# FORESTS AND FARMING: AN ANALYSIS OF RURAL LIVELIHOOD PROGRAMS FOR POVERTY REDUCTION IN EASTERN ZAMBIA

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Forests and Farming: An analysis of rural livelihood programs for poverty reduction in eastern Zambia

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This paper investigates the effectiveness of Joint Forest Management (JFM) and agricultural programs at reducing rural poverty in Zambia. Community-based natural resource management (CBNRM) programs in Africa have been aimed at improving livelihoods, creating tangible benefits, and increasing incomes from forests and forest products through the sustainable use and conservation of forest resources. Agricultural programs have often had similar goals regarding improved livelihoods, benefits, food security, and income generation for soil conservation and reduced forest conversion due to agricultural expansion. With increased rates of deforestation and forest conversion, Zambia is in need of effective measures for the sustainable utilization and conservation of forest resources.

JFM and agricultural programs are analyzed and compared to distinguish key indicators of success and failure and how these programs are relevant to Zambia in terms of improving livelihoods, household and food security, incomes, and reducing rural poverty.

Levels of local participation, adoption, the resulting effects on local populations, and five key factors (socio-cultural, historical, institutional, design, and benefit) that influence program success frame the analysis and comparison for improved livelihoods and poverty reduction.

This paper is based on a review of the literature in both the fields of community forestry and agricultural programs and on the author's research and experience with community-based natural resource management and agricultural livelihood improvement programs in Zambia.

The results from this paper suggest that agricultural programs are performing better at this point in time for livelihood improvement, food security, and poverty reduction. Barriers and pitfalls for each of these programs are identified and recommendations are offered that may help to improve their ability in achieving the project goals of livelihood improvement and conservation, in addition to reducing rural poverty in eastern Zambia. The recommendations may have utility across Zambia.

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This paper is dedicated to those with open minds and open hearts.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ADMADE | Administrative Management Design |
| ASP | Agriculture Support Programme |
| CAMPFIRE | Communal Areas Management Programme for Indigenous Resources |
| CBC | Community-Based Conservation |
| CBNRM | Community-Based Natural Resource Management |
| CF | Conservation Farming |
| CFU | Conservation Farming Unit |
| CIDA | Canadian International Development Agency |
| CLUSA | Cooperative League of the United States of America |
| CNRM | Community Natural Resource Management |
| FAO | Food and Agriculture Organization |
| FD | Forestry Department |
| FMC | Forest Management Committee |
| GART | Golden Valley Agricultural Research Trust |
| GMA | Game Management Area |
| ICDP | Integrated Conservation and Development Program |
| ICRAF | International Center for Research in Agroforestry (World Agroforestry Research Center) |
| IGA | Income Generating Activity |
| GRZ | Government of the Republic of Zambia |
| JFM | Joint Forest Management |
| LWF | Lutheran World Federation |
| MAC | Ministry of Agriculture and Cooperatives |
| MoU | Memorandum of Understanding |
| MTENR | Ministry of Tourism, Environment, and Natural Resources |
| NGO | Non-Governmental Organization |
| PAM | Project Against Malnutrition |
| PFAP | Provincial Forestry Action Programme |
| SI | Statutory Instrument |
| SIDA | Swedish International Development Agency |
| USAID | United States Agency for International Development |
| VAG | Village Area Group |
| VRMC | Village Resource Management Committee |
| WCRF | Wildlife Conservation Revolving Fund |
| WFP | World Food Program |
| ZAWA | Zambia Wildlife Authority |
| ZFAP | Zambia Forest Action Program |
| ZNFU | Zambia National Farmers Union |

## INTRODUCTION

Improving prosperity among the rural poor and curtailing environmental degradation is a great challenge. A large percentage of the world's poorest people and global biodiversity are found in countries with significant areas of tropical forest, which are often under heavy pressure to deliver tangible economic benefits. The utilization of tropical forests for economic development and poverty alleviation, while maintaining long-term social and environmental sustainability, is paramount (Hammond and Zagt, 2006) for many developing countries in the tropics and sub-tropics. The use and management of these forests by many different stakeholders at many different levels and scales can result in disagreement and disillusionment.

"There is an old African proverb that states, 'When the elephants fight, the ants will get stamped on.'" Battles at regional or national levels that have often neglected the inclusion of rural people have left them feeling stamped on and a desire to change this situation has given the rise to community forestry (Baker and Kusel, 2003). In general, the need for a grass-roots approach for conservation and development helped initiate the community-based paradigm (Western and Wright, 2003). Community-based programs gained much attention during the 1970's when conservationist and community activists became disenchanted with the results of large-scale conservation and development projects (Kellert et al., 2000) that had limited success in achieving either conservation or development.

Community-based programs have gained much popularity around the world in the past two decades. The devolution of management responsibility to communities offered promise for greater effectiveness and efficiency (Wycolff-Baird et al., 2001) and benefits

for communities and natural resources. Conservation and development are frequently viewed as comprising opposite sides of the same coin, both conservation and development organizations have incorporated the "opposite" into policy (Campbell and Vainio-Mattila, 2003). The community-based natural resource management (CBNRM) template has spread globally from the successful implementation of programs in the sectors of forestry and wildlife management both in developed and developing countries.

In Zambia, the shift from the top-down model of management to a model of community participation and inclusion for conservation and tangible benefits for rural development gave rise first to the CBNRM approach in wildlife management (Wainwright and Wehrmeyer, 1998) and later spread to forest management (Bwalya, 2004) through a program known as Joint Forest Management (JFM). In hopes of reducing poverty in Zambia these CBNRM programs appeared attractive. Average poverty levels for the population are extremely high. Rural population poverty rates are more pronounced, especially those involved in agriculture and forestry.

Touted as the "True Africa" by the government, Zambia contains many unique peoples, ecosystems, and agricultural practices. This paper will explore these unique features of the country and provide in-depth background information on forest utilization, agricultural systems, and livelihood strategies.

Agriculture is the primary livelihood of Zambia's rural population and human interactions with forests for shifting cultivation has taken place for thousands of years and helped shape the forests as we see them today. Contemporary agriculture policies are to ensure food security through increased crop production and to build agriculture

capacity and competitiveness. However, this push to increase crop production and food security can often increase the rate of forest conversion for agriculture.

Miombo forests, a common forest type in southern Africa, that cover over 50% of Zambia are economically important for timber products, non-timber forest products, and contribute to local livelihoods by providing income, food security, reduced vulnerability to external change, and an increased well-being. These forests are essential for the rural poor in Zambia since many forest-adjacent households use miombo woodlands in their livelihood strategies.

However, there has been degradation of this forest type in Zambia. National policy has been aimed at combating deforestation and encouraging the sustainable use of forests and forest products obtained from miombo woodlands while promoting the improved status and livelihood of forest users. Efforts to address these issues have been attempted by the forestry and agriculture sectors in Zambia.

The Forestry Department has recently engaged in collaborative management called Joint Forest Management (JFM) in hopes of improving rural livelihoods, decreasing poverty, and conserving forested lands. Programs within the agricultural sector also have goals aimed at improving rural livelihoods, income, and sustainable land utilization for food security and poverty alleviation. Thus, the goal of this paper is to gain a better understanding of forestry and agricultural programs and policies and to critically evaluate these programs.

Specifically, this professional paper will investigate the forestry program of JFM and agricultural livelihood improvement programs in Zambia. Both JFM and agricultural programs will be analyzed individually and compared to each other according to key

criteria or indicators of success and failure for such programs, the challenges ahead, where these programs are most likely to succeed, how these programs are relevant to Zambia in terms of improving livelihoods, household and food security, improved income potential, and, ultimately, how effective these programs are at reducing poverty. Five key factors (socio-cultural, historical, institutional, design, and benefit) that influence program success will frame the analysis concerning improved livelihoods and poverty reduction. These programs are both government-initiated and this analysis will focus on national policies and institutions, but it is primarily directed at the local, rural level. These programs and the analysis of such programs is important and worth studying due to their relevance for rural populations, their livelihoods, and future well-being.


Figure 1: Zambia (CIA, World Fact Book) - modified to include Kaloko Village

I spent over two years living and working in this diverse country as a Peace Corps volunteer from May of 2004 until July of 2006. As a Forestry Extension Agent, I worked with the people in and around the small village of Kaloko in the Eastern Province of Zambia (see Figure 1) to help establish the JFM program and to disseminate information

on alternative agricultural practices and techniques for improved production and food security.

The experience of being a Peace Corps volunteer is grounded in being a part of local communities and understanding their wants, needs, and desires. This process was best articulated by Dasmann in 1977 in regards to international research:

> It involves learning the native language of the people who live in the areas that require long-term protection. It involves spending a lot of time talking with them, telling them your concerns, goals, and objectives, and listening to theirs. It means seeking with them ways in which these goals can be jointly achieved... this approach takes time and patience. For the most part, we have gone ahead, producing new generations of poachers, surrounding nature reserves with alienated people and generations, instead of embedding them within such reserves and encouraging the development of a friendly human environment of stewards and protectors. But we are finally beginning to change our ways (cited in Alcorn, 2005).

These comments are relevant to all researchers studying communities and natural resource interactions. Similarly, these comments are relevant to those assisting governments, their natural resource departments, and local communities for sustainable forest utilization.

The initiation of these programs in rural areas, my experience in these areas, and the varying levels of local participation, adoption, and the effects on local populations, has led to this analysis and comparison between JFM and agricultural programs presented in this paper. The analysis will judge these programs within the parameters of opportunities for improved livelihoods, food security, and poverty alleviation. First, there will be a description of each program followed by an analysis to understand the strengths, failures, and challenges faced by each of these programs. Finally, recommendations will be offered to existing forestry and agriculture programs.

Recommendations for these programs are directed at current and future processes in order to truly help rural communities.

This is a site specific evaluation of these programs in the Kaloko Village area based on two years of participatory observation and the use of key informants. Results and recommendations from this analysis may be useful in other regions of Zambia where JFM and agricultural programs are being implemented. It should be noted that this is a preliminary document that begs for further research and documentation to obtain a clearer picture of the realities surrounding these programs.

## BACKGROUND AND LITERATURE REVIEW

### Zambia

Zambia, located in south-central Africa, covers 752,614 square kilometers, which is approximately the size of the state of Texas, with a population around 11.5 million people. Roughly half of its population lives within urban areas, which is atypical of most sub-Saharan countries. Zambia's population consists of more than 70 Bantu-speaking ethnic groups and the major religions in the country are a blend of traditional beliefs and Christianity (U.S. Department of State, 2007).

The indigenous population of Zambia began to be displaced or absorbed by migrating tribes about 2000 years ago. The major migrations of Bantu-speaking immigrants began in the 15th century, but the greatest influx occurred between the late 17th century and early 19th century. This occurred primarily from the southern areas of the Democratic Republic of Congo and northern Angola, but also from the Ngoni peoples of southern Africa. By the late 1800's the various tribes of Zambia were largely established in the areas that they currently occupy today. Western exploration of Zambia accelerated in the mid-1800's and this was followed by a host of missionaries, traders, and profiteers. Word of Zambia's natural resources and the wealth that they could potentially provide soon spread.

Zambia was initially colonized not by a government, but by a company. The peculiar butterfly shape of Zambia is owed, of course, to the colonial scramble for Africa, but the first occupier in Zambia (then Northern Rhodesia) was the British South Africa Company (BSAC), which acquired rights throughout the region in 1889. The South African mining magnate, Cecil Rhodes persuaded the British government to grant a

charter to his mining company which sought to gain signatures from African chiefs throughout the country for protection and security against inter-African fighting and slave trade activities for the patronage of exploratory mining concessions (Grotpeter et al., 1998). The BSAC controlled Zambia administratively until 1924, when the British Colonial Office officially gained power.

Zambia became a republic on October 24, 1964 and a nationalistic era began. The rise of nationalism in southern Africa resulted from the exploitation of the majority by colonial domination and the white, minority rule. African nationalism advocated the development of contemporary African societies that would redress social, political, economic, and psychological damages that resulted from colonialism and its legacy (Tlou, 1997). By inheriting economic conditions and problems from colonial Britain (coupled with tenuous relations with Zimbabwe, then Southern Rhodesia, South Africa and European countries such as Britain and Portugal) (Gaily, 1981), Zambia, with economic and international relationships to manage, simply adopted former key colonial laws concerning land and natural resources with only minor modifications to those laws (Virtanen, 2003). This began to set the stage for natural resource exploitation. A prior history of colonialism has been shown to strongly limit the ability of a government to organize the use of natural resources as part of their development process (Feldmann, 2003).

The fledgling, independent country of Zambia sought to exploit the vast natural resources of its country. This primarily occurred in the mining sector and rich deposits of copper, cobalt, lead, and zinc were used to fuel economic expansion. Agricultural expansion was also encouraged for the country's food security, but also for potential

exports. The country's staple crop is maize (corn) and most of the land in agricultural production is used for maize. Sorghum, millet, sunflowers, cassava, and groundnuts (peanuts), are also grown. The primary cash crops include tobacco and cotton. The encouragement of agricultural expansion and extractive industries such as mining have aided in the conversion of indigenous forests.

The forests of Zambia are dominated by the miombo woodlands, which are an important source of timber and non-timber forest products. In Zambia, miombo woodlands cover 53% of the country and are the source for building materials, poles, firewood, and charcoal (Chidumayo, 2002; Chidumayo and Kwibisa, 2003). These forests are rich in biodiversity and are estimated to contain roughly 5500 species of flowering plants, 88 species of mosses, and 146 species of ferns. In addition, the faunal diversity is high with about 1330 vertebrate species consisting of 65 amphibians, 156 fishes, 145 reptiles, 731 birds, and 233 mammals (Mwinga, 1997). This wealth of biological diversity is important to Zambians because biodiversity provides values for consumptive use (used directly as food, fuel wood, shelter, fodder, and medicinal purposes), productive use (exploited by industry for the production of food, fibers, and energy), and non-consumptive use (ranging from cultural, spiritual and ethical values linked to biological diversity) (Mwinga, 1997).

Zambia's National Environmental Action Plan identified water pollution, soil degradation, air pollution, wildlife depletion and deforestation as the five environmental issues with the greatest social costs (de Queiroz, 1997). Mwinga (1997) echoes similar concerns for the sustainable use of natural resources, including biological resources, which are land degradation and soil erosion, deforestation, poaching and the over-

exploitation of wildlife, and the contamination of water and air from industry. These environmental issues have placed the nation-state of Zambia in a situation in which it is juggling the political, economic, social, and environmental needs of the country.

The global fall of copper prices and the fuel shortages in the 1970's hit Zambia particularly hard. Per capita annual incomes are currently about one-half of their levels at independence, which are presently at $627. This places the country among the poorest nations in the world. Social indicators also continue to decline. Life expectancy at birth is roughly 38 years and maternal and infant mortalities are high. The HIV/AIDS pandemic is also taking its toll on Zambia and HIV prevalence is formally listed at 16%, although it is likely that it is much higher. As mentioned, almost half of Zambia's population lives in a few urban zones and these are along major transportation corridors. These populations suffer from unemployment and underemployment (U.S. Department of State, 2007).

Poverty is widespread and severe in Zambia. Over 70% of Zambians live in poverty (Kapungwe, 2004). Living in poverty is typically defined as living on less than one USD (United States Dollar) per day. However, in Zambia, where most people have little monetary income, the concept of the minimum food basket is used to describe and measure poverty. People in rural areas can often go weeks or even months without transactions that involve currency. Maize is often the local currency. Maize is traded in exchange for food goods such as meat or vegetables for those that do not have animals or gardens; it is traded for services such as labor for work in someone's field, and; it is pooled within groups or communities to sell and purchase items. Thus, using a monetary system to measure poverty is often difficult. The concept of the minimum food basket in

the measurement of poverty assumes that individuals require a minimum caloric intake and level of food consumption (Kapungwe, 2004). This system is a better measurement of poverty since livelihoods and survival in most rural areas depends directly on food and not currency.

Studies have indicated that rural areas suffer a greater prevalence of poverty than urban areas. The estimated rate of poverty in urban areas ranges from 26-69% and 67-89% in rural areas (Alwang et al., 1996). The Poverty Reduction Strategy Paper produced by the Government of the Republic of Zambia (2003) puts the average poverty level at 73% with poverty in rural areas at 83% as compared to 56% in urban areas. Populations in rural areas involved in agriculture, forestry, and fishing recorded the highest incidence of poverty (Kapungwe, 2004). The true scope and depth of poverty in Zambia, quantitatively speaking, is difficult to grasp and measure due the size of the country, the remoteness of the rural population, and rural-urban, urban-rural migration patterns. The point is that poverty levels are high throughout the country, but significantly greater for those living in rural areas.

**Eastern Province of Zambia**

The topography of eastern Zambia is characterized by a flat to gently rolling landscape with altitudes ranging from 300 meters above sea level in valley bottoms to 1200 meters on the plateau areas. The most common soil types are loamy sand or sand Alfisols, interspersed with clay and loam Luvisols. Generally, the soil is sandy loam at 0-30cm depth and sand clay loam at 31-100cm depth. Parent material is typically a granitic basement layer of rock that is deformed by quarzites, gneisses and schists. Rainfall in

this area of Zambia is about 1000 mm per year with about 85% of this precipitation falling in four months, December through March. These rains saturate seasonally waterlogged, low-lying areas that are known locally as dambos that are encompassed by miombo. Air temperatures range from 15-18$^{o}$ C during June-July to 21-26$^{o}$ C in September-October (Phiri et al., 2004; Kuntashula and Mafongoya, 2005; Chidumayo and Kwibisa, 2003). Zambia is divided into three agro-ecological zones, Regions I, II, and III. The Eastern Province falls into Region I, along with the Southern Province, and this region receives the least amount of rainfall in the country (GRZ, 1997).

The tribal groups of Eastern Province are as diverse as the rest of the country. There are about 15 different language groups with Chichewa, Chinyanja, Chinsenga, Chitumbuka, and Chikunda being the most common. The vast majority of inhabitants in this area are subsistence and emergent farmers with little to no steady form of income. Many, but not all, have small gardens to grow vegetables primarily for consumption, but with occasional sales. Virtually everyone has a field for agriculture to grow food crops and cash crops, but not everyone has a garden area often due to poor ground water supplies in areas where gardens are located. Small-scale income activities include piece-work (hired labor), charcoal production, reed mat and basket weaving, broom making, beekeeping and honey selling, blacksmithing and tool making, vegetable gardening, beer making, and the selling of transported fish and meat.

The main agricultural products in this area include maize, groundnuts, cotton, and pumpkin, and, to a lesser extent, cassava, sorghum, beans, rice, sunflower, millet, and more recently soy beans, cow peas, and pigeon peas. The main farming practice is ridge cultivation and some are able to purchase fertilizer, but most do not have this input. All

farmers cultivate the staple food crop, maize, and most cultivate a cotton crop for income generation. This is usually their primary, and often only, income, which comes at one time of the year and in one large payment. Maize is often sold at a low price to make money to buy household essentials like soap, cooking oil, kerosene, and grinding mill fees, which then leads to a shortage of food reserves. People in the area, for the most part, harvest enough maize, even in drought years, for one year's consumption. However, after the income generated from the sale of a cash crop has been spent they sell their food reserves to cover the costs of household expenditures throughout the year. This, in turn, leads to food insecurity. Studies have shown that only 4-10% of the households surveyed in eastern Zambia had enough maize to feed their household members throughout the year (Ajayi et al., 2003). Poverty levels in the Eastern Province are at 81% (Kapungwe, 2004).

## Forest Ecology

### Structure and Composition

In Africa, forests and woodlands cover about 650 million hectares (21.8%) of the total land area and about 99% of the forests are natural with 1% being classified as plantations. Many forests are more important for the services that they provide (watershed protection and arresting land degradation) than they are for the conventional goods that they provide (Chikamai and Tchatat, undated). The forests found in Zambia are located within the Afrotropics biome, which consists of tropical and subtropical grasslands, savannas, and shrublands. Miombo forests are common in Africa and they consist of single-storied woodlands with a light, closed canopy, which is dominated by

trees of the genera *Brachystegia* and *Julbernardia* (Stromgaard, 1985). They cover an estimated 2.7 million $km^2$ in southern, central, and eastern Africa and in Zambia they cover 53% of the country and they are economically important for timber and non-timber forest products (Chidumayo, 2002; Chidumayo and Kwibisa, 2003) and create a variety of habitats for organisms.

**Management History**

The forests of Zambia have always been managed in some form or another. Traditional hierarchies have allocated and organized land activities for centuries. Then colonialism under British rule centralized the ownership and management of all natural resources. This started the process of labeling land and ownership rights. There are two land tenure systems in Zambia, customary and leasehold tenure. Customary tenure is an indigenous form of land ownership, which is also referred to as traditional African customary tenure and it has a communal character, in that the traditional leadership has management authority and rural citizens are allowed to utilize land for agriculture and use forests for timber and non-timber products. Leasehold tenure was introduced by the inclusion of Zambia to the world economy through colonialism. Leasehold tenure is usually held on land that is known as state land (GRZ, 2006); land that is in direct control by the Government of Zambia.

After independence all land became vested in the President who holds it in trust for the people of Zambia. Thus, the government owns all of the land in Zambia, but it can be managed in different ways. Today there are two types of land: state land and customary land. As mentioned above, state land/leasehold tenure is defined as reserved

or gazetted land (national forests, local forests, and parks), towns, and permanent commercial farms. Customary land means traditional land or "open land" (non-gazetted) where traditional chiefs and their village headmen decide on how the land is to be used. Sixty-two percent of the country falls under customary administration (GRZ, 2006; GRZ, 2005).

**Human Use and Livelihoods**

Tribal ethnic groups in Zambia have based their cultures and livelihoods around the collection and utilization of natural resources. The collection of wild plants, wild game, forest products, and non-timber forest products are an integral part of their agricultural activities. These activities are shaped by various social commitments and obligations in addition to the priorities for food and an income source (Marks, 2001). The general theme here, as well as in other parts of Africa, is that natural resources, including forests, are for the direct use and consumption by humans.

Zambia's forests have evolved with human interaction. Modern humans have lived in miombo woodlands for at least 55,000 years and through cultivation, grazing, consumptive harvesting, and burning, humans have played a key role in the modification and transformation of the landscape in miombo woodlands (Chidumayo and Kwibisa, 2003). The clearing of African forests may have begun more than 5000 years ago and traditional swidden agriculture, like small-scale disturbances, in forests can enhance biodiversity (Agrawal and Gibson, 1999). The creation of a mosaic in miombo woodlands due to agricultural disturbance can act to improve stand heterogeneity, structure, function, and overall diversity.

In contemporary eastern Zambia the population density varies between 25 and 40 persons $km^2$ (Phiri et al., 2004) and in rural areas these populations use natural resources directly and have helped shape these forest ecosystems. Most forests are, in fact, anthropogenic and humans have manipulated biodiversity and have influenced species composition and structure (Agrawal and Gibson, 1999) to enhance their livelihoods.

The term livelihood is defined as the capabilities, assets and activities required to achieve a means for living. A livelihood is only sustainable when it can cope and recover from stresses and disturbances, and maintain or enhance its capabilities both now and in the future (Carney, 1998). The role that forests play in supporting livelihood strategies in Zambia is immense. Obviously, forested areas are important to people for overlapping reasons. Forest conversion provides nutrient-rich land for agricultural activities, specifically for shifting cultivators to plant food crops; a farming system that has existed for thousands of years in Zambia. This gives them a food and an income source and creates land tenure. Forests and forest products also contribute to livelihoods by providing increased income, improved food security, reduced vulnerability, a more sustainable use of the natural resource base, and an increased well-being (Warner, 2000). This is critical for poor households in Zambia for some of the poorest forest-adjacent families obtain up to 80% of their livelihoods from forests (PFAP II, 2005a).

