Micologia Aplicada International, 27(2), 2015, pp. 31-42
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www.micaplint.com

Community initiatives for biodiversity conservation: mushrooms protecting mountain gorillas, pygmies, other people and even wider biodiversity

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INTRODUCTION

While our subject is to describe the many and complex accomplishments of Community Initiatives for Biodiversity Conservation (CIBC), and how it has filled many needs of the community, the community is an even more complex story[4,5]. In order to describe CIBC, we must also describe the communities around Bwindi Impenetrable Forest National Park.

Most, 90%, of the people in the area are of the Bakiga tribe, 5% are Batwa pygmies and another small group are members of the Bafumbria tribe[11]. Others are refugees from wars in the Congo and Rwanda[2]. CIBC helps members of all of those groups, but particularly widows, orphans and Batwa pygmies. Many are orphans and widows as a result of deaths due to HIV/AIDS[3]. In 2013 an estimated 63,000 Ugandans died of HIV/AIDS and 1,561,900 were living with it. Of course, many other deadly diseases are common. The maternal death rate is high, but infant mortality is much greater, there are 70 male and 52 female deaths per 1,000 live births[3].

In 1991, the government of Uganda declared approximately 331 km² to be the Bwindi Impenetrable Forest National Park to protect the endangered mountain gorillas[13]. The Park is located within three

districts, Kanungu, Kosoro, and Kabale, in southwestern Uganda, as shown in **Fig. 1**. CIBC is in Kanungu. The forest also had many other native residents, animals, plants and fungi. In 1992, the government decided that, in order to protect the gorillas, some native residents, the Batwa Pygmies would have to leave. The Batwa people had always lived in the forest. Some anthropologists believe they have lived there for more than 60,000 years[10]. They had no formal schooling and depended on hunting and gathering techniques handed down from their parents and grandparents. The Bakiga elders consider them primitive, but they are a proud people with a strong culture, that they continue to keep and promote[2,10]. The government thought that somehow, they would be employed by the tourist trade, as soon as Bwindi National Park was established. Unfortunately, that did not happen. Rather the Batwa, with no education, no money and no land were pushed out into the already congested and poor community surrounding the new National Park. With no money, no land and no skills that were needed by others, the Batwa as well as other poor people in the area returned to the forest as poachers. It was the only way they knew to get the food

