



ENVIRONMENT UNDER PRESSURE:
THE IMPACT OF PVO PROJECTS ON A ZAIRIAN VILLAGE

MUTOMBO MPANYA

Working Paper #59 - January 1986

Mutombo Mpanya is a native of Zaire. He received his Ph.D. in Planning from the School of Natural Resources at the University of Michigan. During the last twelve years he has been working with a number of international organizations, conducting research and evaluation studies of businesses, development projects and community-level programs in various African countries. He has taught in several North American universities, including the Universities of Michigan and Notre Dame and Stanford University. Currently Dr. Mpanya is a Fellow of the Kellogg Institute.

Abstract

During this time of acute food crisis in Africa, there is a growing recognition of ecological conservation as a vital issue. According to one view, traditional African land management techniques are the major cause of environmental deterioration while foreign development efforts, particularly those sponsored by Christian churches, are totally beneficial. This paper presents a detailed study of the case of the Bakwa Mulumba village and the Kalonda Mission Station in the Tshikapa area of central Zaire. The findings are, on the whole, in contradiction with the above view and suggest a rather different general evaluation of the relative environmental effects of traditional local techniques and church sponsored innovations.

Resumen

Durante este tiempo de aguda crisis de alimentos en Africa, hay un creciente reconocimiento de la conservación ecológica como un asunto vital. De acuerdo a un punto de vista, la administración tradicional de técnicas en las tierras africanas son la mayor causa de la deterioración ambiental mientras que esfuerzos de desarrollo extranjeros, particularmente aquellos patrocinados por las iglesias cristianas, son totalmente beneficiosos. Este trabajo presenta un detallado estudio del caso de la villa Bakwa Mulumba y la Estación Misionera Kalonda en la área de Tshikapa de Zaire central. Las conclusiones, en general, contradicen el punto de vista señalado anteriormente. Se sugiere una evaluación global distinta de los efectos ambientales de las técnicas tradicionales locales y de las innovaciones patrocinadas por la iglesia.

Introduction

There has been a longstanding interest in the problems of environment and in the overseas work of Christian missions, especially as these issues relate to the present African food crisis.

Many people assume that the African food crisis is caused by an ecological deterioration mainly because of poor traditional techniques of land management and the unwillingness or inability to control human reproduction. Ecological crises in general tend to be attributed to the work of large corporations looking for short-term profit. These same people also assume that church agencies, unlike large corporations, do not create their own brand of environmental problems. They assume that these agencies do not exploit natural resources such as oil and minerals nor manufacture industrial products and discharge their byproducts into the rivers.

It is true that many traditional techniques of land exploitation used by Africans have the potential to destroy the soil. For example, bush fire kills wild life indiscriminately while, at the same time, it exposes the soil to rain, sun and wind erosion. Overgrazing destroys the grass cover and leaves the soil unprotected. On the other hand, one should not forget that many African people have developed techniques for working on the land such as long fallow, which helps the soil regenerate. It is also true that in many places in Africa the population has increased steadily during the past 20 years, even though it is not clear that this increase is due to the traditional orientation toward fertility. As a matter of fact one could argue that traditional taboos about the spacing of children are undermined by Christian teachings which lead to large families and higher population levels. (This paper is not directly concerned with the issue of the role played by large corporations in creating environmental problems by their exploitation of natural resources, although reference will be made to this.)

The pervasive assumption that church programs are not likely to create environmental problems may not be justified. Often this assumption is based on the fact that church programs are very small in size and by nature concentrate on education, health and evangelization. This assumption does not take into account the fact that church programs bring their own ways of exploiting the environment which have the potential to cause ecological problems in the local community. New methods of building and land cultivation, if not properly tested beforehand, have the potential to destroy local soils. It is also important to know that desired outcomes of church programs, e.g., new health-related behavior and different ways of conceiving of the world acquired through new educational systems, may be the source of unintended adverse effects on the environment.