Increased income can arise from the sale of many forest products such as bushmeat and fuelwood. In Zambia, the major commercial forest produce from indigenous forests is charcoal, which is used by 83% of urban households (GRZ, 1997). Nationally, the present annual consumption of woodfuel is 7.2 million tons, of which two-thirds are used as fuelwood and charcoal in rural areas and one-third is used as

charcoal in urban areas (FAO, 2007). Household food security improves from the collection of forest resources such as fruits, mushrooms, honey, roots and tubers, caterpillars, termites, grasshoppers, and other small-game animals (GRZ, 1997: FAO, 2007). Forests reduce the vulnerability of households by acting as a safety net by bridging seasonal gaps, meeting particular needs, and helping households tide themselves over during long periods of shortage (Arnold, 2001; Warner, 2000; Bwalya, 2004). The degree of dependence on forests and forest products is higher for women and children, regardless of marital status and household size, and women collect most of the above-mentioned food items (Bwalya, 2004). Sustainable use of natural resources is critical for an individual's livelihood and the poor tend to be the most vulnerable to the effects of environmental degradation (Warner, 2000). Enhancing social and human capital contributes to the social well-being of an individual by heightening his or her's self-esteem, sense of control, and inclusion (Warner, 2000), but forests also improve physical well-being by providing medicinal plants. In Zambia, the inability of many people to reach modern health facilities strengthens the utilization of medicinal plants. Lastly, forest also help in maintaining livelihoods indirectly through watershed protection, grazing potential for livestock, live fences, windbreaks, and soil conservation (FAO, 2007).

**Disturbance**

It is estimated that there are about 33.5 million hectares of forest in Zambia and that Zambia loses about 850,000 ha of forest every year; only Brazil, Indonesia, and Sudan are losing more forest annually (PFAP II, 2005b). Another study has suggested a

much lower rate of loss (250,000-300,000 ha/year), but both of these estimates have been based on partial sampling and extrapolation and there has not been a national forest inventory since the 1960's. Deforestation has been running at approximately 5% a year since 1996 (PFAP II, 2005a; PFAP II, 2005b). It would be safe to say that there is not a clear understanding of just how much forest is being lost each year. The fuelwood industry is Zambia's largest forest industry followed by the saw-milling industry (FAO, 2007). This**,** coupled with the high pressure to convert forests into agricultural land**,** has accounted for such high rates of forest loss. A discussion of Zambia's disturbance regimes will now be discussed, in addition to the contested paradigm of shifting cultivation.

The primary disturbance regime in Zambia is that of agricultural disturbance. As mentioned above, there have been human interactions in Zambia for thousands of years that have helped shape miombo woodlands and this is from primarily agricultural conversion of these woodlands by way of shifting cultivation or shifting agriculture, otherwise known as slash-and-burn cultivation.

Almost all of the population in rural areas of Zambia practice some form of shifting agriculture. Shifting agriculture is the process by which forests are felled, cleared, and burned for agricultural fields. The area is cultivated for roughly five years and then is abandoned, usually due to decreased fertility, and then the farmer repeats the process of forest conversion in a different area to continue agricultural livelihoods.

In eastern Zambia, about half of the farmers practice ox cultivation and the other half cultivate by hand-held hoe. Average cropped land ranges from 1.1 to 1.6 hectares for hoe cultivators and 2.3 to 4.3 ha for ox cultivators (Phiri et al., 2004). Maize or corn

is the most common and important crop, accounting for about 60% to 80% of the total cultivated area. Other food and cash crops include sunflower, peanuts, and cotton (Phiri et al., 2004; Kuntashula and Mafongoya, 2005).

Different types of shifting cultivation are practiced in the miombo woodlands of Zambia and these have been blamed by the Zambian government for causing deforestation. Also, the high dependency of urban households for firewood and charcoal in many southern African countries, including Zambia, has contributed to deforestation (Chidumayo and Kwibisa, 2003). Increased population has also been theorized to contribute to deforestation. As a result, deforestation can occur from many different factors, but it is often shifting cultivation that receives the blame.

The paradigm that views shifting cultivation as negative, destructive, and unsustainable, even though it was once sustainable, has been readily accepted over the past 60 years. However, that idea is being challenged. The idea that it is unsustainable is based on increased population figures and reduced fallow time among shifting cultivators. This idea has been upheld due to increased population growth rates all over sub-Saharan Africa and documented evidence that fallow lengths have reduced due to population pressure in some areas. However, quite often these have become generalizations, exaggerations, and assumptions. For example, studies have shown that farmers use varying fallow lengths for different fields. This could be seen as pressure to produce food crops due to shrinking land availability. In actuality, it gives some indication of the degree to which farmers respond to differences in micro-ecology and the complexities involved in the shifting cultivation technique (Ickowitz, 2006). The point is that shifting cultivation has often been misdiagnosed as destructive and wasteful when it

is actually a beneficial disturbance practice for both forest ecosystem diversity and supporting local agricultural practices. Furthermore, it should be noted that this is an agricultural practice that developed independently on every continent with human populations.

It is not my intent to debate this paradigm within the context of this paper, but rather to show the complexities of shifting cultivation and the actors involved within agriculture and forest management and conservation. The point is that shifting cultivation has existed as the primary disturbance regime within miombo woodlands for thousands of years and has ultimately shaped them into what we see today. Furthermore, most miombo woodland species are highly resilient and have the capacity to regenerate vegetatively from resprouts and stumps after clear-felling and fires (Chidumayo, 2004). In every action there can be both positive and negative outcomes. It is my position that in a region that lacks a significant natural disturbance regime that human induced disturbance is a positive catalyst for diversity.

However, shifting cultivation, increased human population, and decreased fallow times can have a negative impact on forest resources. One only has to look next door to Zambia in Malawi to see the effects of these processes. Malawi now has the same population of Zambia (around 11 million) and the country is approximately the same size as just the Eastern Province of Zambia. Malawi has one of the highest population densities in Africa with land becoming the major farming system constraint, while in Zambia available labor primarily limits productivity. Accordingly, pressure on trees in the remaining natural forests and woodlands is approximately ten times higher in Malawi than in Zambia (Bohringer, et al., 2003). For example, under the slash-and-burn type of

shifting cultivation, where vegetation is clear-cut, the recovery of the miombo takes approximately 43 years (Stromgaard, 1985). This is not very long in the grand scheme of forest ecology and recovery, but with increased pressure this could become a concern. Thus, agriculture and forest exploitation in Zambia must proceed with caution to not replicate the conditions of its neighbor.

Fire is also an important ecological factor in the miombo woodlands of Zambia. Natural fire disturbance in Zambia is limited due to the subtropical climate. Lightning events are the predominant natural cause of wildfires in a typical fire disturbance regime. However, in Zambia, lightning events are most often associated with the timing of the rainy season and thus accompanied by large amounts of precipitation. Therefore, natural wildfires at the onslaught of the rainy season are infrequent. As a result, most fire disturbance events are human induced and occur after the rainy season during the hot and dry season, typically late-August to October. Many of these fires are started from land clearing activities such as shifting cultivation and often other fires are started in the forest to make travel easier for the collection of timber products, non-timber forest products, and local building supplies. These late dry season fires, as they are known, can do a large amount of damage to drought stressed miombo woodlands.

However, as mentioned, humans have been actively shaping this environment for thousands of years and these forests are adapted to this fire disturbance regime. These forests would be very different than they are today if there had not been a human presence in the area for thousands of years; a human presence that has historically used fire, much like the Native Americans in the Rocky Mountain west. Fire is a positive component of forest ecology in southern Africa and burning has been reported to increase

soil fertility temporarily (Chidumayo and Kwibisa, 2003) and thus its use in shifting cultivation as well.

The shaping of miombo woodlands due to a historical anthropogenic fire regime has generated some negative aspects as well. First, the burning of understory grass biomass significantly reduces the topsoil organic matter and nitrogen component and this has a great impact on topsoil nutrients (Chidumayo and Kwibisa, 2003), which are key in many ecological processes such as nutrient cycling, erosion control, moisture retention, pH balancing, cation exchange capability, and the overall fertility of the soil. In addition, it has been demonstrated that miombo woodlands, although shaped by fire, are ultimately fire-sensitive as opposed to fire-tolerant. They are susceptible to fire, and they can be destroyed by repeated late-season fires, which inhibit the regeneration of trees, leading over time to a loss of the tall canopy-forming trees of the genera *Brachystegia*, *Julbernardia* and *Isoberlinia* (Cauldwell and Zieger, 2000).

## Global Perspective of Community-based Programs

### CNRM, CBNRM, and CBC Program Description

Policies that remained in place after independence from colonial regimes in many countries continued to propel the notion of conservation as protection-against-people and hands-off management (Western, 2003a). However, recognition in the 1960's and 1970's of the mounting threats to the environment, the need for a grass-roots approach for conservation and development, and the human rights and indigenous peoples movements helped initiate the community-based paradigm for conservation and management (Western and Wright, 2003). Community-based programs gained attention during the

1970's when conservationist and community activists became disenchanted with the results of large-scale, capital-intensive, and centrally-planned conservation and development projects (Kellert et al., 2000) such as Integrated Conservation and Development Programs (ICDPs) that had limited success in achieving both of its stated goals.

For the purpose of this discussion, community natural resource management (CNRM), community-based natural resource management (CBNRM) and community-based conservation (CBC) will be used synonymously since they have common goals and objectives. Various expressions of community-based programs include social and community forestry, community wildlife management, cooperative or co-management, buffer zone management, participatory multipurpose community projects, and communal area management for indigenous resources. The examples often have subtle, yet important, differences, but all share certain characteristics (Kellert et al., 2000). Broadly speaking, the primary objectives of these community-based programs are to enhance biodiversity conservation and to provide incentives for local people, usually economic (Campbell and Vainio-Mattila, 2003). The main assumptions for community-based programs include:

- local populations have a greater interest in the sustainable use of resources upon which their livelihood or cultural survival rests than the state or distant managers (Brosious et al., 1998; Belsky, 1999; Kellert et al., 2000)
- local communities have experimental knowledge of the intricacies of local ecological processes and practices and that traditional values and ecological knowledge should be used in modern resource management (Brosious et al., 1998; Belsky, 1999; Kellert et al., 2000)
- local communities are more able to effectively manage those resources through local or traditional forms of access (Brosious et al., 1998).

The primary goals and characteristics of community-based programs include:

- devolving power and authority from central and/or state governments to more local scales such as indigenous institutions and populations provides ownership (Kellert et al., 2000; Wycolff-Baird et al., 2001; Goldman, 2003)
- to link and reconcile the objectives of socioeconomic development and environmental conservation in a win-win approach that has tangible benefits for local peoples and the environment (Kellert et al., 2000; Bwalya, 2002; Bwalya, 2003)
- to defend and legitimize local and indigenous resource and property rights (Kellert et al., 2000)
- participation among multiple stakeholders across many different scales (Wycolff-Baird et al., 2001).

Community-based programs have gained popularity and momentum around the world in the past two decades. Where state sectors involved in natural resource management demonstrated weak technical capacity and were portrayed as top-heavy and riddled with corruption, the devolution of management responsibility to communities held high promise for greater effectiveness and efficiency (Wycolff-Baird et al., 2001). Due to the successful implementation of such programs in the fields of wildlife management and forestry, the CBNRM template has spread globally, both in "developed" and "developing" countries. In southern Kenya, the integrated approach to wildlife conservation and development at the Amboseli National Park impacted national policies in many countries in southern Africa, including Zimbabwe, Namibia, and Zambia (Western, 2003a). The CAMPFIRE program in Zimbabwe (Metcalf, 2003; Murphee, 2005) is another success story that is well-touted for community wildlife management. CBNRM in the field of forestry has had acclaimed success in Mexico (Bray et al., 2003) and the United States (McCarthy, 2005).

**CNRM, CBNRM, and CBC Program Discussion**

With the widespread use of CBNRM programs globally there are bound to be struggles and failures. The critics of community-based programs are right to point out these failures and they have legitimate concerns. However, most of the problems that have occurred resulted because of poor or improper implementation, the use of erroneous assumptions, or the failure to clearly define the CBNRM paradigm within institutional frameworks and governance structures (for example: What is community? How should it be defined and by whom? What is the scale?).

Poor implementation of CBNRM (for example, incomplete or partial devolution of management authority) is a way that central governments retain control and influence in CBNRM projects. This suggests that devolved management from governments to communities can reflect more rhetoric than actual substance (Goldman, 2003). Natural resource departments in governments that claim to be serving the public interest often use scientific management to justify continued central control over natural resources (Shackleton et al., 2002). The perpetuation of scientific management draws clear lines between the professional and the unprofessional, reinforces the tendency to disregard the local users and their knowledge, and will choose "for the resource" when confronted with a conflict (Fairfax and Fortmann, 1990). Furthermore, governments can devolve decision-making authority over a resource, but retain enforcement authority (Wycolff-Baird et al., 2001). Thus, communities can, incorrectly, be seen as responsible for a program's limited success or failure.

The assumptions that communities are stable, homogenous, have a local scale, and likely to preserve their ecosystems out of self-interest are dangerous. Transferring

control to “the community” isn’t necessarily ensuring that resource use will benefit all of the members of a community in equitable and sustainable ways (McCarthy, 2005). Communities are difficult to define and their definitions are often nebulous depending on who defines them, for example, a state government or the communities themselves. The “mythic community,” one defined as having a small spatial structure, a homogenous social structure, and shared norms are typically incorrect and CBNRM programs that use this definition likely to encounter problems during implementation (Agrawal and Gibson, 1999; Brechin et al., 2003).

The scale of defining a community is also problematic. Defining a community by place on the basis of proximity to a natural resource seems logical, but there are complications for such a local scale. Ecological processes that require management occur on a local scale, but also a landscape, regional, national, and international scale. Furthermore, concerning a natural resource, there are often communities of place, communities of use, and communities of interest. People living within or adjacent to a natural resource that is managed by a community of place must also interact with communities of use (those people that don’t live within the resource, but use it to maintain their livelihood) and communities of interest (those that neither live within the resource or use the resource, but have an interest in the sustainability of the resource, for example, conservation organizations). All of these different communities at different scales all have an interest and a stake in the resource and involving all of these stakeholders and getting participation from these stakeholders can be difficult (McCarthy, 2005).

People have varying levels of participation within these different scales of community. If individuals, groups, or communities choose not to participate then their voices are not heard. Or, perhaps, through participation, people gain voice on a democratic platform and gain greater say in management then there is the possibility that rural democracy could promote, through democratic means, the loss of natural resources as rural people gain a greater say in land-use decisions (Hackel, 1999). On the other hand, the devolution of power and management authority given to communities can be grabbed by local elites and the participation of certain individuals, groups, or communities can eliminated or they can steer the management of the resource for their gain (McCarthy, 2005; Shackleton et al., 2002; Wycolff-Baird et al., 2001).

Lastly, the concept of conservation is ambiguous within the CBC/CBNRM/CNRM paradigm. Different stakeholders have different definitions of conservation and what is worth conserving. Conservation is a human enterprise comprised of social and political processes and its goal of maintaining a variety of levels of species and habitats to ensure biodiversity for the future of our planet is paramount (Alcorn, 2005). Conservation implies restraint by resource users and biodiversity protection will only occur through human institutions such as laws, organizations, or cultural practices that control the behavior of individuals. Control or moderation of exploitation typically happens through a combination of self and externally imposed enforcement and the key to this is legitimacy. Legitimacy refers to any behavior or grouping of circumstances that a society defines as just, correct, or appropriate (Wilshusen et al., 2003). Those that define conservation (resource users, governments,

international conservation organizations) can, ultimately, shape how resources are used and who uses them.

For all of the above mentioned reasons, community-based programs have faced serious, and often legitimate, critiques and challenges. Since many community-based programs around the globe are still in their infancy they have not yet achieved their stated objectives of conservation and community development this, in turn, has allowed for the resurgence of the old protectionist paradigm. However, these arguments for a return to top-down, heavy-handed patrol and management of natural resources have largely ignored key components of social and political processes that shape how conservation measures are undertaken in specific contexts (Wilshusen et al., 2002) including moral positions, legitimacy, governance, accountability, learning processes, and nonlocal forces (Brechin et al., 2002).

These kinds of concerns are warranted for often there is so much at stake: the livelihoods and survival of communities, the conservation of biodiversity, the economic prosperity of a state, and the political dimensions that can affect of these. By considering all of the assumptions of CBNRM, the history, rise, and continuing evolution of the CBNRM paradigm, one can gain an understanding of the challenges involved in specific community-based programs.

**Forest Management Programs**

Community-based forestry programs follow the same theoretical tenets of CBNRM by allowing access, receiving tangible benefits, involving local stakeholders through participation, collaboration, collective action, and sustainable use. Like

community-based programs in general, forestry programs have been given multiple names. For the purpose of this discussion, the terms social forestry, community forestry, co-management, and joint forest management will be used synonymously since they fall under the umbrella of community-based forest management programs.

The rationale behind community involvement in forest management is based on a community's proximity and impact on the resource, their livelihood dependency, local governance structures, equity, cost-effectiveness, and the interest in protecting biodiversity. After all, anyone who makes daily decisions about forest utilization based on their knowledge of the resource and shared values could be considered a manager (Fairfax and Fortmann, 1990) and should be involved in management decisions. Community forestry has been defined by the FAO as "any situation that intimately involves local people in forestry activity," and thus covers a range of linkages between people and forests (Arnold, 2001). In the 1980's the concept of management of forests jointly for conservation and development gained momentum due to the acknowledgment that the centralized management of forests has largely failed in its primary objective of conserving the productive and protective values of forest resources (Arnold, 2001). If states and NGOs had been able to keep local people out of ecologically sensitive areas by force, they would have settled for that in many cases so community forestry has been approached often out of necessity. Community forestry has allowed local users, once expelled from areas, to return, control, and manage forest resources (McCarthy, 2005).

The most unifying feature of community forestry is the attempt by people to reorder the relations among and between themselves, and the forests on which they depend on, in a way that both promotes or improves the forest condition and enhances the

community's well-being (Baker and Kusel, 2003). The reordering of social relations between stakeholders often comes in the form of collaboration, which is a core community forestry theme.

Collaborative systems range from situations of full control and ownership of the forest through a community forest program to situations that do no more than create or legitimize limited local rights to usage. Co-management through collaboration has become prevalent because it offers advantages to communities (as discussed above), but also advantages to the state by: enabling governments to continue to exercise a regulatory role, shifting the responsibility and cost of forest protection to the local user communities, and facilitating investment and technical assistance thereby strengthening local institutional capabilities (Arnold, 2001).

The danger is that governments can continue to exert a great measure of control. For real *community* forestry to occur there must be a balance of power and control between the main actors (Arnold, 2001). In addition, genuine collaboration cannot take place when some aspects of management are non-negotiable by the state. Lastly, the state may avoid their responsibility for difficult or unpopular decisions by wrapping themselves in the positive idea of "community" (McCarthy, 2005). With this said, there have been tremendous successes in community forestry in Mexico (Bray et al., 2003), Nepal (Gauli and Rishi, 2004), and India (Arnold, 2001).

A key feature of community forestry is that it is a land use system. Forested areas in many areas of the world function simultaneously as areas for the collection of daily household needs such as fuelwood, food items, income, and non-timber forest products, but primarily serve as areas for agriculture. It is in this light that community forestry

projects can have as much to do with agriculture and agroforestry systems as with forests by themselves (Arnold, 2001).

## METHODS

As a Peace Corps volunteer in Zambia from May 2004 until July of 2006, I lived in a small village in the Eastern Province and worked as a Forestry Extension agent. The primary goals for this position were to work with host national counterparts in establishing Joint Forest Management (JFM), promoting appropriate and improved agricultural techniques, income generating activities, food security, and environmental education. The scope and breadth of this program was vast, but it became apparent that food security and income generation opportunities were issues that were the most salient for rural communities. Working with the Forestry Department (FD) to establish community-based natural resource management (CBNRM) and working with local farmers for improving food security dominated most of my efforts. Considering that JFM and agricultural improvement programs are both designed at reducing rural poverty levels, I evaluate these programs as to their effectiveness at achieving their stated goals.

After returning to the United States I conducted an extensive literature review. Scholarly journals, books, and government documents were consulted to further understand these topics. Gray literature such as conference proceedings and working papers was also studied. Internet searches also provided information on various research organizations, development institutions, and Non-Governmental Organizations (NGOs) working in the fields of community forestry and agriculture. Finally, I reviewed my personal journals, progress reports, and program evaluations for additional information on these topics.

In my literature review, I discovered that there was little scholarly information on JFM within Zambia. Improved agricultural techniques were bountiful in journal articles,

but evaluations on the overall implementation of these techniques were also sparse. Therefore, the evaluation of these programs draws from literature on CBNRM programs and agricultural programs from adjacent countries, similarly designed CBNRM programs, agricultural research, and personal ethnographic insight and experience from my involvement in these programs and relationships with both forestry and agriculture programs.

I lived in the small village of Kaloko in Petauke District, which contained 72 households with a total population of approximately 320 people. Every household was engaged in agriculture and the collection of forest products for their livelihoods. Most could be classified as subsistence or emergent farmers (farmers that are able to produce beyond subsistence levels). Approximately 20% of the households owned cattle for agricultural activities. This village and larger area was dominated by the Nsenga people. Although there are over 70 Bantu-speaking ethnic groups in Zambia, livelihood strategies among most rural peoples are grounded in agriculture and forest utilization.

I was directly involved with the forestry and agriculture departments and assisted them in their efforts for rural extension. I also had personal extension efforts in these sectors in and around the Kaloko area. I was often an attendee at government and NGO-initiated events such as workshops, trainings, and community meetings. Finally, I used 14 key informants in my village, the surrounding area, and government staff at the district, provincial, and national levels. These individuals were from various socio-economic levels within the village and urban areas and provided me a full spectrum of information concerning these topics.

Thus, I used my unique experience of having lived in Zambia and my knowledge of forestry and agricultural programs to evaluate them on their ability to reduce poverty in rural areas. Both JFM and agricultural programs were analyzed individually and compared to each other to distinguish the criteria or indicators of success and failure for such programs, how these programs are relevant to Zambia in terms of improving livelihoods, household and food security, improved income potential, and the effectiveness of these programs at reducing poverty based on levels of local participation, adoption, and the resulting effects on local populations.

There are some limitations in these methods. The academic literature on these topics was limited, especially for JFM, and the insights drawn from some of the gray literature could be biased, inaccurate, or skewed. For these reasons, an analysis and comparison of JFM and agricultural programs in Zambia warrants further study.

In summary, I have attempted to remain objective in my assessment of these programs, but this paper is largely reflective and may be influenced by my interpretation of events. Although I lived in Zambia for two years, which allows for a degree of insight into the culture, lives', livelihoods', problems', and challenges of rural peoples, my interpretations are still those of an outsider in a country that is greatly different from my own and there may be cultural and social aspects that I was not aware of or did not recognize.

## CBNRM IN ZAMBIA

Customary resource management regimes throughout sub-Saharan Africa lost many of their regulatory and authority mechanisms because they were undermined by colonial and, subsequently, post-independence policies. Current people-centered approaches in southern Africa are trying to reverse the erosion of customary systems and rights (Mosimane and Aribeb, 2005). Within the last two decades, Zambia has changed national policies and legislation with the goal of decentralizing natural resource management to local structures and communities and the first of these people-centered approaches was in the realm of wildlife management and later spreading to forest management (Bwalya, 2004). While it is not the purpose of this paper to focus on community-based wildlife management, much can be gleaned from wildlife management programs that provide insight into current forestry programs discussed below.

One such wildlife management program that I will explore is the Administrative Management Design (ADMADE) used in Game Management Areas (GMAs), which are semi-protected areas adjacent to national parks within Zambia. Historically, the use of wildlife as an economic development tool in Africa has been long. The ivory trade throughout a majority of Africa is a historical example of the direct economic benefits of wildlife. In contemporary Africa, wildlife is an economic tool at the disposal of utilitarian, national decision-makers that view wildlife as a resource to be developed for direct national economic gain (Matowanyika, 1989). Tourism and safari hunting are attractive to economic development proponents, but this national development process tends to favor different groups (e.g. the state vs. local communities) both temporally and spatially.