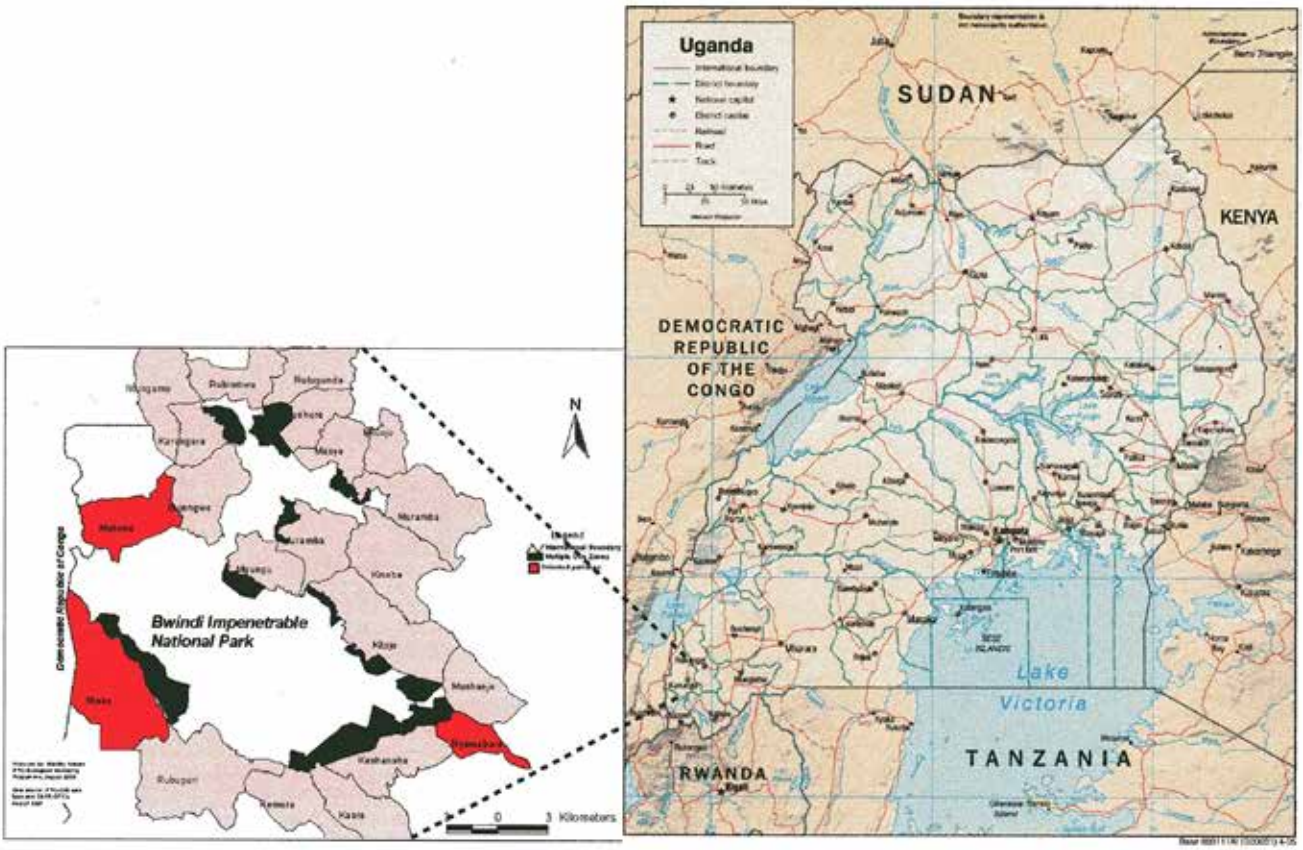


Fig. 1. Left: Map of the Bwindi area, Kunungu region (FAO). Green areas are CARE-promoted privileged-use areas. Red areas are parishes studied by FAO. Right: Map of Uganda with Kununga, lower left (CIA).

Fig. 2. Collection of Gorillas, killed by poachers.

they needed to survive. Since poachers use snares to catch animals to eat, the gorillas are also often caught. The poachers do not eat or use the gorillas in any way. However, the gorillas are sadly, the unintended victims (**Fig. 2**).

THE BATWA

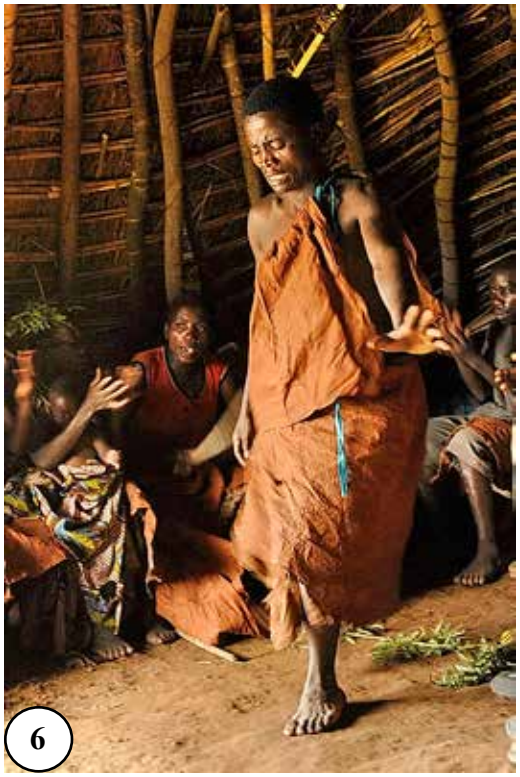
Poaching has continued, but as tourism has increased the Batwa have entertained tourist by performing their traditional dances, selling their handicraft, showing

their traditional homes (**Figs. 3-4**), dancing (**Figs. 5-6**), and demonstrating their hunting techniques (**Fig. 7**)[10]. Although their unique culture is an important part of the tourists' experience, the Batwa have not been trusted to receive or control the money earned[2]. Rather the money is controlled by others who presume to know what is best.

