

# Current Status and Acceptance of Agroforestry and Natural Medicine in Malawi

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## **Abstract**

This paper was written to inform readers about agroforestry and natural medicine in the country of Malawi. Most of the people in Malawi are subsistence farmers living in rural areas. They are resource poor with little or no education and typically have to travel great distances for health care. By educating the rural communities about agroforestry systems and the identification of medicinal tropical plants, livelihoods may be improved. The paper describes the importance of both agroforestry and natural medicine in developing countries. General background information on Malawi is presented, along with a discussion on health issues and how agroforestry might contribute to meeting these needs. A literature review explores deforestation, soil degradation and possible agroforestry interventions. With regards to natural medicine, the paper addresses questions regarding who traditionally practices natural medicine and why people use this form of treatment. Finally, the paper looks at the role of a non-government organization, Action for Natural Medicine (ANAMED), and the role it plays working with the U.S. Peace Corps. A survey was used to gather information about the knowledge and practices of both agroforestry and natural medicine in Malawi during an ANAMED workshop. The survey found most of respondents were educated about agroforestry by their local agricultural extension officer. The survey also found that U.S. Peace Corps volunteers greatly contributed to the importance of planting more trees but also more of a diversity of trees and establishing a natural medicine garden in rural communities.

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## **Chapter 1: Introduction**

Human societies throughout the world have accumulated a vast body of indigenous knowledge over centuries on medicinal uses of plants (Rao 2004). About 80% of the population of most developing countries still use traditional medicines derived from plants for treating human disease (de Silva 1997). In 1978, the World Health Organization (WHO) defined traditional medicine as follows, “Traditional medicine is the entirety of all knowledge, of all explicable and inexplicable methods of diagnosis, prevention and removal of physical, mental and social imbalances, based only on personal experience and on observation passed on from generation to generation” (Hirt and M’Pia 2008).

Rural African communities have long relied upon the spiritual and practical skills of the traditional medical practitioners (TMPs), whose successes have become invaluable to many communities and seem poised to continue. The role of TMPs is all the more important when considering the scarcity of doctors. For example, in Kenya there is a ratio of one medical doctor to 7,142 patients whereas there is one TMP to 987 patients. An even more extreme disparity is found in Uganda, where there is one medical doctor to 25,000 patients compared to one TMP to 700 patients (Erah 2008).

Many plants in traditional agricultural systems in the tropics have medicinal value and both traditional and modern agroforestry practices have a huge potential to support biodiversity conservation, including the protection of medicinal plant species (Rao 2004). The use of agroforestry technologies mitigates biodiversity loss and provides opportunities for improving diversification and range of livelihood options for rural households (Akinnifesi et al. 2008). Agroforestry technologies focus on the role of trees on farms and agricultural landscapes to meet economic, social and ecological needs (Garrity 2006).

The goal of this professional paper is to inform the reader of the current role and importance of Natural Medicine and Agroforestry practices in sub Saharan African with an emphasis on Malawi. A general background (Chapter 2) describes the country as well as its health issues and how these can be addressed with the use of agroforestry. A literature review (Chapter 3) provides additional information on past research in traditional medicine and agroforestry. Chapter 4 focuses on the non-profit organization Action for Natural Medicine (ANAMED). The chapter highlights the contributions, training and practices this organization has had on Malawi with the support from Peace Corps Volunteers. The results of a survey that was given to ANAMED participants to assess their understanding and involvement in natural medicine and agroforestry is also presented in Chapter 4. The final chapter (5) contains some general conclusions and recommendations for promoting additional work on agroforestry and natural medicine in Malawi.

## Chapter 2: Malawi

### A. General Background

The Republic of Malawi is often referred to as “The Warm Heart of Africa”. It is located in sub-Saharan Africa within the beautiful Rift Valley at latitude of 13° 30” S of the equator and a longitude of 34° 00” E of Greenwich Meridian. The Rift Valley runs the entire length of the country, passing through Lake Malawi in the Northern and Central Regions and then to the Shire River Valley in the south. Malawi is a landlocked country bordered by the United Republic of Tanzania to the north and northeast, the People’s Republic of Mozambique to the south and east and the Republic of Zambia to the west.

The total land area of Malawi is 118,484 square kilometers, roughly the size of the state of Pennsylvania, of which 94,276 million square kilometers is land and 24,208 square kilometers is covered by water (NSO 2010). It is located on the third largest freshwater lake in Africa. The country’s most prominent feature, Lake Malawi, is about 475 km long and contains more fish species than any other freshwater lake on earth (UNESCO 2013).

The country is divided into 3 regions; the Northern, Central and Southern (Figure 1). There are 28 districts in the country. Six districts are in the Northern Region, nine are in the Central Region and 13 are in the Southern Region. Administratively, the districts are subdivided into traditional authorities (TAs) presided over by chiefs. Each TA is composed of villages, which are the smallest administrative units, and the villages are presided over by village headmen (NSO 2011).



Figure 1: The three regions of Malawi; North, Central and South (Wikitravel.org, 2010).

Malawi has a tropical continental climate with maritime influence. Rainfall and temperature vary depending on altitude and proximity to the lake. Annual rainfall is highest in the northeastern part of the country along the coast of Lake Malawi, where it averages 163 cm (64 in) a year. From May to August, the weather is cool and dry. From September to November, the weather becomes hot. The rainy season begins in October or November and continues until April (NSO 2011).

## History

Human beings have lived in the area that became Malawi since prehistoric times. Anthropologists believe that the ancestors of modern humans lived in southern Africa about two million years ago (DeCapua 2009). The Bantu people had been migrating from Central Africa into the area now occupied by Malawi. About five thousand years ago, the Katanga and Kafula people lived in the Lake Malawi region (Figure 2) and rock paintings at the present-day Chongoni Rock Art Area near Dedza are evidence of their existence (DeCapua 2009). Established in 1480, the Maravi Empire existed for nearly two hundred years. During the 1500s, the empire included most of modern-day central and southern Malawi. North of the Maravi territory, people known as the Ngonde founded a kingdom about 1600. In the 1700s, people from present-day Mozambique moved into the area around Lake Malawi (DeCapua 2009). Migration to the area stepped up with the arrival of the Tumbuka and Phoka, who settled around the highlands of Nyika and Viphya during the 17<sup>th</sup> century, and the Maravi, who established a large and powerful kingdom in the south (Luckham 2007).



*Figure 2: Fishermen on Lake Malawi. Photo by Trason Hirsch*

The 19<sup>th</sup> century brought with it two significant migrations. The Yao invaded southern Malawi from western Mozambique, displacing the Mavari, while groups of Zulu migrated northward to settle in central and northern Malawi. This century also saw the escalation of the East African slave trade. Several trading centers were established in Malawi, including Karonga and Nkhosha- towns that still bear a strong Swahili- Arab influence today (Luckham 2007).

The most famous European explorer to reach this area was David Livingstone. Between 1858 and 1863, Livingstone ventured into the area of Malawi four times. He mapped the Shire River Valley and Lake Malawi (which he called Lake Nyasa) for the first time 1859 (DeCapua 2009). In 1858 Livingstone was sent to Quelimane, in modern-day Mozambique, as a representative of the British government. Livingstone's orders were to make contact with local African leaders to which he set up the first mission on the Shire plateau in 1861, which made Malawi a center for Christian missionary activity in southeastern Africa (DeCapua 2009). His death in 1873 inspired a legion of missionaries to come to Africa, bringing the more 'civilized' principles of commerce and Christianity. Malawi was ruled by Britain and known as the Nyasaland protectorate from 1891 until July 1964. In 1953, the Federation of Rhodesia and Nyasaland was created, which was composed of three countries, Southern Rhodesia (now Zimbabwe), Northern Rhodesia (now Zambia), and Nyasaland (now Malawi). Colonial rule brought with it an end to slave-traders and intertribal conflicts, but it also brought a whole new set of problems. As more Europeans settlers arrived more land was taken away from the locals and Africans were forced to pay taxes to the administration (Luckham 2007). This created opposition to colonial rule and in the 1950's the Nyasaland African Congress (NAC) party led by Dr. Hastings Kamuzu Banda, began a serious push for independence. In July 1964, Nyasaland became the independent state of Malawi, which gained republic status in 1966 (NSO 2011). Two years later Banda was made president, eventually declaring himself 'President for Life' in 1971. He ruled for 30 years before his downfall and died three years later. Many achievements were made during his presidency but these were overshadowed by his stringent rule: banning the foreign press, imposing dress codes and waging vendettas against any group regarded as a threat (Luckham 2007).

In a free election in 1994, Banda was defeated by Bakili Muluzi. Muluzi was a former member of Banda's government and the founder of the United Democratic Front (UDF) political party. Muluzi's presidency brought greater democracy to Malawi. He freed prisoners arrested by Banda and reestablished freedom of speech and assembly. Muluzi aimed to end government corruption that was marked by officials receiving bribes and employing family members (DeCapua 2009).

