

Environmental Security in Bwindi

A focus on farmers

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1 Introduction

The African Great Lakes region is an ecologically unique and globally important area. The area is comprised of Afromontane forest and is home to the last mountain gorillas. To protect this unique ecosystem and the mountain gorilla several National Parks have been established. One of these National Parks is Bwindi Impenetrable Forest National Park (Bwindi) in South-Western Uganda. This National Park is home to approximately 320 of the critically endangered mountain gorillas (*Gorilla beringei beringei*), which is roughly half of the total population (McNeilage et al., 2002; Namara, 2006).

The area is famous as the last habitat for the mountain gorillas, but is also known for its insecurity. The three countries, Rwanda, Uganda and the Democratic Republic of the Congo (DRC) that share the habitat of the remaining populations of mountain gorillas are prone to violent events which shocked the world. At the moment the situation in Uganda and Rwanda is reasonably stable, but the eastern part of the DRC is still prone to violence (Dizolele, 2006).

This insecurity is not the only threat to the Afromontane ecosystem and the rare mountain gorillas. Human presence and encroachment of their habitats possesses a big threat as well. The areas bordering Bwindi have a high population density, exceeding 300 persons per km² in the southern areas and are inhabited by some of the poorest people of Uganda (Plumptre et al., 2004). This high population pressure combined with poor agricultural practices leads to high land pressure, which is at the moment one of the most important threats to the National Park (UWA, 2004). This report focuses on the human pressure around Bwindi, relating it to the concept of environmental security.

1.1 *The concept of environmental security*

The primary focus of the concept of environmental security is the relationship between the natural environment and human well being. It was launched as a tool to draw more attention on the environment, and give it a place on the international political agenda (Gleditsch, 1998). Besides taking care of the environment because of its intrinsic value, negative impacts on human well being, caused by environmental degradation is central in this view. The linkage between environmental problems and insecurity is nowadays accepted and the meaning is extended. The central notion of resource scarcity, which is a central asset in Homer-Dixon's (2000) interpretation of the concept, is only one aspect of the concept. Effects of global warming, for instance sea level rise, have a direct relation to security as well. This is especially stringent in the case of small island states, which face the fate of disappearing in the ocean.

There is consensus concerning this part of the interpretation of the concept, but there is some discrepancy on the further elaboration. In essence this is caused by differences in the point of departure, and results mainly in a variation in main aspects. One group of scholars starts from a global security perspective. This implies that their central focus is on (armed) conflicts, which can be divided in several layers. The first relation is fundamental: environmental degradation itself is a threat to human well being (Greager, 2001). The second layer is that environmental destruction can result in violence. This does not mean that environmental destruction has to be the direct or primary cause of the conflict; it can also deteriorate the situation. According to Meyer (2004),

environmental problems, related to conflict situations, can be regarded as multipliers. They can intensify the primary causes and the intensity of the conflict, and can change the character of the conflict. The following notion is central in this view: environmental degradation and resource depletion can lead to scarcity, which in turn can trigger conflicts or can change and intensify existing conflicts (Gleditsch, 2001). The third layer is that armed conflicts can have a negative impact on the environment. This could even be extended to include all the negative impacts of preparations made for war.

The second group that can be distinguished, places environmental security under the umbrella of Human Security, which in essence means freedom from pervasive threats to people's safety, lives and rights. Human security has the following components; economic security; food security, health security; personal security, community security, environmental security and political security (UNDP, 1994). To achieve human security, all these different aspects should be realized. Within this view environmental security is defined as 'the absence of negative impacts from environmental degradation and resource scarcity' (Gleditsch, 2001).

A third focus is primarily concerned with the environment, and environmental security can be defined as the 'availability of environmental services for man and nature' (Hyde Hecker, 2005). Ecosystems supply several services and products, such as clean air, water and fertile soil. These services and products are used by humans to sustain themselves. Humans are part of the ecosystems and using these products and services is natural. The problem arises when these services and products are used in an unsustainable manner. If they are utilized unsustainably, in other words if we are exceeding the carrying capacity of these life support systems, the delivery of these products and services becomes uncertain.

The definition of environmental security that will be used in this report will be a combination of the above mentioned. The reason for that is that all three aspects are important for a comprehensive understanding. Although it is important not focus solely on the effects of armed conflicts on the environment, it should be taken into account. The interpretation of the concept central in this report is that environmental degradation and resource depletion have a negative effect on human well being and can trigger conflicts or can change and intensify existing conflicts.

1.2 The concept of environmental security related to Bwindi

In the area around nature reserves and Bwindi in particular, environmental security does have two different components. First, the conservation of the National Park, and secondly the maintenance of natural resources in the area surrounding this National Park. The second element is important with respect to soil erosion, deforestation, soil depletion and pollution of the soil by garbage. This distinction looks obvious, but it is important to acknowledge the difference for clarification. In order to achieve environmental security, it does not make any sense to protect the National Park, if this leads to an ever increasing pressure on the area adjacent to it, cumulating in a situation in which this area can not maintain the human population. To achieve environmental security it is important not only to protect the Afromontane Ecosystem (Bwindi), but to protect environmental resources in the vicinity of the National Park as well.

In the area around Bwindi the main obstacle for achieving environmental security is the high pressure on the land. This is caused by a high population density combined with subsistence agriculture (Oluput & Chapman, in press, Plumptre et al., 2004). In the area there are almost no other ways of income generation: 90 percent of the inhabitants are dependent on subsistence agriculture (Plumptre et al., 2004). In order to earn some little money for necessities such as soap, salt, school fees supplies for children, some of the agricultural products are sold. This leads to an even higher pressure on the land, because additional land is needed to grow these products. This has accumulated to a situation in which almost every piece of land is in use, including steep hill slopes and swamps, which are drained and transformed into farmland (Boffa et al., 2005). This furthermore leads to a situation that fallow periods are shortened and eventually disappear. This study aims at investigating how the pressure on the land can be reduced.

1.3 The research

This report is part of a bigger programme, Environmental Security for Poverty Alleviation, and will hopefully contribute to achieving Environmental Security in Bwindi. In 2004 and 2005 an Envirosecurity assessment was carried out by the Institute for Environmental Security. As an outcome of this assessment the report 'Promoting Environmental Security and Poverty Alleviation in Virunga-Bwindi' was released (Hyde Hecker, 2005). The aim of this report was to describe the problems in the area in the border region between Rwanda, Uganda and the DRC and identifying causal relationships among the problems in order to generate a comprehensive understanding of the situation. One of the recommendations for the Virunga-Bwindi region is to focus on generating sources of income and employment outside subsistence agriculture. In the report some attention areas are pointed out. Two of them are the basis of this research: 'Alternatives to agriculture' and 'Intensification and diversification of agriculture' (Hyde Hecker, 2005).

An important limitation of this study is that although earlier research reveals that there are two main causes of high environmental pressure in this area, dependency on subsistence agriculture and high population pressure, this research will only focus on alternatives to subsistence agriculture. This research does not look at population growth, or ways to reduce the population. Although the IES acknowledges the need for measures to reduce population growth rates, this research focuses on other types of solution, for instance alternatives to subsistence agriculture and alternative methods for income generation. The reason for this is that this is not one of the recommendations or attention areas which are outlined in the original Envirosecurity assessment.

