepared feedlot and cowshed for expecting to get crossbred future is observed in Ntarama Sector.

(2) Development Constraints in Livestock Sector

In development of livestock sector, most critical constraints are confined to two problems as below.

Table 3.3.6 Constraints of Livestock Development in the Study Area

No	Constraints	Details
1	Fodder crop	Shortage of fodder crops during the dry season
2	Animal Health	-Insufficient of vet-technicians -Insufficient of watering points for livestock -Shortage of animal drugs -Nature of grazing system to transmit disease easily through livestock movement

Source: Interview result to RARDA by JICA Study Team, 2006

Concerning animal health, outbreak of following animal disease are reported so far in the Study Area.

1) Tick bone disease

2) Worm disease

Parasitic worm ranging in marshland and swamp is transmitted to lever or intestines of cattle when cattle herd move around swamp or marshland.

3) Burcelosis

4) Foot and Mouth Disease in 2002

3.3.7 Inland Fishery

(1) Fisheries and aquaculture

In Bugesera District, aquaculture is slowing down and exclusively carried out in fishponds. The yield is very poor and limited for family consumption. On the other hand, there are serious damages for fishery due to environmental issue. As an example for the situation, it can be seen that fishery has no more been practiced in Lake of Chohoha North after progressive water depletion. Thus, it needs protection from ecological and scientific points of view to secure fish productivities in the future, too.

Fishing in Bugesera, anyhow, is not in good condition and the causes for its situation can be summarized as follows:

- Presently, the exploitation of the stocks of fish is harmful: the number of fishermen and net is too high and fish are captured although they are still too young,
- The dry season during the years 1997-2000 influenced negatively the stocks of fish: due to the decrease of the water level of lakes and/or fishponds, fish are caught easily or die. It seems that the surviving fish have been in a critical condition and presently there is a serious deficit in the stock of the main parents (particularly among tilapia).
- Erosion around the lakes is harmful at long term.

Fishing being an important activity that generates incomes, in order to be of high profitability the following steps are expected to be taken: (i) introduction of new species and actively increase the quantity of fish in lakes, (ii) limitation of the number of fishermen authorized to fish in lakes (=fishing rights) with limitation of the number of nets and of the size of nets used, namely, 4 cm or more, (iii) stopping periodically fishing to allow reproduction of fish in the future.

(2) Project to Support Comprehensive Development and Management of Inland Lakes (PAIGELAC),

The MINAGRI is now implementing a project which aims to strengthen fishery field in the country. The title of project is "Project to Support Comprehensive Development and Management of Inland Lakes (PAIGELAC)". This section discusses an outline of the Project.

1) Background of the project

Rwanda is among the least developed countries. The endemic poverty since two decades affects around 60 % of households living below the threshold of poverty. To reduce poverty, the Government of Rwanda has defined following a large consultation of the population, civil society, non government organizations (NGO) and donors. A poverty reduction strategy with six targets namely: (i) Rural

development and agriculture transformation; (ii) Human resource development; (iii) Development of economic infrastructures; (iv) Good governance; (v) Development of the private sector, and (vi) Strengthening institutional capacities.

Specifically in fishery and fish farming (aquaculture), the poverty reduction strategy has re-affirmed the strategic targets of the national policy of fishery and fish farming: (i) Comprehensive development of water stretches or reservoirs (reconstituting fish stocks and their sustainable management); (ii) Protection of aquatic areas, watersheds of lakes and biodiversity; (iii) Increase of national fish production and adding its value; (iv) Development of private initiative and bringing up fisheries. To implement the strategy, the Government has applied for funding to the Bank, in accordance with which, the Bank prepared, pre-assessed and assessed the Project to support comprehensive development and management of inland lakes). The project fits within the priorities of the Poverty Reduction Strategy Paper (PRSP), in Millennium Development Goals and the National Fishery and Fish farming Policy. It is also in line with the vision and strategic plan of the Bank, Africa Development Fund (ADF) IX objectives, and intervention strategy of the Bank formulated in Country Strategy Paper for 2002-2004 to intensify actions in agriculture and infrastructure sectors.

2) Objectives

The sector basis objective of the project is to contribute to the strengthening of food security. The specific objective is sustainable enhancement of income of fisheries.

3) Project specifications

The project components are: (i) Strengthen institutional capacities; (ii) Improve production and marketing; and (iii) Project management. Main achievements expected are: (i) Strengthen institutional capacity of fishing operators, NGOs, fishery administration and local collectivities; (ii) Comprehensive development of 25,000 ha of water stretches and protection of 35,000 ha of watersheds; (iii) Increase national fish production to 10,000 tons/year associated with livestock (poultry, pig) production of 1,000 tons/year, and (iv) Improve infrastructures, basic equipment and services to add value to fish production.

3.3.8 Agricultural Extension Services and Farmer's Organization

(1) Role of District Office in Agricultural Extension Service

The District Office has promoted the important agricultural policy focusing on livestock and crops in the command area as below.

Table 3.3.7 Important Agricultural Policy in Bugesera District

	Important Policy	Details
1	Livestock	<p>1. Creation of Awareness on introduction of crossbred cow: Promotion of creation awareness for introducing crossbred cow by selling Ankole Cow through sensitizing population</p> <p>2. Promotion of replacing Ankole cow with crossbred cow</p>
2	Promotion of Important Crop	<p>1. Maize: Target cultivated area in 2006 is 1,000 ha.</p> <p>2. Rice: Target cultivated area in 2006 is 700 ha (accomplished)</p> <p>3. Cassava: Dissemination of anti-mosaic virus cassava (AMVC) varieties (TM-14, and 063), and establish at least 20 ha of AMVC field in each Sector in 2006. Cuttings production on AMVC is managed by CNS under RADA allocated in Musenyi and Gashora Sectors.</p> <p>4. Coffee: 360,000 coffee seedlings are distributed to the command area via District office in this September, 2006. The seedlings are raised in the five Sectors including Musenyi, Mwogo, Shyara, Ruhuha and Nyamata.</p> <p>Background of promoting the important crops: Main reason of these 4 crops is as below.</p> <p>(1) Good cash crop to generate income compared to other traditional food crops like sorghum, sweet potato and so on.</p> <p>(2) Dissemination of AMVC is urgent issue to stop mosaic virus disease of cassava in Bugesera District</p> <p>(3) Maize and rice grains are preserved for long time.</p>

Source: Interviewed Result to Bugesera District by JICA Study Team, 2006

Promoting the above policy in the District, the agricultural staff stationed to the District Office is four consisting of agronomist, agriculture cooperatives, coffee crop and vet-technician. The latter two staff is seconded from OCIR and RARDA, respectively. Apart from the District Office, an agronomist is stationed to the Sector Offices, in charge of agriculture and usually concurrently covering of development plan, land, house, infra and environment as well.

The function imposed to the staff in the District and the Sector Offices is mainly confined to communication and reporting from the central level to local level, planning and monitoring work, and vice versa. Thus, public extension service is extremely limited. The task work of each staff concerned is summarized as follow.

Table 3.3.8 Working Conditions and Task work

	Staff	Working Situation
1	Agronomist/ District	<p>1.Task work</p> <ul style="list-style-type: none"> -Monitoring work of whole District and considering countermeasures in case of problems arisen (outbreak of pest and disease, etc) -Formulation of development plan -Formulation of agricultural project -Collection of agricultural data -Sensitization of farmers to form agricultural association -Public tender work for procurement -Reporting (quarterly, annual)

		<p>2. Weekly Schedule -Generally, three days in office work and two days in field work -Field work is mainly confined to holding a gathering of disseminating farming information, distribution of seeds, monitoring of crop growth and progress of agricultural policy implementation in the command area.</p> <p>3. Transportation mean -No special bike or vehicle allocation, thus site visiting is severely limited in his filed work to cover whole District.</p> <p>4. Assigned to District Office - April, 2006 from the ex-Ngenda district</p>
2	Vet-technician/ District (RARDA)	<p>1. Task work -Monitoring on the occurrence of disease in Bugesera -Surveillance of animal health treatment -Check of animal movement (Control post is located at the bridge of Akanyaru River in Kigali-Nyamata road) -Check of animal disease -Reporting to RARDA on any sign of animal disease outbreak</p> <p>2. Transportation mean -His special motorbike is allocated by PADEBEL (motorbike) and RARDA (fuel).</p>
3	Agricultural Cooperatives/ District	<p>1. Task work -Strengthening of marketing issue including tourism for commercialization via sensitization to the private sector - Mobilization of population to be members of cooperatives and associations -Sensitization of investor to invest Bugesera District</p> <p>2. Transportation -No special motor bike or bicycle allocated</p> <p>3. Assigned to District Office -February, 2006 from private sector</p>
4	Coffee Specialist (OCIR)	<p>1.Task work - Strengthening of coffee production in the District Details of his task work are studied in the next field survey.</p> <p>2. Transportation -OCIR lends motorcycle for his task work</p> <p>3. Assigned to District Office -June, 2006</p>
5	Agronomist/ Sector (Ntarama Sector)	<p>1.Task work -Dissemination of farming information to the 3 Cells by holding a gathering by Cell, instructed by the District Office -Wednesday is office work to receive visitors (farmers) for giving advices about cattle management, fishing, beekeeping, and improved grain storage method and so on. Other working days are used of dissemination of farming information instructed by the District Office -Environmental Conservation</p> <p>2. Transportation mean -No special motorbike or bicycle allocated, thus field work is severely restricted.</p>

Source: Interview results to Bugesera District and Ntarama Sector Offices by JICA Study Team, 2006

Needles to say, one of critical constraints for their activities is lack of transportation means for monitoring of on-going farming activities in grass root level of the whole District. Beside the said public service, many NGOs are involved in various Sectors in the Study Area (**See Chap. 3.4.4**).

(2) ISAR Karama Station

In the Study Area, ISAR agricultural research station is located at Karama in Gashora Sector, focusing on research in the agro-ecological zone of less than 1,400 m altitude. The overall research outline of Karama Station is summarized as follow.

Table 3.3.9 Outline of ISAR Karama Research Station

	Outline of Station	Details	
1	Research Facility and Staffing	1) Research Facility -Total research area : 1,000 ha -Grass land : 700 ha -Research field : 100 ha -Building : 100ha 2) No of Research staff: 20 staff	
2	Livestock Research	Cattle	a. Preservation of genetic resources of Ankole species
		Goat	a. Goat (for meat): cross breeding of F1 and F2 based on Alpine, Bore and Gara species introduced from abroad for distribution to local Farmer
		Fodder crop	a. Selection of promising fodder crops (8 crops) including gramineae and leguminous species (grass and tree species) b. Distribution of promising fodder crop seeds to local farmer c. Economic hey and silage making method
3	Crop Research	Haricot bean	Selection of drought tolerant variety within 90 days maturity
		Cassava	Selection of high yielding variety based on anti-cassava mosaic virus resistance, taste under Bugesera agro-climate conditions
		Sweet potato	a. Selection of high yielding promising variety based on the 8 introduced varieties from CIP. b. Selection is basically made through cross-breeding method
		Sorghum	Selection of early maturity variety within 90 days

Source: Interview survey to ISAR by JICA Study Team, May, 2006

Concerning research-extension linkage, ISAR Karama station plays an important role to disseminate research output by distributing improved seeds and on-farm trials such as Murama watershed development project under participatory approach in Nyamata Sector, but access to the farmers is quite limited.

(3) Seed Multiplication Farm by RADA

RADA has operated seed multiplication farms, National Seed Center (CNS) in Musenyi and Gashora Sectors as follow.

Table 3.3.10 National Seed Center in the Study Area

	Site	Farm Area	Target Crops
1	Musenyi CNS	35ha	-Cassava (Anti mosaic virus variety), 5 Rwf/cutting -Maize
2	Gashora CNS	14 ha	-Cassava (Anti mosaic virus variety)

Source: Interview survey to RADA by JICA Study Team, 2006

In 2007, about 8 million cuttings of cassava are scheduled to produce in the said NSCs for distribution.

(4) Farmer's Organization

The Rwandan farming world consists of different shapes of organizations more or less institutionalized. It is associations of traditional and customary help, of the collective work groupings, of the tontines, of the cooperatives, of the inter groupings and of the unions or federations of cooperatives. The associative movement took an important size since the years 1980s and has been stimulated more after the 1994 genocide. At present, the 40 cooperatives over the 10 types are registered in the District Office as below (See Annex II.4).

Table 3.3.11 Number of Cooperatives by Sector in Bugesera District

Sector	No of Cooperatives	Type of Cooperatives									
		Grain Storage	Rice	Loan & Saving	Food Crop	Coffee	Maize Farmer	Fishery	Basket Handicraft	Livestock	Environment Coservation
1 Mareba	3	1	1	1							
2 Shyara	5	1	1	1	1	1					
3 Nyarugenge	4	1	1	1			1				
4 Ruhuha	3	1	1	1							
5 Ngeruka	4	1	1	1			1				
6 Kamabuye	1	1									
7 Rweru	3	1			1			1			
8 Gashora	4	1						1	1		1
9 Rilima	2	1						1			
10 Juru	3	1			1			1			
11 Myange	1	1									
12 Nyamata*	2	2									
13 Ntarama	1	1									
14 Mwogo	2	1								1	
15 Musenyi	2	1			1						
Total	40	16	5	5	4	1	2	4	1	1	1

Source: Bugesera District Office, 2006

Remark: Grain storage cooperatives in Nyamata refer to District and Sector level, respectively.

In this table, it is found that the cooperatives on rice are confined to the ex-Ngenda district, and fisheries in the ex-Gashora district where many lakes exist, respectively. One of the rice cooperatives interviewed in Luhuha consists of 4,315 members with 418 ha paddy fields in 2005, and sells milled rice in the local market by operating the three rice milling machines.

Meanwhile, the grain storage cooperative allocated to each Sector is newly established this year under the GOR initiatives. The idea behind of these cooperatives is based on two reasons in terms of 1) food security view, and 2) protection of producers from middlemen's buying at an unreasonably low price. In accordance with Government regulation, farmer is imposed to store 100 kg of specific crop harvest to the said cooperatives as obligation and buy the stored grains with fixed price when they need. At present, the said cooperatives collect sorghum grains from local farmers and store in either Sector or Cell Offices as storages.

3.3.9 Marketing System

(1) Major Markets

In the Study Area, there are three primary weekly markets in Nyamata, Ruhuha and Gashora where were ex-capital of the former district, respectively. These markets handle fruit and vegetables, food grains, meat and daily necessities including clothes, bicycle repairing and so on. Apart from these weekly markets, the livestock market mainly cattle including small livestock is operated monthly at Mbyo in Myange Sector, and in other Sectors, small livestock is traded every Wednesday, Saturday in Nyamata, and Thursday in Rilima as well.

Table 3.3.12 Major Markets in the Study Area

	Major Market	Marketing Day	Commodities	Physical Distribution
1	Nyamata	Wednesday, Saturday	Vegetables & fruits, grains, meat, daily necessities, small livestock	Bugesera, Kigali, Gitarama, Kibungo area
2	Gashora	Tuesday, Friday	Vegetables & fruits, grains, meat, daily necessities	Bugesera area and Burundi
3	Gashora	Friday of first week in every month	Small livestock (Goat, sheep, chicken)	In and around of Gashora
4	Ruhuha	Tuesday, Friday	Vegetables & fruits, grains, daily necessities	Bugesera are and Burundi
5	Mbyo	Once in every Month	Cattle and small livestock (goat, sheep, chicken)	Whole Bugesera District
7	Rilima	Every Thursday	Crop, small livestock (Goat, sheep, chicken)	In and around of Rilima Sector

Source: JICA Study Team, 2006

(2) Marketing Price and Margin

The Study Team, as presented in Table 3.3.13, surveyed the farm gate price and retail price in the Nyamata Weekly Market in June. The commission charge of retailer in the Market varies with type of crops, buying unit from the producers and selling unit to the consumers, thus analysis is generally difficult. Limiting to commodities in the same unit of buying and selling from producer to consumer, it ranges 5 to 500 Rwf in fruits, 10-50 Rwf in legumes, and 5-150 Rwf in vegetables. In local administration, Nyamata weekly market is controlled by Nyamata Sector, and which imposes 120 Rwf per each market day to tenant in the market or 6,000 Rwf per year, and pays tax revenue to Bugesera District Office.

Table 3.3.13 The Results of Market Survey in Nyamata Center Weekly Market

	Crops	Variety	Retail Price		Purchased Price		From		Remark
			Unit	FRW	Unit	Frw	Sector	Cell	
Fruit Vegetables	Tomato		Heap (16 pc)	50	Basket	1500	Around of Nyamata		
	Pepper (hot)		Heap (46 g)	20	kg	150	Within Bugesera		
	Egg plant	Green	Heap (230 g)	50	Bag (25 kg)	2000	Within Nyamata area		
	Green pepper	Small	pc	20	Bag (15 kg)	2000	marshland or lowland area		
	Green pepper	Large	pc (70 -100 g)	50	pc	30	Via middlemen		
	Egg plant	Black	3pc (560 g)	50	25 kg bag	1000	via local Farmer		
Leafy Veg	Cabbage	Golden Aker	pc (500 g)	50	pc	30	Within Bugesera via Farmer		
	Cabbage	(round type leaf)	bunch	50	bunch	30	via Lowland cultivation		
	Coriander		bunch	50	bunch	30	Within Bugesera via Farmer		
Root & Tuber Crops	Sweet Potato	Magereza	Basket(2.3 kg)	350	Big bag	7000	Kibungo province via middleman		
		Magande							
	Taro	Bwayisi	Heap(7pc)	400		7000	Musenyi via middleman		
	Onion (purple shallot?)		bunch	200			Gitarama		
	Irish Potato		kg	100	kg	95	Ruhengeri Prov .,		
	Onion (purple bulb onion)		kg	500	kg	350	via Kigali Market		
	Carrot		kg	300	kg	180	Gisenyi Prov		
	Cassava		heap(6 tubers)	400	Heap	300	via local Farmer		
Fruits	Pineapple		pc	150	pc	120	Kibungo Province		
	Avocado small)		pc	20	pc	15	Middleman brought here		
	Avocado Big)		pc (380 -430 g)	50					
	Banana (small) yellow colour		Bunch	100	bunch	80	From Kibungo via Middlemen		
	Big bunch yellow colour		Bunch	130	bunch	100	From Kibungo via Middlemen		
	Orange		pc	20	pc	15	From Gitarama via Middleman		
	Lemon		3pc	100	1pc	20	From Gitarama via Middleman		
	Guava		pc	10	pc	5	Farmer around of Nyamata		
	Banana(Cooking) green bunch		bunch(15 kg	2000	bunch	1500	Within Bugesera		
Legume	Harico(grain)		kg	150	kg	140	Within Bugesera		
	Soya bean		kg	200	kg	150	Within Bugesera		
	Harico(grain)	Korota	kg	180	kg	160	within Bugesera		
Grains	Green Maize		PC	25	pc	20	around Nyamata area		
	Sorghum grain		kg (Basket)	160	kg (basket)	150	ditto		
	Maize grain		kg	160	kg	150	ditto		
Others	Maize powder	White	kg	280-300	50kg bag	13000	Uganda	From Kigali via middlemen	
	Maize power	rather brown	kg	200	50kg bag	10000			

Date : June 10, 2006 - June 15, 2006, Source: JICA Study Tea, 2006.

(3) Marketing Channels and Estimated Volume of Major Commodities

According to Health and Public Hygiene in Bugesera District, several marketing channels on food commodities are existed in Nyamata weekly market as below. As for agricultural crops, marketing channels consist of the three comprising of a. producer directly selling in the market, b. producer selling to the retailers in the market, and c. producer selling to the middlemen from other province, and the ratio of volume flow by each channel is roughly estimated at 60 %, 25 % and 15 %, respectively. However, another channel which is not by way of Nyamata weekly market is rising in Ntarama Sector where vegetables are cultivated in the marshland. The producer, either belonging to farmer's association or individuals directly carries to Kicyukiro market in Kigali by bicycle or hiring pickup

truck. The reason why these farmers directly sell to Kigali is due to less demand with lower sale price in Nyamata market. Coffee, sugarcane and maize marketing channels which involve in the private companies are also independent from the said channels.

Marketing Channel (Agricultural Crops)

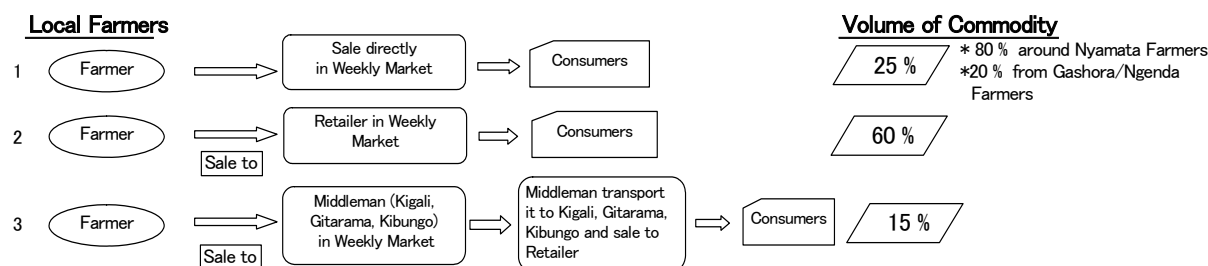


Figure 3.3.4 Marketing Channels in Nyamata Weekly Market

Food commodities such as maize and wheat flour in Nyamata Market are mostly flowed from Kigali market via importation from Uganda (maize and wheat powders) and Kenya (wheat powder). Meanwhile, cassava powder is dominantly from Gitarama area via middlemen. The quantities of inflow on major agro-commodities in Nyamata Center are estimated through inflow of the cargo trucks in a year as follow.

Table 3.3.14 Quantities of Agro-commodities inflow to Nyamata Center

	Agro-commodities	Quantities inflow tons /Year	Estimated Basis
1	Cassava power	3,120	30 tons per market day via Kigali
2	Cassava tuber	2,000	19 tons per market day via Kigali
3	Sweet potato	300	Rough estimation
4	Green Maize	120	do
5	Grain maize	14	do
6	Haricot bean	567	3 cargo trucks(3.5t/cargo) per each marketing day in a year
7	Sorghum grain	224	4 cargo trucks (3.5 t/cargo) per market day during July to October (4 months harvesting months)

Source: Interview survey to Health and Public Hygiene in Bugesera District
by JICA Study Team, June/ 2006

3.4 Development Activities

3.4.1 Rwandan Government

(1) Gashora Marshland Development Project

The Ministry of Defense (MINADEF) has reclaimed over 1,500ha of Gashora Sector, Bugesera District in the Eastern Province for the rice farming with founding from MINAGRI. A dike is currently being constructed along the Akagera River from Gashora to Tabarali about 8km. The dike that is being

constructed is raised three meter above the ground and is expected to be completed by December 2006 and to cost over 1.5 billion Rwf, which is exclusively founded by the government to help drought damages in Bugesera District (Refer to Figure 3.1.1)

(2) Provision of Silos at each District

RADA through the MINAGRI will purchase the 100 silos which has 50 metric tons in storage capacity in each from Israel. The cost is estimated at US\$1,422,400 equivalent to 793 million Rwf. The silos are expected to boost the people's production capacity and increase on the quality of commodities that are consumed on local markets and those that are exported. And also it aims that the increase in production should match with measures for safe storage commodity as well as a move to stabilize prices in bad season. Silos will be located at every District's headquarters.

(3) Provision of Crossbred Cows to Bugesera District

In line with the governmental policy of one cow-one family, MINAGRI in collaboration with ISAR has decided to provide 300 heads of crossbred cows and 100 heads of *Ankole* cows to the Bugesera District within 2006.

In order to exchange the mutual information related agencies concerned the crossbred cows, a meeting was held on 14th July 2006 hosted by Bugesera District in the presence of JICA Study Team, Luxemburg, CARITAS/PASAB, and ISAR Karama. These agencies have a plan to introduce modern cows with their own budgets in 2006. The plans of each agency are shown as below.

Table 3.4.1 Cow Distribution Plan of each Agency in Bugesera District

Agencies	Project Components	Quantity	Remark
MINAGRI/ISAR	Provision of cows	Crosbred cows 300 heads <i>Ankole</i> cows 100 heads	
JICA Study	Provision of cows	Crosbred cows 18 heads with cow sheds, Training for recipients, and M&E	By QP
CARITAS/PASAB	Provision of materials	Fodder crop seeds & cow shed materials	27 million Rwf
Luxemburg	Provision of cows	Supporting by micro finance Crosbred cows 25 heads	

(4) Expansion of Improvement of Cooking Stove by MINADEF

MINADEF has disseminated the improvement cooking stove to the Bugesera District in cooperation of the Bugesera District. Since middle of 2006 demonstration of the improved cooking stove has been conducted at each Cell by his own budget.

(5) Integrated Participatory Watershed Management Project in Murama by ISAR

The project gives boost to the government's current policy of protection, conservation of promotion of

environment in Rwanda. The project was planned and executed by the local population in Murama village 7km from Nyamata in a participatory model with ISAR as a facilitator. The project was started in middle of 2005 and completed in middle of 2006. Total cost is estimated at 82,707,500 Rwf financed by Rwanda government. The project components are shown as below.

- Farm Pond: for small scale irrigation in dry season (5 numbers, 10m x 10m, depth in 1.5m)
- Construction of Contour Band with 25m horizontal intervals.
- Check Dams at road side ditch to prevent from the soil erosion and water was introduced to farm pond.
- Demonstration Farm for Agro forestry (Moringa and Neem plantation)
- Animal Husbandry: provision of improved breed goats and its training for maintaining goats, artificial insemination, etc.

The project was just completed the middle of 2006 and lessons learned from the project will be served as a useful reference for the formulation of the Pilot Project in JICA STUDY.

(6) Rainwater Harvesting Project by MINITERE

The proposed project site, Rilima, is located about 55 km south of the capital city, Kigali. The project will be implemented under overall supervision of the Ministry of Land, Environment, Forestry, Water and Natural Resources (MINITERE) in cooperation with Bugesera District.

MINITERE has recognized the need to pilot and disseminate appropriate water harvesting (WH) techniques to supplement the indigenous practice to protect crops failure against moisture stress in moisture deficit parts of the country. The water harvesting effort has to be integrated with natural resources protection and management for better and sustainable results.

Communities in the proposed project area are vulnerable because the recurrent droughts have depleted the household assets and their ability to withstand shocks. Traditional agriculture-based livelihood systems no longer provide adequate resources for household needs in most years. The natural resources have been degraded and no longer support the growing population. The planned project attempts to address the root causes of the problem through protection of natural resources degradation and water harvesting. Based on the severity of water shortage and natural resources degradation, Rilima Sector is selected for piloting of water harvesting and natural resources protection pilot project. Implementation of the project is under preparation.

