Community-Based Natural Resource Management (CBNRM) Plan.

Kinigi Area, Rwanda



Report prepared for the International Gorilla Conservation Programme

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Acronyms

CBNRM	Community Based Natural Resource Management		
CDF	Communal Development Fund		
CGIS	Centre of Geographic Information Systems		
CRED	Centre de Recherche en Economie du Devéloppement		
ELECTROGAZ	Etablissement Public de Production, de Transport et de Distribution		
	d'Electricité, d'Eau et de Gaz		
FRW	Franc Rwandais / Rwandese Franc		
GCPHR	General Census of Population and Housing of Rwanda		
GMP	General Management Plan		
ICRAF	International Centre for Research in Agro Forestry		
IGCP	International Gorilla Conservation Programme		
ISAR	Institut des Sciences Agronomiques du Rwanda		
MINECOFIN	Ministere de l'Economie et des Finances / Ministry of Finance and		
	Economic Planning		
MINILARE	Ministry of Lands, Resettlement and Environment		
MINISANTE	Ministere de la Sante / Ministry of Health		
NCS	National Census Service		
NGO	Non Governmental Organisation		
NPRP	National Poverty Reduction Program		
NSAPCBR	National Strategy and Action Plan for the Conservation of		
	Biodiversity in Rwanda		
NUR	National University of Rwanda		
ONAPO	Office National de la Population / National Office for Family		
	Planning		
ORTPN	Office Rwandais du Tourisme et Parcs Nationaux / Rwanda Office		
	of Tourism and National Parks		
MT	Metric tonnes		
PA	Protected Area		
PDC	Plan Devéloppement Communautaire / Community Development		
	Plan		
PNV	Parc National Des Volcans / Volcanoes National Park		
PRSP	Poverty Reduction Strategy Paper		
RoR	Republic of Rwanda		

Executive Summary

A Community-Based Natural Resource Management (CBNRM) Plan was developed for Kinigi Area comprising of five ex-districts: Mutura, Buhoma, Mutobo, Kinigi and Bukamba in Rwanda, all bordering Parc National des Volcans. The CBNRM plan seeks 1) to minimise threats (due to high demand for natural resources within and to guarantee the long-term protection and sustainable management of the national park, 2) to optimise the use of natural resources and improve land productivity in settled areas, 3) to resolve conflicts over use of natural resources, and 4) to elaborate an institutional framework for natural resource managemen. The overall objective is to guarantee a sustainable system of livelihoods for the local population and maintain integrity of the natural environment.

The CBNRM plan has for key components:

- Chapter One: Provides general information and a contextual sketch of the Kinigi and area
- Chapter Two: Presents a socio-economic characterization highlights the push and pull forces that drive rural development process in Rwanda generally and Kinigi area specifically, and influence use of basic land resources
- Chapter Three: Attempts to a general characterization of land use practices and offers broad land use zones
- Chapter Four: Summarizes results of a participatory natural resources planning process and gives recommendations for immediate and future actions.

Information on the first three chapters was mainly obtained from existing documentation about the Kinigi area (cf. References) and details the current status of natural resources: availability, general management constraints and opportunities in farmland immediately outside and within the Parc National des Volcans (PNV). The three chapters provide baseline information and zonatiomn maps that formed the basis on which local communities in the respective Districts developed natural resource management work plans (Chapter Four). CBNRM workshops were conducted in each of the five districts of Kinigi area, between in November and December 2005, supported by IGCP to promote community involvement in planning and implementation of natural resource management interventions.

Workshops were strategically organized to leverage effective community participation from each district. It was important that the local population fully embraced and owned the process. Appriate number of Sectors and Cells were identified and included to ensure a largely representative process. The workshops provided valuable opportunities to obtain deeper understanding of the Kinigi area and to examine natural resource management and utilization options. All the workshops were conducted at Sector level. To achieve efficiency and effective representation at the District level, participants from various neighbouring Sectors were brought together.

In selecting participants, UBUDEHE facilitators were considered an important entry point because they are elected by the community and have basic training and experience in participatory planning. In addition, the UBUDEHE facilitators understand the community problems having facilitated community development programmes before in addition to being representatives at Cell level.

The overarching goal of the CBNRM workshops was to obtain a deeper understanding of natural resource management issues in Kinigi area and identify possible solutions. The outcome of this process is well summarized in Chapter 4 of this report. On the basis of this analysis, priority issues were identified and work plan developed. Key issues emerging from this process include:

- Issues ralted to access to clean and safe water, soil fertility loss and problem of soil erosion control. Further analysis revealed that addressing these three key issues offered an opportunity to solve or minimize all the other land use related issues and problems identified.
- While the area was found to be seriously hit by environmental problems including soil erosion, lack of wood resources, lack of clean and safe water, and conflicts between the Park management and the local communities, the underlying cause was established to be a very high population density and corresponding high levels of poverty..

Arising from this complex mix of land use issues and problems, the report weaves recommendation around the following key elements:

- 1) Integrated farming system that includes tree planting, animal rearing and crop production considered desirable as it provides multiple benefits to the land constrained communities: improve farmland productivity. Promotion of zero grazing is highly recommended considering the scarcity of land in the area.
- 2) Because of the steep terrain, this report recommends, digging of soil erosion control trenches and have them stabilised with grass and agroforestry trees. This will reduce surface run-off, increase water infiltration and improve soil fertility.
- 3) Considering the acute shortage of firewood, the promotion of energy saving stoves will reduce energy demands. This however needs to be promoted alongside tree planting/agro forestry promotion.
- 4) The absence of water in the area was noted to be one major source of illegal entry into the national park hence a source of community-PA (National Park) conflict. Promotion of rain water harvesting tanks is recommended as an immediate response. In future, this plan recommends rehabilitation of water channels and re-launch of Mutobo project.
- 5) In recognition of land constraint, this plan recommends introduction or expansion of off-farm activities such as mushroom growing, bee keeping, and community and cultural tourism development: diversification of livelihood strategies.
- 6) Finally, there is need to closely study the operation and appropriateness of UBUDEHE approach as an entry point and a platform for promotion and implementation of conservation and livelihood programmes.

GENERAL INFORMATION ABOUT THE KINIGI AREA

1.1. Area Location

1.1.1. Rwanda

Rwanda is a landlocked country in central Africa covering 26338 Km². It shares its borders with Uganda in the north, the Democratic Republic of Congo in the west, Burundi in the south and Tanzania in the east. Rwanda is among the most densely populated nations in Africa and its population growth rate is one of the highest in the world. Rwanda has three national Parks namely Akagera National Park, Nyungwe National Park and Volcanoes National Park also known as Parc National des Volcans (PNV). Natural forests cover a small part of Rwanda's land surface (137000 ha by 1982) but are of high biological diversity with several species endemic to the forests. In 1993 protected areas covered 15% of the total land, but this area has reduced tremendously due to settling and resettling displaced people in the Parks and forests. Ibirunga (Volcanoes) forest cover in Rwanda alone is said to have covered 34000 ha in 1960 but had by 1999 regressed to 16000 ha equivalent to a regression rate of 52.94 % (RoR, 2003:41).

1.1.2. The Parc National des Volcans Region

The PNV (1°30'5, 29O'E or 1°21'-1° 35' South, 29°22'- 29°44' East, depending on the source) is situated in the North of Rwanda bordering Democratic Republic of Congo (DRC) and Uganda (**Figure 1**) and covers medium and high altitudes towards the south of Virunga Chain (Plumptre *et al.*, 2004; ORTPN, 2005b).



Its length is around 40km and its width varies from 8km to 1km. The interface of PNV with its local population is around 60km; the surface area of the park is about 160km². The altitude varies from 2400 m to 4500 m, the highest point being the top of Karisimbi (4507 m). The park is located in a chain of dormant volcanoes called Ibirunga. The volcanoes include Muhabura, Gahinga, Sabyinyo, Bisoke, and Karisimbi. It covers Rwandan sector of the "Virunga Massif" and is contiguous to the Parc National Virunga in DRC and Mgahinga Gorilla National Park in Uganda, thus forming a trans-boundary bloc of protected area covering almost 450 km². The nearest forests are Gishwati in Rwanda and Bwindi Impenetrable National Park, in Uganda.

Figure 1. Location of the Parc National des Volcans.

Source: ORTPN (2005b:4)

The park lies within the Provinces of Gisenyi (15%) and Ruhengeri (85%) along the border of the DRC and Uganda and is part of the Albertine or Western Rift. The Volcanoes National Park is the most important Park in Rwanda despite being the smallest amongst the three national Parks of the country. This Park, created in 1925, is the oldest on the African continent and is habitat to the mountain gorillas. It is located in one of the poorest and most densely populated parts of Africa. People have little access to opportunities to improve their livelihoods and have so little land that they cannot increase their wealth by farming (Plumptre *et al.*, 2004; ORTPN 2005b).





Source: ORTPN (2005a:7, 2005b:11).

1.1.3. The Kinigi Area

The Kinigi area is made of the five districts containing the Parc National des Volcans (**Figure 2**), namely: Bukamba, Kinigi, Mutobo, Buhoma (in Ruhengeri Province) and Mutura (in Gisenyi Province), within which the CBNRM process is proposed. Each of the districts is further subdivided into Sectors and Cells. A total of 24 sectors are adjacent to the PNV and shared out among the five districts as follow (**Figure 3**): Bukamba (7), Kinigi (6), Mutobo (4), Buhoma (2) and Mutura (5). The districts surrounding the PNV total an area of 892.6 km² but the surface area covered by the 24 sectors to be covered by the CBNRM is not documented.



Figure 3. The Kinigi area and the Sectors adjacent to the PNV

Source: CGIS-NUR / ORTPN (2005:5).

1.2. Biophysical Environment

The biophysical environment of the Parc National des Volcans and its environs is influenced by its volcanic chain made of five volcanoes. The high altitude of these volcanoes (between 2300 and 4507 m above sea level) and the presence of volcanic soils make the region naturally diverse in terms of relief, substrate and vegetation cover. Most details in this section are referenced in three documents: Park Management Plan 2005-2009 (ORTPN, 2005b), Parc National des Volcans: Plan de Zonage (CGIS-NUR/ORTPN, 2005) and The Socio-economic status of People Living near Protected Areas in the Central Albertine Rift (Plumptre *et al.*, 2004).

1.2.1. Topography

The PNV geographically covers two parts: the western made of two volcanoes, Karisimbi (4507 m) and Bisoke (3711 m), and the eastern part made of Sabyinyo (3634 m), Gahinga (3434 m) and Muhabura (4127 m). The zone adjacent to the Park (the peripheral zone) is made of five districts and divided into two topographic units: the volcanic region and the Crête Congo-Nile region. The volcanic region extends from the foot base of all volcanoes to the top and is made of the districts of Bukamba, Kinigi, Mutura, part of Mutobo and part of Buhoma. This region is prone to soil erosion due to steep slopes on the southern aspect of the volcanoes and high rainfall. The Crete Congo-Nile region is composed of granitic soils of high altitude and is made of other parts of Mutobo and Buhoma districts. The volcanoes found in the Park are steep and eroded in different forms with deep gullies,

especially Sabyinyo. Steepness is highest near the foot of Muhabura and Bisoke, intermediate around Sabyinyo and lowest around Gahinga and Karisimbi. There are a number of caves in the Park and also in the neighbouring environment. Based on the topographic map details (CGIS-NUR/ORTPN, 2005:13), the highest altitude of the zone outside the Park is 2400 m, 2550 m, 2600 m, 2800 m and 2850 around Gahinga, Sabyinyo, Muhabura, Karisimbi and Bisoke volcanoes, respectively. The steepness of the terrain outside the Park varies among the five districts.

1.2.2. Geology

The geology of the area is linked to volcanic movement. All the five volcanoes on the Rwandan territory are currently inactive though some little flowing lava has been observed on the slopes of Muhabura and some minor earthquakes do take place in the Park. The Virunga chain is situated in the Rift Albertin of the Great African Rift Valley and its geological and geomorphologic structure is very complex. The local geological features are uniform in all the administrative Sectors adjacent to the PNV (ORTPN, 2005b).

1.2.3. Climate

Generally, the north-western region of Rwanda has a moderate and humid climate due to its high altitude and abundant rainfall, which records the national annual rainfall maxima of 2000 mm between 2000 and 3000 m of altitude. Below and above this altitude, rainfall intensity decreases with altitude, reaching 900 mm at the top of Karisimbi. The afromountain forests of PNV enable climatic regulation in the region as far as precipitation is concerned. There is rainfall throughout the year but with two heavy rain seasons; the longest being from February to June with a peak in April while the shortest is from September to December with a peak in November. This pattern of rainfall is characteristic of the Intertropical Convergence Zone known to be ideal for agricultural activities. The annual temperature averages depend on altitude, decreasing by 0.65° C every 100 m. For example, outside the PNV, this temperature is 23° C in Ruhengeri Township at 1878 m a.s.l. and 14°C at Karisoke at 3000 - 3100 m a.s.l. The climate is drier in the eastern part of the Park (Lebrun 1960 in ORTPN 2005b:5).

1.2.4. Hydrology

The volcanoes chain in Rwanda is endowed with a good number of permanent lakes such as Bisoke, Ngezi and Malalo. In addition, some swamps and wetlands exist between volcanoes. The PNV vegetation, litter and porous sub-soil are very important in water movement control especially for surface. The PNV is considered as the Water Tower for the neighbouring region due to abundant precipitations that are received almost throughout the year. There is a mean of 220 million m³ of water per year over the 16000 ha of the Park (Weber et al., 1987 in Plumptre et al., 2004). There is an efficient regulatory mechanism of water within the Park due to vegetation cover, litter and permeable sub soil. Unfortunately, this analogy of Water Tower is not significantly perceived within the immediately adjacent region because there is no permanent river or stream. This is due to the nature of soil composition and the structure of the parent rock that favors high water infiltration and underground flows of rainwater, forming the subsoil reservoir of river Mukungwa. The water principally flows underground and some small sources of water gush out within the Park and its surroundings, especially along the lava at 15 km from the Park. There is a seasonal problem of water in the volcano region where porous soil does not enable the retention of water on the surface nor does it enable permanent flow of water (ORTPN, 2005b). A times storms hit the volcano slopes and cause considerable damages down the slope.

1.2.5. Soils

There was no specific study done on the nature of the soil in the Park but the drainage is generally regular. The sub-soil is composed of brown clay covered with black fine layer of soil. This layer of soil may be covered with a fine layer of humus and simple creeping flat roots on the steep slopes of the mountains. There is also a formation of fine alluvial peat in the wetlands and on the steep slopes at high altitude. Near the Park, the main soils are of volcanic origin in the category of Andosols (black in colour) and Andic soils. The volcanic soils developed from volcanic ashes and evolved as a function of climate of the region. Thus, local variations in soil characteristics may be observed from zone to zone. The volcanic soils are generally fertile (high moisture, rich in organic matter, high pH levels, high cation exchange capacity and phosphorus absorption) throughout around the PNV despite high permeability of the soil and volcanic parent rock preventing water storage in the sub soil. Soil erosion problems are relatively less pronounced over the major part of the zone covered by the volcanic lava as compared to neighbouring areas. This is due to the slopes that are generally gentle at the foot of the Volcano Mountains and to the abundant vegetation cover on the slopes. On steep slopes such as around Muhabura (Bukamba District), soil erosion phenomenon might be a major problem for human activities. The Department of Surveys and Statistics estimated that, in Rwanda, the quantity of soil lost on slopes above 20 % steep can reach over 25.7 tons/ha/year (in Plumptre et al., 2004:17).

1.2.6. Vegetation

The vegetation of the Park is typical of central African altitude formation and East African Mountains in general. Biological resources (flora and fauna) of the PNV and the neighbourhood declined progressively following the loss of vegetation cover in the area. Pasture for domestic animals, which was particularly rich in 1960's and 1970's could have influenced the current structure of vegetation. However, some plant and animal species still exist inside the Park. Different species of trees have been introduced such as *Cupressus* and *Eucalyptus* species. The landscape outside the Park is mainly covered with food crops, pyrethrum, large tree plantations, small private woodlots and scattered trees (Plumptre *et al.* 2004; ORTPN, 2005b).

1.2.7. Fauna

Although no detailed data are available about the vegetation and wildlife resources outside the Park, wild animal-human conflicts do take place around the PNV where herbivores such as buffaloes and elephants destroy agricultural crops. Thirteen species of birds have been recorded in the Park and its neighbourhood within a radius of 500 m. Households around the PNV keep a variety of domestic animals, both large and small (Plumptre *et al.* 2004, CGIS-NUR/ORTPN, 2005).

1.3. Interactions between the PNV and Communities

This subsection gives an overview of the analysis of interactions between the PNV and the surrounding communities. Based on the socio-economic survey which separately sampled 974 households among communities other than Batwa within a belt of 10 km around the Parc National des Volcans and 21 households of the Batwa community in 2002 (Plumptre *et al.*, 2004), and based on the information extracted from the Park Management Plan 2005-2009 (ORTPN, 2005b), a summary of interactions between the Park and the adjacent communities was made in this section.

1.3.1. Socio-economic impact of the Park through touristic activities

The Park has significant impact on socio-economic wellbeing of local communities through revenues linked to touristic activities. The Park is an important source of employment for part of the local population through different activities taking place both inside and outside the Park. Tourists, mainly attracted by the presence of mountain Gorillas in the Park, have been increasing in number every year during the last few years, leading to local and national economy improvement. Local people benefit through services offered to tourists (local hotels, transport facilities and other services). The recent restructuring of ORTPN encourages the sharing of revenues from tourism with the neighbouring districts through development of socio-economic infrastructures. However, some people in the five districts are still not yet satisfied with the level of employment of locals and the sharing of revenues between them and ORTPN (ORTPN, 2005a, b).

1.3.2. Employment of local population by ORTPN and Partner ngos

Contradicting views are reported that most people (>75%) living near the PNV feel they benefited from the presence of the conservation agents (Plumptre *et al.*, 2004) while others feel they don't benefit much (ORTPN, 2005a, b). The ORTPN/PNV and partner NGOs in the management of the Park employ a large number of people (about 150 currently) in offices and inside the Park for patrols, as guides, transporters etc. The forest is also a source of employment in terms of beekeeping and grazing of domestic animals up to 2 km into the forest. However, grazing of livestock, beekeeping and honey hunting in the Park are prohibited illegal activities (ORTPN, 2005a, b).

1.3.3. Water reservoirs

The Park plays a crucial role in the catchment and regulation of regional water sources through its influence on the climate and its permanent swamps. All water being used by the surrounding communities originates from the Park. Moreover, the majority of the population adjacent to the Park fetches water from the forest especially during dry periods when the seasonal streams dry off. Though there are often periods of water scarcity, this scarcity would be more pronounced without the PNV. Thus the Park acts as a critical water reservoir for local populations. This impact is also felt well beyond the area directly adjacent to the Park due to underground water reservoirs, which surface beyond the lava region and contribute to feeding the river Mukungwa. According to D'Huart et al. (1985) cited by CGIS-NUR/ORTPN (2005), although the PNV covers only 0.6 % of the national territory, it contributes 10 % of the water resources of the country. Though ORTPN allows people to access water from the Park during periods of water scarcity outside, it still finds it as a threat to the integrity of the Park especially if there are a high number of water fetchers in the ecosystem. People may be tempted to carry out illegal activities like animal trapping or tree cutting. There are also risks of polluting the park or of disease transmission from humans to wildlife (ORTPN, 2005a, b).

1.3.4. Soil erosion control

Natural vegetation cover of the Park contributes to the soil stability especially on steep slopes of the volcanoes. This reduces considerably risks of landslides. Also, in regulating water flow towards rivers after rainfall, the forest contributes to the mitigation of flooding or erosion problems in region located down slopes. However, in some areas, rainwater from the park causes soil erosion outside (ORTPN, 2005a, b). The planting of trees and other adapted plants to fix the soil on contours, integrated with other measures to divert water on steep slopes would probably mitigate this problem.

1.3.5. Income generating enterprises for local populations

To reduce the dependence of local people on the Park resources, ORTPN and allied NGOs have embarked on promoting some income generating enterprises in the zone of influence around the Park. This new policy currently focuses on agri-pastoralists, apiculturists, traditional medicine practitioners and artisans. These activities are still at an early stage and need reinforcement in the future as expressed by local communities to alleviate high poverty incidence around the Park (ORTPN, 2005a, b).

1.3.6. Damages caused by wild animals to farm crops around the Park

For some years now, local populations have been complaining about wild animal damages to their crops and impairing with agricultural development. Crop-raiders are noticed weekly for antelopes, monkeys, porcupines, and occasionally for birds, buffaloes, elephants, gorillas, and rats. Buffalos are so far responsible for most damages. The most affected crops are maize and cowpeas. These damages have negative impact on the livelihoods of the local people who have now abandoned the growing of the susceptible crops. People complain about lack of control of these animals and lack of compensation for the caused damages (ORTPN, 2005a, b). CARE International in Rwanda has embarked on the construction of a protective wall around the Park to confine animals within the Park and reduce the damages. Where this wall is complete, complaints have significantly reduced.

1.3.7. Land conflict

Between 1959 and 1973, the Park lost 8000 ha to agriculture, mainly pyrethrum farming, through excision. Thus, since its creation, the area of the Park has been reduced by nearly 50%, shifting from 328 km² to 165 km² due to chronic economic and population pressures. Where the Park boundary is not clearly defined, encroachment still takes place. This destruction of the vegetation results in serious soil erosion due to rain run-off. Some people complain to have lost land to the buffer zone around the Park (ORTPN, 2005b).

1.3.8. Collection of forest products

The high dependence of the Batwa community on the forest (52.4 %) is jeopardized by the restriction imposed on collection of products from the forest in the Park. Most of the collections are illegal but termed as beneficial by the communities around the park. These products include firewood, bamboo, building poles, bean stakes, honey, medicinal plants, grass cutting and animal poaching (big mammals, hyrax, Baby Gorillas) (ORTPN, 2005b). **Table 1** shows the number of Park users in percentage and **Table 2** captures the frequency of collection, sale and buying of the different products as reported in the Socio-economic reports (Plumptre *et al.*, 2005b). The items made by people from forest products as raw materials around the park are indicated in **Table 3** while **Tables 4** and **5** contain the price lists for various non-transformed products from the Park and for "manufactured" items from forest-derived raw materials, respectively. The socio-economic study used

questionnaires to collect views from people. Therefore, care must be taken when interpreting these findings because some responses may have been biased depending on their sensitivity. However, although some biasness could be inevitable as far as questions about illegal activities are concerned, the authors of the socio-economic report indicated that there is good evidence that what people stated they harvested from the forest did match with ranger-based monitoring data collected from forests.

Community	Building	Bean	Firewood	Bamboo	Honey	Minerals	Medicinal	Water
	poles	stakes					plants	
The Batwa	36.4	54.6	54.6	18.2	45.5	9.1	18.2	72.7
Non-Batwa	53.3	46.4	67.8	59.1	51.6	40.6	45.8	100.0
groups								

Table 1. The % of households that harvest particular products from the PNV

Table 2. The frequency of collection, sales and buying of various products from PNV for the Batwa and non-Batwa communities

Product	Frequency	Batwa Community	Other Communities
Duilding	01 Collection	$\Omega_{\text{associated}} = 11 \text{ s}^{*}(10, 10/2)$	Weakly (0.60%) Occorrigation ally (5.40%)
Building	Collection	Occasionally (19.1%)	Weekly (0.6%); Occasionally (5.4%)
poles	Sale	Occasionally (4.8%)	Weekly (0.1%); Occasionally (10.3%)
	Buying	N/A	Weekly (0.1%), Monthly (0.6%), Occasionally (39.6%).
Bean stakes	Collection	Weekly (14.3%)	Weekly (0.1%), Monthly (0.1%), Occasionally (1.2%)
		Occasionally (14.3%)	
	Sale	Weekly (23.8%)	Monthly (0.1%); Occasionally (3.6%)
		Occasionally (4.8%)	
	Buying	N/A	Weekly (0.10%), Monthly (0.4%), occasionally (40.5%).
Firewood	Collection	Weekly (19.1%),	Weekly (1.6%), Monthly (0.3%), Occasionally (5.5%)
		Monthly (9.5%)	
	Sale	Weekly (23.8%)	Weekly (1.75%), Monthly (1.1%), occasionally (3.5%)
	Buying	N/A	Weekly (7.3%), Monthly (3.5%), occasionally (22.9%).
Bamboo	Collection	Monthly (4.8%),	Weekly (0.8%), Monthly (0.1%), Occasionally (4.0%)
poles		Occasionally (4.8%)	
	Sale	N/A	Weekly (0.1%), Monthly (0.1%), occasionally (5.3%)
	Buying	N/A	Weekly (0.1%), Monthly (0.6%), occasionally (30.1%).
Honey	Collection	Occasionally (23.8%)	Weekly (0.7%), Occasionally (2.0%)
	Sale	Occasionally (4.8%)	Weekly (0.1%), Monthly (0.1%), occasionally (3.1%)
	Buying	N/A	Weekly (0.1%), Monthly (0.5%), occasionally (6.2%).
Medicinal	Collection	Monthly (4.8%),	Weekly (0.3%), Occasionally (1.3%)
plants		Occasionally (4.8%)	
	Sale	N/A	Occasionally (1.0%)
	Buying	N/A	Weekly (0.3%), Occasionally (5.8%).
Water	Collection	Weekly (19.1%),	Weekly (5.5%), Monthly (0.1%), Occasionally (9.6%)
		Occasionally (14.3%)	
	Sale	Occasionally (4.8%)	Weekly (1.6%), Monthly (0.1%), occasionally (1.6%)
	Buying	N/A	Weekly (3.5%), Monthly (0.1%), occasionally (8.3%).