The goal of this paper is to demonstrate that (1) contrary to most common assumptions, local African people, through their land exploitation techniques and through their religious practices, had--and still have--a strong sense for the conservation of the natural environment; (2) also contrary to prevalent beliefs, a church project, by its physical presence, evangelization and educational programs, may contribute to ecological crises which threaten the life of a local African community. This paper is based on the case of Bakwa Mulumba village and the Kalonda Mission Station in the Tshikapa area of central Zaire near the Angolan border. First, the geography and history of the village and the mission station are briefly described. Second, the ecological changes experienced by the villagers from 1960 to 1980 and the importance of these changes are discussed. Third, the possible determinants of the ecological crisis are considered, followed by policy recommendations.

Methodology

A preliminary word on methodology and sources seems

appropriate. The following steps were taken. Three sites were chosen for the purpose of comparison with respect to density of trees and shrubs, the composition of catches from fishing and the quality of the water. One of the sites included Bakwa Mulumba village and the mission station; the other two were about 20 - 25 miles north and south of the village respectively. (The northern site was close to Bakwa Nsumpi, a Luba village of much the same size and demographic composition as Bakwa Mulumba.) These sites were similar in several ways. They all had the same soil and vegetation-- wooden savannah of central Zaire; they were dominated by elephant grass and trees with the local name of *nkwanga*. All the sites included a small river with a large number of palm trees along its banks. These rivers were all tributaries of the Kasai river and were similar in length and flow.

Fifteen plots were studied, five in each of the three sites. Each plot was selected on the basis of location and ecological conditions comparable to those of the other two plots from the other two sites. In each plot, five independent assistants estimated the densities of grass cover and trees. Fishing was done in all three small rivers and the results of the catches were compared. Fifty interviews were conducted with the people in the village on the subject of social and ecological changes. Many of the results were discussed with them. On the basis of this information several estimates were made. The percentage of area covered by the tree canopies was used in calculating the density of tree cover. Samples of water were taken and checked every hour for cloudiness and silt deposit over a period of three months. Estimates of land use and the consumption of trees were based on direct observations and on interviews by the author with villagers, including those who worked for the mission station.

The Village and its Resources

The village of Bakwa Mulumba is near the city of Tshikapa on the Kasai River, about 40 miles from the Angolan border. It is part of a larger

village called Kalonda. Bakwa Mulumba is situated between three rivers: namely the Kasai River, the largest of the three located to the west of Bakwa Mulumba, the Mbumba River to the south, and the Kantobela River, to the north of the village and smallest of the three. Bakwa Mulumba has an altitude of about 700 m. or 2100 feet, a rainfall of close to 1,000 mm. a year and an average temperature that varies between 25 and 30 degrees Centigrade . The soil is mostly Kalahari sand with some laterized soil where the village is built; the mud walls of the houses are very red.

Bakwa Mulumba village was founded around 1910 when many Luba people moved into the Tshikapa region. These Luba people were escaping from wars of slavery which were initiated by Ngongo Lutete, Lumpungu and local leaders who had the support of the East African Arab slave traders. Taking advantage of this situation the Compagnie du Kasai, a colonial charter company, facilitated the establishment of Bakwa Mulumba Village in order to create a labor reservoir in the area.

Initially Bakwa Mulumba villagers worked as farmers; they also provided labor for the Compagnie du Kasai, cutting rubber and later on mining diamonds. A small percentage of the villagers worked in other businesses associated with the mining operations--e.g. transportation, store keeping, hospitals, schools etc. By 1950 Bakwa Mulumba was still a village of farmers living in a subsistence economy with a small exchange sector.

Land is the most important resource at the disposal of the village. It remains the main source of living for almost all of the villagers who need and use about 30 to 35 square kilometers between the Mbumba, Tshimbinda and Kasai Rivers. Within these limits farmers must find their sources of food, building material, firewood, drinking water and water for other uses.