(7) Construction / Rehabilitation for School Sanitation in Bugesera

In line with the Performance Contract, Bugesera District intends to put up nursery schools, adult education centers at each Cell, and also supports education activities in primary, secondary, and

technical institutions in the District. Sanitation in schools had deteriorated, causing health threats to hundreds of school children so that the District shall spend Rwf 10 million on the building and rehabilitation of toilet facilities in fifty two primary schools during the June-August holidays in 2006.

3.4.2 Bilateral Assistance

(1) Luxemburg: Development of the Rural Economy in Bugesera

Objectives of development are to increase, to secure and to vary the agricultural production and to improve the incomes of the farmers in Bugesera. 240 ha of land will be exploited by modernized irrigation systems, the productivity of the agricultural system of 750 members of agricultural promotion groups will be increased, and the agricultural economy of the Bugesera will be integrated better in the national economy. Three main works will be pursued (see Figure 3.4.1):

- Around some lakes will be developed progressively by irrigation of pumping and aspersion.
- Beneficiaries of the peasants / their groupings will be organized / enhanced
- Two municipal markets at Nyamata and Rilima as well as two important farming roads have been constructed.

The budget of the Luxembourg contribution is of 8,541,500 EURO shown as table below.

Table 3.4.2 Budget of the Financial Contribution of the Luxemburg Grand Duchy

	Components	Total	2003	2004	2005	2006	2007
1	Human resources	2 486 000	830 800	493 800	443 800	358 800	358 800
2	Facilities & materials	730 000	80 000	280 000	180 000	190 000	0
3	Works	4 221 500	894 000	1 070 000	1 502 500	660 000	95 000
4	Formation	205 000	29 000	67 000	50 000	44 000	15 000
5	Follow-up & Assessment	205 000	45 000	15 000	60 000	15 000	70 000
6	Other contributions	694 000	70 000	211 000	131 000	131 000	151 000
	Total en EURO	8 541 500	1 948 800	2 136 800	2 367 300	1 398 800	689 800

Due to the decentralization policy and territorial reform, schedule was about 3 years delayed and the implementation has started from the beginning of 2006.

(2) Egypt: Sustainable Water Resources Management for Bugesera

Rwanda is one of the 10 Nile Basin countries and member of the free trade agreement within the COMESA. In the context of good relationship and cooperation between the Arab Republic of Egypt and Republic of Rwanda, The Government of Egypt and Republic of Rwanda agreed to send 2 Egyptian experts in irrigation to study the Bugesera area and make primary design for the irrigation system and capacity building for the Rwandese counterparts. C/P agency is MINITERE (Ministry of Lands, Environment, Forestry, Water and Mines). Main objectives are (i) Help to identify suitable design for Bugesera irrigation system, (ii) Explore ways for local communities to participate in

irrigation management, (iii) Capacity building for the Rwandese counterparts

Bugesera District requested to concentrate on 8 Sectors, which are Gashora, Rilima, Kamabuye, Mwogo, Rweru, Nyarugenge, Ngeruka, and Juru. Field survey was executed during 3 October 2005-7 July 2006 about 7 months and A pilot area was chosen south west of Bugesera right hand side Akanyaru River at 5 places with area of approximately 600ha. Pilot project sites are identified but implementation schedule including finance has not known but it should be noted to avoid duplication on the Pilot Project proposed by the JICA STUDY.

3.4.3 International Agencies

(1) AfDB: Project to Support Agriculture Development in Bugesera

The objectives are to increase agricultural production in Bugesera District through development of wetlands, protection of watersheds, agriculture development and capacity building of farmers. The project components are described as below. Total cost is estimated at 12.4 million US\$ (AfDB:10 million US\$, GoR:2.4 million US\$). The project will be 5years but the budget for detail design has not been allocated yet.

1) Physical development and economic development of natural resources

- (i) Mitigate drought effects in Bugesera District through water resources and agriculture developments for irrigation of watersheds and slopes and secure agriculture productions during dry seasons. Proposed irrigation area is about 650 ha
- (ii) Water and soil conservation through developments of slopes of these watersheds and lakes
- (iii) Facilitate the marketing of agricultural products through rehabilitation of rural trails, construction of market places and store houses. These developments pertain to the three Sectors in Bugesera District and are particularly concerned with Mwesa Valley and the lakes of Cyohoha Sud, Gashanga, Kidogo, Rumira and Mirayi

2) Agriculture Development

It aims at increasing food production through: (i) creation of irrigated area, (ii) Organisation and training of producers, (iii) dissemination of improved seeds; (iv) promotion of the techniques to step up production and water and soil conservation, and (v) extension of processing, water and soil conservation techniques.

(2) FAO: Production and Supply of Cassava Stems to Extremely Poor Households in Bugesera

The objective is to assist the GoR in fighting against food insecurity in Bugesera by supporting extremely poor households to rehabilitate their cassava plantations for better prevention, preparedness and coping with frequent drought encountered in the District. The project components are described as below.

- Evaluate the extreme rural poverty in Bugesera and define priorities for rapid intervention
- Produce 24 millions of cassava stems from varieties resisting against Cassava mosaic

Supply the mosaic virus disease resistant cassava stems to 12,000 extremely poor households in collaboration with the Catastrophy Managing Coordination of the Office of the Prime Minister, MINAGRI, Province Authorities and NGO partners of FAO. ISAR Karama will produce cassava stems.

Expected results at the end of the project are;

- Establishment of production contracts of cassava stems from varieties resisting against mosaic virus:
- Training of farmers on techniques of cassava stem multiplication
- Production of 24 millions of cassava stems without mosaic virus
- Cultivate around 2,400ha, on average 0.2 ha per household
- The 2,400 ha have the potential production of around 24,000 tons of fresh cassava (10 tons/ha).

Activities to be carried out are the following;

- Collect and analyse the existing documentation on extreme poverty and the background of drought in Bugesera District
- Quick survey on extreme rural poverty in the District as to specify the concerned categories, affected areas, the number of households, indicators to be used, solidarity traditional mechanisms, livelihood coping strategies and priorities for rapid interventions.
- Together with ISAR identify of sweet and bitter cassava varieties needed in the area
- Together with ISAR and RADA (National Service of Seeds) identify associations or rural groupings of Bugesera able to produce cassava stems. Spotting the sites for production
- Training for producers conducted by ISAR and RADA (National Service of Seeds) researchers
- Establish production contracts between SNS, FAO and the producers.
- Purchase stems from ISAR (one million of stems of 30 cm), transport to the multiplication sites

- Supervise activities plantation and maintenance of wood park
- Purchase of the first cutting (24 millions of stems) and supervise the distribution at local level, beneficiaries coming themselves to get stems from the multiplication sites that will have to be decentralised.

(3) IFAD

There are 3 projects supported by International Fund for Agricultural Development (IFAD) not only Bugesera District but also countrywide. Summary of the projects are shown as below.

1) Support Project for the Strategic Plan for the Transformation of Agriculture (PSTA)

The objective of the project is to support GoR in implementing its strategy to affect a gradual shift from subsistence agriculture to market-based agriculture. The project will provide support for farmers' organization, the GoR, the private sectors and other partners to put in place technical innovations such as embocagement, or the use of living hedges around household plots, as well as dairy production, and intensified rice production and raise the quality of services provided to farmers.

Plans call for pilot programmes in watershed protection, livestock development, marshland cropping and strengthening of the research and extension system. The project will also help lay the groundwork for the agriculture sector programme to be launched in 2008.

Table 3.4.3 Outline of IFAD Support Project for PSTA

Total Cost	IFAD Finance	Duration	Direct benefiting	Co financing	Partners
Us\$20.1M	Loan for US\$8.2M Grant for US\$ 200,000	2006 -2012	20,000HH in former District of Budaha , Bukonya, Karaba, and, Ngenda	United Kingdom of Great Britain, Northern Ireland and the Netherlands	MINAGRI and United Nations Office for Project Services

2) Rural Small and Micro enterprise Promotion Project Phase II

An aim of the project is to strengthen rural micro enterprises of individuals or associations in order to modernize them, improve their management and create jobs. Priority is given to disadvantaged groups such as women, young people, orphans, landless peasants and families affected by HIV/AIDS.

Table 3.4.4 Outline of IFAD Rural Small and Micro Enterprise Promotion Project Phase II

Total Cost	IFAD loan	Duration	Direct benefiting	Partners
Us\$17.6M	US\$14.9M	2004-2011	10,000HH	Copecy and Union of People's Banks of Rwanda (UBPR)

3) Smallholder Cash and Export Crops Development Project (PDCRE)

The project is intended to increase incomes for 28,000 poor rural farmers in former four provinces by improving their tea and coffee yields and also contribute to privatizing one of the state-owned

industrial plantations and redistributing it to 4,000 poor smallholders householders, of whom some 2,000 are headed by women.. The main objective is to assist coffee and tea growers in setting up cooperatives producing and processing Arabica coffee and high-quality tea

Table 3.4.5 Outline of IFAD Smallholder Cash and Export Crops Development Project

Total Cost	IFAD loan	Duration	Direct benefiting	Co financing	Partners
Us\$25.1M	US\$16.3M	2003 -2011	28,000HH in former provinces of Gikongoro, Kibuye, Kibungo, and Kigali-Ngali	Arab Bank for Economic Development in Africa (BADEA) and local banks	OCIR The', OCIR Café', Twin Trading Ltd., BNR, BRD

Source: Pamphlet of IFAD in Rwanda

(4) WB / IDA: Rural Support Project

The Rural Support Project is to support a long-term poverty reduction program developed by the GoR with the support of the International Development Association (IDA) and World Bank. The program is planned to cover 14 year and divided into 3 phases. Phase 1 was started in 2001 and almost 1 year behind the schedule due to the recent decentralization policy and territorial reform.

- Phase 1 (2001-2005): Building of the institutional and technical capacities, called as the Rural Sector Support Project (RSSP)
- Phase 2 (2006-2011): Acceleration of the pace of intensification and commercialization of agricultural production
- Phase 3 (2012-2017): Utilization of the stimulus resulting from faster growth in the rural areas and extend the productive employment of available resources.

Table below shows the RSSP Sub projects implemented until the end of 2005 in Bugesera District.

Rehabilitation/expansion of small dams with irrigation facilities at Kiruhura, Rwabikiwano, and Ruvubu marshlands in Ngenda Sector and intensification project of maize growing at Hilly area in Nyamata, Ngenda Sectors had implemented. At present Cooperatives have established and operated actively at each site but extension services by related agencies concerned are very poor (see Table 3.4.5 and Figure 3.1.1).

Table 3.4.6 Summary of the RSSP Sub projects in Bugesera District until 2005 (unit:Rwf)

Code	Period	Sub project title	Type	Sectors	Grant amount	Disbursed
A27/4	1/4/04-1/4/05	Technical support ISANGANO (extension	Extension	Nyamata	3,521,460	2,823,636
A15/4	1/4/04-1/3/05	Technical support IZMGM (extension programme)	Extension	Ngenda	3,464,380	3,364,882
A91/4	1/9/04-1/1/05	Emergency support to the maize intensification project in Ngenda	Extension	Ngenda	4,607,000	4,517,350
A90/4	1/9/04-1/1/05	Emergency support to the maize intensification project in Nyamata	Extension	Nyamata	5,870,000	3,860,000
A01/4	25/2/04-1/1/05	Intensification of maize growing in Ngenda 2004	Extension	Ngenda	8,257,407	8,257,407
A81/4	25/2/04-1/1/05	Intensification of maize growing in Nyamata District of 2004	Extension	Nyamata	13,828,065	13,828,065
-	-4/2/05	Nkanga Market site upgrading :study (2 phase)	Market	Gashora	1,130,308	
112/5	16/6/05-31/12/05	Intensification of maize growing in Nyamata marshlands-AGRO CONSULTANTD 2005	Extension	Nyamata	5,880,490	4,589,600
112/5	16/6/05-31/12/05	Intensification of maize growing in Ngenda marshlands-AGRO CONSULTANTD 2005	Extension	Ngenda	4,946,260	3,987,500
152/5	19/9/05-30/10/06	Training in construction & maintenance of agricultural facilities in Kiruhua, Rwabikwano, Rubuvu marshlands 270ha	Extension	Ngenda	27,527,000	4,588,840
					79,032,370	4,588,840

Source: MINAGRI/Rural Sector Support Project Office

(5) Others

1) Millennium Village Project supported by UN with Columbia University

The GoR selected the Millennium Village in Kagenge Cell, Mayange Sector as a pilot area in August 2005. The project prioritized agricultural development to fight hunger that hits the area, health to fight malnutrition-related diseases, HIV/Aids and malaria, education and water supply by digging boreholes in the District. An implementation of the sub projects has been started in February 2006 for the 5 years project. The amount of budget in agricultural interventions is allocated about 70,000US\$ this year.

2) Rehabilitation of the Main Road from Kichkiro to the Boudary of Burunji

Refer to Chapter 3.2.3, (2) Road Rehabilitation Program

3) Water Supply Project in Bugesera District

Refer to Chapter 3.2.4, (3) Water Supply

3.4.4 NGOs

The number of local and international NGO that have conducted activities in Bugesera District is about 25 according to the Action Plan in 2006, CDP in 2005 of Bugesera District and survey by study team (See Annex I.3)

Their sectors are as follow. Many NGOs are targeting vulnerable people like HIV patients, victims of Genocide such as widows and orphans etc., and supporting them in various sectors like agriculture, animal husbandry, education, health, income generating activities etc.

Table 3.4.7 Main Activities of NGOs in Bugesera District

Name of sector	Name of NGOs	Number of NGOs
Agriculture	Bamporeze, Caritas, FRAD, SSS(Selected Seed Service), World Vision, ZOA	6
Animal Husbandry	Caritas, IBUKA, World Vision, ZOA	4
Reforestation	ACORD, Bamporeze, Caritas, PAFOR, RDO(Rwanda Development Organization), Vi-Life, ZOA	7
Microfinance	CRATER RIM, INTAMBWE, INKINGI, SERUKA, URWEGO, World Vision (Vision Finance Company S.A)	6
Income generation	Bamporeze, SERUKA	2
Education	ACORD, AAA(Agro Action Allemande), Caritas, Compassion International, IBUKA, Save the Children, World Vision	7
Health	Bamporeze, Catholic Sisters, Compassion International, Save the children, Trust and Care, Vi-Life, World Vision, ZOA	8
Habitat	IBUKA, World Vision	2
Water	World Vision, ZOA	2
Other	AVEGA Agahozo, Food for Hunger, Haguruka, RDA, Vi-Life(improved cooking stove)	5

Source: Action Plan in 2006 and CDP in 2005 of Bugesera District and hearing by JICA Study Team from 15 Sector offices and NGOs staff

In agricultural and animal husbandry sector, distribution of seeds and goats etc. are typically conducted and accompanied by training or enforcement of recipient associations. Modern cow distribution is under trial by some NGOs like World Vision and Caritas (Caritas is going to support fodder crop production and cow shed construction). Micro-finance managed by some NGOs also helps farmers. Farming techniques are sometime trained in ways to conserve soil fertilities like manure making, terracing etc. In other case for example, FRAD is concentrating in assistance of a rice-farming cooperative in former Ngenda district area. The cooperative consists of 90 associations, 5436 members (2006), and using 6 swamps (Rwabikwano, Gatere, Kiruhura, Rububu, Nyaburiba, and Kibasa)

To improve income generation besides agriculture and animal husbandry, some activities are assisted such as soap making, carpentry training (Bamporeze) and bee-keeping (SERUKA). Environmental activities that the Bugesera District is strongly promoting are reforestation sector and many NGOs are participating in. To reduce consumption of firewood, improved cooking stoves are also introduced by Vi-Life.

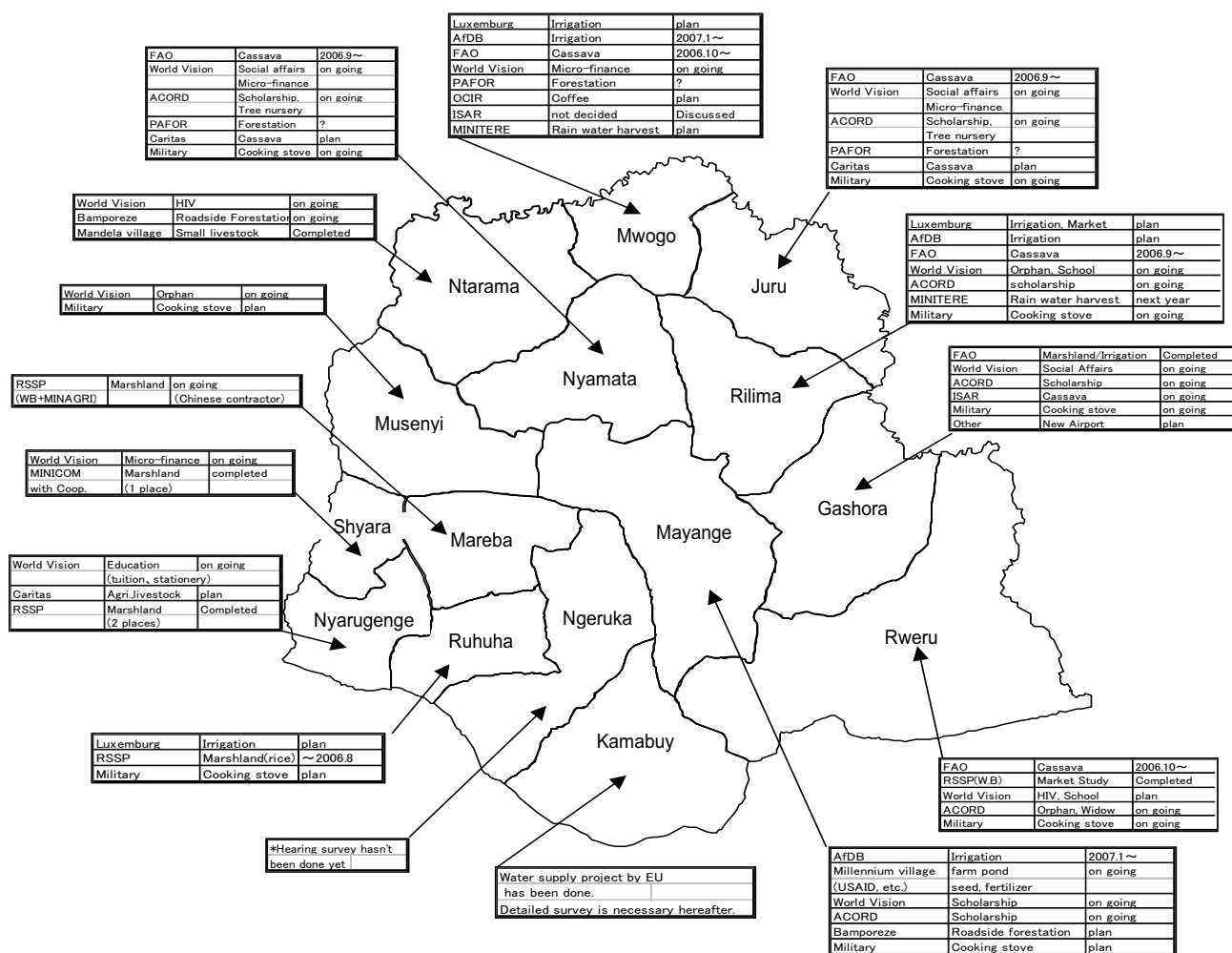
The activities in education sectors are such as scholarship, donation of stationary, desks, uniform etc. Moreover World Vision is conducting school constructions. In health sector, typical activities are related to AIDS and many NGOs support people infected with HIV and conduct prevention campaign while there are some other activities like supporting health center and nutrition center, distribution of mosquito coils against malaria etc. In water section, there are activities such as water tank foundation

at school (World Vision) and shallow well construction (ZOA).

Some NGOs have their office in Bugesera. World Vision is one of the biggest NGOs assisting Bugesera district and has 3 offices in Nyamata, Ruhuha and Rilima, respectively to implement its program named ADP (Area Development Program) as well as 1 office in Nyamata for the other program named DAP (Development Assistance Program). Moreover it has 3 offices of its branch company "Vision Finance Company S.A." next to the ADP offices. Caritas has also its office in Nyamata and FRAD has one in Ruhuha. Bamporeze is using rooms of Nyamata, Gashora and Ruhuha Sector offices.

One of the problems of NGOs activities is harmonization or collaboration issue. Some NGO's activities are collaborated with each other but few. For example, Bamporeze and RDO (Rwanda Development Organization) work together in reforestation sector. The Project "PASAB" conducted by Caritas from 2006 to 2009 is collaborated with World Vision and Luxemburg project. However, such cases are still limited. Another problem is budgetary limitation. For example, fund of Bamporeze financed by UNICEF for orphan assistance is until Dec. 2006, so it has to look for next donor to continue activities. World Vision is also in trouble of finance and decided to reduce main target area from current 15 Sectors.

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Other Information

- *EU: Water supply project is done in all sectors in former Nyamata and Gashora district (has already beendone in former Ngenda district)
- *IFAD: Rural development program is planned in former Ngenda district.
- *Luxemburg: 2 roads maintenance and 2 markets establishment are planned besides irrigation project.
- *RSSP(World Bank): Technical support (extension program) and maize intensification project were done in former Nyamata and Ngenda district (the location is not clear).
- *MINAGRI: Tree seeds distribution for nursery establishment (in all sector? Confirmation is necessary)
- *OPEC, Saudi Fund: Kigali-Bugesera asphalt road project is under implementation.

Source: The JICA Study Team Field Survey

Figure 3.4.1 Activities of Foreign Donors and NGO's in Bugesera District

Table 3.4.8 Other Donar's Activities in Bugesera District

Project Name	Luxembourg	IFAD	AfDB	FAO	RSSP (VVB)	Others
	Development of the Rural Economy in Bugesera	1)-Support Project for the strategic plan for the agriculture (PSTA) 2) Smallholder cash and export development project 3) Rural small and micro enterprise Project II	Muwesa Valley Development Project	1) Emergency Marshland Development in 2000 2) Emergency Pump Irrigation Project 3) Cassava Mosaic resistant variety multiplication Project	1) TS for ISANGANO Nyamata 2) TS for IZMGM Ngenda 3) Emergency support to the maize intensification project in Ngenda 4) -ditto-, in Nyamata 5) Intensification of maize growing in Ngenda 6) -ditto-, in Nyamata 7) Nkanga Market site upgrading study (2 phase) 8) Intensification of maize growing in Nyamata marshlands 9) -ditto- in Ngenda marshlands 10) Training for O&M of Irrigation Facilities	1) Mayange Millennium Village 2) Rainwater Harvesting Project by MINITERE 3) Expansion of improved cooking stove by Military 4) Participatory Watershed Development Project at Murama
Date of Interview	2006/4/24	2006/5/14	2006/4/27	2006/5/15	2006/5/24	—
Representative	Philippe le BUSSY Conseiller Technique Principal	Rwabidadi Eric Country Liaison Officer, Eastern and Southern African Division	Mohamed EL AZIZ Country Operation Officer	Laurent GASHUGI Assistant Representative	MINAGRI/Rural Sector Support Project Jean Damascene MANIRAGUHA, Senior Agronomist	—
Budget	some portion of 8.5 M EURO	1)-8.2MUS\$ and grant for 0.2MUS\$, 2) 16MUS \$ 3) 5.4MUS\$	10MUS\$ by AfDB, 2.4MUS\$ by Rwanda	unclear	1) 3.52 MRwf, 2) 3.46 MRwf 3) 4.61 MRwf, 4) 5.87 MRwf 5) 8.26 MRwf, 6) 13.83 MRwf 7) 1.13 MRwf, 8) 5.88 MRwf 9) 4.95 MRwf, 10) 27.53 MRwf	1) UN, 70,000US\$ in 2006 2) MINITERE unclear 3) Military unclear 4) ISAR about 16,000US\$ 5) WB, PSSP, unclear
Project Period	Planning 2003-2007, 5years but actually started in 11/2005	1) 5/2006-2012 2) 2003-2011 3) 1998-2004	5years	1) 2000 2) 2001 3) 09/2006 will be started	1) 1/4/04 - 1/4/05, 2) 1/4/04 - 1/3/05 3) 1/9/04 - 1/1/05, 4) 1/9/04 - 1/1/05 5) 25/2/04 - 1/1/05 6) 25/2/04 - 1/1/05 7) ? - 4/3/05 8) 16/6/05 - 31/12/05 9) 16/6/05-31/12/05 10) 19/9/05-30/10/06	1) Feb 2006 to 5 years 2) be started in 2007 3) On going 4) 2004-2005
Summary of the Project	Irrigation of 240ha around the lake, Rehabilitation of rural road, (Gahembe to Kindama 20km), Construction of 2 markets (Rilima and Nyamata), and Introducing Micro-Finance	1) Demand-Driven type, Soil conservation of hilly area, introducing modern cow, and strengthening of agricultural study and extension systems 2) Supporting the coffee and tea small scale farmers 3) Supporting microfinance system for small scale farmers	Irrigation Planning in wetland area	1) To secure drought damages in 1999, urgent supporting projects were executed. (reclamation of marshland for 1,400ha, provision of treadle pumps (500 Nos), in cooperation with UNDP & WFP 2) Irrigation system at hilly area 3) Provision of mosaic virus disease resistant cassava stems 1 million	1), 2) Training for existing association groups 3) to 6) Intensification of the maize grower organizations in hilly site 7) Feasibility study for suitable market at Nkanga, Rweru Sector 8), 9) Intensification of the maize grower organizations in marshlands 10) Training of O & M of irrigation facilities to the beneficiaries in Kiruhura, Rawabikwano, Rububu marshlands	1) Distribution of chemical fertilizers and improved seeds, Water Harvesting, improvement of farming 2) Rainwater Storage 3) Expansion of improved cooking stove 4) Construction of small scale check dams and ponds and contour bands for soil conservati

Table 3.4.8 Other Donar's Activities in Bugesera District (continued)

	Luxembourg	IFAD	AfDB	FAO	RSSP (WB)	Others
Target area	Nyamata area Ngenda area Rihima area, etc.	-Ngenda area, one zone out of 6 pilot project zones	Irrigation of Muwesa Valley of 650 ha along the Nyabarango river	1) Marshland between Gashora & Kibungo 2) Hilly area around Gashora 3) Covers Bugesera district, 1,200 farmers are targeted and breeding to 24 million stems	10) Total irrigation area are 270 ha in Kiruhura & Rawabikwano, and 100 ha in Rububu marshlands	1) MAYANGE Sector 2) MWAGO Sector, etc. 3) Not yet confirmed 4) NYAMATA Sector
Objective	Food security and Poverty reduction	same in the left	Through development of the wet lands, to enhance ownership of beneficiaries and to secure food (rice, maize, banana, and seeds distribution)	1),2) To secure drought damages and food shortage 3) Food security distributed by mosaic virus disease resistant cassava	1) - 6), 8), 9) Training the capacity building for maize grower at hilly side and marshland 7) Improvement for marketing system in Rweru Sector 10) Capacity development for farmers of irrigation	1) Soil conservation, food security 2) Improvement of life style 3) Improvement of life style and environmental conservation 4) Soil conservation, food security
Problems, others	Implementation schedule of the project was delayed and proposed market site was changed due to reform of administrative boundary		Budget (about 2MUSS) for detail design has not been allocated			

3.5 Main problems / needs in each Sector Level

According to the each Sector level survey carried by the Study Team, problems/needs at each sector/field are summarized as table below. Sectors have many problems and issue to solve challenges through the all sectors.