The aim of this research is to explore the possibilities for poverty alleviation in the area around Bwindi, by analyzing factors that determine adoption of new methods for income generation. The underlying thought is that developing other sources of income will decrease pressure on the National Park by reducing pressure on the surrounding land. In order to promote other sources of income, it is necessary to learn which factors determine whether farmers adopt new methods.

This report is aimed at understanding motivations of the local communities for adopting or rejecting new methods. It should be acknowledged that a 'community' is a social construct. Within a community there are differences, with relation to education, views, ethnic background, etcetera, which can dictate differences of members of the community

in access to resources, services and information and can explain power structures. Every household, or farmer, has its own specific reasons, background and story which results in their specific way of living (Namara, 2006 & Van der Ploeg, 2003). This report therefore does not aim to come up with one 'master factor', that is valid for all the people living close to Bwindi. But the aim is to give insight in important issues in the region.

The following research questions are formulated to structure the research and this report. An important first step is to gain a good overview of the situation in the area near Bwindi. In addition to an insight of the different methods the inhabitants use for income generation, it is important to gain an overview of the different organizations and projects in the area. This is important because it can influence the methods of income generation and the perceptions of the people. A (now finished) project by CARE for instance has been focused on improving the perceptions of the people towards the National Park. This was done both by sensitizing as well as by showing the people that they can benefit by protecting nature.

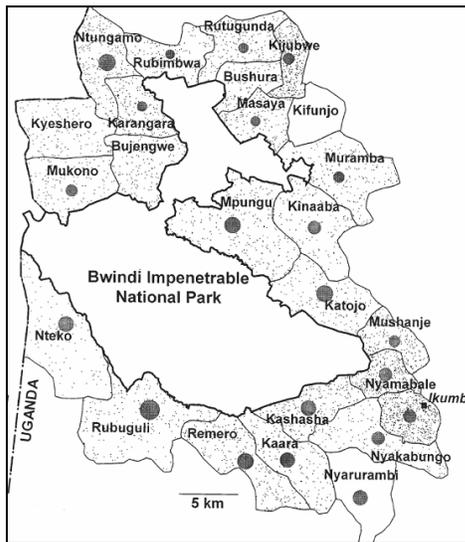
- What are the existing projects and initiatives in the area around Bwindi?
 - Projects combining conservation and development
 - Projects focusing on alternatives to agriculture
- Do households express any need for improved methods for agriculture or additional income generation?
- What kinds of methods are applied for agricultural intensification and diversification?
- What kinds of alternatives for subsistence agriculture are adopted in the area?
- Which factors determine whether farmers will or will not adopt new agricultural methods?
- Which factors determine whether farmers will or will not adopt alternatives to agriculture?

This report will start with an overview of the study area. An introduction will be given about the history of the National Park and the ecological importance will be examined. In addition the people living adjacent to Bwindi will be discussed. Insight will be given about the main sources for livelihood and the relation between the National Park and the communities will be discussed. The third chapter will give an overview of the different organizations and projects in the area. The focus of the fourth chapter will be on the analysis of the factors which are found to determine whether farmers will or will not adopt new methods for income generation. Chapter five and six are the conclusions and discussions respectively.

2. The study area

In this chapter an outline of the study area will be given. The natural environment, the local population and the relation between the park authorities will be discussed. This research is primarily concerned with the people living in the adjoining parishes of Bwindi. The parishes can be seen in figure 1. Strictly speaking, Bwindi itself is not part of the research area. But, as explained in the previous chapter, in order to achieve environmental security, it is important to protect the National Park as well as to preserve the natural resources of the area adjacent to it. This chapter will therefore include an overview of the ecological characteristics of Bwindi and its management history. This is important in order to understand the relation between the park authorities and the communities surrounding the park, which in turn can explain some of the insights in the possibilities for alternatives to subsistence agriculture.

Figure 1: Map of Bwindi



Source: Cunningham, 1996

Figure 2: Border Bwindi



2.1 Bwindi

Bwindi Impenetrable National Park covers approximately 331 km². It is situated on the edge of the Western Rift Valley occupying the highest blocks of the Kigezi Highlands (Namara, 2006). The park borders the DRC and is situated in three different districts; Kabale, Kanungu and Kisoro. Bwindi is comprised of two forest blocks, which are connected with each other by a small corridor, see figure 1. This is a result of previous conservation management. The two forest blocks are protected since 1932, and were known as the Kasatora (southern section) and Kayonza (northern section) Crown Forest Reserves (UWA, 2002). Due to protection efforts the two forest blocks were combined in 1942 and renamed as the Impenetrable Central Crown Forest. By this time the forest was under dual control by the Forest department and the Game department (Mutebi, 2003). In 1991 the area was upgraded as a National Park, and was named Bwindi Impenetrable National Park. As a National Park the responsible organization shifted to

Uganda National Parks, now Uganda Wildlife Authority (UWA, 2002). The shift from Forest Reserve to National Park had more implications than just a change in management. It also had a major impact on the surrounding communities; they were no longer allowed to enter the area. This implied that they no longer were able to utilize resources, as they had done traditionally. The Forest Department used to allow free extraction of the non-timber products of the forest (Namara, 2006).

As is made visible in figure 2, there is an enormous difference between the National Park and the surrounding lands. The border can be seen from a distance, due to a dramatic change in vegetation. Directly outside the park the trees are cut and the land is transformed into agricultural land. For this reason, the ecological characteristics of Bwindi and the surrounding area are dealt with as two components.

The ecological importance of Bwindi is exceptional, and has therefore been rewarded as an UNESCO World Heritage Site. Bwindi is an Afromontane forest that is considered to be the rarest vegetation type on the African continent. Although the park is not the largest of the Afromontane forests in the region, its contribution to the total species diversity is significant. This high species diversity is attributable to a big altitudinal range and because part of the forest has served as a Pleistocene refugium. Bwindi is one of the richest forests in East Africa for birds, butterflies, reptiles, trees, moths and has the highest diversity of small mammals amongst the African forests (UWA, 2002). The forest serves as an important water catchment area, it gives rise to several major rivers, and it is the primary source of water for Lakes Edward, Mutanda and Bunyonyi (Cunningham, 1996).

2.2 Characteristics of the area bordering Bwindi

The area outside the park belongs to the montane agro-ecological zone. This zone is characterised by higher elevations, high and effective rainfall. The main agricultural products grown for subsistence are sorghum, sweet potatoes, millet, peas, wheat, Irish potatoes and bananas (PMA, 2000). The area outside the park is intensively cultivated. From the valley up to the top of the hills, every piece of land is in use. To provide for wood needs, 30 percent of the farmers have on-farm substitution of plants and trees normally grown in the forest (Plumptre et al., 2004). The main reasons for planting trees in the area are to fight soil erosion, to improve soil fertility, and to provide in timber needs (Nyenko et al., 2002).