A shift from the top-down model of management to a model of community participation and populism for conservation to produce tangible benefits for rural development gave rise to the CBNRM approach to wildlife management in Zambia (Wainwright and Wehrmeyer, 1998). The Zambian government, in collaboration with donors and international conservation agencies, adopted the school of thought that contends that wildlife conservation and utilization are viable economic land use options for rural areas rather than more traditional land-use practices (Matenga, 2002). However, the community-based approach to wildlife management rests on its ability to change local behavior and practices to ways that achieve conservation and community development that are often predetermined or defined by outsiders (Gibson and Marks, 1995). The CBNRM approach was first attempted in the early 1980's in the Lower Lupande GMA as a pilot project supported by the Wildlife Conservation Society. The successes in addressing the increasing pressure on the biological resources of the country's national parks and the local communities' complaints that they were not receiving benefits from the parks led to the adoption of a nation wide parastatal organization in 1988 known as the Administrative Management Design (ADMADE) for GMAs (Kramer et al, 2002).

The basic premise of the ADMADE program is that local residents of GMAs would provide assistance for conserving wildlife in Zambia if they were provided a share of the revenue benefits from the commercial uses of wildlife in their area. This community-based conservation program is predicated on the involvement of local residents as part of the decision-making process, returning the revenues generated from protected areas for investment in the local economy, and to establish a system of user rights with defined access to wildlife resources (Mwinga, 1997). In exchange for

protecting habitats, communities are allowed to derive revenues from the harvesting of game animals. The primary mode of income generation stems from the hunting of wildlife contained within a community's GMA by safari clients and this was to be regulated by the communities involved in the ADMADE program.

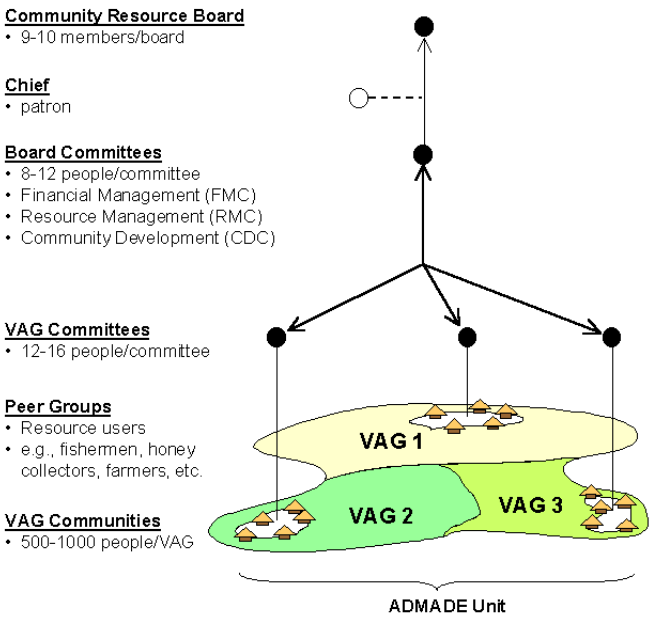


Figure 2: ADMADE structure (Lyons and Lewis, 1999)

The initial startup phase of the ADMADE program was not without its problems, however. The chores of decentralizing wildlife management activities, as well as facilitating community participation in the program were difficult obstacles due to legislative constraints. Local organization, community participation, and the transparency of government and local activities and fiscal managements were concerns of participants in the program (Kramer et al, 2002). New legislation helped rectify these problems with a revision to the Zambia Wildlife Act of 1998, which transformed the National Parks and Wildlife Service into the Zambia Wildlife Authority (ZAWA) to serve in a supervisory role within the ADMADE structure. It was in hopes that by enacting various components into the Wildlife Act that the ADMADE program would be legitimized (Matenga, 2002). The ADMADE program appears to be a devolved, decentralized, collaborative, participatory, democratic, and inclusive institution. The structure of the program is as follows (see Figure 2): The ADMADE process is driven

largely by a community organization which is structured through village area groups (VAGs) based on geography and demography. At the head of the organization is the Community Resource Board, legally recognized under the Zambia Wildlife Act, which is composed of local residents that must meet certain certifiable qualifications before they are democratically elected to prioritize development needs, manage the revenue from safari hunting, and to oversee resource management activities. Traditional chiefs serve as patrons to provide cultural and social stewardship to ADMADE activities by ensuring harmony and accountability of the elected leaders. The traditional powers of the chief are formally recognized and greatly respected within the ADMADE structure. On the next level are three technical Board Committees, composed of local residents, which advise the Community Resource Board on issues of resource management, community development, and financial management. A ZAWA officer trained in CBNRM skills is stationed in each ADMADE area and this official supervises residents employed by the Community Resource Board such as village scouts. Village scouts monitor animals, protect wildlife from its illegal use, assist local farmers in guarding crops from problem animals, and educate members of the community about the ADMADE project (ADMADE, 1999).

ADMADE receives more than 90 percent of its revenues from safari hunting concessions and hunting fees (Matenga, 2002) and the funds derived from these legal licenses and harvests are shared according to a specified formula: 40% for local wildlife management, 35% for community development, and 25% is retained by the national government (Marks, 2001). The funds generated by safari hunting are managed by a centralized revenue collector known as the Wildlife Conservation Revolving Fund

(WCRF) which retains the initial earnings from each ADMADE unit and distributes these funds the following year (Lewis, 1993) to the Community Resource Board according to the formula outlined above.

At face value, ADMADE appears to be a visionary approach to conserving wildlife and promoting community participation and involvement. Proponents of the program claim that it has been successful in seeking outside sources of revenue, for example, from the U.S. Agency for International Development (USAID) and the Wildlife Conservation Society for financial support and it has improved the enforcement and planning within the GMAs (Kramer et al, 2002). ADMADE offers: community empowerment and participation, local decision-making and leadership, incorporates the traditional/cultural hierarchy, direct community benefits, creates ownership and positive attitudes towards conservation, employment opportunities to villagers, reforms poachers, provides education, reduces the tensions between the government and communities, forms food security and land use committees and offers revenue to develop community services and to develop other community-based services (ADMADE, 1999).

Critics of ADMADE contend: that it is dependent on tourism and safari clients, the start-up costs are high, the traditional authority (chief) is incompatible with a democratic citizenship, the colonial legacy has shaped it and thus its legitimacy is questioned, it is technocratic and authoritarian, the revenues are disproportionately shared, there are few permanent jobs, it creates land use conflicts, and the budgets are mismanaged (Virtanen, 2003). There will always be opponents of a program that attempts to satisfy or integrate conservation with development, but the critiques raised above are valid concerns when livelihoods for local inhabitants may be compromised.

**Joint Forest Management (JFM) Inception**

Community-based forest management has followed a similar course as ADMADE in Zambia. Organized forestry in Zambia, then Northern Rhodesia, started in 1931 as a unit within the Department of Agriculture until it was recognized as an independent unit, the Forestry Department, in 1947 (PFAP II, 2005a). Legislation that was passed during the colonial period and laws that were largely left unchanged after independence led to the dissatisfaction of local communities that the profits of forest products, much like wildlife as discussed above, were not benefiting local populations. Furthermore, forests were disappearing at an alarming rate. Fundamental policy and legislative changes have since been made by repealing the Forest Bill of 1964 and 1974 and by molding a new forest policy (Bwalya, 2004).

Due to these policies, communities and government officials have considered forest ownership and management as the responsibility of the government and foresters have usually acted as forest "police" that prevent people from utilizing forests and their products, which has made communities fearful of entering forests (PFAP II, 2005b). With the rise of CBNRM in Zambia in the wildlife sector, it was likely that CBNRM in the forestry sector would emerge. In 1996, the Zambia Forest Action Program (ZFAP), an investigatory body created to address forest management principles, concluded that the current Forestry Department was too depleted and inflexible to be an appropriate management authority for Zambia's forests in the 21$^{st}$ century. Also, it identified the need to begin the process of devolution and empowering those living close to or involved with the forests.. The recommendations by ZFAP were then developed into the Zambia Forest Policy of 1998 and the Forests Act of 1999 (PFAP II, 2005a).

Participatory forest management experiences in Zambia were drawn from other countries, namely Tanzania. However, compared to Tanzania, decentralization has not progressed as far and local government institutions play a smaller role. The Provincial Forestry Action Programme Phase I, which was funded by the Finnish government, was largely an information gathering procedure to evaluate the likelihood of JFM implementation and success was valuable in formulating the Forests Act of 1999 (PFAP II, 2005b).

The Forests Act of 1999 was instrumental in supporting the role of communities in collaborative, participatory forest management for in many situations the greatest need in forest management is for policy and legal frameworks that legitimize the participation by poor user groups in co-management of the resource and provides mechanisms to put this in place (Warner, 2000). Most notably, the Forest Act of 1999 establishes the following:

- the creation of the Zambia Forestry Commission to replace the Forestry Department as the administrative body for the Act
- the establishment of Joint Forest Management
- the participation of local communities, traditional institutions, NGOs and other stakeholders in sustainable forest management
- the conservation and use of forests and trees for the sustainable management of forest ecosystems and biological diversity (GRZ, 1999).

Furthermore, of primary concern to communities, is the concept of revenue sharing. Within the Forests Act of 1999, there are stipulations that the Forestry Commission will share the financial benefits of forest utilization with communities that are involved in the JFM process. Revenue sharing, at this stage, is still somewhat unclear due to the status of land ownership. 7.2 million hectares of Zambia's 33.5 million hectares are gazetted as national or local forest with the remainder legally referred to

customary land (village land). JFM can only be exercised in local forests and on customary land.

Most natural forests are located on customary lands, which are far from government offices the government is viewed as an "absentee landlord." The lack of intimate knowledge by government officials and forest extension officers of forest resources in these rural areas means that local forest management will be less expensive if managed by the local communities than by the Forestry Department (Bwalya, 2004). These issues are cause for concern. In addition, the entire Forests Act of 1999 itself is not yet fully operational. Thus, the financial benefits that are supposed to accrue from forest utilization and then shared with the communities are not being realized in most areas. A detailed critique will follow in a later section.

**JFM Goals and Objectives**

The Ministry of Tourism, Environment and Natural Resources (MTENR) has the mandate to provide an environmental policy framework, monitor, evaluate, and coordinate its implementation, to ensure the protection of the environment, sustainable development, and the management and utilization of natural resources for the benefit of the present and future generations. The Forestry Department, following under the MTENR is mandated by law to protect and promote the sustainable use of forests and forest resources, which includes combating deforestation (FAO, 2007). Following this theme, PFAP Phases I and II defined their objectives and goals to provide "improved livelihoods and status of forests in Zambia" (PFAP II, 2005a). This has been a common motif of community-based forestry programs. Approaches to rural development

expanded from the idea of meeting "basic needs" to the recognition of the importance of income in securing household "food and livelihood security" (Arnold, 2001). Simply put, the strategy of JFM is grounded in improving the management and quality of the forest by community involvement and to contribute to improvements in the livelihoods of the communities (PFAP II, 2005b); and, according to the government, "experience so far shows that it can really improve people's lives in rural areas" (GRZ, 2005).

**JFM Process and Implementation**

The JFM process, structure, and implementation are very similar to ADMADE, as discussed above. The steps for starting a JFM program in a forest are as follows:

1. choosing a forest
2. making a formal application
3. getting the application verified
4. mobilization
5. initiating the first action plan
6. writing a memorandum of understanding (MOU)
7. declaration
8. preparing the JFM plan (GRZ, 2005).

A detailed description of each step in the process will now be discussed.

Step 1: Choosing a forest can be made by local communities, a group of individuals, an NGO, or the Forestry Department. This step is to identify the area for JFM, to inform the traditional leadership, namely the chief and local headmen, and the communities to affirm that there is local support for the idea of JFM. The criteria for selecting a forest for JFM are:

- the community is interested in keeping the area **as a forest** and **not for agriculture**
- if there are **settlements or fields** in the forest, the community and the local Chief are willing to discuss the issue
- the local **Chief** supports the idea of JFM in his area

- the **community** agrees where the boundaries of the forest are (bold within document).

All of these criteria must be confirmed before proceeding with JFM implementation (GRZ, 2005).

Step 2: Making the formal application involves communities, people who represent the communities, or other interested parties having to write and submit a letter to the Forestry Department asking for assistance with the creation of JFM in their area.

Step 3: The process of getting the application verified involves a group of individuals from various institutions such as the Forestry Department, the local government (in this case, the District Council), someone representing the chief, individuals from the communities of interest in JFM, NGO representatives, and field officers from other government departments such as the Ministry of Agriculture and Cooperatives. These individuals will inspect the forest and collect data on the forest itself, the uses of the forest by communities, the boundaries for the JFM area, the villages that are adjacent to the forest, and local interest and support. They then formulate a general plan and these parties have to agree on where the funds for inspection will originate. They will then provide a report that interprets the results of their findings, how feasible it will be to start JFM in the area, and describe the boundaries for the JFM program (GRZ, 2005). An important note here is that Forestry Extension Officers should deal directly with communities in the implementation of the JFM process at the local level, but they are few in number at present (FAO, 2007).

Step 4: After the application has been approved the mobilization of the interested parties (traditional leaders, village members, NGOs, government departments, etc.) occurs. The purpose is to inform everyone involved of the JFM process, to discuss the

procedures involved, and to clarify the expectations of communities and the Forestry Department. The process of electing members in various committees and user groups begins here (GRZ, 2005).

As mentioned above, this is very similar to the ADMADE program (please refer to Figure 2). The bottom level of the management structure begins with the formation of Village Resource Management Committees (VRMCs) usually composed of 15 members. These are similar to VAGs in composition, which are supposed to be elected by the community and the village headman is usually a member. Multiple villages within short distances may be consolidated to compose the VRMC based on proximity. However, there is a certain amount of doubt in the real nature of representation since instances arose where just a few villagers attended the elections for the VRMCs and the whole process appeared to be artificial (PFAP II, 2005b).

The VRMC membership is composed of a village headman, user group representation, and a forest guard. User groups in the ADMADE structure are referred to as peer groups. User groups consist of people that are engaged in specific forest products or forest utilization. Some of the most common user groups include firewood collection, medicinal plant collection, timber production (pit-sawyers), wood carving, beekeepers, mushroom collection, and clay pot production. There could be other user groups depending on how communities use the forest and the items that they produce.

Following the election of multiple VRMCs in an area proposed for JFM, members from each VRMC are elected to represent their VRMC in the Forest Management Committee (FMC) along with individuals that represent the chief, the FD, and the District Council. This FMC is similar to the Community Resource Board in the ADMADE

structure. Forestry personnel are responsible for facilitating the elections of these committees and providing training courses community strengthening, facilitation and leadership shills, group mobilization, conflict management, gender sensitization, HIV/AIDS awareness, constitution and by-law formulation, and book-keeping and financial management (PFAP II, 2005a).

Step 5: After the election of committees, a simple action plan must be prepared. The action plan describes what should happen over the first two years and should concentrate on important activities such as meetings that need to occur, details of what will and what will not be allowed in the forest, guidelines for noncompliance of these forest rules, a statement of how any squatters or fields in the forest will be handled, and limits for the amount of forest products that can be taken from the forest. In addition, administrative details should be included that describe who will be responsible for these activities, rules for the management of any funds that may come from the area or be given to assist with JFM, and details of the fees for using forest products and the fines for offences (GRZ, 2005).

Step 6: A Memorandum of Understanding (MoU) is then agreed upon by local communities, the chief, and the Forestry Department. It is a document that establishes the rules on forest use and who has the right to use the forest. Information found within the MoU primarily comes from the community's action plan and constitution (GRZ, 2005).

Step 7: The MoU is then submitted and the Ministry of Tourism, Environment and Natural Resources declares the forest a JFM area. The land status of the area, either local forest or customary land, will not change and if arrangements deteriorate (for

example, a community's desire to withdraw from the program) a local forest will continue to be controlled by the Forestry Department and customary land will continue to be controlled by the traditional leadership (GRZ, 2005).

Step 8: The FMC prepares the JFM plan in close cooperation with VRMCs, traditional leaders, communities, and other key stakeholders involved. The FD provides technical assistance in preparing the plan such as harvest calculations for sustainable use. The JFM plan includes information that wasn't in the first action plan and should contain all of the pieces of information that is needed to manage the forest. The JFM area is then gazetted and the JFM plan becomes law. Thus, it is now legally binding and the activities and rules in the plan are to be followed by everyone involved (GRZ, 2005).

**Roles and Responsibilities**

Individuals and communities in and around JFM areas are expected to follow that rules that were laid down by committees in their by-laws. Most people in rural Zambia are not used to following regulations concerning forest use. Therefore, long lists of "don'ts are easy to put in by-laws initially when communities favor strict approaches, but if people feel the hand of their own rule then they may not follow it (PFAP II, 2005b). It is the responsibility of the forest resource guard that was elected by the communities to enforce the by-laws. To give them legal powers they are gazetted as Honorary Forest Officers by the MTENR, but they are not employees of the FD and do not receive a salary. Their main responsibilities are to patrol the forest, inform people of the importance of forest management, monitor forest products and their use, organize people to suppress late-season fires, and to report to the VRMC on their activities.

VRMCs are responsible for involving people in the marking of forest boundaries, marking trees to be cut, organizing JFM meetings and activities, resolving conflicts, reporting to the FMC, producing plans and budgets, and issuing licenses and permits and collecting the funds from such permits (GRZ, 2005). In rural areas, it is unrealistic for people to travel a long distance to the Forestry Office to obtain a license for small-scale utilization or for FD officers to travel to JFM areas for licensing (PFAP II, 2005b). Giving responsibility to communities to issue permits solves this problem both for resource users and FD staff.

FMCs primary role is to manage and develop the forest properly, to manage the finances for the JFM area (assure money is being is being collected from the VRMCs and distributing the benefits of the forest are properly shared in the local community), and approving plans and changes made to the by-laws by the VRMCs (GRZ, 2005). The role of the FD is to coordinate and monitor JFM activities and provide leadership and encouragement to those engaged in JFM. The District Council's role is to provide institutional legitimacy to the process. The extent to which District Councils have been involved varies somewhat, but their participation has generally been low (PFAP II, 2005b).

**User Groups**

Individuals within a community use the forest in different ways. The rise of user committees or user groups gained widespread adoption in the mid-1990s in many less developed countries to give ordinary people a voice at the local level (Manor, 2004). The process of forming user groups takes this into consideration. The composition of

VRMCs was initially thought to include broad-based community representation, but after some trials of JFM in pilot areas most of the forestry field staff agreed that the user group approach was preferable since they are more likely to include motivated people (PFAP II, 2005b). The majority of membership in a VRMC are people that represent different user groups, as discussed above. Once user groups are formed they can be responsible for the day-to-day management of the parts of the forest that they use, they can suggest ways to the VRMC to manage the resource, they are the main people doing JFM activities, and can get assistance and training from the FD in selling their forest products (GRZ, 2005). This also provides opportunities for establishing or solidifying income generating activities encouraged by the FD and numerous NGOs.

**Funding**

The FD does not spend much on forest management since there is limited management activity and does not have the financial capacity, employed labor force, and equipment such as vehicles to undertake this work (FAO, 2007; PFAP II, 2005b). This has led to the attractiveness of JFM in parts of Zambia. The assumption that JFM can be financially sustainable is flawed and it is likely that outside funding agencies need to be involved (Arnold, 2001; PFAP II, 2005b). The costs of creating JFM in an area involve the initial costs of starting the program and the recurrent costs of managing the forests within JFM. Communities that are interested in JFM have the cost of time spent on JFM activities and meetings and the cost of labor for projects such as boundary demarcation and forest inventories. The costs borne to the FD consist of employing staff, transportation, training, and labor (GRZ, 2005).

Funding from donor agencies has been critical in financing the development and facilitation of resource management devolution (Shackleton et al., 2002). Discovering sources of start-up funds can affirm a program's potential, but these must then be replaced with long-term operating funds derived from dependable sources (Wycolff-Baird et al., 2001). Covering the start-up costs of JFM without external support is unlikely and in many areas it may ever be possible to achieve self-financing of all management activities by the communities in the near future (PFAP II, 2005b). The Provincial Forestry Action Programme (PFAP) funded by the Finnish government is the latest in a series of support to the forestry sector in Zambia dating back to the early 1970s (PFAP II, 2005a). PFAP and the Cooperative League of the United States of America (CLUSA) have been the largest funders of JFM in Zambia since the mid-1990s.

**Benefits**

The compensation for the costs of the JFM implementation process are found in the benefits that are derived from JFM. Many of these benefits are intangible to communities such as the preservation and sustainable use of forest products both timber and non-timber products, forest health and productivity, wildlife habitat, and watershed protection, to name just a few. The tangible benefits include legal access to resources and the provision of their daily needs for firewood, construction materials and some supplementary foods (PFAP II, 2005b). The maintenance of forest ecosystems also provides opportunities for income-generating activities (IGAs). Beekeeping is a good example of an IGA that is actually linked to responsible forest management and men and women can participate in this activity which provides a supplemental food and income

source (PFAP II, 2005b). For instance, non-timber forest products such as this offer targeted benefits for poor producers and their extraction tends to have less ecological impacts than that of timber production (Wunder, 2001).

The greatest benefit perceived by communities is that of economic gain. Revenue sharing is the process by which funds generated by licenses and permits are to be shared between the FMC and the government of Zambia (GRZ, 2005). The Forests Act of 1999 has introduced the principle of revenue sharing with communities, but the actual percentages to be apportioned have not yet been agreed upon (PFAP II, 2005a; FAO, 2007) unlike that of ADMADE, which has clearly defined revenue sharing guidelines.

Another tangible benefit derived from JFM is that of the opportunity to apply for government loans in the forestry sector. The Forest Development Credit Facility is a domestic, public financial mechanism that allows communities involved in JFM to apply for loans. The loan is from the government of Zambia to the rural poor to participate in forestry business. This is considered a revolving fund and no donor funds are involved in this mechanism (FAO, 2007). Loans are given to communities to develop certain forestry sectors such as beekeeping, pit sawing, and other timber and non-timber utilizations. These loans are then paid back to the government, which, in turn, finance other communities applying for loans.

As previously mentioned, the government benefits by outsourcing the management of forests to local communities and thus reduces the operating costs for the FD. In addition, there are the benefits of capacity building, community organization and mobilization, protection of forest resources through community involvement and forest guards, and financial benefits through the revenue sharing process.

**Cooperation between the Government and Non-Government Agencies**

Often there has been a local distrust of the government and government institutions due to prior policies and practices that placed foresters and local communities in confrontation with each other. This has allowed for the rapid expansion of NGOs in many community forest management programs, in which they act as intermediaries between the state and local users. They facilitate change at the local level by providing training, extension, advisory, and marketing services. In addition, they also offer an advocacy role on behalf of communities that can help influence policy at the local, national, and international levels (Arnold, 2001). Outside organizations such as NGOs can strengthen the positions of local actors (Wycolff-Baird et al., 2001) and they may be as powerful as the state, but their power often originates from the money that they control (McCarthy, 2005).

In Zambia, currently there is almost no capacity or knowledge about JFM amongst NGOs. If JFM is to expand throughout the entire country, NGOs and other agencies must play a role and the FD needs to have a greater willingness to work with such agencies outside of the government (PFAP II, 2005b). However, this is starting to change and some NGOs, namely World Vision and Keeper Zambia, are starting to work with the FD in the acceleration of non-timber forest utilization such as beekeeping, which has been a common livelihood pattern throughout much of Zambia's rural communities.

**JFM Statutory Instrument and Stagnation**

The Forests Act of 1999 has since been amended by supplements or Statutory Instruments (SIs) that help clarify or specifically define the roles and responsibilities of

the government, communities, and others interested or invested in the JFM process. Essentially, the Forests Act is still dormant and the Forestry Commission that is spoken of as operational within the Act is not yet functioning and thus the FD continues to be the institution with the authority over all forestry practices in Zambia (PFAP II, 2005b). Furthermore, the new Act was not operational six years after the endorsement by parliament and the president. This is a clear signal that the implementation of forest policy is far too slow and could be construed as a waste of time. One District Forestry Officer commented, "The policy is fine, involvement of all stakeholders needed, but it appears the same government (that made the policy) is not ready for this" (PFAP II, 2005b). Finally, in the most recent Statutory Instrument (Number 47 of 2006) a select few JFM areas were recognized formally, but the definition or explanation of the revenue sharing benefits among stakeholders was not even mentioned within the SI.