Table 3.5.1 Problems/Needs at each sector/field

Sector/Field	Problems/Needs
Food Security	<ul style="list-style-type: none"> • Starvation/drought
Agriculture	<ul style="list-style-type: none"> • Swamps are not utilized • Lack of agricultural extension services • Need manure • No seedling
Livestock	<ul style="list-style-type: none"> • Materials for animals shed are not enough • Livestock improvement
Environment	<ul style="list-style-type: none"> • Soil Erosion
Improvement of Living Standard	<ul style="list-style-type: none"> • Lack of firewood • No micro finance
Social Affairs	<ul style="list-style-type: none"> • Poverty, many vulnerable people (orphans, widows) • Street Children (drop out from school)
Education	<ul style="list-style-type: none"> • Lack of school, especially secondary school • Illiteracy Rate
Health and Sanitation	<ul style="list-style-type: none"> • Lack of clinic/medical care • HIV • Shortage of drinking water
Rural Infrastructure	<ul style="list-style-type: none"> • Poor households with grass roof • No electricity • Bad road condition • Lack of transportation • Poor public facilities • No residence for returnees

Source: JICA Study Team field survey at each Sector

Table 3.5.2 and Figure 3.5.1 show ranking for problems/needs at Sector level. Response number in the most is starvation/drought in 9 numbers and second shows lack of school, especially second school in 8. Major problem faced by local people is to secure staple food and also improvement of agriculture/livestock activities as well as rehabilitation/expansion of the rural infrastructure is main subject in the Study Area. More details for problems/needs should be carefully studied using socio-economic baseline survey data that has been carried out from August-September 2006.

Table 3.5.2 Ranking for Problems/Needs at Bugesera District

Ranking	Response Nos.	Problems/Needs	Mark
1	9	Starvation/drought	
2	8	Lack of school, especially secondary school	
3	7	Soil erosion	
3	7	Lack of clinic/medical care	
4	6	No electricity	
	6	Poverty, many vulnerable people (orphans, widows)	
5	5	Livestock improvement	
6	4	No seedling	
7	3	Shortage of drinking water	
	3	Bad road condition	
	3	Swamps are not utilized	

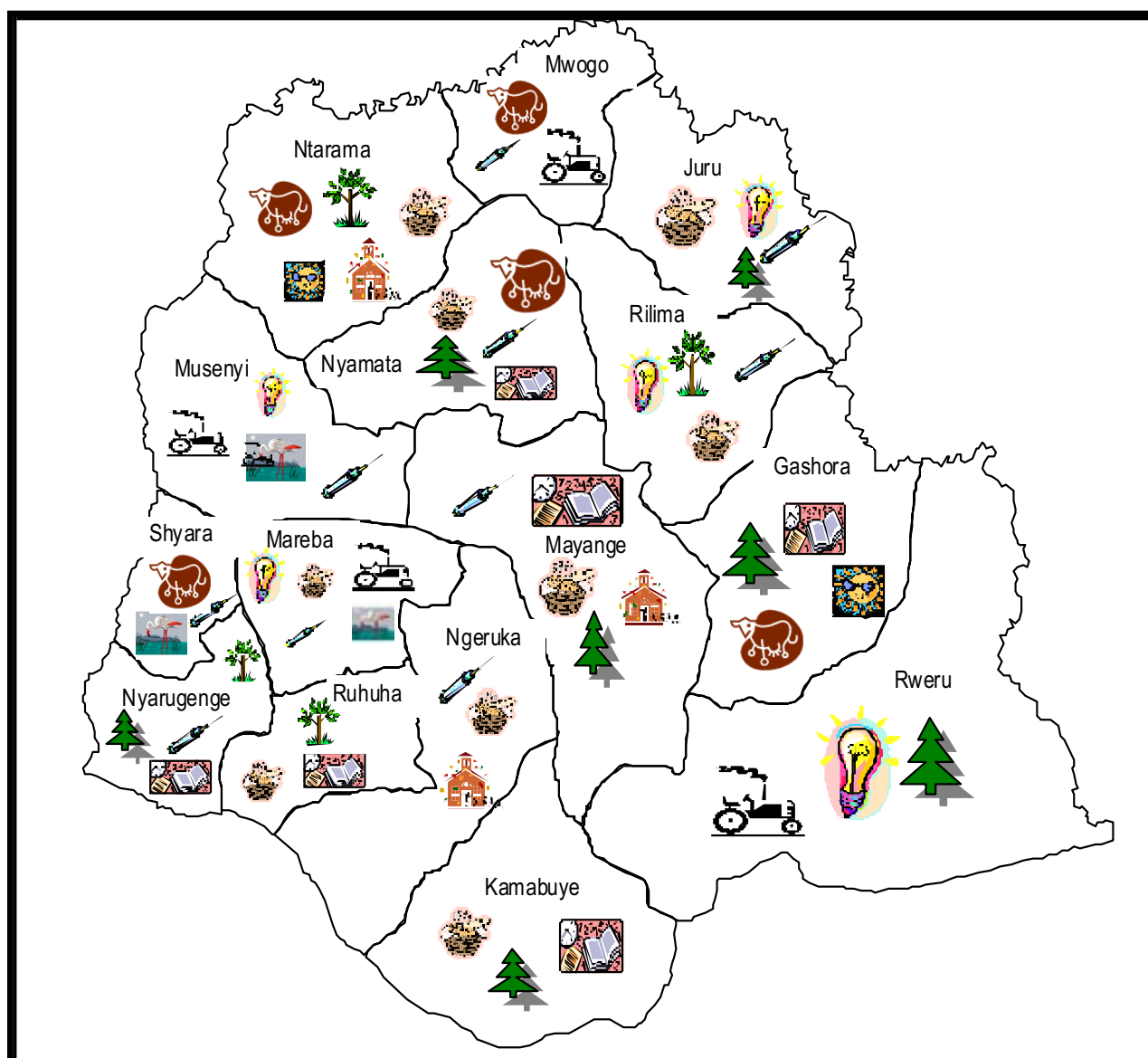


Figure 3.5.1 Main Problems / Needs at each Sector in Bugesera District

CHAPTER 4 ENVIRONMENTAL CONSIDERATION

4.1 Environmental Evaluation System in Rwanda

4.1.1 Environmental Law in Rwanda

(1) Objectives

As a fundamental environmental law, the Environmental Law was established in April 2005. This Law shall:

1. Regulate the environment, people and their habitats;
2. Establish fundamental principles related to environment protection , any means that may degrade the environment with a view to promoting natural resources, discouraging any hazardous and destructive factor;
3. Promote the social welfare of the population considering equitable distribution of the existing resources;
4. Consider resource sustainability, putting emphasis on equal rights for present and future generations;
5. Ensure to all Rwandans sustainable development that is friendly for environment and social welfare of the population;
6. Establish strategies to protect and reduce negative effects on the environment and replace the degraded environment.

(2) Fundamental Principles

The fundamental principles are set forth as follows:

1. **Protection principle:** activities considered or that are likely to have negative impacts on environment shall not be implemented, even though such impacts have not yet been scientifically proved. Scientific uncertainty should not be taken into consideration for environment harm; rather it should be used in environment conservation.
2. **Principle of sustainability of environment and equal opportunities among generations:** The right to development must be achieved in consideration of the needs of present and future generations.
3. **Polluter pays principle:** Every person who demonstrates behaviour or activities that cause adverse effects on environment is punished or is ordered to make restitution. He or she is also ordered to rehabilitate it where possible.
4. **Principle of information dissemination and community sensitization in conservation:** Every person has the right to be informed of the state of environment and to take part in devising

strategies aimed at protecting the environment.

5. **Cooperation principle:** Authorities, international institutions, associations and private individuals are required to protect the environment at all possible levels.

(3) International Convention on Environmental Protection

Rwanda government signed a number of international conventions on environmental protection as shown in Table 4.4.1

Table 4.1.1 International Conventions on Environmental Protection signed by the Government of Rwanda

Name	Signed in	Approved by
International Convention on Biodiversity and its Habitat	Rio de Janeiro (1992)	P.O.* No. 017/01 of 18 March 1995
United Nations Framework Convention on Climate Change	Rio de Janeiro (1992)	P.O. No. 021/01 of 30 May 1995
Stockholm Convention on Persistent Organic Pollutants	Stockholm (2001)	P.O. No. 78/01 of 8 July 2002
Rotterdam International Convention on the Establishment of International Procedures agreed by States on Commercial Transactions of Agricultural Pesticides and Other Poisonous products	Rotterdam (1998), New York 1998 ~ 1999)	P.O. No. 28/01 of 24 August 2003
Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal	Basel (1989)	P.O. No. 29/01 of 24 August 2003
Montreal International Convention on Substances that Deplete the Ozone Layer	London (1990) etc.	P.O. No. 30/01 of 24 August 2003
Cartagena Protocol on Biosafety to the Convention of Biodiversity	Nairobi (2000), New York (2000 ~ 2001)	Law No. 38/2003 (2003)
Kyoto Protocol to the Framework Convention on Climate Change	Kyoto (1998)	Law No. 36/2003 (2003)
Ramsar International Convention on Wetlands of International Importance, especially Waterfowl habitats	Ramsar (1971)	Law No. 37/2003 (2003)
Bonn Convention on Conservation of Migratory Species of Wild Animals	Bonn (1979)	Law No. 35/2003 (2003)
Washington Agreement on International Trade in endangered Species of Wild Flora and Fauna	Washington (1973)	P.O. No. 211 (1980)

*: P.O.; Presidential Order

4.1.2 Marshes Order in Rwanda

(1) Objectives

MINITERE established “Ministerial Order No.2 of 24/9/01 related to the Exploitation and Management of Marshes in Rwanda” (hereinafter referred to as “Marshes Order”) in September 2001. This Marshes Order has the following objectives:

- This Order concerns the use and management of marshes before putting in place a policy and a law on marshes.
- Marsh lands are administered and allocated by the Minister holding lands within his remit or by his delegate. Applications for allocation of marsh lands are submitted to the Minister holding lands within his remit through the Minister having in his/her attributions the activity to be carried out in the marsh. This Minister holding lands within his remit allocates the land for rent while the concerned land's exploitation permit or authorization is issued by the Minister holding the involved activity within his remit.
- All marsh development and exploitation works shall be preceded by a study of the said works' impact on human health and environment. Those works shall be started upon the approval by the Minister holding environment protection within his remit.

4.1.3 Land Law in Rwanda

(1) Objectives

MINITERE established "Organic Law No. 08/2005 of 14/07/2005 Determining the Use and Management of Land in Rwanda" (hereinafter referred to as "Land Law") in July 2005. This organic law determines the use and management of land in Rwanda. It also establishes the principles that are respected on land legal rights accepted on any land in the country, as well as all other natural or artificial appendages.

(2) Categorization of Land

The land is categorized into the followings:

- Urban and rural land
- Individual ownership of land
- State land (public domain/ Private state owned land)
- District, town and municipality land

4.2 Conservation Activities in Bugesera District

The Unit of Land, Urbanization, Habitat and Infrastructure is established in Bugesera District Office. Three staff members are assigned in this unit, namely Director of Unit, a staff member in charge of infrastructure, and staff member in charge of environment and natural resources. The projects on environment in Bugesera District Action Plan in 2006 are shown in Table 4.2.1.

Table 4.2.1 Project on Environment in Bugesera District Action Plan 2006

Service	Local Target 2006	Budget (Rwf)			Implementing Body
		District	Others	Total	
Sensitize the	80% of the population have	6,000,000	0	6,000,000	District and

population on environment conservation	been sensitized about environment conservation				MINITERE
Combat water hyacinth from rivers and lakes	Uproot all water hyacinth found in Bugesera lakes	12,000,000	0	12,000,000	District and MINITERE
Protect and increase forest production	Plant 2,000,000 tree seedlings	11,947,300	1,936,000	13,883,300	District, Vi Life and PASAB

(1) Afforestation Activities

In general, MINITERE implements the planning of afforestation across the country, and distributes tree seeds, mainly *Grevillea robusta*, *Cedrela* sp., to each Province. MINITERE works in cooperation with ISAR, which produces seeds. Each District is provided with seeds from province and budget from MINECOFIN, and Districts distribute seeds and budget to each Cell through Sector. Cell office plants seeds at its nursery through “Umuganda” or NGOs such as PASAB (the project of Caritas, NGO) and PAFOR. Seedlings are freely provided to the population, the population plants seedlings at their farmland and some public space such as roadside, which is appointed by Cell office. In response to the government policy, planting 2 million tree seedlings for afforestation as described in Table 4.2.1 is under way in Bugesera District in collaboration with ISAR, Vi Life (NGO) and PASAB and Mayor in Bugesera disclosed in July that trees will be planted around the lakes this year.

(2) Soil Erosion Control

MINAGRI is the responsible agency for soil erosion control. Three methods for soil erosion control are adopted in Rwanda, such as Counter Bund, Trench Ditch, and Terracing. Counter Bund method is to set up the bank along the counter line; some grasses such as Napiergrass (*Pennisetum purpureum*) are planted on the backs. ISAR implemented a pilot project in Murama in partnership with the local association called TITA (Turwanye Isuri Tuzigama Amazi). This method is suitable for gentle slope, so ISAR envisages spreading this method in Bugesera District.

Trench Ditch method consists in setting up ditch (length: 10m, width: 40~50cm, depth: 30cm). These ditches are found in some places in Bugesera District. However this method is for steep slope, therefore ISAR researchers intend to stop using this method in Bugesera. Although terracing is relatively effective at steep slope and it is costly, that method is found in most of farmlands in Bugesera District. However, small-scale soil erosion controls such as check dam, fence with rock and trees crossing the trails are not found.

(3) Extermination of Water Hyacinth

The water hyacinth (*Eichhornia crassipes*) found over the entire extent of wetlands constitutes a

serious threat for their biological resources and inland fishing activities. Among the damaging effects of the water hyacinth, one can point out the degradation of the quality of water since it covers water and leads to the reduction of the quantity of dissolved oxygen, pH and temperature, the direct result of this being the reduction and disappearance of the biodiversity of affected wetlands. So MINITERE is looking for ways and means to exterminate it from some lakes.

Many Donors, NGOs, Associations, etc. practice environmental protection activities; however its actual conditions, such implementing body, location, term, kind of activities, etc., are not clear. JICA Study Team will continue data collection and field reconnaissance.

4.3 Considerations Needed for the Project Implementation

The following activities on rural and agricultural development are prohibited by the Environmental Law:

- Dumping or disposal of any solid, liquid waste or hazardous gases substances in a stream, river, lake and in their surroundings;
- Damaging the quality of air and of the surface or underground water;
- Non authorized bush burning;
- Dumping any substances, in any place, which may 1) destroy sites and buildings of scientific, cultural, tourist or historic interest; 2) kill and destroy flora and fauna; 3) endanger the health of biodiversity ; and 4) damage the historical sites and tourist beauty at the lakes, rivers and streams;
- Dumping in wetlands 1) wastewater, except after treatment in accordance with instructions that govern it; and 2) any hazardous waste before its treatment;
- Damaging the quality of water;
- Keeping or dumping waste in a place where it may 1) encourage the breeding of disease carriers; and 2) disrupt the people and the property;
- With exception of activities related to protection and conservation of streams, river and lakes, an agricultural activities shall respect a distance of ten (10) meters away from the banks of streams, and rivers and fifty (50) meters away from the banks of lakes. In such distances, no agricultural activities shall be allowed;
- No pastoral activities that require agricultural activities in swamps that shall be carried out without respecting a distance of ten (10) meters away from the banks of rivers and fifty (50) meters away from the lake banks. Cattle kraals shall be built in a distance of sixty (60) meters away from the banks of streams and rivers and two hundred (200) meters away from the lake banks. The location of fish ponds as well as species of fish to be used in fish farming shall require authorization from the Minister having environment in his or her attributions or any other person the Minister shall delegate;
- To construct houses in wetland (rivers, lakes, big or small swamps), in urban or rural areas, to build a sewage plant that can damage such a place in various ways, and to construct in a distance of twenty (20) meters away from the bank of the swamps.

The following activities on rural and agricultural development are prohibited in the Marsh Order:

- Agricultural activities are allowed **10 m** away from the rivers' bank and **50 m** away from the lakes' shores. No agricultural activity is allowed within those limits. However, a Governor of Province may decide otherwise according to the marsh's dimensions. In the case of many provinces' convergence on one and same marsh, it is up to the Governors of involved Provinces to decide; in case of disagreement, the Minister holding agriculture within his remit shall decide.
- It is prohibited to plant in the marshes tree species likely to threaten environment, particularly those derived from modified living organisms.
- Pastoral activities shall respect the margin of **10 m** away from the rivers' banks and that of **50 m** away from the lakes' shores. Building cowsheds for cattle is strictly prohibited within a belt of 150 meters adjoining the 10 meters of the bank from rivers and 50 meters for lakes. The location of fish ponds, as well as species of fishes to be used in fish farming require the common consensus of the Ministries in charge of animal resources and environment.
- It is prohibited to plant eucalyptus and banana trees in marshes except for the purposes of protecting environment and this only after consensus between the Ministries holding agriculture, forestry, animal resources and environment within their remit.
- It is prohibited to carry out fishing and hunting activities in marshes without a written authorization. Authorization to fish in marshes is granted by the Ministry holding animal resources within its remit except for marshes located within the limits of National Parks. For this case, it is up to the Rwanda Tourism and National Parks Authority to issue authorization after consensus with the Ministries holding animal resources and environment within their remit. In case of dispensation, authorization to hunt in marshes shall be issued by the Rwanda Tourism and National Parks Authority (ORTPN) after consensus with the Ministry holding environment protection within its remit.

4.4 Environmental Impact Assessment (EIA)

4.4.1 Basic Concept for EIA in Environmental Law

Environmental Impact Assessment (hereinafter referred to as "EIA") is prescribed in Environmental Law. EIA is subscribed in the Environmental Law as follows:

- Every project shall be subjected to the environmental impact assessment, before obtaining authorization for its implementation. This applies to programmes and policies that may affect the environment. An order of the Minister having environment in his or her attributions shall determine the list of projects mentioned in this organic law.

EIA shall at least indicate the following:

1. A brief description of the project and its variants;
2. A study of direct or indirect projected effects on a place;
3. Analysis relating to the initial state of a place;
4. Measures envisaged to reduce, prevent or compensate for the damage;
5. Reasons based on in selecting such place;

6. A brief description of points from 1. to 5.
7. An explanation of the methods that will be used in monitoring and evaluating the state of the environment before, during the activities of the project, in using the installation but particularly after completion of the project;
8. An estimation of cost of the measures recommended to prevent, reduce or compensate for the negative effects the project may cause on the environment as well as the measures for examining and controlling the status of the environment.

EIA shall be examined and approved by REMA or any other person given a written authorization by REMA. The promoter pays a levy reduced from the operating cost of his or her project excluding the working capital. This tax is determined by the law establishing the National Fund for the Environment. EIA shall be carried out at the expense of the promoter.

4.4.2 EIA Regulations and EIA Guidelines

EIA Regulations and EIA Guidelines are being prepared by REMA in July 2006. These will be approved in the near future. JICA Study Team obtained the Draft EIA Guidelines and some information through interview survey to REMA staff, local consultants, and literates. In this section, the expected outline is discussed.

(1) Projects requiring EIA

Projects related to rural and agricultural development, which require EIA, are as shown in Table 4.4.1. The scale or classification of new project/ rehabilitation project is scarcely prescribed, except “reclamation and drainage of swampland” and “irrigation projects on land” for the scales and infrastructure projects for classification of new project/ rehabilitation project.

Table 4.4.1 List of Projects Requiring EIA related Rural & Agricultural Development (Under Discussion)

<p><u>Developments on lakeshores, riverbanks, rivers, lakes and wetlands</u></p> <ul style="list-style-type: none"> • Reclamation of land from wetlands • Dredging/ mining on lake bottoms and riverbeds 	<p><u>Forestry</u></p> <ul style="list-style-type: none"> • Planting commercial forest plantations on more than 5 hectares • Harvesting more than 2 hectares of forest cover at once • Planting non-indigenous trees • Making more than half a tone of charcoal • Activities carried out in national parks or around national parks
<p><u>Land use and Construction projects</u></p> <ul style="list-style-type: none"> • Construction of schools • Construction of hospitals and healthcare facilities 	<p><u>Rubber industry</u></p> <ul style="list-style-type: none"> • Manufacture, treatment and recycling of rubber products
<p><u>Glass and ceramics</u></p> <ul style="list-style-type: none"> • The manufacture of grass and fiberglass • The manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, floor tiles, stoneware or porcelain 	

Agricultural projects

- **Reclamation and drainage of swampland of more than 5 hectares**
- **Irrigation projects on land exceeding 5 hectares**
- Commercial livestock projects [Including commercial rearing of poultry, pigs, rabbits, beef cattle, dairy cattle, ostriches and crocodiles (and any other animals which **can create** an ecological imbalance if they escaped into the wild)]
- **Aquaculture projects (farms and hatcheries) rearing aquatic plants or animals on more than 5 hectares**
- Commercial fishing
- Greenhouses and protected crops
- Crop and animal farming activities on more than 50 hectares that use fertilizers and chemicals to increase production
- Agricultural activities that use hybrid seeds
- Agricultural activities that use pesticides
- Farming of non-indigenous crops and animals

Textile, leather, wood and paper industries

- Manufacture of fiberboard and plywood
- Manufacture of pulp and paper
- Fiber drying factories
- Cellulose processing and production facilities
- Tannery and leather industries
- Timber treatment and processing facilities

Extractive industry

- Hard rock quarry [Including restoration of disused quarries]
- Soft rock quarry
- Gravel quarries
- Sand quarries
- Clay quarries
- Groundwater abstraction wells and artificial recharge schemes
- Mineral processing industries [Including cement processing plants, rock processing plants, ready-mix concrete plants, concrete block/ brick plants, tarmac production plants and lime kilns.]
- Salt extraction schemes

Food processing

- Manufacture of vegetable or animal fat
- Packing or canning of animal or vegetable products
- Manufacture of dairy products
- Beer brewing
- Bottling of beverages
- Baking and confectionary
- Animal slaughter houses and abattoirs
- Manufacture of industrial starch
- Fish meal or fish-oil industry
- Sugar processing
- Commercial production of livestock feeds
- Commercial grain storage and milling
- Coffee processing plants

Infrastructure

[including construction and rehabilitation]

- Road projects, bridges and tunnels
- Landing sites or boat marinas on lakeshores
- Dams, reservoirs or other installations for storing water on a long-term basis
- Pipelines, sewers and underground electricity or communications infrastructure
- Solid waste management (collection, transportation and disposal) facilities [including landfills, transfer stations, incinerators, recycling facilities and waste processing/ treatment destruction plants.]
- Liquid waste management facilities [including industrial wastewater and sewage treatment plants.]
- Water treatment, supply and distribution infrastructure
- Telecommunications infrastructure [including masts, base stations and optical cable networks]

Energy projects

- Thermal power stations for electricity generation
- Hydroelectric power dams
- Commercial renewable power plants (wind farms, solar, geothermal) [Including installation and harnessing of wind, sun and geothermal for commercial energy generation]
- Electricity transmission lines [Transmission of high voltage electrical energy by overhead cables]

(2) EIA Procedure

Figure 4.4.1 shows the procedure of EIA. The outline of EIA of procedure is as follows:

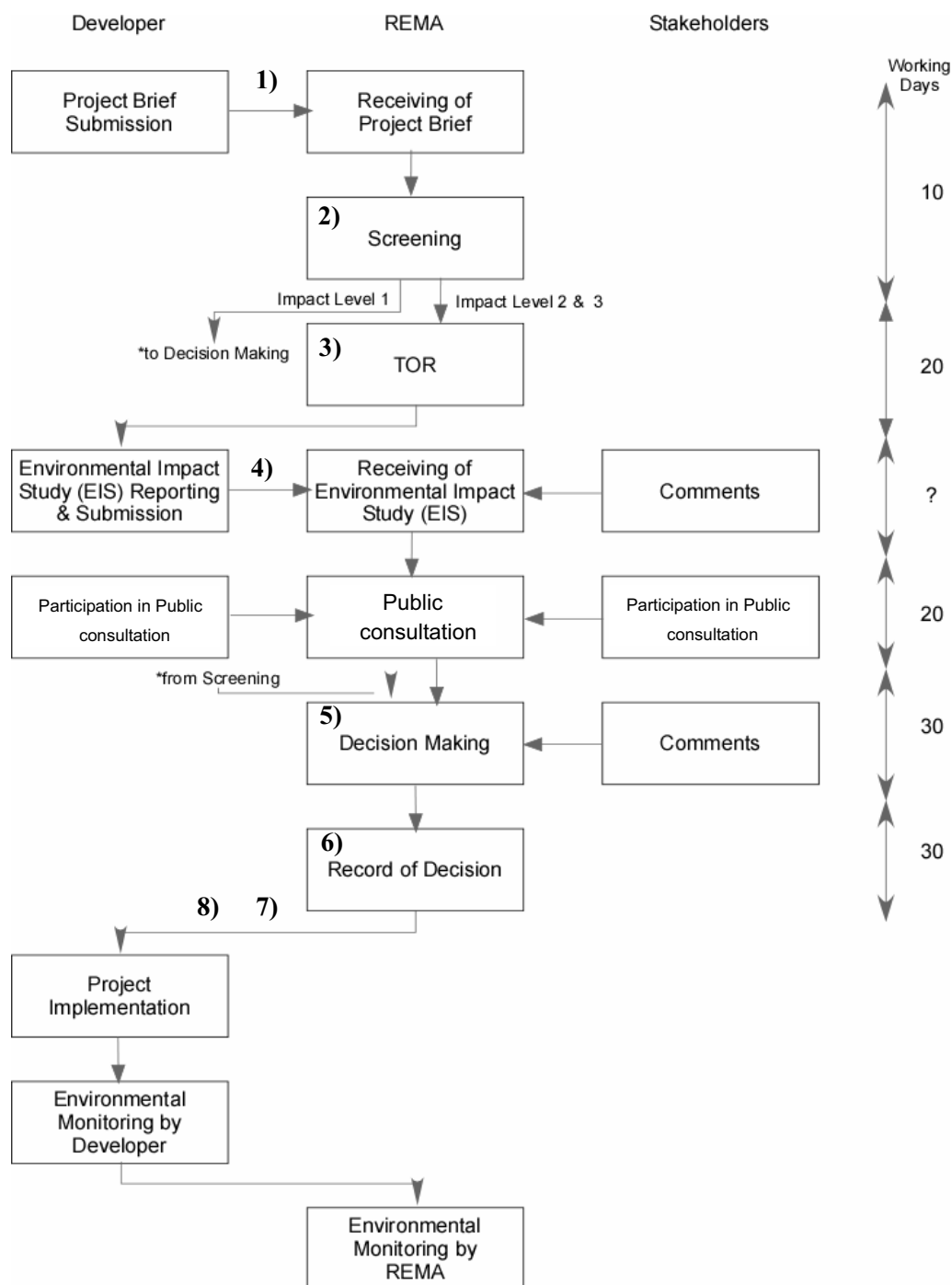


Figure 4.4.1 Procedure of EIA (Draft)

1) Project Application and Registration by REMA

The first step of the EIA process is the submission by a developer of an application for EIA of a

proposed project to the REMA in form of a Project Brief. REMA registers the Project Brief as the developer's formal application for an EIA. The purpose of a Project Brief is to provide sufficient information on the project to enable the REMA establish whether or not the proposed activities are likely to have significant environmental impact, and also enable to determine the level of EIA required (screening). If adequate mitigation measures are identified in the Project Brief, this may eliminate the need for a full EIA and a project may be approved with or without implementation conditions.