The location of Bwindi, in the south-western corner of the country, bordering the DRC, contributes to its remoteness. It is difficult and time consuming to reach the area and the National Park, for tourists, but more important also for the people of the region. Due to the hills, the high rainfall and the bad state of the roads, a trip to Bwindi is a real adventure. All traffic to Bwindi passes Butogota, 17 kilometres from the park headquarters and tourist facilities. The condition of the road between Buhoma and Butogota is in such a bad shape, that this last stretch takes about 50 minutes by car. This is inconvenient for tourist travelling by public transport, but really problematic for the local population. The nearest (weekly) market is in Butogota, and to be able to sell some products, the farmers should travel this way. On market days (Thursday), there is transportation to Butogota, in the form of pickup cars. People, agricultural products, chicken and goats share the limited space in the back of the car. It does not need further explanation that a lot of the products are brushed before reaching the market. But at

least this road is passable all through the year. Other roads, such as the road between Butogota, Ruhija and Kabale, are sometimes impassable, due to bad conditions, caused for instance by landslides. A big problem seems to be that the markets are far away and the infrastructure is really bad. Another disadvantage of the isolated position of the area is that none of the parishes bordering Bwindi are connected to the electricity grid. At the moment of writing the government was expanding the grid to Butogota, which can make a big difference. But it is too soon to start cheering, the electricity is probably too expensive for most of the people, and the electricity is in most places one day on, and one day off. But the availability of energy can be an incentive to start up small enterprises and can serve as a catalyst for development.

2.3 Methods for income generation

The majority (90 percent) of the people living around Bwindi belong to the Bakiga. A smaller group is the Bafumbira. A minority in the area are the Batwa (pygmies). Only 5 percent of the inhabitants belong to this group. In the area around Bwindi over 90 percent of the households are engaged in subsistence agriculture. In addition, some farmers also produce for the markets. 40 percent of the farmers in the area produce coffee, tea and tobacco for sale. Near Butogota, the Kayonza tea factory provides a market for the tea production in the area. The factory provides transportation to collect the tea in the area. In the area close to the factory there is a daily tea collection, villages farther away are served twice a week. The factory is owned by the tea producers themselves, and part of their products is sold in the UK as fair trade tea by Cafedirect (Cafedirect, 2004). About 20 percent of the farmers produce sugarcane and tomatoes for sale (Plumptre et al., 2004). Irish and sweet potatoes are produced for home consumption and for cash (Boffa et al., 2005). A relative new crop that is grown in the area is oyster mushrooms. These mushrooms used to be gathered in the forest, but on-farm production appears to be very lucrative. Fresh as well as dried mushrooms can be sold at good prices to tourist lodges and are exported to other parts of the country (FAO, 2005). Furthermore, mushroom production is a good alternative, because it does not require a lot of land. It can be grown on shelves in sheds. Another new crop that is starting to get a place in the area is Artemisia, a natural medicine to prevent malaria. A factory in Kabale shifted its production from pyrethrum to processing of Artemisia. In the area around Nteko, UWA uses this plant as a buffer between the Park and the agricultural lands, to discourage the gorillas to enter the farmlands.

In addition to agriculture and the use of natural resources of the National Park there are a few other possibilities for income generation. The first obvious source is tourism. Some 20 percent of the households have relatives working in tourism (Plumptre et al., 2004). There are several ways to make a living out of tourism. In Buhoma, at the Parks entrance, some money is made by accommodating the tourists. In the same area income through tourism can be generated through exposing cultural experiences upon tourists. For instance, the Buhoma progressive women group are earning some cash by presenting cultural performances and other women sell handicrafts (FAO, 2005). Although tourism is a promising opportunity to combine conservation and development it should not be the only attention area, because the benefits of tourism can not support the whole population living around Bwindi. The main reasons are that tourism is geographically concentrated and that gorilla tourism has its limitations in number of visitors. The majority of the benefits are concentrated in Mukono parish. A small amount of tourists visit Kitojo parish, where some excellent bird watching is possible. A relatively

new area that is starting to share the benefits is Nteko parish. A new group of habituated gorillas is situated on that side of Bwindi. At the moment there is no accommodation for the gorilla trackers, but this will come in the near future.

Another source of income outside agriculture is the gorilla research and monitoring at the Institute for Tropical Forest Conservation. The institute employs a lot of locals to help the researchers with their work. Although this is an important source of income in the direct vicinity of Ruhija, the restrictions to expand are obviously difficult.

2.4 Constraints for improvements

Despite all these possible income generating activities, the people in this area are one of the poorest in Uganda. An important reason for this is that the area is densely populated. This has as a result that households only have a small piece of land (Boffa et al., 2005). In some cases this small area of land is divided in a couple of small pieces, which most of the time are quite far from each other. In the area there is an average of 4.5 fields per household (Plumptre et al., 2004). This fragmentation of the fields is due to the traditional practise of inheritance, which consists of dividing the land between sons. Small plots of land combined with high population pressure results in the continuous cultivation of plots, which results in a decline in soil fertility and productivity (Boffa et al., 2005).

A study to the socio-economic status of people living near protected area in the Central Albertine rift reveals that the main constraints farmers express for farming are crop raiding and pests, lack of land, lack of soil fertility, lack of technical support (Plumptre et al., 2004). These constraints are not specific for the region around Bwindi, but are named Uganda wide, according to the Plan for the Modernization of Agriculture (PMA, 2000). In addition to constraints for farming, the farmers also have some problems with making money, for instance by selling their products on the market. The main problem expressed by farmers in the area is that there is hardly any access to markets, due to poor roads and lack of capital (PMA, 2000). The distance to markets in the area is on average 6.5 km, ranging from 0.8 up to 27 km (Plumptre et al. 2004).

In the Plan for the Modernization of Agriculture poor farmers expressed their priority areas for action to increase agricultural production. The first priority area is better access to credit and financial services, followed by control of crop and livestock pests and diseases and improved market access. Other priority areas expressed are access to affordable inputs, improved access to arable land and improving access to storage and processing facilities (PMA, 2000). Although the financial service provision is still a constraint, there appears to be a steady increase of institutions involved in micro-finance. Most of these institutions, approximately two-thirds are engaged in rural service delivery. Interestingly, most of the formal specialized micro finance institutions are located in Central and South-Western Uganda (Smith et al., 2003).