Most of the food for the villagers comes from agriculture, animal

husbandry, hunting and gathering. Villagers grow a variety of crops including manioc, corn, peanuts, beans, and vegetables such as eggplant, *muteta*, *mulembwa*, *muhala*, and *mudibu*. There are fruit trees such as mango, papaya, orange and lemon trees. Villagers raise sheep, goats, chickens, and other small livestock such as rabbits and ducks. Also small wild game rodents (*nsejji*, *mpuku*) and birds such as *mkwadi* and *makangala* are hunted. Several wild fruits grow on the land including *ngaji katenda*, *mbulu*, and *matundu*, as well as other edibles such as mushrooms.

Villagers use regular trees, grass and palm trees as building materials. Regular trees -- mostly *nkwanqa* -- and palm trees are used to construct walls and roofs. Grass is used as thatch for the roof. The most abundant of the grasses -- elephant grass, is sometimes used for the walls of temporary shelters. Dried grass and timber are burned for fuel; they are an essential source of energy.

The Kantobela River is used as a source of water for drinking and washing. The processing of food, such as manioc in water, is done in the Mbumba, Kantobela and Kangonga rivers as well as the Kapinga River. Fish are found mostly in the Kantobela and Kasai rivers. Several techniques are used to catch fish: line fishing, mostly for small fish such as *misangi* and *bikela*; trap fishing for *tukunda* and *tusha*; and *kutuwa* fishing in which fish are exposed by damming the river for a short period of time.

The Mission Station

During 1952 and 1953 a mission station was established in Tshikapa for the purpose of evangelization. The location chosen for the station was near the Bakwa Mulumba village, between the Kasai River on the west and the Kantobela and Kangonga rivers on the south and the north respectively.

After securing a concession for the station, the missionary built a small house for his family. The frame of the house was made of wood as were the walls and the roof. Likewise, several classrooms were constructed out of local materials--trees and thatch. By 1954-55 the station had a modern dispensary and a primary school, constructed of brick with a tin roof, for over 600 students. A bible institute and 10 other houses were built for expatriate personnel and some of the local workers. Over 50 families came from the surrounding areas to live on the station--some as workers and some because they desired to be closer to the school, the dispensary, or to the church community.

Construction of the station called for techniques that were foreign to local tradition and used local resources far in excess of those normally required in the construction of traditional structures. Large trees were cut into small pieces (1 x 15 inches) to be used as shingles to cover the roof and walls. Bricks were made of local clay and baked with energy supplied by wood fires. Some of the shelters built of local materials were extremely imposing by local standards and could contain over 200 people. Construction of these shelters put increased pressure on this local environment.

Ecological Changes and Their Importance

In 1980 I visited the village of Bakwa Mulumba after being away for two decades and was received by an old woman who had known me as a boy in the village. As we discussed the changes which had occurred during the years, she concentrated specifically on some of the ecological trends. She complained that the land failed to produce as much as before; that crops no longer grew as easily as she remembered; that the river now had too much clay; and that women had to walk a long distance from the village to gather firewood or grow food.

Initially I did not know whether to believe her as memory is often unreliable. Perhaps she was simply being nostalgic and things were not really very different. I also thought that some of those changes, if they had occurred, might have been caused by local agricultural practices such as bush fires.

However, after several weeks of research and observations in the village, it became clear that indeed considerable ecological change had taken place during the past two decades. The ground cover in most places had been reduced substantially. Grass cover had dropped from 96% of the surface in 1960 to 75% in 1980. Regular trees which occupied 1% of the land surface in 1960 were only 0.6% in 1980. Palm trees had dropped from 0.5% to 0.3%. Wild fruits were almost completely eliminated, declining from 0.6% to 0.2%. The fishing catch was noticeably reduced as well: small sardines or *tusangi* had dropped from 65% of catches to 35%; *bikela* had declined from 5% to 0.8%; *tukunda* from 0.8% to 0.3%, and *tusha*, almost nonexistent now, went from 0.3% to 0.1%. (These figures are based on field research conducted by the author.)