A Project Brief shall contain the following information:

- Details of the developer;
- An explanation of the nature of the opportunities and problems being addressed by the development, and of its general economic, social and environmental objectives;
- A description of the general strategy employed, and of the production process and operational methods to be used, and any alternative methods considered, in reaching the social, environmental and economic objectives of the development;
- An indication of the proposed duration of the project and a justification for its preference;
- An indication as to where the project is economically

2) Screening

Screening carried out by the REMA is a process to determine impact level of a proposed project, which then determines extent of the EIA study. When REMA receives the Project Brief, it reviews it seeking input from appropriate Local Governments and other relevant stakeholders. Based on information in the Project Brief and established project screening criteria of the project site shown in Box below, REMA determines whether or not an EIA is required and the developer is accordingly notified. Screening enables categorization of projects according to their Impact Level as follows:

- Impact Level 1: Project not requiring further environmental analysis
- Impact Level 2: Project not requiring a full EIA but necessitates further level of assessment
- Impact Level 3: Project requiring a full EIA

Box Screening Criteria of the Project Site

The project is not located in, and will not affect, environmentally-sensitive areas such as:

1. National parks
2. Wetlands
3. Productive agricultural land
4. Important archeological, historical and cultural sites
5. Areas protected under legislation
6. Areas containing rare or endangered flora or fauna
7. Areas containing unique or outstanding scenery
8. Mountains or developments on or near steep slopes
9. Forests
10. Lakes or their shores
11. Areas important for vulnerable groups such as fishing communities

- | |
|--|
| 12. Areas near high population concentrations or industrial activities where further development could create significant cumulative environmental problems
13. Groundwater recharge areas or drainage basins |
|--|

3) Scoping and Terms of Reference (TOR)

Scoping is the initial step of the Environmental Impact Study (EIS) phase and involves input from relevant stakeholders and developer to obtain their comments on what should be included in the study and what alternatives should be included in the study and what alternatives should be considered. Screening is the role of REMA.

4) Environmental Impact Study (EIS) Reporting & Submission

EIS phase is the investigative stage of the EIA process for which a developer hires EIA experts. This phase begins by a developer selecting expert(s) among the list of EIA experts provided by REMA. The developer and EIA expert shall work together throughout the EIS phase to develop adequate measures to mitigate negative impacts and enhance positive ones. After completion of EIS, EIA experts produce EIA Report including Environmental Management Plan (EMP), and Developer submits EIA Report to the REMA.

5) EIA Report Review and Decision Making

Review of EIA documents submitted to the REMA enables subsequent decision-making on either approval or disapproval of a project. Once EIA documents are received by REMA, copies are forwarded to Local Governments and the general public so that they can provide comments that would be useful in making the final decision about proposed project approval. During the process to review EIA report, public consultation is conducted by REMA. At the level of REMA, two committees, namely the Technical Committee and the Executive Committee review EIA documents. Performing specific roles is done as follows:

(a) Review by Technical Committee

EIA documents submitted to REMA are first reviewed by a Technical Committee. The committee appointed by the Director General of the REMA, reviews technical aspects of the EIA report and public consultation report. Depending on nature, location and impact level of a project, the Technical Committee is made of experts selected from:

- | |
|---|
| <ul style="list-style-type: none">• REMA (EIA Compliance & Enforcement Unit)• Academic institutions• Recognized experts in the field of project |
|---|

After the review, the committee chair will draft a Technical Summary Report including the following:

- The project summary.
- The decision by the Technical Committee concerning acceptability of the project
- Rationale for adopting changes in the EIA report
- Any other information suggested by the Technical Committee

The Technical Summary Report is signed by all Technical Committee members and submitted to the Executive Committee for final review.

(b) Review by the Executive Committee

The Executive Committee makes the final decision on the acceptability of the proposed project. The Committee comprises three members, namely Director General of REMA (as Chair), Director of EIA Compliance & Enforcement Unit, and the representative of the relevant Agency. The review mainly focuses on consideration and choice of alternatives, while for mitigation measures, the decision would be based on their effectiveness. A unanimous agreement of the Executive Committee is required for the project approval.

6) Record of Decision

After the review of EIA documents, the REMA decide to either approve the project with or without conditions, or reject it. A Record of Decision is prepared by the Executive Committee and issued to the developer. If the project is approved, the developer is issued with an EIA Certificate of Authorization, which permits implementation of the project in accordance with mitigation measures in the EIA Report and any additional conditions as the REMA might consider necessary.

7) Implementation and Operations Order (IOO)

After the record of decision approving project implementation has been made, the Director of the EIA Compliance & Enforcement Unit in REMA issues Implementation and Operations Order (IOO) to the developer.

8) EIA Certificate of Authorization

REMA issues the Authorization Certificate after the proposed project is approved. This is a legally binding document which authorizes the developer to implement a proposed project, subject to any terms and conditions stipulated.

4.4.3 Existing Situation of EIA for JICA Study

The Environmental Law in Rwanda was just established in 2005. All kinds of regulations and rules, such as EIA Regulations, EIA Guideline, EIA Fund, EIA Committee, etc., which prescribed to

establish the Environmental Law, were not yet provided by end of July 2006. The structure and the number of REMA staff as an EIA evaluating body is not completed yet. On the other hand, MINAGRI as the counterpart institution of JICA Study has no environmental staff. So Rwandan EIA system is not yet full-functioned and the structure of MINAGRI for EIA is not yet put in place.

Prior to implementing any project, at least the Project Brief should be provided by the implementing body. Therefore, JICA Study Team has already prepared Quick Project (QP) (detail is in the section 5.6 of this report). The candidates of the implementing body of QP are the MINAGRI, Bugesera District, Ntarama Sector, and the three Cells. As mentioned above, the MINAGRI has no environmental staff, and the Sector and Cell has no margin for the implementing body because of their limited staff and budgets. Actually most of the environmental staff in Sector holds this post concurrently as agronomist. Fundamentally the MINAGRI should be an implementing body for all projects assisted by JICA Study; however the District is most eligible as an implementing body for QP at present. JICA Study Team had some discussions with REMA, and submitted the Project Briefs of QP with the name of the District as an implementing body after some amendments.

JICA Study Team will propose the Pilot Projects (PP) by the end of 2006. The scales of PPs are larger than QPs, therefore some PPs may require full-EIA. When MINAGRI needs to implement EIA, they have to hire the EIA registered consultants. In general, ten million Rwf are needed for EIA procedure. However, by the end of July 2006, MINAGRI had not yet provided budgets for EIA implementation. JICA Study Team is able to assist Rwandan side; however the EIA including Project Brief should be prepared by Rwandan counterpart. JICA Study Team recommends that an environmental specialist be appointed in MINAGRI.

4.5 Initial Environmental Evaluation (IEE)

4.5.1 Existing Environmental Condition

As mentioned above, REMA is implementing the project named “Integrated Ecosystem Assessment (IEA) in Bugesera” in cooperation with UNDP and UNEP. EU is also planning to conduct the study on “Environmental Profile in Bugesera”. This means there are few data on environmental existing condition in Bugesera.

JICA Study Team has been seeking to collect those data, but has not yet managed to obtain them. In this section, the existing environmental condition is described basing on some collected data and the results of field reconnaissance.

(1) Natural Environment

1) Relief

Rwanda's relief presents varieties. From East to West, the altitude varies between 1,000 and 4,500m. The setting of this relief is composed mainly in the east by lowlands (1,100 - 1,500m), in the centre by hills (Central Plateau, 1,500 -2,000m), and in the west by high mountains (Congo-Nile Ridge, 2,500 - 3,000m). The Bugesera District is located in South East edge of Central Plateau, and its altitude is around 1,400m -1600m.

The relief of Central Plateau is made of hills with tops that are sometimes stretched, sometimes round, separated by deep valleys of 50 to 15m, often filled up with alluvial deposits. The lowlands of the East are dominated by depression of the relief.

The Bugesera District is located southeast edge of the Central Plateau. Therefore, it has some characteristics of lowlands. It consists of hills, wetlands along the Nyabarongo, Akanyaru, and Akagera Rivers, and some lakes.

2) Climate

Rwanda shows a temperate continental tropical climate. The thermal rhythm is relatively constant. In the course of the year, temperature varies between 18 and 21°C in the Central Plateau, and 20 to 24°C. Annual rainfall varies between 1200 and 1400mm in the Central Plateau, and 700 to 1400mm in the lowlands of the East. The Bugesera District's temperature ranges from 26 to 29°C; annual rainfall is 250 to 800mm. From the viewpoint of climate, the District has characteristics of lowlands.

Rwanda has increasingly been experiencing long periods of drought which tend to become cyclical and persistent, particularly in the East and South East, where Bugesera District is located. These climatic changes may have a direct relationship with those recorded in the world particularly due to the global warming of the planet. Details on climate in Bugesera District are to be found in 3.1.2 Meteorology and Hydrology.

3) Flora and Fauna

(a) Flora

Bugesera District is a mildly undulating basin surrounded by alluvial plains, marshlands and the lakes from Akanyaru and Nyabarongo down stream. The District is characterized by two types of natural environment such as hill area and its surrounding area. The tree species adapted to Bugesera District, are shown in Table 4.5.1.

Table 4.5.1 Species, Potentially Grown in Bugesera District

Scientific Name	Local Name	Scientific Name	Local Name
<i>Podocarpus usambarensis</i>	Umufu	<i>Dichrostachye cinerea</i>	Umuyebe, Umunkamba
<i>Podocarpus milanjianus</i>	Umuhulizi	<i>Mimosa pigra</i>	Umugeyo
<i>Phoenix reclinata</i>	Umukindo	<i>Albizia adianthifolia</i>	Umusebeya
<i>Trema orientalis</i>	Umubori, Umundondori, Umugwamporo, Umurangar	<i>Albizia amara</i>	Umunaniranzovu
<i>Ficus sycomorus</i> var. <i>gnaphalocarpa</i>	Umuwumu, Umukuyu	<i>Albizia antunesiana</i>	Gatsi
<i>Ficus Thonningii</i>	Umuwumu, Igitoma	<i>Albizia gummifera</i>	Umusebeya
<i>Ficus vallis-chudae</i>	Umurehe, Ikodobori	<i>Albizia petersiana</i>	Umumeyu
<i>Ficus sur</i>	Umukuyu, Umukumu, Umuhungutu	<i>Albizia versicolor</i>	Umububa
<i>Ficus cyathistipula</i>	-	<i>Entada abyssinica</i>	Umusange, Umusangasange
<i>Ficus trichopoda</i>	-	<i>Dalbergia nitidula</i>	Umuhogo, Umuyigi
<i>Ficus asperifolia</i>	Umusene	<i>Erythrina abyssinica</i>	Umuko, Umurinzi, Inanasi
<i>Ficus verruculosa</i>	-	<i>Ormocarpum trichocarpum</i>	Umukamba
<i>Ficus ovata</i>	Umuhere	<i>Sesbania sesban</i>	Umunyegenyege
<i>Ficus glumosa</i>	Umugwampore	<i>Cassia didymobotrya</i>	Umucyuro
<i>Ficus ingens</i>	Umutaba	<i>Cassia singueana</i>	Uruhogo, Ruhogo
<i>Ficus burkei</i>	Umurengarutare	<i>Parinari curatellifolia</i>	Umunazi
<i>Ficus brachypoda</i>	-	<i>Combretum molle</i>	Umurama
<i>Ficus kitubalu</i>	Umurengarutare	<i>Bridelia micrantha</i>	Umugimbo, Umushashi
<i>Acanthus pubescens</i>	Umutovu, Igitovu	<i>Croton dichogamus</i>	Umuhuhe
<i>Lannea shimperi</i>	Umununa	<i>Croton macrostachyus</i>	Umurangara, Umubonobono
<i>Lannea fulva</i>	Umuzinzigwa	<i>Sapium ellipticum</i>	Umusasa
<i>Lannea humilis</i>	Umushiranyota	<i>Strychnos innocua</i>	-
<i>Lannea stuhlmannii</i>	Umushiranyota	<i>Strychnos spinosa</i>	-
<i>Ozoroa reticulata</i>	Umukerenke	<i>Strychnos usambarensis</i>	-
<i>Phus natalensis</i>	Umusagara	<i>Strychnos lucens</i>	-
<i>Phus vulgaris</i>	Umusagara mabunda, Umusagara	<i>Euclea shimperi</i>	Umushikiri
<i>Annona senegalensis</i>	Umushirashira, Ikiryohera	<i>Ximenia caffra</i>	Umusasa, Umusekera
<i>Acokanthera shimperi</i>	Umusagwe, Umushewe	<i>Olea europaea</i>	Umunuri, Umuzenzenzi, Umunzenze, Umuhongoramugita
<i>Carissa edulis</i>	Umushubi, Umunyonza	<i>Securidaca longepedunculata</i>	Umunyagasozi
<i>Ancylobotrys amoena</i>	Inkamire, Umukamire	<i>Ziziphus mucronata</i>	Umuganzacyaro
<i>Vernona amygdalina</i>	Umubilizi, Umugaragara	<i>Teclea noblis</i>	Umuzo
<i>Kigeria africana</i>	Ikivungovongo, Umuremere, Umuvumgavungo, Umuvungovungo	<i>Toddalia asiatica</i>	Umugasa
<i>Markhamia lutea</i>	Umusave	<i>Fagara chalybea</i>	Intare, Y'irungu
<i>Markhamia obtusifolia</i>	Umukoli, Umukundambazo, Umunyagakoli	<i>Clausena</i>	Umuno
<i>Cordia africana</i>	Umuwugangoma	<i>Haplocoelum gallaense</i>	Umushami
<i>Commiphora africana</i>	Umudahwera	<i>Blighia unijugata</i>	Umuturamugina
<i>Acacia brevispica</i>	Umugeyo	<i>Pappea capensis</i>	Umunena, Umuremampango
<i>Acacia gerrardii</i>	Umugunga	<i>Harrisonia abyssinica</i>	Umufatangwe, Umuganzacyaro

<i>Acacia hockii</i>	Umugenge	<i>Dombeya bagshawei</i>	Umukongwa, Umukwa
<i>Acacia kirkii</i>	-	<i>Dombeya burgessiae</i>	Umukore
<i>Acacia polyacantha</i>	Umugo, Umugu	<i>Dombeya rotundifolia</i>	Umukore
<i>Acacia senegal</i>	Umukonji	<i>Dombeya kirkii</i>	Umukore, Igitubabugama
<i>Acacia sieberana</i> var: <i>vermoesenii</i>	Umunyinya	<i>Pterygota mildbraedii</i>	Humuhumuro, Umugurika
<i>Acacia sieberana</i> var: <i>kagerensis</i>	Umunyarugera	<i>Grewia trichocarpa</i>	Umukoma, Umukomagabo, Umukomagore

Source: Arbres et Arbustes des Regions de l'Est du Rwanda

i) Hill Area

Hill area is characterized with clayey soil and very poor granulated laterite. Climate is characterized by few rainfalls and a long dry season. There is no groundwater of low or average depth and soil dryness is the dominant element of the ecology of this area. The natural vegetation is marked by copses in dense formations. These have a complex structure and have hundreds of species with *Carissa sp.* The grass is on the soil between copses, which constitutes good pasture lands. Until 1975, there was under populated and was only mostly used for extensive cattle livestock and hunting. Since 1975, rapid and controlled populating of the area and an intensive tree cutting led to a number of environment problems linked to soil degradation and climate irregularities. No trees are found in places under cultivation activities and soils are at the great stake of dryness and loss of fertility. In less fertile areas which have kept their pastoral activities, the poor management of zones with copses is a threat for the whole ecological system, whereas overgrazing leads to severe desertification problems, especially at Karama in Gashora Sector. On the depleted and dry soil, implementing agro-forestry system would restore the essential functions, which were fulfilled by copses: freshness, abundant litter, humidity recycling and nutritive elements thanks to deep roots. The agro-forest species, which have the potentiality to be introduced in Bugesera District, are shown in Table 4.5.2

Table 4.5.2 Agro-forest Species, which have the Potentiality to be introduced in Bugesera District

Scientific Name	Local Name	Scientific Name	Local Name
<i>Acacia albida</i>	-	<i>Grevillea robusta</i>	Gereveliye
<i>Acacia sieberana</i>	Umunyinya	<i>Iboza riparia</i>	Umuravumba
<i>Acrocarpus fraxinifolius</i>	-	<i>Jacaranda mimosaeifolia</i>	Jakaranda
<i>Albizzia gummifera</i>	Umusebeya	<i>Leucaena leucocephala</i>	Lesena
<i>Albizzia lebbek</i>	-	<i>Maesopsis eminii</i>	Umuhumuro
<i>Alnus nepalensis</i>	-	<i>Markhamia lutea</i>	Umusave
<i>Cajanus cajan</i>	Umukunde	<i>Morus alba</i>	Iboberi
<i>Calliandra calothyrsus</i>	-	<i>Pithecellobium dulce</i>	-
<i>Cassia siamea</i>	Ikasiya	<i>Prosopis chilensis</i>	-
<i>Cassia spectabilis</i>	Ikasiya	<i>Pterygota mildbraedii</i>	Umuguruka
<i>Cedrela serrata</i>	Sedrela	<i>Ricinus communis</i>	Ikibonobono
<i>Ceiba pentandra</i>	-	<i>Sesbania sesban</i>	Umunyegenyege
<i>Erythraea abyssinica</i>	Umuko, Umurinzi	<i>Tephrosia vogelii</i>	Umuruku, Umurukuruku
<i>Euphorbia tirucalli</i>	Umuyenzi	<i>Trema orientalis</i>	Umudoboli, Umugwamporo
<i>Ficus thonningii</i>	Umuvumu, Igitoma	<i>Vernonia amygdalina</i>	Umubilizi, Umugaragara
<i>Gliricidia sepium</i>	-		

Source: Les Arbres et Arbustes Agroforestre au Rwanda

ii) Surrounding Area

Surrounding area is on the edges of the alluvial plains and on the colluviums of large valleys, which benefit from more favorable hydraulic conditions due to large rivers and their marshy and lacustrine conditions, and the alluvial plain of Nyabarongo is formed with a complex mosaic of marshlands and ponds. It is partially cultivated and grazed during its periods of water level dropping. The alluvial and colluvial soils are also more fertile and densely cultivated. Several types of natural vegetation tending to disappear are still present on marshland shores depending on the soil nature and humidity: on humid alluviums on lake and marshland shores; Savanna with *Acacia* sp., *Markhamia* sp., and big *Ficus*. The dry valleys are covered with grassy savanna whereas bushy savanna with *Grewia*, *Rhus*, *Kigelia*, *Entada*, and *Acacia* cover the colluviums.

Surrounding area is the most densely cultivated; various species or formations can be introduced depending on the area and types of habitats and main desired functions: *Acacia Sieberana vermoesonii*, *Acacia hockii*, *Entada abyssinica*, *Ziziphus mucronata*, *Haplocoelum galaense*. As afforestation species along humid shores are *Markamia Lutea*, *Acacia polycantha*, *Sapium ellipticum*, big *Ficus*.

There are no sites for Ramsar Convention in Bugesera District. However, wetlands along the rivers such as Nyabarongo, Akanyaru, and Akagera, and some lakes are very important for Rwanda's ecosystem. Especially the eastern part of Bugesera District, which has many lakes, such as lakes Gashanga, Rumira, Mirayi, Kilimbi, Gaharwa, Rweru, etc., along the Akagera River has the role of water basin for the entire country.

(b) Fauna

The flora, which is the base to habitat for animals, is already cultivated in Bugesera District. Therefore, the fauna decrease its quantity and quality. Large animals are not found at hill area, just medium or small ones only such as some monkeys and rats. These monkeys sometimes damage agricultural crops. Few hippopotamuses and crocodiles are reported to be in Nyabarongo and Akagera Rivers. Few fishes such as catfish and tilapia have habitat in the lakes, and small size fishes are in rivers. The wetlands harbour some snakes and reptiles. Certain cobra species are said to often attack and harm local population. Birds are relatively many in the wetland. Then some pecking damages by birds are reported



in some places, but the bird flu is not yet confirmed in Rwanda. On the contrary, due to the current exploitation of the wetlands by associations or private farmers, nests trees for birds have decreased from year to year and this is a threat to their habitat. The results from bird survey at Lake Rweru are shown in Table 4.5.3

Table 4.5.3 Bird Count Survey Results at Lake Rweru

Scientific Name	Time		Remarks	Scientific Name	Time		Remarks
	1966	2003			1966	2003	
<i>Phalacrocorax carbo</i>	x	x		<i>Macrodipteryx vexillarius</i>	x		
<i>Ardea cinerea</i>	x			<i>Alcedo cristata</i>	x	x	
<i>Ardea melanocephala</i>	x	x		<i>Halcyon leucocephala</i>	x		
<i>Mesophoyx intermedia</i>	x			<i>Halcyon senegalensis</i>	x	x	
<i>Bubulcus ibis</i>		x	CITES	<i>Ceryle rudis</i>	x	x	
<i>Ardeola ralloides</i>	x			<i>Merops oreobates</i>		x	
<i>Ixobrychus sturmii</i>	x			<i>Merops persicus</i>	x		
<i>Scopus umbretta</i>		x		<i>Merops apiaster</i>		x	
<i>Plegadis falcinellus</i>		x		<i>Coracias caudata</i>	x		
<i>Bostrychia hagedash</i>	x		CITES	<i>Upupa africana</i>	x		
<i>Anas erythrorhyncha</i>		x		<i>Rhinopomastus cyanomelas</i>	x		
<i>Haliaeetus vocifer</i>		x		<i>Indicator indicator</i>	x		
<i>Francolinus afer</i>	x			<i>Campethera cailliautii</i>	x		
<i>Numida meleagris</i>	x			<i>Dendropicos fuscescens</i>	x		
<i>Sarothrura elegans</i>		x		<i>Lanius excubitoroides</i>	x		
<i>Fulica cristata</i>		x		<i>Lanius cabanisi</i>		x	
<i>Balearica regulorum</i>		x		<i>Lanius collaris</i>	x		
<i>Charadrius pecuarius</i>	x			<i>Oriolus larvatus</i>	x		
<i>Vanellus spinosus</i>		x		<i>Oriolus percivali</i>	x		
<i>Vanellus coronatus</i>	x			<i>Laniarius erythrogaster</i>	x		
<i>Vanellus superciliosus</i>	x			<i>Laniarius mufumbiri</i>		x	IUCN
<i>Glareola pratincola</i>		x		<i>Telophorus dohertyi</i>		x	
<i>Streptopelia senegalensis</i>	x			<i>Brodornis pallidus</i>	x		
<i>Streptopelia capicola</i>	x			<i>Cossypha heuglini</i>	x		
<i>Turtur chalcospilos</i>	x			<i>Lamprotornis chalybaeus</i>	x		
<i>Turtur afer</i>	x			<i>Creatophora cinerea</i>	x		
<i>Colius striatus</i>	x			<i>Pycnonotus barbatus</i>	x	x	
<i>Urocolius macrourus</i>	x			<i>Bradypterus baboecala</i>		x	
<i>Musophaga rossae</i>	x			<i>Nectarina olivacea</i>		x	
<i>Corythaixoides personata</i>	x			<i>Ploceus xanthops</i>		x	
<i>Crinifer zonurus</i>	x			<i>Ploceus cucullatus</i>		x	CITES
<i>Oxylophus levaillantii</i>	x			<i>Euplectes axillaris</i>		x	
<i>Tyto capensis</i>	x			<i>Serinus atrogularis</i>		x	
<i>Caprimulgus fossii</i>	x						

Source: Etudes Relatives à la Protection Intégrée et Conservation des Ressources Naturelles des Zones Humides Cretiques du Rwanda, MINITERE

(2) Social Environment

The economic activity in Bugesera District is mainly agriculture; therefore most of the population is widely engaged in agriculture. Infrastructure such as road, health facilities, education facilities are very poor, and electricity and water supply are not yet availed except for some centers. In this respect,

the main road construction from Kigali to Mayange on a distance of 40km and water adduction system covering the whole District have been being implemented respectively from May 2006 and September 2005. With respect to the government laws, the issue to evict the population along the road was raised and the Government or contractor has compensated for houses to be removed, as well as farmlands damaged by construction works. It is worth noting a number of trees and bushes have been cut as well. No problem has arisen until now among the involved residents but it should be carefully examined to conserve natural and social environmental aspects arisen by such a way of constructing in the future.



There are few Batwa as minority in some rural area, and they mainly engage in pottery.

4.5.2 Environmental Problems

Rwanda's environmental problems are mainly associated with inadequate management of natural resources. There are also problems caused by industrial, commercial and human settlement activities and various pollutions.

