Exploring Forest-Related Coping Strategies for Alleviating the HIV/AIDS Burden on Rural Malawian Households

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Exploring forest-related coping strategies for alleviating the HIV/AIDS burden on rural Malawian households

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SUMMARY

Rural households are being forced to cope and adapt to changing availability of important forest resources while also dealing with the devastating effects of HIV/AIDS. The purpose of this study was to explore the range of local forest-related coping strategies being used, and innovations that local people would like to try, to alleviate the HIV/AIDS burden on rural households in Malawi. The data were collected from sixty semi-structured interviews with local respondents. The results confirm the use of a range of labour-related coping strategies associated with one of four important forest resources (firewood, water, medicinal plants, thatch grass), along with other broad economic, social, and nutritional coping strategies. Interventions that policy makers and development practitioners could provide in order to foster the most commonly used coping strategies include: provisioning households with required forest resources; investing in agroforestry projects and the domestication of important medicinal plants, wild vegetables and indigenous fruits; and strengthening indigenous responses such as savings clubs and labour and draught power clubs.

Keywords: HIV/AIDS, forest resources, coping strategies, Africa

Exploration des stratégies basées sur la forêt pour soulager le fardeau SIDA/séropositivité dans les foyers ruraux du Malawi

J.A. TIMKO

Les foyers ruraux sont forcés de s'adapter en s'accommodant la disponibilité fluctuante des ressources forestières importantes, tout en ayant à faire face aux effets dévastateurs du SIDA/séropositivité. Le but de cette étude a été d'explorer l'éventail de stratégies d'aide liée aux forêts locales utilisées, et les innovations que les populations locales aimeraient pouvoir explorer pour soulager le fardeau du SIDA/séropositivité dans les foyers ruraux au Malawi. Les données ont été recueillies au cours de soixante interviews mi-structurées avec des interlocuteurs locaux. Les résultats ont confirmé l'utilisation d'un assortiment de stratégies d'aide liées au labeur associées à un choix de quatre ressources forestières (bois de combustion, eau, plantes médicinales, herbe à toiture), allant de pair avec d'autres stratégies économiques, sociales et nutritionnelles. Les interventions que les créateurs et dévelopeurs de politique pouvaient offrir pour aider les stratégies d'aide étaient, le plus communément: approvisionner les foyers avec les ressources forestières requises, investir dans des projets d'agroforesterie et la domestication de plantes médicinales importantes, de légumes sauvages et de fruits indigènes, ainsi qu'un renforcement des réponses indigènes telles que des clubs, pour l'épargne ou la facilitation du labeur.

Posibles estrategias de uso del bosque para aliviar la carga del VIH/SIDA en hogares rurales de Malawi

J.A. TIMKO

Los hogares rurales se ven obligados a hacer frente y adaptarse a los cambios en la disponibilidad de importantes recursos forestales, a la vez que luchar contra los efectos devastadores del VIH/SIDA. El propósito de este estudio fue explorar el abanico de estrategias locales que utilizan el bosque para afrontar el problema, y las innovaciones que le gustaría probar a la población local en los hogares rurales de Malawi para aliviar la carga del VIH/SIDA. Los datos se obtuvieron de sesenta entrevistas semi-estructuradas con informantes locales. Los resultados confirman el uso de un abanico de estrategias de mano de obra asociadas a uno de los cuatro recursos forestales locales más importantes (leña, agua, plantas medicinales, y paja para tejados), además de otras estrategias económicas, sociales y nutricionales más generales. Las intervenciones que los responsables políticos y los profesionales del desarrollo podrían ofrecer para fomentar las estrategias más utilizadas con las que afrontar el problema son: abastecer los hogares con los recursos forestales necesarios, invertir en proyectos agroforestales y la domesticación de plantas medicinales, hortalizas y frutos silvestres indígenas importantes, y el fortalecimiento de iniciativas locales tales como las sociedades de ahorro y las sociedades de mano de obra y de animales de tiro.