* Occasionally means once in a while not on weekly nor monthly basis (no predictable frequency).

There is no buying of products by the Batwa community (**Table 2**). These people are instead involved in the selling of forest products such as stakes for climbing beans, firewood, honey and water. They collect bamboo poles and medicinal plants for 100 % own consumption. For other communities, all the listed products are collected, sold and bought. It is not documented whether there are specialized groups, which collect products for purely commercial end uses. Likewise, quantities collected, sold or bought are not documented.

Forest product as raw material	Manufactured item	% of people making the item
Bamboo	Basket	14.29
	Bed	2.60
	Bows	0.65
	Building poles	22.73
	Ceiling mats	1.95
	Chairs	2.60
	Granaries	4.55
	Hives	0.65
	Mats	18.83
	Ropes	6.49
	Slats	1.30
	Stretchers	1.95
	Winnowing trays	4.55
Honey	Alcohol	5.84
	Medicine	1.30
Wood	Doors	1.95
	Hoe sticks / handles	0.65
Other plants	Baskets	0.65
(Types should be indicated)	Hives	3.25
	Mats	0.65

Table 3. The items that people make from forest products around PNV

The geographic distribution of these artists, if known, would enable to evaluate the feasibility of optimising their production through associations.

Forest product	Unit	Unit cost (in US \$-equivalent)
Building poles	Pole	1.58
Bean stakes	Bundle (conversion factor in metric system?)	0.94
Firewood	Bundle (conversion factor in metric system?)	0.90
Bamboo	Pole	0.31
Bamboo (Firewood)	Bundle (conversion factor in metric system?)	1.71
Honey	Kg	2.25
Minerals	(Not documented)	2.55
Medicinal plants	Handful (conversion factor in metric system?)	8.97
Water	20 litres	0.15

Table 3. Cost of items made itom forest products as raw materials around 1	Table 5.	Cost of items made from	forest products as raw	v materials around PN
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Item	Unit	Unit cost (US \$)*
Alcohol	1 littre	0.21
Baskets	1	0.56
Beds	1	1.99
Chairs	1	1.49
Crafts	1	(Not documented)
Doors	1	5.85
Granary	1	2.13

Item	Unit	Unit cost(US \$)*
Hives	1	(Not documented)
Hoe sticks / handles	1	0.21
Mats	1	2.62
Ropes	1	0.68
Stretchers	1	5.32
Winnowing trays	1	0.21

* Cost in US \$-equivalent per unit.

High population density and search for food, wood and fodder have had and continue to have considerable impact on the resources in the Park through exploitation of natural resources therein e.g. firewood collection. The greatest shortage of fuel appeared to be around the PNV where over 10-30% use agricultural remains most of the times.

Household income is very low and people cannot afford access to sources of energy other than wood. Local people do not have access to large forest plantations in the area because these forests belong to institutions. People are forced to enter the Park to look for firewood. The most exploited species from the PNV is bamboo for construction and art crafts. It is important to note that the demand for firewood is still higher than the supply. The quantity of other products such as crop residues and other fuel used in substitution for firewood is so small that the deficit continues to increase as well as the rate of PNV forest degradation. There is to find out the management options of the large plantations that belong to SOPYRWA after its shifting to solar drying system of pyrethrum and to what extent local people are going to benefit from them.

1.3.9. Special interaction between the Batwa Lifestyle and the PNV

The Batwa culture is intimately linked to forests and their surrounding areas. For the Batwa, forests are a source of physical, emotional and spiritual well-being. Near the PNV, the Batwa's living conditions are very poor as they have little or no land and have no access to forest resources as they used to before the 1930s.

1.4. Key Issues in Land Use and Conservation

1.4.1. Biophysical features

- The high altitude of these volcanoes and the presence of volcanic soils make the region naturally diverse in relief, substrate and vegetation cover.
- The afro-montaine forests of PNV enable climatic regulation in the region, characterised by abundant precipitation throughout the year. The climate is ideal for agricultural activities.
- The PNV is considered as the Water Tower for the neighbouring region but there is no permanent river or stream near the Park due to the nature of soil composition and the structure of the parent rock. There are seasonal rivers that dry up in dry season.
- The PNV vegetation, litter and porous sub-soil are very important in water movement control especially for surface water.
- The volcanic soils are generally fertile (high moisture, rich in organic matter, high pH levels, high cation exchange capacity and phosphorus absorption) throughout around the PNV despite high permeability of the soil and porous volcanic parent rock preventing water storage in soil.
- Soil erosion problems are relatively less pronounced over the major part of the zone covered by the volcanic lava. This is due to the slopes that are generally gentle at the foot of the Volcano Mountains and to the abundant vegetation cover on the slopes.
- Different species of trees have been introduced around the PNV such as Cypress and Eucalyptus but the landscape outside the Park is mainly covered with food crops, pyrethrum, some large tree plantations, small private woodlots and scattered trees.
- Details on the levels of tree integration with other crops such as in Agroforestry around the PNV are lacking.

1.4.2. Opportunities

- High site production potential for many varieties of crops due to favorable ecological conditions and high soil fertility.
- New organization / structure based on decentralization initiatives
- Participation of local people in planning makes it easy to plan
- Tourism development
- Interest and involvement of communities in natural resource management and other development programs.
- Community conservation approach of the ORTPN.

1.4.2. Challenges and / or threats

- No diversification of income agriculture is over 90% the main source of income.
- Too many people while there is no more new farm land. There is need to find ways to assist people benefit from activities which do not depend on land only as a natural resource.
- Deforestation leads to soil erosion. There is need to find strategies of mitigating the problem.
- Agriculture is still extensive. There is need to introduce and disseminate more intensive technologies to increase yield per unit area. Crops with lower returns should be replaced with those with higher returns, but after feasibility and market studies.
- Food processing and preservation technologies are not developed. There is need for such technologies to be developed to add value to the harvest of the dominant food crops (e.g. Irish potatoes, beans, sorghum, wheat, maize) in order to increase returns to farmers.
- The diversity of sources of energy used around the PNV is low. Domestic energy mostly relies on firewood, charcoal and agricultural products. Alternative sources of energy need to be sought, as the current sources are traditionally not environment friendly.
- There is increased pressure on protected areas from local communities and it is impossible to send them off using only traditional law enforcement practices. Wealth indicators show low standards of living for local population around the PNV especially the Batwa. There is need to initiate and support poverty alleviation programs in the region.
- There is very high population density around the PNV, exceeding 500 persons per km² in most Districts adjacent to the Park, which increases pressure on natural resources locally. There is need to intensify sensitisation of population to practice family planning.
- Food production is insufficient with specific periods of food shortage being October-November and April-May of each year. It is constrained by parceling out land as a consequence of the growing population.
- The livestock sector is not advanced despite the intervention of some of the Non-Government Organisations. A few households own livestock and other domestic animals. The basic resources for animal keeping development namely the pasture, fodder and water are insufficient and need to be developed further.
- Where the surplus harvest from agriculture (e.g. *Irish potato, Sorghum, Wheat*) exists, it is sold with constraints imposed by poor marketing infrastructure such as lack of organised marketing channels. Middlemen exploit farmers in price negotiations.
- *Maize and beans* foodstuffs are largely auto consumed and a small quantity is sold to middlemen who store them for two to three months and sell them back to farmers as seeds at the planting period and at an exorbitant price.

- Land is rarely left fallow due to its scarcity; leading to over-exploited and exhausted fields. There is need to apply agricultural inputs, proper crop rotation, and erosion control measures.
- Wild animal-human conflicts are common around the PNV due to the damage of some wild animals (e.g. buffaloes and elephants) on crops. There is need to lay down strategies to resolve these conflicts. For example, a protective wall around the Park is under construction to confine animals within the Park and minimize damages caused by wild animals to the crops.

1.4.3. Interactions between PNV and surrounding communities

- Provision of employment to the local population through different activities taking place both inside and outside the Park. The dependence of local people on the Park resources is being discouraged through initiating income-generating enterprises outside the PNV.
- Revenue sharing between ORTPN and the districts neighbouring the PNV.
- Soil stability and reduced risks of landslides and floods due to the vegetation cover on steep slopes of mountains in the Park promote secure settlement of local communities.
- Communities adjacent to the PNV depend on the collection of products from the forest in the Park for own use and/or for sale. Main products extracted include water, firewood, bamboo, building poles, bean stakes, honey, minerals and medicinal plants.
- The PNV is the major source of water used by the neighbouring communities. Though there are often periods of water scarcity, this scarcity would be more pronounced without the Park.
- The exploitation of forest resources from the Parks by the Batwa and others is not sustainable. There is need for an integrated resource use programme.

1.5. Conservation and Land Use Initiatives

This subsection contains an overview of conservation and land use initiatives in the Kinigi area, including information on applied processes, leading organizations and key targets (focal groups or focal areas).

To tackle the threats to the PNV, ORTPN is working in collaboration with community development organizations and non-government conservation agencies. The conservation activities are highlighted in two categories: conservation initiatives by non-governmental conservation agencies (**Table 6**) and local conservation / land use initiatives in the Kinigi area per district (**Table 7**). These organizations and initiatives support activities that aim at improving Park security, stimulating activities that contribute to the growth of tourist incomes, developing a system of communication through education about the Park and its natural beauty, and initiating some community development activities. Some projects aim at getting access to specific resources such as medicinal plants and honey.

Conservation initiative	Organisation	Activities	Focal zones/groups
Research Centre of Karisoke (KRC) since 1967	Dian Fossey Gorilla Fund International (DFGFI)	Protection and monitoring; Follow-up research groups, support to community development and sensitisation of population	Population around PNV mainly Kinigi District
Project Mountain Gorilla since 1979	The International Gorilla Conservation Programme (IGCP)	Institutional support and empowerment of ORTPN through capacity building; Support to ranger- based monitoring programme. Community conservation and development of local enterprises eg. Skills, crafts, apiculture	Districts surrounding PNV
Protection and sustainable management of PNV resources	CARE International in Rwanda	Planting trees, supply of improved equipment, construction of a protection wall around the PNV, supply goats and sheep	Districts around the PNV
Promotion of the reduction of human pressure on the PNV	Dian Fossey Gorilla Fund - Europe	Work through local NGO's to uplift people's living standards and conservation of the Park.; construction of water tanks, Financial and logistic support to the Virunga Wildlife Club; support to local NGO's in income generating activities e.g. beekeeping, crafts, integration of the Batwa.	Concentrate its activities outside the park
Mountain Gorilla Veterinary Project (MGVP)	Morris Animal Foundation	Veterinary follow-up of Mountain Gorilla Population. Medical treatment to people	Population living near the Park and PNV staff.
Logistic support to PNV	Association Gorilla - France	Regularly intervenes in PNV to supply equipment e.g. camping materials, work uniform	
GEF/PNUD Project initiated in 2004 to start off in 2005	Wildlife Conservation Society (WCS)	Target the development of capacity in areas of biodiversity management	The Volcanoes montane forests

Table 6. Conservation initiatives by Non-governmental conservation agencies

Source: ORTPN (2005a, b).

Table 7. Local conservation and land use initiatives in the Kinigi area per District

Land use initiative	Process applied /	Process applied / Leading organizations	
	Activities and strategies		groups / areas
	of implementation		
Erosion control	Distribution of goats	CDF (Communal	18565 households of
	through a rotating credit	Development Fund)	the District.
	system. Started with		
	Jenda Sector (Ubudehe		
	Program)		
Promotion of Dairy	Distribution of improved	HPI (Heifer Project	District
cows	cows (Jersey) by the	International)	
	rotating credit system and		
	technical support of		
	beneficiaries		
Construction of the		PICG/ORTPN	
protective wall along			
the park			
Promotion of the Irish	Marketing and iisueing	COODAF (Coopérative	Kareba Sector
Potato Crop	credit of plants of Irish	de Développement	Target: Five
	potatoes	Agricole et Forestier)	associations
Promotion of avocado	Production and	COCASTER	District
	distribution of 25000	(Cooperative	Target: Population di
	plants of grafted Avocado	Développement de la	district
		culture d'avocatier)	

Table 7a . Buhoma District

Table 7b. Bukamba District

Land use initiative	Process applied / Activities and strategies of implementation	Leading organizations	Key targets: Focal groups / areas
Promotion of Dairy cows	Distribution of improved cows (Jersey) by the rotating credit system and technical support of beneficiaries	HPI (Heifer Project International)	District Target : 156 farmers
	Issueing of three Bulls and technical support of beneficiaries	PADEBL (Projet d'Appui au Développement des Bovins Laitiers)	Entire population of the District
Genetic improvement of cows	Artificial insemination	CNIA	Population du district
Decentralised Participatory Development	Construction of Gahunga market, issuance of rotating credit to four farmers per Cell and of agricultural and veternary inputs	PADDEP (Programme d'Appui à la Décentralisation et au Développement Economique et Participatif)	Population du district
Environnement	Rehabilitation of roads, anti-erosion activities at the shores of the two Lakes, planting fish into the Lakes and organising fisheremen.	SIG/HIMO	Population in zones riverine to the Lakes Bulera and Ruhondo

Apiculture	Issuance of modern beehives and training of apiculturists	ARDI (Association Rwandaise de Développement Intégré)	Zones adjacent to volcanoes Target: 26 associations
Promotion of apiculture and culture of Mushrooms	Material support and training	PICG (Programme International de Conservation des Gorilles)	(694 apiculturists) Sectors around of the PNV
Tourism	Train in hospitality and guiding of tourists and in conservation activities of the park	ORTPN	Target: Population riverine to PNV
Assistance to agri- pastoralists	Formations and technical support to agri- pastoralists	Urugaga IMBARAGA	Population of the district
Promotion of the Irish Potato Crop	Marketing and iisueing credit of plants of Irish potatoes	COODAF (Coopérative de Développement Agricole et Forestier)	Zones around the Volcanoes Target : Growers of irish potatoes
Development of the maize crop and its transformation	Training of growers, sale of maize seed to farmers, purchase of harvest, conversion of maize into floor, animal feeds.	COAMV	Mainly zones adjacent to volcanoes Target : Associations of maize growers
Development of the wheat crop	Technical support and issuance of credits for inputs (seed and fertilizers)	COPROVAB	Zones riverine to volcanoes Target: Wheat Growers
Development of the sun flower crop	Issuance of credit for seed, purchase of harvest and extraction oil from sun flower	TABARA	District
Development of the pyrethrum crop	Technical support to the growing of pyrethrum, purchase of dry floweres of pyrethrum and their transformation	SOPYRWA	Zones around volcanoes
Assistance to Small rural enterprises of artists	Issuance of micro-credits to artists	PPPMER	Target : artists of the district
Development of agriculture and Livestock	Anti-erosion activities, agroforestry, animal husbandry of small animals, use of mineral fertilizers.	DERN	10 sectors Target: 30 associations (600 members).

Table 7c. Kinigi District

Land use initiative	Process applied /	Leading organizations	Key targets: Focal
	Activities and strategies of implementation		groups / areas
Integrated farming	Agriculture, animal	OXFAM	Target : One Cell per
	growing mushrooms		Sector in four Sectors
Development of the	Technical support to the	SOPYRWA (Société des	Six sectors
pyrethrum crop	growing of pyrethrum, purchase of dry floweres	Pyrethres du Rwanda)	
	of pyrethrum and their		
	transformation		
Promotion of the Batwa	Agriculture, animal keeping and apiculture	AIMPO	Kabwende Sector *
Conservation and	Guarding of PNV,	ORTPN	
protection of PNV	promotion of tourism in the PNV		
	Promotion of Tourism,	IGCP	Sectors around the
	apiculture and growing of mushrooms		PNV
Good governance,	Installation of public	CDF (Communal	District
economic infrastructures	construction of offices for	Development Fund)	
and UBUDEHE	Sectors, Rehabilitation of		
	water adductions,		
	project identified as of		
	priority by beneficiaries +		
	assistance to 2 vulnerable		
Development of	families per Cell	DEPN (Dáveloppement	District
agriculture and animal	seeds, keeping of sheep,	de l'Elevage dans la	District
husbandry	nurseries of fruits and	Région du Nord)	
December (b) life of	agroforestry trees	Kariaalaa Cantus	Directo Conton
Mountain Gorillas	haelth of Gorillas.	Karisoke Centre	Bisate Sector
	Veternary laboratory		
Assistance to agri-	Training, Establishment	Urugaga IMBARAGA in	District
Production and	Multiplication and	SNS (Service National	Kabwende Sector*
distribution of improved	distribution of Irish	Semencier)	
seeds / plants	potatoes plants, seeds of		
Protection of	Production of	FONCE	Gihora Sector
environnement	agroforestry seedlings		
Promotion of the	Installation of adoption	DUTERIMBERE	Gihora Sector: six
Water and Public health	Training construction of	UNICEE	District
	water points and public		District
	latrines		
Promotion of Passion	Establishment of	ASOFERWA	District
fruit (filaracouuja) crop	training of associations of		
	the Passion fruit plant		
	growers		D:
Promotion of Dairy Cattle	races /varieties of cows	International)	District
Cuito	(Jersey) through a	international)	
	rotating credit system		

Promotion of access to improved seeds / plants	Issuance of credit to purchase agricultural inputs and construction of seed storage infrastructures (hangars)	COODAF	7 Sectors
Health	Create awareness about family planning, Testing for VIH/SIDA and cancelling	ARBEF	District

* Sectors outside proposed CBNRM zone

Table 7d. Mutobo District

Land use initiative	Process applied / Activities and strategies of implementation	Leading organizations	Key targets: Focal groups / areas
Socio-econome forums against poverty	Establishing tree nursewries to promote agroforestry, ; Management and exploitation of composts	ACCORD/RWANDA	16 forums in six Cells in five Sectors
Promotion of the farming of mushrooms and assistance to associations of apiculturists		PICG (Programme International de Conservation des Gorilles)	
UBUDEHE	Funding of Community project identified as of priority by beneficiaries + assistance to two vulnerable families per Cell.	CDF (Communal Development Fund)	All Cells of the District Target: The community and two families per Cell
Promotion of farming of Avocado	Nursery management for the production and distribution of grafted plants of Avocado tree	COCASTER	Gataraga Sector Target: Entire population
Issuance of micro- credits	Issuance of micro- credits for projects in agriculture and animal keeping, commerce and construction	COOPEC CEA	Entire population in the District
Promotion to the keeping of dairy cows	Distribution of dairy cows (race Jersey) through the rotating credit system. The adopted system is zero- grazing.	H.P.I (Heifer Project International)	Eight Sectors

Source : Survey by Raphael Rurangwa (IGCP Representative, Ruhengeri, 2005)

Table 7e. Mutura District

Land use initiative	Process applied / Activities and strategies	Leading organizations	Key targets: Focal groups / areas
	of implementation		groups, arous
Promotion of the		WIT	District
development of women			
Agricultural development	Training of farmers and	Centre IWACU de	District
	distribution of agricultural	Kabusunzu in	
	inpputs	collaboration with	
		PDMAR	
Rural developpement		Croix-Rouge Rwandaise	District
Intensive exploition of	Distribution of improved	COODAF, ADEMO	Entire population in
the Irish potatoe crop	plants, agricultural inputs,		the District
over large area	Training of farmers in		
	farming techniques, and		
	assisting them in		
	marketing their		
	production.		
Intensification of	Support to Agri-	BAIR, IMBARAGA,	District
agriculture and	pastoralists associations	PAFOR, CARE,	
environment	of Irish potatoes	RSSP. PADEBL	
conservation	Availing fertilizers		
	Provision of credit		
	Construction of stores,		
	milk collection points		
	Intensification of animal		
	husbandry		
	Extension in agriculture		
	Rehabilitation of Gishwati		
	forest		
	Erosion control		

Source: CRDP (2002)

Though several projects have been initiated since 1994 to address the plight of the Batwa, their needs for forest resources from the Parks have not been considered in integrated resource use programmes, mainly because of the unsustainable ways of harvesting the resources. Hence, the Batwa communities feel marginalized even in the multiple use programme. Initiatives like constructing a protective wall around the Park to confine animals within the Park ecosystem aim at minimising the damage caused by wild animals to farmers' crops. Where this wall is already in place, the production of food crops is improving.

Enhanced income generating enterprises for local populations will reduce the dependence of local people on the Park resources. Assistance is given to different groups including agri-pastoralists, apiculturists, traditional medicine practitioners and artisans. These activities are still at an early stage and need reinforcement in the future. Revenue sharing between ORTPN and the population adjacent to the Park through financing the development of socio-economic infrastructures such as schools, Health Centres, water points etc is going on to motivate local population participate in conserving the Park and the resources therein.

The priority areas that need immediate actions in land use practices around the Parc National des Volcans have been identified through participatory planning approach. They include integrated farming mixing livestock and agriculture; methods of controlling

erosion; Credit for agricultural inputs and livestock acquisition; Creation of selling points for agricultural inputs; support farmers in marketing organisation; Breeding improvement for both cattle and goats. The priority commodity chains (specialized farming) for each Administrative Sector in the five Districts adjacent to the Park include Irish potato in 20 Sectors (excluding Muhingo, Shingiro, Nyange, Rwinzovu), Cattle (10 Sectors), Maize (9 Sectors), Beans (3 Sectors – Nyange, Burambi, Girtaraga), sorghum (3 Sectors – Gatete, Gahunga, Nyange), Pyrethrum (1 Sector – Rwinzovu), Small livestock (2 Sectors: Kabwende, Nyabitsinde), Wheat (2 Sectors: Nyabirehe, Muhingo), Prune de japon (2 Sectors: Shingiro , Muhingo), Beekeeping (1 Sector – Shingiro) (MINAGRI, 2005b).

CHAPTER TWO

SOCIO-ECONOMIC CHARACTERIZATION

2.1. Social Infrastructure

2.1.1. Educational infrastructure

The area around PNV has several primary schools, the majority of which are managed by religions denominations and others managed by the government. Most of these schools were damaged during the period of insecurity (1997-1998) and require rehabilitation. Some schools are over-populated, to the tune of 90 pupils in a class, while in some areas lessons are conducted in residential or other inappropriate premises (Nkurunziza, 2003). However, on a good note, most of the teachers in primary schools are qualified (ORTPN, 2005b). In general the number and population of primary schools is much more than the available secondary schools, so only a small percentage of primary school leavers go to secondary schools.

According to the Buhoma District Development Plan, the district has 24 primary schools, of which six are government schools and eight are private. These schools take a total of about 21880 pupils. Of these six are in a good condition, eight are average, lacking some equipment and scholastic material, and 10 completely lack equipment and materials. However all the 319 teachers were qualified with regard to secondary schools, the district has five secondary schools, and in 2002-03 there was a total of 2641 students, or only 12.1% of the primary school population. Of the 102 teachers, half (46) were qualified (HELPAGE-Rwanda/PADDED, 2002). The state of secondary schools is not satisfactory, with lack of scholastic equipment, insufficient buildings and limited numbers of qualified staff.

Kinigi District has 10 primary schools located in eight sectors of Gihora, Nyange, Kagano, Kanyamiheto, Gasiza, Bisate and Tero. Musanze, Nyabitsinde, Nyarugina and Rwankuba sectors have no primary schools. All the schools are in bad shape and need rehabilitation, scholastic materials and equipment. The district has two secondary schools, including The Baptist College of Saint Sylvestre and the Communal College of Kinigi. Both institutions are in bad shape, poorly equipped, even lacking sufficient blackboards.

Mutobo District has 24 primary schools, with a total of 24105 pupils. The schools are mostly in need of rehabilitation. The schools are overpopulated with an average of 90 pupils per classroom, which justifies the need for expansion of the school facilities. The district has only two secondary schools. These include Bugoso School for Sciences and Technology which is government aided. In the year 2002-2003 the school hosted 829 students. Out of the total of 30 teachers, 11 or 36.7% were qualified. This school has a problem of insufficient dormitories for students, lacks science laboratories and equipment and has big numbers of students who are vulnerable. The other school is Nyakinama Community College, with 120 students and seven teachers of whom only one is a qualified graduate. This school lack qualified teachers, scholastic materials and equipment plus the students are too few.