The UDF was formed by Bingu wa Mutharika and Bakili Muluzi and came to power in 1994 under Muluzi. After Muluzi's two terms were over, Mutharika succeeded him as head of the party and nation. However, Muluzi remained involved in running the party; therefore, Mutharika formed his own party, the Democratic Progressive Party, in early 2005. Many UDF members defected to the new DPP party. The party and Mutharika won elections in 2009, and continued to rule the country ([www.en.m.wikipedia.org](http://www.en.m.wikipedia.org)).

Bingu wa Mutharika increasingly became controlling of the party. He began to groom his brother, Peter Mutharika, to be his successor. This led to a situation where he began to sideline his vice-president Joyce Banda due to her refusal to accept the move. Mutharika then kicked her out of the party, an act that was purportedly unconstitutional because he did not go through a

formal impeachment process. Therefore, the courts held that she was still the vice-president of the country even though she was not the vice-president of the party. Subsequently Joyce Banda formed the People's Party when Mutharika died in April 2012. Banda was still the Vice-President and thus succeeded Mutharika as President ([www.en.m.wikipedia.org](http://www.en.m.wikipedia.org)). Joyce Banda served as president from April 2012 to May 2014. During her presidency she tried to restore diplomatic ties with aid donors as well as Malawi's neighbors like Mozambique and regional countries such as Botswana ([www.en.m.wikipedia.org](http://www.en.m.wikipedia.org)). Peter Mutharika succeeded Joyce Banda and was elected president in May 2014.

## **Economy**

Agriculture is the mainstay of Malawi's economy, accounting for more than 35% of the Gross Domestic Product (GDP) and contributing about 90% of the export earnings (NSO 1987). Agriculture employs 90 percent of Malawians. The remaining 10 percent work in industry and services (DeCapua 2009). Approximately 85% of the total population resides in rural areas and derives its livelihood from farming. The smallholder agricultural sector is responsible for approximately 70% of the country's agricultural output while the estate sector makes up the remaining 30% (Harrigan 2008). Malawi's primary agricultural products include tobacco, sugarcane, tea, maize, potatoes, sorghum, cattle and goats. Its main industries are tobacco, tea, sugar processing, and sawmill products (NSO 2010). Malawi's chief export partners include South Africa, Germany, Egypt, the United States and Zimbabwe. Unlike most other nations on the African continent, Malawi has kept agriculture as the backbone of its economy rather than developing an industrial base. The strategy has made Malawi relatively self-sufficient in food production, but has slowed its growth in other economic areas (DeCapua 2009).

Forestry is a minor but expanding part of the economy. To meet growing demand for timber and to lessen the need for importing it, the government began a forestry plan in the 1980s. Under this plan, 3,000 acres are planted with trees each year, mostly on the plateaus and high mountain slopes. The government owns most of the timber plantations, although private industry has increased its involvement in the forestry business (DeCapua 2009). The Imperial Tobacco Group grows eucalyptus trees to supply timber for its tobacco boxes and also make plywood. The Forestry Department has planted thousands of acres of softwood trees (DeCapua 2009).

Another important part of Malawi's economy is the service sector. The service sector includes jobs in education, government, health care, retail, trade, transportation, and tourism. Services average about 45 percent of Malawi's GDP (DeCapua 2009). Malawi has nine national parks and wildlife reserves that attract about 400,000 visitors each year. Guided safaris into parks and preserves offer activities that include hiking, birding, camping, horseback riding, and fishing. Malawians work as guides and drivers on safaris, as well as in the tourist hotels and shops (DeCapua 2009).

Due to the limited industrial sector Malawi depends heavily on financial aid from the International Monetary Fund (IMF), the World Bank, and donor nations, chiefly the United States and Great Britain (DeCapua 2009). Many Malawians are working to create jobs and to establish their own businesses (DeCapua 2009). They know their efforts will reduce poverty, instill self-confidence, and offer young people an opportunity to achieve economic success. Foreign businesses have also begun to invest in Malawi. Malawi's future must rely on job



training, the promotion of tourism, and disease education and prevention. Malawians are optimistic that the full potential of the warm heart of Africa will be achieved (DeCapua 2009).

## **Population and Demographics**

Malawi's current population is about 16.7 million ([www.worldbank.org](http://www.worldbank.org)). Malawi's population is unevenly distributed. More than half the population live in the Southern Region, where two of Malawi's three largest cities- Blantyre and Zomba- are located. The Northern Region has only about 10 percent of the people. The Central Region has about 40 percent and is where Lilongwe, the capital city of Malawi is located with a population of about 821,000 people (DeCapua 2009). Malawi has more people per square mile than any other country in southeastern Africa. The nation averages 384 people per square mile, which is very high compared to neighboring Zambia, where there are 41 people per square mile.

The average woman in Malawi will give birth six times in her lifetime. Experts expect the population to reach 20 million by 2025 (DeCapua 2009). A mother's mean age at her first birth is just under 19 years of age (Malawi Population Data Sheet, 2012). The population of Malawi has been increasing at a high rate estimated at 3.5% per annum. This increase in population has put a very great pressure on the limited resources FAO (1998). The result is that over 70% of the households are classified as resource-poor households, with holdings of less than 1.0 ha; of these, over 40% are farming less than 0.5 ha (Kazombo-Phiri 2003). It is also one of the continent's least urbanized countries with 85% of the national population living in rural areas (Bryceson & Fonseca 2006). Malawi's age structure breaks down to 44.7 % of the people are between 0-14 years; 20.6% are between 15-24 years; 28.5% are between 25-54 years; 3.6% are between 55-64 years and 2.7% are older than 65 years of age (CIA 2013).

The people of Malawi are 99 percent African and belong to several different ethnic groups. A variety of ethnic groups - including the Tonga and the Sena - have lived in Malawi only since the late 1800s, when their migrations brought them to the area. The Chewa and Nyanja are both descended from the Maravi who migrated to present-day Malawi in the thirteenth century. Together they make up about 60 percent of the population (DeCapua 2009). The Chewa dominate Lilongwe, Dedza, Nkhosvota, and other areas of the Central Region. *Nyanja* means "people of the lake." This group outnumbers other groups of the Southern Region. The Yao, Ngoni, Tumbuka, Tonga, Sena, and Ngonde together form about 24 percent of the population (DeCapua 2009).

English and Chichewa are the official languages of Malawi. English became the national language in 1968, but everyday interactions are conducted mostly in Chichewa. Students in elementary school are taught both English and Chichewa. Malawians also speak a variety of other Bantu-related languages, including Chitumbuka and Chiyao. The prefix *chi-* means "the language of." So, *Chichewa* means "the language of the Chewa tribe" (DeCapua 2009).

The majority of Malawians are Christian. Sixty percent of Christians are Protestant, and 15 percent are Roman Catholic. Islam is also prominent in Malawi. Muslims (followers of Islam) make up about 20 percent of the population. Traditional beliefs also have a place in modern Malawian life and are practiced by 5 percent of the population. Traditional religions revolve around the idea that all things - alive or dead, human or animal - are part of a vital life force.

Many Malawians combine Western Christian beliefs with traditional beliefs. For example, many Malawian Christians consult local African healers or participate in Gule Wamkulu, an animistic religion common among the Chewa people of the Central Region (Figure 3) (DeCapua 2009).



*Figure 3: Traditional Dance by Gule Wamkulu. Photo by Trason Hirsch*

### **Consequences of population pressure**

Increasing population, accelerating deforestation, poor soil and water management, and increasing poverty and land degradation with declining maize yields directly impact food security and human health of millions of Malawians as well as affecting educational systems, water security, infrastructure, and major economic sectors, especially agriculture and tourism (Government of Malawi 2009; Quinion et al. 2010). According to Sanchez (2002), Malawi's food deficit is directly related to poor crop production, rather than inadequate distribution. There is simply not enough food being produced (Kazombo-Phiri 2003). The scarcity with food among the country will inevitably effect the health of the communities of Malawi.

### **B. Health Issues of Malawi**

Historically, Malawi's medical programs have focused on curing, rather than preventing, disease. In the early twenty-first century, however, disease prevention has become a priority. The Mutharika administration has made health a high priority. An increasing portion of the nation's budget is spent on health improvements, especially in the areas of malaria and HIV/AIDS. Malaria is the second-highest cause of death among adults in Malawi. It is the number one killer

of Malawian children. Every day in Malawi, roughly 110 people die of malaria. Nearly half of them are under the age of 18 (DeCapua 2009).

Many households are unable to produce, purchase or acquire enough food to meet biological requirements, particularly smallholders with less than a hectare of land (UNICEF 1993). Specific nutrition deficiencies have been identified in some parts of the country. Vitamin A is a public health concern in the lower Shire. A 1988 Ministry of Health survey in Salima and Dedza East estimated that 22% of the surveyed population showed sign of vitamin A deficiency. Diarrheal diseases are another main cause of death in Malawi. In 1989 diarrheal diseases were the fifth ranking cause of death in health units and hospitals, responsible for 6.1% of deaths (6.5% of children under five) (Coote et al. 1997).