INTRODUCTION

An estimated two-thirds of Africa's 600 million people rely on forests both for subsistence and to supplement their cash incomes (Kaimowitz 2003, CIFOR 2005, Sunderlin *et al.* 2005). Particularly in Sub-Saharan Africa, rural households are being forced to cope and adapt to changing availability of important forest resources while also dealing with the devastating effects of the human immunodeficiency virus (HIV). Sub-Saharan Africa has the highest prevalence of HIV in the world along with 35 of the 45 most highly affected countries (Drimie and Gandure 2005). The acquired immunodeficiency syndrome (AIDS) is a leading cause of death in Africa and worldwide for prime-aged adults – ages 15–49 – the very people who work to support families, those responsible for building society, and those usually the most productive economically (Drimie 2002, Torell *et al.* 2006, Hunter *et al.* 2008).

Across rural Sub-Saharan Africa, forest resources play a crucial role in enabling a household to mitigate the impacts of HIV/AIDS (Villarreal *et al.* 2006). In this region, health care is predominantly a forest-based service (Barany *et al.* 2001) – traditional healers are the dominant providers of medical care in forested areas, often providing between 70% and 95% of primary health care (Colfer *et al.* 2006). Trees and non-timber forest resources can help rural people to alleviate some of the burden of HIV/AIDS by: producing nutritious foodstuffs (e.g., fruits, berries, leaves) that can boost the immune system and help protect against disease; providing medicinal relief and other products that can help treat infections; and offering a safety net of subsistence and income generating opportunities (e.g. firewood for consumption and for sale, animal fodder, potentially high-value tree products, building and thatching materials) (Lengkeek 2005, Villarreal *et al.* 2006).

Yet an unfortunate trend towards less sustainable resource use amongst HIV/AIDS-affected households has been observed (Anyonge *et al.* 2006, Barany *et al.* 2005, Topouzis 2007, Torell *et al.* 2006). A correlation can be found in countries including Zambia, Tanzania, Malawi and Mozambique where HIV/AIDS is not only particularly prevalent, but where high rates of deforestation are also observed (Barany *et al.* 2005, Frank and Unrah 2008). With limited income opportunities, HIV/AIDS-affected households (those where a prime-age adult member of the household is presently infected or chronically ill or has died within the last 5years, or a widow(er)-headed household where a spouse has died from HIV (Barany *et al.* 2005)) often increase their reliance on freely available forest resources as a consistent livelihood strategy to minimize the socio-economic burden of HIV/AIDS (Barany *et al.* 2005, Lopez 2008, Shackleton *et al.* 2004). More timber is harvested to build coffins; more firewood is used for cooking, funerals, and ceremonies; there is increased experimentation and use of medicinal plants to treat the side effects of HIV/AIDS (e.g., shingles, diarrhoea); there is a greater reliance on bushmeat and charcoal for alternative income purposes; and more forest lands are converted to cemeteries (Barany *et al.* 2005, Bolton and Talman 2010, Holding-Anyonge *et al.* 2006, Mauambeta 2003, Oglethorpe and Gelman 2007, Topouzis 2007, Torell *et al.* 2006).

Environmental deterioration is making vulnerable, forest-dependent, HIV/AIDS-affected households more susceptible to shocks, increasing their risk and reducing and limiting their coping strategies (Drimie and Gandure 2005, Hunter *et al.* 2008, Torell *et al.* 2006). At the same time, the impacts of HIV/AIDS on rural people's livelihoods are all encompassing and cumulative. The disease diminishes people's ability to produce income and respond to stress; undermines their coping mechanisms; results in a loss of human capital; deprives them of assets; affects the sequence in which work occurs and how family labour is divided; and fragments the networks between the family and the broader community (McPherson 2005, Slater and Wiggins 2005). Given the centrality of forest resources in the lives and livelihoods of rural people across much of Africa, and indeed in many developing nations, HIV/AIDS further complicates how effectively affected households can obtain these important resources.

Therefore, a concerted effort on behalf of policy makers and development practitioners is required to identify the most commonly used local forest-related coping strategies in order to foster the most promising ones that enable local people to obtain and manage important forest resources. As such, the purpose of this study was to explore the range of local forest-related coping strategies that are being used, and the innovations that local people would like to try, to alleviate some of the HIV/AIDS burden on rural households in the study regions of Malawi. This paper consists of four sections. Following this introduction is a description of the methods used for collecting and analysing the data. The results are then explored using two overarching categories: (1) labour–related coping strategies, and (2) economic, social and nutritional coping strategies. A final discussion section addresses the implications of the results and the study's limitations, and provides recommendations for moving this research domain forward before concluding. The bulk of the paper is focused on the four most important forest resources identified by local respondents (firewood, water, medicinal plants, and thatch grass (Timko, In press)), however other less important forest resources are included in the discussion as well.