2.1.2. Health infrastructure

Most of the health infrastructure (health centres, dispensaries and hospitals) were damaged and looted during the crisis of 1997-1998, and need to be rehabilitated. The main hospital is located in Ruhengeri town, while the districts host only dispensaries and health centres (**Figure 4**). Nationally, the average distance to a health centre in rural areas is 5.8 km. Ruhengeri province is well endowed with health facilities, with an average distance to a health facility below the national average, at 3.9 km, compared to 8 km in Gikongoro. Nationally, about 50% of communities are at least 5 km away from a health centre; while 19% live 10 km or more away. Only 6.8% of cells have a health centre, while 50% benefit from the services of a traditional healer (MINECOFIN, 2002a). Buhoma District has a total of four health facilities, two in Nkuli Commune and two in Nyamutera Cell. The have a total of 61 hospital beds. All the health facilities have a problem of insufficient numbers of qualified health workers, insufficient supplies of medical materials and equipment and poorly remunerated health workers. In addition, Centre de Sante Kareba has insufficient bed capacity and lacks electricity. Centre de Sante Rwankeli has poor latrine facilities while Centre de Sante Nyakiriba has a poor access road.



Figure 4. Distribution of health facilities in the region around PNV Source: Rwanyiziri & Kayijamahe (2004)

Kinigi District has five health facilities, including one traditional medicine center. These include Kinigi Health Center, Gasiza Health Center Kampanga Health Center, a dispensary at Bisate and the Association of Traditional Medicine Practitioners of Rengerubuzima in Gihora. The health center at Kinigi is in a very poor state, yet it is very important for the local population. The number of beds is insufficient), and there is no electricity to facilitate hospital operations especially at night. There are poor security and sanitation facilities. The health center cannot provide practical nutrition education to mothers because they have no materials to use. The district health facilities lack sufficient maternity facilities, yet the rate of delivery in the area is very high. Because of big numbers of deliveries, there is need for separate maternity wings. Kampanga Health Center is in good state because it was recently rehabilitated. Bisate Dispensary however was destroyed during the war and needs rehabilitation and expansion to include pre-natal services like vaccination facilities. The medical facilities in the district are insufficient given its population density. High morbidity rates resulting from poor sanitation facilities around homesteads and poor disposal of fecal material lead to a situation where a big percentage of the population needs but has no access to health services.

2.1.3. Markets

According to the recent report on development indicators done by PADDEP-Ruhengeri (2004), there are four commercial centres in Ruhengeri Province. They are the big market of Ruhengeri, Mukamira in Buhoma District, Byangabo in Mutobo District and Rugarama in Bukamba District.

District/ Town	Market/ commercial or trading center	Location (sector)	Frequency per week	Origin of people who participate	Monthly receipts (FRW)
Mutura	Kora	Kora	Twice	Mutura, Buhoma, Mutobo, Kanama, Cyanzarwe	173000
	Kabari	Kanzenze	Twice	Ruhengeri Province and Gisenyi Cell	160000
	Kabumba	Rusiza	Twice	Cyanzarwe, Kanama Mutura	76000
Kinigi	Kinigi	Kanyamiheto	Twice	Kinigi, Bukamba, Ville Ruhengeri Town, Mutobo	250000
Mutobo	Byangabo	Busogo	Twice	Mutobo, Bugarura, Buhoma, Kinigi	600000 to 800000
	Kinkware	Nkotsi	Twice	Mutobo, Bugarura, Kinigi	160000
	Nyiragihina	Shingiro	Twice	Mutobo, Kinigi	3000/day
	Nyirambundi	Kabere	Twice	Mutobo	1000/day
Buhoma	Mukamira	Mukamira	Twice	Gasiza, Mutura, Buhoma, Mutobo, Gaseke	250000
	Gashyushya	Rugera	Twice	Bukonya, Mutobo, Gasiza	85600
Bukamba	Rugarama	Rugarama	Twice	Bukamba, Butaro, Cyeru, Gisoro (Uganda)	720000
	Kidaho	Between Kidaho, Butega, Gitare and Butete Sectors	Everyday	Kidaho, Butega, Gitare and Butete Sectors of Bukamba	440665
	Nyagahinga	Burambi	Everyday	Burambi and Gisoro (Uganda)	151433
	Gahunga	Gahunga	Twice	All the sectors of the former Commune of Nkumba	400000
	Nyanga	Nyanga	Twice	Bukamba, Cyeru, Bugarura	72000
Ruhengeri Town	Ruhengeri	Mubona	Everyday	All the Districts of Ruhengeri, plus people from other provinces	1865000
	Kariyeri (Carrière)	Muhoza	Everyday	Ruhengeri Town	350000
	Nkandagiro	Gasanze	Everyday	Ruhengeri Town	62000

 Table 8. Market/commercial or trading centers in 2004

Source: Cited from Rwanyiziri & Kayijamahe (2004), but originally cited from Plans de Développement Communautaires des districts de Mutura (CRDP 2002: 30), Kinigi (HELPAGE Rwanda/PADDEP, 2003a: 23), Mutobo (HELPAGE Rwanda/PADDEP, 2003b: 23), Buhoma (HELPAGE Rwanda/PADDEP, 2002: 31), Bukamba (HELPAGE Rwanda/PADDEP, 2003c: 62).

2.1.4. Water

Though the region around PNV experiences an average precipitation of 1500 mm a year, its geological nature mainly composed of permeable rock means that there is no flowing water which can be easily tapped. The problem is particularly severe in all sectors adjacent to PNV. This problem was compounded by the consequences of 1994 war and the insecurity of 1997-1998, in which hydraulic infrastructure was damaged (water pipes, public water points, water tanks). Water is indeed still a big issue in the area, despite effort by government to rehabilitating some of the water sources. Only 41.3% of households have access to clean water (ORTPN, 2005b). Some people have to walk an average distance of 3.9 km to reach a source of water. **Figure 5** shows the distribution of water infrastructure in the region.



Figure 5. Distribution of water infrastructure in the PNV region Source: Rwanyiziri & Kayijamahe (2004)

Indicator	Buhoma	Bukamba	Kinigi	Mutobo	Mutura	Total or average	Standard
Number of water sources available	255	24	1	99	3	-	-
Number of clean water sources	125	28	50	143	32	-	-
Private water sources	4	31	7	87	27	-	-
% of household who access unclean water	42.5	57.0	40.3	49.9	50.0	42.8	0
Liters of water consumed per person per day	7	6	6	6	6	6.3	20
Distance from household to nearest water source (in Km)	2	8.7	4.4	3.2	5	4.1	0.2

Table 9. The situation of water accessibility in the region

Source: Rwanyiziri & Kayijamahe (2004).

Buhoma District has 13 water points in a good state and 65 functioning springs. There are six water reservoirs that need rehabilitation. A total of 116 springs need rehabilitation and five are to be constructed. Though this district has high potential for water production, there is still limited access to clean water. The existing water sources are located in the eastern part of the district, and the north and west have problem of access to water, due to volcanic soils. And though the east has many water sources, many of them are not functional, and those that are in some cases located far from human settlements. The potential to harvest rain water is not exploited due to lack of water harvesting tanks, e.g. at schools and health facilities (HELPAGE-Rwanda/PADDED, 2002).

Kinigi District has 14 water reservoirs. However, only five taps can provide water to about 15972 households. All the water infrastructures are in poor conditions and this causes severe hindrances to the population. Certain villages in Nyabitsinde, Tero and Nyarugina access water from more than 3 km distances. Many village communities face severe shortage of drinking water, and sometimes people are forced to draw water from runoff gullies/drains for consumption and other household needs. This water causes general ill health through spread of diseases.

2.1.5. Energy

Firewood remains to be the main source of energy for the population in the region. Firewood is used to cook food and provide light. Apart from Kinigi District, which has been currently provided with an electric power line and electricity, other districts have very limited access to electricity. Electricity infrastructure in the region was damaged during the years of civil unrest and also need rehabilitation. There is need to extend electricity supply to the main trading centres, health facilities and schools.

2.1.6 Transport and communication

The area around the PNV is would be largely accessible, since there are roads connecting all administrative sectors to the Kigali-Ruhengeri-Gisenyi highway or the regional Ruhengeri-Cyanika road, both paved. However, most of the connecting roads are damaged today and require rehabilitation, leading to isolation of some sectors like Kabatwa and Butaka sectors in the District of Mutura, and other sectors neighbouring PNV (ORTPN, 2005b). For example, Kinigi District has a 147.4 km-long road network, of which 48.5 km are in good condition and 98.9 km in poor condition (HELPAGE Rwanda/PADDEP, 2003a).

The telephone network is not developed in the region, except in Ruhengeri town. The equipment was looted and damaged during the war of 1994 and insecurity crisis of 1997-1998. However, the situation has been improved by the introduction of cellular telephone network RWANDA CELL, which covers a good part of the zone neighbouring PNV, but only few people who can afford are connected on the mobile network.

2.2. Demography

The population of Rwanda stood at 8128553 people as of the 2002 Population Census. It had increased from 1595500 people in 1934 to 7155391 people by 1991. The national population is mainly young, with 57.03% of the population within the age category 0-19 years and only 37.18% in the productive age category of 20-54. Only 5.80% of the population was 55 years and above (**Figure 6**).

2.2.1 Population structure

Around the PNV the population structure is the same as the national one: triangular. The age bracket 0 and 24 years constitutes almost 62.2% of the population in Buhoma District and 60.6% in Mutobo district. In Kinigi district, the youth below 30 years of age represent 69.8% while those between 0 and 18 represent 56% of the population in Mutura population (ORTPN, 2005b).

This kind of population structure indicates high birth and infant motility rates that are indicative of poverty (Plumptre *et al.*, 2004). A big section of the population is not yet in the productive age group, but needs resources to be maintained and is thus straining the country's economy. This situation also indicates possible higher population growth rates in future, especially in a situation of reduced mortality rates.



Figure 6. The population structure of Rwanda

Source: MINECOFIN (2003).

Ruhengeri and Gisenyi Provinces have the highest populations in the country, at 891498 and 864377 people respectively, closely followed by Gitarama Province. Majority of this population (92%) in the two provinces is rural. Also, females comprise a majority within the population, at 53.3% in both provinces (MINECOFIN, 2003). In the 1991 general census, Ruhengeri Province had a total of 769115 people and was in the fourth position nationally, after Kigali Rural (917970 people), Gitarama (851145 people) and Byumba (779669 people). Gisenyi was in the sixth place with 729855 people.

From the results of the 2002 Census by district, the population of the districts surrounding the PNV is indicated in **Table 10** below. The population change between 1991 and 2002 was over 11% increase in four districts. But the most dramatic increase was in Bukamba District, with a 34.4% increase. This may be due to the return of former refugees from Uganda and other neighboring countries. But it may be due to other reasons as well.

District/Town	Population (2 nd	Population (3 rd Rwanda	% Increase
	Rwanda General	General Census, 2002) ¹	
	Census, 1991)		
Buhoma	80169	89210	11.3
Bukamba	88177	118466	34.4
Kinigi	55244	62798	13.7
Mutobo	81621	95922	17.5
Mutura	-	112934	-
Total		479841	-

Table 10. Evolution of the population neighbouring PNV between 1991 and 2002

Source: Rwanyiziri and Kayijamahe (2004).

In the districts adjacent to PNV, females comprise on average 53.2% of the population as shown in **Table 11** below. This could be could be a result of the combined effect of male out-migration in search of employment, plus deaths in the 1990s civil unrest.

Table 11. Sex composition of the population in the districts around PNV

District	Men	Women	Total
Buhoma	48.8	51.2	100
Bukamba	46.3	53.4	100
Kinigi	45.2	54.8	100
Mutobo	45.1	54.9	100
Mutura	48	52	100
Average	47.7	53.3	100

Source: Rwanyiziri and Kayijamahe (2004)

2.2.2. Female-headed households

According to the results of the 2002 population census, the percentage of female-headed households is quite high, at more than a third of the total households (**Table 12**). The country figure stands at 35.2%, while Gisenyi and Ruhengeri Provinces have 36.6% and 34.6% respectively, possibly due the deaths during the 1994 genocide when over a million people perished, and more men than women died.

Table 12. Representation of Female Headed Households

Area	Total households	Female-headed HH	% of Female-headed HH
Rwanda	1757426	618241	35.2
Gisenyi	187213	68437	36.6
Ruhengeri	193160	66894	34.6

Source: MINECOFIN (2003).

2.2.3. Population density

Population density in Rwanda in general has increased from 80 persons per km^2 in 1934 to 308.6 persons per km^2 in 2002 (based on the country size of 26338 km²). The density was estimated to reach 644 persons per km² by 2013 (ONAPO 2003, MINILARE 2003). The average population growth rate is estimated around 3.1% per annum, being one of the highest growth rates in the world (Kayitare and Lanjouw 2002, RoR 2002,

¹ **Note:** District Development Plans (PDC) present higher estimates of population. But the figures presented here are taken to be more valid because they are from the most recent (2002) General Population Census.

MINISANTE/ONAPO, 2003 in Rutagarama 2003) despite the civil war in the 1990s when thousands of people fled the country and over one million people died.

Population growth is mainly a result of natural growth. The contraceptive prevalence in Rwanda is very low, with only 6.7% of women in the age group 12-49 years reporting using it; a rate which is not significantly different between the poor and relatively wealthy sections of the population (5.0% for the poorest against 10.0% for the most affluent). There is also no significant difference between the provinces and the city of Kigali according to the Demographic and Health Survey of 2000 cited in MINECOFIN (2002a).

The districts around PNV are the most densely populated, compared to other districts of the same province (**Figure 7**); mainly because of the migration into the area in the 1960s attracted by the fertile volcanic soils, natural increase and reduced mortality rates. According to the 2002 population census ((MINECOFIN 2003), a total population of 479330 persons lived in the districts around the Park then, hence creating enormous pressure on the local resources. The population density of Ruhengeri and Gisenyi Provinces was 537.1 persons per km² and 423.8 persons per km² respectively. However, looking at the districts surrounding the PNV, population densities are much higher than that (**Table 13**). The average population density in these districts is 690.1 persons per km², exerting a lot of stress on the resource base for food production, fodder and fuel wood (Plumptre *et al.*, 2004). From 1991 to 2002, population density in the neighbourhood of the PNV has shot up.

District / Town	Total population 30/08/2002	Total surface area (Km ²)	Habitable area km ²	Physical density (persons /km ²)	Physiological density (persons /km ²)
Buhoma	89210	154.5	144.1	577.4	619.1
Bukamba	118466	185.1	145.8	640	812.6
Kinigi	62798	162	110.1	387.7	570.2
Mutobo	97180	189.3	141.8	513.3	685.2
Ruhengeri Ville	71511	63.2	63.2	1131.3	1131.3
Mutura	122934	201.7	167.3	609.3	734.9
Average total	489330	892.6	709.1	548.2	690.1

Table 13. Population densities in the districts around PNV

Source: Rwanyiziri and Kayijamahe (2004).



Figure 7. Population density in the region around PNV

Source: Rwanyiziri and Kayijamahe (2004).

Due to demographic pressure caused by natural increase, inequitable access to land resources between the rich and politically well placed and the poor majority (Gasana, 2002) and inter-generational transfers of land, land in most of Rwanda is very fragmented, and around the Virungas some households own up to 10 or more plots of land, with some plots as small as 0.05 ha. The average size of household farms has decreased over the years (André and Platteau, 1995). Farmers are forced into practicing unsustainable farming practices on hillsides, farther degrading them.

2.3. Migration and Settlement Patterns

The 1970-1980 decade saw an intensive migration from the densely populated areas of Gikongoro, Ruhengeri, Gisenyi and Kibuye towards from the semi-arid savannas of the east (Umutara, Kibungo and Bugesera) in search for vacant land. However, at the moment, migration mainly takes two forms: seasonal male labor migration in search of employment, and to a smaller extent, female migration as a result of marriages. Because the land has become very limited, there is surplus labour during certain seasons of the year. The men thus migrate when their labour is not being utilized in their households, but usually come back during peak labour intensive periods. As such there is no labour shortage as a result of male labour migration. Availability of labour at household level has been associated with levels of poverty. For many households poverty leads to having too much labour (given available land, capital or demand), which is likely to manifest itself in underemployment or occasionally unemployment. For other households, it leads to too little labour, with members working long hours, typically at low returns and so in a
situation of time poverty to add to their other dimensions of poverty. This pressure may imply lower school attendance by children of these households (MINECOFIN, 2002a).

There are three main settlement patterns observable in the area. These are scattered rural agricultural settlements, which are the most widespread, then family groups, and agricultural group settlements known as "Imidugudu". The first type is the most widespread in the region, with a house or houses surrounded by an enclosure called "urugo", while the second type is found in Buhoma and Mutobo districts where people live along the road in agglomerations called "insisiro". The third one is a result of a new national settlement policy, which recommends re-grouping households into villages so that land for cultivation can be available and services can more easily be provided. Many group settlements were constructed in the region from 1996. But there are indications that in some cases people abandoned their houses to go back to the land of their ancestors (Rwanyiziri and Kayijamahe, 2004). The housing situation for many rural households is bad. Poor housing is attributed to poverty, the inflow of former refugees who fled the country in 1959 and returned to the country and had neither land nor shelter, and also because of genocide and insecurity, which caused demolition of a considerable number of houses (Rwanyiziri and Kayijamahe, 2004).

2.4. Education

2.4.1 Levels of enrolment

Nationally, education at secondary and higher levels is extremely low. About 33% of the population of 15 years and above have no education, and 60% have only primary education, 7.1% have post-primary or secondary education, and only 0.4% have some tertiary education. Current educational enrolment has been increasing. Most people in Rwanda now have some access to primary education for their children. However, access to secondary and tertiary education is much more limited (MINECOFIN, 2002b). The net enrolment rate in primary school is 72.6% at the national level, with no difference by gender. Urban areas exceed rural areas by 9% (rates being 80.8% in urban areas and 71.8% in rural areas). The same inequalities are observed in considering gross enrolment rates in primary school by class or wealth groups, and in urban and rural areas. In fact among the poorest 20% the rate is 81.0% compared to 104.6% for the richest, and as before urban areas are more favoured (98.3% compared to 91.9% in rural areas) (MINECOFIN, 2002a). **Figure 8** shows the enrolement distribution in primary schools.

In secondary school the net enrolment rate is extremely low at only 7.6% at the national level, with large inequalities between consumption quintiles and between urban and rural areas. The urban enrolment rate is 22.5% compared to 5.8% in rural areas. The poorest are almost completely absent from secondary schooling (at national level 1.1% and 3.3% in the first two quintiles (the poorest) compared to 11.4% and 19.1% for the fourth and fifth quintiles (the wealthiest) (MINECOFIN, 2002a). Gross enrolment rates are similarly very low, showing the same pattern of inequalities in terms of living standards and area of residence. The national gross enrolment rate is only 10.5%, the rate being much higher in urban areas (30.7%) than rural areas (8.1%). By quintile, rates vary from 1.5% among the poorest to 26.0% among the richest, although there are no significant gender differences.

According to the PRSP (MINECOFIN, 2002b), dropout rates in primary schools are high, estimated at 12%, with repetition at 37%. There is some evidence on the reasons for

ceasing to attend school. The expense, exam failure and work are the main reasons for dropping out. Girls are more likely than boys to be away from school because of work. Distance from schools does not appear to be an important deterrent, even for secondary schools. This is despite the fact that almost half of households are at least 30 minutes from a primary school and that two thirds of households are more than an hour from a secondary school. The primary educational system is almost entirely public or grantmaintained, and fees are low, at FRW 300 per pupil per year. In secondary education, 56% of students are in public schools or government-assisted schools and fees are much higher, at FRW 21000 per pupil per year. Both private and public sectors have been expanding fast, and the rate of transition from the final year of primary school to secondary school rose to 42% in 2000.

In Buhoma District, in the year 2001-2002, 22.9% (148) of the candidates leaving primary school passed their national examinations and these included 129 males (21% of the 443 male candidates), and 19 females (9.4 of the 203 female candidates). This shows that generally the pass rates are very low, but even lower among girls than boys. In the same district, during the year 2001-2002, 2 829 children abandoned school for different reasons. This is about 13% of the total primary school population of 21880 pupils (HELPAGE-Rwanda/PADDED, 2002). In Mutobo District, the pass rate for the national primary cadidates examination is still. For the year 2001-2002, 260 (44. 44%) out of 585 canditates passed. It was only in Nyakinama I Primary school that 84.2 % of the candidates passed. The number of school drop out in the year 2001-2002 was 3099 or 12.85%



Figure 8. Net primary and secondary enrolment in rural and urban areas by gender and quintile. Source: MINECOFIN (2002a).

In Bukamba District, during the year 2001/2002, there were 23375 pupils in primary schools, 12215 (52.25%) boys and 11160 (47.75%) girls (**Table 14**). The ratio of girls to boys was highest in the first year of school (at 103.7%), but progressively decreased towards the sixth year (at 91.3%).

Year of school	Boys	Girls	Total	% of total population in primary school	Sex ratio (Girls/Boys)
1st	3967	4125	8092	34.62	103.7
2 nd	2597	2481	5078	21.72	95.5
3rd	2221	1928	4149	17.75	86.8
4th	1423	1272	2695	11.53	89.3
5th	1055	810	1865	7.93	76.7
6th	952	544	1496	6.40	57.1
Total	12215	11160	23375	100	91.3
%	52.25	47.75	100	-	-

 Table 14. Enrollment in primary different years of primary school in Bukamba

 District by gender

Source : HELPAGE Rwanda/PADDEP (2003c).

Bukamba District has a total of 31 primary schools, and only five secondary schools. Of the 1030 primary school pupils who sat for the national examination in 2000/2001, 185 (or 18%), were admitted in public and private scondary schols, while 598 (58.05%) repeated the year in primary schools. bout 1542 students were enrolled in secondary schools, of whom 1010 were boys and only 532 girls.

The differences between the primary and secondary school enrolment rates are indeed very striking (72.6% compared to 7.6% nationally). The main reason for this is lack of secondary school facilities. As the **Figure 9** shows, the number of secondary schools is low compared to that of secondary schools. And some cells are located far from the secondary schools, which may be a disincentive; especially for poor people who cannot afford boarding schools fees. From the map it is evident that in general secondary schools are located outside the sectors adjacent to PNV. Some schools lack sufficient boarding facilities. The issue of affordability of secondary education also leads some children to drop out of school.



Figure 9. The distribution of educational institutions in the region around PNV

Source: Rwanyiziri & Kayijamahe (2004)

2.4.2. Abandonment of school

The result of these low enrolment rates is that children who drop out of school, t married early, with very high fertility rates, cannot access off-farm employment opportunities, leading to farther entrenchment into poverty. Subsequently, such people cannot afford to educate their own offspring.

Nationally, the rate of dropout of primary school is very high, with 33.1% of those aged 7 to 20 years and not currently attending school reporting that they had abandoned primary school without completing it. The principal reasons identified (**Figure 10**) are the cost (26.3%), a lack of interest (29.8%), illness (13.0%) and need to support their family in domestic tasks (12.7%). The lack of interest may reflect to some extent the quality of teaching. The predominant source of financial support for those that attend school comes from their family (90.6%), while the state provides the main support for only 4.5% and other organisations for 3.9%. This implies that children from poor households may be unable to attend school because of the cost constraint.



Figure 10. Reasons for abandoning school by gender

Source: MINECOFIN (2002a).

Boys are more likely to abandon school for lack of interest (33.4% compared to 26.7% for girls), while girls are more likely to abandon school to provide family support (14.9% compared to 10.2% of boys). There is no significant difference in the extent of dropout by gender, but rates of abandonment decline marginally with the quintile (37.0% for the poorest against 30.7% for the richest quintile). With regard to secondary schooling, the average rate of abandonment is 6.4%, without notable differences by quintile or gender. The major reasons identified are cost (53.4%) and exclusions i.e. failure to get admitted into a secondary school (21.0%). These affect the poor much more (MINECOFIN, 2002a).

2.4.3. Literacy levels

The average level of illiteracy in Rwanda is very high at 43.7%. There is also a large differential in favour of men (37.5% compared to 48.6% for women), and a negative correlation with the standard of living (54.1% for the poorest quintile and 38.5% for the richest). This demonstrates though that rates of illiteracy are high even among the richest group (MINECOFIN, 2002a). There are very high illiteracy levels among the community around the Virungas, and the communities highlight illiteracy as a problem (ORTPN, 2004). Literacy levels among the Rwandan population aged 6 and above are averaged at 54% as of the 2002 Population Census. In Gisenvi and Ruhengeri Provinces literacy levels stood at 45.1% and 50.5% respectively (Figure 11). In Gisenvi, 66% of the urban population could read and write, compared to 43.5 of the rural population. In Ruhengeri, 63% of the urban population could read and write, compared to 50% of the rural population. In both provinces, almost half of the population was illiterate. However, literacy was higher among men than women, by a difference of 10.6% in Gisenvi and 12.2% in Ruhengeri. And research by Plumptre et al.(2004) has shown that education levels, particularly numbers of people who have attended secondary education, decrease towards the park boundary. The same study revealed better accessibility in term of time and distance to primary schools than secondary schools around PNV.