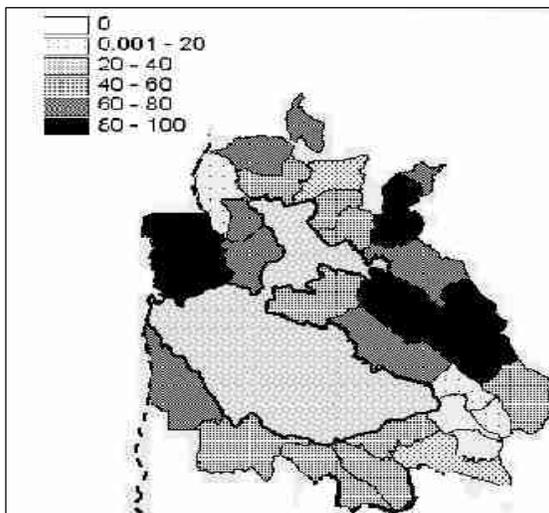
2.5 Relation National Park and communities

The establishment of the National Park caused conflicts between the communities and the park authorities. The communities felt that they were being ignored; they lost access to resources and felt they were given nothing in return. To express their dissatisfaction

fires were set in the forest and threats to the gorillas were made (Namara, 2006). In the following years, several efforts have been made to involve local communities in conservation. Things done include; involving the communities in the setting up of the Management Plan and the inauguration of Community Protected Area Institutions (UWA, 2002). The key roles of these institutions are to coordinate and present the interest of the community to the park management and to serve as a contact point for the park authorities for matters concerning the community and (Namara, 2006). UWA additionally appointed five Community Conservation Rangers whom are based in different parts of the National Park. These rangers serve as contact persons for the local communities (Atuhe, 2006, pers. Comm.). Another measure, which is like the Community Conservation Rangers introduced countrywide, is the revenue sharing programme. This implies that 20 percent of the profits from park entry fees are given to the communities. Each parish adjacent to the park boundaries is given a share of the money. The money used to be invested in infrastructure benefiting the whole parish, such as schools and feeder roads. It appeared that this strategy did not have the impact UWA was looking for, a big part of the communities did not link these improvements with the National Park. The strategy of UWA therefore changed, they start focusing on directly improving the situation on household level, for instance by buying goats for the villagers.

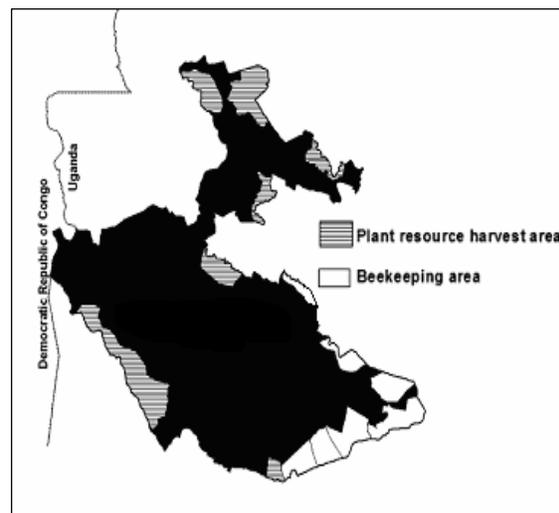
To improve the relation between the local communities and the Park Authorities, people are allowed to gather products from the forest in some areas of the park; this can be done in the so called Multiple Use Zones (MUZ). The products that can be extracted in these zones are medicinal plants, craft materials and seed collection for on-farm planting outside the park. The products that can be extracted are all listed, at this moment 36 species of medical plants and 21 species for basketry purposes are listed (Kazoora, 2002). In addition, some farmers are allowed to use the park for placement of beehives for honey collection (Plumptre et al., 2004). These MUZ are not accessible for all surrounding communities, only those communities who have signed a MoU can access the park, these are at the moment the communities in fifteen out of twenty parishes bordering the Bwindi.

Figure 3: Position of MUZ and beekeeping area



Source: Bitario et al., 2006

Figure 4: Spatial division of households who express to benefit from Bwindi



Source: Plumptre et al., 2004

Around 390 households out of these parishes are registered for use of the products. In addition 350 beekeepers are registered to harvest honey from hives set in the park (Mutebi, 2003). Presently, 20 percent of the park is under multiple use zones (Kazoora, 2002). In figure 3 the position of the MUZ and the areas used for beekeeping are allocated.

Due to these different efforts, the attitude of the communities toward the National Park has significantly improved. According to Franks, 76 percent of the interviewed households were pro-park, for comparison in 1992 only 47 percent of the respondents were pro-park (Franks, 2004). More specific, 55 percent of the households living near Bwindi argue that they personally benefit from the park and almost all households (95 percent) feel that the country is benefiting from the park (Plumptre et al., 2004). The main reason why people feel they benefit from the park are the social services projects running in the area. These include the MUZ project, the incomes derived from tourism etc. There are differences in how the inhabitants of various parishes feel about their personal benefits from the park as can be seen in figure 4. Although the initiation of the MUZs is accountable for a higher appreciation for the conservation, these zones are sparsely used. Only 10 percent of the households collect products in the zones themselves, but over 20 percent stated that they benefit from the zones (Plumptre, 2004). The reason for this could be that not everybody is allowed to enter the park and people who are allowed share their products. It is known that this is practiced by traditional medicine men (Plumptre et al., 2006).

But after all it appears that Bwindi people are benefiting a lot from the National Park. This is extremely visible in Mukono Parish where the lion share of the mountain gorilla tourism is concentrated. In figure 4 can be seen that the almost all (between 80 and 100 percent) of the people in Mukono parish express to be benefiting from the National Park. But for villagers who do not benefit from the tourism industry, life is getting harder, since prices of commodities such as soap, salt and bread have increased.

The opinions about the presence of the National Park are not in harmony. Some farmers express a positive attitude towards the National Park. They claim to be benefiting from it, for different reasons. One of the reasons is that the National Park draws a lot of international attention. Even indirect positive effects are by some farmers perceived as real benefits from the National Park. An example is the Buhoma Community Health Centre. The health centre is set up by an American doctor, who initially came to the area to make a review of the situation of the Batwa in the area. Some farmers believe that Dr. Scott established the health centre after visiting the National Park. Other farmers in contrast perceive the National Park as having a negative impact on their livelihoods. Crop raiding by park animals, mainly baboons is still a problem. Some parents are forced to have their children guard the gardens, to protect their crops against the baboons. This prevents children from going to school. One farmer had lost his base of income, due to the establishment of the National Park. He used to be employed as a lumberjack and lost this job, because cutting trees in the forest became illegal. He therefore had a slightly negative attitude towards Bwindi. He mentioned that the National Park, through tourism, had brought many good things to the community, but he was losing out. He was now doing some small jobs for other villagers. At the time of the interview he was building a new kitchen for one of his neighbours, who had a paid job in one of the tourist camps.

3. Organizations Bwindi

In this chapter an overview will be given of different organizations and projects in the area directly bordering Bwindi. To be able to understand what factors determine whether farmers will adopt or reject new methods for income generation it is important to know which initiatives have already been implemented. Linking information about the running projects to the analysed factors, gaps in the organizational structure can be identified. This can lead to a new strategy of important opportunities to develop. The programmes and organizations will not be discussed to full extent. The reason for this is that there is no room in this report to elaborate on these aspects in great detail. An overview of the goals and most important activities can be found in Table 1.

The most obvious organization working in the area is the Ugandan Wildlife Authority. This organization is in charge of managing Bwindi. As has been described in the previous chapter, UWA has been working on community conservation as well. In the last few years UWA has been working on co-management of Bwindi with the local population. This has been done to give back a sense of ownership to the local communities.