## **Malaria & HIV/AIDS**

In Africa where malaria is endemic, access to chemical treatments is limited in rural areas and cultural practices still remain important. Consequently, 80% of the population use traditional medicine for treating afflictions of early childhood and in particular malaria (Geoffrey and Kirby 1996; Marsh et al. 1995; Phillipson 1994). Malaria is endemic in more than 95% of Malawi and continues to be a major public health problem (NMCP, 2010a). Transmission is perennial in most areas and peaks after the start of the annual rains that typically begin in November-December and lasts through March-April in most parts of the country. The highest transmission areas are found along the hotter, wetter, and more humid low-lying districts (Lakeshore, Shire River Valley, and Central Plain), while the lowest risk areas fall along the highland areas of Rumphi, Mzimba, Chitipa and Kirk Range (Kazembe 2006). Malaria is the leading cause of mortality in children under age 5 and pregnant women and continues to be a major public health problem in Malawi (NMCP 2005). With approximately five million suspected cases annually, malaria is responsible for about 40% of all hospitalizations of children less than five years old and 30% of all outpatient visits across all ages (PMI 2014).

Malawi is one of the African countries hardest hit by HIV/AIDS. It accounts for 59% of deaths (about 84,000 per year) among Malawians between the ages of fifteen and fifty-nine. Malawi's first AIDS case was reported in 1985. In response, the government created the National AIDS Control Programme (NACP) in 1988 to coordinate the country's AIDS education and HIV prevention efforts. The program did little to curb the disease. Another factor in the program's lack of success was the taboo nature of the subject: Malawians do not discuss sex openly. By 1993 HIV prevalence among Malawian women had risen from 2 percent in the 1980's to 30 percent. In 2004 President Mutharika established the first National AIDS Policy. The policy, combined with aid from the United States government and the Global Fund to Fight AIDS, Tuberculosis, and Malaria, has provided a number of AIDS prevention and support programs. These included free drugs for those who are infected and increased testing for those who are not. The success of these efforts has stabilized the spread of HIV/AIDS, so that in the early 2000s, 14 percent of the entire population of Malawi suffers from HIV/AIDS. Several urban areas, such as Lilongwe, have witnessed a decline in HIV/AIDS, but some rural areas are still experiencing an increase in cases (DeCapua 2009). As in other countries of sub-Saharan Africa, AIDS has

become a serious threat to the health and well-being of the population of Malawi. Malawi registers as the eighth highest HIV/AIDS prevalence in the world (UNAIDS 2004).

Plant-based traditional remedies in many sub-Saharan African countries are increasingly being used for the treatment of HIV/AIDS-related illnesses (Kayambazhinthu et al. 2003). With growing interest and increasing need for expanded health care in the past 20 years, the governing bodies of the World Health Organization (WHO) have adopted a series of resolutions to promote training and research related to traditional medicine. The WHO and UNICEF adopted resolutions supporting the use of indigenous health practitioners in government-supported health programs. In addition, the resolutions encourage specific measures governing the practice of traditional medicine to be incorporated within national health legislation, adequate budgets to allow promotion of traditional medicine, development of traditional medicine systems, effective launching of these programs, and inventories of medicinal plants (UNAIDS 2000).

Since tribes have been living in the Lake Malawi region for about five thousand years, they have been a resilient, proud and generous people. Malawi is a tropical country in southeastern Africa. It has varied topography from the highlands of Nyika National Park in the north to the lowlands of the lower Shire river valley in the south. Although maize is Malawi's staple crop, Lake Malawi has an abundant tropical fish population which supports rural Malawians with a supplemental protein source. From the discovery of Dr. Livingstone in the mid-17<sup>th</sup> century and the eventual rule of the British to the establishment of their own Democratic Progressive Party in 2005, Malawians have been curious and adaptable among many difficult times. With an exploding population in such a small country, natural resources, crop lands and health issues continue to be challenges Malawians are working towards to alleviate.

## **Chapter 3: Agroforestry and Natural Medicine: A Literature Review**

### **A. Agroforestry**

Agroforestry has been defined as a sustainable land management system which increases the overall yield of the land, combines the production of crops (including tree crops) and forest plants and/or animals simultaneously or sequentially, on the same unit of land, and applies management practices that are compatible with the cultural practices of the local population (King and Chandler 1978). Agroforestry is based on the premise that land use systems that are structurally and functionally more complex than either crop or tree monocultures result in greater efficiency of resource capture and utilization (nutrients, light, and water), and greater structural diversity that entails a tighter coupling of nutrient cycles (Nair 2007).

The practice has been prevalent for many centuries in different parts of the world, especially under subsistence farming conditions (Nair 2007). The motivations for recent agroforestry initiatives included frustrations arising from failure of the Green Revolution to benefit poor farmers and those in less-productive agro-ecological environments, and escalating land-management problems such as tropical deforestation, fuelwood shortage, and soil degradation, as well as increased awareness of the relevance of the age-old tree-and-crop integrated farming practices (Steppler and Nair 1987). It was recognized that a major cause of tropical deforestation was the clearing of more land to provide food and fuelwood for the rapid increasing populations (Nair 2007). The search for appropriate strategies to address these problems led to serious studies of age-old practices based on combinations involving trees, crops and livestock on the same land unit, and the recognition of their inherent advantages (Nair 2007). Agroforestry thus began to be recognized, and it was institutionalized with the establishment of the International Centre for Research in Agroforestry (ICRAF) – now called the World Agroforestry Centre – in 1977, in Nairobi, Kenya (Nair 2007).

Thanks to these efforts over the past three decades, agroforestry has now been transformed from ‘a practice in search of science’ into a science-based practice. It has emerged as an integrated applied science that has demonstrated potential for addressing some of the land-management and environmental problems in developing nations (Nair 2007).

Integration of agroforestry practices into farming systems improves the livelihoods of farm families by increasing the range of products available and opportunities to earn cash income, lower risks associated with drought and at the same time improve biodiversity and nutrient and water cycling in the agro-ecosystem (Beedy et al. 2012). The economic advantage of diversified income is a major motivation for practicing such systems in both tropical and temperate regions. In general, subsistence farming and emphasis on the role of trees in improving soil quality of agricultural lands are characteristic of tropical agroforestry systems (Nair 2007). Agroforestry systems offer opportunities for realizing higher productivity, more dependable economic return, and a greater diversity of outputs and benefits on a sustainable basis. The appeal of agroforestry lies in the multipurpose use of woody plants as well as their products. Some tree species play a vital role in sustaining and improving crop yields by helping to improve soil structure and fertility, reducing soil erosion, providing shade, and other benefits (Kazombo-Phiri 2003).

Agroforestry in Malawi can and has been used to alleviate the on-going issue of deforestation. Encouraging the farmers to introduce agroforestry systems amongst their crops and on their lands, the dependency on indigenous woodlands will decrease.

## **Deforestation**

People in developing countries have traditionally relied on trees for fuel (in the forms of firewood and charcoal) and in most places, trees have been readily available. Indigenous woodlands have been the closest that humanity will ever come to having a free source of energy (French 1986). While the renewable resource of woodlands benefits many cultures, deforestation has been implicated as contributing to the collapse of ancient societies around the world. Population pressure, clearing for agricultural expansion, and high demands for fuelwood and building materials, are the primary causes of deforestation (Bunderson et al. 2002; French 1986).

A major cause of deforestation in Malawi is that wood is regarded as a free resource taken from land with open access (Bunderson et al. 2002). At the tail-end of the 20<sup>th</sup> century, about 10 million solid cubic meters of wood were used for energy. Of this, about 6 million cubic meters was consumed by rural households. The rest was used in urban areas (1.6 million cubic meters), by tobacco estates (2.0 million cubic meters), and by other businesses (0.4 million cubic meters) (French 1986). The number of estates has increased from 229 in 1970 to 37,000 in 1995 (World Bank 1995). Between 1972 and 1990, total forest cover in Malawi declined by an appalling 41%, averaging a loss of 2.3% annually (Figure 4) (Bunderson and Hayes 1995).



*Figure 4: Deforestation near Chikangawa Forest, Northern Malawi. Photo by Trason Hirsch*

Government policies did little to help the problem by subsidizing forestry nurseries and by setting prices of plantation wood at artificially low levels. These factors impede development of private initiatives for efficient tree-based markets. Since wood prices are lower than production costs, incentives to plant trees are limited. This has increased problems of deforestation, particularly around urban centers where demands for wood are growing (Bunderson et al. 2002). As trees grow scarcer in the future, their value will increase. Problems of deforestation are aggravated by the proliferation of enterprises engaged in harvesting trees for fuelwood and building materials, beer brewing, smoking fish, lime production, and brick making. These non-farm activities are among the few options available for resource-poor households to earn cash for food and other basic needs, but long-term prospects are threatened by unsustainable, indiscriminant tree cutting (Bunderson et al. 2002). In addition, good agricultural land will also become scarcer, resulting in at least as great an increase in the value of food crops (French 1990). Under these conditions, most farmers will never find it economical to grow firewood instead of food. Even if some people find it rewarding to grow some firewood for sale, it is inconceivable that enough land will be withdrawn from food production to keep up with the total need for wood energy (French 1986).