Figure 11. Literacy level among the age group 6 years and above

Source: MINECOFIN (2003).

Local people attribute illiteracy mainly to poverty (ORTPN, 2004). This is true to some extent. The lack of secondary school facilities and in some cases the need for children to contribute to household labour also leads to school dropout. There is also a tendency to prioritize boys' education over girls' where resources are insufficient. Illiteracy limits peoples understanding and awareness of wider issues that affect them, e.g. the root causes of poverty, the need for conservation and land management technologies.

2.5. Human Health

The health situation in the area around PNV is not good. Poor health among the population is caused by poor sanitation, insufficiency of health services and poverty. The main diseases in the area are infections of digestive system, malaria, serious respiratory infections etc. There is also AIDS and some cases of malnutrition as well (ORTPN, 2005b). Nationally, health indicators are very poor at all levels, and access to health facilities is similarly very limited. The main reasons for poor access to health services is poverty itself (financial accessibility), which represents a more important constraint than the distance to travel to these services. This is expected, considering that the patients themselves pay 70% of the operational costs of health centres. As such, only 21.5% of people make consultations within the health system when they fall ill, due to the financial constraint (MINECOFIN, 2002a). The prevalence of HIV increased dramatically during the mid-1990s, partly because of the war and genocide. It is now estimated at 11.2% nationally and 10.8% in rural areas, compared to a rate of 1.3% in rural areas in 1986 (MINECOFIN, 2002a).

2.6. Community Livelihood Issues

2.6.1 The issue of poverty

Rwanda is one of the poorest counties in the world with an average annual income of \$ 251 per person (MINECOFIN, 1998). A high percentage of people living around PNV live in abject poverty, characterized by low education levels, large households and poor quality housing. Almost half of the households in Kinigi (49.59%) live in mud-walled houses, 18.17% and 8.73% in grass and tarpaulin-roofed houses respectively (Plumptre *et al.*, 2004:45). There is limited access to schools, health services (communities near the PNV boundary and other parks have to travel farther to access health services than other communities), water and market. The area is also characterised by small land endowments, food shortage and lack of enough surplus from food production for sale (Plumptre *et al.*, 2004).

The poverty assessment study revealed that 60.3% of the country's population were poor, with 14.3% of the urban and 65.7% of the rural populations identified as poor. Majority (97.5%) of those identified as living below the poverty line live in rural areas, where 89.5% of the total population live. Incidence of poverty is relatively low in the provinces of Gisenyi (53.5%), Gitarama (53.7%), Kibungo (50.8%), urban Kigali (12.3%) and Umutara (50.5%), which are below the national average (at 60.3%) in terms of the incidence of consumption poverty. Relative to the national average, the provinces most affected by poverty are Gikongoro (77.2%), Butare (73.6%), Kibuye (72.5%), Kigali Ngali (70.8%) and Ruhengeri (70.3%). Ruhengeri features among the poorest provinces, though it is one of the most fertile and productive areas in Rwanda, largely due to the civil unrest experienced in the 1990s. In fact, incidence of food poverty² though generally similar around the country, was highest in Ruhengeri Province at 83.7%, followed by Gikongoro (80.2%), Kibuye (79.4%) and Butare (75.5%). In Gisenyi Province, the incidence of food poverty was established at 68.5% (MINECOFIN, 2002a).

Incidence of poverty was assessed to be 7.3% higher among female-headed households than male-headed households. Also, poverty was highest among households whose main activity was agriculture, than among households engaged in other activities. Among agricultural households, poverty incidence was much more among households selling agricultural labour (73.1%), than those farming on their own accounts (67.4%) (MINECOFIN, 2002a).

Poverty is highly recognized as a problem in the community, which leads to PAcommunity conflict. However its underlying causes are not well recognized; they include population increase and illiteracy. The markets for agricultural produce are poor with low prices. Reducing crop yields, land shortage or complete landlessness of some households also lead to poverty.

2.6.2 Land ownership

Of the 3418047 economically active people in Rwanda, 2948032 or 86.3% are engaged in agriculture, hunting or forestry activities. However, there is serious land shortage in Rwanda, and the agricultural frontier cannot be increased at the moment without encroaching on protected areas. Arable land was estimated at around 1380000 ha, which is about 52% of the country's surface area, and this was increased by the recovery of a part

 $^{^{2}}$ Food poverty was defined in MINECOFIN (2002a) as situations where food consumption expenditure falls below the food poverty line.

of the Akagera National Park, i.e., a surface area of 194000 ha and the entire Umutara Game Reserve, or around 15000 ha, for agriculture, livestock and forestry to bring the total surface area of arable land to 1589000 ha, or 60% of the national territory. Competition for access to land is growing due to the combined effects of scarcity of land in the face of very high population growth rates, and inequitable land distribution, where there is increasing hold of the urban elite over rural land (MINETERE, 2002).

According to the poverty assessment study (MINECOFIN, 2002a), the percentage of the households that own farm size of less than 0.2 ha becomes smaller as one move up the wealth quintiles. As many as 40.5% in the lowest quintile (poorest) own less than 0.2 ha compared to only 14.9% in the top quintiles. Butare (61.7%) and Gikongoro (59.0%) are the provinces with highest percentage of households with farm sizes of less than 0.2 ha, followed by Cyangugu (37.3%) and Ruhengeri (35.9%). Farms of this size will generally be quite inadequate to support a household at a reasonable level, especially where the land is of poor quality, and yet few agricultural households have the opportunity to raise their incomes by being engaged in off-farm activities. There is a high vulnerability for households owning small land sizes and given that the majority of the households in Rwanda survive on subsistence. Only 0.4% of the households in the lowest quintile own more than 5 ha of land. This percentage however increases among higher quintiles, with the highest quintile showing 2.0% of the households owning this amount of land. These results indicate substantial inequality in land ownership in Rwanda (MINECOFIN, 2002a).

In their research in a village in Gisenyi Province, André and Platteau (1995) reported that the importance of land purchases in overall inequality of land distribution had doubled between 1988 and 1993, and was rendering almost a half of the household quasi-landless households (owning less than 0.25 ha of land). They concluded that the increased inequality in land endowments was increasing the incidence of absolute poverty, a direct result of quasi landlessness coupled with absence of regular off-farm income.

2.6.3. Agriculture

The area around PNV is a very rich agricultural area, producing food, even for other districts in Rwanda. Agriculture is the main economic activity in the region, with more than 90% of the population involved. A variety of crops including potatoes, beans, sorghum, wheat, peas and maize are grown for food, and pyrethrum is grown along the western part of the park. However, food production is insufficient. Thus there are recurrent periods of food insufficiency, malnutrition, low income and poverty among the community. Taking purchase of seeds during the planting season to indicate a situation of food insecurity, the poverty assessment study (MINECOFIN, 2002a) revealed that in the provinces of Gikongoro and Ruhengeri, 75% and 70% of the households respectively purchased seed. This indicates that the populations in these provinces consume all their produce in times of hardships. In Gisenyi this proportion of household purchasing seed was only 18.8%.

According to MINECOFIN (2002a), of the 18 major crops grown among the households in Rwanda, the one most stored by the households is dry beans (with 39.2% of producing households storing beans), followed by sorghum (26.7%) and maize (14.4%). Overall, as expected there is more storage of the crops as one gets to the higher quintiles, a point which applies for most individual crops and overall. This basically further indicates the food security problem or vulnerability in the lower quintiles. Ruhengeri Province is among the provinces with the fewest households storing food commodities. Apart from land scarcity, wildlife damage of crops also causes food shortage. This has been cited as one of the reasons why some people within the local communities to encroach on park resources. It is taken to be a form of compensation for their losses (Plumptre *et al.*, 2004).

Most people around the park are primarily cultivators (**Table 15**). A few of them also keep livestock, though in very small numbers because there is simply nowhere to graze livestock.

Province	Activities									
	Agriculture		Livestock rearing		Aquaculture		Forestry		Others	
	Number	%	Number	%	Number	%	Number	%	Number	%
Gisenyi	170746	91.2	86003	46.0	508	0.3	55394	29.6	9268	5.0
Ruhengeri	185162	95.9	119040	61.7	631	0.3	87656	45.4	12353	6.4
Rwanda	1571876	89.7	950800	54.2	6695	0.4	571324	32.6	104283	5.9

Table 15.	. Percentage	of households	involved in	different	agricultural	activities
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Source: Nkezabahizi (2005).

Between 1970 and 1986, the amount of land under cultivation increased from 528000 to 836000 ha in Rwanda. This involved conversion of grazing land, some of it unsuitable for cultivation, to cultivation, which subsequently reduced it from 487000 to 200000 ha (Uvin, 1996 cited in André and Platteau, 1995). Cattle numbers subsequently reduced for lack of grazing land (André and Platteau, 1995).

The community around PNV realizes that soils have deteriorated and yields have decreased. Almost 60% in Kinigi identified poor soils and lack of fertilizers as a problem facing the agriculture sector (Plumptre *et al.*, 2004: 52). They see the need to be assisted to improve on their yields and to control soil erosion. Some of the few households with livestock think that being allowed to graze in the park could relieve the situation, while others would like assistance to rear improved breeds of livestock and apply improved livestock feeding methods. These developments have to be accompanied with improved access to markets. Poor produce markets have been identified as a problem for farmers. The present marketing system offers farmers very low prices. Farmers would like to access better-paying markets (ORTPN, 2004).

2.7. Sources of Income

Agriculture is the main economic activity and crops are grown for both food and income. The crops mostly sold include vegetables, leeks and cabbages, peas, sorghum, wheat, Irish potatoes and pyrethrum. Income from agriculture is however low, partly because of proliferation of diseases and poor agricultural practices, poverty and lack of credit, which would facilitate access to agricultural inputs like fertilizers and insecticides. Poor income is also a result of land shortage. **Table 16** below shows the percentage of crop value derived from sales.

Table 16. Percentage of crop value from sales around PNV

Сгор	%
Pyrethrum	100
Vegetables, leeks, cabbages	53.4
Peas	29.8
Sorghum	25.3
Wheat	23.8
Beans	4.5
Maize	0.0

Source: Hatfield and Malleret-King (2003)

Livestock is an important source of cash. More than 70% of the people keep livestock. However livestock are kept in small numbers, due to limited grazing land. Most of the livestock in the region were decimated during the 1994 and 1997-1999 civil unrest. This was worsened by diseases, lack of veterinary services, insufficient pasture and water. Cows, sheep, goats and chicken are kept. The value of livestock to the household is derived from sale of livestock (86.8%), as opposed to consuming the livestock at household level (13.2%). According to Hatfield and Malleret-King (2003), more households sell live animals (82.2%) rather than their products (17.8%). Though most household own woodlots, only 12% have enough wood to sell, and in general there is a wood deficit around PNV.

2.7.1. Off farm employment

The availability of off-farm income has been identified as crucial to addressing the present poverty associated with limited land availability and productivity (André and Platteau, 1995; Gasana, 2002). Around PNV, 26.51% classified themselves as unemployed (though a significant section of these were children out of school) (Plumptre *et al.*, 2004). The main forms of employment mentioned were in the informal sector with a few people employed in the formal sector. These included shopkeepers, carpenters, electricians, mechanics, drivers, priests, tailors, traditional medicine people, craft makers and masons, plus civil servants. Around PNV, 26.51% were unemployed (Plumptre *et al.*, 2004:57).

2.7.2. The Potential for community tourism development

According to ORTPN (2004, 2005), there is a rich natural and cultural diversity on which local community tourism development outside the park can be based and it is the intention of the organization to promote this. This includes natural attractions like the caves; craters, hot springs and the beautiful landscape, and cultural attractions based on the Rwandese traditional way of life, craft and entertainment, which are unique. The tourist attractions and facilities around which community-based tourism development can de promoted are shown in **Figure 12** below. This potential needs to be exploited to provide an impetus for transforming the local people's livelihoods with the ultimate aim of reducing pressure and direct dependency on natural resources, including the park resources. Communities also need to be supported to take more active roles in park-based tourism (as business proprietors and employees of ORTPN or the private sector). However, there is limited capacity for the local people to engage in paying business, and therefore their involvement in tourism service provision would necessitate high investment in capacity building.



Figure 12. Tourist attractions and facilities in the region

Source: Rwanyiziri & Kayijamahe (2004).

2.7.3. Rural credit

Access to rural credit is still limited in Rwanda. In the poverty assessment exercise (MINECOFIN, 2002a), out of 40 Cells surveyed in every province, Cyangugu (26 Cells), Umutara (24 Cells) and Gikongoro (18 Cells), ranked the highest in terms of communities reporting having access to rural credit. The most badly served provinces in terms of access to rural credit were Gisenyi (4 Cells), Gitarama (5 Cells) and Ruhengeri (6 Cells). However, the accessibility to rural credit and incidence of poverty in provinces did not clearly show much relationship. For example, Gisenyi had the lowest access to credit yet is the least poverty-stricken. On the other hand, Gikongoro, one of the poorest and poverty-stricken provinces had modest accessibility to credit

2.8. The Batwa

There is a fairly significant population of Batwa around the park. The Batwa were identified among the poorest categories in the community around PNV, as most of them were reported to have very small land or no land at all. They are also marginalized within the general communities where they live, in both Uganda and Rwanda (Plumptre *et al.*, 2004). During consultations towards the formulation of the General Management Plan for the PNV, it was revealed that Batwa depend on the park for survival, either by harvesting wild food and hunting, or by harvesting products for sale, especially bamboo, vines, fuel wood, poles, and stakes (ORTPN, 2004).

What makes the Batwa a distinct group around the park is their extreme poverty compared to the other members of the community, the magnitude of their dependency on and

interaction with the park, which has significant implications on management of the PA and conservation of resources therein. Batwa around PNV have the least number of livestock, owning on average 1.04% animals compared to 2.73% owned by other community members. The dependency on park resources for livelihood was also found to be higher for the Batwa than other community members. Twenty nine percent (28.81%) of the Batwa households said they get fuel wood from the park compared to only 0.41% of the rest of the community. These figures especially for the other community members may be lower than the reality because the resources are illegally accessed and people do not openly talk about the illegal activities they do. About 52% of the Batwa households around PNV said they harvest forest products for subsistence and income compared to 18% of the other community members. The illiteracy levels among the Batwa were also found to be higher than among other members of the community. The report further revealed that the Batwa still value the cultural importance of the forest more than other community members. It should be noted that the Batwa say they carry out these illegal activities, which are detrimental to the PA resources, because of lack of livelihood alternatives.

In the PAs community conservation program and any other interventions initiated around PNV, there is need to focus on the Batwa as distinct group within the community, in view of their interaction with the park and the significance of the impact of this interaction on park resources. This is to forge ways to address the mostly negative impact the Batwa have on the PA resources, and to integrating the positive aspects of Batwa interaction with the PA into its management. There are already some NGOs and other development partners implementing programmes aimed at changing the attitudes and lifestyle of the Batwa to fit in the mainstream development process. These efforts have yielded some good impacts but in most cases the beneficiaries are reported to have gone back to their old lifestyle of illegally accessing resources in the park. The impact of these interventions on the Batwa lifestyle is still limited. Consultations among the community have revealed that because they are heavily dependent on park resources for their subsistence and sale to meet other basic needs, Batwa status cannot be uplifted without deliberate affirmative action. This would involve a lot of investment in building their capacity to engage in productive activities, change their attitudes to work and their relationship with other community members, and their general attitude to life. It would also involve educating the other community members about the human rights of Batwa to reduce the exploitative relations that exist between the Batwa and the general community (ORTPN, 2004).

CHAPTER THREE

LAND USE PRACTICES, ZONATION AND MAPPING

3.1. Analysis of Predominant Land Use Practices

3.1.1. Overview

The main form of land use for the Kinigi area is agriculture, which is the main activity for more than 96% of households as a means of subsistence and source of income. In addition to agriculture, households practice also animal husbandry and forestry, up to 51.4% and 38.6% respectively (**Table 17**). Almost all the Kinigi region is fertile, except in some rocky areas as earlier pointed out in Chapter One (cf. Biophysical environment). Nevertheless, annual income remains low, partly because of proliferation of crop diseases and agricultural malpractice, poor farmers and lack of credit, which would facilitate access to agricultural equipment and inputs. On the other hand, poor income is connected with land subdivision, following population explosion. In fact, average land per person has become very small (0.25- 0.8 ha / person) during the past years (Nkurunziza, 2003).

8									
District	Total	Agricultural	% ¹	Agriculture	% ¹	Animal	% ¹	Forestry	% ¹
	households	activities				husbandry			
Bukamba	25316	24615	97.2	24499	96.8	14832	58.6	12104	47.8
Kinigi	13701	13510	98.6	13462	98.3	5752	42.0	7168	52.3
Mutobo	20467	19663	96.1	19576	95.6	12553	61.3	10055	49.2
Buhoma	19276	18495	95.9	18429	95.6	9926	51.5	6079	31.5
Mutura	24727	23096	93.4	22920	92.7	10075	40.7	4497	18.2
Kinigi	103487	99379	96.0	98886	95.6	53138	51.3	39903	38.6
area									
Total	1752970	1583303	90.3	1571876	89.7	950800	54.2	571324	32.6

Table 17. Households by type of predominant land use activity per District in the Kinigi Area

¹All the % values were determined based on total households values (2nd column).

Source: Nkezabahizi (2005)

Rwanda

We note that the popularity of agriculture and forestry is above national average. Other land use practices that are practiced, but at a lower scale as compared to the tabulated ones, include fisheries practiced by less than 0.5 % of households, beekeeping and others.

3.1.2. Agriculture

Due to the scarcity of arable land, the cropping system encountered in the region is small scale farming. The average land is estimated at less than 1 hectare per household. Although the land is traditionally inherited through the paternal line in Rwanda, a high percentage of land acquisition by sale (around 36%) has been observed within the Kinigi area. The ecological conditions in the region contribute to the production of many varieties of food and cash crops. The most important food crops are: irish potatoes, beans (climbing variety), maize, sorghum and wheat. The main cash crop is pyrethrum. **Table 18** below shows the area (in ha) cultivated in 2004 (a) and the percentage of households per district (b) involved in the growing of the said food crops and pyrethrum.

District	Ma	ize	Sorg	hum	Wh	eat	Bea	ans	Irish p	otatoes	Pyrethrum
	a	b	a	b	a	b	a	b	a	b	a
Bukamba	2114	87.9	1210	88.7	869	12.3	9487	93.9	2429	45.2	126
Kinigi	2657	92.9	7028	81.0	208	2.7	1400	91.2	4576	79.1	1077
Mutobo	4264	81.6	241	62.7	620	25.6	1049	85.4	7597	51.8	238
Buhoma	2136	72.0	1210	40.6	1742	24.9	3670	71.7	3634	55.6	476
Mutura	1081	81.8	-	0.7	-	1.2	541	43.4	10816	85.6	1051
Total	12252		9689		3439		16147		29052		2968

Table 18. Area (ha) cultivated (a) and the percentage of household involved (b) per crop and District

Sources: (a): District records (Pers.comm.2005); (b): Nkezabahizi (2005), SOPYRWA records in 2004

Banana, sweet potato and vegetables are also significantly grown in the region. Other crops include rice, Soya bean, groundnuts, cassava, cowpeas, fruits and tomatoes though at low level. The reports consulted do not provide enough details to ascertain the existence of each of the crops in the 24 Sectors adjacent to the PNV. As cash crop, the pyrethrum is grown in the Kinigi area by a total of 26000 households on a total area of 2968 hectares. Other cash crops reported within the five districts include coffee and tea but at very low levels. Crop production is done under rain fed conditions. There are two farming seasons: season A, from October to mid-February, and season B, from mid-February to June. Agriculture extension services are very limited with only four agricultural extension officers operating at the District level and a few NGOs intervening in this sub-sector.

In terms of applied production technology, all farming activities, from land preparation to harvesting, are done by hand using some tools mainly hoes for land preparation, weeding and harvesting of tubers. Spraying machines are used during the application of pesticides. Most farmers use their own seeds from the previous harvest rather than improved ones. It has been estimated that only 10% of farmers are using certified seeds. Inorganic fertilizers and pesticides are used mainly on Irish potato. There is a limited use of organic matter especially manure, due to the lack of animals and lack of knowledge of compost making technologies. The productivity for most of the crops is still low (**Table 19**) because of the lands' progressive degradation by erosion and the low use of agricultural inputs. In addition, land is rarely left fallow due to the scarcity of arable land as earlier noted (cf. Chapter One). For example, Irish potato whose average yield is about 12.7 MT/ha can give a yield of 25 MT/ha on private seed multiplying farms where improved seeds, fertilisers and other farm inputs are used in the production process (Service National Semencier, Personal Communication 2005).

	Crops			Districts	6	
		Buhoma	Bukamba	Kinigi	Mutobo	Mutura
Irish	Production (MT)	47242	28640	36666	72180	183872
potatoes	Productivity (MT/ha)	13	11.8	8	9.5	17
Maize	Production (MT)	3206	3065	2390	6079	-
	Productivity (MT/ha)	1.5	1.4	0.9	1.4	2.9
Sorghum	Production (MT)	2056	10507	336	4473	-
	Productivity (MT/ha)	1.7	1.4	1.4	1	-
Wheat	Production (MT)	2184	1444	124	755	-
	Productivity (MT/ha)	1.3	1.7	0.6	1.2	-
Beans	Production (MT)	5138	12822	1330	967	-
	Productivity (MT/ha)	1.4	1.4	0.9	0.9	1

Table 19. Average agricultural productivity for the main crops per District

Sources: MINECOFIN (2004), CGIS-NUR / ORTPN (2005)

The average yield of pyrethrum turns around 1250 and 1500 MT per hectare. Most of farmers lack proper farm produce storage structures, which causes considerable losses, mainly for the Irish potato. Due to lack of organised marketing channels, middlemen exploit farmers in price negotiations. There is a wide price variation observed within a year as exemplified below for the year 2004 (**Table 20**).

Table 20. Price variations during the year 2004 in the Kinigi Area

Commodity	Ν	/Iin. price	Max. price		
	Month	Value (FRW /kg)	Month	Value (FRW /kg)	
Irish potato	December	17	August	30	
Maize	March	33	September	75	
Beans	May	73	September	115	

3.1.3. Animal husbandry

It is important to note that a good number of animals reduced seriously in Kinigi Area as a result of the events, which hit the region in 1994 and 1997-1999. A socio-economic study conducted in 2004 found the following average numbers of domestic animals per household: 0.29 cows, 0.63 sheep, 0.72 goats, 0.06 pigs and 1.03 chicken. Diseases, lack of veterinary services, insufficient pasture and water worsened this reduction. **Table 21** below shows per district the total number of domestic livestock (a) and the percentage of household who own these animals (b). **Table 22** shows meat and milk production as well as income from animal keeping in the Kinigi Area.

Table 21. Domestic livestock in absolute values (a) and percentage of households owning the animals $\left(b\right)^{1}$

District	Cov	WS	Goa	nts	She	ep	Pi	gs	Chic	ken	Rabbits	Beehives
	a	b	a	b	a	b	a	b	a	b	a	а
Bukamba	5192	27.4	15006	46.4	7606	30.0	1235	10.4	17704	36.9	-	983
Kinigi	2839	11.4	2076	25.6	3230	21.8	12	0.7	3185	20.7	2015	1090
Mutobo	5548	21.2	10536	42.2	10336	44.5	2456	17.9	12489	41.9	4370	2230
Buhoma	1720	11.2	3092	33.9	1805	32.0	293	11.8	4345	33.5	975	2306
Mutura	10708	18.2	1 4 4 0	20.5	464	11.3	7	0.3	4569	23.7	200	*

*Traditional beehives exist in Mutura District but their number is unknown (CRDP, 2002).

¹ The % of households that own specified animals to the total number of all households within a district. **Sources**: District records; Nkezabahizi (2005) - Ruhengeri and Gisenyi Provinces

In general, domestic livestock is composed of indigenous breeds with low milk and meat production. For cattle, some farmers have crossbreeds and pure blood breeds. At national level, 13% of cattle population is crossbreeds against 1% of pure blood breeds. In the Kinigi area, there are no more areas reserved for pasture such that farmers have to graze at a distance and around the park with a risk of conflicting either with cultivators or PNV officials. Few farmers have already adopted the zero grazing system but they are facing problems of lack of sufficient fodder.

District	Buhoma	Bukamba	Kinigi	Mutobo	Mutura
Type of Production					
Annual meat production (Kg)	57370	23717	12376	83215	Missing data
Annual milk production (litre)	1255660	309960	57600	1083816	Missing data
Income from livestock activities in RWF (average by household)	16872	15566	17659	24671	Missing data

Table 22. Animal	production and	income status in	the Kinigi area
	production and	meome status m	the isling area

Source: Ruhengeri and Gisenyi Provinces Records.

The livestock sector is not advanced despite the intervention of some NGOs operating in the region and distributing some animals, such as goats, to the population. Animal farming encounters many problems such as lack of pasture and the type of farming which remains traditional in the whole region.