These changes had several implications for other activities in the village economy. The decline in the number of palm trees, for example, had very significant consequences because of their numerous uses. Palm nuts and palm nut kernels are used to make oil; the male flower of the palm tree, if cut young, gives palm wine; when cut old it is dried and burned and salt can be extracted from the ashes for seasoning food; the "nervure" of palm leaves is used as twine in the construction of brooms, weaving nets to catch fish and making baskets to carry things including small livestock. Salt and oil from palm trees are also used for medicinal purposes. The byproducts of processed nuts and the dried parts of the palm tree are burned for fire. Thus, a decline in the number of palm trees has numerous implications for a range of activities in the village economy.

Other important activities are severely hindered by the above ecological changes. Housing for example, which involves every age group in the village -- young and old, male and female -- depends on ecological resources. Construction of traditional houses requires grass, trees, palm trees, water and clay. The size of housing units has decreased since 1960, probably as a result of the shortage of trees and other resources.

The ecological changes enumerated in the preceding paragraph -- namely reduction in the number of trees and the amount of grass cover, as well as the increased clay deposits in the rivers -- threaten food availability which is already in a delicate state of balance. The number of people involved in agriculture has been reduced to 50% of what it was in 1960. This fact has further implications if one considers that those remaining in agriculture tend to be old people with declining physical energy. Agricultural technology, on the other hand, has not improved and actual agricultural productivity per acre and per person is declining. Animal husbandry has declined by 75%. These facts have to be put together with the reduction in the number of people involved in hunting and fishing. Virtually no one is involved in hunting wild game; very few people are still fishing (less than 25% of the total population); and wine making is almost completely eliminated.

This reduction in food production is even more alarming if one looks at other aspects of the food production system. Traditional agriculture has been oriented toward subsistence and therefore results in very little surplus for exchange. The reduction of the number of people involved in agriculture coupled with declining land and labor productivity has created a situation where people are dependent on imported food. Traditional diets have been low in meat but nonetheless adequate in protein. With the dramatic reduction of animal husbandry, fishing and game hunting, protein deficiency in children and pregnant women may result. The reduction of palm trees and the consequent elimination of wine-making has also

contributed to insufficient protein and mineral salts in the people's diet. Thus, the ecological crisis, by reducing food availability and some essential elements of nutrition, threatens the health of the population and undermines its physical capacity.

Another point alluded to earlier bears repeating: these changes foster economic dependency of the village on outside sources for survival. Here the outside can be the international market and this is illustrated by the shift in economic activities. Before 1950, agriculture was the most important activity in the village -- involving almost 95% of the population. Between 1950 and 1980 a change occurred whereby most of the people in the village, namely young people, became students in the schools on the station. At the same time, between 1960 and 1980, general trade and diamond mining occupied most of the people in the village (more than 75%). The village became more dependent on the diamond trade and other forms of trade which linked them to the international market. This would not have been so lamentable if people were paid fairly and adequately for the diamonds they mined. But in fact the wages are very low and fixed by multinational monopolies. By law, local villagers do not have the right to sell their diamonds to other buyers. Because of the declining productivity of land and labor, people are forced to mine diamonds to survive. Once the diamond mines are exhausted or the wages become extremely unbearable, the chances of starvation will increase. The mining of diamonds also increases the clay deposits in the rivers which in turn reduces the number of fish in the water.

Increases in the number of educated people do not necessarily ameliorate this situation. Young people enrolled in school forget traditional agricultural and food-producing and gathering skills and do not acquire any other skill to survive in their community. Exacerbating this problem is their acquired desires for consumer goods and quick cash returns. Additionally, because of lower productivity in the agricultural

sector and lack of opportunities in other areas, many young people find themselves at a loss for an economic activity to sustain their lives. Many become unemployed and some even turn to crime or become alcoholics. These problems will certainly destroy the social structure of the village if existing trends continue.