This paper is meant to provide insight into this important topic and to highlight potential areas of both relief and further research. As such, the results presented are not meant to be conclusive. Rather, the purpose of this paper is to illuminate the efforts being made locally, and to highlight local knowledge about what efforts appear to be working or not, and what interventions local people would like to try. Therefore, the data are presented in a narrative format to serve as a starting point for further inquiry into how best these coping strategies can be fostered to create meaningful change in the lives of the respondents.

Before proceeding, it is important to make an important distinction between the terms *coping strategy* and *innovation*. Coping strategies frequently do not require any cash to pursue, are short-term strategies with long-term consequences for survival, and are often irreversible in nature (Bishop-Sambrook 2003, Ellis 2000, Mutangadura *et al.* 1999). The term *coping strategy* may be misleading however as it implies that people are getting by or doing well enough when really

the impact of AIDS is devastating their household (Loevinsohn 2008). Drimie and Casale (2009) more appropriately refer to these types of coping strategies as "erosive" as they are not sustainable and jeopardise future livelihood options. Examples of coping strategies could include withdrawing children from school, eating less, slaughtering livestock, or renting out cropland for others to cultivate.

The concept of 'innovation' in this article broadly refers to "doing something different or differently" (Loevinsohn 2008: 7), to any technical, social or organizational adaptation in practice which is new to the practitioners involved (Swaans *et al.* 2009). This could include access to information and new materials such as seeds or tools (Loevinsohn 2008). Unlike coping strategies, innovations are long-term strategies that enable individuals and households to improve their situation (Kgathi *et al.* 2007). "They hold out a realistic prospect of people avoiding the worst consequences of AIDS or recovering faster to a level they would see as normal" and are characterized by the deliberate intention and effort made to adapt a technology, practice, etc. to a person's capabilities and situation (Loveinsohn 2008: 9).

METHODS

Selection of Malawian case study sites

Malawi is an ideal country in which to situate this study as its context can shed crucial insight into the linkages between HIV/AIDS and forest resources given its rural nature, dependence on forest resources, high HIV/AIDS prevalence, and openness to discussing the impacts of HIV/AIDS. The government's 'Forestry and HIV and AIDS Strategy' (Malawi Government 2007) reflects this awareness.

A representative from Malawi's Department of Forestry recommended that the north, central and southern regions of the country be represented in the study so that policy recommendations would be widely applicable. Therefore, variation according to three main characteristics was used to select case study sites across Malawi: proximity to forest resources in either protected forest reserves or village forest areas under customary land tenure (VFAs); HIV prevalence; and regional representation. National HIV prevalence in Malawi is high at approximately 12%, and has been estimated at 6.5% in the north, 8.6% in the central region, and 16.5% in the south (National AIDS Commission 2008). Four districts (rural study site names appear in brackets) were included in this study: Mzimba (Mbalachanda) in the north, Zomba (Domasi) and Chiladzulu (Milepa) in the south, and Mchinji (Kamboni) in the central region of the country.

Interviews

The data presented in this paper stem from a larger study in this domain which characterised how household dependence on forest resources changes according to the presence and progression of HIV/AIDS in the household. The larger study purposively selected respondents for focus group discussions in four case study districts, and then randomly-selected interview respondents from those involved in the focus groups. The data presented in this paper were specifically obtained using the latter, that is, sixty semi-structured interviews with randomly-selected participants from the larger focus groups (fifteen respondents from each of the study districts). Of these, twenty involved respondents from unaffected households and forty involved respondents from HIV/AIDS-affected households; twenty-seven respondents were male and thirty-three were female. Tables 1 and 2 present a characterization of the respondents by age and affectedness.