(1) Natural Environment

1) Degradation of Forest and Soil Erosion/ Flood

Rwanda's relief is uneven and formed of steep slopes, and its soils are fragile and vulnerable, thus, very sensitive to erosion. The displacement of the population caused by the genocide leads to massive deforestation. The use of wood, which is the main source of energy in Rwanda, has accelerated deforestation. Illegal cutting is still practiced. Therefore, soil erosion has occurred across the country, especially in western mountain areas. Bugesera District has not much steep slopes, but soil erosion has occurred in hill area and at riverbanks, as well as on the trails accessing to the marshlands. As a result of field survey, the eastern part of Bugesera District is more sensitive to soil erosion. The damage by heavy rain was observed in Rweru Sector. It occurred on 21 May, 2006. The victim, who is sixty, said that was the heaviest rain she had ever known (more details is shown in 3.1.2, (4) Climate change).



2) Drought

During the previous recent years drought calamity befell to Rwanda, especially eastern lowlands including Bugesera District. The destruction of the plant cover and poor drainage of marshlands have resulted in capacity reduction and water retention period, the drying up of water sources and lakes. This adds to the increasingly frequent climatic disturbances and progressive reduction of natural water reserves in that region. More details on chapter 3, 3.1.2 (4) Climate change.

3) Water Pollution

JICA Study Team could not find any data on water quality analysis of rivers and lakes, and any document on the existing conditions of water quality in Bugesera. As a result of interview survey, the water of Nyabarongo River is polluted by fertilizers and agrichemicals which are used by some coffee or tea plantations, located upper part of the River. During the field survey, it was observed some water pollution sites at some lakes, such as Lake Cyohoha North and Lake Cyohoha South. It is forecasted that the water pollution is caused by domestic wastewater, solid waste, and agricultural wastes. The water volume at lakes is reported to have been progressively decreased during the recent years due to recent drought and degradation of water keeping function by deforestation.

Table 4.5.4 shows results of water quality analysis of the 10 sites in Bugesera District implemented by ZOA. The results in some parameters, such as colour, turbidity, conductivity, hardness, ammonium (NH₄⁺), iron (Fe), etc. at 9 sites out of 10 sites are not satisfied with water standard. Although this water is not suitable for drinking, local population cannot help drinking this water since they have no other alternative.

Table 4.5.4 Water Quality Analysis

Parameter	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	Drinking water sta.	
											NotTreated	Treated
Former District	Gashora	Gashora	Gashora	Gashora	Nyamata	Ngenda	Nyamata	Nyamata	Gashora	Gashora		
Former Sector	Nkanga	Rweru	Rweru	Rweru	Kanazi	Kindama	Maranyundo		Rweru	Mwendo		
Former Cell	Kigina	Maburane	Kintambwe	Gasenyi	Nyamata I	Gatare	Gatare II	Gatare I	Mugina	Kayovu		
Point of Water	Manual pump	Manual pump	Manual pump	Manual pump	Rwakibirizi	Gatare II	Gahombo	Tap (Rwakibirizi)	Manual pump	Manual pump		
Sampling date	11/01	11/01	11/01	11/01	11/01	12/01	12/01	12/01	12/01	12/01		

Colour (Pt Co)	252	196	17	66	17	45	91	0	0	9	15	0-5
Odor	Moderate	Rot	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Taste	Innocuous	Bitter	Innocuous	Innocuous	Innocuous	Innocuous	Innocuous	Innocuous	Innocuous	Salty	Innocuous	Innocuous
Turbidity a) Visual	Trouble	Opaque	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear
b) FTU	54	33	5	14	4	10	15	0	0	3	4-9	6.5-8.5
pH	8.0	5.0	8.5	8.0	5.5	5.5	5.5	6.0	8.0	6.0		
CO2 (mg/l)	82	530	150	100	94	106	76	30	40	169		
Conductivity (ms/cm)	506	541	1759	890	54.0	86.0	54.7	62.2	367	785	1000	100-200
TDS (mg/l)	342	350	1458	584	35.1	56.4	35.4	39.4	338	523		
Alkalinity (TAC) (mg/l)	456	220	980	760	68	56	52	60	284	464		
Hardness (TH) (mg/l CaCO3)	722.4	309.6	1238.4	619.2	28	36	32	40	309.6	516	-	100-200
Total Calcium (mg/l Ca2+)	258	154.8	309.6	258	24	28	24	28	158.8	309.6		
Total Magnesium (mg/l Mg2+)	464.4	154.8	928.8	361.2	4	8	8	12	150.8	206.4		
Ammonium (NH4+) (mg/l)	1.5609	7.224	0.9159	1.806	0.0903	0.2064	0.2193	0.1161	11.8035	0.1548	2.5	0.5
Nitrite (NO2-) (mg/l)	0.0891	0.0132	0.1221	0.0429	0.0198	0.0264	0.0297	0.0198	0.0097	0.0297	1.0	0.5
Nitrate (NO3-) (mg/l)	0	15.84	6.6	6.72	14.96	24.2	7.48	15.84	7.48	7.92	80	50
Fluoride (F) (mg/l)	0.59	0.19	1.19	0.96	0.25	0.10	0.27	0.19	1.18	0.84	1.5	1.5
Phosphate (PO4-) (mg/l)	0.71	0.56	0.84	0.6	2.12	0.65	0.66	0.65	0.27	0.64	-	5
Sulfate (SO4-) (mg/l)	27	375	450	68	0	0	7	0	8	140	-	400
Chloride (Cl-) (mg/l)	13.9	7.7	97	16.2	0.7	0.4	1.1	1.4	17.7	22.9	-	5-20
Iron(Fe) (mg/l)	1.69	1.90	0.30	0.49	0.00	0.00	0.06	0.00	0.28	0.20	-	0.3
Zinc (Zn) (mg/l)	0.02	0.00	0.13	0.10	0.25	0.34	0.31	0.99	0.00	0.07	-	5

Source: ZOA

Legend: bold and underlined Number is not satisfied with treated water standard, underlined number is not satisfied with no treated water standard.

4) Bush Fire

Bush fires are very frequent during the dry season, especially in the eastern and south-eastern regions. It causes land degradation, deforestation and loss of diversity. As a result of interview survey, Bugesera District is very famous for its bush fires to exploit farmland, as well as to prevent monkeys from browsing on sorghum during harvest season. It occurs not only during the dry season but also in the wet season, and not only in wetlands but also in hillside in Bugesera. Grass such as papyrus is burnt in wetlands, tree in hillside. Recently burning of solid waste including incombustibles such as plastics and glasses also became a crucial problem in urban area.



Wetland in Nyabarongo river

(2) Social Environment

1) Vulnerable People

There is a big difference between the male and female proportion of the widowed population: 2.1% of male and 13.9% of female. This might be caused by the 1994 genocide. Ratio of women-headed households is 38.1% on average and among the total population who is engaged in economic activities, women represent 57% on average in the Bugesera District. It might be quite clear that women's role is very important for economic activities as well as livelihood for women. Accordingly, they are forced to do heavy work along the day. As regards orphans' issues, on average about 1% or 583 households were child-headed households (6-17 years) old in 2002 (refer to section 3.2.2 and 3.2.6). They live on tenant farming or lending their land to nearby farmers or governmental supports but not so much. At present, there are no real figures available on the vulnerable people in Bugesera District. More details will be known after the social-economic baseline survey results in October 2006.

2) Returnee's Resettlement to Imidugudu

Rwandan government adopted a national human settlement policy aimed at establishing an improved rural human settlement model, grouping settlements in villages generally known as "imidugudu", which meet the criteria of environmental viability through the recognition of the national space, land form, improved housing quality, etc. In Bugesera District, most of residents in imidugudu are genocide survivors whose houses were destroyed during the genocide and new returnees. They were settled in imidugudu most of the time by NGOs and agencies in charge of rehabilitation.

The target benefits in imidugudu settlement were primarily easy access to basic human needs such as school, water and electricity. During the site survey by JICA Study Team, it was noticed that the residents in imidugudu in Ntarama Sector where is the target area of quick project faced water shortage problem like the rest of the population in the District and no power supply as well. Similarly, other returnees in imidugudu in Mwogo and Nyamata Sectors are allocated with farmland but no houses.

3) Trauma caused by the Genocide

The 1994 genocide affected the Rwanda by large and its aftermaths resulted, among others, in trauma problems for genocide victims. Bugesera is one of the severely affected Districts and counts a number of genocide victims. The interview survey carried out among some medical services and trauma counselors in Bugesera revealed symptoms of trauma cases include wailing, beating, and making noise. Trauma mostly breaks out during the mourning period from April to June. 90 % of these patients are women who experienced violence during the genocide, the rest are mainly teenagers who were too young during that period. Trauma cases are unable to carry out their usual activities or properly pursue

their studies. About 102 patients were medically treated in Nyamata Hospital (District hospital in Bugesera) or all health centers in Bugesera, 2005. A trauma counselor said she has a consultation and mental training for patients without medicines and injections, but treatment is very difficult. With respect to trauma caused by the 1994 genocide, Gacaca Courts, a sort of kangaroo court dealing with Genocide cases is regularly opened in Cell, Sector and District level respectively since July, 2006 in the Study Area and the 110 defendants have been convicted of guilt so far.

4) Health Problems in the Study Area

In the Study Area, several health problems pertaining to their living environment are reported. Below Table 4.5.5 shows 10 primary morbidity causes for patients treated in 12 Health Center in Bugesera District in 2005. The top three patients are reported to malaria, IAVRI (Respiratory disease) and intestinal parasitosis (amoeba). The number of malaria patients including presumed malaria indeed amounted to 50 % of total treated patients. Intestinal parasitosis presumably caused by domestic water amounted to 10.5 % following to respiratory disease.

Table 4.5.5 10 Primary Morbidity Causes in 12 Health Center in Bugesera District (in December 2005)

No	Diseases	0-11 months	1-4 yrs	5-14 yrs	15 yrs +	Total	%
1	Confirmed malaria	401	876	629	1709	3615	35.8
2	IAVRI (respiratory disease)	261	330	190	646	1427	14.1
3	Presumed malaria	194	704	175	276	1349	13.3
4	intestinal(stomach) parasitosis	44	170	146	703	1063	10.5
5	IAVRS	74	176	169	538	957	9.5
6	Skin diseases	35	102	151	225	513	5.1
7	no bloody diarrhea	112	127	38	166	443	4.4
8	Physical traumas	8	34	126	259	427	4.2
9	mouth- dental diseases	1	14	48	116	179	1.8
10	Blood Diarrhea	9	16	12	101	138	1.4
	Total Patients by Age	1139	2549	1684	4739	10111	100.0
	Percentage (%)	11.3	25.2	16.7	46.9	100.0	

Source: Nyamata Hospital in Bugesera District, December 2005

Most possible causes of intestinal parasitosis is presumed that most of the population living in the rural area use river/lake/wetlands water for domestic use including drinking without treatment. This is the cause of many water borne diseases.

5) Social situation of Minorities in the Study Area

The New Constitution including harmonization of tribes was enacted in 2003. Concerning minority in the Study Area, interview survey to stakeholders concerned was carried out during July 2006. The survey results are summarised as follow.

In Bugesera District, Twa tribe is reported to reside in Nyamata and Ntarama Sectors; however, no official data is available because of the said constitution. According to Nyamata Sector Office, 500 to

600 homeless households including Twa tribe are reported. On the other hand, the seven households in Ntarama Sector are recognized and their situation in the community is as below.

Table 4.5.6 Living Condition of Twa Tribe in Ntarama Sector

	Basic Condition	Actual Condition
	Houses	Generally, no own house, and renting house at 800 Rwf house rent per month. Unable to live in <i>Imidugudu</i> (for returnee's settlement houses) due to low priority because of non- returnee.
	Farmland & livestock	No farmland and livestock is owned, and no external assistance from the Government
	Income source	Traditionally, Twa tribe lives for hunting and making pot for sale, thus they usually live nearby the site where clay soil is available. However, income for pot sale is insufficient and work as casual worker.
	Education	No opportunity to go to school due to poverty
	Health	Difficult to receive proper medical treatment due to poverty

Source: Interview results by JICA Study Team, 2006

4.5.3 Results of Initial Environmental Evaluation

JICA Study Team carried out an initial environmental evaluation when rural and agricultural development project is implemented in the wetland and hill area in Bugesera District.

(1) Impacts on Social Environment

1) Impacts on Social Life

Due to the implementation of rural and agricultural development, some impacts caused by resettlement will occur. However, Rwanda has many experiences of resettlement through “*Umudugudu*” policy. Therefore, the impacts are not forecasted, when the adequate resettlement programme is provided. The change of life style, economic activity, infrastructure, and community will take place. These will improve their life; therefore the impacts are positive rather than negative.

The rural and agricultural development will have some potential to affect the minority, such as Batwa, There are some unknown factors on their life. Therefore, an in-depth survey is required, when the development is located near minority's community.

2) Impacts on Health

Agriculture is the main economic activity in Bugesera District. The waste, which will be generated by rural and agricultural development, is mainly natural materials. Therefore, the impacts are not forecasted, when adequate management of waste is implemented.

When the development activity includes the usage of fertilizer or agrichemicals, some impacts will take place. As a result of hearing survey, DDT is still used by some farmers in this District. Therefore, complete management program through seminar, workshop, etc. is required.

3) Impacts on Cultural Property and Aesthetics

This District has been highly affected by the genocide, so there are some genocide memorial sites. Therefore, some consideration to these memorial sites will be required at the development planning stage. The aesthetics of this District consists on natural factors. The impacts will be not forecasted, because the aesthetic which appear newly is also natural factors.

(2) Impacts on Natural Environment

1) Impacts on the Ecosystem

The most part of hillside is already used for agriculture, so the ecosystem in this area is not so valuable. Therefore the impact on ecosystem in hill area is not forecasted, when the existing condition of flora and fauna considered at planning stage. However, careful attention is required, when development is proposed at wetland. Rwanda's watershed is almost one system. Nyabarongo River is the mainstream in this country. Therefore, wetland along this river plays an important role on watershed mechanism. The Nyabarongo, Akanyaru, and Akagera Rivers flow the boundary of Bugesera District, and there are many lakes along these rivers. The special attention to wetland ecosystem should be paid at planning stage, especially in the eastern part of this District.

The wetland has also rich fauna, especially birds. The Ramsar sites are not in this District; however the government has the intention to establish some Ramsar sites in this District. At the planning stage, the movement of the government should be watched.

2) Impacts on Soil and Land

Some small scale of soil erosions is already observed, especially at rural roads in this District. There are many prevention methods in technical by low cost but introduction of these methods is at small scale. Soil erosion is due to heavy rain caused global warming, characteristics of soil, appearance of bare land as a result of deforestation or inadequate land management, etc. Adequate land management appears not to improve easily, but prevention of small-scale soil erosions and reforestation can be relatively easily done. Introduction of reforestation as one of development components highly needs to be considered.

3) Impacts on Water System

When the development at wetland has some activities to change water flow of surface water or groundwater, the impacts on volume of water or water quality will be forecasted. Especially, the development in the eastern part of the District will have the potential to dry up the lakes. Therefore special attention should be paid at planning stage.

Eutrofication at some lakes is already found in Bugesera District. One of eutrofication factor is inflow

of fertilizer. Therefore, adequate usage of fertilizer is required.

In general, the rural and agricultural development is relatively environmental-friendly activities, and JICA Study will propose small scale projects, the significant impacts on environment are not forecasted.

CHAPTER 5 PROGRESS OF THE QUICK PROJECT

5.1 Selection of Quick Project Site

Quick project¹ (QP) was originally scheduled to implement in the second field survey period which starts in November 2006. However, its implementation was brought earlier as the various processes started with the commencement of the Study, May 2006. This advanced schedule resulted from the requests from local authorities such as Eastern Province and Bugesera District to implement QP from the early stage of the Study. Moreover, both parties requested to select Ntarama Sector as the QP site for the following reasons.

- ♦ The JICA's limited fund for QP should be concentrated on one Sector, not dispersed in several Sectors for effective practice. (Otherwise the impact would not be tangible.)
- ♦ There are no intensive activities by other donors in Ntarama Sector.
- ♦ People are still struggling with the damages caused by the 1994 Genocide.

In response to the requests by the District, the Study Team carried out the field survey in Ntarama Sector and other Sectors to grasp the current situation of farmers' problems/needs and to judge the validity of Ntarama Sector as a QP site.

After the field survey, the Study Team acknowledged appropriateness to select Ntarama Sector as the QP site based on the above-mentioned factors.. Like other Sectors, Ntarama Sector has a fragile administrative system due to the recent administrative reform, and it has similar problems/needs as well as natural physical features - hilly area and marshlands - to the other Sectors in Bugesera. Accordingly outcome or lessons learned from the QP could be disseminated to other Sectors and they would not constitute an obstacle in formulating the Action Plan in future. In the end, Ntarama Sector was selected as the site for QP implementation. Summary of the processes is shown below.

Table 5.1.1 Selection Process of QP Site

Date	Activities
24 April 2006	Explanation and discussion of Inception Report to MINAGRI
25 April 2006	Meeting with the Governor of Eastern Province <ul style="list-style-type: none"> ■ Ntarama Sector is a possible site for Quick Project because of serious damage during the genocide in 1994. ■ QP should be in the framework of Province and District development plan.

¹ Quick project (QP) intends to quickly realize diversification of income and improvement of living conditions as a measure to derive initiatives from local population. As compared to pilot projects (PP), which will be implemented in the phase II of the Study, QP has several characteristics in terms of emergency, efficiency and quickness of project results. Hence, it is readily be dealt by the initiatives of local population in small-scale at low-risk.

25 April 2006	Explanation of Inception Report to the Mayor of Bugesera District
5 May 2006	Meeting with the Mayor of Bugesera District ■ Request to implement QP in Ntarama Sector
9-10 May 2006	Interview survey with Cell officers of three Cells, Ntarama Sector
18-19 May 2006	Interview survey with Sector officers of 15 Sectors, Bugesera District

5.2 Selection of Quick Project Component

Regarding the components of QP, Bugesera District also requested the Study Team to be in line with the national policy (e.g. one cow one family) and Bugesera Action Plan as indicated by the Performance Contract, which has made and entered by and between District and the President of the Republic in April 2006. After the field survey, the Study Team proposed following possible components and had discussions with the leaders in 3 cells and Sector officers in Ntarama Sector.

Improvement of Living Conditions

- ♦ Improved Cooking Stove
- ♦ Household Rainwater Storage
- ♦ Two-wheeled Car
- ♦ Expansion of Nursery at Schools and Cells

Diversification of Income

- ♦ Provision of Mosaic Disease Resistant Cassava
- ♦ Small-scale Grain Storage Facility
- ♦ Introduction of Small Livestock (poultry, goat, etc.)
- ♦ Establishment of Bulletin Boards

Extra Proposal Based on the Field Survey

- ♦ Shallow Well Irrigation at Wetland used by Watering Can
- ♦ On-farm Level Drainage System for Soil Conservation
- ♦ Rainwater Harvesting (road side irrigation system)
- ♦ Repairing of Rural Roads
- ♦ Rehabilitation of Small Canals, etc.
- ♦ Compost and Silage making
- ♦ Charcoal Making from Euphorbia Trees

After having discussions at a Cell level, each Cell prioritized the above possible project components. The Study Team brought the results of project components prioritization to the District and had a meeting. The District side excluded some of the components because the District and/or other donors have plans to implement them. Finally, the following components were selected as the QP components with the consent of both JICA headquarters and MINAGRI.

Supported by JICA Study Team

- ♦ Introduction of Modern Cow
- ♦ Installation of Household Rainwater Storage
- ♦ Introduction of Shallow Well Irrigation
- ♦ Introduction of Road Side Irrigation System

Supported by Bugesera District

- ♦ Bulletin Boards at Ntarama Sector and 3 Cells
- ♦ Nursery of Fruit Trees at Schools and Cells

If additional components are proposed by the stakeholders through discussions/workshops at Cell levels, District Mayor and the Study Team will discuss and consider them as the QP components or not. The objectives and preconditions of the four components supported by JICA are summarized in the following table.

Table 5.2.1 Summaries of the Four QP Components

<p><u>Introduction of Modern Cow</u></p> <p>Objective: Income generation, Nutritional improvement, Soil Improvement by manure</p> <p>Preconditions:</p> <ul style="list-style-type: none"> Recipients have a shed-house for cow. Recipients have enough fodder crop plot (at least 0.5 ha). Recipients have experience to raise cattle before. Recipients have strong motivation to raise cows. Recipients are reliable farmers. Recipients reside within sphere where vet-technician can follow.
<p><u>Installation of Household Rainwater Storage</u></p> <p>Objective: Improvement of living conditions</p> <p>Preconditions:</p> <ul style="list-style-type: none"> Priority should be given to the houses far from water source. Priority should be given to vulnerable people.
<p><u>Introduction of Shallow Well Irrigation</u></p> <p>Objective: Income generation, Nutritional improvement (Small scale irrigation for dry season)</p> <p>Preconditions:</p> <ul style="list-style-type: none"> The sites should be near wetland.
<p><u>Introduction of Road Side Irrigation System</u></p> <p>Objective: Soil conservation, Income generation (Rainwater utilization)</p> <p>Preconditions:</p> <ul style="list-style-type: none"> The field should be along the rural road.

Following table summarizes the processes for the selection of QP components.

Table 5.2.2 Selection Process of the QP Component

Date	Activities
9-10 May 2006	Interview survey with three Cell officers (Cyugaro, Kanzenze, Kibungo) in Ntarama
12 May 2006	<p>Proposal of the QP components to Cell and Sector officers in Ntarama Sector based on the field survey</p> <ol style="list-style-type: none"> 1. Improvement of Living Conditions <ul style="list-style-type: none"> ■ Improved Cooking Stove ■ Household Rainwater Storage

Date	Activities			
	<div><div><div>■ Two-wheeled Cart</div><div>■ Expansion of Nursery at Schools</div></div><div>2. Diversification of Income</div><div><div>■ Provision of Mosaic Disease Resistant Cassava</div><div>■ Small-scale Grain Storage Facility</div><div>■ Introduction of Small Livestock (poultry, goat, etc.)</div><div>■ Establishment of Bulletin Board</div></div></div>			
17 May 2006	Feedback from the Cell officers on the results of discussions in terms of priority of QP components in each Cell			
	Priority	Cyugaro	Kanzenze	Kibungo
	1	Modern Cow	Modern cow and Poultry	Rainwater Storage Facility at each HH
	2	Improved Cooking Stove	Rainwater Storage Facility at each HH	Improved Cooking Stove
	3	Rainwater Storage Facility at each HH	Mosaic Virus Disease Resistant Cassava	Modern cow, goat, rabbit and Poultry
	4	Mosaic Virus Disease Resistant Cassava	Storage for grains	Mosaic Virus Disease Resistant Cassava
	5	Fruit Trees (papaya, avocado, mango, etc.)	One wheel cart	Fruit Trees (papaya, avocado, mango, etc.)
	6	-	Improved Cooking Stove	One wheel cart
	7	-	-	Classroom, latrine at school
18-19 May 2006	Interview survey with Sector officers of 15 Sectors, Bugesera District <div><div>■ Confirmed that the issues observed in Ntarama are common and widespread among other Sectors.</div><div>■ The lessons learned could be applied and/or extended to other Sectors.</div></div>			
26 May 2006	7 extra proposals were indicated to the Mayor of Bugesera District by the Study Team based on the field investigation. The Mayor excluded some components because some of the components could be done by the Bugesera District, and the following ones were finally remained as component candidates. <div><div>■ Modern Cow</div><div>■ Household Rainwater Storage</div><div>■ Fruit Trees (papaya, avocado, mango, etc.)</div><div>■ Shallow well irrigation at wetland used by watering can</div><div>■ Rainwater harvesting (road side irrigation system)</div><div>■ Drainage system at on-farm level for soil conservation</div><div>■ Repairing of rural roads</div></div>			
1 June 2006	The Study Team submitted a proposal with the cost and benefit of each component to the Mayor of Bugesera District, and he excluded some of the components since they would be implemented by District and/or other donors. Finally, the four QP components supported by JICA were selected.			

After the selection of the QP components, the Study Team explained basic idea of the work and material sharing with the QP beneficiaries to the officers from the three Cells since the Team considered that contribution from beneficiaries and local authorities was indispensable to facilitate ownership and motivations of the QP by the people.

Table 5.2.3 Basic Idea of the Work and Material Sharing

Component	Share of Beneficiaries	Share of the Study Team
Modern Cow	Labor, Fodder crop, Cow shed, Wood, Nail, Stone	Cow, Sprayer, Cement, Roofing sheet, Technical training, Monitoring costs
Rainwater Storage	Labor, Stone, Sand	Cement, Technical training, Sand, Iron sheets
Shallow Well	Labor, Stone, Tree for fence	Cement, Sand, Rope, Tools (shovel, wheel barrow, etc.), A-Frame, Seeds, Technical training
Road Side Irrigation	Labor, Stone	Tools (shovel, wheel barrow, etc), A-Frame, Technical training

The Cell officers were asked to discuss the priority among the four components with people in each Cell. Through the discussions with people at each Cell, the introduction of modern cow was selected as the first priority in every Cell.

Table 5.2.4 Priority of the Four Components by Cell

Component	Cyugaro	Kanzenze	Kibungo
Cow	1	1	1
Rainwater Storage	2	2	2
Shallow Well	3	4	4
Road Side Irrigation	4	3	3

Table 5.2.5 Activities before Making Plan of Operation

Date	Activities
8 June 2006	Meeting with the Cell council members and Sector officers in Ntarama Sector <ul style="list-style-type: none"> ■ Informed the past of meeting with the Mayor. ■ Explained the four QP components together with various preconditions. ■ Asked the participants to discuss the four components to be prioritized considering various preconditions indicated and their own needs in each Cell.
15 June 2006	Meeting with three Cell representatives and Sector officers in Ntarama Sector <ul style="list-style-type: none"> ■ Presentation of prioritization result by Cell

For the smooth implementation of the QP, the Study Team considered that a participatory approach should be adopted since it allows all the beneficiaries to incorporate their ideas and needs, to be committed and have a sense of ownership; they understand it is their own projects, not JICA projects. Therefore the Study Team tried to involve possible beneficiaries in the meeting from the beginning.

5.3 Progress of Each Quick Project Component

5.3.1 Introduction of Modern Cow

(1) Project outline

This component aims at income generation, soil improvement by applying cow dung manure and nutritional improvement of the local people. In total, 18 modern cows would be introduced in three Cells (6 cows per each Cell). The kick-off workshop was held on 20, 22 and 23 June in Cyugaro,

Kanzenze and Kibungo Cells, respectively. Two technicians from RARDA were also invited to attend the workshop to provide brief lectures on animal husbandry. Following programs were done with the Cell representatives. (See Annex III.1 for the details of workshop.)