Most deforestation in Malawi has occurred on customary and private land where enforcement of conservation policies is weak. This translates into an annual loss of 3.4 % for non-reserve land. The attendant loss of biodiversity is often accompanied by adverse changes in climatic and hydrological regimes. This leads to diminished stream flows, and the siltation of rivers, dams, and lakes (Bunderson et al. 2002). In a national survey carried out by the Energy Studies Unit (ESU), 55% of the smallholders interviewed said that the cutting of trees had reduced the fertility of their farms (French 1986). Most of these respondents explained that the trees prevent soil erosion and gullyng, drop leaves that decompose and enrich the soil, and improve the locale microclimate (ESU 1982). While native trees take the brunt of deforestation, plant species are adversely affected. About 12.5 percent of all plant species are threatened with immediate extinction by deforestation. Most botanists regard this estimate by the International Union for the Conservation of Nature (ICUN) as conservative, because it considers only species known to science; numerous undiscovered species pass from the world unrecorded (Cox 2000). Given these understandings, farmers may well find attractive a kind of agroforestry that provides various tree products while protecting the soil (French 1986). Although policy makers in Malawi have considered various ways of dealing with deforestation, present policies do little to promote alternative fuels and building materials. Continued reliance on wood is threatened by exploitation of forest resources (Bunderson et al. 2002). One obvious measure is to try to plant new trees as replacements for the ones being cut down. Deforestation could be curbed by planting trees either by the government of Malawi or by the farmers. If the government were to invest the money into plantations and then sell the wood back to the people, costs of the plantation firewood would be significantly higher than the *average* costs of firewood for people living in the rural areas (French 1986). Deforestation in itself is a terrible issue confronting Malawi, but encouraging local communities, nursery clubs and farmers to participate in agroforestry practices and planting more trees, they can work towards wooded landscapes. If the land is left unprotected, soils will wash or blow away, as well as losing the nutrients and texture that trees provide through their leaves and root systems. Unchecked, this process would transform the wood energy problem into a more serious crisis in food production (French 1986).



## Soil Degradation in Malawi

Soil erosion is characterized by deterioration of soil structure, reduced moisture retention capacity, depletion of nutrients and organic matter and decreased micro-fauna and flora. The basic cause of soil degradation in Malawi is accelerated erosion caused primarily by rainfall on unprotected soil (Kazombo-Phiri 2003). Unprotected soil is usually a consequence of forest degradation and depletion for farmland and fuelwood harvesting (Figure 5). Inorganic fertilizers have masked soil nutrient depletion, rather than correcting it, especially soil micronutrients, thus bringing into question the possibility of maintaining production levels over the long-term (Beedy et al. 2012). Many Malawian soils remain nutrient-depleted, and maize production on such degraded land produces lower yield efficiencies than on adequately nourished land, even given adequate rainfall (Sileshi et al. 2011).



*Figure 5: Soil Degradation in Northern Malawi. Photo by Trason Hirsch*

Poor agronomic practices, especially in marginal land and steep slopes contribute to soil degradation. Low levels of organic matter in the soil can cause physical degradation. Declines in soil fertility result from the loss of organic matter and chemical nutrients through leaching and the removal of crops and residues, compaction and loss of soil structure and the physical erosion of topsoil by rainfall (Kazombo-Phiri 2003). These physical constraints lead to increased surface runoff, which causes soil erosion. Chilimba et al. (1998) documented that in Malawi organic matter content is reported to drop by 59% in the first year of cultivation and nationally crop yields are estimated to be declining by 2% annually.

Declining soil productivity is the main cause of food insecurity in Malawi. However, the adoption of beneficial soil management practices has not been very remarkable in part due to lack of funds to run the programs.



## Soil Improvement Technologies

Agroforestry shows high potential as a complementary, low-cost approach to sustain agricultural production and reduce environmental degradation. Its universal appeal lies in the multi-purpose function of trees, where farmers actively participate in identifying practices and species best suited to their needs (Bunderson et al. 2002). Most agroforestry practices provide complementary effects on soil and water conservation by improving soil structure and providing denser ground cover. They also offer secondary products such as fuelwood, food, quality fodder, and shade (Bunderson et al. 2002). Research results during the past two decades show the main tree-mediated processes that determine the extent and rate of soil improvement in agroforestry systems include increased nitrogen input through nitrogen-fixing trees (Nair 2007). The presence of deep-rooted trees in the system can contribute to improved soil physical conditions and higher soil microbiological activities under agroforestry practices (Nair 2007).

Annual undersowing aims to restore crop productivity by improving the chemical, physical, and biological properties of the soil with fast growing, nitrogen fixing shrubs. It entails intercropping the shrub with maize when the rainy season starts, followed by harvesting it just before land preparation at the start of the next rains. A few key benefits of undersowing include fast restoration of soil fertility and structure from high biomass yields, soil and water conservation from good vegetative cover and litter combined with the suppression of weeds and abundant fuelwood (Bunderson et al. 2002).

Improved fallows of fast-growing, nitrogen-fixing trees speed up soil restoration, yield secondary products and provide good ground cover. Improved fallows generally produce a higher crop response than other agroforestry systems because of the higher biomass generated (Bunderson et al. 2002). Improved fallows may be short or long term, and may be combined with other practices on the same land, e.g., boundary planting and vetiver hedges. Both short and long-term fallows require targeting farmers who have adequate land to fallow, or to leave idle in the following season (Bunderson et al. 2002). These improved fallows, incorporate fast growing trees and shrubs to speed up soil restoration with secondary wood products. The best species are those that enhance soil fertility by fixing nitrogen and by establishing ground cover quickly. This technology is advantageous in that it requires little labor and management, but small land holdings may limit its application. Short-lived shrubs such as *Tephrosia vogelii* are best suited for this technology. Some farmers preferred *Tephrosia* because it could be directly sown in the field, avoiding the laborious nursery process (Beedy et al. 2012). Other farmers preferred *Gliricidia sepium* (Figure 6), because although it required nursery management it only had to be planted once, and would re-sprout after annual coppicing for leaf manure (Beedy et al. 2012). Fruit trees can also be intercropped and associated with improved fallows.



*Figure 6: Established Gliricidia sepium-maize intercropping system in Southern Malawi. Photo by T. Breedy*

Additionally, use of organic and inorganic fertilizers, agroforestry practices, intercropping legumes with cereals and crop rotations to improve soil fertility are being demonstrated to farmers in Malawi. In an experiment carried out in southern Malawi by Kamanga et al. (1999), it was found that yield benefits obtained from the legume systems with mineral nitrogen fertilizers are sufficient to overcome food insecurity of many households, particularly within smaller landholdings. An assessment of impact of the project in terms of maize yield was conducted across six districts. The results show doubling of maize yields with the addition of agroforestry to the cropping systems (Mwalwanda et al. 2012).

### **Agroforestry Interventions**

Malawi has intensified agroforestry interventions in order to improve food security, agricultural sustainability and the conservation of the natural resource base by addressing common problems faced by smallholder farmers (Figure 7) (Kazombo-Phiri 2003). These technologies have particularly been taken on board to address problems of small farm sizes, a lack of land for agricultural expansion, low or declining soil fertility and crop yields, increasing soil erosion and water runoff on steep slopes, animal nutrition problems and inadequate fodder, shortage of fuelwood and building materials, accelerated deforestation, overgrazing, and the rising costs of farm inputs coupled with limited credit opportunities (Kazombo-Phiri 2003).



*Figure 7. Mrs. Zabeta Elisa tends to her groundnuts growing under farmer-regenerated trees in Kwendaguwo village in Malawi. Photo by D. Ouya/ICRAF*

It is believed that projects that offer free tree seed and seedlings, and training in how to plant and care for and integrate the trees with cropping systems, help to overcome the barrier to adoption among the poorest smallholders (Beedy et al. 2012).

The major cost of investing in agroforestry trees for smallholders are for seed, seedlings, and labor for land preparation and tree establishment. Most of these costs are incurred upfront, while farmers have to wait for a year or more before they start to realize the benefits (Beedy et al. 2012). There is a one to three- year lag between the first use of agroforestry and the appearance of the benefits (Beedy et al. 2012). The poorest farmers may delay adoption of an agroforestry system despite knowing the benefits, as their priority is to meet immediate household food and income requirements (Ajayi et al. 2008). Poor farmers may lack financial resources for meeting the upfront costs of investing in agroforestry, but once established the trees produce seed that farmers can collect and use to expand the size of this plantations and for replanting in the future (Beedy et al. 2012). Fertilizer trees, nitrogen-fixing trees adding nutrients to the soil, were the most widely planted by farmers, followed by fruit trees. If left to grow for two seasons or more as would be the case for farmers engaged in rotational fallows or fertilizer tree seed production, fertilizer trees can also produce wood that is big enough for use as firewood (Beedy et al. 2012).

## **Project Implementation and Associated Partnerships**

Agroforestry has been promoted in Malawi for some years dating back to the inception of the European Union (EU) funded ADDFOOD project in 1989, although most projects have been limited to a small geographical area (Beedy et al. 2012). In 2007-2011, the World Agroforestry Centre (ICRAF) - southern Africa gathered a diverse group of development partners including

government departments, farmer organizations, Community Based Organizations (CBOs) and Non-Governmental Organizations (NGO) partners in a team effort to provide knowledge and tree seeds and seedlings to smallholders in 11 of Malawi's 28 districts as part of the Agroforestry Food Security Project (AFSP) funded by Irish Aid (Beedy et al. 2012).