3.1.4. Forestry

Trees in the Kinigi area can be seen in the form of large tree plantations, small private tree plantation and scattered trees in the landscape. Large tree plantations basically belong to the districts that manage them. A large percentage of forest plantations (11520 ha) also belong to SOPYRWA, a company for the processing of pyrethrum. The plantations were established to dry the pyrethrum flowers but, recently, SOPYRWA switched to solar driers and as a result, there might be fewer plantations established or maintained by this company in future. Following a vast forest-clearing phenomenon during genocide and insecurity period, a tree planting campaign was launched in the country. Some sources indicate that 835 hectares have been replanted in the Kinigi area, mostly with Eucalyptus and bamboo (ORTPN, 2005b) however statistics in **Table 23** below reveal a far much lower figure (50 ha) for the Sectors adjacent to the Park in comparison to statistics at District levels. Areas near the PNV seem to be the least forested.

District	Sector	Forest area (ha)
Buhoma (145.75 ha)	Kareba	0.00
	Musumba	4.72
Bukamba (266.78 ha)	Burambi	23.00
	Gitaraga	7.00
	Rutambo	0.00
	Maya	0.00
	Musanzu	0.00
	Gatete	1.70
	Gahunga	0.00
Kinigi (22.6 ha)	Bisate	0.00
	Gasiza	3.00
	Kabwende	0.00
	Kagano	1.50
	Nyabitsinde	0.00
	Nyange	5.10
Mutobo (112.13 ha)	Rwinzovu	0.00
	Nyabirehe	0.00
	Muhingo	0.00
	Shingiro	4.50
Mutura *	Kora	Data missing
	Gataraga	Data missing
	Gihorwe	Data missing
	Kabatwa	Data missing
	Butaka	Data missing

Table 23. Forested area in Kinigi Area by District and Sectors adjacent to the PNV

Source: Statistics from Districts Forest Offices (2005).

Data for Mutura District were not yet available by the completion of this report. Based on the details from the Plan de Development Communautaire de Mutura (CRDP, 2002), the district has no forest other than the Parc national des Volcans. Gishwati natural forest has practically disappeared. In the entire district, nealy 2000 ha of forests have been destroyed. However, a planting programme is now on as well as rehabilitating old forest sites. A number of tree nurseries exist (created by the community through Umuganda). The production capacity for the district was 692000 seedlings in 2002. However, resources are still limited and delay effective erosion control and rapid afforestation. Tree planting activities are being intensified as indicated by recent high tree seedlings production levels in various districts as provided by Districts Forest Offices (**Table 24**).

Tuble At I routed on of agroup con y becamigs in numberies in various Districts

Species	1	Number of seedlin	gs
	2003	2004	2005 (Planned)
Eucalyptus	324000	326137	180000
Grevillea	108000	114925	50000
Fruit trees	-	-	25000
Others*	108000	116241	50000
Total	540000	557303	305000

Dunoma District, 2005	Buhoma	District.	2005
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* Essentially Calliandra

Kinigi District, 2005

Species	Number of seedlings				
	2003	2004	2005 (Planned)		
Eucalyptus	55000	312000	0		
Grevillea	55200	89000	0		
Fruit trees	218000	45900	277000		
Others	45200	116000	90000		
Total	373400	562900	367000		

Mutobo District, 2005

Species		of seedlings	
	2003	2004	2005 (Planned)
Eucalyptus	56200	334618	25000
Grevillea	14360	105000	15000
Fruit trees	23450	13414	5000
Total	94010	453032	45000

3.1.5. Orientations for future land use practices

Farming specialization per administrative Sector (Priority commodity chains) has been identified through community based consultations (MINAGRI, 2005b). The following priority areas were identified for the Kinigi area:

- Promotion of integrated farming mixing livestock and agriculture;
- Promotion of methods for fighting against erosion;
- Promotion of afforestation and agroforestry
- Credit for agricultural inputs and livestock acquisition;
- Creation of selling points for agricultural inputs;
- Support farmers in marketing organisation;
- Breeding improvement for both cattle and goats.

Table 25 shows priority commodity chains for each of the Sectors adjacent to the PNV.

Table 25. List of crops identified to be prioritised in each of the 24 Sectors surrounding the park and for which to develop commodity chains

District	Sector	First priority commodity	Other important priorities
Buhoma	Kareba	Irish potato	- Cattle,aize
	Musumba	Irish potato	- Cattle, Maize
Bukamba	Burambi	Irish potato	- Beans
	Gitaraga	Irish potato	- Beans
	Rutambo	Irish potato	- Maize
	Maya	Irish potato	- Maize
	Musanzu	Irish potato	- Maize
	Gatete	Irish potato	- Sorghum
	Gahunga	Irish potato	- Sorghum
Kinigi	Bisate	Irish potato	- Pyrethrum
	Gasiza	Maize	- Irish potato
	Kabwende	Irish potato	- Small livestock
	Kagano	Irish potato	- Maize
	Nyabitsinde	Irish potato	- Small livestock
	Nyange	Beans	- Sorghum
Mutobo	Rwinzovu	Pyrethrum	- Maize, Cattle
	Nyabirehe	Irish potato	- Maize, Wheat
	Muhingo	Prunier du japon	- Cattle, Wheat

	Shingiro	Prunier du japon	-	Beekeeping, Maize
Mutura	Kora	Irish potato	-	Maize, Cattle
	Gataraga	Irish potato	-	Maize, Cattle
	Gihorwe	Irish potato	-	Maize, Cattle
	Kabatwa	Irish potato	-	Maize, Cattle
	Butaka	Irish potato	-	Maize, Cattle

Source: MINAGRI (2005).

The CBNRM process is to review these priorities based on existing natural resources and develop operational plans turning these ideas into actions.

3.2. Definition of Criteria for Land Use Mapping

Two levels of details, Sector and District, are available for different land use parameters. The actual distribution of Sectors or Districts into different zones is highlighted below and maps provided in Section 3.3. However, for efficient planning, levels of details for all useful and integrated parameters should be the same. Maps should be availed on similar scales Therefore, there is need to search and acquire details to Sector level for those parameters that are so far described to District level.

3.2.1. Mapping scale: - The Sector

Details to Sector level are available for steepness, population density and human-animal conflict (**Table 26**). Three zones are distinct for steepness (**Figure 13**): Low for gentle slopes (18 Sectors) and high for steep slopes (6 Sectors). The exact degrees of steepness and small-scale local variations need to be determined based on field visits and measurements. Three physical population density zones are defined (**Figure 14**) as relatively low (300-500 persons per km²), high (500-1000 persons per km²) and very high (< 1000 persons per km²). The figures indicated are mid-class points of intervals provided in the document "Plan de Zone by CGIS-NUR / ORTPN (2005). Four zones can be formed based on the percentage of people complaining about wild animal damages to crops (**Figure 15**): Zone of low damage intensity (> 5% complains), high damage intensity (>5 - 50%) and very high damage intensity (> 50%). The percentages are also mid-class points of intervals provided in the document sprovided in the document mentioned above. **Table 26** below classifies each Sector across the three criteria. The ranking used from "very high" to "very low" are relative.

The physical population density (computed based on habited and non-habited area) was used as a criterion to produce the map of population spatial distribution up to Sector level (CGIS-NUR/ORTPN, 2005: 30). Same level of mapping was applied to the concentration of Buffaloes and population complaints about crop damage by wildlife (CGIS-NUR/ORTPN 2005: 86). The additional criterion is the degree of steepness derived from the topographic map with contours (CGIS-NUR/ORTPN, 2005: 13).

District	Sectors	Steepnes	s Population density	y % Population complaining/ crop damage by wildlife
Mutura	Butaka	Low	High	Low
	Kabatwa	Low	High	Low
	Gihorwe	Low	Very high	Low
	Kora	Low	Low	Low
	Gakarara	Low	Low	Low
Buhoma	Kabera	Low	Low	Low
	Musumba	Low	High	High
Mutobo	Nyabirehe	Low	High	High
	Rwinzovu	Low	High	Low
	Muhingo	Low	High	High
	Shingiro	Low	High	Low
Kinigi	Bisate	High	High	Very high
	Nyabitsind	e Low	Low	High
	Kabwende	Low	Low	Very high
	Nyange	Low	High	High
	Kagano	Low	High	Very high
	Gasiza	Low	Low	High
Bukamba	a Gatete	Low	High	High
	Gahunga	Low	High	High
	Musanzu	High	Very high	High
	Maya	High	High	Very high
	Rutamba	High	High	High
	Gitaraga	High	Very high	Low
	Burambi	High	High	Low

Table 26. Criteria useful for land use mapping around the PNV up to the Sector level

3.2.2. Mapping scale: - The District

Details up to Districts level (and not below) are available for major types of food crops grown and productivity of the sites (CGIS-NUR/ORTPN, 2005: 34), types and number of domestic animals raised (CGIS-NUR/ORTPN, 2005: 36), living standards (CGIS-NUR/ORTPN, 2005: 38), and the concentration of piped water infrastructures (CGIS-NUR/ORTPN, 2005: 58). Productivity levels per crop or animal stocking levels used in zoning and mapping are as indicated in **Table 27**. Land use mapping scale for these parameters in the Kinigi Area is the district level (**Table 28**). Some class boundaries in **Table 27** are too detailed; they may be redefined for CBNRM planning purposes.

Crop / animals	Productivity levels					
	Very high	High	Low	Very low		
Irish potatoes (tons / ha)	13-17	9.5-13	8-9.5	5.5-8		
Wheat (tons /ha)		1.3-1.7	1.2-1.3	0-0.6		
Maize (tons / ha)	2.2-2.9	1.5-2.2	1.4-1.5	0.9-1.4		
Sorghum (tons / ha)	1.7-2.6	1.4-1.7	0-1.0			
Beans (tons / ha)	1.4-1.5	1.0-1.4	0.9-1.0			
Cows (total number)		5549-10708	2240-5548	1721-2239		
Sheep (total number)		3231-10336	2487-3230	465-1805		
Goats (total number)		3093-5535	1441-2076	200-1440?		
Poultry (total number)		12490-17704	3186-4569	3185		
Pigs		1236-2456	13-293	7-12		

Table 27. Criteria useful for land use mapping around the PNV at District level

Source: CGIS-NUR / ORTPN (2005:35-36)

Table 28. Distribution of various Districts into mapping zones according to food crops productivity, animal keeping, living standards and water supply infrastructures

Criteria		Mutura	Buhoma	Mutobo	Kinigi	Bukamba
Food crops	Irish potatoes	Very high	High	Low	Very low	High
(Productivity;	Wheat	Very low	High	Low	Very low	High
Yield/ha)	Maize	Very high	High	Low	Very low	Low
	Sorghum	Low	Very high	Low	High	High
	Beans	High	Very high	Low	Low	High
	Cows	High	Very low	Low	Low	Low
Animal keeping	Sheep	Very low	Very low	High	Low	High
	Goats	Very low	Low	High	Very low	High
	Poultry/Chicken	Low	Low	High	Very low	High
	Pigs	Very low	Low	High	Very low	High
	Beehives	*	High	High	Low	Low
Standard of living	Annual revenue / household	Very low	Low	High	High	Very low
	Concentration of					
Water infrastructures	s Piped water points	Very low	High	High	Low	Low

*Traditional beehives exist in Mutura District but their number is unknown.

Source: CGIS-NUR / ORTPN (2005:35-36)

3.3. Maps of Actual Land Use Zones



3.3.1. Using details available at the "Sector level (Sector Scale)"

Figure 13. Zoning of the terrain in terms of steepness outside the PNV in Rwanda



Figure 14. Spatial distribution of human population density outside PNV in Rwanda



Figure 15. Zoning of spatial distribution of crop damage intensity (expressed in terms of % of people complains) by wild animals around the PNV in Rwanda

3.3.2. Using details available at the "District level (District Scale)"

The following mapping or zoning (**Figures 16** to **27**) used the District as the smallest mapping unit and is about crop production potentials, animal husbandry, living standards, piped water infrastructures and beekeeping.



Figure 16. Zones by productivity (yield, t/ha) levels for Irish potatoes in Kinigi Area



Figure 17. Zones by productivity (yield, t/ha) levels for Maize in Kinigi Area



Figure 18. Zones by productivity (yield, t/ha) levels for Sorghum in Kinigi Area



Figure 19. Zones by productivity (yield, t/ha) levels for <u>Beans</u> in Kinigi Area



Figure 20. Zones by productivity (yield, t/ha) levels for Wheat in Kinigi Area



Figure 21. Zones by animal keeping levels – Cattle in the Kinigi area



Figure 22. Zones by animal keeping levels – Sheep in the Kinigi area



Figure 23. Animal keeping levels – Goats and Pigs - same trend in the Kinigi area



Figure 24. Animal keeping levels – Chicken in the Kinigi area



Figure 25. Living standards levels – annual revenue per household in the Kinigi area



Figure 26. Living standards levels-concentration of piped water points in Kinigi area

3.4. Information Gaps

3.4.1. General remarks

- The earlier zoning plan elaborated for the volcanoes national Park which divided the Park into the zoning outside the Park and the zoning inside the Park (CGIS-NUR/ORTPN 2005) is not detailed enough to form a firm basis of the CBRNM process.
- The development zone which was defined based on three criteria namely proximity to the Park, number of illegal activities and population density, requires more detailed characterization with respect to existing potential / resources outside the Park.
- CBNRM aims at enhancing socio-economic development of communities through sustainable management and utilization of local resources and other development opportunities. Whereas the CBNRM process focuses on the management of resources outside the park and does not directly refer to the Park, earlier planning approaches put the Park / Protected Area at the centre.
- The zoning suggested in reviewed reports, e.g. CGIS-NUR/ORTPN (2005), is not elaborate enough for the CBNRM process; it focused on interactions between the PNV and local communities and not directly to the mechanisms and strategies of optimizing the utilization of local resources and other opportunities.
- The interpretation key to the map showing management zones (Figure 42,CGIS-NUR/ORTPN, 2005:108) from which Nyirimana (2005) drew three categories of Sectors, is not clear; making it difficult to be relied on during CBNRM process.
- Finally, the zoning / mapping done in this report may also require fine-tuning based on rapid appraisal of local situation through field excursions (ground truthing process).

3.4.2. Specific remarks

Table 29 summarizes some of the specific gaps highlighted in the reports and shows strategies of acquiring missing information.

Table 29. Outline of id	lentified gaps i	n information	and how	to fill t	them in	the Kinigi
area for CBNRM plan	ning					

Gaps / Needs for	Way forward
Surface area covered by 24 Sectors adjacent to the	Need further details from specialised mapping
Park.	services.
Fine details on topography and soil erosion	There is need to encourage localized studies.
phenomenon in the Kinigi area.	
The extent to which the landscape outside the Park	To get accurate information, there is need for
is covered and productive with respect to crops,	systematic tree cover assessment studies
large tree plantations, small private woodlots and	
scattered trees in each of the 24 Sectors. E.g. Details	
on the levels of tree integration with other crops.	
Marketing system (demand, supply, transaction	Need for Rapid market surveys
process) of various products including collected	
forest products, locally manufactured items:	
Experiences, constraints and opportunities.	
Quantification of products in terms of standard units	Need for rapid assessments / surveys
e.g. bundle of stakes, firewood, bamboo, minerals;	
Handful of medicinal plants.	
Required amount and types of raw material per unit	Consultations of communities (Focused / target
item manufactured (Table 3; this report).	studies)
The geographic distribution of artisans to enable	Field surveys / Consultations
synergized working system e.g. associations.	
Extent of PNV forest clearing for agriculture	Filed surveys/Interpreting remote sensing images
Actual impact of the Batwa activities in the forest	Ethnobotany and ecological studies
Details up to Sector level for major types of food	Need for up-to-date local consultations / surveys
crops grown and productivity of the sites, types and	
number of domestic animals, living standards, and	
concentration of hydraulic infrastructures to enable	
proper resource and land use zoning and mapping in	
the Kinigi area.	
Confirm agricultural productivity levels (very high	Need to encourage studies investigating relationships
to very low) and determine factors behind	between productivity levels, land characteristics and
differences in crop productivity among sectors.	farming practices
Quantify the number of beehives in Mutura District	Need for elaborate consultations / surveys in the
and documentation on modern beekeeping	District
initiatives in the entire Kinigi area	
Factors behind differences in living standards in	Socio-economic studies
Kinigi area.	

CHAPTER FOUR

WORKSHOPS REPORTS AND RECOMMENDATIONS

4.1. Introduction

Community Based Natural Resource Management (CBNRM) is a natural resource management approach where communities are facilitated to understand the natural resource management issues and encouraged to take lead in their planning and management. It is an approach that brings about genuine partnerships and ownership by all the stakeholders hence establishing a sustainable mechanism for natural resource management (Ingles *et al.*, 1999; Sanginga and Chitsike, 2005).

Realising that community involvement is a key approach in promoting ownership and genuine partnerships in natural resource management, IGCP facilitated CBNRM workshops in the Kinigi Area from 14th November to 16th December 2005. The specific objectives of the CBNRM planning workshops include;

- 1. To minimise threats on the natural resources and guarantee the long-term integrity of the Parc National des Volcans, by developing livelihood alternatives to what communities harvest from the park;
- 2. To optimise the use of natural resources, by developing integrated model for natural resource management that provides multiple benefits;
- 3. To resolve conflicts over natural resources, through clear definition of roles and responsibilities and facilitating an open dialogue on issues that impact negatively on both the communities and park management;
- 4. To elaborate an institutional framework to manage natural resources.

The overall objective is to guarantee the sustainable future of the human population and its natural environment.

4.2. The CBNRM Workshop Process

In planning the workshops the CBNRM team first agreed on the areas where the workshops were to be conducted. This was followed by an agreement on the types of participants to invite and the number per workshop. The analysis of the area, type and number of participants per workshop provided a picture of the number of workshops to be conducted per district as elaborated below.

4.2.1. Area selection

The main focus of the CBNRM planning was the communities who live close to PNV in Kinigi area, within the 24 Sectors of five districts adjacent to the National Park as earlier described (**Figure 3 in Chapter One**). Workshops were conducted in all those Sectors.

4.2.2. Participants selection and workshops planning

In selecting participants (**Appendix II**), UBUDEHE facilitators were considered a very important entry point. This group is composed of the elected community representatives and have some basic experience in planning, having facilitated poverty alleviation programmes in the community under UBUDEHE programme. UBUDEHE facilitators are composed of two community representatives at cell level and four district level facilitators. In addition, sector coordinators and some technitians from the district (the agronomist and the development officer) participated. This ensured that the planning borrowed experiences from a wider stakeholder group. Furthermore, the community interests were well catered for since the cell level representatives understand both the conservation and development challenges within their communities.

The UBUDEHE program is a participatory planning process launched by the Government of Rwanda to support its decentralization and the poverty reduction strategy programs. Through a cascade of training, the UBUDEHE program has now four facilitators in each district and two in each cell. Through the efforts of these facilitators, each community at cell level has identified a priority problem to be addressed, prepared an action plan and is now implementing the activities with the financial support from the Communal Development Funds (CDF).

While planning the CBNRM workshops, the aspect of capacity building for the local facilitators was considered very important. This would enable the local communities to scale up the CBNRM planning process. Based on this consideration, district and PNV staff was selected to act as rapporteurs for all the workshops. This enabled them to gain skills in facilitating future CBNRM workshops at community level in addition to understanding community problems better.

Considering the size of the area, administrative and social structure in the Kinigi area, it was agreed that community workshops would be held at sector level.

In order to have an effective participation, it was agreed that the number of participants would not exceed 45 people. Each workshop was planned to take 2 days per group. It was on this basis that the number of workshops were determined hence the grouping reflected in **Table 30** below.

Table 30. Estimated number of participants per district

Sector	Number of	Number of	Est.number of	Number of	Total number
	sectors	cells	participants	groups	of days
Kinigi	6	35	88	2	4
Buhoma	2	9	28	1	2
Bukamba	7	42	102	2	4
Mutobo	4	30	74	2	4
Mutura	5	45	106	3	6
Total	24	161	398	10	20

4.2.3. The CBNRM workshops development

The workshops were conducted following six sub themes as elaborated below.

a) Understanding of natural resources:

The workshops started with deeper understanding of natural resources issues and how natural resource management aspects impact people's livelihoods. The output of this process was a list of natural resources in the area as understood by the participants.

b) Analysis of problems

A participatory analysis of problems associated with the listed natural resources was done. The output was a list of problems associated with each natural resource.

c) Problem prioritisation

A shortlist of problems was made and ranked using pair-wise matrix ranking. The use of pair-wise ranking method ensured minimal bias of the outcome. This exercise produced a list of problems according to their priorities or level of impact on the community livelihoods and conservation. The communities were then requested to decide how many of the priority problems they wanted to plan for. Most of the community groups selected 3 to 5 priority problems out 9 to 12 problems identified.

d) Linking the priority problems with UBUDEHE selected projects

The selected problems were then compared with the priority projects that communities had selected under Ubudehe programme to establish whether addressing the selected priority natural resource management problems would support the implementation of community development projects. A strong link was established in almost all the community meetings. In most cases such projects would fall under the activities proposed to solve the proposed natural resource management problems.

e) Stakeholder analysis

The analysis of stakeholders was done to establish the NGOs, community groups and government institutions with interest in the identified issues/problems. This was important to ensure that each priority problem is assigned to a list of stakeholders during the action planning process.

f) Community CBNRM action planning

The completion of stakeholder analysis meant that the communities were now able to plan for their priority problems and identify possible sources of support in addition to setting periods when they would like to start implementation. The development of action plans was done using the priority problems selected.

The action planning was done in tabular form following the format below;

Priority problem	Suggested solutions	Responsible body	When to start

4.3. Key Outcomes of CBNRM Workshops

The key outcomes of the workshops were:

- 1. A list of participants
- 2. A list of natural resources as understood by and agreed with the communities
- 3. A list of problems associated with the named natural resources
- 4. A prioritised list of problems for which communities wanted urgent action
- 5. Action plans for the short listed priority problems. The action plans had the priority problems, suggested solutions for addressing the identified priority problems, a list of stakeholders and sources of support for the implementation of the suggested activities and the timeframe within which the activities are to start.

4.3.1. Level of participation

As indicated in **Table 31** below, the level of participation exceeded the expected number. Out of the planned 398 people, the total number of participants was 421 (106%). Due to the interest the communities had to participate in CBNRM planning, the cell coordinators in some sectors also insisted to attend the workshops even though they were not invited. The participation of women was low with 16.6%.

The low participation of women is attributed to the low levels of women empowerment in the area. In addition, the tradion in Rwanda is that women are less vocal and respect men's decisions. They are therefore certicified with the decisions and positions their husbands take, hence less interested in such meetings. Although women attendance in the workshops was very low, the few who turned up exhibited high levels of confidence and made significant and meaningful contributions to the workshop outputs. This is partly attributed to the fact that the women who turned up are already in positions of leadership hence more confident and ascertive.

District	Planned	Actual	% of	Number of	% of females
	number of	number of	attendance	females	
	participants	participants			
Bukamba	102	112	110	28	25.0
Kinigi	88	89	101	18	20.2
Mutobo	74	91	123	9	9.9
Buhoma	28	31	111	2	6.5
Mutura	106	98	92	13	13.3
Total	398	421	106	70	16.6

Table 31. Level of attendance

4.3.2. The natural resources as understood by the community

As earlier mentioned, the community workshops involved awareness and agreement on what the term natural resources meant. This helped communities to reflect on their environment and come up with the natural resources in their areas. The natural resources that were agreed upon with the communities during the workshops included:

a) The volcano national park

This was looked at as an important natural resource as communities understood it as a very important source of foreign exchange that government use to improve their social infrastructure. The revenue sharing programme was highly regarded by the community and strongly linked to the volcano national park. Under the revenue sharing programme, ORTPN has constructed classrooms, bridges, water tanks to mention but a few. These have contributed to the well-being of the local communities hence, their high regard for the national park.

b) Land

This was considered the most vital resource as their livelihoods totally depend on its exploitation. Communities however noted that poor landuse practices had degraded their soils making it unproductive and less able to support their livelihodd. Vises like landslides, soil erosion and soil fertility loss were noted to constitute serious threats to the community survival. It was also noted that some of the reasons for community entry into the national park was in search for alternative livelihood needs since their land was now less able to meet their basic needs. One other factor that came out prominently was over cultivation of land due to small landholding per household. This is caused by very high population pressure in the area. To this regard, some communities suggested intensification of family planning iniatives in addition to organising nucleated settlements to allow for cultivatable land

c) Water

The community understood water to be an indispensable natural resource that every living creature needs for survival. They however noted that the geology of their land was unable to hold surface water; hence most of the water percolate and find its way into central water collection centres like the lakes and major rivers. This leaves the communities in the highlands with no nearby sources of water. In many sectors, illegal water collection from the national park was noted to be one of the major causes of conflict between the national park and the local communities.

One of the observations made was that the area has very high levels of rainfall and if rain water was harnessed, the community would have plenty of water. The other observation was that the area was well served with many public buildings (schools, churches and administrative structures) that can be used for rain water harvesting. Infact one of the big causes of soil erosion was observed to storm water collected from the roofs of house wich flow in huge mass and speed cause destruction of land and property.
d) Natural attractions (caves, rocks, historical sites etc.).