1. Self introduction of the participants (ice breaking)
2. Explanation of cow distribution component and its preconditions
3. Lectures in terms of cattle management by RARDA staff
4. Questions & Answers
5. Request to select possible beneficiaries of modern cow in the Cell

The following eight preconditions were given to select possible recipients in each Cell.

- (1) Recipient should be resided in applicable Cell where vet-technician could follow up.
- (2) *Recipient should have a cow shed.
- (3) *Recipient should have an enough fodder crop plot at least 0.5 ha.
- (4) Recipient should have an experience to raise cattle before.
- (5) Recipient should have a strong motivation to raise cows.
- (6) Recipient should be reliable farmer in the community.
- (7) *Recipient should be a member of Association or Cooperatives. Concerning this precondition, it is possible to organize newly association after nomination for recipient.
- (8) Recipient should not have any crossbred and exotic cows.

(The preconditions with asterisk should be cleared by the time to deliver crossbred cow.)

On the workshop day, the responsibilities among the recipients and the JICA Study Team in terms of materials and works were preliminarily indicated to the Cell representatives by the Study Team as shown below. However the details would be decided during the workshop in the course of making a plan of operation.

Table 5.3.1 Preliminary Demarcation of Responsibilities for Modern Cow Distribution

Party	Kind	Description
Cell/People	Materials	Woods for cow shed, stones for cowshed floor Fodder crop plot and feeding stuff for cow
	Work	Labor force for construction of cow shed, management of crossbred cow farming
Study Team	Materials	18 Crossbred Cows (Ankole vs Fresian), Chemical Sprayer, Cement, Roofing sheet for cowshed, nails
	Work	Technical Training via RARDA -Cattle management -Prevention/Treatment on disease -How to organize farmer's organization including marketing aspect -Reproduction of cattle including AI -Practical training in open place Study Tour to advanced crossbred farming farm households Monitoring including technical guidance for four months

According to the preconditions, pre-selection of possible recipients had been processed in each Cell. On 27, 29 and 30 June, with the selected recipient candidates, workshops were held to make a plan of operation in Cyugaro, Kanzenze and Kibungo Cells, respectively. However, after the workshops, it was revealed that some of the selected candidates were not eligible in the context of the preconditions. Therefore selection was again done together with a Sector agronomist in each Cell and the workshop for making a plan of operation was held on 11 July with the 16 recipient candidates of the three Cells (Cyugaro: 5, Kibungo: 5, Kanzenze: 6). The plan of operation for modern cow distribution component is shown in the next page.

BOX People were encouraged to write their own ideas.



Table 5.3.2 Plan of Operation (Modern Cow Distribution)

Quick Project : Modern Cow Distribution
Plan of Operations (0)

Prepared on 11 July 2006

Activities	Schedule							Inputs			Responsible Person(s), Group	
	2006				2007			Personnel	Goods/Materials	Others		
	7	8	9	10	11	12	1					2
1 Fodder crops are ready to harvest. 2 Cow sheds are constructed.										Roof sheets		Individual recipient
										Cement		JICA
3 Training is provided to recipients.										Nails		JICA
										Sand		JICA
										Machete		Individual recipient
										Water storage		Individual recipient
										Wheelbarrow		Individual recipient
										Water		Individual recipient
											Labor	Individual recipient
										Stones		Individual recipient
										Wood		Individual recipient
										Shovel		Individual recipient
4 Study tours are provided to recipients.									Mason			Individual recipient
									Livestock experts			JICA
										Training text		JICA
											Transportation	JICA
										Notebook		JICA
										Pen		JICA
											Lunch	JICA (Rwf 1,000/person)
											Training Venue	Individual recipient (JICA: Rent fee)
											Transportation	JICA
											Lunch	JICA (Rwf 1,000/person)
5 Vet-technician is available in the area. 6 Cows are delivered to recipients. 7 Delivered cows are properly managed.									Veterinary Technician			-2007.2 JICA, 2007.3- Recipient
										Modern cows		JICA
										Sprayer		JICA (one for each cell)
										100 ml Akaricide		JICA
										Drugs		Individual recipient
										Machete		Individual recipient
										Trident		Individual recipient
											Insemination	Individual recipient
										Wheelbarrow		Individual recipient
										Fodder		Individual recipient
8 Monitoring is properly done.										Salt Block		Individual recipient
										Milk can		Individual recipient
										Broom		Individual recipient
										Bicycle		Individual recipient
										Cutter		Individual recipient
												Individual recipient, Cell, Sector, JICA, RARDA

(2) Technical Training Program for the Recipients

Based on the Plan of Operation agreed with the recipients for modern cow distribution, the technical training program (See Annex III.2) was carried out by the RARDA- JICA joint team during the August 1-3, 2006 at MANDERA Woman Promotion Center in Ntarama Sector as below.

Table 5.3.3 Summary of Technical Training Program

Expert/RARDA		Training Subject	Time	Remark
August 1 (Tue) 8:00 – 14:00				
1	JICA Study Team	Briefing of Training Program	20 min	Distribution of training program and module
2	Dr. Rutagwenda Director General of RARDA	-Opening Remarks -General Introduction of Modern Cow Program	30 min	
3	Ms. Angelique (RARDA Staff)	-General Introduction of Cow Management -Cowshed Construction	120 Min	
4	Dr. Abel/RARDA	-Animal Nutrient	90 min	
5	Mr. Kagabo Andrew (RARDA)	-Animal Reproduction	100 min	
August 2 (Wed) 8:00- 14:00				
1	Mr. Kagabo Andrew	Artificial Insemination	40 min	
2		Animal Health	180 min	
3	Ms. Angelique	-Formation of Association including marketing aspect	75 min	-Cell Office role -Board Member -Schedule
August 3 (Thu) 8:00 – 14:00				
1	RARDA Staff and JICA Study Team	-Open class a. Evaluation of the host farmer’s dairy farm management	Half days	-Modern Cow Keeper in Kanzenze Cell -Traveled by minibus
2	RARDA Staff & JICA Team	-Overall Discussion for future schedule and training evaluation a.Site of offloading materials b.Selection of a recipient for the 1 st cowshed construction c. Schedule of study tour d. Formation of Association e. Evaluation of Training Program	60 min	Results of Discussion (See below Table)

Source: JICA Study Team, July 2006

Prior to commencement of the training program, JICA Study Team has made a training module in Kinyaruwanda language by inserting several illustrations about cowshed, compost pit, crush-pen, silage pit and so on so as to make the trainees including illiteracy understanding visually in consultation with



Practical Training in Farmer's Field

RARDA staff (See Annex III.3).

Under participation of the 18 recipients (See Annex III.6), Cell/Sector/District Officers, local vet-technicians and relevant NGO, three-days technical training program was successfully completed without any dropout and strong motivation of the recipients was actively generated by raising various questions through the training sessions (See Annex III.4).

(3) Results of Overall Discussion

Prior to closing the three days training program, overall discussion for the future schedule and the evaluation on the Training Program was practiced, and the following subjects were discussed and adopted.

Table 5.3.4 Progress of the Decision Matter discussed among the 3 Cell Recipients for the future schedule of the Modern Cow Distribution

	Construction Materials	Off-loading Site		
		Kanzenze	Cyugaro	Kibungo
1	Roofing sheet, nail, cement, mesh	Cell Office	Cell Office	Cell Office
2	Sand(fine and coarse)	No.6 Kayiranga Paul, No.3 Kayitabu Onesphore	No.6 Murenzi Sylvestre No.3 Karake Jean Claude	No.2 Muguareza Inocent No.5 Mukabisangua Marie
3	Construction site of model cowshed	No.5 Mandenge Anne Marie	No.3 Karake Jean Claude	No.5 Mukabisangua Marie
	Subjects	Details		
4	Study Tour	Visiting Site : 1) Dr. David Dairy Farm in Gahanga area, 2) Dr. Jacque's Cattle Farm in Kanzenze Area Date & Time: August 8 (Tuesday), 9:00 am Meeting place: Mandera Woman Promotion Center Movement: Minibus 2 units + 4 WD land cruiser		
5	Formation of Association	The recipients by Cell shall report the nominated board members of farmer's association to the Agronomist in the Sector Office by August 15 (Tuesday).		
6	Evaluation	RARDA-JICA Joint Team asked for any comments about the intensive technical training program so as to improve training program in the future, and the comments arisen by the recipients were as follows: • Woman(3 participants) : Training program was excellent and we appreciated RARDA-JICA's training programs. • Men (6 participants): The training was excellent and we appreciated RARDA-JICA for organizing this program. We will do our best for taking care of crossbred and we would like RARDA-JICA to monitor our performance.		

Source: JICA Study Team, August, 2006

(4) Study Tour

In order to strengthen management capacity of modern cow keeping for the recipients, the study tour was conducted by visiting two cattle farms, where are located in and around Ntarama Sector on August 8, 2006. The numbers of the participants for the study tour amounted to 28 including the

agronomist and three vet-technicians in Ntarama Sector who are supposed to play an important role for supporting the recipients in the said quick project.

The first visiting farm was a large scale of modern dairy farm with 50 heads of Frisian spp raised in nearby Kigali (See the right figure), and the 2nd site, cattle fattening farm within Ntarama Sector. The recipients were actively raising questions to the host farmer in terms of animal health, feeding method, lactation method and so on (See Annex III.5).



(5) Progress

As of mid-August, 2006, the result of monitoring and evaluation on the QP is summarized below. Since the last decision for the future schedule made on August 3, some change for off-loading site of the construction materials was made according to views of security and convenience for delivery. Meanwhile, board members of farmer's association as per each Cell recipient group have already been selected except for legalization process. Further, whole recipients have already provided the construction materials like stones and wood according to the PO made on July 11, 2006.

Table 5.3.5 Monitoring Results of the Recipients for Modern Cow Distribution

	Construction Materials	Off-loading Site		
		Kanzenze Cell	Cyugaro Cell	Kibungo Cell
1	Roofing sheet, nail, cement, mesh	No.2: Kayenamura Marcel House (President)	No. 6: Murenzi Sysbestre House (Treasurer)	No. 6: Gakwisi Inocent House (President)
2	Sand(fine and coarse)	No.6 Kayiranga Paul, No.3 Kayitabu Onesphore	No.6 Murenzi Sylvestre No.5 Nzamwita Jean Bosco	No.2 Muguwareza Inocent No.5 Mukabisangwa Marie
3	Construction site of model cowshed	No.5 Mandenge Anne Marie House	No.3 Karake Jean Claude House	No.5 Mukabisangwa Marie House
5	Formation of Association	President: Mr. Kayinamura Marcel Vice President: Mrs. Mandenge Anne Marie Secretary: Mr. Kayiare Onesphore Treasurer: Mrs. Mukakayiru Enatha	President: Mr. Ahimana Apollinaire Vice President: Mrs. Kandamutsa Florence Secretary: Mr. Karake Jean Claude Treasurer: Mr. Kurenzi Sylvestre	President: Mr. Gakwisi Inocent Vice President: Mr. Nyagasaza Jean de Dieu Secretary: Mr. Mugwaneza Innocent Treasurer: Mrs. Kukabisangwa Marie
		List of board members for the association by Cell was submitted to the Agronomist on August 7 based on the result of discussion by each Cell group.		
6	Progress of	According to the PO, the	According to the PO, the	According to the PO, the

	Material provision	six recipients have already provided wood and stone for construction of cowshed.	six recipients have already provided wood and stone for construction of cowshed.	six recipients have already provided wood and stone for construction of cowshed.
--	--------------------	--	--	--

Source: JICA Study Team, August, 2006

(6) Future Schedule

After the study tour, the construction materials including cement, iron roofing sheets, nails and sands are scheduled to be distributed to the recipients properly, and construction of a model cowshed is demonstrated at selected construction site among the recipients by each Cell under participatory approach of the recipients. Purchase and distribution of crossbred cow into each recipient is scheduled to make in late October to November under intervention of RARDA staff and the JICA Study Team in order to minimize a risk on animal health.

5.3.2 Installation of Household Rainwater Storage

(1) Project Outline

This component aims at improvement of living conditions of local people (particularly, those who are presently suffering from water scarcity for domestic use and have troubles in fetching water) by installing household rainwater storage. In total, 90 households (30 households in each Cell) are targeted.

About two weeks after the prioritization workshop held on 15 June, an explanation workshop was held with the representatives from the three Cells and the officers of Ntarama Sector on 28 June. After the self-introduction of participants, the Study Team explained the project contents of other three water related components: household rainwater storage, shallow well irrigation and road side irrigation.

In the workshop, the responsibilities among the recipients and the JICA Study Team in terms of materials and works were preliminarily indicated to the Cell representatives by the Study Team as shown below. However the contents are changeable according to the locally available materials.

Table 5.3.6 Preliminary Demarcation of Responsibilities for Household Rainwater Storage

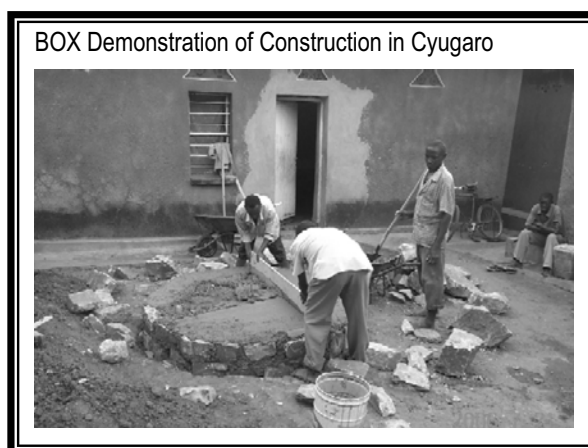
Party	Description
Cell/People	Following items should be collected and contributed by a group of recipients: 1) Stone, 2) Sand, 3) Water, and 4) Labor.
Study Team	The Study Team provides following materials. 1) Iron sheets, 2) Wires for gutter, 3) Cement Tools (wheelbarrow, shovel, pick, hoe, etc.) are provided to the Cell Office and recipients should borrow them from the office. Technical training is given to recipients through demonstrations.

During the workshop, following points were emphasized for the selection of recipients.

- Priority should be given to those who are far from water source at present. (e.g. Fetching water takes more than 2 hours.)
- Priority should be given to those who are still far from the pipe water system, which are presently being constructed by a French contractor, SOGEA SATOM. (The construction of the water system is financed by the EU and scheduled to be finished in February 2007.)
- Priority should be given to vulnerable people. (e.g. elderly people, widows, orphans, etc.)

In addition, the Study Team requested the representatives from the three Cells to make a list of recipient candidates in line with the above conditions.

Although it is common to make a plan of operation firstly and then start various activities in accordance with the plan, the Study Team decided to start with some demonstrations of rainwater storage construction because of the two reasons: (1) the detailed data in terms of construction materials, schedule and costs should be collected through the demonstration, and (2) some of the workshop participants didn't seem that they thoroughly understood the component because some other donors had provided rainwater storage facilities without any duties from the beneficiary side in Bugesera District. The first demonstration of rainwater storage construction was started in Kibungo, Cyugaro and Kanzenze from 19, 20 and 26 July, respectively.



(2) Cost / Working Sharing

Objectives of the QP are (i) to keep sustainability through the implementation of the project based on the local population's needs, (ii) To strengthen sense of solidarity among local population through collaboration activities so that the participants are required cost/working sharing strongly.

On the contrary the household rainwater storage tank (storage capacity about 1.0m³) was constructed by Luxemburg project at Kibungo Cell as a QP target site. The reason of the selection is far a away from the fountain to be constructed by SOGER and all construction materials as well as labor fee are born by Luxemburg. Under this situation, Kibungo Cell representatives requested the Study Team to bear all costs for the construction of rainwater storages as Luxemburg project.

Following discussion with Cell representatives on the aims of the QP, it was agreed that the recipients have to collect the construction materials such as stones, sand, etc. as much as possible and collaboratively participate in the construction work. During the preparation of the participatory

activities for QP implementation by the Study Team and the Cell representatives, they have at least raised their awareness about the QP purpose.

(3) Implementation of the rainwater storage as a demonstration

During the discussion process with recipients on their contribution regarding implementation and extension of rainwater storage component, the Study Team considered that the recipients should carry out themselves a series of participatory activities such as collection of the construction materials and making concrete, etc. Experience through this process is very important and it presents the real situation to help them understand the participatory approach. One household was selected to construct rainwater storage by Cell representatives as a demonstration to construct. After demonstration activities, an Operation Plan is to be formulated through workshops. In addition, it is envisaged to construct rainwater storage for schools at each Cell due to serious problems to secure water for school provided-lunch. The demonstration process for rainwater storage is described as below.

Table 5.3.7 Process of the Implementation of the Rainwater Storage

Cell	Kibungo	Cyugaro	Kanzennze
Person responsible	Executive Secretary: Mr. Patrick	Cell coordinator: Mr. Andrew	Executive Secretary: Mr. Gatabazi
List of recipients	30persoons, July 10 th received	30persoms, July 11 th received	30persons, July 13 th received
Demonstration date	July 19th	July 20th	July 26th
Target	69yeas old man with wife, ask for fetching water (100Rwf/ Jerrican/2tim	Widow, care of a few orphans Old women and water source is far away	Cell coordinator, resident is within the Umudugudu. Water source is far away

(4) Tangible facts while implementing the demonstration of rainwater storage

It emerged out the following during the demonstration of rainwater storage.

1) Problems and measure regarding the rainwater storage structure design

At first a structure design was adopted the conventional one as a model, which is widespread used at public facilities such as schools and Cell offices, etc. (cylinder type, stone masonry, storage capacity in 3 m3 class, see the picture below on the left). The structure is quite familiar to the local population. Study Team introduced an alternative structure design and a mason living in Nyamata was employed and recipients involving construction activities were undertaken. The picture below on the right shows the improved one using burnt bricks instead of stones by the Study Team. During the demonstration implementation, the following issues were pointed out.

- Conveyance of the stones from Cell office to the site is quite difficult for women and old men
- It takes long time and hard work for smashing and trimming the stones.
- Experienced techniques are required to load stones /bricks and to fabricate reinforcing bar.

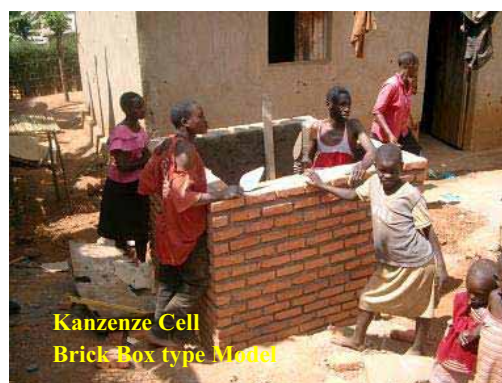
- Design of structure is over estimated and design stress is too strong.
- Construction period from 13-15 days seems to be not realistic for every household
- Construction cost is about US\$350/facility and it is very expensive for local population



In this respect, the Study Team proposed 2 types of structure design namely a) Box type storage using burnt bricks and b) Wooden box with vinyl sheets, storage capacity is about 1m³, respectively. The former was introduced at Kanzenze Cell at first to solve the above-mentioned problems. Merits of the Box type storage using burnt bricks are as below:

- It is technically appropriate level to construct for local population without making resource to sophisticated technique.
- It is easy to handle and convey construction materials for women and old men recipients.
- Construction needs to be done in a short time.
- Construction cost should be cheap.
- From the viewpoint of extension purpose, storage facility model is easy to imitate

In addition to the above mentioned condition, transportation of construction materials should especially be carefully considered from the aspect of extension purpose in future not only for the QP but also for other projects. As residents are divided into two categories, namely a) people living in **Imidugudu**, which are located from flatland to inclined plane with relatively gentle slope, and b) the residents scattered on steep slope of the hilly. It is quite difficult to convey heavy construction materials to the latter residents.



At for the demonstration of Brick Box type model at Kanzenze Cell, it took only 2 hours for excavation and placing concrete of foundation and its working time was short as only about 2 hours

compared with the conventional type at Kibungo and Cyugaro that took 1 day for foundation work. Wall construction work was also easier and shorter than that of conventional methods. Construction cost including labor's fee is estimated at about US\$130 which is about 2.7 times cheaper than the conventional method. Table 5.3.11 shows the comparison for dimension, storage capacity, materials, etc between conventional, improved conventional and JICA proposal of rainwater storage.

Table 5.3.8 Comparison between Conventional and JICA proposal method of Rainwater Storage

Dimension, materials	Conventional Method	Improved Convent. Method	JICA Proposal Method	
	Stones	Stones/Brick	Type A (Brick)	Type B (Wood)
Dimension	1.2m,H=1.5m	1.2m,H=1.5m	1.2x1.2 m, H=1.0m	1.2 x 1.2m H= 1.0m
Storage Capacity m ³	1.70 m ³	1.41 m ³	1.44 m ³	1.44 m ³
Fine Sand	18 wheel barrows	31.5 wheel barrows	3 wheel barrows	-
Coarse Sand	18 wheel barrows	2 wheel barrows	6 wheel barrows	-
Cement (50kg)/suck	10.5	8.5	4	-
Brick (20x10x5)	66	700	700	-
Water Prof. (nos)	10	8.5	2	-
Wood	-	-	-	0.66 m ³
Masonry/ person	1	1	1	-
Helper	2	1	1	-
Working Period	15 days	13 days	3 days	-
Cost (US\$)	370	350	130	120

On the other hand the Study Team and representatives of each Cell studied the location of the recipients' houses. It was found that 6 houses in Cyugaro and 6 in Kibungo are very difficult to access by car and to convey construction materials such as cement, gravels and rock, etc. by wheelbarrow due to the topographical condition. As a result of discussion between Cell representatives and recipients, they agreed to introduce wooden box with vinyl sheet instead of brick box type.

2) Stone and Sand Collection by recipients

As mentioned above, some construction materials had to be collected by recipients themselves as part of cost sharing, but so far recipients have been unable to fulfill their commitments. Some of the reasons are a) some recipients are elderly persons, women or disabled persons, b) Some of the local population tend to rely on outside assistance such as JICA Study Team as same as Luxemburg project.

3) Level of participation in demonstration activities and its remedial measures

Although the project intends to construct rainwater storage at each household, recipients need to participate in collaboration work. Actually level of recipients' participation was found to be extremely poor as table below shows. The Study Team requested the Cell offices to improve such situations but no improvement has so far been observed.

Table 5.3.9 Number of Participants for Demonstration in each Cell

Date	Kibungo		Cyugaro		Kanzennze	
July 19 th	1 st day	18 participants				
July 20 th	2 nd day	4	1 st day	3 participants		
July 21 st	3 rd day	1	2 nd day	2		
July 22 nd	4 th day	1	3 rd day	2		
July 23 rd	5 th day	1	4 th day	2		
July 24 th	6 th day	1	5 th day	2		
July 25 th	7 th day	1	6 th day	1	1 st day	8 participants

Note: Participants means recipients of each Cell

Under these circumstances, the Study Team carried out an interview survey among recipients at Kibungo and Cyugaro Cell on 26th July 2006 and found out the following reasons.

- There was no information from Cell office when a demonstration is commenced
- It couldn't participate in because distance between the demonstration site and own home is far away
- Farming practices was so busy.
- It was difficult to participate in long term because the construction period of conventional methods takes 2 to 3 weeks and also was so doubtful when the construction is commenced at his/her own house.
- When some recipient are reluctant to participate as they doubt who already received his/her own rainwater storage will participate or not so that he/she does not participate in the demonstration construction work.

The most important problem was found that “there was no information from Cell representatives when a demonstration is commenced”. This shows the lack of management and adjustment abilities for Cell officers. One of main reasons is they have no distribution information instruments except for bicycle or on foot.



Under these circumstances, a) confirmation of the recipients again, b) grouping the recipients and select the Leader at each group, c) distribution information system is decided as Study Team-Cell officer in charge of the project-Group leader-Group member d) cost sharing, and e) construction of schedule at each group were agreed through the discussion of interview survey at each Cell. In accordance with the decisions, construction of rainwater storage at each household was scheduled. Accordingly the plan of operation was decided realistically at this place. Members list of recipients at each Cell is shown in Annex III.7.

(5) Progress up to now and further Implementation Schedule

17 numbers of rainwater storage were completed until the end of August 2006. Taking consideration of the actual progress till now, construction of whole work will be completed at the end of December 2006 in cooperation with the recipients. During construction period, construction materials borne by Study Team should be delivered timely and appropriate site so that the implementation organization has formulated as shown in Figure 5.3.13.

Table 5.3.10 Implementation Schedule for Rainwater Storage by using Bricks

Cell/Month	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Kibungo	1*	4	5+6* ³	5	5	4	30
Cyugaro	1* ²	5	5+6* ³	5	5	3	30
Kanzenze	0	6	6	6	6	6	30

Note: 1*; Conventional, 1*²; Revised Conventional, 6*³; Wooden box

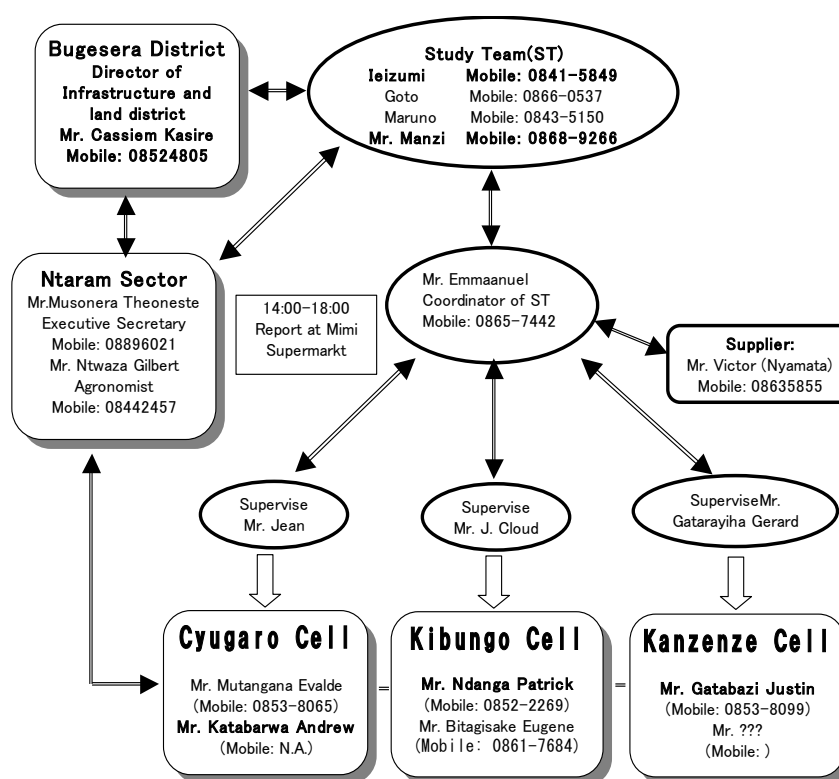


Figure 5.3.1 Implementation Organization Chart for Rainwater Storage Construction

5.3.3 Introduction of Shallow Well Irrigation System

(1) Outline of the Project

This component aims at income generation and improvement of nutritional condition of local people during dry season through farming around shallow wells near wetland. In total, 30 wells (10 in each Cell) will be introduced.