The Malawi government maintains agricultural extension officers and land resource conservation personnel in all 28 districts (Beedy et al. 2012). The Land Resources Conservation Department (LRCD) trains agricultural extension officers and lead farmers who in turn train and provide information on soil and water conservation to the rest of the farmers in the communities (Beedy et al. 2012). However, the government's extension services are not equally strong in all districts, and are supplemented by the efforts of NGOs and CBOs where they are present (Beedy et al. 2012).

CBO's were also included, though they are smaller scale, because of their ability to bring contextual issues such as gender, HIV/AIDS, and governance into the management of what is essentially a natural resource management project (Beedy et al. 2012). CBO's also work with local schools establishing a school garden or reforestation on school property.

NGO's such as Total Land Care (TLC) work with local farmers, tree nursery clubs and communities supplying knowledge and skills about agroforestry, seed sourcing and composting with natural fertilizers. Environmental organizations like TLC also will supply tools and services to clubs with an established government.

Recognizing that households typically engage in both farm and off-farm livelihoods, and that the impacts of HIV/AIDS are systemic – impacts on one livelihood strategy are bound to affect other livelihood strategies (Barany et al. 2005). The Forestry Department of the Food and Agriculture Organization of the United Nations, the Malawi government and Barany et al. conducted a survey looking at fuelwood, food and traditional medicine in relation to rural communities suffering from HIV/AIDS. The study found that the collection and/or use of medicinal plants are common woodland-based responses to illness and of the households experiencing the illness of an adult member within the last 12 months, 60% relied on medicinal plants as a response and even those who made clinic visits, continued to use medicinal plants as a complement (Barany et al. 2005). The study found 17% of households reported increasing forest product collection to generate income needed to pay for medical expenses and purchase basic necessities (Barany et al. 2005). Although for the majority, adult illness limited the ability of the household to meet their daily subsistence woodland needs; 54% of the households experiencing adult illness reduced forest product collection (Barany et al. 2005).

In April 1999 Peace Corps Malawi established the Community-Based Natural Resource Management Project. Volunteers work with communities that border Forest Reserves, Game Reserves and Game Parks. Volunteers, communities and government extension officers work collaboratively to enhance the protection, conservation and management of individual and community natural resources. This is accomplished through the promotion of counterpart and community capacity building, sustainable natural resources management techniques and income generating activities ([www.usembassy.gov](http://www.usembassy.gov)). In the past five years, the Government of Malawi has realized that successful management of natural resources must include rather than exclude communities that border protected areas. Peace Corps Community Health Project works in collaboration with the Ministry of Health, the Christian Health Association of Malawi (CHAM) and local NGOs and CBOs to address health issues in rural areas ([www.usembassy.gov](http://www.usembassy.gov)). It is of

great benefit to Malawi to develop and integrate HIV/AIDS education and forestry programming at national, institutional and local levels. This can be done by utilizing and blending both the Peace Corps Environment and Health sector programs with the use of traditional medicine in their curricula.

## **B. Natural/ Traditional Medicine**

The World Health Organization (WHO) describe traditional medicine (including herbal drugs) as comprising therapeutic practices that have been in existence, often for hundreds of years, before the development and spread of modern medicine and are still in use today (Pal and Shukla 2003). Traditional medicine is the synthesis of the therapeutic experience of generations of practicing physicians of indigenous systems of medicine. Hirt and M’Pia (2008: 19-20) agree with the WHO’s definition of what traditional medicine is but followed up by stating that, ‘all medicine made of natural substances is at the same time a traditional, local, native product of the country of origin.’ With that being said, they define traditional medicine as, ‘the sum total of all practices, methods, treatments, supplementary materials, and attempts of any kind (material, spiritual or other) which, for generations, have enabled people to protect themselves from sickness, to relieve suffering and to bring about healing.’

The earliest recorded evidence of traditional medicinal use in Indian, Chinese, Egyptian, Greek, Roman and Syrian texts dates back 5000 years (Pal and Shukla 2003). Traditional preparations comprise of medicinal plants, minerals, organic matter, etc. (Pal and Shukla 2003). Herbal drugs constitute only those traditional medicines which primarily use medicinal plant preparations for therapy. Traditional medicine might also be considered as a solid amalgamation of dynamic medical know-how and ancestral experience (Erah 2008). Alternative health care includes a large number of different practices including home remedies, folk medicine, traditional medicine, religious healing, homeopathy and culture-based practices such as Chinese acupuncture (Erah 2008). Governments and international bodies such as the World Health Organization (WHO) have long recognized the importance of access and utilization of health care services especially for the poor, who typically exhibit a heavier burden of disease, benefit from fewer resource expenditures and subsidies and generally spend more out of pocket of medicines and care as proportion of their income than the rich (Gwatkin et al. 2007; Hanney, Gonzalez-Block, Buxton & Kogan 2003; UN Millennium Project 2005). Some authors have argued that traditional medicines are more affordable because herbal products are cultivated in surrounding areas reducing both direct and indirect costs and individuals can self-apply them (van den Boom, Nsowah-Nuamah & Overbauch 2008).

In contrast with western medicine, which is technically and analytically based, traditional African medicine takes a holistic approach; good health, disease, success or misfortune are not seen as chance occurrences but are believed to arise from the actions of individuals and ancestral spirits according to the balance or imbalance between the individual and the social environment (Erah 2008). Traditional medicine is based on both spiritual and physical components of personhood (Nyika 2006). Herbal products were discarded from conventional (i.e., Western) medical use in the mid-20<sup>th</sup> century, not necessarily because they were ineffective but because



they were not as economically profitable as the newer synthetic drugs (Tyler 1999). In the early 19<sup>th</sup> century, scientific methods became more advanced and preferred, and the practice of botanical healing was dismissed as quackery (Pal and Shukla 2003).

However, according to the World Health Organization the use of herbal remedies throughout the world still exceeds that of the conventional drugs by two to three times (Evans 1994). The use of plants for healing purposes dates back hundreds of years and forms the origin of much modern medicine (Pal and Shukla 2003). Worldwide, herbal medicine received a boost when the WHO encouraged developing countries to use traditional plant medicine to fulfill needs unmet by modern medicine (Winslow and Kroll 1998).

The herbal medicines / traditional medicaments have therefore been derived from rich traditions of ancient civilizations and scientific heritage (Kamboj 2000). Herbal medicine is still the mainstay of about 75-80% of the world population, mainly in the developing countries, for primary health care (Kamboj 2000). With a very large number of patients to one doctor in nearly all African countries, particularly in rural areas, the reliance on traditional medicine to improve the health of many people cannot be disputed. No wonder then that traditional medicine has been described by the WHO as one of the surest means to achieve total care coverage of the world's population (Erah 2008).

### **Who Practices Natural Medicine?**

Some traditional medical practitioners (TMPs) specialize in the use of herbs (herbalist), others are proficient in the spiritual healing, especially in the use of incantations, while still others combine both (Erah 2008). Traditional healers represent a broad range of practices, including herbalism and spiritualism, as well as a range of individuals who call themselves diviners, priests and faith healers, among other terms (UNAIDS 2000). The diversity is further enhanced by their adaptations to the dramatic social changes that have affected much of the region since colonization, such as urbanization, population migration, displacement, and civil conflict (Good 1987).

### **Why Do People Use Natural Medicine?**

There are multiple reasons for patients turning to herbal therapies. Often cited is a “sense of control, a mental comfort from taking action,” which helps explain why many people taking herbs have diseases that are chronic or incurable, for example diabetes, cancer, arthritis or AIDS (Pal and Shukla 2003).

When patients use home remedies for acute conditions, such as a cold, sore throat, or bee sting, it is often because professional care is not immediately available, too inconvenient, costly and/or time-consuming (Winslow and Kroll 1998). The rural population is heavily dependent on traditional medical systems (Mudur 1995). Tabi, Powell and Hodnicki (2006) mention that rural areas had more poverty creating a hardship to travel the distance to modern medical facilities. If service could be accessed, the high cost of treatment would make it unaffordable. This same

isolation served to create a bond between villagers and their local, familiar healers that increased their faith in traditional healing. In these rural areas, there are additional cultural factors that encourage the use of botanicals, such as the environment and culture, a “man-earth relationship.” People believe that where an area gives rise of a particular disease, it will also support plants that can be used to cure it (Winslow and Kroll 1998).

### **Present status of Natural Medicine**

In the last few decades, a curious thing has happened to herbal medicine. Instead of being killed off by medical science and pharmaceutical chemistry, it has made a comeback. Herbal medicine has benefited from the objective analysis of the medical science, while fanciful and emotional claims for herbal cures have been thrown out, herbal treatments and plant medicine that works have been acknowledged (Pal and Shukla 2003). Plant substances remain the basis for a very large proportion of the medications used today for treating heart disease, hypertension, depression, pain, cancer, asthma, neurological disorders, irritable bowel syndrome, liver diseases and other ailments (Zollman and Vickers 1999; Alschuler et al. 1997; Carter 1999; Bensoussan et al. 1998; Schuppan et al. 1999). Africa has a long and impressive list of medicinal plants and traditional healing approaches based on local knowledge (Erah 2008). Many tropical medicinal plants are well adapted to partial shading, moist soil, high relative humidity and mild temperatures, allowing them to be intercropped with timber and fuelwood plantations, fruit trees and plantation crops (Rao 2004).