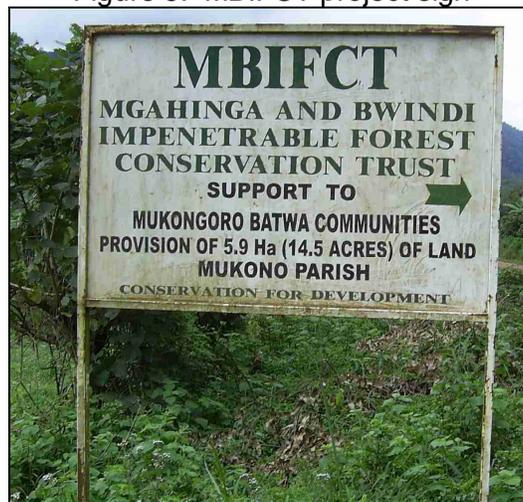
An important and influential programme in the area has been the CARE-Development through Conservation (DTC) programme. This programme started in 1988 and has phased out in 2002. The main goal of the programme was to improve the perceptions of the local communities towards the National Park, by showing them that they can benefit from the presence of the National Park and the Gorillas. The programme was built around three phases. The first phase took place from 1988 up until 1991. In this phase training of local communities in the fields of tree planting, soil conservation and environmental conservation was a central theme. The second phase was initiated in 1991, and lasted up to 1996. In this phase a pilot programme was set up, concerning utilization of non-timber forest products and new agricultural interventions that generate income to substitute for income previously derived from exploitation of park resources. The third phase started in 1997 and lasted until 2002, which simultaneously marked the end of the CARE-DTC programme. This third phase was particularly concerned on the poorer section of the population. The overall goal of the programme was consist of three main elements. 1) a sustainable increase of environmental values and natural resources of Bwindi and Mgahinga, 2) a sustainable increase of the livelihood security of resource poor households in the adjoining parishes and 3) equal share of social and economic benefits (Malpas et al., 2002).

Another important programme is the International Gorilla Conservation Programme (IGCP). This programme was set up in 1991, with joint effort of African Wildlife Foundation, the World Wide Fund for Nature and Fauna & Flora International. These three organizations are coalition partners, and work in co-operation with the three Park authorities, the Office Rwandaise du Tourisme et des Parcs Nationaux (ORTPN), the Uganda Wildlife Authority (UWA) and the Institute Congolais pour la Conservation de la Nature (ICCN). The goal of IGCP is to ensure the conservation of the regional Afromontane forest habitats of the mountain gorillas in Rwanda, Uganda and the DRC. Although the primary objective of the programme is nature conservation, the organization does a lot of work to improve the situation of the local communities. The reason for this is that the strategy of IGCP is based on identifying threats and

implementing specific strategies to mitigate these threats. At the moment the biggest threat to the habitat of the mountain gorilla is the high population pressure, which results in high pressure on the land and park. By identifying this, the key strategic objectives involve forming and strengthening linkages with local populations and promoting the flow of benefits from conservation to local people (WWF, 2006). IGCP is therefore concerned with improving the livelihoods of the local populations. An example is the establishment of a honey purification machine. Beekeepers can use this machine to process their honey, to make it ready for sale.

A third project which deals with improving the perception of the local communities towards the National Park is the Mghinga and Bwindi Impenetrable Forest Conservation Trust Fund (MBIFCT). The *raison d'être* of this trust fund is that the conservation of the National Parks should not only be a burden for the local communities, because of denied access to the parks resources, crop damage by problem animals etc. The communities bearing the costs for the protection of the ecosystem should be rewarded, this is also known as the ecosystem payment services. The trust fund is active in the three types of activities. The first type are the most visible activities, the community development activities, such as buying land for Batwa communities and building schools as can be seen in figure 5. The other activities involve support to research activities and park management activities.

Figure 5: MBIFCT project sign



The three projects, CARE-DTC, MBIFCT and IGCP, are all focused on empowering the local communities around Bwindi, whereby an important issue is to strengthen the relationship between nature conservation and improved income generation, in order to raise a feeling of ownership by the local communities of the National Park and therefore the urge to protect it. It is therefore not surprising that both organizations sometimes work together and/or in collaboration with UWA. The Community Conservation Warden, C. Atuha, explained that UWA works in close accordance with MBIFCT to fulfil their objectives (Atuha, 2006, Pers. Comm.).

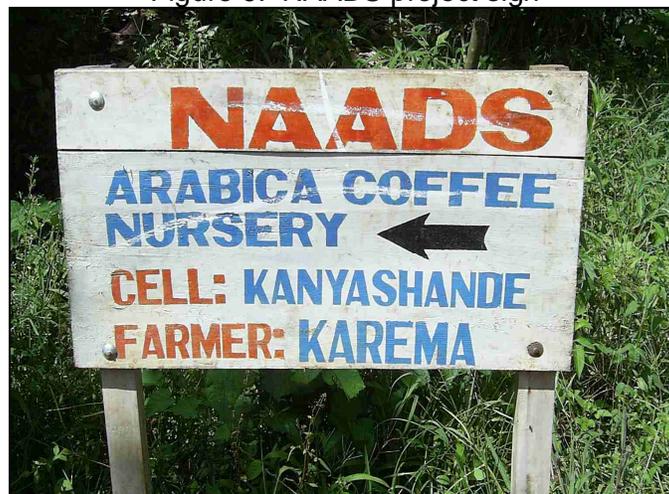
An example of collaboration of UWA with IGCP is the Human Gorilla conflict resolution (HuGo) project. This project is focussed on the problem of gorillas leaving the park and destroying crops. The main goal is to ease the tensed situation between the park

authorities and the local communities and to increase the level of community support for gorilla conservation. Gorilla Monitoring and Response teams were installed. These teams consist of 42 volunteers from the community, which monitor the gorilla movement. Whenever the gorillas move outside the park these teams gently chase them back. The volunteers all got training in 1) chasing methods, 2) fire management and 3) GPS use and communication skills. The methods the volunteers use to chase the gorillas away are ringing bells, whistling, shouting and herding. IGCP and UWA provide field equipment for the volunteers (UWA, 2002). To volunteers were elected by the community. To keep the spirit up, they were given a grant of 400.000 shilling (equivalent of €180.00). A striking conclusion is that the majority of the grants was spend in domestic matters such bride price and illness, in stead of the intended business development (Bayamukama and Asuma, 2006).

The above mentioned organizations/programmes are all part of international operating organizations. They have a whole range of activities in the area. As has been described before, the organizations often work together, or some of their specific projects are sponsored by other organizations. It appears that a lot of the projects, initiatives and organizations are interlinked with each other.

A programme that is totally different from the earlier reviewed initiatives is the National Agricultural Advisory Services (NAADS). This programme is an outcome of the governments 'Plan for the Modernization of Agriculture'. NAADS is focused on introducing new crops, to transform Uganda's agricultural sector from mainly subsistence agriculture to agriculture based on cash crops. Two of the three districts which share Bwindi are participants in this programme. Different new crops are therefore introduced in the area, such as apples, grapes, Arabica coffee and improved rice varieties. Previous experience in the area near Kabale shows that particularly apples and grapes are highly appreciated products. One apple can yield as much as 200 Ugandan shillings (equivalent of €0.10).