## AGRICULTURAL LIVELIHOOD PROGRAMS IN ZAMBIA

> If many little people,
> in many little places,
> do many little things,
> they can change the face of the earth.
>
> (African proverb - Leakey and Simons, 1998)

### Agriculture Background

As mentioned above, shifting agriculture has existed in southern Africa for thousands of years, but with the arrival of European populations the traditional technologies eventually changed. Land availability was reduced (often the most productive land), but the introduction of the animal drawn mouldbourd plough, and later tractor, temporarily enabled food supply to meet food demand (Fowler and Rockstrom, 2001). Spurred by the devastating droughts in South Africa in the 1920's and the United States in the 1930's, British colonial authorities imposed soil conservation interventions across much of British Africa into the 1950's. These African colonial schemes were widely resented and collapsed after independence, but interest in United States-based minimum-tillage practices gained momentum. Repeated oil price shocks of the 1970's raised interest in minimum-tillage techniques (Haggblade and Tembo, 2003). Zambia, however, continued to pursue intensive agriculture grounded in fossil fuels, hybrid seed, and inorganic inputs, such as fertilizer. Zambian policies in the agriculture sector provided incentives to rural residents for cash income and poverty reduction in the form of subsidized farm inputs from the government (Njobvu, 2004). By the 1990's, three decades of heavy subsidies for maize, fertilizer, tractors, and plows came to an end following the collapse of Zambia's agricultural parastatals and global copper prices (Haggblade and Tembo, 2003).

Since independence in 1964 until the early 1990's, the policy of the Zambian Government was to ensure food security through increased crop production by providing unrealistic markets to guarantee producers greater profits from various crops; in particular, maize, the national staple food crop. The policies for subsidized inputs and low-priced, processed agro-products in urban areas during this period were easy to implement when the economy was strong, but as the economy grew weaker during the 1970's and onward it became increasingly difficult, which resulted in very high budget deficits due to the subsidies (Chizuni, 1994: Kwesiga et al., 1999).

Since 1992, Zambia has undergone reforms as part of the Structural Adjustment Programs imposed by the World Bank, International Monetary Fund (IMF) and other development partners to improve the economy and reduce poverty in the country. These privatization policies in all of the sectors of the economy were aimed at improving farm productivity, enhancing farmer's access to agricultural extension services, increasing participation in product markets, improving access to credit facilities, and enhancing the private sector's involvement (Njobvu, 2004). However, the removal of these subsidies by the state on maize purchasing and fertilizer subsidies in favor of privatization has accelerated the decrease in food production since the anticipated improved marketing climate has not materialized (Kwesiga et al., 1999).

Zambia's former system of heavily subsidized, high-input agriculture has collapsed both financially and ecologically. There has been a need to find cost-effective methods to maintain soil fertility and production for Zambia's farmers to accelerate economic growth (Haggblade and Tembo, 2003). Recently, the thrust has been on sustainable agriculture to meet both production and economic prosperity. Sustainable

agriculture has been defined by the Food and Agricultural Organization (FAO) of the United Nations as "the use of agricultural practices which conserve water and soil and are environmentally non-degrading, technically appropriate, economically viable and socially acceptable" (Fowler and Rockstrom, 2001).

Sustainable agriculture is of great concern in Zambia for some of the agricultural problems found within the country include soil degradation through acidification, nutrient loss, soil structure deterioration, soil erosion, salinization, chemical pollution and deforestation (GRZ, 1997). Farmers, both small-scale and large-scale, are often considered the culprits of such deterioration.

Typically, there are three main categories of farmers in Zambian agriculture: small-scale, medium-scale, and large-scale. Small-scale farmers are subsistence farmers of staple foods with an occasional surplus for sale or income; medium-scale farmers have surplus maize and other cash crops for the local markets; and, large-scale farmers produce primarily cash crops and livestock for the domestic and international markets (GRZ, 2006). Sustainable agriculture is relevant for all of these farmers. Furthermore, sustainable agriculture is of interest to domestic and international agencies because much of the arable land in Zambia includes land incorporated within national parks, forest reserves, and low-potential agricultural areas (GRZ, 1997) and is thus unavailable to local populations.

**Agricultural Concerns and Problems**

The prior history of agricultural policies and practices has created concern for those whose livelihoods depend on agriculture. The removal of government subsidies for

fertilizer and price controls for purchasing maize have limited the options for rural farmers. The increased cost of fertilizers has dramatically reduced the use of fertilizers by those who were once able to purchase them (Ajay and Kwesiga, 2003). This has limited the production of maize and other food crops on depleted and marginal soils, thereby leading to agricultural expansion in indigenous forests or the reduction in fallow periods from reduced nitrogen reserves.

Countries in southern Africa, including Zambia, face land-use problems including a shortage of fuelwood and a shortage of livestock fodder, but the paramount concern facing farmers is that of declining soil fertility (CTA, 2002). In Zambia, traditional shifting cultivation agriculture fallows are considered to be natural fallows for there are no human interventions or alterations. Fields are abandoned and allowed to recover through natural successional processes. Traditionally, farmers in Zambia leave their fields in a natural fallow for five to twenty years to recover soil fertility through the regrowth of natural vegetation (Sileshi and Mafongoya, 2003; Chirwa et al., 2004). As mentioned, farmers have identified declining soil fertility as one of their perceived problems and nitrogen deficiency was found to be the most important problem that is responsible for low maize yields. The increased pressure on land has reduced natural fallow periods to one to three years (Phiri et al., 2004). When yield productivity decreases, which it eventually does, those with the means will move to mature, indigenous forests and begin clearing a portion for a new field. Those without the means remain stationary and will see a continued decline in yield.

The national agricultural policies of Zambia place great emphasis on food security, but the factors previously mentioned translate into decreased food security for

much of the rural population. Food insecurity is due to low productivity, past government policies that over-emphasized the production of hybrid maize at the expense of traditional crops, and the limited access to agricultural services and resources (Chizuni, 1994). Both the government of Zambia and NGOs have developed programs to address the continued problem of food security and poverty alleviation.

**Government and NGO Agricultural Programs**

The government of Zambia has embarked on many programs aimed at increasing food security and reducing poverty in rural areas. The general strategies to strengthen rural producers are targeted at improving infrastructure such as roads, education, sanitation, and combating HIV/AIDS. These strategies can improve an individual's and a community's overall health and thus increase producer output to reduce food insecurity and increase income for poverty alleviation. At the national level, the Poverty Reduction Strategy Paper (PRSP) is focused on policy reform and reviewing land tenure acts to build agricultural capacity to expand production, productivity, and competitiveness to meet local and international demands. At the local level, programs such as the Fertilizer Support Programme and the Food Security Pack are meant to service smallholder farmers to enhance the productivity of their land through the provision of improved seed varieties and fertilizers for food security and poverty reduction (GRZ, 2006). Often these programs include education and training in alternative farming techniques practices designed to maintain soil productivity and increase production.

The implementation of these policies and programs throughout the country has been undertaken by numerous government agencies, private institutions, research centers,

and NGOs. Some of these include the Ministry of Agriculture and Cooperatives (MAC), the Zambia National Farmer's Union (ZNFU), the World Agroforestry Research Centre (ICRAF), the Conservation Farming Unit (CFU), the Golden Valley Agricultural Research Trust (GART), the Cooperative League of the USA (CLUSA), the Programme Against Malnutrition (PAM), the Agriculture Support Programme (ASP), district-level Farmer's Training Centers, the Dunavant Cotton Company, plus NGOs such as World Vision, CARE International, Africare, and the Lutheran World Federation (LWF), among others (Haggblade and Tembo, 2003). Cooperation, training, and extension activities have occurred between research institutions, government ministries, and NGOs (Franzel et al., 2004).

The programs and the supporting organizations address many facets of agriculture, food security, and poverty alleviation. However, within the context of this paper I will only address the promotion of conservation farming and agroforestry.

**Goals and Objectives**

The advocacy of conservation farming and agroforestry by government and non-government organizations is focused on maintaining and/or improving soil fertility to ensure continued yields. This, in turn, attempts to meet the goals of increasing food security and poverty alleviation. Conservation farming and agroforestry will now be discussed to determine how they meet these goals and objectives

Declining soil fertility has resulted in many parts of Zambia due to conventional farming practices such as the burning of crop residues and fallow vegetation, intensive hoeing and plowing, and the failure to incorporate organic matter into the soil (Steiner,

2002). Conservation farming's main objective is to improve and sustain the productivity of agricultural lands (GRZ, 2006). Conservation farming (CF) or conservation tillage is defined as any cropping system which results in the conservation of natural or other resources. It is a generic term given to soil management systems that aim to conserve natural resources (Fowler and Rockstrom, 2001).

To understand CF one must first understand traditional field preparation and farming practices in Zambia. Typically, in existing agricultural fields most rural Zambians begin field preparation once the first scattered rains have arrived, which signals the start of the rainy season in early November. This loosens the soil after the long, hot, dry season and makes field preparation easier for both the hoe farmer and the ox-plough farmer. Ridges are created by building up soil into lines for planting. Weeding the fields usually occurs twice during the rainy season. Ridges are rebuilt and weeds uprooted by hoe or plough to dry and decompose in this process. Harvesting begins once crops dry in the fields.

In contrast, CF includes dry-season field preparation with minimal soil disturbance, crop residue retention, precision input application (inorganic fertilizer or animal manure), and nitrogen-fixing crop rotations (Haggblade and Tembo, 2003; Steiner, 2002). To avoid a long, analytical description of the process, CF involves the creation of planting station "basins" verses traditional ridge agriculture. A permanent planting station is created by digging a hole into the soil by hoe-farmers or using a ripper implement by ox-plough farmers. These basins at the soil's surface capture precipitation more efficiently than planting stations on top of ridges. This is extremely important for farming systems found within arid and semi-arid regions in southern Africa where

rainfall can be unpredictable and sporadic, as those found within southern and eastern Zambia. The benefits of CF will be discussed in a following section.

The use of nitrogen-fixing crop rotations as described in CF practices is paramount. Tantamount to this is the use of nitrogen-fixing tree rotations as in the use of agroforestry systems. The goals of agroforestry are to generate environmental benefits and in increase household incomes (Franzel et al., 2004). Rural participants in agroforestry intervention programs identified the goals of agroforestry as enhancing food security and nutrition, eradicating poverty, conserving natural resources, promoting income generation, and improving the supply of wood products (CTA, 2002). Agroforestry is defined as "a land-use system in which woody perennials (trees, shrubs, palms, bamboo) are deliberately used on the same land management unit as agricultural crops (woody or not), animals or both, either in some form of spatial arrangement or temporal sequence. In agroforestry systems there are both ecological and economic interactions between the different components" (CTA, 2002).

One study recognized some 18 different agroforestry practices, but it is likely that each practice has an infinite number of variations (Leakey and Simons, 1998). Concerning agroforestry, this is a point that must be made explicit. In Zambia, agricultural fields are cleared of all vegetation. There is not an agroforestry system that incorporates agriculture beneath indigenous forest stands like those in south-east Asia or South America, in which farmers plant food or cash crops under the canopy or slightly reduce the forest canopy for agricultural production. In Zambia, mango trees are typically the only trees that can be found in farmer's fields. This could be considered an agroforestry system, but for this discussion agroforestry is the marriage of agriculture and

forestry by the use of nitrogen-fixing tree species in fallowed agricultural fields (known as improved fallows) that both increase the productivity of agricultural crops and reduce the demand on surrounding forest reserves for fuelwood and building materials.

Improved fallows are ones that use fast growing plant/tree species that fix nitrogen, produce easily decomposable biomass, are compatible with cereal crops in rotation, and are adapted to the climate and conditions of the miombo woodland ecology of southern Africa (Ajayi et al., 2003). These trees are usually established as a pure stand or intercropped with food crops. The tree fallows are cut two or three years after planting and the foliar biomass is incorporated into the soil during land preparation, which easily decomposes and provides nutrients for subsequent crops (Ajay and Kwesiga, 2003).

CF and agroforestry systems seek to improve and maintain soil conditions by utilizing and maximizing all available inputs such as moisture, organic matter, fertilizers (if they are available), nitrogen, and human labor. The use of CF and agroforestry in southern African farming systems has gained momentum and governments, development agencies, and NGOs have indicated their support and interest in these programs by funding them.

**Funding**

Funding for the research, development, and extension services for conservation farming and agroforestry programs largely comes from international sources. The United States Agency for International Development (USAID), the Swedish International Development Cooperation Development Agency (SIDA), the Canadian International Development Agency (CIDA), the Food and Agriculture Organization (FAO), and the

World Food Program (WFP) are some of the largest donors. These funds are given to government ministries, research institutions, and agriculture organizations to facilitate CF and agroforestry technology extension.

**Benefits**

The quote at the beginning of this chapter illustrates the importance of CF and agroforestry. These practices often begin small, but have the potential to make large and lasting changes. The benefits of CF and agroforestry will now be discussed.

To enhance food security and reduce the dependence on external donors, sustainable agriculture has become imperative and the potential value of CF has been growing throughout Africa (Fowler and Rockstrom, 2001) and Zambia. The benefits of CF have environmental, economical, and social effects. CF's environmental effects are to maintain soil fertility, reduce erosion, and increase water infiltration to the soil; the economic effects are the reduction in production costs (labor and capital) and the reduced time spent in field preparation and weeding, which can be used for other income-generating activities; the social effects are that CF has contributed to social and economic empowerment of communities and raised the self-confidence of individuals. Additional effects of CF include carbon sequestration by storing carbon in the soil, poverty reduction by increasing labor productivity and income, and food security by enabling an efficient use of rainwater, which reduces the risk of crop failure due to drought (Steiner, 2002).

To illustrate this, those who do early field preparation and early planting in CF are able to capture early rains and save an average of two weeks of rainfall utilization as compared to traditional farming practices. This proves an important determinant of crop

yields. Furthermore, smallholder Zambian CF farmers who use hand hoes or ox-plough rippers achieve significant reductions in peak season labor. Overall, these practices improve soil structure and water retention and reduce the need for chemical fertilizers while at the same time increasing crop yields (Haggblade and Tembo, 2003).

In addition to CF, agroforestry offers a host of benefits to farmers in Zambia. As mentioned, declining soil fertility has been identified by rural farmers as the most important factor in reduced yields. The conversion of a forested area followed by cultivation has been found to reduce the topsoil organic matter and it is recommended that farmers cultivating in miombo woodland soil, like those found in Zambia, should implement measures that sustain topsoil organic matter concentrations to minimize the long-term deterioration in soil fertility (Chidumayo and Kwibisa, 2003). A successful way to mitigate the decline in soil fertility is the use of agroforestry species in improved fallows.

The propagation of agroforestry tree species in improved fallows is a remedy to combat this problem. "Improved fallows or the rotation of fast growing nitrogen-fixing legume species with cereals have been shown to accumulate nitrogen and organic matter, recycle nutrients in the soil and improve soil physical and chemical properties, and increase crop yield compared to traditional fallows" (Sileshi and Mafongoya, 2003). For example, following a 2-year improved fallow, farmers achieved maize yields of approximately 3.6 tons per hectare as compared to approximately 1.0 t/ha in continuous cropping or following a 2-year natural fallow (Phiri et al., 2004).

The most widely promoted, adopted, and beneficial agroforestry tree species in Zambia include: sesbania (*Sesbania sesban*), pigeon pea (*Cajanus cajan*), tephrosia

(*Tephrosia vogelii*), and gliricidia (*Gliricidia sepium*). These species vary in the effectiveness of soil restoration, disease tolerance, and secondary uses, but all are effective in promoting soil fertility maintenance and reducing the inclination to engage in shifting cultivation because maintaining a productive and successful improved fallow requires less work and energy than felling, clearing, and burning a portion of mature, indigenous forest.

The use of multiple agroforestry species by an individual farmer appears to be the most successful method of encouraging agroforestry techniques. Farmers agree that soil fertility improvement is the single most important consideration for adopting improved fallow technologies, but fuelwood, construction poles, light construction material, and to a lesser extent animal fodder could be the main benefits that encourage rural farmers to become involved in agroforestry (Kuntashula and Mafongoya, 2005). For instance, a mature, one hectare stand of sesbania can produce on average 10 tons of fuelwood each year. This is significant because the majority of African households need approximately three tons of fuelwood each year for cooking (ICRAF, 2004). Furthermore, the intercropping of multiple agroforestry species within cereal crops such as sesbania + pigeon pea, sesbania + tephrosia, and tephrosia + pigeon pea has been demonstrated to reduce the infestation by termites (which are known to cause up to a 29% loss of maize yields in Africa) and weeds, and give a maize grain yield that is comparable to the recommended rates of inorganic fertilizers (Sileshi and Mafongoya, 2003). Lastly, pigeon pea has been shown to supply water from deeper soil layers to the associating/intercropped maize plants through hydraulic lift (Sekiya and Yano, 2004) and sesbania fallows can increase the soil-water storage in the soil profile (Phiri et al., 2003).

Sesbania and pigeon pea's deep root systems and their resulting ability to draw water upward from lower layers to benefit maize crops is drastically important in the Eastern Province of Zambia, which is typically a dry area and regularly experiences droughts.

Besides the noticeable, tangible benefits to farmers, there are many ecological benefits that often go unnoticed. Mixed agroforestry species are believed to increase the biological diversity, productivity and sustainability of the fallow system, reduce pest and disease risks, modify the microclimate, resource utilization, allelopathy, and improve the nitrogen, phosphorus, and potassium supply from leguminous biomass to improve crop vigor (Sileshi and Mafongoya, 2003). In addition, fertilizer trees such as those mentioned above can sequester 10-20 tons of carbon per hectare per year and increase soil carbon by approximately one ton per hectare per year (ICRAF, 2004).

Overall, agroforestry benefits rural, subsistence farmers and others engaged in agriculture by increasing and maintaining the soil fertility of their fields, which, in turn, reduces the need for expensive inorganic inputs such as fertilizers (Chirwa et al., 2003) and reduces the need for forest conversion into agricultural systems resulting from declining fertility.

## EVALUATION OF PROGRAMS

### Comparison Between JFM and Agricultural Livelihood Improvement Programs

The ultimate goal in lesser developed countries and the international community is poverty reduction/alleviation. This is achieved by supporting rural development programs that target a local population's livelihood in ways that can enhance productivity. Thereby maintaining their livelihood, household and food security, and offering potential income sources while utilizing natural resources wisely and sustainably. As governments translate development goals into policy and then pass specific laws and legislation, there must be critical scrutiny for success is measured not by how these policies are passed or sold to the public, but by the effects it has on people's lives (Li, 2005).

In Zambia, a host of these rural development programs have been undertaken over the past forty years with varying levels of success. Zambia's rural populations are deeply dependent on the landscape for agricultural practices and the utilization of forest products for survival. It is within this vein that such development programs have arisen. The focus of this paper is to further understand these programs, how they are performing in rural areas, and if they are achieving the desired goals of poverty reduction, increased income, and food security.

Joint Forest Management and agricultural programs will now be compared and evaluated from an extensive literature review and how this resonates with my personal experiences, my participatory observation, and the use of key informants in the Kaloko area of Zambia. Indicators of success and failure for each program will be identified and outlined to understand the requirements needed for achieving program success and

avoiding failure. The two programs will then be evaluated on their individual successes and failures based on these indicators followed by an evaluative summary. Furthermore, a detailed evaluation of participation and adoption, the two main factors of successful program implementation in rural areas, will be discussed at theoretical and pragmatic levels succeeded by a critique of each program. In addition, funding and the poverty reduction potential that these programs offer will follow. Lastly, an analysis of the future feasibility of these programs will be presented.

**Success Indicators for JFM**

Found throughout the literature in community-based programs are three fundamental requirements for successful resource management: individuals from local communities must highly value a natural resource to have the incentive to manage the resource sustainably; property rights must be devolved to individuals who use the resource to enable them to benefit from its management; and, individuals at the local level must have the ability to create micro-institutions to regulate the use of the resource (Gibson and Becker, 2000). JFM has theoretically achieved these requirements, in that most rural Zambians do value forest resources as part of their livelihood strategies, use and access rights are guaranteed in the JFM program, and micro-institutions are created to manage the resource such as the formation of Village Resource Management Committees (VRMCs).

Other primary requirements for successful resource management include:

- tangible benefits to local resource users and managers, often economic or financial with legal basis (Bwalya, 2004; PFAP II, 2005b; Wycolff-Baird et al., 2001; Arnold, 2001; Little, 2003; Bromley, 2003);
- to help change national policy regarding community-based management

(Western, 2003a)

- market potential for forest products (Bwalya, 2004; Wilshusen et al., 2003; Arnold, 2001);
- to establish legitimacy of the program, the implementing agency, and the government (Brechin et al., 2003; Bwalya, 2002);
- accountability of local and state institutions with the ability to admit failure (Wilshusen et al., 2003; Brechin et al., 2003; Wycolff-Baird et al., 2001; Western, 2003b);
- establishing local participatory management committees, as mentioned above, with democratic elections that include the resource users (Bwalya, 2004; PFAP II, 2005b; Manor, 2004);
- to develop community capacity and decision-making skills (Bwalya, 2004; PFAP II, 2005b; Wilshusen et al., 2003);
- to raise the awareness of the resource's importance to users (PFAP II, 2005a; PFAP II, 2005b);
- to establish relationships and participatory collaborative agreements between local decision-makers and the government for mediation and dialogue (Wycolff-Baird et al., 2001; Feldmann, 2003);
- the power to learn from the process and adapt to changing circumstances, for example adaptive management (PFAP II, 2005a; Brechin et al., 2003; Langston, 2005);
- the inclusion and participation of external parties such as the private sector and NGOs (PFAP II, 2005b; Arnold, 2001; Bwalya, 2003; Feldmann, 2003);
- local leadership skills (Wycolff-Baird et al., 2001);
- the inclusion of traditional leaders (Bwalya, 2004);
- the use of local individuals for monitoring and policing (Hughes, 2001);
- access to small grants by communities (Wilshusen et al., 2003); and
- to reduce the likelihood of over-ambitious targets (Arnold, 2001).

These requirements, as mentioned above, are all found within the JFM program. Most of these requirements are found within the national legislation concerning JFM policy or are defined and exercised within the parameters of the program itself.

Based on my experience in the Kaloko area, many of these success indicators are present within the JFM program at large, the Forestry Department-community dialogue process, and the implementation of JFM within rural areas. Another requirement for the success of a community-based program like JFM is project timing concerning both the initial start-up phase, as well as the length of continued support from the FD. Seasonal issues should be considered. After the harvest period, when most rural people have fewer

labor obligations, is the best time to introduce JFM into an area. This can be followed by additional meetings, workshops, and trainings to solidify the program in an area before the following planting season. This can help ensure successful JFM participation, knowledge exchange, and the adoption of the program before people become busy with agricultural activities again. Lastly, patience on behalf of all stakeholders is required for success. The FD must realize that the pace of JFM capacity-building at the local level takes time and communities must understand the pace of receiving tangible benefits from the program also takes time.

**Failure Indicators for JFM**

It would simple, easy, and, yet, accurate to describe the indicators for failure as the inverse of the success indicators. This is true, but it is often more complicated than that in community-based management programs. Failure of a community-based program can result because of one factor or a combination of factors not being addressed or rectified.

A thorough review of the literature reveals the following indicators of failure:

- the state's lack of trust in communities or local management bodies in decision-making or the incomplete devolution of access rights or management authority (Goldman, 2003; Arnold, 2001; Wycolff-Baird et al., 2001);
- legislation that enables community-based management, but results in gridlock or delay and a limitation or uncertainty concerning local rights and authority (Arnold, 2001; Hughes, 2001; Bromley, 2003; Lynch and Alcorn, 2003);
- the dubious election of committee members, which includes the exclusion of the poor, the inclusion of women with no guarantee of female influence, or the election of committee members to support the state and challenge local users (Manor, 2004; Gauli and Rishi, 2004; Arnold, 2001);
- the usurpation of power by local elites in the committee (Wycolff-Baird et al., 2001; Manor, 2004; Arnold, 2001; Bwalya, 2002; Hughes, 2001; Metcalf, 2003; Baker and Kusel, 2003);
- the inability to provide tangible benefits to locals, share the revenues from

collaborative management, or provide market opportunities for resources (Arnold, 2001; Wycolff-Baird et al., 2001; Manor, 2004; Bwalya, 2004);
- the failure to resolve existing conflicts before starting CBNRM or having appropriate measures to resolve conflicts after implementation (Hughes, 2001);
- the reliance on scientific management to maintain authority and control (Alexander and McGregor, 2000; Goldman, 2003);and
- the use of a community-based program widely over a geographic area when such programs are often site-specific (Seymour, 2003; Brechin et al., 2003).