### **Intercropping of Medicinal Plants**

Two types of intercropping systems can be distinguished involving medicinal plants: (1) medicinal plants as upper-story trees and (2) medicinal plants as intercrops in other crops. Coffee (*Coffea arabica*), cacao (*Theobroma cacao*) and tea (*Camellia sinensis*) are traditionally grown under shade offered by multipurpose trees that produce timber, fruit, flowers, nuts, palms etc. A couple examples of tall and perennial trees are *Eucalyptus globulus* (for oil) and Moringa (*Moringa oleifera*) that can be intercropped with annual crops in the early years until the tree canopy covers the ground. Some of the medicinal trees may allow intercropping for many years or on a permanent basis depending on the spacing and nature of the trees. The intercrops give some income to farmers during the period when the main trees have not started production (Rao 2004).

Some well-known medicinal plants have been successfully intercropped with fuelwood trees (e.g., *Acacia* spp., *Albizia lebbek*, *Eucalyptus* spp. and *Leucaena* spp.) including turmeric (*Curcuma longa*) and ginger (*Zingiber officinalis*) (Chadhar and Sharma 1996; Mishra and Pandey 1998; Prajapati et al. 2003). Aromatic grasses such as vetiver (*Vetiveria zizanioides*), lemongrass and citronella (*Cymbopogon nardus*) can be grown on field bunds and soil conservation bunds in croplands. Vetiver has extensively been tested and is being promoted for planting in contour strips or as a live hedge barrier and to stabilize terrace risers on sloping lands in a number of countries (Rao 2004).

When *Artemisia* and maize are intercropped (Figure 8), these attributes may offer enormous capacity to optimize yield of maize grain and *Artemisia* leaf while minimizing field operations and lowering production costs (Chumba et al. 2013). Another medicinal plant found almost everywhere in Africa is the tropical plant *Securidaca longepedunculata*. In Malawi, the leaves are used for wounds, coughs, bilharzia, venereal disease, and snakebite. The dried leaves in Malawi are used to cure headaches while in Nigeria, it is used for skin diseases (Erah 2008).



Figure 8: Intercropping *Artemisia* and Maize. Chumba et al. 2013

## Summary & Conclusions

Healthcare systems originate and develop on the basis of health views. At the core of people's health views are culturally determined beliefs and values. Through experience and socialization, people demonstrate health behaviors reflective of personal development (Tabi, Powell and Hodnicki 2006). The rebirth of herbal medicine, especially in developed countries, is largely based on a renewed interest by the public and scientific information concerning plants. Herbal remedies are popular among patients with chronic diseases. Classically trained physicians cannot ignore herbal medicines any more. They must realize that large number of patients are using herbal medicine (Pal and Shukla 2003).

For the herb-using patient who views conventional medicine with ambivalence, the physician can foster a more open and communicative relationship by demonstrating an objective understanding of both alternative and conventional approaches (Winslow and Kroll 1998). The public should be better protected and informed on herbal medicine, and doctors should take an active part in this process (Ernst 2000). The WHO and various governments in African countries have realized that the success of primary health care in developing countries and will rely more heavily on traditional medicine (Erah 2008). Many governments in African countries are paying more attention to herbal medicine than in the past and this is paving the way for new research and investment in this field (Erah 2008).



## **Chapter 4: The Role of ANAMED and the Survey**

### **A. Background and Vision of ANAMED**

Action for Natural Medicine (ANAMED) was founded on January 25, 1986 in the Democratic Republic of Congo and is currently based out of Germany. It is an international Christian non-government organization open to all denominations and faiths. It is also a movement that promotes effective health care in the tropics in natural ways by using locally available resources (<http://www.anamed.org/en/>). About 19 countries world-wide host ANAMED and in many countries a key activity of the organization is putting on natural medicine training sessions. Depending on the country, objectives of the region and the form of the trainers' goals, training session attendees should be invited to represent the full range of people who practice medicine, have a striking interest or who work in administrative posts, such as traditional healers, nurses, doctors, pharmacist and representatives of church and government. Farmers and extension officers are also encouraged to attend because they work the fields, have a greater knowledge of the native plants and in many cases are very active members in their communities to spread the word of natural medicine. Their vision is to “dream of a world in which even those people living in the simplest circumstances meet their own health needs, by using their own skills and abilities to utilize their own locally available resources, and by working in cooperation with others. Families, communities and health centers in the Tropics and even entire regions take responsibility for their own health and thereby become virtually independent from imported products” (<http://www.anamed.org/en/>).

### **B. ANAMED and the US Peace Corps**

ANAMED Malawi focuses on teaching people all over the country about the wonders of natural medicine through comprehensive trainings. During trainings participants are taught to identify plants and trees, know their uses, how to process the medicines for safe consumption and application, understand dosages and even how participants can sell the extracts for personal prosperity.

ANAMED Malawi has been conducting training programs with the US Peace Corps for about six years. Peace Corps volunteers from throughout the country come to the training center in Dedza for week-long trainings. They are accompanied by their counterparts so their counterparts can take what they learn and share the information with their respective communities. “Every plant cannot be grown at one location yet in order for us to maximize the diversity, we should share what we can with each other so everyone in Malawi realized the benefits of natural medicine” (<http://www.anamed.org/en/>). Peace Corps volunteers are encouraged to attend the training session at least once within their region during their tenure of service. The Peace Corps attendees may be from any of the three country sectors; environment, health and education. The volunteers are also highly encouraged to invite their counterpart or an interested and active member in the community to the seminar. After the first training session,

participants are expected to put into practice much of what they have learned and run the seminars themselves in their own communities.

During the week-long seminar the instructor will have a plan of action for what he or she wants to teach. Thoughtful teaching and learning needs to be full of variety. Some preparation is done prior to the training session with the collection and drying of native plants, writing songs about natural medicine, preparing slides and films as well as finding and locating particular plants at the site for interpretive walks. The meetings should be explained very clearly that everybody is there to learn from each other and have the opportunity to share their experiences with Natural Medicine. It is also very important that each person is able to accurately identify the medicinal plants that they wish to use. The participants are encouraged to go for walks when not in a classroom or outdoor session, take a notebook or camera and look carefully at the appearance, the shape and color of the flowers, leaves and seeds.

### **C. Background and Results of ANAMED Survey**

#### **Survey Results from the November 2012 ANAMED Training**

A survey was written to gather information on the practices, community clubs' involvement and plant species used both in Agroforestry and Natural Medicine in the country of Malawi. The subsequent Natural Medicine training session was held during the first week in November 2012 at the Nkhata Bay Pastoral Center in the Northern Region. Of the 35 people who attended the training, five were trainers, 15 were Peace Corps volunteers and 15 were Peace Corps Malawian counterparts. It was these 15 Malawian counterparts who participated in the survey. The survey was distributed in the morning of the first full day of the week-long ANAMED natural medicine training session and collected at the end of the first full day. The respondents had all day to answer the survey. The survey was made up of thirty-two yes/ no and short answer/ explanation questions (Appendix A). The survey was distributed by Brad Kindler, a Peace Corps Volunteer. The week-long seminar sessions are facilitated by the country's representative, orator and active natural medicine facilitator, Mr. Nelson Moyo.

#### General/ Club Questions

During the ANAMED training at the Pastoral Center in the town of Nkhata Bay we found that the participants came from five of the six districts of Northern Malawi, those being Chitipa, Karonga, Rumphi, Nkhata Bay and Mzimba. We had no participants who came from Likoma Island in the heart of Lake Malawi.

Nine participants were involved in a general tree nursery club, five were not part of a club and one respondent did not answer. The clubs were established anywhere between the years of 2006 to 2013. The total number of members in the clubs ranged from 10 to 45 members. Eleven of the respondents for the natural medicine training were male and one was female; three chose not to answer. When asked about their profession we found a health surveillance assistant,

veterinary scout, a medical assistant, a social worker, two forest guards, a forestry extension worker, four farmers, two teachers and two did not answer.

Eleven of the respondents had a structured governmental body for their club. One participating member had a club but did not have governing body for it. Eleven had a president, nine had a Vice President whereas one did not. All of the 11 participants who had a President also had a secretary for the club. Three of the 15 participating ANAMED attendees were not involved in a club at all. Most of the clubs met once or twice a week and one club met three times a week. There were two clubs who met twice a month. The total land owned by the participating club members ranged from a quarter acre up to about five acres.

The attendees of natural medicine training who participated with tree nursery clubs planted a wide variety of agroforestry tree species and a variety of plant species in their nursery. They included *Moringa oleifera*, *Tephrosia vogelii*, *Azadirachta indica*, *Senna siamea*, *Senna spectabilis*, *Albizia spp.*, *Azizelia quanzensis*, *Gliricidia sepium*, *Eucalyptus spp.*, *Pine spp.*, apples, orange, mango, and tangerine. The plant species the clubs were planting are Aloe Vera, Lemongrass, Cassava and Ringworm bush.

When asked if the club planted the trees for reforestation, profit, soil conservation, or preventing soil erosion, most of clubs planted for all of those reasons.