Figure 6: NAADS project sign



The Bwindi Advanced Market Gardeners' Association (AMAGARA) is a local CBO in Buhoma. The idea behind this association is that the threats to biodiversity conservation and environmental security can be reduced by helping farmers living near the park to gain access to the market for agricultural products offered by tourist lodges located in the area, thereby giving them a direct incentive to conserve forest resources, and helping to lift them out of poverty. The association aims to achieve this goal by acting as a bridge between farmers and the tourism industry, training farmers in target crop production and natural resource management, consolidating and grading produce, and finally marketing products to the tour camps. The big advantage of this organization compared to the above mentioned is that everybody included in the organization is living and working in the same parish. The organization has only started late 2006, and is still in the starting-up phase.

Table 1: Overview of the goals and activities of the organizations

Organization	Goal	Main activities	Examples
IGCP	Protect the habitat of the mountain gorilla	Forming and strengthening linkages with local populations and promoting the flow of benefits from conservation to local people	Support HuGo volunteers with field equipment. Support to beekeepers.
UWA	Managing Bwindi	Guarding the park, providing guides for tourists.	
CARE-DTC	The environmental values of Bwindi and the livelihood security of resource poor households in the surrounding parishes are sustainable increased and the social and economic benefits are equitable shared.	# 1: Community conservation #2: institutional development #3: Agricultural development	
MBICT		Sponsoring development, research and park management activities	Buying land for Batwa
AMAGARA	Improve income base of local farmers in Mukono Parish.	Linking farmers and tourist camps, training farmers to produce vegetables for the camps	
NAADS	Modernize agriculture in Uganda	Farmer schools	Introduction of grapes and Arabic coffee nursery.
FAO	Conservation of biodiversity of Bwindi Heritage Site	Support community based enterprises	Support to the Buhoma Community Village Walk
CTPH	Conservation of Bwindi through public health care	Monitoring Gorilla health, Computer services, TB prevention	Internet café, computer training.

4. Reasons for change

In this chapter an analysis is made of the most important factors that determine whether farmers will adopt or reject new methods for income generation. This chapter is based on interviews held with local farmers living close to Bwindi. In November and December 2006, 46 farmers have been consulted about their ways of income generation and views for the future. The interviews were not strictly bound to a questionnaire, but were semi-structured conversations. A topic list, which was the basis of the interviews, is admitted as appendix 1. Because of the character of the interviews, this analysis is qualitative by nature. In addition to individual farmers, there have been conversations with representatives of local farmer groups, the Njabihya group, Mbirameze Women group and the Ruhija canteen beekeepers association.

4.1 Need for improvement

A first important question to the farmers was if they felt a need for improvement. Do they feel as if they need changes, i. e. more income or improvements of their agricultural methods, or is that just a western perception? It appeared that all but one farmer expressed a need for improvement. This one farmer gave as reason for his satisfaction, that he had everything he needed. He had just been married, had a place to sleep and enough food. The answer was surprising, because this farmer was not producing any cash crops, thus had no monetary income at all. A neighbour of the farmer did express need for improvement; the main reason for him was that only a small part of the children of this area were able to go to school and only 2 out of his 4 own children. The others were not able to, because of lack of money for school fees and supplies as well as the long distance to the nearest school.

Except from this farmer, all other interviewed did express a need for improvement. Some farmers have specific areas they would like to improve and directly mention which aspects they would like to improve. These preferred improvements include new seed varieties, building a permanent house and being able to send all children to school. Others just want to improve their lives in general, and do not specify which areas they would like to improve. Even though one farmer did not express need for improvement, a conclusion could be drawn that the farmers do express need for improvement.

4.2 Agricultural methods

Mainly due to efforts of different organizations mentioned in the third chapter some new agricultural methods have been introduced and applied. Some of these new methods are for environmental protection. An example of a new method to fight loss of soil fertility is to ban burning of grass and weeds as a method to clear a plot of land. In stead of burning the grasses farmers now bundle it and use it as feeder for their animals. Another new method to preserve soil fertility is using dung of the cattle as manure. A third example is terracing of the plots on steep hill slopes. This prevents the soil for being washed away by the rain.

Other changes have been introduced specifically to promote a more effective way of farming. One of these new methods is 'line planting'. The traditional practise was to throw a hand full of seeds in a plot, and just wait and see if and how the seeds came up. An organization introduced the practise of planting in lines. This is somehow more labour-intensive, but it saves a lot of seeds. Not only is it more seed-effective, the yields are also higher, because the plants are evenly distributed along the field. Another 'method' is the maintenance of the fields. The majority of the farmers were used to plant seeds, and check on them only when the time of harvesting arrived. Doing it this way saves a lot of time, but also wastes a lot of potential. Weeds can grow in the meantime and use up a lot of nutrients, which then can not be used for the food crops anymore.

In addition to new agricultural methods these organizations brought new products with them, such as climbing beans, Irish potatoes, apples and vines. The introduction of some of the new crops had more implications. These crops, such as Irish potatoes need extra input in the form of pesticides and fertilizers during the growing season.

In the field of agriculture quite a few new methods have been introduced the last few years. One of the most striking observations is that all the new improvements seem to come from outside. None of the farmers spoken to expressed to have initiated a change or introduced a new method himself. This is quite understandable when new crops are introduced or with the introduction of pesticides. But the fact that even new methods such as regular weeding have to be initiated from outside, is rather strange.

4.3 Factor analysis

There are different causes that can explain the situation. Roughly all these causes can be divided between causes that are out of reach for the farmers, and causes that cohere with opinions and views of the farmers. The first cluster is comprised of explanations such as remoteness, bad infrastructure, no markets, no electricity and absence of paid jobs in the area. These objectives should be improved to lift the villagers out of poverty. But this chapter is concerned about the question why farmers themselves do or do not adopt new methods for income generation. What are the explaining factors causing the majority of the population to be engaged in subsistence agriculture? These factors can not be explained or understood if there is no full understanding of the situation. The circumstances can cause or can influence the reasons for the villagers not to change methods. Now that the situation has been examined in the previous chapters and is the opinions of the farmers summarised in table 2, the focus will turn to the perceptions of the farmers. Table 2 is a summary of different structural factors expressed by farmers, as being an obstacle to changes.

Table 2: Structural factors

Structural factor	No.
Remoteness	13
Relative distance to the market	10
Absence of formal jobs	5
Bad conditions of roads	7

The different factors that explain why farmers adopt or reject new methods for income generation are categorized in table 3. The different categories and factors were

extracted after the interviews with the villagers. The factors are divided into three different categories; social, economic and ecological factors. These are the reasons farmers express not to produce more cash crops or to engage in other forms of income generation. Some factors seem to overlap a bit, like 'lack of knowledge' and 'no formal education'. But there is a difference between the two; the first one is about everyday knowledge needed for improvements, while the latter is mainly a reason for them to claim to not have a paid job.