INTERNATIONAL ORGANIZATIONS

If the techniques used by FAO, CARE and some other international organizations were effective, by now, all of the people living near Bwindi Impenetrable Forest National Park should be well fed and have no thoughts of poaching. Those organizations have used a standardized project of spending more than one year interviewing and surveying the poor people of an area, then more than another year organizing them. Finally, less than a year teaching them to help themselves. At the end of three years the organization people leave, with no continuing support. An agricultural analogy would seem

Figs. 3-4. 3: Traditional Batwa tree home. 4: Family at their traditional Batwa ground home.



Figs. 5-6. 5: Batwa women dancing. 6: Batwa man dancing.

appropriate advice to these organizations: the field needs to be plowed only once, but cultivation needs to continue until the final harvest. In the Bwindi area, CARE convinced the Uganda Wildlife Authority that if they let a limited number of people harvest only materials for handicraft, from a limited part of the Park, another limited group raise bees, for honey, in the Park and a third group harvest limited timber, that all the problems would be solved (**Fig. 1**)[2,7]. That is, three privileged groups should be allowed to do designated damage to the Park, and that was somehow going to save the Park and everyone around it.

Then in 2001-2004, FAO came in, did their survey, organized and provided limited training to people in some of the areas around the park, they identified leading tourist community walks, beekeeping, handicraft, "Irish" potatoes, and mushroom cultivation as enterprises to improve the conditions in the area. They projected mushroom growing to produce the greatest income. The training included how to grow and sell oyster mushrooms. Shortly after the initial training was completed the FAO ended the project and their people who had tried to support the local people left the area. The people, who do the work on these projects for international organizations, often understand what needs to be done, but as employees of large organizations, directed by people in offices, on other continents, they must do as they are told. The FAO people who wrote the report made the guarded conclusion:

"Natural resource-based enterprise development with communities involves intensive investment in capacity building and it can take many years for enterprises to become sustained and profitable. Enabling

Fig. 7. Batwa men, with a wild pig, returning from hunting.

conditions – such as favorable policy and legal set-up, exposure to environmental education schemes, previous experience of participatory processes, and enterprise management capacity – increase significantly the chances of success and speed the establishment of enterprises. A multilevel approach, involving concerned stakeholders and local-, district-, and national-level authorities will guarantee long-term sustainability and offer a real possibility of improving rural livelihoods, while simultaneously protecting the environment and conserving high biodiversity areas[7]."

Unfortunately, the "Enabling conditions" were not in place. The senior author of this article worked six weeks as a volunteer teacher in a CARE project in Upper Egypt (Cairo to Aswan) in 2006-2007. A CARE staff member, who had worked hard to organize farm village groups and teach them, told him that so far, they had taught them "just enough to be dangerous." By "dangerous," he meant that they knew enough to try to improve their livelihoods, but success was not very likely. A few months later, CARE fired all of the project staff. A glowing report was written. The work of the senior author was praised out of proportion to what he had been able to do in six weeks, out of a three year project. It should have been good for his ego, but he saw the truth.

Another international organization, Institute for Environmental Security (IES), The Hague, Netherlands, surveyed people

in 2007. One of their conclusions about these poor people with limited education and limited experience beyond their small communities was: "A drawback of all of 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 of improvement[11]." Unlike FAO and CARE, the IES report shows no attempt to do anything, but to do another "inventive" survey, while listing about seven that had previously been done in the Bwindi area.