While the area is well endowed with natural attractions like crater lakes, caves, historical sites (isinde rya Ruganvu), fascinating rocks and unique/rich culture, no efforts have been put in place to develop them as sources of rwevenue. Communities however acknowledge these resources as very important of revenue if they were developed and advertised for tourism.

4.3.3. Analysis of the CBNRM issues

The CBNRM issues identified were classified into three major categories; the park related issues, the community related issues and the cross-cutting issues. There was however an observed intersection between the park and community relateissues as indicated in the grouping below (**Figure 27**).



Figure 27. Grouping chart showing major categories of CBNRN issues in the Kinigi Area

From the grouping chart above, it is observed that lack of clean and safe water, crop destruction by park animals and lack/scarcity of land were considered cross-cutting. This is because the three issues directly impact both the communities and the national park.

Lack of clean and safe water makes communities enter the national park to enter the park in search of water. In the process, they undertake other illegal activities and conflict with the park authorities.

When the wild animals destroy crops, the community livelihood sources are compromised leaving them more vulnerable. This increases conflict between the communities and the national park as communities struggle to supplement their living from the park resources.

Land scarsity is the main threat to conservation. This is so because the small land holding per households means that communities are unable to deliver all their survival needs from the small plots of land. The result is illegal entry into the Nantional Park for supplementary sources of food and income. Land scarcity was also observed to be the main cause of soil erosion and soil fertility loss. The small land holding per household means over-cultivation of the small plots of land causing soil erosion and subsequent fertility loss. The fact that the farmers use inappropriate farming methods further worsens this problem. This means that strategies to address land scarcity would reduce pressure on the national park, reduce occurance of illegal activities while at the same time increasing people's livelihood security.

4.3.4. Analysing the rating of the CBNRM issues

Table 32 below presents the rating of the levels of impact of the CBNRM issues for each workshop held. In total, there were nine workshops conducted. There are issues that were considered among the first five in all the workshops, others in at least 70% of the workshops while some appeared as isolated/special cases in few workshops.

During workshops, it is observed that lack of clean and safe water, soil fertility loss, soil erosion, poaching and wood collection were considered as problems in all the groups.

Collection of water from the national park, crop destruction, neglect of attractions outside the protected area, scarcity of land and bee keeping in the protected area were considered problems in at least seven out of the nine groups.

Further analysis showed lack of clean and safe water being scored as the most pressing problem. It was ranked among the top three problems by all the groups and ranked first by 6 out 9 groups.

Soil fertility loss ranked second with two groups ranking it the first priority. This problem was ranked among the top three problems by seven out of nine groups.

The problem of soil erosion ranked third with eight out of nine groups ranking it among the top three problems.

While crop destruction was not considered as a key problem in all the workshops, Kinigi 2 ranked it the third priority problem while Mutobo 2 ranked it the second most pressing problem. The problem of storm water (huge water mass destroying property and life) emerged as problem number one in Bukamba despite the fact that it had been ranked very low in all other groups.

No.	Priority problem	Kinigi 1	Kinigi 2	Mutura 1	Mutura 2	Mutobo 1	Mutobo 2	Buhoma	Bukamba 1	Bukamba 2
1	Lack of clean and safe water	3	1	1	2	1	1	1	1	2
2	Soil fertility loss	1	4	2	1	3	3	2	3	4
3	Soil erosion	2	2	3	3	2	5	3	2	3
4	Poaching	4	7	7	6	6	8	10	8	9
5	Wood collection	5	6	5	5	5	6	6	7	8
6	Water collect from the national	8	9	6	8	4	7	7		11
	park									
7	Crop destruction	9	3	10	9	7	2		6	12
8	Neglect of attractions outside the	6	5	11	4	10		5	10	6
	PA									
9	Scarcity of land		8	4		10	4	4	4	5
10	Bee keeping	10		8	7	8	9	9		7
11	Traditional medicine collection			9		8			9	
12	Storm water	6							5	1
13	Grazing in the national park						10			
14	Violence against local									10
	communities by park guards									
	Total number of problems	10	9	11	9	11	10	9	10	12
	ranked									

Table 32. Ranking of each of the identified issues during CBNRM workshops

4.3.5. Analysis of community action plans

While analysising the priorities selected by the communities it was found that lack of clean and safe water, soil fertility improvement and soil erosion control, were highlighted as key issues by all the community groups (**Appendix I**).

a) Analysis of actions suggested

 Table 33 below summarises the actions suggested by all the groups to address the three key problems

Priority problem	Suggested solutions	Actions that would require immediate implementation
Lack of clean and safe water	 construction and repair of spring water channels construction of water tanks on public structures re-launch the Mutobo water project (former World Bank funded project) 	• Construction of rainharvesting water tanks. The roofs are already in place and the investment costs are relatively low
Soil fertility loss	 rearing small Ruminants (under zero grazing system) crop rotation promotion of off-farm income generating activities planting nitrogen fixing agro forestry trees 	 promotion of off-farm income generating activities (Bee keeping, promotion of mushrooms and planning community tourism activities) planting agro forestry and nitrogen fixing tree species rearing of small ruminants
Soil erosion	 planting soil erosion control hedgerows construction of soil erosion control trenches planting agro forestry trees construction of water tanks promotion of energy saving stoves 	 planting soil erosion control hedgerows promotion of energy saving stoves planting agro forestry trees

Table 33. Suggested actions for the three priority problems

The actions suggested to solve the three key problems present an opportunity to address most of the other problems mentioned.

For instance addressing the problem of soil fertility involves rearing of small ruminants, which will reduce poaching in addition to providing household income and source of animal proteins.

Establishment of an agro forestry system addressed the problem of wood collection from the national park, reducing community-park conflict in addition to providing fodder, staking materials, fuel wood, and soil nourishment and reducing surface runoff that would result into storm water problems.

Construction of water harvesting tanks will provide community access to water hence reducing community entry into the national park. In addition, harvesting of water from large building reduces soil runoff that in some cases is very destructive.

One of the reasons highlighted for soil fertility loss is over cultivation due to small land holding per household. In addition to promoting technologies that improve soil fertility therefore, it is important to promote off-farm income generating activities. These will include bee-keeping, mushroom production and promotion of community and cultural tourism. In some places, community groups highlighted a number of attractions within the community including caves, rocks and historical sites. These would provide alternative sources of income if developed and communities trained.

Construction of soil erosion control trenches addresses the problem of soil erosion, improved soil water infiltration and minimises chances of destructive storm water.

One of the causes of soil erosion is vegetation loss. In a highly populated area such as Kinigi area, fuel wood harvesting contributes significantly to loss of tree cover hence soil erosion and water run-off. Promoting energy saving systems is one of the activities that were proposed to address this problem.

A scan through the 14 problems raised by the community realises that most of them are sub problems associated with the three top priority problems selected by the communities.

b) Stakeholders' analysis

In analysing the stakeholders, communities expressed strong interest and commitment to take lead in the implementation of action plans.

Further analysis revealed that there were a number of other stakeholders already implementing similar programmes in the country who could provide support if mobilised. These include government institutions, international organisations and NGOs. Among the government institutions identified were ORTPN for the overall support, ELECTROGAZ for water, ministry of defence for energy saving stoves, ISAR/ICRAF for agro forestry technology transfer and the local government for community and resource mobilisation. The NGOs identified include OXFAM, IGCP, etc).

c) Time of implementation

Due to the fact that these problems are impacting very negatively on the community livelihoods and the conservation of the national park, all groups strongly suggested immediate implementation of actions addressing the three key problems. In order to manage community expectations however, the facilitators explained the steps through which ideas are developed before implementation. This was to give the communities a practical idea on when the implementation would start.

4.4. Synthesis of the CBNRM Outcomes and Recommendations

This section analyses the findings from the CBNRM workshops and provides key recommendations on the way wayward.

4.4.1. Synthesis of the CBNRM outcomes

The CBNRM workshops process had two major considerations that the exercise ensured were taken care of. The first consideration was to promote deeper understanding of natural resource management issues and their interrelationships. The second was the understanding of community livelihood strategies and how such strategies impact on conservation.

While analysing the natural resource management issues in the area, population pressure was found to be the biggest cause of environmental degradation. In Bukamba district the communities have cultivated upto very high altitude in the mountain but still don't have enough acreage to allow for meaningful agriculture. The consequence has been frequent landslides and high speed erosion that has on several occasions caused mass destruction to property and lives. In some cases people have died in the process and others have been forced out of their settlements. The soil erosion has swept most of the top soil leaving rocky infertile layers. This problem is wide spread although Bukamba is being used as a reference.

Looking at the exstent to which frequent erosion is degrading various sites and considering that this is accelerated by cultivation of high elevation sites, it is important to start planning for cover perennial crops in the areas where normal farming methods are observed to accelerate soil erosion.

In an area where the population density is above 500 persons per square kilometre, the only way to promote meaningful agriculture is through promotion of high value intensive farming. This however has a limit considering that the population is still increasing. It is important to start planning for off-farm activities like community tourism, mushroom growing, and beekeeping. For these to have sustainable impacts however, promotion of family planning programmes needs to be emphasised.

While there are some environmental and social impacts associated with nucleated settlement, especially when not well planned, it is clear that the current settlement patterns can not sustain the communities given that they need to increase their acreage.

The outcomes of these workshops indicate clearly that no single intervention can work in isolation since livelihood security is derived from a combination of resources and assets. For instance, communities who go poaching are at the same time cultivators. This means that promotion of integrated models would provide multiple benefits to the communities.

4.4.2. Recommendations

The recommendations highlighted in this section are drawn from the workshop process and issues/concerns raised by communities. The recommendations discussed below also build on the observations and lessons learnt by the workshop facilitators.

a) Promote integrated farming system

Although communities emphasised the need to tackle soil erosion, soil fertility loss and access to clean and safe water, it was clear that they have multiple needs/constraints. Small land holding per household is one of the problems. The other issues noted were lack of income sources and food insecurity. This means that implementing interventions for land management need to adopt an integrated approach to enable communities to gain multiple benefits from the implemented activities. One of the ways to achieve this is to promote an integrated farming system. This would include; introducing small ruminants, establish an agro-forestry system with trees and grass planted along the contours to control soil erosion, replenish soil fertility, provide source of fodder, fuel wood, building and staking materials.

b) Promotion of zero-grazing

Because people don't have enough land, it is not practical to promote free range husbandry, this report recommends zero grazing as the best animal rearing system. Zero grazed animals will provide source of manure, income and the much desired meat (animal proteins).

c) Provision of incentives for agro-forestry promotion

In many places, animals are source of pride and highly treasured. In addition, promotion of agro forestry has proved difficult in many places especially when such innovation emphasises only tree planting. Providing animals to farmers who excel in setting up excellent agro forestry systems would encourage adoption of such ventures, contributing to the conservation of soils and the National Park.

d) Construction of soil and water conservation trenches

In places where the landscape is very steep, this report recommends introduction of soil and water conservation trenches constructed along the contours. These trenches would then be stabilised with grass and agro forestry trees. This is useful because it conserves water useful for plant growth, prevents erosion, increases water infiltration, prevents/reduces occurrences of destructive storm water and provides a good reason for agro-forestry.

e) Promotion of energy saving systems

While efforts to increase tree biomass on people's farmland have been strongly recommended, it is important to develop strategies for energy saving since illegal firewood collection was frequently cited as a source of conflict between the park and the local communities. Construction and use of energy saving stoves was highlighted as an important undertaking in Kinigi area. There is already an interesting experience in the region where Rwanda Defense Forces (RDF) collaborated with local communities to initiate energy saving stoves. This has proved successful in some parts of Mutura district.

f) Provision of clean and safe water is urgently needed

In all the workshops, the problem of water shortage was noted as a very pressing need. Water is collected very far and in most cases not clean. These impact seriously on people health and take significant amount of time, especially for women and children, which would be used for other productive activities. Water shortage was also found to contribute to a number of illegal activities including unauthorised entry into the national park.

Although the Mutobo water project is on-going, this report strongly recommends construction of rain water harvesting tanks on the public buildings in the area. In addition, rehabilitation and protection of existing water springs needs to be done to complement both Mutobo and rain water harvesting facilities.

g) Introduction/extension of off-farm activities

Because land shortage was recognised as a key problem, this report recommends introduction or extension of off-farm activities such as bee keeping, growing of mushrooms, handcraft and community tourism activities to complement other on-farm livelihood activities.

h) Develop tourism activities outside the park

During the workshops communities were facilitated to identify tourism opportunities outside the national park. A number of attractions that included caves, historical sites, crater lakes, rich cultural values and traditions and handcrafts were found great potentials for community and cultural tourism activities. This report recommends deeper study of the attractions outside the national park, analyse their viability for tourism and develop a tourism plan based on out of park attractions. This is envisaged to diversify benefits from tourism. In addition, promotion of tourism outside the protected areas provides opportunities for greater community benefits from tourism activities.

i) Strengthen and work with locally developed institutions

In order to ensure sustainability, strengthening and working with locally developed institutions is very important. This report recommends that the Ubudehe approach is closely studied and strengthened in order to develop it as a vehicle for implementing conservation and rural development interventions.

j) Need for immediate implementation of the action plans

This report strongly recommends to ORTPN/IGCP to launch immediately the elaboration of proposals at least for the following:

- Integrated farming (small ruminants);
- Rain water harvesting on public structures;
- Energy saving stoves; and
- Extension of the pilot off farm income generating activities: mushroom cropping, beekeeping and handcraft.

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Appendices

Appendix I: Group Workshops Reports

A. Kinigi 1: Nyange, Kagano, Gasiza

The workshops in Kinigi 1 were held at Kagano on 28/11/2005 and 29/11/2005.

a) Identified problems associated with each natural resource and suggested solutions

Natural	Problems associated with the	Suggested solutions
resources	natural resources	
1. The national	-Crop depredation	-strengthening the buffalo wall
parks	-illegal tree and firewood	-tree planting
	harvesting from the forest	-bamboo growing
	-water collection from the park	-rearing domestic animals
	-beekeeping and honey collection	-constructing water collection points within the
	from the park	communities
	-storm water from the park	-designating areas for beekeeping
	-poaching	-construction of energy saving cook stoves
		-finding alternatives to tree products
2.Soils	-Soil erosion	-soil erosion control
	-soil fertility loss	-animal rearing
	-inappropriate tree species planted	-planting trees that improve soil fertility
	in agricultural land	-crop rotation
		-use of farm-yard manure
		-planting soil erosion control hedges and
		construction of trenches
3. Water	-Lack of clean and safe water	-increasing water collection points
	-erosion brought by storm water	-construction of water harvesting tanks
		-construction and repair of water channels
		-construction of storm water break points
		-planting trees along storm water channels
4. Attractions	-Lack of care for the attractions	-caring and advertising them
outside the	-not being advertised	-developing them for
protected areas		
5. Forests	-Destroyed for firewood	-planting trees which improve soil fertility
	-source of animals which destroy	- construction of energy saving stoves
	people's crops	
	-planted trees destroy arable land	

* The attractions outside the park are mainly in Gasiza sector

Summary of the problems

- a. Crop depredation
- b. Collection of trees and firewood from the national park
- c. poaching
- d. beekeeping in the national park
- e. water collection from the national park
- f. soil erosion
- g. soil fertility loss
- h. lack of clean and safe water
- i. storm water
- j. Attractions outside the national park.

b) Prioritisation of the problems using a pair wise matrix

	Α	В	С	D	Ε	F	G	Η	Ι	J	Total
Α		2	1	3.5	2	1	1	1	2	2	15.5
В	3		2	4	2	3	2	1	3	2.5	22.5
С	4	3		4	3	2	1	3	2	2.5	24.5
D	1.5	1	1		2	1	1	2	2	2	13.5
Е	3	3	2	3		1	1	1	2	2	18
F	4	2	3	4	4		3	3	3	4	30
G	4	3	4	4	4	2		4	4	3	32
Н	4	4	2	3	4	2	1		3	2	25
Ι	3	2	3	3	3	2	1			3	22
J	3	2.5	2.5	3	3	1	2	3	2		22

From the priority ranking, the following were the priority problems in the order of their importance

- a. Soil fertility loss
- b. Soil erosion
- c. Lack of clean and safe water
- d. Poaching
- e. Illegal collection of trees and firewood from the park
- f. Storm water
- g. Neglect of attractions outside the park
- h. Water collection from the national park
- i. Crop depredation
- j. Beekeeping in the national park

The first five priority problems were selected for action planning

c) The community action plan for Nyange, Kagano, Gasiza

Priority problems	Suggested Actions	Responsible body	When to
Soil fertility loss	 Rearing small luminants Crop rotation Construction of soil erosion control trenches Planting agro forestry trees 	The sector The district NGOs in the area Veterinary officer	02 /06
Soil erosion	 Planting soil erosion control hedgerows Construction of soil erosion control trenches Construction of water tanks Promotion of energy saving stoves 	Community The sector The district NGOs in the area Veterinary officer PICG	01 /06
Lack of clean and safe water	 Construction of water tanks Construction and repair of water channels 	Community The sector The district ELECTROGAZ PICG, UNICEF, OXFAM	01/05
Poaching	 Rearing small luminants Mushroom growing 	Community The sector The district NGOs in the area Veterinary officer PICG	04/05
Illegal collection of trees and firewood from the forest	 Planting bamboo and other tree species Construction of energy saving stoves 	Community The sector ORTPN/PICG	05/05

B. Kinigi 2: Kabwende, Nyabitsinde and Bisate

The workshops in Kinigi 2 were held on 1/12/2005 and 2/12/2005

Natural	Problems associated with the natural	Suggested solutions
resources	resources	
1. Water	Lack of clean water	Re-launching Mutobo water project
		Repair of water springs of Cyabirumba
		and Ryango
		Construction of water tanks on public
		structures
2.soils	Soil erosion	-Rearing of small ruminants
	Soil fertility loss	-promotion of family planning
	Small land holding per household	-application of inorganic fertilisers
		-planting soil erosion control hedgerows
3. Park	Crop depredation by park animals	-Increasing the size of the stone wall
	Illegal collection of trees and firewood	-increased conservation education.
	Illegal collection of water from the park	-rearing of small ruminants
	Poaching	-tree planting especially bamboo.
4. Attractions	-Lack of care	-Care and publicise them
outside the park	-lack of publicity	-establish their actual location and
		numbers

a) Identified problems associated with each natural resource and suggested solutions

The shortlist of problems associated with the natural resources

- a. Lack of clean and safe water
- b. Soil fertility loss
- c. Small land holding per household
- d. Soil erosion
- e. Poaching
- f. Illegal collection of trees and firewood from the park
- g. Crop depredation by park animals
- h. Illegal water collection from the park
- i. Lack of care for attractions outside the park

b) Prioritisation of the problems using a pair wise matrix

	Α	В	С	D	Е	F	G	Н	Ι	Total
Α		4	3	3	4	4	2.5	5	3	28.5
В	1		4	1	3	3	2.5	4	4	22.5
С	2	1		1	2	1	1	2	2	12
D	2	4	4		4	4	2	4	3	27
Е	1	2	3	1		2.5	1	3	1	14.5
F	1	2	4	1	2.5		2	3	1	16.5
G	2.5	2.5	4	3	4	3		4	3	26
Η	0	1	3	1	2	2	1		1	11
Ι	2	1	3	2	4	4	2	4		22

From the priority ranking, the following were the priority problems in the order of their importance

- a. Lack of clean and safe water
- b. Soil erosion
- c. crop depredation
- d. Soil fertility loss
- e. Lack of care for attractions outside the park
- f. Illegal collection of trees and firewood from the park
- g. Poaching
- h. Small land holding per household
- i. Illegal water collection from the park

The participants then selected the first five priority problems to form the basis for their action planning. The identified stakeholders are also reflected in the action plan below.

Priority problems	Responsible body	When to	
			start
1. Lack of clean and safe	Re-launch the mutobo water project	Community ;	12/2005
water	Rehabilitating cyabirumba ryango	Local	
	water channels	government	01/2006
	Construction of water tanks on public	OXFAM	
	buildings and individual households	-CARE	
	*	-ELECTROGAZ	
2. Soil erosion	Planting trees on steep hills	-Community	01/2006
	Planting soil erosion hedgerows	-ORTPN;	
	including grass bands	-Local	
	Construction of energy saving stoves	government	05/2006
	Planting trees along storm water		
	channels		
3. Crop depredation	Increasing the size and height of the	Community; Local	12/2005
	stone wall	Government	
	Planting mauritius thorn along the stone	-ORTPN	01/2006
	wall	-CARE	
4.soil fertility loss	Rearing both small ruminants and large	-Community	01/2006
	mammals	-Local	
	Crop rotation	Government	
	Planting leguminous trees and grass	-ISAR	01/2006
		-ORTPN	
5. Neglect of attractions	Identifying and enumerating the	-Community;	12/2005
outside the park	available attractions outside the pa	Local government	
	Development of a management plan for	-ORTPN	
	such attraction		01/2006

c) The community Action plan for Kabwende, Nyabitsinde and Bisate

C. Mutobo 1: Nyabirehe and Rwinzovu

The workshops were held on 05/12/2005 and 06/12/2005

Natural resources	Problems associated with the natural resources	Suggested solutions
1. Land	-soil erosion -soil fertility loss -small land holding per household	-preparing organic fertilisers -planting soil erosion control hedgerows -family planning -timely planting -undertaking alternative income generating activities
2. The national park	-illegal tree and firewood cutting -illegal water collection -illegal honey collection and placement of hives in the national park -poaching -collection of medicinal herbs	 -increasing the width and height of the stone wall -planting bamboo and other tree species -rearing animals -extending the Mutobo water scheme -identifying alternative beekeeping sites -support with beehives and space -construction of rain harvesting water tanks -conservation education
3. Water	-lack of clean and safe water -dried up water points -illegal water collection from the park	 construction of rain harvesting water tanks extending the Mutobo water scheme Rehabilitation of Mutera channels tree planting along water catchments
4. Attractions outside the park	-mismanagement of attractions outside the park -not advertising such attractions	-proper management and advertising -development of tourism plans for such attractions
5. Animals	-crop depredation -spread diseases -poaching	-rearing animals -public awareness -prompt medical assistance -increasing the width and height of the stone wall -compensation programme for crops destroyed

a) Identified problems associated with each natural resource and suggested solutions

The shortlist of problems associated with the natural resources

- a. Soil fertility loss
- b. Soil erosion
- c. Small land holding per household
- d. Crop depredation by wild animalse. Poaching
- f. Illegal tree and firewood collection from the park
- g. Illegal placement of beehives in the park and honey collection
- h. Illegal water collection
- Medicinal herb collection i.
- Lack of clean and safe water j.
- k. Lack of care for the attractions outside the park

Based on the problems already highlighted, the problems were coded and prioritised using a pair wise ranking matrix as shown below.

b) Prioritisation of the problems using a pair wise matrix

	Α	В	С	D	Е	F	G	Η	Ι	J	K	Total
А		2	4	4	4	4	4	3	4	1	4	34
В	3		4	4	4	3	4	4	4	2	4	36
С	1	1		1	1	2	2	2	2	1	2	15
D	1	1	4		2	2	2	2	3	1	3	21
Е	1	1	4	3		3	3	1	3	1	4	24
F	1	2	3	3	2		4	1	4	1	4	25
G	1	1	3	3	2	1		1	2	1	3	18
Η	2	1	3	3	4	4	4		4	1	4	30
Ι	1	1	3	2	2	1	3	1		1	3	18
J	4	3	4	4	4	4	4	4	4		4	39
Κ	1	1	3	2	1	1	2	1	2	1		15

The group then selected the first five problems based on their ranking and used them to develop the action plan. The five top problems were;

- a. Lack of clean and safe water
- b. Soil erosion
- c. Soil fertility loss
- d. Illegal water collection from the national park
- e. Illegal tree and firewood collection

Based on the five priority problems, the group developed their action plan as reflected in the table below.

c) The community Action plan for Nyabirehe and Rwinzovu

Priority problem	Suggested actions	Responsible body	When to
			start
1. Lack of clean and safe	Re-launching the Mutobo water	Community; Local	01/2006
water	scheme	Government	
	Construction of rain water harvesting	ACCORD	and
	tanks on public structures and	ORTPN ;PICG	
	individual households	CDF ;HIMO	06/2006
		DFGF-E;	
		ELECTROGAZ	
2. Soil erosion	Planting soil erosion control	Community;	01/2006
	hedgerows	Local government	
	Planting nitrogen fixing tree and grass	ORTPN ;PICG	and
	species	ACCORD	
	Promotion of zero grazing	CDF ;HIMO	11/2006
	Practicing modern methods of farming	DFGF-E ;district	
		DERN ;ISAE	
		ISAR ;SNS	
		Urugaga imbaraga	
3. Soil fertility loss	Crop rotation	Community; District	01 /06
	Fallowing the farmland	DERN ;ISAE	
	Mulching	ISAR ;SNS	and
	Planting soil erosion control structures	Urugaga Imbaraga	04/2006
	Planting nitrogen fixing tree and grass	COODAF	
	species promotion of zero grazing	ACCORD	
4.illegal water collection	Community sensitisation and training	community	01/2006
from the national park	Encouraging communities to live in	ORTPN ;PICG	
	communal settlements	CDF ;DFGF-E ;	and
		district, ACCORD	
		ELECTROGAZ	07/2006
5. Illegal tree and firewood	Access to tree seed	PICG ;ORTPN	01/2006
collection from the park	Promotion of energy saving stoves	district ;community	and
	Looking for other livelihood activities	Urugaga imbaraga	03/2006
	(off-farm activities)	ACCORD	