JFM in Zambia has largely avoided the some of the primary indicators of failure. Although it was established by law in the Forests Act of 1999, it is relatively new regarding its implementation in rural areas. Therefore, this could be a reason for avoiding many of the pitfalls of failure. At this point in time the program has simply not existed long enough and has not been applied in many areas for most of these problems to manifest themselves.

My experience in the Kaloko area with community-based forestry also suggests that lack of consistency in training, funding, and information dissemination can lead to failure. The lack of (or slow realization of) tangible benefits for populations in rural areas further complements the failure indicators in what I have witnessed. In addition, opportunities for low-interest loans are present within the framework of JFM, but often there is little knowledge within communities or the Forestry Department extension staff concerning the writing of technical loan applications. Often FD personnel are not completely versed in what type of information should be contained within such a proposal and how a proposal should be expressed in written format. Rural communities are put at a disadvantage if FD personnel are incapable of assisting them with loan opportunities. Finally, the entire JFM process takes time. The expectation by the FD that communities will be able to manage the forests around them in collaboration with the FD soon after training sessions in JFM is unrealistic, especially with few and infrequent

trainings on this new topic.

**Successes in JFM**

Success is measured in different ways through the eyes of different stakeholders. Specifically, the definition of success may vary at different scales; for example, the household level, the community level, the regional level, the national level, or the international level.

JFM has made some significant gains since the legal recognition of the program in the Forests Act of 1999. A success that is often underscored is the fact that Zambia has collaborative forest management. Many countries still do not have a program with legal recognition for the rights of resource users. Where people are excluded from decision-making processes and prevented from accessing resources, which they consider they have the right to utilize, there will be struggles and conflict (Baker and Kusel, 2003). Zambia's effort to develop JFM and recognize local populations as partners in the process within legislation is a success in and of itself. In addition, the JFM program has been largely financed by external donors, which illustrates the support by the international community. The devolution of forest management, in turn, has opened channels of communication and allowed locals to express their concerns and priorities, which has helped to improve community-government relations (Shackleton et al., 2002).

The inclusion of community structures into the JFM process can be viewed as an important success. The emphasis of the need to utilize local traditional structures and recognizing the role of traditional leaders in communities creates partnerships between the government and communities (FAO, 2007). Also, the recognition of local knowledge

and using that knowledge within JFM programs is beneficial for the FD and local communities.

This inclusion has helped generate local interest. Where JFM has occurred in pilot areas there have been instances of adjacent communities expressing interest and asking that the program be extended into their area (PFAP II, 2005b) and I also witnessed this in my district. This is a good indicator that the program is proceeding correctly. According to PFAP, the primary funder of JFM, the interest by women in the program, their willingness to participate, their satisfaction with JFM guidelines, and the goal of the FD to increase training opportunities for communities and FD staff (PFAP II, 2005a) illustrates the success of gender policies within the JFM framework. Local interest has also generated local awareness of forest management concerns within communities and some JFM pilot programs have conducted environmental education activities in local schools to increase awareness (PFAP II, 2005a). Efforts made by the FD did result in increased awareness in forest problems and concerns in my experience.

Building local community-capacity and supporting local livelihoods has also been a great success. A significant amount of training has been done with communities to establish local management institutions such as VRMCs and FMCs and Forest User Groups (PFAP II, 2005a). The FD has put much effort into supporting and strengthening beekeeping user groups, a common livelihood found throughout Zambia. Helping people move into rewarding endeavors that involve less labor and high returns rather than focusing on forest activities of low potential is a challenge for forest management (Warner, 2000), but the FD has recognized beekeeping as a common and productive

livelihood in need of further development. Beekeeping groups in Zambia have gained significant power and control over their product and prices in recent years (FAO, 2007).

Successful partnerships with other bodies such as the private sector and NGOs have been observed. The Forests Act recognizes the need to include the private sector in preparing management plans for JFM areas (FAO, 2007) and efforts have been made to link rural areas with urban markets. NGOs are valuable in that they can be project implementers, provide technical information, promote gender equality, and work to integrate development needs of local people with natural resource management concerns (Shackleton et al., 2002). NGOs have been filling these roles in other sectors such as health and education and the FD has began to utilize their skills in JFM forest products, especially when working with beekeeping user groups. In my personal experience, the NGO, World Vision, has collaborated with the FD in implementing gender-balanced beekeeping programs, which provided technical information, supplies, and provided market opportunities for honey and beeswax with the FD. NGOs were also instrumental in promoting forest conservation and increasing the awareness of local forest problems and concerns.

**Failures in JFM**

The requirements for success may be found within JFM and in the measures that it hopes to implement, but, in the field and on the ground, the reality of success requirements may vary. The lack of significant overall success in the JFM program (in that the committees and communities can manage the forests themselves) warrants a discussion of where and how the program is failing to meet its designed objectives.

Funding of the FD and of the JFM program in particular is a major failure. The lack funding support for FD staff and extension agents who conduct the fieldwork and training in JFM is apparent. Low numbers of staff and staff members that leave the FD in pursuit of more lucrative opportunities with NGOs or international organizations has severely reduced the already inadequate personnel numbers in the FD (PFAP II, 2005a; FAO, 2007). I observed this as well, which will be discussed in a following section.

JFM gives management and use rights to local communities for private consumption, but if forest products are collected and subsequently sold then a license is required. Due to the lack of government financial support to the FD or for the JFM program, the FD has been forced to raise the license fees for authorized forest collection. Once the cost of production for an item, plus the cost of a collection fee/license is calculated by forest users, it usually results in many users not purchasing a license due to the meager profits. Thus, continued forest product collection and utilization is then deemed illegal (PFAP II, 2005b). The increase in license prices for the rural producer has resulted in practices counter to the entire premise of JFM forest income generation from licensing. In my experience, the FD was still policing extensively, particularly for illegally cut trees for charcoal production.

Continued policing for these products, even in areas that does not have an established JFM program, will continue to create distrust and resentment towards the FD. In addition, this illustrates that FD funds could be used to further train VRMCs and forest guards on licensing, fee collection, and policing; thereby, sharing patrolling responsibilities. Efforts aimed at supporting and monitoring existing VRMCs rather than partial capacity-building and subsequent abandonment of VRMCs in favor of policing

may be preferable. This would strengthen VRMCs to the point at which they can police and regulate themselves and reduce the resentment of the FD once they began a JFM project in a new area. To further demonstrate the need for continued support and monitoring, CLUSA initiated conservation farming and agroforestry training in JFM pilot areas, but some farmers in the Kaloko area abandoned the measures after just one year. This possibly could be traced back to poor support and monitoring after these agricultural techniques were introduced.

The real nature of local committees also has been an area of contention. Procedures for electing committee members were not always clearly defined and in some instances only a few village members were present, which did not represent the entire community or area and were largely artificial (PFAP II, 2005b). Low numbers for committee elections were not observed in my experience, but the comment is worth noting. Furthermore, Manor (2004) noted that government officials in Zambia favored nominating user committee members that were considered sophisticated and cooperative people because they would not create trouble and thus, the committees would be insulated from the "politics" of Zambia's local councils. Low representation and the selective nomination of committee members can hardly be seen as democracy and could be better described as a failure.

To continue with the elections of committee members, the FD is in need of retraining personnel in programs such as JFM that require participatory and gender sensitive planning, monitoring, and implementation (FAO, 2007). JFM guidelines suggest that a minimum of 30% of VRMC, FMC, and user groups be composed of women, but even this has been difficult to achieve (PFAP II, 2005a). For example, JFM

processes can discourage women's participation since women often conform to traditional roles and do not speak much in community meetings; they have less time available for meetings due to fulfilling household roles; they often have lower literacy rates; many have less time to plan and think of long-term gains since they are trying to manage short-term needs of their households; and men often decide if women are allowed to participate in community events (PFAP II, 2005b). In my experience, the inclusion of women in many different government and non-government initiated village committees appeared to be a token of gender inclusion. A prescriptive number of women, although well-intentioned, will not guarantee true participation and democracy. Often the women on these committees are the spouses of village headmen, thus ensuring the involvement of village elites. Perhaps VRMCs should be composed primarily by women since they are the ones most directly dependent on forest resources. Regardless, there is the need for more inclusion of women and not just the women with more status or power.

Finally, the formulation of forest management plans could be considered a failure in that quite often such plans were developed and driven by the FD itself. The role of communities was limited to providing feedback as opposed to truly developing the plans themselves or in collaboration with the FD (PFAP II, 2005b). In addition, scientific management, technocratic thinking, and the emphasis of forest protection based on the fear of promoting unsustainable practices also contributed to forest management plans being usurped by the FD (PFAP II, 2005b; FAO, 2007). For example, the formation of basket-making user groups was designed at the national level, but usually applied in all of the JFM pilot areas. Given that basket-making is common across Zambia, this is a

logical conclusion to form this type of user group. However, market opportunities at local and regional levels may differ. At a provincial meeting of foresters, I heard one District Forest Officer comment to the group, "How many baskets can you make and sell?" This comment speaks volumes. Many user group products are produced and traded locally and often there are not adequate markets for NTFP expansion on a level that is profitable for the producer.

**JFM summary**

Ground-breakers and initiators often have the most difficult time and are usually subject to critical review and criticism by others. JFM is no exception. PFAP and CLUSA have achieved tremendous success in starting a program that is aimed at protecting an important national, community, and individual natural resource. Starting collaborative forest management in Zambia is a success in that it recognizes and values local participation and inclusion. In addition, the establishment of local management authorities such as VRMCs and FMCs is a large step in the right direction.

However, funding by PFAP and CLUSA for JFM projects was often inadequate to completely train and support this new management structure. Additional support for VRMCs was fleeting and monitoring efforts were not used to strengthen components of JFM to the degree that communities could proceed without assistance. Successes were achieved regarding the formal steps of JFM implementation, but at the local level, where it matters most, it is debatable if communities involved in JFM could be considered successful. Committee election processes could also be improved to ensure greater inclusion and participation, which would lead to a more involved and supportive

committee. Finally, communities under PFAP and CLUSA both developed management plans for their forests, but in both cases the "implementation did not show any meaningful results" (PFAP II, 2005b). This was my experience as well. All of the time and money spent on developing plans, committees, user groups, forest guards, and other pieces of the JFM puzzle mean little if there are no perceived benefits by local populations. The JFM program demonstrated little, if any, tangible results for communities or the FD that I observed.

**Success Indicators for Agricultural Programs**

The success indicators of agricultural programs such as conservation farming (CF) and agroforestry are often measured in similar ways. Tangible benefits, market opportunities, and the learning and adaptation of processes are also success indicators, much like community-based programs. In direct comparison between community-based programs and agricultural programs the similarities are:

- the recognition of a valuable resource (e.g. soil fertility)(Ajayi et al., 2003);
- the membership and participation in collaborative groups such as farming groups (Ajayi et al., 2003);
- partnerships with other users and extension staff (farmers and agriculture extension staff, in this case) for information exchange (Kwesiga et al., 1999);
- external support, in the form of farming training centers and rural farmer field visits (Kwesiga et al., 1999);
- the encouragement and enthusiasm with farmer experimentation (Kwesiga et al., 1999); and
- the process of scaling-up markets to add value to raw products (Franzel et al., 2004).

The indicators of success for agriculture programs are largely based on participation and adoption (discussion to follow) and are backed prominently by individuals rather than communities so it is difficult to compare and contrast all of the

requirements. Thus, a simplified comparison has been presented to draw similarities and some requirements are fundamental amongst all programs aimed at improving livelihoods and reducing rural poverty.

Furthermore, in my field experience, there are additional indicators of success. The timing of agricultural education is vital. Workshops and trainings are best conducted immediately prior to the planting season. For example, four to six weeks before people start planting is preferable. This gives farmers an opportunity to evaluate new farming methods and techniques and decide where and how to utilize the information in their fields. In addition, the information from these workshops is fresh in their minds and the specific technical requirements will be recalled with less difficulty. If possible additional or repetitive workshops and trainings are preferred. Adoption of new techniques or technologies should recognize that adoption rates could be low initially. Risk aversion and experimentation are factors that reduce initial widespread adoption. Lastly, subsequent trainings and/or field visits should follow to monitor the progress of farmers, answer questions, offer additional information, and provide encouragement. In addition, follow-up visits during the period of agricultural activities can help provide farmers with relevant seasonal agricultural issues such as information on weeding, insect control, harvesting techniques, and post-harvest storage technology.

**Failure Indicators for Agricultural Programs**

The failure of agricultural programs, once again, is based on their ability to affect individuals rather than communities. The literature offers few failure indicators, but correlations can be drawn:

- the lack of awareness of agricultural programs (Ajayi et al., 2003);
- the lack of information dissemination regarding technical knowledge (Ajayi et al., 2003; Kwesiga et al., 1999);
- the lack of specific knowledge regarding planting techniques (Ajayi et al., 2003; Kwesiga et al., 1999); and
- the disadoption of practices or techniques after a period of time (Haggblade and Tembo, 2003).

These are the usual symptoms of agricultural program failure and are largely rooted in infrequent training demonstrations on agricultural topics.

In my experience, the number of agriculture extension agents able to execute these projects and disperse information to rural farmers is directly related to adoption rates. The lower the number of extension agents equals lower adoption by farmers. In addition, the continued lack of extension will likely lead to disadoption. Furthermore, it has been noted around the globe that adoption rates for programs intended to improve farmer's livelihood and productivity are not adopted as quickly as hoped. Again this relates to a farmer's risk aversion. Once observing the performance of an agricultural program for at least one season and evaluating the risk involved, then a farmer may adopt an improved agriculture technology (Ajayi et al., 2003). Success is measured with active participation and subsequent adoption and failure is measured by disadoption in following years. I noticed that there were few monitoring efforts that followed workshops. Continued monitoring, evaluation, and support for farmers that have been trained in improved agricultural methods may decrease disadoption.

**Successes in Agricultural Programs**

The successes in conservation farming and the use of agroforestry have been well documented in Zambia and other countries. Conservation farming offers increased labor

productivity in agricultural fields; thus, providing surplus time and opportunities for other income generating activities. This can, thereby, increase in household income (Steiner, 2002). In addition, the acceptance of conservation farming by farmers has been successful when participatory strategies are used to transfer knowledge and there is encouragement through farmer experimentation. Furthermore, soil deterioration has been reduced when conservation farming techniques are utilized (Fowler and Rockstrom, 2001).

Agroforestry has had similar successes. The greatest success in agroforestry has been in the pragmatic results such as: increased soil fertility, fodder for livestock, fuelwood supplies, erosion control, water conservation, increased crop yields, improved nutrient cycling and biomass production all leading to sustainable land use (CTA, 2002; Young, 1989; Kwesiga et al., 1999). Extension efforts have led to the successful utilization of agroforestry. Information dissemination by diagnosing a farmer's concerns through field visits, farming groups, training center workshops, and visits to research centers have improved the success of agroforestry. In my experience, the formation of farming groups by government or non-government institutions and inviting farmers to participate at farmer training centers have greatly improved the success of farmers utilizing the technology.

Adaptive research has also been a large component of success in agroforestry. The inclusion and participation of farmers in technology development, research, and testing has greatly improved extending the knowledge of agroforestry to rural farmers (Kwesiga et al., 1999; CTA, 2002; Franzel et al., 2004). In addition, the encouragement and motivation from extension staff to farmers increases the likelihood of success by

demonstrating results and not empty promises (Kwesiga et al., 1999). Furthermore, the encouragement of experimentation by farmers themselves has led to the success of agroforestry. Effective measures are giving farmers a wide range of management options in agroforestry and allowing them to test and examine how these technologies can improve their productivity (Kwesiga et al., 1999; Franzel et al., 2004).

Agroforestry has succeeded in offering a technology that is gender neutral, incorporated local knowledge, and has involved local leadership for implementation (Kwesiga et al., 1999). Plus, it has been effective in the collaboration between agricultural extension institutions (CTA, 2002) and has even achieved the integration of agroforestry technologies into Zambia's elementary education system on a national level (Franzel et al., 2004).

Finally, agricultural extension efforts by the government and NGOs are incorporating forestry issues within their training on agricultural techniques such as conservation farming and agroforestry; for example, the importance of forest conservation via soil conservation. This has added heightened awareness to issues concerning forest conversion and forest utilization. Personally, whenever I performed workshops and trainings on agriculture, I usually had high numbers of participants, which provided a forum for discussion on the importance of these techniques for maintaining agricultural productivity, in addition to forest productivity from conservation. In fact, most of the assistance that people wanted from me in rural areas concerned agriculture, but it opened opportunities to stress the importance of forests as well. Other agencies and organizations involved in agricultural extension activities also married the importance of agriculture and forests in a holistic manner as land use systems.

**Failures in Agricultural Programs**

Conservation farming (CF) has suffered severe constraints due to low funding. The limited budgets in agriculture departments to extend participatory training have resulted in the low numbers of people utilizing improved farming methods (Steiner, 2002). Furthermore, government extension personnel are often scientifically trained and science-based technologies tend to ignore and denigrate local knowledge concerning agriculture (Fowler and Rockstrom, 2001). Other agriculture extension staff in CF may be trained in agriculture in a generalist manner such as NGOs and the precise practices required by CF can become difficult to sustain. Overall, the lack of information on improved farming techniques is a primary indicator of CF failure (CTA, 2002). Extension staff faults and failures to continue the monitoring of farmers can result in a 20% per year disadoption in CF techniques (Haggblade and Tembo, 2003).

The high likelihood of risk aversion is also relevant to the failure of CF. For those who are trained in CF, rarely do 100% of the farmers engage in the method. Most farmers do not have the resources to manage entire fields using CF methods (time and labor to start a radically new technology) and view CF portions of their field as insurance against drought and famine. They appear to view CF technology as a portfolio of diversification to ensure household food security (Haggblade and Tembo, 2003). Furthermore, concerning risk aversion, there is also "social risk" aversion associated with using a new technology. "Instead of allowing community members to succeed and improve, communities tend to pull innovators back into the 'status quo,' a possible spiritual dimension to development often noted but seldom addressed" (Fowler and Rockstrom, 2001). This was noted in my experience in many facets of rural

development. Jealousy is rampant in rural villages and those that experiment and try new technologies are often the targets of sabotage, which include the theft of food crops in the field, destruction of property, and social misconduct such as spreading rumors, lies, and gossip.

Agroforestry failures have followed similar courses. Funding, again, is the primary constraint to success. Inadequate government funding of agroforestry programs is a major constraint and most funds for such programs are derived from donors (CTA, 2002). In fact, the scaling-up of agroforestry programs is greatly improved with external aid (Franzel et al., 2004).

The lack of funds has resulted in the shortage of trained personnel to extend agroforestry technologies and has decreased livelihood improvement technologies for rural farmers. In addition, the outcome of poor financial support has been the unreliable supply of quality seed for agroforestry species (CTA, 2002). The lack of qualified personnel and seed stocks in rural areas to perpetuate these technologies is a failure for widespread uptake of these livelihood improvement programs.

Furthermore, agroforestry fallows take time and work to see tangible results. Granted, it only takes two or three years to see the results, but shifting cultivators, such as those found in rural Zambia, have heightened expectations from agricultural programs in hopes to step out of poverty as quickly as possible as in the times of subsidized fertilizer programs to increase production. Agroforestry offers decreased lengths of fallow recovery, but in rural Zambia patience is thin and fleeting, especially when added labor is involved in the planting, care, and monitoring of agroforestry trees and shrubs.

Finally, the Ministry of Agriculture and Cooperatives has not done an effective job of performing a primary tenet of their ministry; starting cooperatives. Agricultural cooperatives are collaborative groups that sell maize to the government at prices fixed by the government. There were no cooperative groups in the Kaloko area and people were distrustful of cooperative arrangements due to a cooperative started by CLUSA that failed to provide any benefits for the members. In addition, surrounding areas did not have cooperatives and there were few training sessions for rural people on starting cooperatives. Cooperatives offer substantial potential for decreasing rural poverty. For example, the typical rural farmer sells maize to a buyer that visits rural areas or sells maize to a buyer in an urban area. These are middle-men and the prices are usually quite low, but after the harvest rural farmers are in desperate need of income to pay for household expenses. Farmers sell their maize to these buyers for 15,000-18,000 Zambian Kwacha per 50 kilogram bag (3.33-4.00 USD/50kg). However, through a cooperative, a farmer will receive a price of 36,000-40,000 per 50 kg bag (8.00-8.88 USD/50kg). This doubles their income potential and is an accelerated avenue out of poverty. This may also reduce the retaliatory actions from jealousy if everyone can access profitable markets. More time, money, and energy needs to be focused on cooperatives by the Ministry of Agriculture and Cooperatives.

**Agricultural Program Summary**

The technical successes of conservation and agroforestry techniques have been well documented in field trials, experiments, and the literature on such topics. Tangible benefits such as improved soil fertility, soil conservation, and increased productivity have

been observed by researchers and rural farmers. Government and non-government institutions are recognizing the benefits to rural farmers and are implementing these techniques into extension programs in the hopes of alleviating rural poverty.

However, funding for these institutions is limited and has prevented the scaling-up of these technologies. In addition, the inherent risk aversion by the rural poor has limited widespread utilization. Considering that agriculture is practiced by an overwhelmingly high majority of the population, more should be done to promote cooperatives and improved agricultural techniques to improve income and to maintain or improve production.

## Detailed Comparison Based on Primary Success/Failure Indicators

### Participation Overview

Participation is a key ingredient in any rural development program and is required by all of the stakeholders. Participation (like adoption to follow) has multiple definitions and meanings and is often as nebulous as "community," "development," or "conservation." Participation has been defined as:

> "an active process by which beneficiary or client groups influence the direction and execution of a development project with a view to enhancing their well-being in terms of income, personal growth, self-reliance, or other values they cherish" and as "the organized efforts to increase control over resources and regulative institutions in given social situations on the part of groups and movements of those hitherto excluded from such control." In combination, the two main elements of participation are that participation as a goal in itself and participation as a means to achieve improved social and economic objectives (Little, 2003).

Early rural development programs such as Integrated Conservation and Development Projects (ICDPs) often had low levels of local participation due to divergent goals, knowledge differences, local histories, class, status, and ethnic

differences (Wilshusen et al., 2003). However, the acknowledgment and need for community participation grew. Community-based proponents and conservationists quickly seized and supported the concept of participation in community development and conservation programs. The idea of participation in forestry was introduced in the late 1970's when development policy was shifting towards the provision of basic needs at the community level (Skutsch, 2000). Conservation programs have become participatory because of the rise in the number of stakeholders and the very nature of complex environmental problems requires a participatory approach (Berkes, 2003). Participatory development then shifted from a passive voice (such as in "basic needs development") into an active voice; one that included the local people's decisions (Campbell and Vainio-Mattila, 2003).

**Participation in JFM**

Local participation is a large component of JFM in Zambia. The legislation that established JFM, the Forests Act of 1999, specifically addresses this issue, "the participation of local communities, traditional institutions, NGOs and other stakeholders in sustainable forest management" (GRZ, 1999). Participation must start at the planning phase when forests and communities begin the process of JFM and the inclusion of traditional leaders is vital (PFAP II, 2005b). This usually begins with conversations with the area chief and subsequently the village headmen and communities that are in proximity to JFM areas. Local participation continues through the length of the JFM process: establishing JFM forests, electing VRMC members, establishing by-laws, and

working with the Forestry Department. It is here that I would like to begin my critique of participation within the JFM structure.