Table 3: Categorized factors

Category of factors	Factors	No. (N=46)
Social factors	Lack of knowledge	8
	No formal education	4
	Availability of manpower	2
	Attitude towards agriculture	12
	Dependency on input from outside	9
Economic factors	No money for fertilizers, new varieties of seeds or pesticides	5
	Incentives (money for school fees etc.)	7
Ecological factors	Soil fertility	5
	Rainfall	3
	Agro-ecological circumstances	10

A general impression of the farmers is that they are bit lethargic. There is a lot of room and necessity for improvement, but a lot of the farmers do not initiate changes themselves. A reason behind this lethargic attitude can be that a lot of the improvements seem to be out of their reach. Even if they would produce some more cash crops, the added income is relatively small and these extra dollars a week do not improve their way of living dramatically. The cash income is needed to build a permanent house; most villagers live in semi permanent houses, made out of wood and mud, with a tin roof. The absence of electricity, regular transportation and role models, makes the villagers wonder why they need to work harder. To what extent will the quality of their lives improve because of these few extra shillings? My impression is that the villagers are satisfied if they have enough food, a bed to sleep in and enough money to send their children to school. Of course there are some farmers who show initiative to improve their live. One farmer explained that he was working on the establishment of a new farmers group, who were going to join forces in marketing and selling their Irish potatoes. His vision was that together they could fight a better price for their potatoes. In addition they could share the cost of transportation.

Social factors

An often heard reason to explain why the farmer did not have a job, or was engaged outside subsistence agriculture was that he/she did not have had any education. The ruling opinion is that you really need education to get a job. Without education, there is no work. This seems a bit strange at first sight, but we have to take in mind that paid jobs are scarce. Even with an academic degree, finding a paid job is difficult. But it appeared to me that farmers, who had some form of formal education, were better able to adapt to changes. This leads to another important factor why villagers do not change their agricultural methods; farming is not regarded as a 'job' by a lot of villagers. They perceive farming as a domestic matter, as just a way of providing food, and thus as a

responsibility of the woman. Almost none of the male interviewees claimed that the job they had was being a farmer. This can hinder further development because they do not focus on making money with agricultural products. An example showing that it is possible to make money out of agriculture is provided by one of the rangers working for UWA. In addition to his paid job, he grew passion fruits and was able to sell them for a good price. He also bought ill, malnourished piglets, fed them, and sold them on the market with a large profit. The strangest feature of this example is that neighbours who saw he was making good money with just a few hours work a week (he combined it with a full time job) were not able or willing to copy him. Some neighbours tried, but quit after a few weeks, probably because of disinterest.

Figure 7: Piglet keeping



The above made statements are reflected in the different factors shown in table 2. Twelve farmers expressed, direct or indirect, that their attitude towards agriculture made them not to focus on modernizing their agriculture (i.e. to produce more specific cash crops).

Economic factors

Some farmers said that they did not have any incentives to change their methods of income generation, while others changed methods because of changes forced them to. These incentives can be monetary, but this is not necessary the case. A monetary incentive could be that the children of the farmer start schooling, and he has to pay for their fees and supplies. This could be a reason for the farmer to actively look for ways of earning cash. A non-monetary incentive could be that the farmer does not produce enough food to feed the whole family. This could be a reason to change methods and work more effective. The factor can thus be applied in both ways, but it accounts definitely as a reason for the farmers to (or not to) change.

Another reason why farmers did not made the preferred change, is that they do not have enough money. They for instance would like to use pesticides and fertilizers to enlarge their harvest, but they do not have the money to by these products.

Ecological factors

The cluster of ecological factors consist of three factors; agro-ecological circumstances; rainfall and soil fertility. It can be argued that rainfall and soil fertility are components of the agro-ecological circumstances. The reason to decide to regard them as separate factors is that the rainfall and soil fertility were specifically expressed by the interviewed farmers. Another reason is that the farmers mentioned the rainfall and the soil fertility, because they were prone to change. The farmers were convinced that there was more rainfall, which damaged their crops and stated that the soil fertility was declining. The factor of agro-ecological circumstances does not deal with changes, but with the limitations set by the natural environment. Some products can not be grown in this area, such as vanilla. Other products can not be grown in parts of the area, this is mainly caused because of elevation and steep slopes.

Figure 8: Rabbit keeping



Figure 9: Presence of NGO in daily live



4.3 View towards interventions by NGOs

It appears that the farmers are quite positive towards the interventions done by the different organizations. Examples of improvements mentioned by different farmers are: introduction of new products, such as climbing beans and rabbits; introduction of new, improved varieties and introduction of knowledge about environmental protection measures. In a lot of the houses promotional material, such as calendars were hanging on the wall. A drawback of the presence of the different organizations is that the farmers tend to show a kind of fatalism. Thanks to the projects they have access to new crop varieties and skills. The most heard response to the question why they did not undergo the changes they are interested in, was that they do not have the means to do so, and that at the moment there are no organizations providing them. An example for clarification is a farmer who did not have any tea plants, because he missed out in the beginning of the project. He expressed real interest in having the tea plants. But instead of buying them himself, he complained that there was no organization at the moment distributing them. The question of course arises if this is a negative side effect of the good work of the organizations, or that the villagers always had this mentality.

5. Conclusions and recommendations

In this chapter answers to the research questions will be given, and a final conclusion will be drawn and recommendations are given. In addition the results of this study will be linked to the recommendations made in the Envirosecurity assessments.

5.1 Conclusions

To achieve environmental security in the Bwindi area two components should be applied. The first part is the conservation of the National Park and the second part is the conservation of environmental values in the area adjacent to Bwindi. These two components are of course interlinked, but it is important to acknowledge that both aspects are important. An important threat to the National Park is high pressure on the land, which is mainly caused by a combination of a high population and the dependency on subsistence farming. This report is focused on reducing dependency on subsistence agriculture as means for reducing pressure on the land. Reducing the dependency on subsistence agriculture can be done in two ways; 1) by focussing on commercial agriculture, through intensification and diversification, and 2) by focussing on alternative methods for income generation.

In addition to lessen the pressure on the land and preserve the ecological values of the area, these alternatives to subsistence agriculture could result in extra income. Thus, if farmers will become more independent from subsistence agriculture, the result is an achievement in the direction of realizing environmental security and poverty alleviation.

There are a lot of projects and initiatives in the area. Most of them focus on the relationship between the National Park and the livelihoods of the communities. An accepted vision is that by improving the lives of the people will improve the perception of the communities towards the conservation of the forest. If they experience that the presence of the National Park is in their benefit as well, by earning direct money from it and by conservation of important life support systems, they will have a strong incentive to protect the park themselves. This approach seems to work. The perception of the communities has improved a lot, as a result of more visible benefits derived from the park. The perception towards Bwindi has also improved through sensitizing the villagers about the importance of the protection of the mountain gorillas. A drawback of all these initiatives is that a situation can arise in which farmers do not show any inventiveness themselves to improve their situation. They expect organizations to come, and to give them ideas and means for improvement.

All but one of the households spoken to did express a need for improvement. Some farmers have specific areas they would like to improve, while others just want to improve their lives in general. The two most important factors that determine whether the farmers will adopt new agricultural methods or alternatives for subsistence agriculture are: the opinion towards agriculture and the remoteness of the area. The first factor is important in relation to the inventiveness of the farmers. As long as farmers do not regard farming as a real job, they will not invest in their agricultural assets. This becomes a real problem when villagers at the same time believe that they can not get a paid job, because they do not have any formal education. The second factor is the remoteness of the area. This

is a structural factor, which actually is a combination of bad (or no) roads, no electricity and situated in the border region. Most important to this aspect is the perception of the farmers that they live in a remote area. That can be a reason not to change. But if they feel to be connected to other parts of the country it can be an incentive to change.