D. Mutobo 2: Shingiro and Muhingo

The workshops were held on 07/12/2005 and 08/12/2005

Natural resources	Problems associated with the	Suggested solutions
	natural resources	
1. Land	Soil erosion	Use of organic fertilisers
	Soil fertility loss	Planting soil erosion control hedgerows
	Small landholding per household	Family planning
		Practicing sustainable agriculture
		Protection of the forests
		Fallowing of farmland
		Crop rotation
2. Natural forests	Illegal tree and firewood collection	Tree and bamboo planting
	Illegal water collection	Rearing animals
	Illegal placement and honey	Community sensitisation
	collection from the park	Building rain water harvesting tanks
	Poaching	Initiating income generating projects
	Grazing in the park	
3. Wildlife	Crop depredation	Rearing of animals
	Poaching	Improving and strengthening the stone
		wall
		Community sensitisation
		Initiate income generating projects
4. Water	Lack of clean and safe water	Building rain water harvesting tanks
	Illegal water collection from the	Re-launch and repair mutobo water
	park	scheme
		Planting trees in water catchments areas
		Increasing water harvesting channels

a) Identified problems associated with each natural resource and suggested solutions

The shortlist of problems associated with the natural resources:

- a. Soil erosion
- b. Soil fertility loss
- c. Small land holding per household
- d. Collection of trees and firewood from the park
- e. Grazing in the forest
- f. Water collection from the forest
- g. Poaching
- h. Illegal honey collection and placement of hives in the park
- i. Crop depredation
- j. Lack of clean and safe water

Based on the problems already highlighted, the problems were coded and prioritised using a pair wise ranking matrix as shown below.

b) Prioritisation of the problems using a pair wise matrix

	Α	B	С	D	Е	F	G	Н	Ι	J	Total
А		3	3	1	4	4	3	4	1	1	24
B	2		3	4	3	4	4	4	2	1	27
С	2	2		4	4	4	4	4	1	1	26
D	4	1	1		3	4	3	4	1	1	22
Е	1	2	1	2		1	1	3	1	0.5	12.5
F	1	1	1	1	4		4	4	1	0.5	17.5
G	2	1	1	2	4	1		3	1	1	16
Η	1	1	1	1	2	1	2		4.5	0.5	14
Ι	4	3	4	4	4	4	4	0.5		2	29.5
J	4	4	4	4	4.5	4.5	4.5	4.5	3		36.5

The group then selected the first five problems based on their ranking and used them to develop the action plan. The five top problems were;

- a. Lack of clean and safe water
- b. Crop depredation
- c. Soil fertility loss
- d. Small land holding per household
- e. Foil erosion

c) The community Action plan for Shingiro and Muhingo

Priority problems	Suggested actions	Responsible	When to
		body	start
1. Lack of clean and	Re launching Mutobo water scheme	Community	01/2006
safe water	Construction of rain water harvesting tanks on	ACCORD	
	public buildings and homes	ORTPN ;PICG	
	Tree planting	CDF; District	06/2006
		ELECTROGAZ	
2. Crop depredation	Improving and strengthening the stone wall	PICG ;ORTPN	01/2006
	Rearing of small ruminants	District;	06/2006
		Community	
3. Soil fertility loss	Fallowing	Community	01 /06
	Planting soil erosion control hedgerows	District	
	Income generating enterprises	DERN ;CDF	04/2006
	Zero grazing	Urugaga	
		Imbaraga	
		World vision	
4.shortage of land	Family planning	Community	01/2006
_	Identifying alternative income generating	ONAPO ;ISAE	
	activities	ORTPN ;PICG	
		CDF ;district	
5. Soil erosion	Promote proper farming methods	Community;	01/2006
		District	

E. Mutura 1: Kora and Gakarara

The workshops were held at Kora and Gakarara on 06/12/2005 and 07/12/2005.

Natural resources	Problems associated with the	Suggested solutions
	natural resources	
1.The national park	Illegal collection of trees and	Bamboo and tree planting
	firewood	Strengthening the stone wall-
	Illegal water collection	establishing bee keeping establishing
	Illegal honey correction and	apiaries outside the national park
	placement of hives in the park	Constructing energy saving stoves
	Poaching	Rearing animals
	Crop depredation	Planting medicinal herbs outside the park
	Medicinal herb collection	
2. Water	Lack of clean	Construction of rain water harvesting
	Lack of clean and safe water	tanks
		Re-launching the Mutobo water scheme
		Rehabilitation of Kagohe and Ruvumbu
		water springs
3. Land	Soil fertility loss	Promotion of organic fertiliser use
		Zero grazing
		Construction of water tanks
		Crop rotation
		Following
		Planting soil erosion control hedgerows
		Making soil erosion control trenches
	Soil erosion	Tree planting
		Planting nitrogen fixing tree species
	Shortage of land	
4. Attractions outside the	Lack of care for the attractions	Management and advertising the
park	outside the park	attractions outside the park.

a) Identified problems associated with each natural resource and suggested solutions

The shortlist of problems associated with the natural resources:

- a. poaching
- b. crop depredation
- c. Illegal tree and firewood collection
- d. illegal water collection
- e. Honey collection and placement of hives in the park
- f. medicinal herb collection
- g. lack of clean and safe water
- h. soil fertility loss
- i. soil erosion
- j. shortage of land
- k. lack of care for attractions outside the park

Based on the problems already highlighted, the problems were coded and prioritised using a pair wise ranking matrix as shown below.

b) Prioritisation of the problems using a pair wise matrix

	Α	B	С	D	Е	F	G	Η	Ι	J	K	Total
Α												22
В												10.5
С												27.5
D												26
Е												16
F												12
G												40.5
Н												38
Ι												36.5
J												30
K												16

From the priority ranking, the following were the priority problems in the order of their importance:

- a. Lack of clean and safe water
- b. Soil fertility loss
- c. Soil erosion
- d. Shortage of land
- e. Illegal tree and firewood collection
- f. Illegal water collection
- g. Poaching
- h. Honey collection and beekeeping in the park
- i. Medicinal herb collection
- j. Crop depredation
- k. Lack of management for attractions outside the park

The group then selected the first five problems based on their ranking and used them to develop action plan.

c) The community Action plan for Kora and Gakarara

Priority problem	Suggested actions	Responsible body	When to start
1. Lack of clean and	Re-launching Mutobo water scheme	Community; Local	01/2006
safe water	Construction of rain water	Government, CDF,	
	harvesting tanks on public structures	ACCORD, ORTPN;	
	and individual households	PICG, CDF; IMO,	06/2006
		DFGF-E; Electrogaz	
2. Soil fertility loss	Crop rotation	Community, District	01 /06
-	Fallowing the farmland	DERN ;ISAE	
	Mulching	ISAR ;SNS	04/2006
	Planting soil erosion control	Urugaga Imbaraga	
	structures	COODAF	
	Planting nitrogen fixing tree and	ACCORD	
	grass species for promotion of zero		
	grazing		
3. Soil erosion	Planting soil erosion control	Community ;CARE ;	01/2005
	hedgerows	ISAR ; ICRAF ;	
	Planting nitrogen fixing tree and	District, MINADEF;	
	grass species	ORTPN	
	Promotion of zero grazing		
	Practicing modern methods of		
	farming		
4. Shortage of land	Family planning	Community, ,ONAPO;	01/2006
_	Identifying alternative income	ISAE, ORTPN; PICG	
	generating activities	CDF ; District	
5. Illegal tree and	Access to tree seed	PICG ;ORTPN,	01/2006
firewood collection	Promotion of energy saving stoves	District ; Community	
from the park	Looking for other livelihood	Urugaga Imbaraga	
_	activities (off-farm activities)	ACCORD	03/2006

F. Mutura 2: Kabatwa, Butaka and Gihorwa

The workshops were held at Kabatwa on 08/12/2005 and 09/12/2005.

a) Identified priority problems

- a. Soil fertility loss
- b. Lack of clean and safe water
- c. Soil erosion
- d. No care for the attractions outside the park

b) The community Action plan for Kabatwa, Butaka and Gihorwa

Priority problem	Suggested actions	Responsible body	When to
			start
1. Soil fertility loss	Rearing of small ruminants	Community,CDF;	01/2006
	Planting improved seed	CNLS; CARE ;ISAR ;	
	Planting nitrogen fixing tree species	SOPYRWA, Dstrict	04/2006
2. Lack of clean and safe	Construction of water tanks on public	Community, District ;	01/2006
water	buildings	ORTPN ;CICR ;	and
	Re-launching mutobo water scheme	Electrogaz ; ADRA	06/2006
3. Soil erosion	Planting soil erosion control	Community, District ;	12/2006
	hedgerows	ORTPN	
	Tree planting		02/2006
4. Lack of care for	Developing a management plan for	Community, District ;	01/2006
attractions outside the park	the attractions	ORTPN	

G. Buhoma: Kareba and Musumba

The workshops were held at Kareba on 12/12/2005 and 13/12/2005

a) Identified priority problems

- a. Lack of clean and safe water
- b. Soil fertility loss
- c. Soil erosion
- d. Shortage of land
- e. Lack of care for the attractions outside the park

b) The community Action plan for Kareba and Musumbwa

Priority	Suggested actions	Responsible body	When
problems			to start
 Lack of clean 	Water tank construction on public buildings	Community; CDF;	
and safe water	Re-launching mutobo water scheme	District ; ORTPN ;	
	Rehabilitating the existing water springs	UNICEF;	
	(Kanzenze, Nyarwungo Mizingo, Rusho,	ELECTROGAZ	
	Kabashumba, Murambi)		
2. Soil fertility	Rearing small ruminants	Community ;CDF;	
loss	Crop rotation	District; ORTPN; ISAR	
	Planting nitrogen fixing agroforestry trees		
3. Soil erosion	Planting soil erosion control hedgerows	Community ;CDF;	
	Tree planting	District; ORTPN; ISAR;	
	Promotion of agro forestry	MINADEF	
	Promotion of energy saving stoves		
4. Shortage of	Family planning	Community; CDF;	
land	Encouraging communities to live in settlements	District; ORTPN; ISAR;	
	Starting up off-farm enterprises	PPPMER	
5. Lack of care	Developing management plan for attractions	Community ;CDF;	
for attractions	outside the park	District; ORTPN	
outside the park			

H. Bukamba 1: Gatete, Gahunga, Musanzu, and Maya

The workshops were held at Maya on 12/12/2005 and 13/12/2005.

a) Identified priority problems

- a. Lack of clean and safe water
- b. Soil erosion
- c. Soil fertility loss
- d. Shortage of land
- e. Storm water
- f. Crop depredation

b) The community Action plan for Gatete, Gahunga, Musanzu, and Maya

Priority problems	Suggested actions	Responsible body	When to
			start
1. Lack of clean and	Good management of water	Community, District;	01/2006
safe water	channels	ORTPN,HIMO	
	Increasing the number of water		6/2006
	collection points		
	Construction of bridges		
2. Soil erosion	Planting soil erosion control	Community, District;CDF;	01/2006
	hedgerows	ORTPN; OXFAM; MSF;	
	Planting nitrogen fixing agro	HIMO, IRC, MOUCECORE	12/2006
	forestry trees		
	Digging water pressure break		
	trenches		
3. Soil fertility loss	Establishment of off-farm	Community, District, ORTPN;	01/2006
	enterprises	HIMO; ISAR, DERN	
	Zero grazing		06/2006
	Improved farming methods		
4. Shortage of land	Family planning	Community, District,	02 /06-
	Intensive farming	CARE, ;CDF ; DERN, ISAR	
5. Storm water	Planting soil erosion control	Community, District; ONAPO,	01/2006
	hedgerows	MSF,RSSP,ORTPN	
	Digging water pressure break		
	trenches		03/2006
	Tree planting		
	Encouraging community members		
	to live in settlements		
	Construction of bridges		
6. Crop depredation	Strengthening the stone wall	Community, District, ORTPN,	01/2006
		ORINFOR, HIMO,	
		ELCTROGAZ	06/2006

I. Bukamba 2: Burambi, Gitaraga and Rutamba

The workshops were held at Rutamba on 14/12/2005 and 16/12/2005.

a) Identified priority problems

- a. Storm water
- b. Lack of clean and safe water
- c. Soil erosion
- d. Soil fertility loss
- e. Shortage of land
- f. Lack of care for the attractions outside the park

b) The community Action plan for Burambi, Gitaraga and Rutamba.

Priority problems	Suggested actions	Responsible body	When to
1. Storm water	Construction of bridges	Community, District ;ORTPN,HIMO	01/2006
2. Lack of clean and safe water	Re-launching Mutobo water scheme Increasing water collection points through rain water harvesting tank construction	Community, District; CDF ; ORTPN; OXFAM; MSF; HIMO, IRC, MOUCECORE	01/2006
3. Soil erosion	Planting soil erosion control hedgerows Planting nitrogen fixing agro forestry trees Digging water pressure break trenches	Community, District , ORTPN ; HIMO; ISAR,DERN	01/2006
4. Soil fertility loss	Establishment of off-farm enterprises Zero grazing Improved farming methods	Community, District, CARE, ;CDF ; DERN, ISAR	01 /06
5.shortage of land	Family planning Promotion of intensive agriculture	Community, District ; ONAPO, MSF,RSSP,ORTPN	01/2006
6.lack of care for the attractions outside the park	Developing a management plan for the attractions outside the park	Community, District ,ORTPN, ORINFOR,HIMO, ELECTROGAZ	

Appendix II: Attendance List

Nº	Name and first name	Gender	Sector	Cell	Title
1	MUKAMUGANGA	F	Burambi	Nyagahinga	Executive secretary
2	UWIMANA	F	Burambi	Zindiro	Ubudehe facilitator
3	UWIMANA	F	Burambi	Hanika	CDC
4	MUKAMUGEMO	F	Burambi	Hanika	Ubudehe facilitator
5	MUKAMUGEMO	F	Burambi	Kabaya	Executive secretary
6	MUKARUHUNGA	F	Burambi	Mugarama	Ubudehe facilitator
7	BARAGAHORANYE	М	Burambi	Nindo	Ubudehe facilitator
8	TUNEZERWE	М	Burambi	Nyagahinga	Ubudehe facilitator
9	KABERUKA	М	Burambi	Hanika	Ubudehe facilitator
10	NIYONSENGA	М	Burambi	Busura I	Ubudehe facilitator
11	MUGEMANA	М	Burambi	Kamupfumfu	Ubudehe facilitator
12	NKEZABAMBARI	М	Burambi	Kabaya	Ubudehe facilitator
13	BAKUNZI	М	Burambi	Gihoko	Ubudehe facilitator
14	MBONYIYEZE	М	Burambi	Kamanga	Ubudehe facilitator
15	MANIRIHO	М	Burambi	Hanika	Ubudehe facilitator
16	MIZERO	М	Burambi	Hanika	Ubudehe facilitator
17	KARUHUNGE	М	Burambi	Hanika	Ubudehe facilitator
18	NSENGIYUMVA	М	Burambi	Hanika	Ubudehe facilitator
19	TWAGIRIMANA	М	Burambi	Nyagahinga	Ubudehe facilitator
20	BENIMANA	М	Burambi	Gitaraga	Ubudehe facilitator
21	N.MPOZEMBIZI	F	Gahunga	Rusenyi	Ubudehe facilitator
22	MUSANABERA	F	Gahunga	Kamatanda	Ubudehe facilitator
23	IZABAYO	М	Gahunga	Kidakama	Ubudehe facilitator
24	IYAMUREMYE	М	Gahunga	Kabindi	Ubudehe facilitator
25	DUKUZUMUREMYI	М	Gahunga	Gasagara	Ubudehe facilitator
26	HABARUREMA	М	Gahunga	Gasagara	Ubudehe facilitator
27	MUSABYIMANA	М	Gahunga	Gasagara	Ubudehe facilitator
28	NTIBANSEKEYE	М	Gahunga	Nyagasozi	Ubudehe facilitator
29	MUTUYIMANA	М	Gahunga	Kadakama	Ubudehe facilitator
30	MFIZI	М	Gahunga	Gasagara	Ubudehe facilitator
31	TWAGIRAMUNGU	М	Gahunga	Rusenyi	Ubudehe facilitator
32	JARIBU	М	Gahunga	Ruri	Ubudehe facilitator
33	GAHAMANYI	М	Gahunga	Gasagara	Ubudehe facilitator
34	SAGATWA	М	Gahunga	Gasagara	Ubudehe facilitator
35	ARERUYA	М	Gahunga	Gasagara	Ubudehe facilitator
36	SINGIRANKABO	М	Gahunga	Gasagara	Ubudehe facilitator
37	UWIRAGIYE	F	Gatete	Kagoma	Ubudehe facilitator
38	FENDE	М	Gatete	Nyagasozi	Ubudehe facilitator
39	RWAMENYO	М	Gatete	Kigote	Ubudehe facilitator

2.1. List of participants for Bukamba District

40	SERUTOZI	М	Gatete	Ruli	Ubudehe facilitator
41	NTAKAZIRAHO	М	Gatete	Kanaba	Executive secretary
42	AYITEGEKA	М	Gatete	Gisizi	Ubudehe facilitator
43	NZABAHIMANA	М	Gatete	Gisizi	Ubudehe facilitator
44	NTEZIMANA	М	Gatete	Murambi	Ubudehe facilitator
45	RUBAYIZA	М	Gatete	Kagoma	Ubudehe facilitator
46	SHUMBUSHO	М	Gatete	Kanara	Ubudehe facilitator
47	SAMVURA	М	Gatete	Kabindi	Ubudehe facilitator
48	NTAMAKERO	М	Gatete	Ruri	Ubudehe facilitator
49	UWAMAHORO	F	Gitaraga	Nyagiseny	Ubudehe facilitator
50	DUSABIMANA	F	Gitaraga	Nyakabaya	Ubudehe facilitator
51	TWUMVEMANA	F	Gitaraga	Nyagahinga	Ubudehe facilitator
52	UWAMAHORO	F	Gitaraga	Gitaraga	Ubudehe facilitator
53	UWINGABIYE	F	Gitaraga	Gasiza	Ubudehe facilitator
54	MUKARUTABANA	F	Gitaraga	Gihoko	Ubudehe facilitator
55	N.SAFARI	F	Gitaraga	Zindiro	Ubudehe facilitator
56	BIZIMANA	М	Gitaraga	Gihoko	Ubudehe facilitator
57	SINGIRANKABO	М	Gitaraga	Kamanga	Ubudehe facilitator
58	NTIBARIKURE	М	Gitaraga	Gasiza	Ubudehe facilitator
59	NTIBANYANGA	М	Gitaraga	Nguri	Ubudehe facilitator
60	NTAWUKIRAMWABO	М	Gitaraga	Hanika	Ubudehe facilitator
61	NSENGIYUMVA	М	Gitaraga	Gasiza	Ubudehe facilitator
62	NDUHUNGIREHE	М	Gitaraga	Gasiza	Ubudehe facilitator
63	HITAYEZU	М	Gitaraga	Gihoko	Ubudehe facilitator
64	BAZIRORERA	М	Gitaraga	Ntarama	Ubudehe facilitator
65	ZIGIRANYIRAZO	М	Gitaraga	Kabaya	Ubudehe facilitator
66	BAGARAGAZA	М	Gitaraga	Kaziguro	Ubudehe facilitator
67	NZIRORERA	М	Gitaraga	Ntarama	Ubudehe facilitator
68	NDIGIZE	М	Gitaraga	Ntarama	Ubudehe facilitator
69	HABARUREMA	М	Gitaraga	Gihoko	Ubudehe facilitator
70	NZAMUYE	М	Gitaraga	Gihoko	Ubudehe facilitator
71	NKANIKA	М	Gitaraga	Gihoko	Ubudehe facilitator
72	NGERERO	М	Gitaraga	Ntarama	Ubudehe facilitator
73	MUREKATETE	F	Maya	Mushirabwoba	Ubudehe facilitator
74	UWANTEGE	F	Maya	Buhinga	Ubudehe facilitator
75	DUSABEMARIYA	F	Maya	Maya	Ubudehe facilitator
76	MUKAKIMENYI	F	Maya	Maya	Ubudehe facilitator
77	NYIRABARI	F	Maya	Buhinga	Ubudehe facilitator
78	MUKAMPIRANYA	F	Maya	Kadakama	Ubudehe facilitator
79	MUNYANGABE	М	Maya	Maya	Ubudehe facilitator
80	SAFARI	М	Maya	Karangara	Ubudehe facilitator
81	MUGIRANEZA	М	Maya	Karangara	Ubudehe facilitator
82	HINGABUGABO	М	Maya	Rukore	Ubudehe facilitator

83	SEKANYAMBO	М	Maya	Mushirabwoba	Ubudehe facilitator
84	TWAHIRWA	М	Maya	Kadakama	Executive secretary
85	MUJAWAYEZU	F	Musanzu	Buramba	Ubudehe facilitator
86	HABUMUREMYI	F	Musanzu	Buramba	Ubudehe facilitator
87	DUSHIMIRE	М	Musanzu	Murambi	Executive secretary
88	SEBUHINJA	М	Musanzu	Kagoma	Ubudehe facilitator
89	HAKIZIMANA	М	Musanzu	Musanzu	Ubudehe facilitator
90	SERUGENDO	М	Musanzu	Kagoma	CDC
91	HAKIZIMANA	М	Musanzu	Nyangwe	Ubudehe facilitator
92	MUNDERI	М	Musanzu	Nyangwe	Ubudehe facilitator
93	MUNYABIKARI	М	Musanzu	Nyangwe	Ubudehe facilitator
94	NTUYENABO	М	Musanzu	Murambi	Ubudehe facilitator
95	NZAMUYE	М	Musanzu	Kigote	Ubudehe facilitator
96	DUSABIMANA	М	Musanzu	Musanzu	Ubudehe facilitator
97	MUJAWAMARIYA	F	Rutamba	Nindo	Ubudehe facilitator
98	NYIRAMAHORO	F	Rutamba	Rutamba	Ubudehe facilitator
99	AKINGENEYE	F	Rutamba	Hanika	Ubudehe facilitator
100	UWASE	F	Rutamba	Hanika	Ubudehe facilitator
101	RWARETSE	М	Rutamba	Rutamba	Ubudehe facilitator
102	GAHUTU	М	Rutamba	Busura II	Ubudehe facilitator
103	IYAMUREMYE	М	Rutamba	Busura II	Ubudehe facilitator
104	SEMAJYERI	М	Rutamba	Cyahi	Executive secretary
105	NTEZIYAREMYE	М	Rutamba	Marembo	Ubudehe facilitator
106	MPINGANZIMA	М	Rutamba	Rutamba	Ubudehe facilitator
107	REKAYABO	М	Rutamba	Nguli	Ubudehe facilitator
108	RWARAHUMBYE	М	Rutamba	Zindiro	Ubudehe facilitator
109	SEKAZUBA	М	Rutamba	Gasiza	Ubudehe facilitator
110	NIYOMUGABE	М	Rutamba	Hanika	Ubudehe facilitator
111	RUBADUKA	М	Rutamba	Zindiro	Ubudehe facilitator
112	SEMANA	М	Rutamba	Zindiro	Ubudehe facilitator

2.2. List of participants for Kinigi District

-		0											
N°	Name and first name	Gender	Sector	Cell	Title								
1	HABAGUTUMA Cyprien	М	Bisate	Bannyisogo	Ubudehe facilitator								
2	KABERA Alphonse	М	Bisate	Bushokoro	Ubudehe facilitator								
3	KARASANYI PC	М	Bisate	Bushokoro	Ubudehe facilitator								
4	NSHIMIYIMANA	М	Bisate	Gisasa	Ubudehe facilitatorUbudehe facilitatorUbudehe facilitator								
5	TUGIRUBUMWE Lando	М	Bisate	Gisasa									
6	HABIYAREMYE Jean Népo.	М	Bisate	Kabara									
7	NDAGIJIMANA Zabron	М	Bisate	Kabara	Ubudehe facilitator								
8	SHYIRAMBERE Emmanuel	М	Bisate	Kabara	Sector coordinator								
9	NDIZIHIWE Marcel	М	Bisate	Ndubi	Ubudehe facilitator								
10	NKIRANUYE Théogène	М	Bisate	Ndubi	Ubudehe facilitator								
11	BIMENYIMANA Félicin	М	Bisate	Nyarusizi	Ubudehe facilitator								