Once an area has been identified for JFM, a community meeting is usually held. At this meeting JFM is discussed and explained and a VRMC is elected. My experience was that attendance for such meetings was often high and questions and issues raised by both the FD and attendees were addressed. However, the election of a VRMC usually took place immediately after the discussion of JFM. This is a new concept for many people in rural areas and an opportunity to fully digest the process of JFM and to discuss it within communities may be preferable. Elections were conducted by a simple show of hands and are often hurried. To recognize gender issues, usually two to five positions are open exclusively for women. Having women participation on committees, no matter what the committee is established for (education, health, natural resources, etc.) is common in Zambia due to the recent push for gender inclusion by the government and various NGOs. The Zambian Forestry Department is well intentioned by having women participate, but often the gesture appears to be a token rather than true participation. Perhaps women should dominate the committee membership for quite frequently women are the ones that use the forest on a regular basis and have a greater dependence on forest resources.

Participation can involve risks as well. Stakeholders with expertise or influence such as those with training, education, or local elites with status and power can exercise control of the process and committee (Wycolff-Baird et al., 2001). For example, the person who holds the secretary position is usually a person that has had some formal education. Literacy rates in rural Zambia are low and those who can read and write in

English, the official national language of Zambia (despite seven regional languages containing over 70 dialects), are often selected as a committee's secretary. I mention this because this same person is often the secretary on other committees and although they are participating they have the same responsibilities to other committees and groups. This is a voluntary position and their time must be shared among these different committees and their obligations to their own livelihood and household. The point is that often some members have responsibilities within multiple communities and multiple committees. Election processes must investigate this and consider whether or not motivated community members may be over-committed already.

Continuing with the risks of participation, the status and power of local elites may alter true community participation. Decentralization of management authorities, like those found in JFM, can enable local elites to consolidate their power (Wycolff-Baird et al., 2001). The JFM process includes village headmen in the management committee. While this is a typical form of traditional-leadership inclusion and participation it can present instances of corruption, the hoarding of benefits, and a misuse of power, especially when funds are involved. There is no evidence to suggest this at present and my personal experience cannot support these claims. However, this has been significantly observed in the ADMADE program (Gibson and Marks 1995); a program of similar structure and principle in Zambia and, therefore, should offer some cautionary notes. This, of course, can lead to jealousy between committee members and community members. Jealousy is a force that is very strong in rural villages and community development projects. Jealousy can influence collaborative systems just as easily as in individual programs such as agriculture as previously mentioned. The agencies that are

funding or supporting these projects must recognize these internal conflicts that can arise through local participation.

The participation by the Zambian Forestry Department is also a factor. The funding for the FD is low and thus the ability for FD staff to initiate, develop, and support JFM programs in their catchment areas is also low. The participation by the FD in the entire scope of this process is minimal, usually due to budget constraints. Often extension agents feel helpless and unmotivated since they know what to do and how to go about doing it, but they are tethered to the FD and it's meager budgets for all of their forest extension activities, of which JFM is just a piece. As I mentioned earlier, the loss of staff, low morale, and small budgets for equipment transportation to monitor JFM activities can reduce the participation of the FD in the process. After all, JFM is a government-initiated program for devolved management and must involve participation by the FD for successful implementation, progress, and community partnership in the program. Caution must be exercised by the government here because when devolution or decentralization by government authorities occurs to increase local participation from citizens and those citizens discover that participation is largely illusionary then they can react with cynicism to the government (Manor, 2004) and erode collaborative processes.

**Participation in Agriculture Programs**

Agriculture, on the other hand, faces fewer pitfalls concerning participation. Agriculture is largely an individual or household endeavor and requires much less community involvement and participation. Participation in agricultural extension activities is voluntary and doesn't require collaboration with other individuals, groups, or

communities. Decisions to plant or not to plant specific crops are an individual's choice and these decisions are usually based on food requirements, market prices, and demand. Agriculture in rural areas, unlike forest use, is not communal, collaborative, or community-based. There are no communal fields for agriculture in communities. The exception being fields used for cash crop production for groups such as churches or community schools to raise income for their institution.

Agricultural programs in Zambia designed for food security and poverty alleviation address individual choice. All of the information, improved methods and technology, and training in conservation farming and agroforestry are available for farmers to either utilize or refuse. The workshops, training programs, and field demonstrations that I attended or facilitated in rural areas were all framed at demonstration and explanation. They allowed the individual to choose to participate in the training and choose to implement the information that was disseminated.

Based on my field experience, participation was usually high at such workshops and demonstrations. Often, the numbers of attendees at government-sponsored workshops had to be limited or restricted in order to effectively conduct the training. This indicates a high level of interest and desire to participate. Agriculture, being the primary form of livelihoods in rural areas, and programs related to agriculture generates high interest in rural areas. Subsequently, attendance and participation at such events is typically high due to the thirst for knowledge to improve their primary livelihood. However, this could be due to the infrequency of such events. The Ministry of Agriculture and Cooperatives is also poorly funded and has very few agriculture

extension agents at the district level to facilitate rural education and demonstrations. This could also explain that when agricultural workshops are held there is high attendance.

To sum up, increased production is at the heart of participation in programs that attempt to reduce poverty through income generation such as forestry or agricultural programs. To summarize Peter D. Little (2003), the experiences with local participation in social forestry programs have had to address the dilemma of conservation versus production or development. This issue is less important in farming systems because these are tied directly to production and income concerns.

**Participation Summary**

Participation is the first key to success for forestry and agriculture programs. Rural people participate in these programs in the hopes that there will be benefits from them. However, when there are no tangible benefits to be gained from participation in a program the people's participation will cease. Social forestry or community-based forestry programs often have a difficult time achieving tangible benefits when coupled with conservation requirements or stipulations *and* the sharing of benefits among multiple stakeholders. Concerning JFM, participation can be a means for stakeholders such as elites and power-hungry individuals to secure or usurp power and control over a participatory process. Thus, caution must be exercised by those involved in establishing collaborative programs. Furthermore, the FD must continue to participate in JFM. The lack of funds or low morale and subsequent lack of participation will only deteriorate existing programs. After all, it is called Joint Forest Management.

Conversely, participation in agricultural programs is based on individual characteristics. Agricultural improvement programs are specifically designed for increasing production or maintaining production through soil fertility improvement interventions and, as a result, generating income potential at the household level. The high interest in such programs is a result of the interest in improving production aimed at achieving household food security. Furthermore, the primary livelihood of rural Zambians is agriculture and the participation in agricultural programs is viewed as promoting and enhancing an existing livelihood strategy.

**Adoption Overview**

Participation in a program is often meaningless unless participants adopt the measures that are trying to be enacted; either in their own interest, in a communal interest, or in the interest of the parties attempting to enact a program. Adoption of programs, whether they be in forestry or agriculture, signals that the principals of the program are worthy of implementation by individuals or communities. However, adoption involves risk. It can be very risky for individuals or a community to adopt a new program or strategy that may be well-intentioned and aimed at improving their livelihoods, but are untested in personal experience. Most rural villagers in Zambia, as well as rural inhabitants across the globe, are risk-averse. It is very difficult to gamble on new and foreign activities when there is very little to gamble with.

**Adoption of JFM**

Regarding JFM in Zambia, the government accepted the risk and adopted a community-based program in the forestry sector largely due to the ADMADE program in community-based wildlife management and community-based forestry programs in surrounding countries. Zambia adopted participatory forest management with the possibility that it could lead to the improvement in the quality of the forest resource and that such an approach could be cheaper than conventional management practices (PFAP II, 2005a).

Certain communities in Zambia, as a result, have adopted JFM in their areas. The costs and risks of JFM are often borne by the communities as the above statement suggests. Local communities are sometimes invited to take on more of the responsibilities and costs of managing forests without obtaining a commensurate increase in the security of their rights, and thus are being put at risk (Arnold, 2001); something that is often against their innate behavior.

At present, there are few areas in Zambia that have adopted JFM and it is here that I want to express my concern. Adoption of JFM was often instigated by the FD in my experience and in talking with others that were involved in JFM implementation. JFM implementation was usually initiated by the FD as compared with communities pioneering their interest in the JFM program within their area. As previously mentioned, rural communities in Zambia are poverty stricken, illiteracy rates are high, health services are few, and overall, opportunities for climbing out of the perpetual rut of poverty are infrequent. Thus, any program initiated in a rural community is often greeted openly and with enthusiasm, regardless of the instigator - government, NGO, or private sector

stakeholder. Initially, people welcome new programs if they offer opportunities for increased household income. However, as programs become established, individuals will evaluate their personal risk and decide whether or not to adopt a program. They may continue to support the program verbally in the hopes of receiving benefits, but do very little to support the program pragmatically. Therefore, true adoption may be transparent. As commented on in the Introduction, this is simply a preliminary document that begs for further research and documentation to obtain a clearer picture of the facts and data concerning this issue.

**Adoption of Agriculture Programs**

Adoption of agricultural programs such as conservation farming and agroforestry has followed a different course in Zambia. Adoption, in addition to participation, involves individual choice. Adoption rates of conservation farming have proved highest in the agro-ecological regions of sporadic rainfall with strong extension services, input supply systems, and the availability and opportunity costs of labor such as in Zambia's Agricultural Region 1 (Haggblade and Tembo, 2003). Eastern Zambia falls within Region 1, but the extension services and input supply systems are intermittent due to low government funding, as mentioned above. Once practiced and adopted, conservation farming (CF) methods can save hand hoe farmers an average of 120 days per hectare for field seedbed preparation and weed control (Fowler and Rockstrom, 2001).

Adoption rates through participatory extension services can be increased by the encouragement of farmer innovations, utilizing indigenous knowledge, recognizing specific local opportunities, and supporting the formation of CF groups (Steiner, 2002). I

noticed that just simple encouragement by extension staff to farmers greatly accelerated adoption. Even if farmers were not doing CF methods precisely as they were instructed, the encouragement by staff and other farmers partaking in CF spurred their adoption of the method. One thing that should be considered here is that CF is drastically different than traditional farming methods in Zambia. Farmers have learned techniques from their parents and grandparents and they have done things the same way their entire lives. These things are ingrained in them. Thus, changing their farming methods involves uncertainty and risk. This is usually mitigated by farmers trying CF on just a small portion of their fields. Farmers can then evaluate for themselves the pros and cons of CF.

Continuing with agricultural programs, the adoption of a new technology such as agroforestry is influenced by economic and physical characteristics such as labor availability, credit, tenure, farm size, risk and uncertainty, human capital, and supply constraints of inputs such as fertilizer. In addition, the adoption of such technologies is influenced by the personal characteristics of farmers (Ajay and Kwesiga, 2003). This is something that should be stressed. In the literature and my personal experience, farmers that have more wealth can usually afford fertilizer and have very little interest in adopting agroforestry. Personal characteristics are also very important such as interest, motivation, and openness to new ideas and technologies. Furthermore, a farmer's decision to adopt agroforestry is governed by the interplay of macro-level factors (e.g. land tenure systems, institutional and agricultural policies) and individual-level factors, in addition to household-specific variables (e.g. age and education), and community-level factors (e.g. the presence of NGOs and the availability of markets) (Ajayi et al., 2003).

All of these factors are salient. A farmer that has a small field with declining soil fertility and that has no opportunity for relocation or shifting agriculture due to land tenure or population density is more likely to adopt agroforestry technologies as compared with a farmer that has wealth for inputs such as fertilizer and local power that can enable the farmer to establish new fields.

**Adoption Summary**

Adoption is the second key to success for forestry and agriculture programs. The poor adoption of JFM in the Kaloko area could be traced to either the failure of the community or the failure of the FD. As mentioned, rural Zambians are risk averse and quite often they engage in a "wait and see" policy concerning individual benefits. Individuals and communities could be viewed as performing this strategy, but based on my experience, the FD may be the party that did not truly adopt JFM by continuing to monitor and support JFM structures once they were established.

Adoption for agricultural programs is, once again, more of an individual choice based on a variety of factors. Cultural, social, personal, and economic factors influence adoption rates. Successful adoption is greatly propelled by the simple use of encouragement and increased monitoring may lead to higher adoption rates.

**Funding Overview**

Financial support of community-based programs is required to establish and implement projects within rural areas. Most projects need initial capital for design, the training of staff, the extension to communities for input, and the exploration of market

potential for community-based products. Most developing countries are not able to fund the development and implementation of such projects without external assistance and donors need to be linked to these projects (Seymour, 2003). In addition, the long term economic viability of projects must be evaluated to understand if the project will be sustainable without donor funding (Alexander and McGregor, 2000).

**Funding of JFM**

The Forestry Department in Zambia has severe financial constraints. It also has inadequate human and technical capacity to implement broad policy changes and to sustain the implementation of JFM even with donor support (FAO, 2007). Furthermore, the efficiency and cost-effectiveness of JFM implementation, based on funds used to date, demonstrates that this approach is not sustainable without donor funding (PFAP II, 2005a). The expansion of JFM in other areas of Zambia may be unappealing to donors given the amount of money required to establish and maintain the program. Donors and country/program recipients of funds are often under pressure to demonstrate success as early as possible and donors face pressure to move onto newer initiatives after a certain period of time (Seymour, 2003). The loss of funds and, as a result, the loss of staff needed to support community-based programs can quickly lead to program failure (Western, 2003a). As previously mentioned in regards to my personal experience, the funding for JFM in my area ceased approximately four years after implementation, which was just five months after my arrival in the area. This had obvious detrimental results that were discussed earlier.

**Funding of Agriculture Programs**

Agricultural programs in Zambia confront similar concerns. The government funds agricultural programs, but external donors supply a large amount of financial aid as well. These funds are used to support agricultural improvement programs in addition to direct food aid. The degradation of natural resources, in which livelihoods depend upon, has propelled many into a spiral of decreased food security and increased aid dependence (Fowler and Rockstrom, 2001). An incredible amount of money and food aid is donated to Zambia, most notably following a year of drought when individual and national food reserves (maize) are at their lowest. The result has been a cycle of dependency. Dependency syndrome was common in my area and across Zambia with some subsistence farmers. They believe that the government will give them help in the form of food aid if they do not grow enough food for themselves. Conservation farming and agroforestry programs offer potential to sever the strings of dependency and help rural farmers rely on their own efforts to insure their own future. Agriculture programs and research institutions such as the World Agroforestry Center (ICRAF) offer attractive alternatives to direct aid, either financial or food. These programs and institutions can help train and educate small-holder farmers in protecting and advancing their food security, improving livelihoods, and eventually reduce rural poverty.

**Funding Summary**

JFM and agricultural programs face severe funding limitations. Both programs do not get much support from the government, are reliant on external funding sources, and have low numbers of staff and extension agents. If donor support is questionable or

inflexible for the time consuming progress to establish these programs in rural areas, then these departments must use their resources wisely. Zambia can not depend on donors for continued support. Crises in donor countries could result in the complete dissolution of funds for recipient countries such as Zambia. These programs need to focus on individuals, groups, communities, and institutions that have received prior training and support from their efforts. Supporting and monitoring existing programs will be more beneficial in the long-term versus broadcasting their efforts over a large geographic area with low monitoring efforts. This will most likely result in low long-term adoption rates.

**Poverty Reduction Potential Comparison**

Both JFM and agricultural programs in Zambia offer the potential to reduce poverty. Poverty is commonly measured by thresholds of income or consumption, food security or lack of it, and, recently and more accurately, by evaluating multidimensional characteristics and causes of sustainable livelihoods (Warner, 2000), as previously discussed in the Human Use and Livelihoods section. JFM and the primary funding institution for the program, PFAP, state their overall objective as, "Improved livelihoods and status of forests in Zambia," which provided a clear poverty-focused rationale to the program's purpose of implementing a sustainable, collaborative forest management practice (PFAP II, 2005a). While reducing local poverty may be the most effective means of achieving environmental goals such as the "improved status of forests," this does not mean that community-based conservation must confront all dimensions of poverty. Conservation can be improved by supporting existing agricultural programs rather than new conservation initiatives (Little, 2003). Furthermore, forestry tends to be a

rather capital-intensive activity as compared to agriculture and formal forestry employment is probably not a major contributor to rural incomes (Wunder, 2001) such as large-scale timber harvests and the use of local forest guards in JFM.

These points, then, get at the heart of this paper. Which sector's programs, forestry or agriculture, are best suited for real poverty reduction? The answers aren't typically clear or easy, but the results, as submitted in previous sections, will be consolidated and presented below.

At this point in time, based on the literature and my personal experience in Zambia with these programs that are focused at reducing poverty, it appears that agricultural programs are performing better on many different levels. Agricultural programs have had greater success in terms of participation and adoption, which are a direct function of the tangible benefits that individuals receive or perceive that they can receive. JFM has succeeded in the formal process in terms of proceeding down the checklist for the creation of JFM in rural areas. However, it has not delivered in terms of local benefits, which makes agricultural programs more appealing to those whose primary livelihood is derived from agriculture. Most of the individual benefits of agricultural programs, both tangible and perceived, are nested in reducing personal food insecurity, income insecurity, and general poverty.

Poverty is felt at individual, household, community, regional, and national levels. However, an individual's poverty is often a motivating force greater than that of community poverty. Hence, there is the likelihood to adopt measures such as agricultural programs to alleviate personal and household poverty before community poverty. This does not mean that there is not a place for community poverty reduction programs such

as JFM. JFM is a means to complement poverty reduction efforts on community and regional scales. This, then, begs the question of the future of these programs in Zambia.

## DISCUSSION OF FIVE FACTORS

It is likely that Joint Forest Management will continue and certainly agricultural programs such as conservation farming and agroforestry will be promoted in Zambia. These are both aimed at improving livelihoods, increasing community and household income, and reducing rural poverty. For these programs to continue there must be a high level of support for these programs on many different scales: individual, community, local and national government, and international support.

Both of these programs have had varying levels of success in rural areas. If these programs are to continue and achieve their desired goals then the problems found within them must be addressed and rectified in order truly help the population and satisfy the external funding agencies. Based on my experience, agricultural programs appear to be more effective at improving livelihoods, food security, and offer greater potential for poverty reduction at this point in time. Within the above literature and my personal experience, there appear to be five major underlying themes or factors influencing success that merit further discussion. The factors are socio-cultural, historical, institutional, design, and benefit. These factors are not easily separated from each other for they are all interrelated and it is difficult to discuss one factor without mentioning characteristics of another factor, as suggested in Figure 3. An analysis of these factors will be presented below.

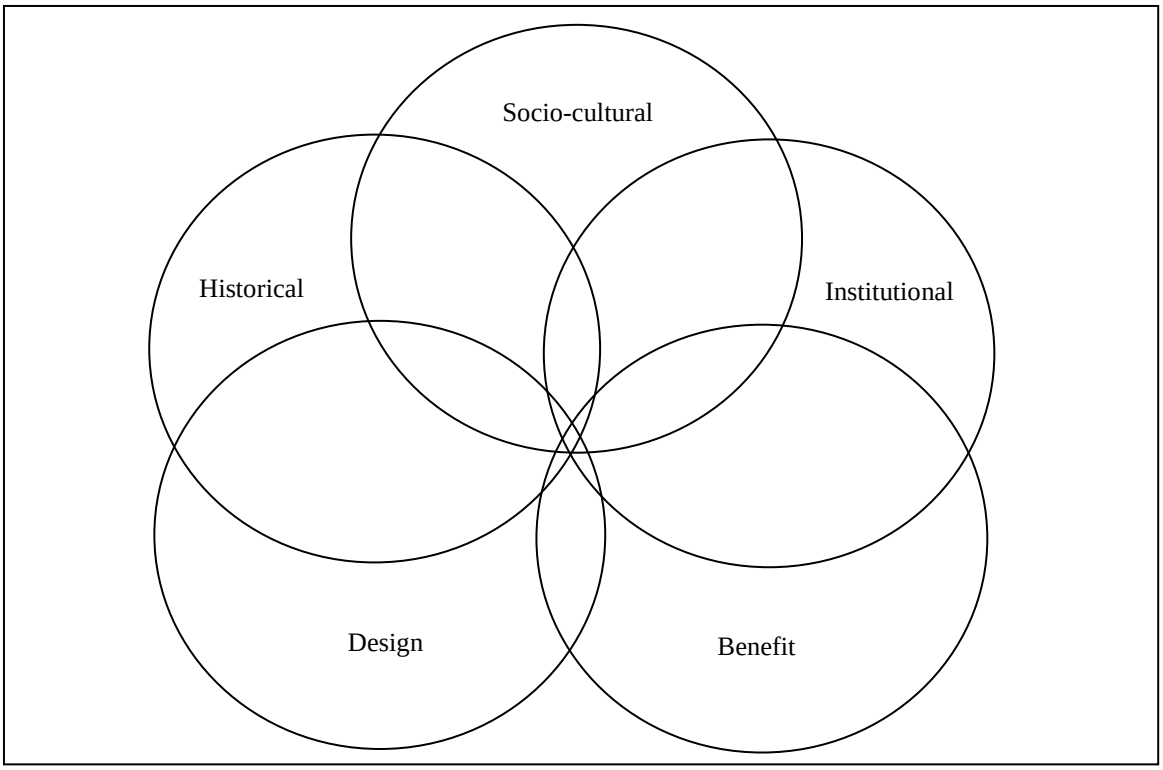


Figure 3: Five Factors Illustration

**Socio-Cultural Factors**

Social and cultural practices and norms play a role in successful project implementation. This is the way in which people respond to projects based on their cultural traditions and social norms. In the Kaloko area, three socio-cultural factors were identified that may affect the adoption of livelihood programs. These are risk aversion, jealousy, and the concept of time.

As discussed earlier, the rural poor are typically risk averse. When new development or livelihood improvement programs are introduced they are often openly welcomed, but individuals practice a "wait and see" approach to ascertain if the program is worth his or her's time, energy, or investment. JFM in the Kaloko area was introduced

and welcomed, but locals have been slow to invest much of their time and energy in the program due to risk aversion. They are not seeing or receiving many tangible benefits from the program and thus spend their time and energy in other more profitable livelihood strategies.

The same is true for agricultural programs. Risk averse people tend to evaluate conservation farming and agroforestry for at least one season and then chose to either adopt or abandon the methods. In my two years in the Kaloko area, people steadily adopted these technologies in growing numbers. These agricultural technologies offer greater individual benefits that are easily measured by rural farmers. Thus, the risk averse nature of individuals has been outweighed by benefits.

Jealousy or social risk is another motivating socio-cultural factor. As described earlier, communities tend to pull innovators back to the status quo and jealousy is rampant in rural areas. This can severely damage a program such as JFM for it has been well documented in the ADMADE program; a program of similar design. Jealousy can occur from the selection of committee members, the distribution of benefits, and the consolidation of power by committee members, village headman, or chiefs. Although this was not observed in the forestry program in the Kaloko area, it should be of concern. Once benefits start materializing through revenue sharing in the JFM program this will likely become more salient.

In agriculture, jealousy also affects innovators through the destruction of property, theft of crops, and by spreading false rumors. *Uzenguluka* or "back-stabbing" is a common form of jealousy. The following story is a description of how one of my key informants mitigated the possibility of jealousy.

I visited this innovator and key informant in his garden where I found him teaching a member of his village improved gardening techniques. I let him finish his discussion with the villager and then asked him what he was doing. He replied in Chinsenga that he was trying to help many people so that he could bring everyone up. What he meant by this was that if he helps bring everyone up to his level than everyone will do better. It could be argued that he is altruistic, but considering the prevalence of *uzenguluka* in Zambia and this community it is more likely that he is trying to preserve his own self interests. He is less likely to become the target of jealousy by helping others improve their livelihoods and raising them to his level.

Agricultural programs help all those who are interested and the knowledge sharing of improved agricultural techniques can mitigate the social risk of success. Also, the sharing of agricultural knowledge can help an individual's social standing. JFM in the Kaloko area at this time cannot be accurately evaluated in terms of social risk since it is not yet providing benefits and thus has not created an environment that is open to jealousy.

Lastly, the concept of time is a socio-cultural factor that needs to be addressed. For example, the village in which I lived, and the larger surrounding area, is dominated by the Nsenga people. In their local dialect the word for "today" is *lelo*. The local word for "yesterday," as well as "tomorrow" is *mailo*. In extremely poor rural areas, yesterday and tomorrow do not mean much. It is all about *lelo*. Learning from the past and preparing for the future is often difficult for people in poverty when the primary concern is on the "today." Conservation farming and agroforestry take some time to see the benefits, but is measured in months not years. For example, the benefits from

conservation farming can be seen in six months and the benefits from agroforestry can be seen in one year. However, the benefits from JFM have yet to be realized four years after its implementation in the Kaloko area. Tangible results and benefits must be achieved quickly for locals to invest in the program, which enable people to think about and plan for *mailo*.