In light of the ramifications in ecological changes that took place in the Bakwa Mulumba village, let us consider some of the factors that may have created this situation. Three possibilities need to be discussed. First, could the traditional forms and rates of resource utilization be at the root of the present changes? Bush fire for hunting, overgrazing and "*kutuwa*" may have destroyed the soil and caused the deterioration of the environment. However, it is my opinion that, with a few exceptions, traditional techniques of exploiting nature embodied elements of conservation and, for the most part, could not have created the ecological changes described above. Overpopulation could not have played a role since large numbers of young people left the village. What took place in the Bakwa Mulumba village was a rapid deterioration of the environment which could have been caused only by a new element in the ecological system.

Second, the mining company may have been the source of the environmental destruction. It is true that the mining operations needed a lot of wood for brick baking, as an energy source for some of its trucks and for home cooking. However, neither the Kantobela, nor Kangonga watershed areas were used by the company for these purposes. These two watersheds were used mostly for agricultural purposes in the traditional manner. In my opinion the mining company could not alone have affected the watersheds associated with the Bakwa Mulumba village to this extent. The company may have had an indirectly negative impact in that it forced the villagers, through the colonial administration, to produce food for the local personnel of the company. To make farmers more productive, some

aspects of production were changed slightly. There were some elements of intensification in the agricultural practices that may have undermined the soil. However, generally speaking the agricultural techniques used were still traditional and had, as mentioned above, strong elements of conservation.

Third, the missionary station may have undermined the ecological situation of the Bakwa Mulumba village because of its dramatic increase in the utilization of the village resources and its introduction of an education system oriented toward western materialism rather than an agricultural life style. In the following section I will discuss the extent to which these two factors may have played important roles in the present ecological situation.

Traditional Methods of Exploitation

With some limitations, traditional methods have always had some elements of conservation. Let us consider the following examples. In the area of crop husbandry, local people have traditionally practiced what is known as slash and burn. The farmer usually clears a small piece of land, about 1 acre, leaving the stumps of trees and bigger, severed branches. This practice controls erosion as the top soil is not removed by running water. After the land is cleared, and some of the cuts have dried, farmers burn the field and plant at the first rain. Usually several crops are planted in the same field; it is common to see farmers planting manioc while they are harvesting peanuts or planting beans while weeding corn. This multiple cropping always keeps something growing in the soil to protect it against the sun and the rain. After the harvest, the last crop in the rotation is manioc which can stay in the ground for up to two years. After the manioc is harvested, the field is left fallow for about ten years to regenerate the soil.

In the area of animal husbandry, the methods are also conservationist on the whole. Moreover, the diet of people is not oriented towards meat; rather, people prefer fish and vegetables. Usually there are very few animals per person (less than 1 goat or 1 chicken per person). Animals eat the byproducts of food processed for human consumption. For example, goats, sheep, and chickens are fed the byproducts of processed manioc and corn. They also eat tree leaves, green grass, and, in the case of chickens, worms and small insects. Generally speaking the animals do not constitute an ecological danger. Even when they eat tree leaves, they eat only leaves that they can reach; they usually stay close to the village and do not forage in the wild.

Villagers also exploit local wild game, which was not abundant in 1960, but only sparingly. Usually they set traps to capture one animal at a time. When hunting rodents during the 2-month hunting season, they use the 3 or 4 hunting dogs available in the village. (Bush fire, generally hazardous to the ecological system, may be used as a hunting device. However, it was rarely used in the village.)

Wild fruits are gathered in season. Only the fruits are picked from the bush and the bush is left to grow. Young children who gather these fruits do not affect the grass cover at all. Similarly the cutting of palm nuts and the wine tapping does not affect the life of the tree. It is true that many of the trees which are tapped for wine do not bear palm fruits--this is due to the fact that male flowers are cut young, eliminating cross pollination, and much of the sap of the tree is taken to drink. However, the tree itself continues to live. Damage to palm trees is limited by the difficulty of acquiring the necessary climbing skills. In order to climb well, one must begin at an early age and learn to use the special climbing belt. Actually only a small percentage of people (3 or 4 out of 100) master the art of climbing a palm tree. This makes it difficult to challenge the environment through the aggressive harvesting of palm fruits.