Within the survey, questions were asked if the clubs had both short-term and long-term plans. Seven of the 11 clubs who have a tree nursery had plans for their parcel of land. Their short-term plans included to plant more trees in general, plant a greater diversity of trees, to acquire more land, to prevent soil erosion, to improve soil fertility, to use the land and site as a demonstration nursery to the community, to plant early maturing foods and, finally, to plant trees in boundary areas. Those who had long-term plans wanted to prevent excessive deforestation by the community, to acquire more land and more people who can benefit from the forest and woodlot, to improve the soil fertility, to process the trees and sell as lumber, to reforest, to prevent soil erosion and finally to build a factory to process fruit.

When asked whether everyone has access to the nursery or woodlot, those who answered, five would have access to the land and five did not have access to the land. Of the five who said they would not allow access, four answered people with HIV/AIDS, community members, common villagers, schools, churches and the entire community would be allowed. In addition, the club members are able to access the nursery and woodlot.

### Agroforestry Questions

We asked the participants 10 agroforestry questions. The first question is whether they have ever heard of agroforestry, 13 said they have heard of it, one said they have not and one did not answer. Next we asked who informed them of agroforestry; 13 participants answered the question and two did not. Six said they heard about it from an agricultural extension officer, three heard about it from a forestry officer, one heard about it from a Total Land Care extension

officer, one from a Peace Corps Volunteer, two from a school teacher, one from a forestry assistant and two did not respond.

When asked if they used agroforestry, 13 said they use it and 2 do not. Those who do use agroforestry use a number of different systems, some of which are used together, such as intercropping and alley cropping. The agroforestry tree species used in these two systems are *Leucaena diversifolia* and *Tephrosia vogelii*, *Gliricidia sepium*, Papaya and various nitrogen-fixing trees. The crops used in these systems are, maize, beans or groundnuts, cassava, and vetiver grass.

We asked how much land they own either as a club or individually and the quality of their soil. Total land area ranged from one quarter acre to about fifteen acres. Six had a soil quality of good, five had a soil quality of fair and four had a soil quality of poor.

Fourteen out of the respondents had an agricultural officer in their village to assist with technical knowledge and skills. When asked the question of what kind of assistance, knowledge and information do the agricultural extension officers provide and/or promote, 13 responded. Answers ranged from intercropping, use of composted manure instead of synthetic fertilizers, beekeeping, agroforestry, crop rotation and planting trees, planting legumes, animal health, planting vetiver grass, irrigation, education on the spacing of crops, intercropping *Gliricidia sepium* with maize and good soil management. 13 respondents said that their agricultural extension officer educated them about agroforestry.

A question was asked if the respondent had a club and was practicing agroforestry and if so, was it their goal. Eight responded and said it was their goal and four responded saying it wasn't their goal and three did not respond. Those who said it wasn't their goal, only three responded saying they wanted to produce *Moringa oleifera* products and natural medicine, another said the club wanted to practice reforestation and prevention and the last wanted to improve soil fertility and structure and reduce the use of synthetic fertilizers.

We were interested if the club sourced their own seed and, if they do, what seeds they use in their nursery. If they do not source their own seed, we asked them to explain why they didn't. Seven of the clubs did own their own seed which included *Moringa oleifera*, *Cajanus cajan* (Pigeon pea), *Gliricidia sepium*, *Tephrosia vogelii*, *Azadirachta indica* (Neem), *Leucaena diversifolia*, *Senna spp.*, *Albizia spp.* While five did not source their own seed, they mentioned that the clubs didn't make enough money to buy seed and many of the species they are looking for were not available in the area. One was looking forward to the Malawian forestry department to provide seeds. As a side note, non-governmental organizations such as Total Land Care, can provide free seed and educational skills to established, organized and enthusiastic tree nursery and agroforestry clubs.

Of those clubs who have nurseries seven found they had problems with insects and diseases while four did not have an issue. No details were reported regarding specific insect or disease problems.

As mentioned, most Malawians are subsistence farmers. Their main crops being maize, cassava and rice. Additionally, to these staples the Malawians we surveyed planted ground nuts,

tobacco, soya, beans, peas, cotton, eggplant, millet, sunflowers, tomatoes, avocado trees, coffee trees, banana trees, pumpkins, potatoes, lemongrass and sugar cane.

### Natural Medicine Questions

We asked the participants of the ANAMED training if they have heard of natural medicine. All participants heard of natural or traditional medicine. We then followed up and asked who they heard the term from. Eight of the participants heard about natural medicine from a Peace Corps Volunteer, four had heard about it from an actual training workshop of natural medicine through ANAMED and the rest through friends, relatives and traditional herbalists in their village. We asked the counterparts if they currently have a natural medicine garden. Eight responded that they did and the rest did not have one. Those who answered that they did have a natural medicine garden, the plants they included were *Azadirachta indica* (Neem), *Moringa oleifera*, *Aloe vera*, Papaya, Lemongrass, Ginger, Turmeric, Pea, Avocado, Cinnamon, Ringworm bush, Guava, Mango, Stomonium weed and Cassia spp. Those who mentioned they did not have a natural medicine garden said they would establish one in the future anytime from one month to one year.

Eleven of the respondents have heard or knew of medicinal trees. Those that mentioned said they heard of *Moringa oleifera*, *Azadirachta indica* (Neem), *Senna spectabilis*, Guava, *Jatropha curcas*, Papaya, Eucalyptus, Cassia, Orange and Lemon Trees.

We asked the survey respondents if they obtained natural medicine from the club forest. Six people said that they do collect medicine from the club forest and six do not. Three chose not to answer. When asked what plants are collected they mentioned *Azadirachta indica* (Neem), Eucalyptus, Bitter Leaf, Vernonia, Guava, *Moringa oleifera*, Aloe Vera, *Cassia spectabilis* and Castor. Eleven answered that the plants collected were for health needs and four did not answer.

We asked the respondents in the survey about their current management of the club's forest and if they think they are limiting access to natural medicine species to non-club members: seven answered yes, three answered no, and five chose not to answer.

For many clubs in Malawi, funding can be an issue and will have to be generated by the working club. In this case, we wanted to know who received funding and who did not. Those that answered, six said they received funding from either, Find Your Feed, Peace Corps Volunteers and Volunteer Service Overseas (VSO) (a non-government organization). We then asked if the funding was adequate, four who received funding said that it was not adequate, coming from Carla (a private source), VSO and Peace Corps; and two said that it was adequate, receiving funding from Find Your Feet. Twelve said they are still looking for other funding avenues. Ten said the club is looking for seed, two said they are not and three did not answer. When looking for equipment, ten clubs are looking and two are not. When looking for supplies, eight are looking for and four are not.

Malawi is a farming country and we were wondering what the farmers' perception was about their government's incentives, from the national level down to the village level. Eight

people said they received incentives from the national government, three said they did not and four did not answer. When looked at the Area Development Committee government, five said they received incentives, six did not and four did not answer. When looked at the Traditional Authority six said they received incentives, five did not and four did not answer. When looking down at the village level, ten said the Village Headman and Group Village Headman did provide incentives, one said they did not and four did not answer.

Peace Corps Volunteers are sometimes curious if they are providing the knowledge and skills acquired in Pre-Service Training as well as in higher education. All of the participants said Peace Corps Volunteers were helpful. A whole range of examples of how we were helpful came about. Examples included educating about a good diet and the prevention of HIV/AIDS, education about medicinal plants, providing seeds for medicinal plants, sharing information, helping with organization [with clubs], working hand to hand, educating with math and physical science, addressing environmental issues associated with climate change, capacity building, invitations to ANAMED, soap making and bringing the community together for self-reliance and income. Constructive criticism is always welcome which allows us to reflect and tailor our education to what the community really needs and wants. Some mentioned that we need to train the community more about natural medicine, making tree nurseries and beehive making. One said that we should be added in numbers. Some are looking for Peace Corps volunteers to provide different medicinal species for a garden and the education of the construction of a food dehydrator.

## **Chapter 5: Conclusion and Recommendations**

The survey found in general that communities in rural Malawi wanted to plant more trees but also more of a diversity of trees. This may be for increased fuelwood consumption for home use, improvement of soil quality for staple crops, sales through a nursery to improve economic livelihood and improving health by planting fruit trees and medicinal shrubs.

The time has arrived to utilize the benefits of the remarriage of crops and trees in addressing some of the major threats facing the world today, such as food and nutritional security, eroding soils, and expanding deserts. Too often, we treat agriculture and forestry separately, yet these two sectors are often interwoven in the landscape and share many common goals (Nair 2007). While it is creditable that considerable progress has been achieved during the past three decades in transferring age-old agroforestry practices into a science-based activity, several knowledge gaps exist even in areas that have received research attention in the past. There are also several potentially promising areas that have not yet been explored. For example, substantial efforts are needed to domesticate indigenous fruit and medicinal trees and promote their cultivation on farms (Nair 2007).

Traditional systems of medicine in most developing countries depend primarily on the use of plant products either directly or indirectly. Besides serving the healthcare needs of a large number of people, medicinal plants are the exclusive source of some drugs even for modern medical treatments (Rao 2004). Pharmaceutical companies are still analyzing various plant species around the globe to come up with new drugs.