It is difficult to understand why another survey was needed, but in 2006-2008, a survey done for a Norwegian Master's thesis seems to have provided the most and most carefully collected information[2]. The surveys often note that land is already limited and that the population is growing rapidly, but no report seem to even suggest that family planning is needed to avoid greater poverty in the future, or to make any provisions for it. All reports seem very short-sighted.

COMMUNITY INITIATIVES FOR BIODIVERSITY CONSERVATION

At that time Bwindi Impenetrable Forest was established as a National Park, in 1991, John Bosco Tusingwire was an adolescent. Like many others he was the son of a close, but poor family. He understood the pain of poverty, but was fortunate to find help to continue his own education and to use it to help others in his community. Along with other people in the community Mr. Tusingwire organized Kinkizi Rural Development Initiative Trust in 2007 and managed it until 2009. It has now become a farmers' cooperative society.

In 2012 while away at school he realized that the answer to the problem of poaching could be in empowering those who were poaching by teaching them agriculture and supporting their continued efforts in alternative activities for their livelihoods. Once again he gathered community leaders and formed Community Initiatives for Biodiversity Conservation (CIBC). The Uganda Wildlife Authority (UWA) was made an important partner to teach the importance of protecting gorillas and other wildlife. Much of the early activities of CIBC emphasized pigs to replace bush meat (**Fig. 8**) and vegetables to replace plants (**Fig. 9**) that were gathered in the Bwindi forest.

MEAT

The pigs are an important part of the CIBC initiative, since most poaching is done to get meat to eat. Yet, FAO and CARE did not consider that a domestic source of meat was needed to prevent poaching. Byaruhanga, who was not trying to provide solutions, noted that the Batwa used their limited money to purchase meat[2]. While, there is no indication that the Batwa or other people in the Bwindi area eat mountain gorillas; the gorillas are equally susceptible to the snares used to catch other animals. So meat was clearly needed to reduce the inadvertent killing of gorillas. For that reason, CIBC began with a piggery to teach pig husbandry and was able to supply animals to some participants (**Fig. 8**). Over 250 households are now raising pigs to feed their families and to sell. Bukyebe, a Batwa man, stated that "wild pig's pork do not taste as good as the pork from domestic ones." Those were welcome words to the CIBC and

Figs. 8-9. 8: Pigs at the CIBC piggery. 9: Cabbage in the CIBC demonstration garden.

Uganda Wildlife Authority teachers. The success with pigs is a huge step to alleviate poaching, but as of now, it is small compared to the need for flesh to eat. CIBC has now begun a project to farm fish and integrate it with chicken production (**Fig. 10**). However, the problem is not just meat, wild fruit and vegetables are gathered for food. Both people and wild animals eat the wild fruit and vegetables, so those in Bwindi Park are also protected, gathering them is really another form of poaching, so vegetable cultivation is as important as pigs, fish and chickens.

MUSHROOMS

Soon it was recognized that mushrooms had been a more important part of diets than the limited results of the FAO project. Mushrooms had also been gathered from the forest and few were available outside of Bwindi Park. Not only were wild mushrooms traditional food they also provide an extender for meat, when it is limited. Many local people wanted them and the tourist facilities also wanted them for their clientele. With so little land available especially to the Batwa and other poor people, it became clear that mushrooms were a valuable crop.