The grass used for thatch is cut with a machete or pulled by hand; either technique leaves about 5 cm. of grass on the ground. Though construction of houses requires a lot of resources (sticks, thatch, and mud), houses last close to ten years before they need to be replaced. The old branches removed from the razed homes are often used as firewood. Sometimes people cut fresh trees and leave them on the ground to dry for several weeks, but this is only rarely done.

Traditional methods of exploiting water-based resources are also conservationist, with a few exceptions. Fishing is done with traps (like lobster baskets) or with lines. Usually traps capture several fish or several kinds of fish at one time. However, it is rare to find more than four fish in one trap, even during a good season. Sometimes a poison called mbuba is used in non-running water. Once every three years women use a system whereby they dam the river and dry the waterbed to expose fish which are then caught. This process usually occurs during the course of an entire day, though the waterbed usually remains dry for only one or two hours as the dam is not very effective in holding back the water. Generally speaking the traditional way of exploiting this natural system does not constitute a serious threat to the environment.

New Forms and the Rate of Utilization

The Mission station may have had a directly negative impact on the local environment. This could have occurred in several ways. First, the mission introduced a new form of land ownership (private property) and reduced the land available to the community by about one-third. This consequently reduced the length of time in which a field remained fallow and contributed to soil erosion. New techniques of land exploitation which cleared trees more effectively (removal of stumps and roots) led to a loss of about 50,000 trees. (The local trees take an average of thirty years to

reach maturity.) Secondly, the building of modern, western buildings required 50,000 to 100,000 trees to bake 500,000 to 1 million bricks. In addition, some of these new buildings were constructed with local materials such as thatch and trees. Thirdly, the presence of the station increased the consumption of home energy in the form of firewood. For an expatriate population of about six families, it took close to 10,000 trees a year. A local population of about 50 families on the station needed about 20,000 trees a year; finally, Bakwa Mulumba villagers needed over 40,000 trees a year. The local population on the station also needed about 500,000 square meters of land per field use and 5,000 to 10,000 square meters for traditional houses. The houses took between 25,000 to 50,000 trees--the extra space needed for the houses of the local population on the station possibly contributed to a further reduction of fallow time and an increase in soil loss and erosion. This tremendous and rapid increase in the consumption of ground cover exposed the soil to sun, wind and rain which increased its erosion and destroyed its structure.

Beside these direct impacts, the Kalonda station may have had an indirect impact on the ecological system of the village of Bakwa Mulumba. Two features of the station are relevant here. First of all, the western school, espousing western materialistic values, inculcated the desire for western material goods but did not provide any skills in how to make the goods or how to make money to buy them. The traditional agricultural work became devalued; no agricultural skills were taught in the school so that children could survive in their own culture. Without means of support to earn a living, school-educated people, filled with western consumer expectations, turned to diamond mining and trading in the hope of acquiring a lot of money quickly. In the process of haphazard digging for diamonds a lot of clay soil was dumped in the waters which reduced fish life. The school-oriented young people adopted a new kind of relation with their environment.

Secondly, evangelization may have affected the place that the environment enjoyed in the local culture. Several institutions, which were linked to conservation of the environment and which provided an opportunity for people to relate intimately to nature, lost their prestige. Local religious beliefs encouraged people to plant trees and to conserve the natural environment. As an example, in Bakwa Mulumba, people follow a religious tradition whereby they plant a small tree called *nkambua* to represent the spirit of the grandmother on the father's side. This tree is planted when a young man starts a household, when a married couple wants to have children or when the family wants to give thanks to the ancestor's spirit. The ceremony itself includes an individual prayer, a petition to the spirit of the grandmother (*Iusanzu*), and the killing of a chicken and a display of food under the newly planted tree so that the ancestor will come and eat in the night. Usually the small tree is kept with some grass around it in an area of about 10 square feet. The tree is of a hardy variety which almost always survives; it does not lose its leaves, and it has bark that resembles the cactus plant. This tree and the shrubs around it were easy to grow and provided a good protection for the soil.