In summary, risk aversion, jealousy, and the concept of time all contribute to the greater success of agricultural programs versus JFM. The lesson learned from these examples is that social and cultural factors can affect programs introduced into rural areas and failure to recognize this factor can lead to problems and program failure.

**Historical Factors**

The prior history of programs aimed at improving livelihoods can influence the success or failure of current programs with similar goals. Failures by prior programs create distrust and resentment and limit the success of well-intentioned programs; for example, the efforts of CLUSA that I experienced in the Kaloko area.

CLUSA, the initial funder of JFM in the Kaloko area, started numerous projects that had limited success and directly affected the success of subsequent projects. First, CLUSA started an agricultural co-operative in the JFM area. This co-operative was focused on producing and marketing peanuts and paprika, which are products that have a high market value and offered potential at improving income generation. This co-op was in its decline when I arrived in Kaloko. The responses that I received from key informants were that the co-op was not providing them with benefits. One woman reported to me that the work that was required for the planting, harvesting, and shelling

of peanuts for the co-operative were not worth the financial benefit and that it was preferable to keep the harvest for home consumption. The co-op was in disarray and many complained of not benefiting from membership in the co-op, especially since there were membership fees. Many were jaded about future co-operative initiatives since they paid for membership in a program that didn't return substantial benefits from the sale of peanuts and paprika.

The importance of this type of prior history is illustrated by the community's response when a Cooperative Extension Agent from the Agriculture Department came to the Kaloko area to discuss the formation of an agricultural co-operative through the Agriculture Department. This type of co-op is focused on the sale of maize, which is the primary agricultural product in Zambia. The interest in this type of co-operative was high, but the prior history and failure of the CLUSA co-op created skepticism and allowed for a resurgence of negative views on co-ops. The co-operative attempted by the Agriculture Department did not develop past the introductory meeting due, in large part, to the failure of the previous co-op.

In addition, CLUSA attempted to promote conservation farming with certain individuals called lead farmers. While this was appropriate and well-intentioned, the farmers trained in these methods years ago did not continue CF techniques. This reveals the need for continued monitoring and recognizing that a prior history of workshops and trainings may not have been performed correctly.

Finally, CLUSA attempted tree planting efforts around certain villages and also attempted to start tree nurseries at rural schools for the sale of ornamental and fruit trees. Most of these projects failed due to the lack of interest from villagers and school staff.

All of these historical factors have relevance for both JFM and agricultural programs. If JFM attempts to incorporate projects such as tree planting and nurseries within their program then the FD would be wise to recognize these past failures and correct their implementation by helping rural peoples to see the benefits of such efforts. That is, if they are even salient to rural peoples. Agricultural programs also must recognize and understand the prior history in an area.. The failure of the CLUSA co-operative and the lack of adoption in conservation farming from the CLUSA trainings can create problems in the future as demonstrated by the mistrust of the Agriculture Department's co-op before it began.

**Institutional Factors**

Institutional factors are those that are grounded within the government, the department, the program, or the staff. They occur at many different scales and can directly affect the success of a project in the field. Institutional factors in the Kaloko area are the direction of program implementation and funding.

JFM implementation has largely been a top-down affair. The program was conceived and created at the national level and implemented by the FD to rural communities. JFM in Zambia was not a grass-roots effort initiated by people at local scales. JFM has a somewhat rigid format and prescriptive measures such as user groups, bylaws, and revenue sharing. Agricultural programs are initiated by government and non-government agencies, but they are directed at rural farmers in such a way that allows them to decide whether or not to adopt the method and also allows them the freedom to experiment and modify the technologies as they see fit.

The institutional factor of funding has more negatively affected JFM as compared to agricultural programs. Both sectors are poorly funded for extension efforts, but agricultural programs appear to be having greater success with the limited funds at their disposal.

For example, the first District Forestry Officer in the area was not very involved in the JFM process and had what appeared to be little interest in local forestry issues as a whole. CLUSA was spearheading the extension operations and he had a small role in JFM's implementation in the field. It appeared that he was allowing CLUSA staff to perform the duties of the Forestry Department. Instead of collaboration, information exchange, and capacity-building within the FD, the FD staff was largely coasting along from the outsourcing of JFM extension. Extra staff and funds from CLUSA during the period of appropriate funding for JFM implementation in the Kaloko area enabled the FD staff to become lackadaisical. The DFO's general malaise became clear once he revealed that he was to work and study abroad in another country and continent.

As a result of staff loses, the remaining FD personnel often have a low morale concerning FD operations and the uncertain practical continuation of JFM (PFAP II, 2005b). Once again, this was observed with the subsequent District Forestry Officer after the support and funding for CLUSA staff and extension activities ceased. The lack of funds to do extension work in JFM and collaborative forest management left a highly motivated and energetic person feeling disenchanted with the FD since he was unable to execute extension efforts due to the lack of funds and he expressed this to me on numerous occasions.

The funding issues were quite apparent in the Kaloko area. Funding for JFM was initially supplied by CLUSA and later assistance from PFAP. Both have similar goals and objectives regarding JFM. CLUSA had been involved in JFM in the Kaloko area since 2000 and started collaborative activities with communities in 2002. However, by the end of 2004 (five months after my arrival in Kaloko) the funding from these organizations ended. Village Resource Management Committees (VRMCs) in the Kaloko area had been elected and a forest guard had been trained, but VRMCs had not drafted by-laws for their area. Most extension activities to continue the capacity-building process for forest management ceased, but the FD staff still expected these committees and communities to do policing efforts and issue forest licenses.

Near the end of my stay in Kaloko a timber business from the provincial capital was in the Kaloko area harvesting trees. I asked the DFO about these individuals and he commented that they had purchased licenses from the FD to cut trees in the area, but "they (the VRMC in Kaloko) should be doing their own licensing by now." However, the VRMC in the Kaloko area was not trained to the point that they could proceed without FD support. This demonstrates the lack of true support by funding agencies and FD staff to proceed with JFM to the point that communities can manage local forest resources in collaboration with the FD. Furthermore, it appeared that the FD in the Kaloko area was not interested in collaborating with organizations that offered little or no funding potential for the FD to continue JFM, regardless of opportunities to improve forest conservation.

In addition, JFM's problems are further compounded by the fact that Zambia's miombo forests are poor in commercial timber species with the exception of two

hardwood species and there are few areas in the country that have profitable commercial timber reserves (GRZ, 1997). Plus, the market and income potential for NTFPs such as honey from beekeeping or indigenous fruits is small due to seasonal supply, poor economic potential or insufficient markets (Leakey and Simons, 1998; PFAP II, 2005b; Wunder, 2001).

Finally, JFM must be honest about its severe financial limitations. As Arnold (2001) states, "It is a mistake to think that community forestry is necessarily a low-cost route to sustainable forest management." Continued funding of this program with very few results for the forest department and for local communities in terms of economic gain and the conservation or sustainable use of the forest resource will cause external funding agencies to question their involvement. Communities will also question their involvement in these programs. JFM should not be started in areas where they can not be sustained financially, either by external donors or from JFM forest products, because this will erode community solidarity, trust, and future cooperation (Bwalya, 2004).

As a final note, the funding for pilot areas in JFM are limited to just three of the nine provinces of Zambia and the funding will cease at the end of 2008. This begs many questions for it is difficult to set time frames and limitations to a process that is continually evolving and often in need of external support and facilitation from the FD. Hopefully, these areas will have had sufficient training in all of the aspects of JFM so they can continue forest management without the assistance of the FD based on external funding sources.

Agricultural programs have similar funding constraints, but their programs are designed for information dissemination. Those that are educated in improved farming

techniques have the liberty to choose to adopt the technique or not. Continued monitoring can help increase adoption rates, but that is unlikely without further funding. However, the steady adoption and information sharing by farmers demonstrates that minimal funding does not affect the success of agricultural programs as severely as forestry programs.

**Design Factors**

How a program is designed for the use and participation by rural communities can affect the success of such programs. The structure and mechanics of a program such as JFM can have serious flaws as compared to agricultural programs that rely on individual choice and adoption.

At this point in time, JFM faces many problems and areas of concern for communities, the government, and the program itself. The need to draw on the lessons learned from other community-based programs should be paramount for JFM. PFAP itself, the primary funding agency for JFM in Zambia, admits that it lacks documented lessons from other related projects such as the community-based wildlife program in Zambia (PFAP II, 2005a).

Community-based wildlife management has existed for decades in southern Africa and Zambia has its own CBNRM program for wildlife, ADMADE, as discussed above. JFM is closely modeled after the ADMADE program, which is modeled after the CAMPFIRE program in Zimbabwe, and could learn some valuable lessons from these.

First, there is the issue of revenue sharing. In the ADMADE program, the prescriptive allocation of revenues from safari hunting is meant to return 35% of the

proceeds from hunting licenses to community development. However, this often varies and is usually well below that allocated percentage. Revenues are spread thinly across large numbers of communities, are often misappropriated, or there is high taxation on the profits and communities don't view conservation as beneficial when there is low compensation for such efforts. This does not bode well for internal sustainability and the continued support from external donors is often required (Bwalya, 2003). JFM's revenue sharing tenant is similar and has not been realized in most areas including Kaloko. Further donor support will likely be needed. In fact, a definitive percentage of revenues from fees and licenses has not been legally defined within the Forests Act of 1999 or the Statutory Instrument No. 47 of 2006. Until a meaningful percentage for communities is prescribed there will continue to disagreement, conflict, and a perceived lack of tangible benefits among the stakeholders.

Second, the ADMADE program has often been initiated and developed in a top-down format by external agents and has succumbed to the influence of power-hungry chiefs and other rural elites (Matenga, 2002). The ability of elites to secure power and control for themselves, to influence elected positions such as village game scouts (similar to forest guards in the JFM program), and their power to manipulate the overall agenda of the program (Gibson and Marks, 1995) should be of concern for JFM since it closely follows a similar path by including traditional leadership. For example village headmen are included in VRMCs and area chiefs are included in the overall JFM structure.

Third, site specificity is key in any community-based program. Communities vary over geographic areas and programs must be tailored to appropriately meet the needs and concerns of communities. CAMPFIRE has failed miserably in parts of

Zimbabwe (Alexander and McGregor, 2000; Hughes, 2001; Murphee, 2005) and ADMADE has failed in parts of Zambia (Marks, 2001) due to a variety of factors that were not addressed in project implementation and ultimately led to the failure of these programs in certain areas.

Fourth, there is the need for adaptive management. Adaptive management has been a key feature in the ADMADE program by innovating and testing new methods and accepting mistakes as part of the learning process (ADMADE, 1999). If communities are not allowed to adapt and change to internal and external variables they are then constrained to the status quo when the natural resource is favored over the needs of communities. The lack of adaptive management can lead to "forced primitivism," that is, that residents must remain doing what they are doing (Hackel, 1999). This will inevitably result in conflicts between resource users and management entities. JFM must be allowed the flexibility to experiment and learn from its successes and failures.

Another similarity between community-based wildlife programs and forestry programs such as JFM is the issue of legitimacy. Past experiences in the wildlife sector suggest that when there is a lack of tangible benefits for communities, a distrust of government agency motives, or a history of transparency and accountability failures the entire program will lack legitimacy (Alexander and McGregor, 2000; Hughes, 2001; Bwalya, 2003). JFM will cease to have legitimacy among local populations if it fails to deliver pragmatic benefits in an honest an open fashion.

Finally, the design of JFM's User Groups is an area of concern. User groups are largely determined by the FD. At a JFM community meeting for the establishment of user groups within the Kaloko area it appeared that the FD extension staff was steering

the villagers into forming certain user groups. The staff asked meeting members how they used the forest and what forest products were used and collected. All of this was appropriate for they subsequently created user groups for timber, medicine, and firewood. However, user groups were also created for carvings and clay pots. Carvings are not a popular livelihood strategy in this area and, in fact, there were no individuals that I encountered making carvings, unless one includes tool handles as carvings. Furthermore, clay pots are not a dominant livelihood activity and such products are traded locally. The selection of a clay pot user group headed by female membership may be a token of gender inclusion for the market potential of clay pots is small. Kaloko village is 20 miles from the nearest urban center where such things could be traded in large quantities. Carvings and clay pots do not realistically offer income potential in this area.

An additional example of the failure to match initiatives with local livelihood activities previously mentioned stems from when I attended a provincial forestry meeting where these issues were raised. One DFO from a different district commented on a basket-making user group in which he said, "How many baskets can we make and sell?" Baskets are also traded and sold locally. Some communities involved in JFM may have better market potential for such products, but his comment reveals that there are obvious supply and demand issues involved in marketing these products. In summary, the variability in market potential across Zambia reveals significant design faults in the JFM program; specifically the selection and establishment of user groups that are not relevant to local conditions.

In general, agricultural programs face some design problems also. The low numbers of agriculture extension staff, the low institutional support, and the low access to

information for agricultural services will continue to be a problem for the rural population. Agricultural policies will further complicate matters. The government policy of encouraging maize production throughout Zambia by subsidizing prices has changed the eating habits to favor maize. In contrast, the consumption of more traditional drought-resistant crops such as sorghum, millet, and cassava have been reduced or abandoned (Chizuni, 1994). Plus, policies have often lacked private sector support and participation, lacked incentives and credit institutions for small-holder farmers, and the overall lack of infrastructure improvement for marketing opportunities (Njobvu, 2004).

Also, market opportunities need to be stressed. The access to trade and markets for rural populations in agricultural growth and development is the key to poverty alleviation (Wunder, 2001). Market opportunities for rural villagers are usually limited and potential profits from agricultural products are often siphoned off by middle-men that give minimal prices to rural producers. Improved markets vis-à-vis agriculture cooperatives are potential avenues for greater producer profits. This is a hallmark of the Ministry of Agriculture and Cooperatives, but often rural communities have difficulty engaging in a cooperative measure that is largely based on individual effort such as farming, as discussed above.

Finally, the use of NGOs in agricultural activities suggests a large push for improving rural production. These organizations are often very helpful in disseminating knowledge of improved agricultural techniques, but it illustrates the paralysis of the government (Feldmann, 2003), policy, and general agriculture information circulation.

Specifically, agricultural programs such as conservation farming and agroforestry face certain challenges and problems for successful implementation. A discussion of the

problems facing conservation farming followed by a discussion of agroforestry problems are presented below.

While I was discussing conservation farming (CF) with an agriculture extension agent in Zambia, he commented that CF should be made mandatory in legislation for drought-prone agro-ecological regions such as in southern and eastern Zambia. Fowler and Rockstrom (2001) would agree. They argue that policies and legislation need to be developed to promote CF. They also argue that the major constraint to further adoption was the transfer of knowledge, the need for information exchange networks, and the need for agricultural extension staff and NGO staff to be exposed to successful CF practitioners to learn more participatory research-extension techniques (Fowler and Rockstrom, 2001). Finally, on a more pragmatic level, common rural farming practices often impede those that attempt to follow CF guidelines. For example, a major tenet of CF is to leave prior crop residues for mulch and soil improvement. This is often negated by grazing animals that browse on the residues or through consumption by uncontrolled bush fires (Ajay and Kwesiga, 2003), which are common in Zambia. The scaling-up of conservation farming in the future will be a challenging task.

Scaling-up agroforestry will also be a problem. Numerous factors cause problems for rural farmers to engage in improved fallow technologies. Environmental factors such as leaf-defoliating insects and drought (Kwesiga et al., 1999) and customary/cultural factors such as free-range cattle grazing and brush fires (Ajay and Kwesiga, 2003; Kwesiga et al., 1999) result in the abandonment of agroforestry technologies. Brush fires were a major complaint by farmers in the Kaloko area. Often their time and labor was wasted due to human-caused brush fires that destroyed their improved fallow

agroforestry trees. Labor factors such as the inability to establish their own improved fallows because of time spent working in fields of others for additional income and the need to establish fallows every 2-3 years after the cropping phase in agroforestry systems can also limit widespread uptake (Ajayi et al., 2003; CTA, 2002). Finally, the lack of seed for these agroforestry species or the misuse of appropriate species for a given area can result in failure (Chirwa et al., 2003) and should be considered for the future promotion of agroforestry technologies.

However, the simple encouragement of improved agricultural techniques by extension staff has significantly improved the adoption of these techniques and continued monitoring will likely lead to further success.

**Benefit Factors**

Direct, tangible benefits gained by individuals and communities are the final factor in the evaluation of JFM and agricultural programs. This is most likely the most salient factor for rural communities and directly dictates their involvement, participation, and adoption in such programs. The benefits may not be measured solely in economic terms. Benefits may also include increased time saved, labor reduction, or overall livelihood improvement.

Sadly, at this point in time, there is very little to comment on concerning JFM. It simply has not provided tangible benefits for the rural populous of the Kaloko area. The program has been implemented, the structures are in place, and awareness has been raised concerning JFM and the need to protect, conserve, and wisely use forest resources, but there have not been any direct benefits to individuals, households, or communities in the

Kaloko area with the exception of beekeeping. The FD has had some success in providing and enhancing a supplemental income generating activity such as beekeeping by providing training on such topics and establishing a market within the FD for comb honey.

Conversely, agricultural programs such as conservation farming and agroforestry have provided many direct, tangible benefits that can be observed or perceived by individuals and households. These have been discussed at length above, but some of these include increased soil fertility, increased labor productivity, fodder for livestock, fuelwood supplies, erosion control, water retention and conservation, increased crop yields, and improved nutrient cycling all of which lead to sustainable land use.

These benefits help individuals and natural resources, in which their livelihoods depend upon. This has helped rural farmers realize the potential for improving their livelihoods while maintaining natural resources in a win-win fashion. Agricultural programs also offer the benefits of reducing foreign and domestic aid (food and economic) by severing the dependency syndrome and reducing rural poverty. Numerous key informants commented to me how these programs (conservation farming or agroforestry) allowed them to rely on themselves and on their own efforts. Most of the comments were to the effect of that "we cannot rely on the government to help us," "we must pull ourselves up by our own bootstraps," or "we must solve our own problems and these methods help us do that."

**Summary**

Both JFM and agricultural programs face serious problems if they are to substantially improve rural livelihoods and incomes and meet the overall goal of reducing poverty. Both need to learn from past mistakes and failures from similar programs in Zambia, as well as surrounding southern African countries and both need to learn from the above mentioned five factors that can influence program success or failure.

Specifically, JFM's problems are grounded in following the ideology of programs such as ADMADE and CAMPFIRE without learning from their previous mistakes and failures. JFM is likely doomed to repeat these and will incur similar results at the expense of communities and the program as a whole. Agricultural programs also need to learn from their prior mistakes and misapplications since adopting new technologies at the rural level is at the expense of inherent and ingrained local agricultural knowledge and may possibly reduce food production. This can result in a lack of trust, cooperation, or the disregard for future programs.

Agricultural programs offer greater potential in avoiding, achieving, mitigating, or solving the five factors of success or failure as compared to the current forestry program of JFM. Agricultural programs can more easily deal with risk aversion, jealousy, and the concept of time to mitigate socio-cultural factors. Historical, institutional, and design factors are currently in favor of agricultural program adoption. Finally, the benefit factors clearly favor agricultural programs as compared to JFM for they are more easily perceived and measured.

The key for JFM as well as agricultural programs aimed at conservation and poverty alleviation is involvement, inclusion, and participation. Participation in long-

term conservation efforts tends to be associated with higher income and lower rates of poverty and income equality and, at present, both agricultural and forest activities generate very little income for rural residents (Bwalya, 2004). Thus, there is tremendous need to demonstrate that these activities can provide tangible benefits for rural peoples; benefits that can be measured in both conservation and economic terms. The scaling-up of these programs is best described by Franzel et al. (2004) in regards to agroforestry, but it is relevant to all programs in Zambia, by "bringing more quality benefits to more people over a wider geographical area, more quickly, more equitably, and more lastingly."

## CONCLUSIONS AND RECOMMENDATIONS

Joint Forest Management and agricultural programs are both facing limitations at this point in time. Obviously, funding issues are paramount for these programs and most of the problems and constraints to successful implementation are rooted in inadequate budgets. Low numbers of extension staff, few and infrequent training opportunities, limited information sharing, plus infrequent monitoring and evaluation procedures all have their origins in the meager financial situations of these departments. However, improvements can be made with existing financial constraints. Furthermore, recommendations for the improvement of JFM and agricultural programs around the village of Kaloko may have wider utility for other districts in the Eastern Province and the nation as a whole.

Regarding the implementation of CBNRM in Zambia, specifically JFM, there needs to be a change in the assumptions. There must be extensive institution building before CBNRM can be effectively applied, educational efforts should be increased especially in the social and environmental benefits of community-based programs, and that stakeholder conflict and heterogeneous interests are the norm, rather than the exception (Kellert et al., 2000). The socio-cultural pitfalls of risk aversion and, specifically, social risk and jealousy can create stakeholder conflicts and impede the progress of programs. In addition, JFM and agricultural programs must consider the socio-cultural concept of time. Although almost all extension staff with the forestry and agricultural sectors are Zambian and they know how slow things can proceed in the village and Zambia in general, they must recognize that an individual's interest,

participation, and adoption of programs wanes as the length of time increases to receive direct benefits.

JFM and agricultural programs must recognize historical factors. A prior history of failure or continued failure will preclude adoption of such programs in the future. This is most apparent for JFM. Slow adoption and limited benefits of the JFM program in the Kaloko area coupled with the meager results of CLUSA/FD-initiated agricultural co-operatives greatly affected the success of the program and compromised the ability of the Agriculture Department to promote a co-operative that was directed at the staple food crop.

In the Kaloko area, institutional factors such as JFM initiation in a top-down fashion and the application without a full complement of capacity-building skills for local institutions helped create a lack of complete adoption. Local institutions that were deficient concerning a complete toolbox of JFM skills were then expected to fulfill the duties and obligations without being properly trained. Much of this can be traced back to a lack of funding. As a result, this can slow down the process and should be recognized and calculated in project implementation. The FD would be wise in using the funds at its disposal for solidifying one pilot JFM area before expanding the program in other areas to simply satisfy donors on the basis of numbers of programs implemented. These issues must be addressed and resolved before a project begins to reduce the likelihood of stagnation, disillusionment, and subsequent failure.

JFM in the Kaloko area and nationally needs to have design adaptability on many different levels. The ability to adapt to local conditions and to adapt policy to reflect local and social conditions is required. Legislation should follow the objectives of the

project and not program objectives chasing the legislation (PFAP II, 2005b). Furthermore, JFM needs to realize where and when it is not working in an area. Community projects should target communities that have had a successful record with collective management or those with little or no formal experience. Projects should be limited in communities that experience many failures. Government and external organizations should desist from starting community projects in which they are incapable of sustaining, which can lead to eroding community solidarity, trust, and cooperation (Bwalya, 2004). The FD in the district of the Kaloko JFM program would be wise to consult other government departments such has health, education, water and sanitation, in addition to NGOs that have projects or programs in rural areas. Consultation with these parties may help in discovering if there are existing productive and successful collaborative groups in areas that are being evaluated for JFM implementation. This could help reveal levels of cooperation and collaboration in community or commons projects and learn if there are existing disputes or conflicts.

Furthermore, JFM must learn from the ADMADE program within its borders and the CAMPFIRE program in Zimbabwe regarding wildlife management in order to avoid the pitfalls in a forestry program that is structured similarly. After all, programs that "fail" are not failures if they learn and adapt from their mistakes. JFM must think critically and objectively when establishing new JFM areas. The quality and quantity of timber and non-timber forest products, successful markets for these products, the selection of appropriate user groups, the true potential for communities, and the overall sustainability for all of these must be considered before starting JFM in a rural area.

Agricultural programs could also use their existing budgets more efficiently by improving the design, timing, and consistency of demonstrations, trainings, and workshops. Scaling-up conservation farming and agroforestry requires using funds for demonstrations before the planting season, followed by extensive monitoring. Working with smaller numbers of farmers or using budgets to do more monitoring with those that have been trained could improve adoption rates. Farmers that continue to use introduced technologies successfully and appropriately will be in a position to educate other rural farmers, thereby performing the role of agriculture extension staff without direct assistance.