At the beginning of each interview, the respondent was characterized according to age, gender, ethnic group, number and composition of people living in the household, and whether their household qualified as 'affected' or unaffected. Households were broadly deemed *affected* if one of the following criteria was met: a prime-age adult member of the household was presently infected or chronically ill, and/or widow- and widower-headed households where the spouse died from HIV (Barany *et al*. 2005). Households were deemed *unaffected* provided prime-aged adults (ages 19–49) were present part of year and not chronically ill, and there was no prime-aged illness or death within the last five years.

The interviews were conducted between June and September 2010 in the ChiChewa language by two Malawian field assistants at a time and location deemed safe and convenient to the respondents. Prior to conducting focus groups and interviews, all questions were approved by the *Behavioural Research Ethics Board* at the author's university. Interviews were exploratory in nature; they were not intended to be inferential, but rather to provide insight into the issue of forest-related coping strategies and innovations being used or sought by HIV/AIDS-affected households.

TABLE 1 *Male respondents (n=27) categorised by age and HIV-affectedness*

Household Type		**Age Range (years)**				**TOTAL**
		20–29	**30–39**	**40–49**	**>49 / Elder**	
Unaffected		1	2	6	0	**9**
Affected	**Not Widowed**	0	0	0	14	**14**
	Widower-headed	0	0	4	0	**4**
TOTAL		**1**	**2**	**10**	**14**	**27**

TABLE 2 *Female respondents (n=33) categorised by age and HIV-affectedness*

Household Type		Age Range (years)				TOTAL
		20–29	30–39	40–49	>49 / Elder	
Unaffected		2	5	4	0	**11**
Affected	**Not Widowed**	0	0	0	6	**6**
	Widow-headed	3	4	8	1	**16**
TOTAL		**5**	**9**	**12**	**7**	**33**

Data Analysis

All interviews were recorded on digital voice recorders and transcribed as soon as possible afterwards into individual Microsoft Excel spreadsheets. Once completed, these spreadsheets were then compiled into one master spreadsheet. The data were summarized to document the *range* of coping strategies and innovations being used by respondent households for the identified important forest resources, as well as innovations that respondents mentioned wanting to try. Interview questions were not designed to elicit change across time; therefore the nature of the data did not permit an analysis of the *extent* to which coping strategies changed over time for unaffected and affected households. The data are instead presented as the general coping strategies employed by all respondents, regardless of HIV-affectedness, and those strategies that were only specific to respondents from HIV/AIDS-affected households.

RESULTS

HIV/AIDS impacts how much labour is available and how it is structured within a household, which can affect and intensify the already tenuous economic, social, and nutritional coping strategies that households may be employing. The coping strategies uncovered through this research are discussed in regard to whether they are a labour-related coping strategy associated with one of the identified four important forest resources (firewood, water, medicinal plants, thatch grass (Timko, In Press)), or are more broadly an economic, social, or nutritional coping strategy. Agroforestry and wild foraging coping strategies are both included in the discussion. Wherever possible, relevant published literature is used to facilitate a better understanding of the coping strategies mentioned by local respondents.

Labour – related coping strategies

Intra-household labour is affected both when a person falls ill and is unable to work, and when other members of the household shift their extra-household activities to caring for the sick (Ngwira *et al.* 2002, Slater and Wiggins 2005). HIV/AIDS particularly affects the availability of labour and how family labour is divided, as well as the sequence of how work gets done, with a resultant loss of human capital over time (McPherson 2005, Slater and Wiggins 2005).

Timko (In Press) reported that firewood, water, medicinal plants, and thatch grass (*herein* grass) were ranked by the respondents as the four most important forest resources regardless of a household's HIV-affectedness. This section is broken down into four subsections, each dedicated to exploring the labour-related coping strategies associated with one of the four important forest resources. A range of general coping strategies are employed by all respondents, regardless of HIV-affectedness, while some coping strategies were only mentioned by respondents from HIV/AIDS-affected households (Table 3). It is unlikely that the latter are solely restricted to affected households, and may have been a result of the fact that 2/3 of the respondents were from affected households. However, a small number of coping strategies that may actually be unique to HIV/AIDS-affected households are highlighted in the text below. Local perceptions about what efforts appear to be working or not, are discussed, and where the data permits, interventions and innovations requested by local respondents are highlighted.