Mulemba is another tree which is linked to a form of religious worship. In this case it represents the spirit of ancestors who had political leadership. It is believed in the Bakwa Mulumba village that the qualities of political leadership and the responsibilities that come with such leadership are inherited. If, for some reason, one is not willing to recognize one's belonging to this heritage, one may face the wrath of the ancestors. Thus, people who are related to the political leadership often have to plant the *mulemba* tree. The ceremony here includes a "*Iusanzu*" and a talk with deceased ancestors. A goat is killed and some meat is placed under the tree as food for the ancestors. In this instance the tree looks like a rubber tree; it is always green, has deep roots, never fails to grow, gives much shade, and is easily incorporated into the local architecture.

Mulemba is also related to burial rites. Usually when someone dies, especially someone who is related to political leadership, a *mulemba* tree is planted on his tomb in the yard of his home, a vine is tied to his finger and put around the *mulemba* tree. The tree and the vine grow together. Because of this particular rite in the Bakwa Mulumba village, initially there were no cemeteries--there were only a number of *mulemba* trees. It should be noted that palm trees also played a role in a burial ceremony; they were used to build the small shelter in which the body was laid out before the actual burial. These trees prevented erosion and had many practical uses as mentioned above.

There are other rites involving trees that are linked to birth rather than death. Four of them are especially notable. Traditionally children are born on banana leaves. The second rite is called *tshibota tshia ku diyala*. Practically this rite involves a place in the yard where a banana tree is planted. At the bottom of this tree the stools of the baby are thrown out until he/she reaches two years of age. Usually the banana tree grows well because of the manure. If the family is large, a small garden of banana trees grows behind the family house. The third rite deals with *mwabi*, or the tree of luck. This tree is planted in the court when a child is born to the family. It is believed that spirits may be jealous and kill the child. Consequently parents plant a tree to bring luck to the child and to ward off evil spirits. The fourth rite involving trees has to do with premature children. When a child is born prematurely, besides planting a banana tree, the parents plant a tree called *tshisanga-sanga*. This tree belongs to the same family as the *nsanga* tree, which is a symbol of strength and is associated with the place of origin of the Luba people--including *Bakwa Mulumba*. All of those trees contribute to the environment and provide the people with a sense of strength; in addition, the banana trees are a valuable source of food.

Aside from specific rites, there are many beliefs in *Bakwa*

Mulumba that relegate a lot of spiritual healing power to the natural environment, as in the case of premature children. Sometimes spiritual and physical healing for adults is gained by staying close to nature. There are cases of people who build small houses in the bush when they are sick in order to regain their health; or who build small huts in the bush to stay for several weeks or months in order to accomplish a particular work, or just to have inner peace.

In conclusion, it seems that trees and the natural environment occupy an important role in the life of the people. This holds for all major transitions: death, birth, passage to adulthood, illness and recovery. Generally, in their culture, people identify with trees as major natural forces -- *Kazadi Mutshi, diku dia mutshi*.

The natural environment was and still is the basis of people's lives; for example, many aspects of life are related to the maintenance of trees around the house. However, it seems that some Christian teachings or values, by undermining the traditional beliefs, may have undermined the ecological aspects of local society.