Agricultural programs should also focus more of their extension efforts in a holistic manner. Agriculture is a year-round activity and extension should be provided on food storage technologies and farmer co-operatives. Improved yields from the use of conservation farming and agroforestry are negated by post-harvest pests and insects in poor grain storage devices. Workshops or trainings during or immediately following the harvest period could help farmers protect their food reserves and improve food security. In addition, continued education on co-operatives must be performed. The formation of co-operatives in rural areas can give farmers access to markets with higher prices and can double their profits from maize sales. This offers a pathway out of poverty and more education in this area is needed.

Most importantly, these rural livelihood improvement programs must recognize that benefit factors are the most salient for individuals, households, and communities. Of the five factors that precipitated from this analysis, all of these eventually are tied in some form or hinge on direct, tangible benefits. JFM has provided few benefits at this point in

time, but agricultural programs have generated steady interest and adoption through real, tangible benefits for farmers. This, in turn, can help in reducing the cycle of dependence and rural poverty.

Generally speaking, both JFM and agricultural programs need to utilize the non-government sector more. Budgets for these programs, which are derived from national income and external sources, are insecure and subject to fluctuations. NGOs in Zambia are often well financed and their use and collaboration with government programs should be expanded. NGO missions are usually aimed at poverty reduction and the goals of government projects can easily mesh with NGOs. However, caution should be exercised so that the objectives of government programs are not misdirected by secondary missions of NGOs.

Finally, there must be greater synergy between the forestry and agriculture departments. Increased collaboration and coordination between them would help them to improve rural livelihoods, conserve natural resources, and reduce poverty. Community-based projects designed to tackle poverty and improve conservation efforts can succeed by supporting existing agricultural programs (Little, 2003). Conversely, agricultural programs can assist community-based forestry programs by improving soil fertility and maintaining yields, thereby reducing the need to convert forested lands into agricultural areas. Zambia's forestry and agriculture sectors must collaborate because, once again, community forestry projects can have as much to do with agriculture and agroforestry as with forests by themselves (Arnold, 2001).

Overall, agricultural programs in Zambia are doing better than JFM with the resources at their disposal, but the evaluation of forestry and agricultural programs

warrants further research. Based on the literature and my personal experience, agricultural programs are performing better in the Kaloko area in terms of local interest, participation, and adoption on the basis of livelihood improvement, food security, achieving the five factors of success, and the potential for poverty reduction. The primary livelihood and food source for rural people is agriculture and benefits from agricultural programs are more timely and easily perceived by locals. Forests will continue to be a safety net and there is a need for forestry programs such as JFM, but the benefits have been slow to materialize.

Zambia's ecosystems are as unique and diverse as the peoples that inhabit them. The co-evolution of the environment and local peoples have produced ecosystems, cultures, and livelihood options that are unique and definitely worth preserving. Improvements in forestry and agricultural programs that identify and rectify problems in the rural socio-cultural environment, their respective history, institutions, program design, and benefit allocation will greatly aid the management, use, and conservation of natural resources while simultaneously increasing the ability of rural communities to maintain their livelihood options, reduce food insecurity, and alleviate poverty.

## REFERENCES


ADMADE Foundation. 1999. ADMADE - Communities Managing Wildlife to Raise Rural Standards of Living and Conserve Biodiversity. Retrieved March 15, 2004 from http://www.usaid.gov/zm/Docs/so1/ADMADE_Foundation_Part1.pdf.

Agrawal, Arun and Clark C. Gibson. 1999. Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* 27 (4): 629-649.

Ajayi, O.C., S. Franzel, E. Kuntashula, and F. Kwesiga. 2003. Adoption of improved fallow technology for soil fertility management in Zambia: Empirical studies and emerging issues. *Agroforestry Systems* 59: 317-326.

Ajayi, O.C. and F. Kwesiga. 2003. Implications of local policies and institutions on the adoption of improved fallows in eastern Zambia. *Agroforestry Systems* 59: 327-336.

Alcorn, Janis B. 2005. Dances around the Fire: Conservation Organizations and Community-Based Natural Resource Management. In Brosius, J.P., A.L. Tsing, and C. Zerner (Eds.) *Communities and Conservation: Histories and Politics of Community-Based Natural Resource Management* (pp. 37-68). AltaMira Press.

Alexander, Jocelyn and JoAnn McGregor. 2000. Wildlife and Politics: CAMPFIRE in Zimbabwe. *Development and Change* 31: 605-627.

Alwang, Jeffery, Paul B. Siegel, and Steen L. Jorgensen. 1996. Seeking Guidelines for Poverty Reduction in Rural Zambia. *World Development* 24 (11): 1711-1723.

Arnold, J.E.M. 2001. Community Forestry: 25 Years in Review. FAO, Rome, pp. 1-128.

Baker, M. and J. Kusel. 2003. *Community Forestry in the United States: Learning from the Past, Crafting the Future*. Island Press.

Belsky, Jill M. 1999. Misrepresenting Communities: the politics of community-based rural ecotourism in Gales Point Manatee, Belize. *Rural Sociology* 64 (4): 641-666.

Berkes, Fikret. 2003. Rethinking Community-Based Conservation. *Conservation Biology* 18 (3): 621-630.

Bohringer, Andreas, Elias T. Ayuk, Roza Katanga, and Stephen Ruvuga. 2003. Farmer nurseries as a catalyst for developing sustainable land use systems in southern Africa. Part A: Nursery productivity and organization. *Agricultural Systems* 77 (3): 187-201.

Bray, David Barton, Leticia Merino-Perez, Patricia Negreros-Castillo, Gerardo Segura-WWarnholtz, Juan Manuel Torres-Rojo, and Henricus F.M. Vester. 2003. Mexico's Community Managed Forests as a Global Model for Sustainable Landscapes. *Conservation Biology* 17 (3): 672-677.

Brechin, Steven, Peter R. Wilhusen, Crystal L. Fortwangler, and Patrick C. West. 2002. Beyond the Square Wheel: Toward a More Comprehensive Understanding of Biodiversity Conservation as Social and Political Process. *Society and Natural Resources* 15: 41-64.

Brechin, Steven, Peter R. Wilhusen, Crystal L. Fortwangler, and Patrick C. West. 2003. The Road Less Traveled: Toward nature Protection with Social Justice. In S. Brechin, P. Wilhusen, C. Fortwangler, and P. West (Eds.), *Contested Nature: Promoting International Biodiversity with Social Justice in the Twenty-First Century* (pp. 251-270). Albany, NY: Statue University of New York Press.

Bromley, Daniel W. 2003. Economic Dimensions of Community-based Conservation. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 428-447). Washington D.C.: Island Press.

Brosious, Peter J., Anna Lowenhaupt Tsing, and Charles Zerner. 1998. Representing Communities: Histories and politics of community-based natural resource management. *Society and Natural Resources* 11: 157-168.

Bwalya, Samuel M. 2002. Community based wildlife management in Zambia: a critical analysis of experiences from the Blue Lagoon Game Management Area. Paper presented at the Ninth biennial conference of the International Association for the Study of Common Property (IASCP). Victoria Falls, Zimbabwe, 17-21 June 2002.

Bwalya, Samuel M. 2003. Understanding Community-Based Wildlife Governance in Southern Africa: A Case Study from Zambia. *AJEAM-RAGEE (African Journal of the Environment and Management)* 7: 41-60.

Bwalya, Samuel M. 2004. Rural Livelihoods and Collective Action in Joint Forest Management in Zambia. Retrieved February 13, 2007 from http://www.saga.cornell.edu/images/cau-bwalya.pdf

Campbell, Lisa M. and Arja Vainio-Mattila. 2003. Participatory Development and Community-Based Conservation: Opportunities Missed for Lessons Learned? *Human Ecology* 31 (3): 417-437.

Carney, D. 1998. Implementing the sustainable livelihoods approach. In D. Carney (Ed.) *Sustainable rural livelihoods: what contribution can we make?* London, UK, Department for International Development.

Cauldwell, A.E., and U. Zieger. 2000. A reassessment of the fire-tolerance of some miombo woody species in the Central Province, Zambia. *African Journal of Ecology* 38 (2): 138-146.

Chidumayo, E. N. 2002. Changes in miombo woodland structure under different land tenure and use systems in central Zambia. *Journal of Biogeography* 29 (12): 1619-1626.

Chidumayo, E. N. 2004. Development of *Brachystegia-Julbernardia* woodland after clear-felling in central Zambia: Evidence for high resilience. *Applied Vegetation Science* 7: 237-242.

Chidumayo, E.N. and L. Kwibisa. 2003. Effects of deforestation on grass biomass and soil nutrient status in miombo woodland, Zambia. *Agriculture, Ecosystems and Environment* 96 (1-3): 97-105.

Chikamai, Dr. B. and Dr. M. Tchatat. Undated. Forest Management for Non-Wood Products and Services in Africa. Retrieved January, 25, 2007, from http://www.ksla.se/sv/retrieve_file.asp?n=750.

Chirwa, P.W., C.R. Black, C.K. Ong and J.A. Maghembe. 2003. Tree and crop productivity in gliricidia/maize/pigeonpea cropping systems in southern Malawi. *Agroforestry Systems* 59: 265-277.

Chirwa, T.S., P.L. Mafongoya, D.N.M. Mbewe and B.H. Chishala. 2004. Changes in soil properties and their effects on maize productivity following *Sesbania sesban* and *Cajanus cajan* improved fallow systems in eastern Zambia. *Biol. Fert. Soils* 40: 20-27

Chizuni, Jonathan M. 1994. Food Policies and Food Security in Zambia. *Nordic Journal of African Studies* 3 (1): 46-51.

CIA - Central Intelligence Agency. 2003. World Fact Book. Retrieved February, 16, 2004, from http://www.cia.gov/cia/publications/factbook/geos/za.html#top.

CTA - Centre Techniquie de Cooperation Agricole et Rurale ACP-EU. 2002. Agroforestry in Malawi and Zambia. Netherlands. Retrieved February 13, 2007 from http://www.cta.int/pubs/agroforestry/sumreport.pdf

de Queiroz, Joao S. 1997. Environmental Threats Assessment: Zambia. Retrieved March 7, 2004, from http://www.usaid.gov/zm/Docs/so1/Environmental_Threats_Assessment.pdf.

Fairfax, Sally K. and Louise Fortmann. 1990. American Forestry Professionalism in the Third World: Some Preliminary Observations. *Population and Environment* 11 (4): 259-271.

FAO. 2007. Forests and the forestry sector - Zambia. Retrieved January 26, 2007 from http://www.fao.org/forestry/site/32228/en/zmb.

Feldmann, Fabio. 2003. Community Environmental Action: The National Policy Context. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 393-402). Washington D.C.: Island Press.

Fowler, Richard and Johan Rockstrom. 2001. Conservation tillage for sustainable agriculture: An agrarian revolution gathers momentum in Africa. *Soil and Tillage Research* 61: 93-107.

Franzel, S., G.L. Denning, J.P.B. Lilleso and A.R. Mercado Jr. 2004. Scaling up the impact of agroforestry: Lessons from three sites in Africa and Asia. *Agroforestry Systems* 61: 329-344.

Gaily, Harry A. 1981. *History of Africa from 1800 to Present - Volume II*. Huntington, New York: Robert E. Krieger Publishing Company, Inc.

Gauli, Kalyan and Parul Rishi. 2004. Do the Marginalized Class Really Participate in Community Forestry? A Case Study from Western Terai Region of Nepal. *Forests, Trees, and Livelihoods* 14: 137-147.

Gibson, Clark C. and C. Dustin Becker. 2000. A Lack of Institutional Demand: Why a Strong Local Community in Western Ecuador Fails to Protect Its Forest. In C.C. Gibson, M.A. McKean and E. Ostrum (Eds.) *People and Forests: Communities, Institutions and Governance* (pp. 135-161). MIT Press.

Gibson, Clark C. and Stuart A. Marks. 1995. Transforming Rural Hunters into Conservationists: An Assessment of Community-Based Wildlife Management Programs in Africa. *World Development* 23 (6): 941-957.

Goldman, Mara. 2003. Partitioned Nature, Privileged Knowledge: Community-based Conservation in Tanzania. *Development and Change* 34 (5): 833-862.

Government of the Republic of Zambia. 2003. Poverty Reduction Strategy Paper: 2002-2004. Lusaka, Zambia.

GRZ. 1997. Preliminary First Draft - National Report on the Implementation of the Convention on Biological Diversity. Lusaka, Zambia. Retrieved February 13, 2007, from http://www.biodiv.org/doc/world/zm/zm-nr-01-en.pdf

GRZ. 2006. Policies and Strategies for Agrarian Reform and Rural Development to Secure and Improve Access to Natural Resources. Lusaka, Zambia

GRZ. 2005. Joint Forest Management Guidelines. Lusaka, Zambia.

GRZ. 1999. The Forests Act Number 7 of 1999. Lusaka, Zambia.

Grotpeter, John J., Brian V. Siegal and James R. Pletcher. 1998. *Historical Dictionary of Zambia* (2nd ed.). Lanham, Maryland: Scarecrow Press, Inc.

Hackel, Jeffery D. 1999. Community Conservation and the Future of Africa's Wildlife. *Conservation Biology* 13 (4): 726-734.

Haggblade, Steven and Gelson Tembo. 2003. Early Evidence on Conservation Farming in Zambia. *A paper prepared for the International Workshop on "Reconciling Rural Poverty and Resource Conservation: Identifying Relationships and Remedies*. Cornell University, Ithaca, New York. May 2-3, 2003. Retrieved February 13, 2007 from http://aem.cornell.edu/special_programs/AFSNRM/Poverty/Papers/individual/Papers/Haggblade,%20Tembo.pdf

Hammond, David S. and Roderick J. Zagt. 2006. Considering Background Condition Effects in Tailoring Tropical Forest Management Systems for Sustainability. *Ecology and Society* 11 (1): 37-61.

Hughes, David McDermott. 2001. Cadastral Politics: The Making of Community-Based Resource Management in Zimbabwe and Mozambique. *Development and Change* 32: 741-768.

Ickowitz, Amy. 2006. Shifting Cultivation and Deforestation in Tropical Africa: Critical Reflections. *Development and Change* 37 (3): 599-626.

ICRAF - World Agroforestry Research Center. 2004. Annual Report 2004: Defying the odds, African farmers meet food security goals. Retrieved February 13, 2007 from http://www.worldagroforestry.org/ar2004/tf_story01.asp.

Kapungwe, Augustus. 2004. Poverty in Zambia: Levels, patterns and trends. *Development Southern Africa* 21 (3): 483-507.

Kellert, Stephen R., Jai N. Mehta, Syma A. Ebbin, and Laly L. Lichtenfeld. 2000. Community Natural Resource Management: Promise, Rhetoric, and Reality. *Society and Natural Resources* 13: 705-715.

Kramer, Randall, Jeff Langholz and Nick Salafsky. 2002. The Role of the Private Sector in Protected Area Establishment and Management. In John Terborgh, Carel van Schaik, Lisa Davenport, and Madhu Rao (Eds.), *Making Parks Work - Strategies for Preserving Tropical Nature* (pp.335-351). Washington, D.C.: Island Press.

Kuntashula, Elias and Paramu L. Mafongoya. 2005. Farmer participatory evaluation of agroforestry trees in eastern Zambia. *Agricultural Systems* 84 (1): 39-53.

Kwesiga, F.R., S. Franzel, F. Place, D. Phiri, and C.P. Simwanza. 1999. *Sesbania sesban* improved fallows in eastern Zambia: Their inception, development and farmer enthusiasm. *Agroforestry Systems* 47: 49-66.

Langston, Nancy. 2005. Resource Management as a Democratic Process: Adaptive Management on Federal Lands. In R.G. Lee and D.F. Field (Eds.) *Communities and Forests: Where People Meet the Land* (pp. 52-76). Oregon State University Press.

Leakey, R.R.B. and A.J. Simons. 1998. The domestication and commercialization of indigenous trees in agroforestry for the alleviation of poverty. *Agroforestry Systems* 38: 165-176.

Lewis, Dale M. 1995. Importance of GIS to Community-Based Management of Wildlife: Lessons from Zambia. *Ecological Applications* 5 (4): 861-871.

Li, Tania. 2005. Engaging Simplifications: Community-Based Natural Resource Management, Market Processes, and State Agendas in Upland Southeast Asia. In Brosius, J.P., A.L. Tsing, and C. Zerner (Eds.) *Communities and Conservation: Histories and Politics of Community-Based Natural Resource Management* (pp. 427-457). AltaMira Press.

Little, Peter D. 2003. The Link Between Local Participation and Improved Conservation: A Review of Issues and Experiences. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 347-372). Washington D.C.: Island Press.

Lyons, Andrew and Dale Lewis. 1999. Supporting Community Based Wildlife Conservation in Africa with a GIS Enabled Relational Database. Retrieved March 12, 2004 from http://gis.esri.com/library/userconf/proc00/professional/papers/PAP780/p780.htm.

Lynch, Owen J. and Janis B. Alcorn. 2003. Tenurial Rights and Community-based Conservation. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 373-392). Washington D.C.: Island Press

Manor, James. 2004. User Committees: A Potentially Damaging Second Wave of Decentralization? *European Journal of Development Research* 16 (1): 192-213.

Marks, Stuart A. 2001. Back to the Future: Some Unintended Consequences of Zambia's Community-Based Wildlife Program (ADMADE). *Africa Today* 48 (1) 120-141.

Matenga, Chrispin R. 2002. Conservation Development Programmes in Protected Areas - Perspectives of Land-Use in Game Management Areas in Zambia. *Paper presented at the 9th Biennial Conference of the International Association for the Study of Common Property (IASCP), "The Commons in an Age of Globalization," 17-21 June 2002, Victoria Falls, Zimbabwe*. Retrieved March 10, 2004 from "The Digital Library of the Commons," at http://dlc.dlib.indiana.edu/archive/00000862/00/matengac170502.pdf.

Matowanyika, Joseph Zano Zvapera. 1989. Cast Out of Eden - Peasants Versus Wildlife Policy in Savanna Africa. *Alternatives* 16 (1): 30-39.

McCarthy, James. 2005. Community-Based Forestry in the United States: Antecedents and New Directions. A Report to the Ford Foundation.

Metcalf, Simon. 2003. The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 161-192). Washington D.C.: Island Press.

Mosimane, Alfons Wabahe and Karl Mutani Aribeb. 2005. Exclusion through defined membership in people-centered natural resources management: Who defines? Center for Applied Social Sciences and Programme for Land and Agrarian Studies. Retrieved February 13, 2007, from www.sarpn.org.za/documents/d0001460/P1802-Mosimane_Aribeb_2005.pdf

Murphee, Marshall W. 2005. Congruent Objectives, Competing Interests, and Strategic Compromise: Concept and Process in the Evolution of Zimbabwe's CAMPFIRE, 1984-1996. In Brosius, J.P., A.L. Tsing, and C. Zerner (Eds.) *Communities and Conservation: Histories and Politics of Community-Based Natural Resource Management* (pp. 105-147). AltaMira Press.

Mwinga, Doris Katai K. 1997. The Biodiversity Convention and *in situ* Conservation in Zambia. *RECIEL - Review of European Community and International Environmental Law* 6 (1): 32-41.

Njobvu, C.A. 2004. Agricultural Policy reforms and their impact on smallholder farming and poverty reduction in Zambia. *Paper prepared fro the "Citizen's Global Platform, the Global Economic Agenda, Helsinki Process on Globalization and Democracy."* Retrieved February 13, 2007 from http://www.globalplatform.fi/doc/1100009403.67.

PFAP (Provincial Forestry Action Program) II. 2005a. Program Completion Report: 2000-2005. Lusaka, Zambia.

PFAP II. 2005b. Lessons Learnt from Joint Forest Management in Zambia - The Experiences of PFAP II. Lusaka, Zambia.

Phiri, Donald, Steven Franzel, Paramu Mafongoya, Isaac Jere, Roza Katanga, and Stanslous Phiri. 2004. Who is using the new technology? The association of wealth status and gender with the planting of improved tree fallows in Eastern Province, Zambia. *Agricultural Systems* 79 (2): 131-144.

Phiri, E., H. Verplancke, F. Kwesiga and P. Mafongoya. 2003. Water balance and maize yield following improved sesbania fallow in eastern Zambia. *Agroforestry Systems* 59: 197-205.

Sekiya, Nobuhito and Katsuya Yano. 2004. Do pigeon pea and sesbania supply groundwater to intercropped maize through hydraulic lift? - Hydrogen stable isotope investigation of xylem waters. *Field Crops Research* 86 (2-3): 167-173.

Seymour, Frances J. 2003. Are Successful Community-based Conservation Projects Designed or Discovered? In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 472-498). Washington D.C.: Island Press.

Shackleton, Sheona, Bruce Campbell, Eva Wollenberg, and David Edmunds. 2002. Devolution and Community-Based Natural Resource Management: Creating Space for Local People to Participate and Benefit? *ODI Natural Resource Perspectives* 76: 1-6.

Sileshi, G. and P.L. Mafongoya. 2003. Effect of rotational fallows on abundance of soil insects and weeds in maize crops in eastern Zambia. *Applied Soil Ecology* 23 (3): 211-222.

Skutsch, M.M. 2000. Conflict management and participation in community forestry. *Agroforestry Systems* 48:189-206.

Steiner, Kurt. 2002. Conservation Tillage - Gateway to Food Security and Sustainable Rural Development. Retrieved February 13, 2007 from http://www.act.org.zw/docs/actis01.pdf.

Stromgaard, Peter. 1985. Biomass, growth, and burning of woodland in a shifting agriculture cultivation area of south central Africa. *Forest Ecology and Management* 12 (3-4): 163-178.

Tlou, Lehlohonolo. 1997. Convergent and Divergent Ideals in the SADC Region. *Journal of Third World Studies* 14: 95-112.

U.S. Department of State. 2007. Country Profile - Zambia. Retrieved January, 25, 2007, from http://www.state.gov/r/pa/ei/bgn/2359.htm

Virtanen, Pekka, 2003. Local Management of Global Values: Community-Based Wildlife Management in Zimbabwe and Zambia. *Society and Natural Resources* 16: 179-190.

Wainwright, Carla and Walter Wehrmeyer. 1998. Success in Integrating Conservation and Development? A Study from Zambia. *World Development* 26 (6): 933-944.

Warner, K. 2000. Forestry and sustainable livelihoods. *Unasylva* 51 (202): 3-12.

Western, David. 2003a. Ecosystem Conservation and Rural Development: The Case of Amboseli. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 15-53). Washington D.C.: Island Press.

Western, David. 2003b. Linking Conservation and Community Aspirations. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 499-523). Washington D.C.: Island Press.

Western, David and Michael Wright. 2003. The Background to Community-based Conservation. In D. Western and M. Wright (Eds.) and S. Strum (Associate Ed.), *Natural Connections: perspectives in community based conservation* (pp. 1-12). Washington D.C.: Island Press.

Wilshusen, Peter R., Steven R. Brechin, Crystal L. Fortwangler, and Patrick C. West. 2002. Reinventing a Square Wheel: Critique of a Resurgent "Protection Paradigm" in International Biodiversity Conservation. *Society and Natural Resources* 15: 17-40.

Wilhusen, Peter R., Steven R. Brechin, Crystal L. Fortwangler, and Patrick West. 2003. Contested Nature: Conservation and Development at the Turn of the Twenty-first Century. In S. Brechin, P. Wilhusen, C. Fortwangler, and P. West (Eds.), *Contested Nature: Promoting International Biodiversity with Social Justice in the Twenty-First Century* (pp. 1-22). Albany, NY: Statue University of New York Press.

Wunder, Sven. 2001. Poverty Alleviation and Tropical Forests - What Scope for Synergies? *World Development* 29 (11): 1817-1833.

Wycolff-Baaird, B., A. Kaus, C. Christen, and M. Keck. 2001. Shifting the Power: Decentralization and Biodiversity Conservation. Biodiversity Support Program, publication 100. World Wildlife Fund, Washington, DC.

Young, A. 1989. *Agroforestry for Soil Conservation*. CAB International; Wallingford, U.K. Pp. 233-243.