Firewood

Timko (In Press) reported that firewood was one of the four most important forest resources used by study respondents. Firewood is particularly important to households experiencing HIV-morbidity as it is required as a heat source for ill members, is sold as a source of income, and because the more calorically-dense foods (such as cassava) required to meet the caloric requirements of ill household members require cooking. The collection of firewood is generally a very time consuming task, almost exclusively falling to women (Bishop-Sambrook 2003). In many places, women walk for several hours before starting the search for firewood, which itself can take several hours.

Respondents in Malawi have both changed their practices and adapted existing technologies in order to obtain and use this important forest resource. By far, the most common short-term coping strategy employed by respondents, regardless of affectedness, appears to be substituting firewood with other products for cooking, heating and lighting. These included using things such as agricultural residues (pigeon pea stems, cassava stems, maize and sorghum stalks, tobacco stems), reeds, plastic, and rubbish. All respondents also reported walking further to get firewood; purchasing firewood from markets or neighbours; and adapting existing technologies (*sensu* Loevinsohn 2008) by planting specific firewood-providing species around their homesteads such as various species of *Eucalyptus* and *Pinus*, *Gmelina arborea*, *Senna siamea*, sendrella (*Toona ciliata*), and Neem (*Azedrachta indica*).

TABLE 3 *Labour-related coping strategies regarding important forest resources mentioned by all respondent types, and those only mentioned by HIV/AIDS-affected respondents*

Forest Resource	General Coping Strategies	Strategies Specific to HIV/AIDS-Affected Respondents
Firewood	• Substitute other products for cooking, heating, and lighting - agricultural residues commonly used include corn cobs, pigeon pea stems, cassava stems, sorghum stalks, tobacco stems - plastics, rubbish • Walk farther or longer to get firewood • Purchase firewood from market or neighbours • Plant firewood-producing tree species such as *Eucalyptus spp*., *Pinus spp*, *Gmelina arborea*, *Senna siamea*, *Toona ciliata*, and *Azedrachta indica* on homesteads	• Have relatives provide firewood; have children collect firewood or charcoal • Eat less food or eat foods that don't require cooking • Economize the use of firewood by not leaving the fire burning when there is nothing cooking • Use pruning and thinning of other trees growing around the homestead such as bluegum, mango, bamboo • Cut fresh trees and dry them
Water	• Walk long distances to collect water from boreholes • Bought an extra pail to store water when scarce • Use riverine or stagnant wetland water for other purposes and save borehole water for drinking • Reduce use of water by washing less clothes or leaving domestic chores undone	• Wash dishes and clothes in the river • Bathe in the river • Have relatives and friends provide water • Wake up early or wake at night to collect water from a well or borehole to avoid line ups • Collect rainwater using corrugated iron sheets on the roof
Medicinal Plants	• Walk long distances to collect medicinal plants • Dry medicinal plants in powder form • Seek treatment / buy medicinal plants from traditional healers	• Plant medicinal plants like *Moringa oleifera* on homesteads
Grass	• Use plastic sheeting in addition to grass for roofing • Use corrugated iron sheeting for roofing • Substitute grass with other resources such as reeds, palms, banana leaves, vertiver grass • Walk long distances to collect grass • Buy grass from others or hired labour to collect grass	• Women now roof houses • Men will now collect grasses

The data also revealed several coping strategies that were only mentioned by respondents from HIV/AIDS-effected households. While further research is warranted to uncover whether or not these are indeed isolated only to affected households, these respondents reported that they: rely on relatives to provide firewood including having children collect firewood; eat less food or eat foods that don't require cooking; and economize the use of firewood by not leaving it to burn when there is nothing to cook (Table 3).

Respondents noted that practicing agroforestry and planting woodlots have been rather successful, but the most successful coping strategies have been: planting *Eucalyptus* spp. because they regenerate quickly; planting tree species such as *Senna siamea* and *Gmelina arborea* on individual woodlots nearby as they reduce the expenditure of energy required when travelling to the forest reserve*;* and obtaining seedlings for these species from the Forestry Department. Respondents noted that they would like to: plant a village forest area and more individual woodlots; recycle waste paper into briquettes as a fuel source; use the sawdust from a nearby saw mill (in one study site) as an alternative fuel source; carry out forest reserve enrichment planting in the forest reserve; and use wood saving mud stoves or solar powered stoves.