5.2 Recommendations

This report is based on the recommendations made as a result of the Envirosecurity assessment. The recommendations in this report are mainly a further elaboration of the original recommendations, which are focused on providing alternatives for subsistence agriculture. As well as recommendations focused on filling the gap between organisations and the life world of the local population.

- Organizations should be focused on empowerment of the villagers to make a change themselves. This does not mean to use the bottom-up approach, but to encourage the farmers that they can improve their lives themselves, without interference of organizations. They should understand better that their lives are in their own hands.
- Organizations should focus on convincing farmers and villagers without a job, that agriculture is a real job. They should invest in agriculture and know that even without being qualified for other employment it is possible to earn good money. They should not perceive agriculture as only a domestic matter of providing food, but as a real source of income.
- Farmers should be trained in aspects of seasonality. Some farmers saw their harvest go wrong, because it was destroyed by rain. It appeared that they had planted their crops in the wrong season of the year.
- Villagers should be taught general principles of business development. At the moment it appears that most of the villagers do not have a long term planning. If they have a starting capital or a grant they use it to solve immediate problems, such as buying medicine and paying bride prices. This results in a situation where money can only be used once, if they understand and have ideas how to, they can use the first amount of money to invest in a project in order to generate a constant flow of money.

5.3 Link to Envirosecurity assessment

The original recommendations were largely focussed on Rwanda. Some of the recommendations do definitely account for the situation in Uganda as well. This especially accounts for recommendation nine: *'to lessen pressure on Virunga region and the ecology in general, priority should be given to generate sources of income and employment outside the subsistence agriculture. Support for small to medium industries, to the ICT sector and to energy is an absolute requirement'* (IES, 2005). As has been described in this report this accounts for the Bwindi region as well.

The original report had two recommendations in the field of empowerment and training. One of them focuses on training ex-rebels, ex-militias and refugees skills outside agriculture, recommendation 11: *'After demobilisation and repatriation, the rebels, militias and refugees need to be trained in skills outside subsistence agriculture'*. Even though the Bwindi area does not have this problem in the same extent as the border region between Rwanda and the DRC, training of skills outside subsistence agriculture is

necessary. This recommendation could be extended in the sense that not only ex-rebels and ex-militias should be trained; even the 'ordinary' villager should be given guidance on other sources of income. It is understandable that after a period of insecurity repatriation of the former rebels should be given the highest priority, but great efforts should be made by farmers, as well as local, national and international organisations to find alternatives to subsistence agriculture.

6. Discussion

This report has been written as a part of the Environmental Security for Poverty Alleviation Programme of the Institute for Environmental Security, within the African Great Lakes Region case study. Bwindi is only part of this case study (see further Hyde Hecker, 2005). The other forest block central in the case study is the Virunga Volcanoes, 40 kilometres south of Bwindi. This forest block is shared by three countries; Uganda, Rwanda and the DRC. The situation in this part is totally different from the situation in Bwindi. The situation in Bwindi is quite stable, there is no fighting and the most important threat is the high land pressure. Although the distance between Bwindi and the Virunga Volcanoes is negligible, there are a lot of differences between the two areas. A first evident difference is the natural environment. While Bwindi is comprised of a thick impenetrable forest situated on narrow, very steep sided valleys running in all directions, Mgahinga Gorilla National Park attracts the attention by the peaks of the volcanoes. Not only the appearance of the Parks differ, due to altitudes the vegetation and climate differs as well. This also accounts for the main agricultural products grown in the area. But there is a more striking difference between the two regions: the state of security. Bwindi is situated in only one country, while the Virunga Volcanoes is shared by three countries. This should not automatically be a problem, except that there is a high instability in the area. In the eastern part of the DRC, the area bordering the Congolese part of the Virunga Volcanoes is still prone to violence. Key threats to the National Park are militias fighting against the government and the influx of refugees. The concept of environmental security has a total different connotation when the National Parks are used by militias as a hide-out. The conservation of the area is not only important for its conservational value, but also for the possibility of serving as a 'Peace Park' (Van de Giessen, 2005). The results of this report are therefore only applicable to Bwindi, and not to the whole ESPA case study region.

Figure 10: Meeting with a farmer group



A point of discussion with regard to the methodology of this research is the time that has been spent in Uganda, about three months. It can not be expected that the whole society has been fathomed. The data that has been collected during those months is used in addition to existing literature on this topic. Another related aspect is the fact that as a researcher from another (donor) country, with another skin colour, you are attracting

attention. It could be that the interviewed villagers gave socially desirable answers. Measures have been taken to minimize this effect, such as positioning the interviews in an informal setting and using a local as an interpreter. It is of course difficult to exclude all the possible side-effects. An example is a visit to a farmer who was working for NAADS. At the end of the visit he claimed to be proud that a white woman had paid him a visit. He even said that this was the biggest benefit of participating in the NAADS programme.

The last point of discussion is related to the international attention to the area. The people living in the area belong to the poorest of Uganda; a need for improvement does exist. Thanks to the global attention to the mountain gorillas, the area is mapped. This means that many (large international) organizations are working in the area. The problems of this area are known, and the global community will put effort in the conservation of the magnificent mountain gorilla, and will therefore improve the lives of the local communities. Are other areas that are internationally considered of less importance, not more in need of support? Take for instance the Echuya Forest reserve, the Afromontane forest-ecosystem is comparable with either Bwindi or Mgahinga, but it has the disadvantage of not being the last habitat of the mountain gorilla. Therefore it does not receive as much international attention. Are areas like Echuya less important to conserve, or areas that do not have the advantage of being close to a globally important ecosystem? To achieve global environmental security it is important that all life support systems are sustained, not only areas of high conservational value, but also in populated rural areas.

Figure 11: Mgahinga and farmland



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Annex 1. Topic list interviews

0. Information about the Household (introduction)

Household composition

Location (county/ village)

How far is the local market (in time)

Number of fields/ area of fields

How far are their fields from their house and from each other?

1. Present Situation:

Composition of total household income:

- Agriculture. Cash crops vs. subsistence (which crops are they growing)
- Activities outside agriculture (are they engaged in tourism, conservation etc. & what are the benefits)
- Income through family members working in town/abroad.

2. Past situation

Has the total household income been subject to change the past few years?

What has been changed?

- Agricultural methods (intensification or diversification)
- New agricultural products
- New activities outside agriculture (fi tourism)

Why have there been changes?

What has caused this change?

- *A development programme*
- *The establishment of the National Park*
- *Experiences from neighbours*

Has the establishment of the National Park caused any change for your livelihood?

Was it a forced change (neg.) or anticipation on an opportunity (pos.)?

3. Future situation

Do households express any **need** for improved methods for agriculture or additional income generation?

Do they see **opportunities** for income generation in the near future?

- *Through changing practices in agriculture*
- *Through engaging in new activities outside agriculture*
- *Which factors have a positive effect?*

What do they express as **constraints** for improvement?

- *Possible factors*