Of course, the idea of teaching people to help themselves by growing their own food is as old as agriculture, itself. Growing food for sale to others to enable the grower to be more flexible in what they can buy to eat and for other goods is

Fig. 10. Hillside with fish rearing ponds, overlooking the CIBC center.

only a little newer. However, most people in southwest Uganda live on subsistence farming with little or no money. While cultivating plants and raising animals dates to ancient times, even crude mushroom cultivation, began only in about 1650 and planting spawn made from pure cultures was not done until 1894, and commercial pure spawn came after 1900[6,8]. Cultivation of oyster mushrooms dates only from 1936, but it appears to have remained only experimental until commercial production began in the 1960s[1,9]. Then, however, oyster mushroom cultivation spread quickly to all six inhabited continents and to many countries that had never cultivated any mushroom before. Modern methods have made oyster mushrooms not only the easiest mushrooms to grow, but they also use the least resources[12]. They are also the most adaptable and can be cultivated from cool temperate to warm tropical climates. Wild oyster mushrooms can be found from the tropics to the coldest temperate places. That has resulted in them being popular as the mushroom of choice in many countries that have never cultivated other species.

All of their positive attributes have made oyster mushrooms the first choice for beginning mushroom growers, but their beauty and pleasant flavor have given them staying power, so that most who start growing them continue. However, CIBC appears to be the first to cultivate mushrooms as an important part of an integrated program with the intent of helping wild animals by providing cultivated mushrooms outside of the park, and teaching the value of preserving biodiversity. The gorillas and other animal have more wild mushrooms to eat and poachers, who grow mushrooms, are a little less hungry for meat and have less reason to enter the forest. More specifically CIBC training and support provides food to protect mountain gorillas in Bwindi Park, other wild animals, Batwa Pygmies, and other poor people in an area of high population density. The mountain gorillas are herbivores, not omnivores like humans. It takes a large volume of fruit and vegetables to keep such large animals active and healthy, so any loss in their food supply is a threat to their protection. One problem is that not only do people poach into Bwindi Park, but the gorillas and other animals eat the farmers' crops. An ongoing solution to prevent movement into and out of the Park is planting a Mauritius thorn hedge around the boarder of the park. Movement through the hedge is unpleasant for man and animals.

When CIBC started teaching their members to grow oyster mushrooms, they taught them to soak, ferment and then steam their substrate. While there is a huge forest, it is protected and that means that wood to burn must come from the surroundings where the land is needed to grow food, so firewood is limited and steaming requires hours and a great amount of fuel. So, now

they have begun to use dry substrate and to soak it in water at 60 C for about 45 minutes[12]. FAO taught people to put bags of spawned substrate on wooden shelves. Not only do the shelves reduce yields and increase long, tough stems by slowing the movement of carbon dioxide away from the mushrooms, but the mushrooms grow on the wood and rot it. CIBC teaches the use of plastic-rope slings that provide very good ventilation and are easy to reach as shown in **Fig. 11**. They pack 1 kg of their mushrooms into bags and sell them for the equivalent of about USD $2.00 each (**Fig. 12**).

CIBC now supports about 100 women who grow mushrooms. Those women now serve over 1,000 customers, including the Bwindi Park tourist lodges and camps, with their fresh mushrooms. Like the other foods that CIBC has taught the people to grow, a very important part of growing mushrooms is to provide money, by selling them to the tourist camps, lodges, to stores and to individuals in the area. Money translates into providing school fees for children and buying other goods to provide a better life for the people in the area.

Most parents, in the area, understand

Fig. 11. Bags producing young oyster mushrooms in the CIBC growing room.

Fig. 12. Bagging fresh oyster mushrooms for sale.

that education provides the only way their children can break the ties to poverty. Traditionally, each son is given a part of his father's land. Generation after generation, the son get his part then his sons divide his land, etc. Through the generations each son has a fraction of his father's land, but the grandson receives only a fraction of his father's fraction, etc. As the children grow up they understand that even subsistence will be difficult on so little land. A true story is told of a young man called Joseph. Joseph is a porter, who carries luggage for tourists and takes various other jobs to earn money. He and his wife have a garden to provide food for themselves and are able to sell some of their produce. Joseph has a younger brother who inherited half of their

father's farm. However, rather than take his half he agreed to give it to Joseph. In return, Joseph is supporting his brother's education[2]. This is just the sort of thing that CIBC is helping families to do. The story was written in 2008 when his brother was preparing to study in a university.

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