Water

As with firewood, collecting water is one of the most burdensome tasks that take place on a daily basis for women (Bishop-Sambrook 2003). Hence, returns for investing in labour-saving technologies for this task may be higher given that more hours per household would likely be saved by innovations in this area, particularly for women (Mather *et al.* 2005, Slater and Wiggins 2005). In Malawi, many of the respondents reported changing their practices in order to obtain water, included walking longer distances to find water; purchasing an extra pail to store water when it was scarce; using sunken wells along riverine areas; using wetland/ stagnant water for other purposes to save borehole water for drinking; and reducing water use by washing less clothes, or leaving domestic chores undone.

Several coping strategies mentioned only by affected respondents included: washing dishes and clothes or even bathing in the rivers; waking up earlier to be the first one to collect water from a well/borehole or waking at night to avoid queues; and relying on family and friends to provide water. Only two respondents, both from affected households, reported the innovative harvesting of rainwater by using corrugated iron sheets on the roofs of houses.

The Malawian respondents reported that they have planted trees with the assistance of forest department to try to conserve water at the source, and that using stagnant or river water for consumption does not work because they suffer from diarrhoea, bilharzia, or dysentery. Respondents recommended a variety of interventions they would like to try, including: having government or NGOs provide water reserves like dams or tanks; sinking communal water boreholes or digging individual wells; establishing water catchment protection and conservation regulations and guidelines to conserve water sources; managing forest resources to conserve water sources; replanting trees in all water re-charge points such as along rivers and around bore holes; and being provided with water purifying chemicals to protect the water from germs.

Medicinal Plants

Respondents reported that medicinal plants were the second most important forest resource for households experiencing HIV/AIDS-related morbidity (Timko, In Press). This is unsurprising given that medicinal plants are a primary response to HIV-related illness in Malawi for the treatment of symptoms such as diarrhoea and shingles (Barany *et al.* 2005). Coping strategies common to all respondents included walking longer distances to collect medicinal plants; drying medicinal plants in powder form to use in the future; and seeking treatment and buying medicinal plants from traditional healers. The only coping strategy unique to affected respondents was planting medicinal plants like *Moringa oleifera* on homesteads.

Respondents noted that efforts to grow *Afzelia quazensis* were unsuccessful as it does not grow well in their regions, and there were several reports that the assistance of traditional healers did not help. Respondents reported their desire to: receive capacity building into planting indigenous medicinal plant species including; establish a village medicinal plant garden or arboretum with species that are used often (e.g., Neem, *Moringa oleifera*, various species of Aloe, citrus fruits, etc.); document medicinal tree types and the ailments that they manage; and have the government or health personnel distribute different types of medicinal plants to those infected by HIV/AIDS.

Grass

Grass is the most commonly used roofing material. Nearly all respondents noted using plastic sheeting in addition to grass to ensure their roofs are more waterproof. Respondents also reported changing their practices by walking longer distances to collect grass, substituting grass with other resources such as reeds or palms, and buying grass from others or hiring help to collect grass. A few respondents noted the use of corrugated iron sheets could replace thatched roofs.

Several respondents reported that rats are often associated with the use of plastic roofing materials, creating problems for the household. As well, the other resources that are often used in lieu of thatch grass do not work as effectively because, for example, banana leaves have too many serrations on the leaves and palm leaves are small in size and thus require great skill to lay them properly to make a waterproof roof. Respondents suggested several innovations they would like to try including fibre-cemented roofs; corrugated iron sheets; and planting vertiver and other local varieties of grass as a thatch grass substitute.

In the context of grass collection, affected respondents noted that HIV/AIDS had forced them to revise their traditional gender roles. Women and men have traditionally held responsibility for different household tasks including home maintenance; kitchen gardening; planting and harvesting crops; and collecting forest resources. But many of the Malawian respondents reported that this has all changed due to HIV/AIDS, and that "there are no specific gender roles, everybody is doing whatever they can". For women, respondents reported that "because of AIDS, women are always busy" now: constructing bathrooms and digging pit latrines; hunting bushmeat; roofing houses; and cutting building materials like grass, poles and reeds. Likewise, men now will collect grasses for thatching; and collect and even sell mushrooms, edible caterpillars, firewood, and fruits.