An explanation workshop was held with the representatives of the three Cells and the officers of Ntarama Sector on 28 June, and the Study Team explained the project contents of shallow well irrigation. In the workshop, the responsibilities among the recipients and the JICA Study Team in terms of materials and works were preliminarily indicated to the Cell representatives by the Study Team as shown below. However the contents are changeable according to the locally available materials.

Table 5.3.11 Preliminary Demarcation of Responsibilities for Shallow Well Irrigation

Party	Description
Cell/People	Following items should be collected and contributed by a group of recipients: 1) Stone, 2) Sand, 3) Water, 4) Tree for fence, and 5) Labor.
Study Team	The Study Team provides following materials. 1) Cement, 2) Wooden board/timber, 3) Rope, 4) Seeds of vegetables, and 5) A-Frame, if necessary. Tools (wheelbarrow, shovel, pick, hoe, etc.) are provided to the Cell Office and recipients should borrow them from the office. Technical training is given to recipients through demonstrations.

During the workshop, following points were emphasized for the selection of beneficiaries and sites.

- Beneficiaries should be members of groups such as associations, not individual farmers.
- The sites should be near wetland.

The Study Team also requested the representatives from the three Cells to select suitable sites within each Cell.

Like the introduction of rainwater storage component, the Study Team decided to start with demonstrations of shallow well construction before making a plan of operation because of the two reasons: (1) the detailed data in terms of construction materials, schedule and costs should be collected through the demonstration, and (2) some of the workshop participants didn't seem that they thoroughly understood the component. The first demonstration of shallow well construction was started in Kanzenze on 25 July.

(2) Selection of the sites and Type of Irrigation System

The process of selection of the sites are a) Explanation of the aims of the project by the Study Team, b)

Selection of the sites by Cells, c) Fields survey both the Study Team and Cell representatives, d) Decision of the sites and identification of the recipients. Through the process, following sites are selected as Shallow Well Irrigation System project. Members list of recipients at each Cell is shown in Annex III.8

Table 5.3.12 Selected Sites for Shallow Well Irrigation System

Site	Kibungo	Cyugaro	Kanzenze
Group 1	Kagoma marshland	Cyingabo marshland	Nyirarukushya mars.
Group 2	Rugazi marshland	Ruchahabi I marshland	Karumuna marshland
Group 3	Ryarutanga marshland	Ruchahabi II marshland	Kwibuga marshland
Group 4	Nyirabahanga marsh.	Rutovu marshland	Kabeza marshland.
Group 5	Kimondo marshland	Cyato marshland	Muzi Cyeru Marshland
Group 6	Kiganwa marshland		Karumuna 2 marshland
Group 7	Gashyamagariro marsh.		
Group 8	Rujabagne marshland		

Lessons learned from the rainwater storage implementation, and through the site survey, it was found that construction materials such as stone, sand, cement, and reinforcing bar are difficult to convey by truck as well as wheelbarrow by manpower. From the point view of sustainable extension purpose, basic policy for construction of the facility should use natural resources obtained at the site. Accordingly wet masonry or concrete for shallow well frame is not adapted.

In accordance with the fluctuation of the groundwater level, association member or individual farmer practices vegetables farming beside the marshland and rivers. From July groundwater level is lowering from day to day, farmland is extended toward marshland/river. On the contrary from October groundwater level is raising, farmland is shrunk toward hilly area. In generally farmers use watering can to irrigate vegetables but distance from water source and farmland is 20m-40m away and very inefficient. Some places farmers use potable pumps rented by private company but very few.

Considering the secular variation of the groundwater, topographical condition of the farmland and current inefficient irrigation methods, it emerged out from the site survey that the following improved irrigation methods of 3 types, which are easy to construct within a short period at low cost are to be proposed.

Type I, Shallow well: Groundwater level in dry season becomes more than 3m lowering then shallow well around 4m below from ground is being dug.

Type II, Small scale canal: Groundwater level in dry season become 1m -2m lowering then about 20m from marshland to farmland of canal is constructed

Type III, Small-scale farm pond with canal: Groundwater level in dry season become 2m-3m lowering then 9m² (3m x 3m, 3m in depth) of pond is constructed with canal.

1) Demonstration: Type I, Shallow well

First demonstration at Muzi Cyeru marshland, Kanzenze Cell was carried out with 9 recipients on July 25 2006. During 2.5 hours working about 1.5 m was dug and groundwater level was only 8cm from the bottom of well but next day on 26 July groundwater level found at 0.60m in depth. Construction of embankment work around the well was done on 7 August 2006. Currently vegetables such as tomato, green onion, etc. are planting and farmers wanted pesticides and sprayers. Final finishing of well is summarized as below.

Type I: Shallow Well

Width: 2m x 2m, Depth: 1.8m

Embankment around well: h=0.50m



2) Demonstration Type II, Small Canal

Demonstration Type II was carried out on 4 August 2006 at Gashyamagariro marshland, Kagoma Village, Kibungo Cell. During 3 hours operation about 20m from marshland to farmland, 1.0-1.5 m in depth was excavated with 9 participants. After that 0.5m-1.0m of digging at bottom was completed on 9 August 2006. 17 farmers practice vegetable farming such as sweat potato, tomato, etc at site. After completion of the work , farmers quite satisfied with their perfpmance. Farmers desire to have watering can storongly. Throug the discussion between Study Team and participants, next demonstration site and consruction schedule were dicided as Rjabagwe marashland siteon on 18th August 2006. Through the working and interacting with the receipients, agressing farmer to lead his associater was not found and this is a issue to strngthening a farmes organization in future. Final finishing is summarized as Box right.



Type II: Small Scale Canal

Width: about 1.5 m, Depth: 1.5-1.8m

Length: l=20m

3) Demonstration Type III, Small Scale Pond with Canal

Demonstration Type III was carried out on 16th August 2006 at Rutovu marshland in Cyugaro Cell. In this area RengeraIbidukikije Association (Protection of Environment) was established with 55 households and about 10ha of farmland was reclaimed since 2003. Contract for tomato farming with a factory in Kigali has been concluded. Currently hilly area of farmland is irrigated by mobile pump

(rental fee 3,000Rwf/day) and near marshland by watering cans. The pond has been already constructed but farmers are suffering from irrigation by watering cans due to inaccessibility of road leading to the pond, which is muddy. In addition, watering takes so many times. The Study Team recommended constructing conveyance canal from the pond to farmland and the president of the association agreed to start the work. Within a couple of days construction of canal will be completed. Final finishing will be summarized as box bellow.

Type III: Farm pond with canal

Existing pond: 3m x 4m, depth: about 3m
Canal Dimension: l=20m, width, 1.5m,
depth 1.5m



(3) Progress up to now and further Implementation Schedule

Until the end of August 2006, 3 types of irrigation system were demonstrated in collaboration with the recipients. Through the implementation of the systems, Study Team recommended and instructed recipients how to use water for irrigation purpose and how to construct irrigation facilities then they worked themselves using their hoes and shovels and picks provided Cell offices by Study Team. Accordingly Plan of Operation (PO) should be decided at site on a case-by-case basis taking consideration of groundwater condition as well as topographic one. It is therefore PO for remaining candidate sites has to be formulated in the presence of the recipients and Study Team one by one at site. The progress up to August 2006 and further schedule are shown as following.

Table 5.3.13 Implementation Schedule for Shallow Well irrigation

Cell/Month	July	Aug.	Sept.	Oct.	Nov.	Total
Kibungo	0	2	4	2	0	8
Cyugaro	0	2	2	1		5
Kanzenze	1	2	2	1		6

5.3.4 Introduction of Road Side Irrigation System

At present priorities are given to the implementation of the household rainwater storage and shallow well Irrigation System. So that candidates site will be identified in cooperation with each Cell representatives and then demonstration will be scheduled at the beginning of September 2006.

5.4 Baseline Survey for Selected Quick Project Site

In accordance with implementation sites and components of the quick project agreed upon with the Bugesera District, a baseline survey on the beneficiaries of the quick projects was confined to Ntarama Sector, comprising of three Cells. Total numbers of the beneficiaries over the four components of the quick project are expected to be around of 250 households as of the end of August, 2006. From the selected beneficiaries of the QP components, the baseline survey was commenced by sampling middle class of the beneficiaries, and the outline of the baseline survey is as follow.

(1) Objectives

The baseline survey is aimed at grasping the basic information for analyzing of agricultural and rural development potential and constraints together with index for evaluation of the quick project and the pilot project.

(2) Survey Method

The baseline survey was commenced based on the following steps.

Table 5.4.1 Step of Baseline Survey

1)	Briefing to the enumerator about the overall outline of the baseline survey with the questionnaire and revision of the questionnaire through preliminary test for 2 days in the Quick Project site
2)	Interview survey: 5 days through collective interview of small group comprising of 3 – 5 households by splitting the target households by QP component into morning and afternoon groups.
3)	Analyses of interview results and confirmation: 5 days
4)	Total: 14 days for overall working days and scheduled in August, 2006

The outline of the baseline survey for the household economy on the quick projects is summarized as below.

Table 5.4.2 Summary of Baseline Survey for the Beneficiaries of Quick Project

Items	No	QP components	No of Beneficiaries in QP	No of Sampling Households
Target Group	1	Rainwater Storage	90 HHs in 3 Cells (30 HHs in each Cell)	5 HHs in each Cell (medium level HH) Total: 15 HHs
			Remark: -Main objectives: Secure domestic water and save time for fetching water -Monitoring is mainly how to use of spare time for the family generated by the rain water storage system during the rainy season. -Monitoring period should be one year.	
	2	Shallow well Irrigation	30 sites in the 3 Cells (around 124HHs) a. Kanzenze: 6 sites: Around 32 HHs b. Kibungo: 8 sites: around 67 HHs c. Cyugaro: 5sites: around 25 HHs	5 HHs in each Cell (medium level HH) <u>Total: 15 HHs</u>

			Remark: -Main objectives: Improving of farming activity in the dry season (Income generation) -Monitoring should be based on farming activity and income generation. -Monitoring period should be through the Study Term.	
	3	Roadside Irrigation	30 sites in the 3 Cells (around 30 HHs) (10 sites per each Cell) a. Kanzenze 2 sites: 10 HHs b. Kibungo 2 sites : 10 HHs c. Cyugaro 2 sites: 10 HHs Remark: 4-5 HHs per each site is estimated (Based on 200-300 m length of suitable road distance).	5 HHs in each Cell (medium level HH) <u>Total: 15 HHs</u>
			Remark: -Main objectives: Improving of farming activity (Productivity and soil conservation during the rainy season) -Monitoring should be based on farming activity and income generation. -Monitoring period should be through the Study Term.	
	4	Modern cow Distribution	18 HHs in the 3 Cells (6 HHs in each Cell)	3 HHs per each Cell <u>Total: 9 HHs</u>
			Remark: -Main Objective: Improving Farming activity (Income generation, soil improvement, nutritional improvement) -Monitoring should be based on income generation, application of manure to crop and family health aspects. -Income generation by the QP is supposed to start from 5-6 months after distribution of heifer in-calf (when cow start lactation). -Thus, outcome should be monitored through the Study term.	
	Total HHs for Survey		54 House holds (Tentatively):	
	Monitoring method		Monitoring Period and Method: QP1: One year to cover bimodal rainy season QP2, 3, 4: Through the Study Period because of involving farming activity. No of HHs in monitoring: Selecting bench mark HHs as per each QP objectives based on clarifying criterion of selection	
Method	Enumerator: 1. One Chief Surveyor (local consultant) 2. Two Assistants (Living in Nyamata; experience of HHs survey in Millenium Village before) Collective interview method in a small members comprising of 3-5 households could be considered by convening the recipients in a meeting place (Cell Office or church, etc) for facilitation of survey efficiency.			

Contents of the Survey	Survey Items: 1) Main cash income (agriculture, livestock, beekeeping /off-farm activity, etc) and expenditure (food: cooking oil/salt/etc, kerosene, clothing, School fee, ceremonial occasion, medical fee, soap, contribution in community) 2) Household aspect: HH member (educational background, age), decision-maker and manager of household economy, staple food and frequency of meal per day 3) Individual Farmland size (Own cultivated land, Renting farm land, Lending Farmland in Hillside and Marsh/Wetland), Number of site location, cultivated crops and cultivated period (specifying month), proportion of self-consumption in production 4) Association's farm land (member only): Association's main farming activity, cultivated crop and cultivated period (specifying month) 5) Time required for fetching water and collecting firewood, potable water source 6) Participating performance for Umganda, Umdehe, Umsanzu, Ibibina, Kugurizanaya and association (any association)
	Basic Concept: 1) The survey items should be emphasized in accordance with each QP brief and objectives.

Note: HH refers to Household.

The questionnaires were elaborated in accordance with the above survey items and revised according to the results through a preliminary test to verify the contents of the questionnaires to the recipient of the QPs (See Annex III.9).

(3) Progress

A briefing to the chief enumerator, a development consultant with experiences of survey in Bugesera District was made on early August to review the questionnaires for baseline survey and amended in early August. From the 4th week of August, the preliminary survey prior to the baseline survey was carried out to justify the content of the questionnaires through interviewing few farm households. As a result, the questionnaire was verified effectively and started from the beneficiaries of the QP: modern cow distribution, Rain water storage, and Shallow well irrigation in order.

5.5 Monitoring and Evaluation

(1) Principle of Monitoring on Quick Projects

Concept of monitoring on the four components of the quick project is principally contemplated based on the objectives of each quick project including monitoring period as follow.

Table 5.5.1 Concept of Monitoring on the Quick Projects

No	Quick Project	Objectives	Monitoring Period	Principle Monitoring Items
1.	Modern Cow Distribution	-Income generation -Soil improvement -Nutritional improvement	Up to the end of JICA Study	-Amount of compost applied to crop field -Yield of crops applied with manure -Amount of lactation per day and per month -Income by selling milk/month and amount of self consumption/month -Animal health conditions including drug

				used and sickness, visiting time of vet-technician -Activity of farmer's association
2	Rain water storage	-Securing domestic water by saving time of fetching water	One year including the bimodal rainy seasons	-Time consumption for fetching water -Spare time and the way to use spare time -Frequency of having diarrhea by month -Frequency of having other intestinal problems by month
3	Shallow well irrigation	-Improving farming activity during the C cropping season -Income generation	Up to the JICA Study	-Cropping area based on shallow well irrigation, -Type of crops with amount of inputs to cultivate -Self consumption and sale amount of the crops by shallow well irrigation
4	Road side irrigation	-Improving farming activity during the bimodal rainy season - Soil Conservation -Income Generation	Up to the end of JICA Study	-Cropping area based on roadside irrigation, -Type of crops with amount of inputs to cultivate -Self consumption and sale amount of the crops by roadside irrigation

Source: JICA Study Team, 2006

(2) Methodology of Monitoring and Evaluation

Monitoring and evaluation on the QP is aimed at evaluation of project impact, feedback of lesson learnt to the project concerned as well as capacity building of the stakeholders concerned through a joint monitoring and evaluation activity. To fulfill these purposes, a joint monitoring and evaluation method among the JICA Study Team and the stakeholder concerned QP projects like beneficiaries, Cell office and Sector Office is taken by organizing mid-term and final evaluation workshops in combination with regular monitoring activity by each quick project. A framework of monitoring and evaluation on the quick projects shall be formulated through the process of setting up of the quick project concerned.

(3) Results of Monitoring and Evaluation

Monitoring and evaluation on the quick project shall be made from the second field survey, starting from October, 2006.

5.6 Environmental Impact Assessment for Quick Project

The Project Briefs for proposed Quick Projects are prepared by the JICA Study Team. The proposed Quick Projects are as follows:

- Modern cows Introduction Project
- Household Rainwater Storage Introduction Project
- Shallow Well Irrigation Project

- Roadside Irrigation System Introduction Project

5.6.1 Project Brief for Introduction of Modern Cow

(1) Developer

Name:	Bugesera District Office
Title:	Mayor of Bugesera District
Address:	Bugesera District, Eastern Province

(2) Project

Name:	Cows Introduction Project
Objectives:	Income generation, Soil improvement by applying cow dung manure & nutritional improvement
Size:	18 cows
Activity:	
(Construction stage):	The plot for fodder crop and cowsheds are made, and cows are distributed to each farmhouse (18 farmhouses, 6 farmhouses for 3 Celles (Cyugaro, Kanzenze, Kibungo)) in Ntarama Sector.
(Operation stage):	Cows are reared at each farmhouse.
Products/Inputs:	Construction materials for cowshed (Wood, Cement, stone, sand, roofing sheet, nail), construction equipments (shovel/ wheelbarrow for fodder plot cultivation, roof sheets/ cement/ stone/ sand/ nails/ wood/ wheelbarrow/ shovel for cowshed construction), materials for fodder crop production (fertilizer, pesticide, fodder cutter), labour force for construction Material for cow keeping (fodder crop, water, salt), material for health care (vaccine, drugs, crush pen), labour force for cow keeping

(3) Project Description

1) Background

Modern cow has some opportunities, such as big production of milk, production of manure by rearing in the cowsheds, creation of employment, and in line with the national policy (one cow, one household).

2) Activities at Construction Stage

- Around 0.2 ha plot per each farmhouse for fodder crop will be prepared using part of existing farmland, and feeder crop will be raised up using fertilizer and pesticide. Feeder crop will be cut by fodder cutter.
- Cowshed of around 6m² (2.1m x 2.7m) per farmhouse will be constructed using by roof sheets, cement, stone, sand, nails, wood, wheelbarrow, shovel, etc. Ground for cow's walking area around 9m² (3m x 2.7) next to cowshed is prepared. Construction work is done by farmer who is distributed cow with some helps from neighbours. The plan of

cowshed is shown in Figure 5.6.1.

- Cow will be distributed to 18 farmhouses.

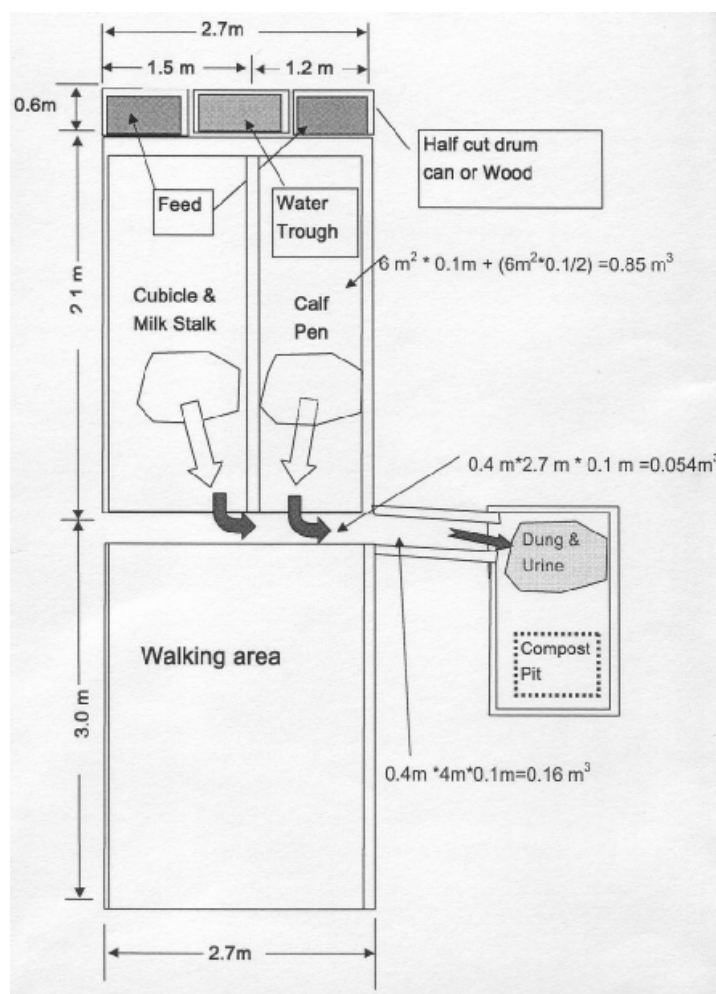


Figure 5.6.1 Plan of Cowshed

3) Activities at Operation Stage

- Distributed cow will be maintained as healthy.
- Fodder crops, clean water and salt are fed to cow for daily care.
- Vaccine, drugs, crush pen will be used for protection of disease.
- Cowshed will be covered and clean to ensure clean environment for cow.
- Excrement from cows is used for agriculture as manure.
- It takes about a few days for preparing of fodder crop and construction of cowshed per each farmhouse.
- The project is planned to start in early September 2006.

(4) Site Description & Legal Setting

Ntarama Sector is located in the North West of Bugesera District in combination with hilly area, lowland and flood plain along the Akanyaru and Akagera Rivers (See Location Map of the Study Area). Households introduced modern cows are scattered in Ntarama Sector.

Natural Environment

(a) Location and geographic data

Ntarama Sector is one of the administrative Sectors composing Bugesera District. This Sector consists of 3 administrative Cells, namely: Cyugaro, Kanzenze, and Kibungo. The Sector is located at 30°05' E in longitude and 02°09'S in latitude. It covers surface area of around 356.5 km². Its center is located more or less 30km from the capital of Rwanda (Kigali). Ntarama Sector is bordered at western and northern boundaries, divided by River Akanyaru and Nyabarongo, confluence of Akagera, the confluent point of which is situated at lowland of Kibungo Cell.

(b) Relief

Ntarama Sector composes part of low-plateau regions in the north of Bugesera District, the mean altitude of which is measured at 1,428m. The relief is also comprises a succession of low plateau with old mountains, hills and dry valleys, wet marshy places formed under tectonic subsidence.

(c) Hydrographic network

Two rivers mainly characterize hydrographic network of Ntarama Sector, i.e., Akanyaru River Akagera River. These streams meet at downstream of Kibungo Cell where is located at northern part of Ntarama Sector.

(d) Climate and rainfall

Ntarama Sector is characterized by a dry climate, where altitude varies from 1,000m to 1,600m. The District is known as erratic rainfall regime characterized by rainfall variability with the mean ranging from 250 to 800 mm/year. It is area with least precipitation but possibility of concentrated heavy quantity of dew and fog caused by the presence of floating marshes that entail higher vapor tension.

The mean atmospheric temperature varies with time but normally between 21 °C and 23 °C, also the maximum ranges 26 °C and 29 °C, whereas the minimum remains in the order between 13 °C and 15 °C. However, the minimum can rise up to 19 °C during a long dry season.

Ntarama Sector presents four seasons characterized by alternate falling of dry and rainy seasons. These seasons are summarized as:

- From January to March: small dry season (urugaryi),
- From April to May: large rainy season (itumba),
- From June to September: large dry season (impeshyi) and
- From September to December: small rainy season (umuhindo).

These seasons capriciously change both the beginning and the duration. Besides, the last five years

have been characterized by less favorable rainfall condition with frequent long period of drought over all the area of Ntarama Sector.

During last three years, climatic condition has been perturbed by prolonged dry season out of normality. This catastrophic situation has provoked a migratory movement of the inhabitants towards other regions where the climate is still acceptable because environment has become unfavorable for both household family members and livestock.

(e) Soil

All along the streams and marshes, soil is clayey and relatively fertile. Soil on plateaus and watershed is sandy and schist (platy). It contains gravel, laterite and quartz. In general, soils are more or less fertile but permeable and fragile.

(f) Flora and fauna

This area consists on wetlands along the rivers and hills. However, much of the area cultivated for agricultural therefore there are no natural vegetation. There are only common species on fauna, which habitat in cultivated area.

(g) Social Environment

The land use in Ntarama Sector is mainly farmland. Therefore, residents in this Sector are almost farmers, so that main economic activity is only agriculture. On the infrastructure, there are some official offices, schools and feeder roads, etc. There are no clinic, electricity, water supply system, public transportation system, solid waste/wastewater management system.

(h) Legal Setting

There is no area for protected by government laws/ orders/ regulations in Ntarama Sector.

(5) Environmental impacts/ Mitigating measures/ Alternatives

The fodder crop plot is prepared in the existing farmland, and cowshed is constructed in the farmhouse garden at the construction stage. The fodder crop plot is already cultivated and its size is small (just only 0.2ha). The size of cowshed is also very small, and constructed mainly using by natural materials. Construction period is limited. Therefore there is no impact at construction stage.

The cow is rearing, and the fodder crop is produced at operation stage. The cow is bred cleanly to keep their health. Excrement from cow is collected adequately at the compost pit, therefore the impact from excrement is not forecasted. And it is used at fodder crop plot as manure for environmental friendly agriculture. The methods to use fertilizer and pesticide will be adequately. Therefore there is no impact at operation stage.

5.6.2 Project Brief for Installation of Household Rainwater Storage

(1) Developer

Name:	Bugesera District Office
Title:	Mayor of Bugesera District
Address:	Bugesera District, Eastern Province

(2) Project

Name:	Household Rainwater Storage Introduction Project
Objectives:	Improvement of living conditions, supply of domestic water
Size:	90 sets of rainwater storages
Activity:	
(Construction stage):	90 sets of spouts and cisterns are installed at 90 farmhouses (30 farmhouses for 3 Celles (Cyugaro, Kanzenze, Kibungo)) in Ntarama Sector.
(Operation stage):	In case of rain, rainwater is collected in the rainwater storage naturally for each household.
Products/Inputs:	Construction materials (iron sheets, stones, cement, sand, water), construction equipment (shovel, spade, wheel barrow), labour force

(3) Project Description

1) Background

Rain Water Harvesting as a method of utilizing rain water for domestic and agricultural use is already widely used throughout the world. It is a method which has been used since ancient times and is increasingly being accepted as a practical method of providing potable water in development projects throughout the world. It has wide application also in urban and rural areas where the reliability and quality of piped water is increasingly being questioned. Despite these facts the percentage of households using rain water harvesting in Rwanda both in urban and rural areas is remarkably low.

Most rainwater collection systems use roofs to collect water. These offer a convenient and relatively large surface area exposed to the sky. Many houses in the rural areas of Bugesera District are now fitted with iron sheet roofing which makes them ideal for the collection of rainwater for domestic use. However, very few of these are fitted with gutters and none is fitted with harvesting tanks. Currently there is agreement between JICA Study Team and MINAGRI (Ministry of Agriculture and Animal Resources) to make rainwater harvesting more popular as a way of gaining water for domestic use in Ntarama Sector. The technique has particular relevance where ground water is not easily accessible and where hand pumps are far away. Actually to fetch water for domestic use takes more than an hour because of the hand pumps are far away.