There are several instances of Christian teachings that may have had a negative impact on the traditional religious practices mentioned above. Theologically, Christianity teaches that God is in heaven and there is no other intermediary between God and humans but Jesus Christ. Local culture, on the other hand, believes that God is the oldest of our ancestors. There is not a rupture but a continuity between the living and God through our dead ancestors. Ancestors are perceived as intermediaries between God and humans. The rites of *mulemba wa bukelenga*, as they relate to ancestors, contradict Christianity. When someone becomes a Christian, he or she is required to abandon all ancestor worship practices.

On theological grounds, Christians recognize that there is Satan,

God, Jesus as the Son of God, and the Holy Spirit; there is no room for spirits in nature. Christian teachers assert that beliefs about spirits in nature are superstitious.

Another instance of the negative impact of Christian teaching on local environment has to do with the western notion of hygiene. Christian education taught people that having all these trees around brought snakes and mosquitoes. People were instructed to live in a "clean" environment. Since snakes tend to be shy of people, the incidence of snake bite had in fact always been extremely low. Paradoxically there were more mosquitoes in modern homes than in the traditional ones. This was because in traditional homes people were making fire in the house and mosquitoes were repelled by the smoke. Western medicine displaced traditional medicine, which linked man to the spirits in the trees and plants. People began to trust more in the dispensaries and the hospitals rather than in the healing principles of their natural environment. As a result of the Christian education brought in by the church, people had less incentives to conserve trees and the nature around them and this may have led to the deterioration of the soil and land in general. Western medicine displaced traditional medicine, which linked man to the spirits in the trees and plants.

Conclusion

During this time of the tragic African food crisis, traditional African land management techniques have come under criticism: bush fire, overgrazing, and deforestation have become common words in the description of the local management traditions. At the same time, the work of church agencies is perceived as all good and almost holy. There is an assumption that churches, unlike large corporations which exploit huge quantities of natural resources (oil, minerals), do not create environmental problems; it is assumed that church projects tend to be small and deal mostly with evangelization, education and relief. Even

though there are many cases in which these assumptions are correct, this paper shows that in some cases the assumptions are false. The case of the Bakwa Mulumba village and the Kalonda Mission Station prove that a church project can have destructive effects on the environment, such as the reduction of grass cover, trees, palm trees and consequently water quality deterioration. Such effects are likely to create profound changes in the life of the local community such as a reduction of agricultural activities, fishing, wine-tapping and animal raising. While both the church and local practices may have contributed to the degradation of the ground cover and the subsequent soil erosion, clearly the church station may have played a greater role in the above ecological problem than did traditional management practices. The assumption that local practices cause the environment to deteriorate does not seem to hold very well. On the contrary, it appears that most local practices had some sense of conservation of the environment. Slash and burn techniques using a long fallow period and multiple cropping kept the soil from being eroded and gave it the opportunity to regenerate. Methods of animal husbandry restricted animals to the village and fed them, in part, on the remains of human food. Hunting of wild game was limited; fishing techniques caught selected kinds of fish (except in the case of *kutuwa* or *mbuba* which were indiscriminate methods but were rarely practiced).

Church projects, in contrast to these traditional approaches, seem to have had a negative impact on the local ecological situation. A large number of trees and large amounts of grass were used in short periods of time without any conservation measures. From educational and evangelization programs, church projects undermined both the local economy and local religious beliefs. The former became dependent on the international market and the latter may have caused a loss of spiritual reverence for the natural environment.

The case of the Bakwa Mulumba village does more than challenge the

assumption that church projects do not have a negative impact on the environment; it also suggests that we should adopt policies and attitudes in planning church projects that would enhance the relation of the church project to its local environment. Essentially four things have to be kept in mind:

1. Make an environmental assessment of the projected church action.
2. Outline some remedial actions that can be taken in case negative impacts occur; for each action include some details about long-term costs and benefits to the local community.
3. Determine what specific values and behaviors in the local community promote or hinder a better relation with the environment.
4. Design specific policies to encourage and promote the values mentioned above and finally to stimulate the people to protect their own life support system. This can be done with a sense of continuity and respect for the established wisdom of traditional ecological practices.