12	NSHIMIYIMANA Evariste	М	Bisate	Nyarusizi	Ubudehe facilitator
13	UWIMANA Césarie	F	Bisate	Nyarusizi	Ubudehe facilitator
14	NDAGIJIMANA JD	М	Bisate	Nyarwayu	Ubudehe facilitator
15	NSENGIYUMVA André	М	Bisate	Nyarwayu	Executive secr.
16	HABIMANA JB	М	Bisate	Ruginga	Ubudehe facilitator
17	NDAYAMBAJE JP	М	Bisate	Ruginga	Ubudehe facilitator
18	BISENGIMANA J.Baptiste	М	District	Gifumba	Ubudehe facilitator
19	BUGINGO Aimable	М	District	District	Agronomist
20	NDAGIJIMANA Apolinaire	М	District	District	Ubudehe facilitator
21	NDAGIJIMANA JMV	М	Gasiza	Bunyampombo	Ubudehe facilitator
22	NSABIYUMVA J.Baptiste	М	Gasiza	Bunyampombo	Cell Coordinanator
23	TWIZERIMANA Félicien	М	Gasiza	Gahama	Ubudehe facilitator
24	BASIRIMU JMV	М	Gasiza	Gikoro	Ubudehe facilitator
25	ISHIMWE Justin	М	Gasiza	Gikoro	Exécutif Sec.
26	MUNYAKABUGA J.Bosco	М	Gasiza	Gikoro	Ubudehe facilitator
27	BIGIRIMANA J.Pierre	М	Gasiza	Muhabura	Cell Coordinanator
28	NAMBAJIMANA Faustin	М	Gasiza	Muhabura	Ubudehe facilitator
29	NZABONIMPA Fidèle	М	Gasiza	Murinzi	Ubudehe facilitator
30	RWANDA Faustin	М	Gasiza	Murinzi	Sect Coordinator
31	SIMBIZI P.Célestin	М	Gasiza	Murinzi	Ubudehe facilitator
32	BATANYURWA Grégoire	М	Gasiza	Ntamiziro	Ubudehe facilitator
33	NDAGIJIMANA Alphonse	М	Gasiza	Rushari	Ubudehe facilitator
34	SEBIREMBO Donath	М	Gasiza	Rushari	Ubudehe facilitator
35	IRAKOZE Julienne	F	Gasiza	Ruvumu	CNF Coordinator
36	NZAMUYE Daniel	М	Gasiza	Ruvumu	Ubudehe facilitator
37	N.BAKOBWA Agnès	F	Gihora	Nyabitare	Ubudehe facilitator
38	MUKANDEKWE Jeanette	F	Kabwende	Cyabirumba	Ubudehe facilitator
39	MUNYEMANA Aphrodice	М	Kabwende	Cyabirumba	Executive secr.
40	RWAMUNINGI Léonard	М	Kabwende	Cyabirumba	Ubudehe facilitator
41	KANYAMIHIGO Félicien	М	Kabwende	Gifumba	Cell coordinator
42	N.MBANGUTSE	F	Kabwende	Gifumba	Ubudehe facilitator
43	NGIRABAKUNZI Schadrack	М	Kabwende	Gifumba	Ubudehe facilitator
44	MUSABYIMANA J Baptiste	М	Kabwende	Kansoro	Ubudehe facilitator
45	NGENDAHIMANA Théogène	М	Kabwende	Kansoro	Ubudehe facilitator
46	MUNYAMBANZA F	М	Kabwende	Ruhanga I	Ubudehe facilitator
47	MUNYANGANIZI J. Pierre	M	Kabwende	Ruhanga II	Ubudehe facilitator
48	NSABIMANA Evariste	M	Kabwende	Ruhanga II	Ubudehe facilitator
49	NSHUTI Séraphin	M	Kabwende	Ruhanga II	Ubudehe facilitator
50	MAZIMPAKA Enock	M	Kabwende	Ryango	Ubudehe facilitator
51	IYAMUREMYE J. de Dieu	М	Kagano	Kabari	Ubudehe facilitator
52	KANTARAMA Béatrice	F	Kagano	Kabari	Ubudehe facilitator
53	MUKESHIMANA Consolé	F	Kagano	Kivumu	Ubudehe facilitator
54	MUKESHIMANA Consolé	F	Kagano	Kivumu	Ubudehe facilitator

55	N.HABIMANA Béatrice	F	Kagano	Kivumu	Ubudehe facilitator
56	N.HABIMANA Béatrice.	F	Kagano	Kivumu	Ubudehe facilitator
57	MUNYARUGENDO Aloys	М	Kagano	Maho	Sect Coordinator
58	MUTUMWINKA Josiane	F	Kagano	Maho	Ubudehe facilitator
59	NSABIMANA Aimable	М	Kagano	Maho	Exécutif Sec.
60	RUGWIZA J.Damas	М	Kagano	Maho	Ubudehe facilitator
61	RUGWIZA J.Damas	М	Kagano	Maho	Ubudehe facilitator
62	MBERABAGABO Augustin	М	Kagano	Ninda	Ubudehe facilitator
63	MUSABYIMANA J Damas	М	Kagano	Ninda	Ubudehe facilitator
64	MUSABYIMANA Thomas	М	Kagano	Ninda	Ubudehe facilitator
65	MANIRAGABA Bosco	М	Kagano	Nyamiyaga	Ubudehe facilitator
66	MUKANOHERI Olive	F	Kagano	Nyamiyaga	Ubudehe facilitator
67	MASHAKO Cyprien	М	Kagano	Rukaranka	Ubudehe facilitator
68	MASOZERA Samuel	М	Kagano	Rukaranka	Ubudehe facilitator
69	NIZEYIMANA Védaste	М	Kagano	Rukaranka	Ubudehe facilitator
70	ZIRIMWABAGABO Alphonse	М	Nyabitsinde	Karandaryi	Executive secr.
71	DUSABIRANE Agnès	F	Nyabitsinde	Buhangabo	Ubudehe facilitator
72	HABIMANA Félicien	М	Nyabitsinde	Buhangabo	Ubudehe facilitator
73	NDAGIJIMANA Peter	М	Nyabitsinde	Karandaryi	Ubudehe facilitator
74	MURERAMANZI Hesron	М	Nyabitsinde	Rwamikore	Ubudehe facilitator
75	GATSIMBANYI G	М	Nyabitsinde	Ryango	Sector coordinator
76	NKIRANUYE Léonidas	М	Nyabitsinde	Ryango	Ubudehe facilitator
77	NZAMUYE	М	Nyabitsinde	Ryango	Ubudehe facilitator
78	MUNGUIKO Antoinette	F	Nyange	Gahama	Ubudehe facilitator
79	HAGUMIMANA M.Goreth	F	Nyange	Kibingo	Cell Coordinanator
80	MUDAHARINKA Marcel	М	Nyange	Kibingo	Ubudehe facilitator
81	HAGUMIMANA JMV	М	Nyange	Kiryamo	Ubudehe facilitator
82	NZAMWITAKUZE Drocelle	F	Nyange	Kiryamo	Ubudehe facilitator
83	HABIMANA Célestin	М	Nyange	Ntamiziro	Ubudehe facilitator
84	HARERIMANA Emmanuel	М	Nyange	Ntamiziro	Ubudehe facilitator
85	AHOBANTEGEYE Capitolina	F	Nyange	Nyarubuye	Exécutif Sec.
86	MUKANDORI Espérance	F	Nyange	Nyarubuye	Ubudehe facilitator
87	ZIRIMWABAGABO Emmanuel	М	Nyarugina	Nyabageni	Ubudehe facilitator
88	NDAGIJIMANA Zabron	М	Nyarugina	Rucumu	Ubudehe facilitator
89	NSHIMIYIMANA Emmanuel	М	Nyarugina	Rwunga	Ubudehe facilitator

2.3. List of participants Mutobo District						
Nº	Name and first name	Gender	Sector	Cell	Title	
1	ICYITEGETSE	F	Shingiro	Shingiro	Ubudehe facilitator	
2	MUREKATETE T	F	District	District	RSAD	
3	NYIRANDAYISABA	F	Muhingo	Mucaca	Ubudehe facilitator	
4	NYIRABASHYITSI	F	Muhingo	Kageshi	Ubudehe facilitator	
5	MUKARUHUMURIZA	F	Muhingo	Nyaruhanga	Ubudehe facilitator	

6	SEMUCYO L	F	Nyabirehe	Nyabirehe	Ubudehe facilitator
7	MUSABYIMANA J	F	Rwinzovu	Manjari II	Ubudehe facilitator
8	NYIRAJYAMBERE	F	Shingiro	Rutovu	Ubudehe facilitator
9	UWAMAHORO	F	Shingiro	Rukoma	Ubudehe facilitator
10	NTAWUKIRABABO J	М	District	Gataka	Ubudehe facilitator
11	BIZIMANA Epimaque	М	District	District	Ubudehe facilitator
12	NTAWUKIRABABO	М	District	Mutobo	Fontainier
13	BIZIMANA Epimaque	М	District	Muhingo	CDC/district
14	KANYARWANDA JD	М	Muhingo	Nyarubara	Sector coordinator
15	SEBAGABO	М	Muhingo	Mucaca	Ubudehe facilitator
16	BIGIRIMANA	М	Muhingo	Kageshi	Ubudehe facilitator
17	NDAGIJIMANA	М	Muhingo	Nyirankona	Ubudehe facilitator
18	MVUYEKURE	М	Muhingo	Muhingo	Ubudehe facilitator
19	MBERABAGABO	М	Muhingo	Muhingo	Ubudehe facilitator
20	SEMARIRO	М	Muhingo	Nyarubara	Ubudehe facilitator
21	HAGENIMANA	М	Muhingo	Nyarubara	Ubudehe facilitator
22	MUNYANEZA	М	Muhingo	Mucaca	Ubudehe facilitator
23	BAHEZA	М	Muhingo	Mucaca	Ubudehe facilitator
24	NGERAGEZE	М	Muhingo	Nyaruhanga	Ubudehe facilitator
25	NSENGIYUMVA	М	Muhingo	Nyirankona	Ubudehe facilitator
26	RUGEMA JMV	М	Nyabirehe	Kabyaza	Sector Coordinator
27	HABIMANA Th	М	Nyabirehe	Gahira	Sector Coordinator
28	BAVURIKI E	М	Nyabirehe	Rubaka	CDC /Sector
29	BIMENYIMANA	М	Nyabirehe	Kabyaza	Ubudehe facilitator
30	NZARORA JD	М	Nyabirehe	Gatovu	Ubudehe facilitator
31	MBONEZA E	М	Nyabirehe	Nyabirehe	Ubudehe facilitator
32	HATANGIMANA S	М	Nyabirehe	Gatovu	Ubudehe facilitator
33	NIYONZIMA J	М	Nyabirehe	Gahira	Ubudehe facilitator
34	BUTERA F	М	Nyabirehe	Kagongo	Ubudehe facilitator
35	NSABIMANA JD	М	Nyabirehe	Rubaka	Ubudehe facilitator
36	NSENGIYUMVA B	М	Nyabirehe	Kagongo	Ubudehe facilitator
37	HAKIZIMANA J	М	Nyabirehe	Rubaka	Ubudehe facilitator
38	NZITABAKUZE S	М	Nyabirehe	Nyabirehe	Ubudehe facilitator
39	RUDATSIKIRA R	М	Nyabirehe	Kagongo	Ubudehe facilitator
40	MBANZABUGABO Uziel	М	Nyabirehe	Rutagara	Ubudehe facilitator
41	NZITONDA JD	М	Nyabirehe	Rutagara	Ubudehe facilitator
42	NGABOYIMANZI	М	Nyabirehe	Rutagara	Ubudehe facilitator
43	MUSABYIMANA J	М	Rwinzovu	Manjari I	Sector Coordinator
44	UWIMANA A	М	Rwinzovu	Rusambu	Ubudehe facilitator
45	MANIRAGABA C	М	Rwinzovu	Rusambu	Ubudehe facilitator
46	BARIYANGA JD	М	Rwinzovu	Gakuku	Ubudehe facilitator
47	BUGABO J	М	Rwinzovu	Rwinzovu	Ubudehe facilitator
48	HAKUZIMANA F	М	Rwinzovu	Gakuku	Ubudehe facilitator
49	KABERA P	М	Rwinzovu	Ruremera	Ubudehe facilitator
50	MIRIHO JD	М	Rwinzovu	Gataka	Ubudehe facilitator

51	MUTIGANYA J	М	Rwinzovu	Manjari II	Ubudehe facilitator
52	BAKAKA JD	М	Rwinzovu	Ruremera	Ubudehe facilitator
53	MUNYANDEKEZI E	М	Rwinzovu	Gakuku	Executive secr.
54	MBARUSHIMANA S	М	Rwinzovu	Gataka	Ubudehe facilitator
55	DUFATANYE F	М	Rwinzovu	Gataka	Ubudehe facilitator
56	MUNYANSHOZA PD	М	Rwinzovu	Mikingo	Ubudehe facilitator
57	MBONYIMANA F	М	Rwinzovu	Manjari I	Ubudehe facilitator
58	BAGIRAMENSHI F	М	Rwinzovu	Mikingo	Ubudehe facilitator
59	BARAYAVUGA Em	М	Rwinzovu	Rwinzovu	Ubudehe facilitator
60	UWIMANA L	М	Rwinzovu	Rutagara	Ubudehe facilitator
61	NGABOYIMANZI T	М	Rwinzovu	Rwinzovu	Ubudehe facilitator
62	IYAMUREMYE	М	Shingiro	Rutovu	In charge of Planning
63	SEBUKUNAMA	М	Shingiro	Rukoma	Ubudehe facilitator
64	NSENGIYUMVA	М	Shingiro	Kibwa	Ubudehe facilitator
65	HABIMANA J	М	Shingiro	Rwamahoro	Ubudehe facilitator
66	BAPFAGUHEKA	М	Shingiro	Nyamurimirwa	Ubudehe facilitator
67	NZABARANTUMA	М	Shingiro	Rwamahoro	Ubudehe facilitator
68	MVUNABANDI	М	Shingiro	Buhira	Ubudehe facilitator
69	SENZIRA	М	Shingiro	Ruhamiro	Ubudehe facilitator
70	NDIMUBERA	М	Shingiro	Kinege	Ubudehe facilitator
71	NKIKO	М	Shingiro	Kibwa	Ubudehe facilitator
72	HAKIZIMANA	М	Shingiro	Buhira	Ubudehe facilitator
73	NIYONIZEYE	М	Shingiro	Rukoma	Ubudehe facilitator
74	MUNYARUGEME	М	Shingiro	Nyamurimirwa	Ubudehe facilitator
75	MBONEZA	М	Shingiro	Shingiro	Ubudehe facilitator
76	NZITABAKUZE	М	Shingiro	Buhira	Ubudehe facilitator
77	SEBAGABO	М	Shingiro	Rukoma	Ubudehe facilitator
78	SEBIKARI	М	Shingiro	Rwamahoro	Ubudehe facilitator
79	KAREKEZI	М	Shingiro	Nyamurimirwa	Ubudehe facilitator
80	MUNYAZIBONEYE	М	Shingiro	Kibwa	CDC/Sector
81	MUNYAMASOKO	М	Shingiro	Shingiro	Sector coordinator
82	NDAYAHOZE	М	Shingiro	Ruhamiro	Ubudehe facilitator
83	BIGIRIMANA	М	Shingiro	Buhira	Ubudehe facilitator
84	NKUMBUYE	М	Shingiro	Buhira	Ubudehe facilitator
85	MUNYAKABUGA	М	Shingiro	Kinege	Ubudehe facilitator
86	BIGIRIMANA	М	Shingiro	Kinege	Ubudehe facilitator
87	MUNYAMPIRWA	М	Shingiro	Kinege	Ubudehe facilitator
88	NSHIMYIMANA	М	Shingiro	Ruhamiro	Ubudehe facilitator
89	NDIMUBERA	М	Shingiro	Kinege	Ubudehe facilitator
90	HABIYAMBERE	М	Shingiro	Shingiro	Ubudehe facilitator
91	NDAYAMBAJE	М	Shingiro	Nyamurimirwa	Ubudehe facilitator

Nº	Name and first name	Gender	Sector	Cell	Title
1	IRADUKUNDA	F	Musumba	Kinyangagi	Ubudehe
2	MUKESHIMANA	F	Musumba	Rusiza	,,
3	HAKIZIMANA	М	Gitwa	Kinyengagi	,,
4	NGWIJE	М	Kareba	Kareba	"
5	MUNYARUKIKO	М	Kareba	Kanzenze	,,
6	BIZIMANA	М	Kareba	Gasizi	,,
7	SIBOMANA	М	Kareba	Rwaseka	,,
8	NZABONIMPA	М	Kareba	Sangabo	,,
9	NDAYITEGEREJE	М	Kareba	Rusenge	,,
10	MAKUZA	М	Kareba	Sasangabo	,,
11	NIYIBIZI	М	Kareba	Rusenge	,,
12	NIYONZIMA	М	Kareba	Rwaseka	,,
13	ASIGWA	М	Kareba	Kanyove	,,
14	NZABONIMPA	М	Kareba	Kanyove	,,
15	MURINDANGABO	М	Kareba	Kanyove	,,
16	ZIKAMA	М	Kareba	Kanyove	,,
17	SEBURAKEYE	М	Kareba	Rusiza	,,
18	MUNYAKAZI	М	Musumba	Kanyove	,,
19	MBONEZA	М	Musumba	Kanzenze	,,
20	MURENZI	М	Musumba	Sangabo	,,
21	NZABONIMPA	М	Musumba	Gasiszi	,,
22	NIYONZIMA	М	Musumba	Rwaseka	,,
23	HAKIZIMANA	М	Musumba	Rwaseka	,,
24	IYAMUREMYE	М	Musumba	Sangabo	,,
25	SEMANZA	М	Musumba	Kinyengagi	,,
26	NSENGIMANA	М	Musumba	Rurengeri	"
27	KAREMERA	М	Musumba	Rusiza	"
28	MUNYANGORORE	М	Musumba	Rusiza	"
29	GASHANGO	М	Musumba	Kanyove	"
30	GAKINA	М	Musumba	Rusiza	"
31	NSENGIYUMVA	М	Musumba	Rusiza	,,

2.4. List of participants for Buhoma District

2.5. List of participants for Mutura District (Kora and Gakarara)							
N°	Name	Gender	Sector	Cell	Title		
1	NYIRABAGENI	F	Kora	Bihangara	,,		
2	NIRERE	F	Kora	No 5	,,		
3	MUSABYIMANA	F	Gakarara	Bugarama	,,		
4	MUGABEKAZI	F	Gakarara	Kajebeshi	,,		
5	AYINKAMIYE	F	Kora	Basumba	,,		
6	MUKABERA	F	Butaka	Bipfura	,,		
7	MUKASHEMA	F	Butaka	Nsherima	,,		
8	NYIRAMURENZI	F	Butaka	Nyamutukura	,,		
9	NYIRAMFABAKUZE	F	Kabatwa	No 3	,,		

10	MUKAMURENZI	F	Gihorwe	Rugarama	ANICO
11	NYIRANJISHI	F	Kabatwa	No3	,,
12	NYIRABAMBARI	F	Kabatwa	No 4	CDC /Cell
13	MUKABIRASA	F	Kabatwa	No 5	,,
14	BARIJIMA	М	Kora	No 6	Ubudehe facilitator
15	BIZIMANA	М	Kora	Bihangara	"
16	KAYOBOTSI	М	Kora	No 5	"
17	MUSEKURA	М	Kora	No 5	,,
18	HABINEZA	М	Kora	RusengeI	,,
19	NZAMUYE	М	Kora	Vuga	"
20	NZABAKURIKIZA	М	Kora	Vuga	,,
21	BIDATEGETSE	М	Gakarara	Gasesero	"
22	DUFATANYE	М	Gakarara	Bihinga	,,
23	NDABATEZE	М	Gakarara	Gasesero	,,
24	BAZAMANZA	М	Gakarara	RusengeI	,,
25	NZIRORERA	М	Gakarara	Rega	,,
26	SIMBIKANGWA	М	Gakarara	Kajebeshi	,,
27	UWIMANA	М	Gakarara	Rega	,,
28	RUGWIZANGOGA	М	Gakarara	Rega	,,
29	SAFARI	М	Kora	Kijote II	"
30	KANZAYIRE	М	Kora	Rukore	"
31	MANIRAGABA	М	Kora	Basumba	,,
32	HABARUREMA	М	Gakarara	RusengeI	,,
33	RWABUKAMBA	М	Kora	Rukore	"
34	NGENDAHIMANA	М	Kora	Kijote I	"
35	NKOZEMBIZI	М	Kora	No6	,,
36	HAKIZIMANA	М	Kora	RusengeII	,,
37	BIZIMANA	М	Kora	Basumba	,,
38	BAGARAGAZA	М	Kora	Ruhinga	,,
39	KWISABA	М	Kora	Ruhinga	"
40	GASANA	М	Kora	Gatagara	"
41	BIZIMANA	М	Kora	Rusenge I	,,
42	BYUKUSENGE	М	Kora	Rwankuba	,,
43	HARERIMANA	М	Kora	Kijote I	,,
44	GASASIRA	М	Gakarara	Bukinanyana	**
45	RUZINGE	М	Gakarara	Bukinanyana	**
46	TEGERA	М	Kora	Rusenge II	"
47	HABIMANA	М	Gakarara	Bihinga	,,
48	NZABANITA	М	Kora	No 6	"
49	RIBAKARE	М	Kora	Rwankuba	,,
50	KANYAMASOKO	М	Kora	Gatagara	Ubudehe
51	MANIRAHO	М	Gakarara	Rusenge	**
52	HAKUZIMANA	М	Kora	Kajebeshi	**
53	NKURUNZIZA	М	Butaka	Bugeshi	Ubudehe
54	NDAGIJE	М	Kabatwa	No6	,,

55	MUNYEGAJU	М	Kabatwa	No3	,,
56	SEBAGABO	М	Kabatwa	Rugendabari	Coordinator
57	UWIMANA	М	Butaka	Kinyamuhanga	Ubudehe
58	BAGARAGAZA	М	Butaka	Buringo	,,
59	NDAGIJIMANA	М	Gihorwe	Rumaranyoni	,,
60	KAYONDE	М	Gihorwe	Rumaranyoni	,,
61	NTAWUKIRUWABO	М	Butaka	Kinyamuhanga	,,
62	BIZIMANA	М	Kabatwa	No2	,,
63	BAZAMANZA	М	Butaka	Akimitoni	,,
64	NZAMUYE	М	Butaka	Bipfura	,,
65	NTACYARUTIMANA	М	Butaka	Gahira	,,
66	BIGORO	М	Butaka	Nyamutukura	,,
67	NDIMUBACU	М	Butaka	Gahira	,,
68	HABYARIMANA	М	Butaka	Nsherima	,,
69	NISHIMWE	М	Kabatwa	No 2	,,
70	RUSISIRO	М	Gihorwe	Gihorwe	,,
71	NDAGIJIMANA	М	Gihorwe	Gihorwe	Cell coordinator
72	SEKARAGWENYERA	М	Gihorwe	Ngando	Ubudehe
73	DEMOKARASI	М	Gihorwe	Rugarama	,,
74	TWAGIRAYEZU	М	Butaka	Nyamutukura	,,
75	RWAKAGEYO	М	Gihorwe	Bisukiro	,,
76	NDABAKWAJE	М	Kabatwa	No 4	Ubudehe
77	KAZIBAKE	М	Butaka	Muremure	,,
78	AYIMISIGIRA	М	Kabatwa	No5	,,
79	MANIRAGUHA	М	Butaka	Muremure	,,
80	MUSAZA	М	Gihorwe	Rugarama	,,
81	BAGANIZI	М	Kabatwa	No3	,,
82	BARIHUTA	М	Kabatwa	No 3	,,
83	MBITSE	М	Butaka	Bugeshi	CDC /sector
84	HAGUMIMANA	М	Gihorwe	Cyamvumba	Ubudehe
85	MUNYAKAZI	М	Kabatwa	Cyamvumba	,,
86	SEBARIRA	М	Kabatwa	No 1	Ubudehe
87	RENZAHO	М	Kabatwa	No1	,,
88	MWEREKANDE	М	Kabatwa	No1	,,
89	MURENZI	М	Mugongo	Bihungwe	,,
90	BIZIMANA	М	Gihorwe	Rugarama	,,
91	MAKUZA	М	Gihorwe	Bisukiro	,,
92	UWAMAHORO	М	Kabatwa	No 6	,,
93	BIRIKO	М	Gihorwe	Ngando	,,
94	MUNYANA	М	Kabatwa	No 2	,,
95	SEBAHIRE	М	Kabatwa	No 1	,,
96	NIBAGUMYE	М	Butaka	Buringo	,,
97	MUNYAKAZI	М	Kabatwa	No2	,,
98	NSENGIYUMVA	М	Kabatwa	No3	,,