2) Activities at Construction Stage

- Roof made of corrugated iron sheet will be utilised for harvesting the rainwater for each household. The image of household rainwater storage system is shown in Figure 5.6.3

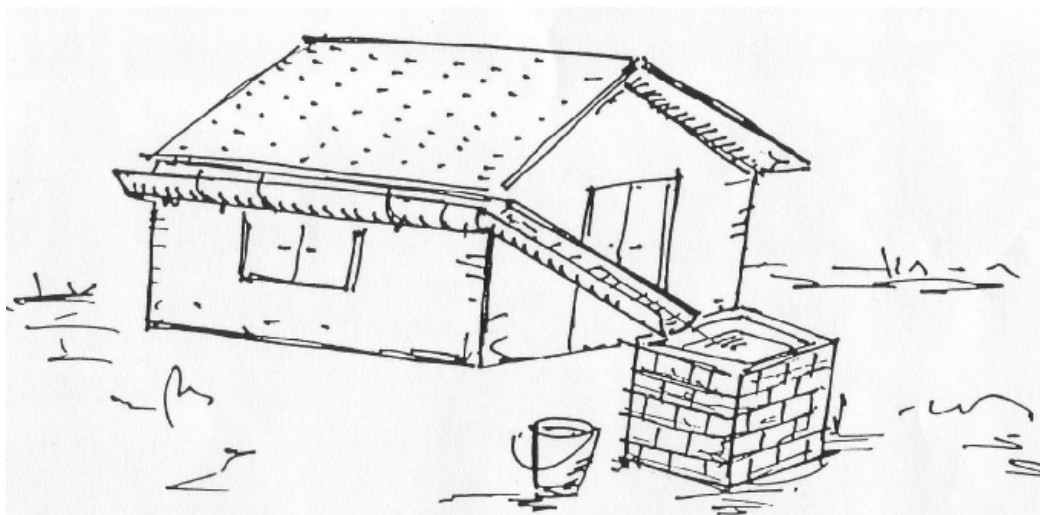


Figure 5.6.2 Image of Household Rainwater Storage

- Gutter and channel can be fixed on the edge of roof all around to collect and transport the rain water from the roof to the storage tank for each household
- Gutter will be prepared in semi circular shape. Locally available material such as galvanised iron sheet will be used by folding them to required shape to prepare semi-circular gutter for each household.
- The storage tank will be constructed using stones as local material. The volume of the storage tank is 1m^3 ($1\text{ m} \times 1\text{ m} \times 1\text{ m}$) for each household.
- This rainwater storage set is to be constructed in the dwelling (each household).
- The material necessary for construction of the rainwater storage is iron sheets, stones, cement, sand, water, and some tools like shovel, wheelbarrow, and so on.
- It takes about 1 - 2 days for construction of this facility for each household.

3) Activities at Operation Stage

- | |
|--|
| <ul style="list-style-type: none">● In case of rain, rainwater is collected and used for domestic water for each household.● The project is expected to start in early August 2006. |
|--|

(4) Site Description & Legal Setting

(Refer to Site “Description & Legal Setting” in “Project Brief for Cows Introduction Project”)

(5) Environmental impacts/ Mitigating measures/ Alternatives

The rainwater storages are constructed beside of farmhouses at the construction stage. The storage size

is very small, and constructed mainly using by natural materials. The space in garden for each household is used for the site, so that there is no activity of land clearing and compaction. Therefore there are no impacts affected by construction of rainwater storages.

The rainwater storages are used at operation stage, mainly rainy season. The mouth of storage tank is covered by lid, so that the impact to health condition is not forecasted. This water harvesting activity will have positive impact rather than negative one to environment.

5.6.3 Project Brief for Introduction of Shallow Well Irrigation

(1) Developer

Name:	Bugesera District Office
Title:	Mayor of Bugesera District
Address:	Bugesera District, Eastern Province

(2) Project

Name:	Shallow Well Irrigation Project
Objectives:	Income generation & nutritional improvement
Size:	30 shallow well irrigation systems (including vegetable gardens)
Activity:	
(Construction stage):	30 shallow well irrigation systems are established at 30 sites (10 sites for 3 Celles (Cyugaro, Kanzenze, Kibungo)) in Ntarama Sector.
(Operation stage):	Water in shallow well is using for vegetable garden by watering can.
Products/Inputs:	Construction materials (stone, sand), construction equipment (shovel, spade, wheel barrow), watering can, vegetable seed, labour force

(3) Project Description

1) Background

The purpose of this system is to get underground water to irrigate vegetables with small size plots, particularly dry season.

Due to erratic rainfall pattern in recently, the population has been suffering from water problem for irrigation as well as domestic use. This shallow well irrigation, therefore, is expected to contribute to getting irrigation water stably through using underground water during dry season.

The shallow wells should be constructed at the places where are between marshland and hill land with appropriate depth. In parallel with well construction, small vegetable garden will be reclaimed near the well. The water to be taken from the shallow well will be utilized for irrigation of this small vegetable garden with watering cans.

2) Activities at Construction Stage

- The size of well is around 2~4m² (1.5 ~2.0m x 1.5 ~2.0m with lengthwise and crosswise) per each. The image of shallow well irrigation system is shown in Figure 5.6.4.

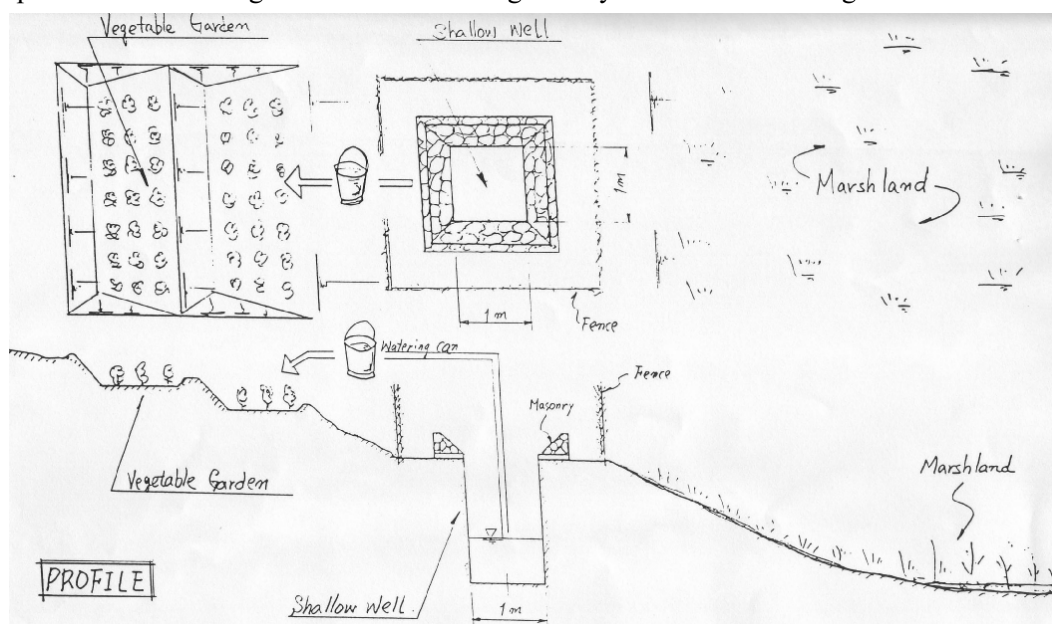


Figure 5.6.3 Image of Shallow Well Irrigation System

- The depth of well is about 4~5 m per each.
- The earth dug out of a well construction site is going to be diverted to vegetable small gardens, which is existing farmland (around 100m² (10m x 10m) per each).
- To prevent the opening of well from being collapse into the well, around the opening should be protect by using masonry.
- Construction period of this facility is estimated at about 2~3 days per site.

3) Activities at Operation Stage

- | |
|--|
| <ul style="list-style-type: none"> ● Water collected in shallow well is used for cultivation for vegetable. ● The project is expected to start in early August 2006. |
|--|

(4) Site description & Legal Setting

(Refer to Site “Description & Legal Setting” in “Project Brief for Cows Introduction Project”)

(5) Environmental impacts/ Mitigating measures/ Alternatives

The shallow well is constructed at foot of hills, and vegetable garden is prepared at the construction stage. The well size is very small (circle 1 meters in diameters, 4~5 meters depth), and constructed mainly using by natural materials. The vegetable garden is using the existing farmland. Therefore there are no impacts affected by construction of irrigation channel and preparation of garden.

The water of shallow well, which is penetrated naturally, is used for vegetable production at operation stage. The water volume is very few, therefore impact to existing water system is not forecasted. The mouth of well is covered by lid to protect generation of vermin, especially malaria mosquitoes. Therefore there are no impacts at operation stage.

5.6.4 Project Brief for Introduction of Roadside Irrigation System

(1) Developer

Name:	Bugesera District Office
Title:	Mayor of Bugesera District
Address:	Bugesera District, Eastern Province

(2) Project

Name:	Roadside Irrigation System Introduction Project
Objectives:	Soil conservation & income generation
Size:	30 farmlands along the rural roads
Activity:	
(Construction stage):	Canals leading rainwater from roadside drain are constructed at 30 farmlands (10 farmlands for 3 Celles (Cyugaro, Kanzenze, Kibungo)) in Ntarama Sector.
(Operation stage):	In case of rain, rainwater in the roadside drain is collected in the canals naturally.
Products/Inputs:	Construction materials (wire, stone, cement, sand, rope, plastic sheet), construction equipment (shovel, spade, wheel barrow), labour force

(3) Project Description

1) Background

As the title of this system, this is an irrigation system located along the existing rural road to get rainfall water. To collect rainwater into the plots, small irrigation canal will be constructed and connected to the side ditch of rural road. When it is rain, rainfall flows into the side ditch of road. And then, this rainwater will be automatically diverted into the small canals which convey the water to the plots. The system of this irrigation structures will not be so complicated.

2) Activities at Construction Stage

- Size of irrigation canal is approximately 30 cm x 30 cm of cross section. The image of roadside irrigation system is shown in Figure 5.6.5.

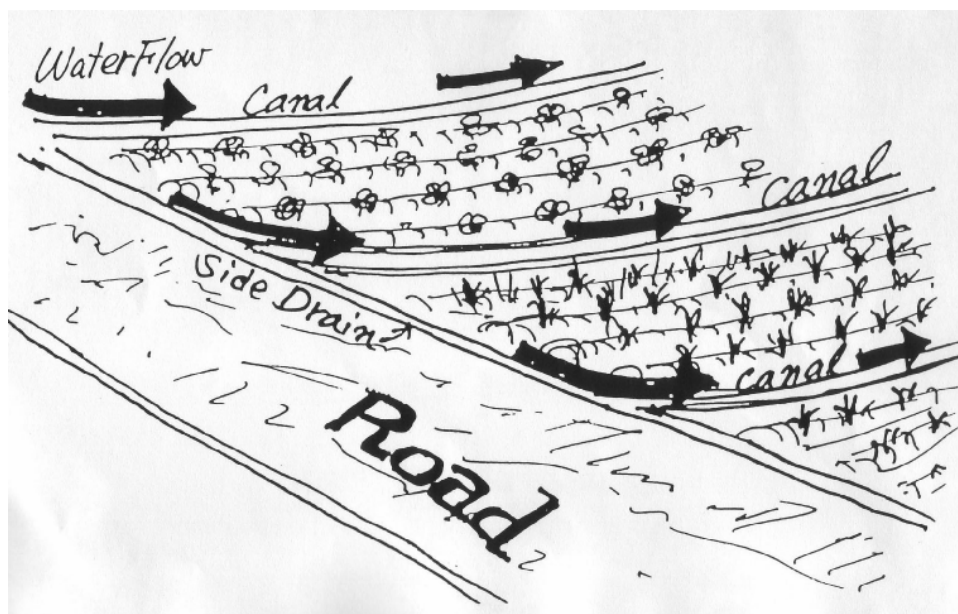


Figure 5.6.4 Image of Roadside Irrigation System

- Length of irrigation canal is about 100m.
- Lining of the irrigation canal is earth lining
- As ancillaries, some small concrete or masonry structures like division box to share the water to each plot.
- Construction period of this facility is estimated at about 2~3 days per site.

3) Activities at Operation Stage

- | |
|---|
| <ul style="list-style-type: none">● In case of rain, rainwater collected by the roadside drain canal is used at roadside farmland (approximately 0.5ha (50m x 100m) per each) for agriculture.● The project is expected to start in early August 2006. |
|---|

(4) Site description & Legal Setting

(Refer to Site “Description & Legal Setting” in “Project Brief for Cows Introduction Project”)

(5) Environmental impacts/ Mitigating measures/ Alternatives

The irrigation channel is constructed at road side. The size is very small, and construction materials are not needed so many. The existing farmlands are used for the beneficial area irrigated by these canals. Therefore there are no negative impacts affected by construction of irrigation channel. After the construction, rainwater flow by gravity from roadside to farmland and any particular cost for operation and maintenance is not needed. Therefore there are no negative impacts after the construction while the canal is expected to prevent erosion around the road.

CHAPTER 6 BASELINE SURVEY FOR CONSTRAINT AND POTENTIAL ANALYSIS

6.1 Survey Methods and Contents

(1) Introduction

JICA Study Team sounded out a joint survey of the baseline survey with GTZ, which had planned to carry out whole households and Sector/Cell office interview surveys in Bugesera District, in collaboration with Eastern Province, NIS, MINALOC, and UNICEF, and they basically came to an agreement in late June. JICA Study Team participated in the kick-off workshop on the explanation of GTZ baseline survey held in Bugesera on June 28 to grasp the whole survey scheme. Moreover, reviewing the questionnaires for household and Sector/Cell levels drafted by GTZ, JICA Study Team proposed additional survey items within JICA Study perspectives. GTZ agreed with JICA proposal to conduct together with GTZ baseline survey on July 17, 2006. The methodology and progress on the baseline survey are as follow.

(2) Survey Method and Schedule

Eight enumerators were recruited by each Cell for the baseline survey and were briefed prior to commencement. Household interview is done on *Nyambakumi* basis, an informal organ at the grass root level under the Cell office which comprises of 30 households. Simultaneously, the Sector and the Cell level interview survey are made. The time schedule for the baseline survey is planed as follow.

Table 6.1.1 Time Schedule of the Baseline Survey

	Schedule	Survey Activity
1	August 2	Distribution of Questionnaires to all Sector and Cell Offices
2	August 4	Small workshop is held in each Sector so as to brief the baseline survey
3	August 5	Numbering of the Households for survey
4	August 7-21	Start data collection through interview
5	August 21-September 4	Start data input to PC and completion
6	September 4-15	Data analysis
7	September 15-30	Reporting
8	End of September	Completion of report for the Baseline Survey results

Source: Discussion result between JICA Study Team and GTZ, 2006

(3) Contents

1) Household Level Questionnaires

The questionnaires drafted by the GTZ comprise 10 categories as below.

**Table 6.1.2 Major Survey Categories of Questionnaires
for the Household Survey**

No	Survey Category
0	General Situation of Households in Nyambakumi
1	Education
2	Health
3	Social Affairs
4	Agriculture
5	Livestock
6	Small Scale Investment and Loan
7	Employment
8	Communication within the Household
9	Housing and Settlement
10	Vulnerable Group

Source: GTZ, 2006

Based on the original questionnaires, JICA Study Team proposed additional survey items within JICA study team perspectives as below. The 149 questions were supplemented over the three categories including the new added one, “*Perception on Environmental Protection*” (See **Annex VI.1**).

Table 6.1.3 Summary of the Revised Questionnaires in Household Level

Category	No of suppl., survey items	Remark
3. Social affairs		
3.1 Water used in the household	15	Supplemented
3.5 Garbage removal	1	Supplemented
4. Agriculture		
4.1 Land/Plots	4	supplemented
4.2 Agriculture Inputs	2	supplemented
4.3 Agricultural tools	12	Newly created sub category
4.3 Total last year production	8	supplemented
4.4 Sowing season (A, B, C) by crop	18	Newly created sub category
4.5 Harvesting Season (months) by crop	27	Newly created sub category
4.6 Soil Conservation	3	supplemented
4.8 Income sources	12	Newly created sub category
4.9 Marketing for surplus crop harvest	5	Newly created sub category
4.10 Agricultural & Irrigation Facilities	4	Newly created sub category
5.4 Animal Production	1	supplemented
5.5 Farmer's Association	1	Newly created sub category
5.6 Access to Agricultural Extension service	16	Newly created sub category
11 Perception on Environmental Protection		Newly created category
11.1 Household facing environmental problems by	13	Newly created sub category
11.2 Willingness to participate reforestations	3	Newly created sub category
11.3 Way of using drinking water fetched from river/pond/rain water	4	Newly created sub category
Total Survey Items supplemented by JICA	149	

Source: JICA Study Team, 2006

2) Sector and Cell Level

The questionnaires consist of the three categories which comprise education, health and water for the Sector levels. Meanwhile the questionnaires for the Sector/Cell level originally consisted of the five categories (Agriculture and Livestock, Infrastructure and Trade, Transporting of goods and communication, Number of Roads, Association and Cooperatives). JICA Study Team proposed the six

additional questionnaires as below table which were accepted by the GTZ (See Annex IV.2).

Table 6.1.4 Additional Questionnaires for Sector/Cell Level

No	Category of Survey
1	Name and area of wetlands and marshlands by the Cell
2	Number of vet-technicians and pharmacies by the Cell
3	Number of nursery centers and species by the Cell
4	Number (site) of soil erosion and area by the Cell
5	Number (site) of water pollution and area by the Cell
6	Number (site) of illegal tree cutting and area by the Cell

6.2 Progress

In accordance with the time schedule of Table 6.1.1, the baseline survey has been commenced since August.

CHAPTER 7 TECHNOLOGY TRANSFER

7.1 Technology Transfer Plan

According to the “SW” as well as the “Minutes of Meeting of SW ” conducted on 1st April 2005, MINAGRI should assign suitable counterpart personnel through the implementation of the Study but due to the recent decentralization policy and territorial reform, staff members of MINAGRI, related parastatal agencies such as ISAR, RADA, RARDA as well as Bugesera district are currently in a very limited number and it was found that they are not enough to afford counterpart personnel in the Study. Taking due consideration on this matter, the target of technical transfer provided by the Study Team was decided about Sector/Cell officers in charge of QP and PP and the officer in charge of environmental aspect in the Bugesera district. Through on-the-job training in the implementation of the Phase 1 of the Study, following officers are decided as counterpart personnel.

- ✓ Ms. UMACU Sylvie; Unit of Infrastructure and Environment in Bugesera District Office
- ✓ Mr. Ntwaza Gilbert; Agronomist in Ntarama Sector Office
- ✓ Mr. Katabarwa Andrew; Coordinator in Cyugaro Cell Office
- ✓ Mr. NDANGA Patrick; Executive Secretary in Kibungo Cell Office
- ✓ Mr. GATABAZI Justin; Executive Secretary in Kanzenze Cell Office

(1) Technology Transfer to the Sector/Cell officers

The subject on technology transfer is focused on small-scaled activities that can readily be handled by local population such as livelihood/life style improvement where various tools as to how QP and PP are planned, mobilized and implemented, how the monitored outcome is reflected on the development plans, how the projects/components are evolved and expanded into lateral direction are transferred. The outline and schedule of technology transfer are shown in Table 7.1.1 and Table 7.2.1, respectively.

Table 7.1.1 Technology Transfer Items to Sector and Cell Offices

Trainee	Mr. Ntwaza Gilbert; Agronomist in Ntarama Sector Office Mr. Katabarwa Andrew; Coordinator in Cyugaro Cell Office Mr. NDANGA Patrick; Executive Secretary in Kibungo Cell Office Mr. GATABAZI Justin; Executive Secretary in Kanzenze Cell Office
Transfer Item	<p><u>Rural Development Plan</u></p> <ul style="list-style-type: none"> • Methods of formulating implementation plan of QP • Methods of the study on rural communities • How to mobilize local population and to implement in collaboration with recipients • Methods of lateral expansion of QP as model projects. <p><u>Inhabitants organizations/rural communities/improvement of life style</u></p> <ul style="list-style-type: none"> • How to organize recipients group to improve their life style • Methodology regarding gender issues in project activities • Method of public awareness on sustainable use and conservation of natural resources <p><u>Farming Techniques/Extension</u></p>

	<ul style="list-style-type: none"> • Development of farming techniques by using low-cost local resources <ul style="list-style-type: none"> - How to use groundwater/surface water in/near the marshland effectively in the dry season - How to introduce rain water to the fields in the rainy season <p><u>Rural infrastructure/water use</u></p> <ul style="list-style-type: none"> • Rural infrastructure improvement by using low-cost local resources <ul style="list-style-type: none"> - How to repair and prevent from soil erosion for rural roads • Methods of readily applicable rainwater use and management <ul style="list-style-type: none"> - How to collect rain water at household in the rainy season
Transfer Method	<ul style="list-style-type: none"> • On the Job Training (OJT) on QP by JICA study members to CP • Discussion at workshop

(2) Technology Transfer to the Environmental Specialist

The objectives of the technical transfer on environmental consideration and natural resource management are:

- To enhance the technical ability to establish environmental impact assessment (EIA) for rural and agricultural development
- To enhance the implementing ability to establish the plan on natural resource management

The outline and schedule of technology transfer are shown in Table 7.1.2 and Table 7.2.2, respectively.

Table 7.1.2 Technology Transfer Items for Environment Aspect

Trainee	Ms. Sylvie Umacu; Environmental specialist in the Unit of Infrastructure and Environment in Bugesera District Office
Transfer Item	<p><u>EIA technique</u></p> <ul style="list-style-type: none"> • Method of data collection and its analysis on legal basis of EIA in Rwanda • Method of executing for Project Brief (first step for EIA in Rwanda) • Method of evaluation on environmental impact caused by rural and agricultural development • Planning of implementing of full-scale EIA and executing on TOR for environmental study <p><u>Planning technique</u></p> <ul style="list-style-type: none"> • Method of data collection and its analysis on resource management of forest, hillside and wetland/marshland • Method of data collection and its analysis on the existing condition of soil erosion site • Planning of zoning to take into consideration with natural resources • Planning of sustainable land use of forest, hillside and wetland/marshland • Method of public awareness on sustainable use and conservation of natural resources
Transfer Method	<ul style="list-style-type: none"> • On the Job Training (OJT) by JICA study members to CP • Discussion at workshop

7.2 Progress of Technology Transfer

Tables below shows the contents, transfer method, schedule and its implemented date during the Phase 1 field survey period from middle of April to the beginning of September 2006. Almost all of the technology transfers except for the “Road side irrigation” are going on according to each schedule.

Table 7.2.1 Schedule and Progress on the Technology Transfer to the Local government Officers

Item	Contents	Transfer Method	Schedule	Progress	Place
Rural Development Plan	Selection of the QP components	Discussion	May 2006	17 th May	Ntarama Sector office, etc
	To prioritize the QP components at each Cell	Workshop	June 2006	8 th June 15 th June	
	Kick off workshop for modern cow	Workshop	June 2006	20, 22, 23 th June	
	Kick off workshop for water related QP components	Workshop	June 2006	28 th June	
	Formulation of modern cow rearing implementation plan	Workshop	July 2006	11 th July	
	Monitoring & Evaluation of the QP	Workshop & OJT	Oct. 2006-		
Livestock Dev.	Training for modern cow rearing	Lecture by RARDA	Aug. 2006	1-3 rd Aug.	Mandera Village
Farming technique	Shallow well irrigation	OJT	July 2006-	25 th Jly-	Each site
	Road side irrigation	OJT	July 2006-		Each site
Water use technique	Rainwater storage facility	OJT	July 2006-	19 th July	Each site

Table 7.2.2 Schedule and progress on the Technology Transfer to Environmental Specialist

Item	Contents	Transfer Method	Schedule	Progress	Place
EIA technique	Legal basis of EIA in Rwanda	Lecture of Environmental Law	June 2006	1 st June	District office
	Executing of Project Brief (PB) (1)	Lecture of Project Brief	June 2006	20 th June	District office
Planning technique	Method of data collection and its analysis on resource management on forest	Site survey and lecture of existing forestry	June 2006	23 rd June	Forest in Shyara Sector
EIA technique	Executing of Project Brief (PB) (2)	Lecture of PB for QP proposed by JICA Study Team	July 2006	15 th July	District office
Planning technique	Method of data collection and its analysis on resource management on wetland and soil erosion site	Site survey and lecture of existing wetland and soil erosion site	July 2006	24 th July	District office
Planning technique	Planning of zoning to take into consideration with natural resources (1)	Lecture of planning sample in Japan	November 2006		
Planning technique	Planning of zoning to take into consideration with natural resources (2)	-ditto-	December 2006		
EIA technique	Method of evaluation on environmental impact caused by rural and agricultural development	-ditto-	December 2006		
EIA technique	Executing of Project Brief (PB) (3)	Lecture of PB for Pilot Project (PP) proposed by JICA Study Team	January 2007		
EIA technique	Planning of implementing of full-scale EIA and executing on TOR for environmental study	Lecture of basic concept of EIA in Japan and Rwanda	January 2007		

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Planning technique	Planning of zoning to take into consideration with natural resources (3)	Lecture and discussion on of natural resource management of wetland in Bugesera District	February 2007		
Planning technique	Planning of zoning to take into consideration with natural resources (4)	Lecture and discussion on of natural resource management of forest in Bugesera District	February 2007		

CHAPTER 8 STUDY PLAN FOR THE 2ND FIELD SURVEY

In accordance with the Ic/R and the progress of the 1st field survey, the 2nd field survey from the beginning of October 2006 will be commenced according to the following schedule.

Table 8.1 Second Field Survey Schedule

Work Plan	2006						2007					
	1st Field Survey			2nd Field Survey						3rd Field		
	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
Implementation of QP												
• Introducing of Modern Cows 18 recipients												
— Construction of Cow Shed												
— Delivery of Cows												
• Rainwater Storage 90 households												
• Shallow well Irrigation 21 sites												
• Roadside Irrigation 6sites												
Monitoring of QP												
Evaluation of QP												
Review of baseline survey result												
Analysis of Agricultural Constrains and Development Potential												
Study on project components to be necessary for rural development												
Study on supporting system for community people by												
Preparation of Draft Action Plan												
Selection of Pilot Project (PP) Sites												
Formulation of PP implementation plan												
Supporting study for EIA												
Preparation of Draft Action Plan												
Preparation of Report												
Assignment Schedule												
M.Goto				23								
K.Iizuka												
Z.Kurita			26									
T.Ieizumi												
O.Isoda												
Y.Maruno												