The increasing demands for medicinal plants by people in developing countries have been met by indiscriminate harvesting of spontaneous flora including those in forests (de Silva 1997). As a result, many species have become extinct and some are endangered. It is therefore, imperative that systematic cultivation of medicinal plants be developed and steps introduced to conserve biodiversity and protect threatened species (Rao 2004).

The Malawi Agroforestry Extension Project (MAFE) is a collaborative grant agreement between USAID and Washington State University under the Land Resource Conservation Department in the Ministry of Agriculture and Irrigation. The project's goal is to improve natural resource management with sustained farm productivity by increasing the adoption of agroforestry and soil conservation practices (Bunderson et al. 2002). MAFE has made significant strides in its partnership network to expand the adoption of sound land management and conservation practices. Although the momentum continues to grow on an exponential scale, partnerships need nurturing as they are still young and vulnerable.

While agroforestry is not a substitute for agriculture or forestry as we know them, the important message here is that agroforestry certainly has a complementary and supportive role in some situations, especially under resource-poor and low-input conditions (Nair 2007).

## **Who should do what?**

Based on the survey, Peace Corps volunteers can promote, encourage and sustain working relationships with government extension officers and NGOs such as Total Land Care. Volunteers can also apply for small grants for projects revolving around agroforestry and nursery clubs that will supply a diversity of tree seeds as well as tools and supplies. Volunteers should continue to participate in natural medicine trainings by AMAMED and encourage their local communities to build a kitchen, school or community garden with medicinal plants. Many rural Malawians are proactive with starting their own bee keeping clubs but lack funds for maintenance and building additional hives. Volunteers could play an active role using their pre-service training skills to help source funds and educate the benefits of a small business. As part of promoting cultivation of medicinal plants, government departments such as forestry may enter into partnership with local farmers to cultivate these medicinal plants in association with forest plantation on profit-sharing basis (Rao 2004). Partnerships between the drug industry and farmers in the form of contract farming with buyback arrangement of the product will go a long way in promoting cultivation of these medicinal plants (Rao 2004).

Additionally, volunteers can provide a detailed summary of their projects in their Description of Service, Replacement Recommendations and Handover reports to inform the Environmental Associate Peace Corps Director and site-replacement volunteer of their on-going community development work.

## **What might be the most effective practices and/or species to advocate?**

Based on the survey half of the respondents had poor soil. Volunteers would encourage planting nitrogen- fixing trees, such as *Tephrosia vogelii* and *Faidherbia albida* for better soil quality, planting vetiver grass for soil erosion and *Sesbania sesban* for leaf-eating pests.

There is considerable evidence that farming households in Malawi highly value trees within their farming systems. Farmers have encouraged the regeneration of trees in fields and around their households by protecting naturally regenerating indigenous trees, by planting tree seedlings, and by leaving favored trees in fields when woodlands were originally cleared prior to cultivation (Dewees 1995). Several indigenous and introduced agroforestry practices have been supported through extension initiatives in order to provide low-cost fertility inputs to maize production systems. *Faidherbia albida*, and indigenous species widely distributed throughout Malawi, holds good promise as an agroforestry tree mainly because of low establishment and management costs. This is particularly the case if we consider that farmers in Malawi have adopted tree cultivation and management practices which generally involve low costs and low risks (Dewees 1995).



## **Research suggestions**

Research partnerships among agroforestry, the medical and nutritional sciences, and the food products industry will be crucial to ensure that the key tree species for such uses are developed for farm cultivation (Nair 2007). Research should focus on species for which there are ready markets and natural sources are fast depleting. Research should simultaneously focus on processing methods at the farm-level and exploring market opportunities (Rao 2004). Agroforestry offers a convenient way of producing many medicinal plants without displacing the traditional crops. Research is needed in each country, especially on germplasm improvement for priority species, appropriate systems in which they can be grown, input management, and value-adding processes.

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## Appendix A:

### ANAMED Questionnaire

To the Malawian Counterparts:

Monire wanalume na wanakazi. A sincere yewo, zikomo and thank you goes out to all the individuals participating in this Anamed training hosted by Mr. Nelson Moyo and Peace Corps Volunteers. With you being here, you are showing great interest in Natural/ Traditional Medicines that can help you, your family and your communities stay healthy. As trainers we hope you'll return to your village, build a small natural medicine garden and educate your community about the benefits of the tropical plants that are so abundant in your area. But I also would like thank you for your contribution in filling out this questionnaire. The answers you provide will be part of my Professional Paper for my Masters of Forestry degree at Northern Arizona University, United States of America. Enjoy the training, have fun and ask questions!

#### Club Questions

1. What district do you come from? \_\_\_\_\_
2. Are you involved in any tree nursery clubs? (circle one)                      YES    NO
3. When was the club established? \_\_\_\_\_(year)
4. What is your gender? (circle one) MALE                      FEMALE
5. How many males and females are there in the club and what do they do within the club structure?  
  
        Number of males \_\_\_\_\_ What do they do?  
        Number of females \_\_\_\_\_ What do they do?
6. a. Does the club have a President? (circle one)                      YES    NO  
      b. Does the club have a Vice President? (circle one)                      YES    NO  
      c. Does the club have a Secretary? (circle one)                      YES    NO
7. How often does the club meet? \_\_\_\_\_

8. How much land does the club own? \_\_\_\_\_

9. What species of trees does the club plant?

10. What do you feel is to be gained from planting the trees? (circle one for each)

- |                                     |     |    |
|-------------------------------------|-----|----|
| • Reforestation (circle one)        | YES | NO |
| • Profit (circle one)               | YES | NO |
| • Soil conservation (circle one)    | YES | NO |
| • Prevent soil erosion (circle one) | YES | NO |

11. What are the club's short-term plans (1-5 years) for the club lands?

If the club does not have short-term plans for the lands, why not?

12. What are the club's long-term plans (5-15 years) for the club lands?

If the club does not have long-term plans for the lands, why not?

13. Will club members be the only ones who have access to the club nursery and forest? (circle one)

YES NO → If no, who else will have access?

#### Agroforestry Questions

14. Have you heard of agroforestry? (check one) YES NO

If YES → From whom? \_\_\_\_\_

15. How do you define agroforestry?

16. Do you currently use an agroforestry system (intercropping, hedge rows, vetiver grass) on your land? (circle one) YES NO

If YES → What system and what plants are you using?

17. How much land do you own? \_\_\_\_\_

18. How is the soil quality? (circle one) POOR FAIR GOOD

19. Are their agricultural extension officers in your village? (circle one) YES NO

If YES → What do they educate/ promote in the community?

Do they educate the community about agroforestry? (circle one) YES NO

20. What is your profession? \_\_\_\_\_

21. Does the club feel they are doing agroforestry? (circle one) YES NO

Is that their goal? (circle one) YES NO

If NO → What is their goal?

22. Does the club source their own seed? (circle one) YES NO

If YES → Which seeds? \_\_\_\_\_

If NO → Why not?

23. Has the club encountered any problems with insects and diseases with the trees they have planted? (circle one) YES NO

#### Natural/Traditional Medicine Questions

24. Other than Maize, what other crops do you plant?

25. Have you heard of natural/ traditional medicine? (circle one) YES NO

If YES → From whom?

26. Do you currently have a natural medicine garden? (circle one) YES NO

If YES → What have you planted?

If NO → Do you plan on establishing one? (circle one)

Within 1 month  
Within 3 months

Within 6 months  
Within 1 year

27. Is the club growing any trees with medicinal value? (circle one) YES NO

If YES → Which trees?

28. Are natural medicines obtained from the club's forest? (circle one) YES NO



If YES → What plants?

If YES → By growing these particular trees, are there any health needs the trees could help address? (circle one)      YES      NO

29. Because of your current management of the club's forest, do you think you are limiting non-club members' access to natural medicine species within the club forest? (circle one)      YES      NO

### Support Questions

30. Does the club receive aid/ funding from local NGO's? (circle one)      YES      NO

If YES → From what NGO's?

If YES → Is it enough to sustain the club in managing the club's nursery and forest? (circle one)      YES      NO

If NO → What is the club looking for? (check all that apply)

- \_\_\_\_\_ Funding
- \_\_\_\_\_ Seed
- \_\_\_\_\_ Equipment (shovels, watering cans, hose, etc.)
- \_\_\_\_\_ Supplies (poly tubes)

31. Have any of the following entities provided incentives for establishment of the club nursery? (check all that apply)

- \_\_\_\_\_ Malawian Government
- \_\_\_\_\_ Area Development Committee (ADC)
- \_\_\_\_\_ Traditional Authority (TA)
- \_\_\_\_\_ Village Headperson (VH or GVH)

32. Are Peace Corps Volunteers helpful? (circle one)      YES      NO

If YES → In what ways have they been helpful?

If NO → What would you like them to do?

Yewo chomene, zikomo & thank you very much for filling out my questionnaire. Please feel free to ask if you have any questions about this survey.

Yewo chomene & Mtendere,

Trason 'Chilipapa' Hirsch  
Malawi RPCV 2011-2013  
Phoka, Rumphu District