Economic, social, and nutritional coping strategies

HIV/AIDS decreases people's ability to produce an income; undermines their coping mechanisms; deprives them of assets; and disrupts the networks between the family and the broader community (McPherson 2005, Slater and Wiggins 2005). Broadly speaking, households can cope with the impacts of the disease by relying on a variety of economic, social and nutritional coping strategies such as depending more heavily upon family (including school aged children); decreasing the area of farmland cultivated; using labour saving inputs such as herbicides; practicing intercropping of vegetables; and seeking other sources of income (Bishop-Sambrook 2003, Mutangadura *et al.* 1999). The economic, social, and nutritional coping strategies relied on by the Malawian respondents are discussed below and are listed in Table 4.

Economic coping strategies

Economic coping strategies occur when savings and financial and physical assets (e.g., farm implements, livestock, household goods) are diverted from investment and sold under duress to cover the medical and funeral expenses of the ill (Bishop-Sambrook 2003, Jayne *et al.* 2005, Loevinsohn 2008, McPherson 2005, Slater and Wiggins 2005). Household members may also seek out employment, paid in cash or kind, as agricultural labourers, further reducing the availability of labour in the household (Ngwira *et al.* 2002). Regarding forest resources, timber, firewood, fodder, and medicinal plants are often harvested and sold to supplement local incomes (Lengkeek 2005, Mutangadura *et al.* 1999).

Economic coping strategies were only mentioned by the affected respondents in this study. Again, this may be a result of the fact that 2/3 of the respondents were from affected households. The variety of strategies used by affected respondents included selling wild mushrooms and fruits, charcoal,

TABLE 4 *Economic, social, and nutritional coping strategies mentioned by all respondent types, and those only mentioned by HIV/AIDS-affected respondents*

Coping Strategy Type	General Coping Strategies	Strategies Specific to HIV/AIDS-Affected Respondents
Economic	N/A	• Hire self out for labour • Sell donuts or fritters to get money • Sell fish in the market • Sell farm produce • Sell firewood • Began wintercropping • Ask grandchildren to work for money • Withdraw children from school due to lack of school fees • Get financial assistance from relatives, particularly children • Beekeeping • Buy medicinal plants from markets or shops • Sell or rent out arable land • Sell livestock • Men now collect and even sell mushrooms, edible caterpillars, firewood, and fruits
Social	• Seek treatment from a traditional healer • Seek medical attention from hospital or health centre • Use demonstration projects to teach the children how to plant trees around the homestead • Groups to teach children to identify medicinal plants in the wild • Groups using role playing and organizing dances in the village to educate about caring for the forest	• Send children to stay with relatives or friends • Have grown children return home to look after the household while parents go into hospital • Asked brother to help thatch the roof of the main house • Join committees like 'People Living with HIV/AIDS' for financial, moral and spiritual support • Join a club with a revolving fund scheme so that I could be assisted with some money • Depend much on the church which provided us with moral and spiritual support
Nutritional	• Collect mushrooms and wild fruits for direct consumption and sale	• Eat less food or eat foods that don't require cooking • Exchange fish for food • Women now hunt bushmeat

and timber from trees on homesteads; withdrawing children from school so their labour can be employed on the farm and to save money on tuition fees; wintercropping; and respondents hiring themselves out as *ganyu* (casual labour). Bryceson and Fonseca (2006) note that *ganyu* has implications for the spread of HIV in Malawi as peasants, especially woman and children, are increasingly turning toward cash-earning work, often beyond the confines of the village, which is putting them at risk of transactional (and unprotected) sex. Beekeeping in forests can also be both an important income-generating strategy and provide food/medicine to treat HIV-related infections (Slater and Wiggins 2005). And indeed, beekeeping is used by some of the Malawian respondents in this study as an economic coping strategy.

Several respondents also reported being deprived of their assets by selling or renting out arable lands to others to cultivate, and selling livestock and tools. Changes to local gender roles are also more apparent when considering economic coping strategies in the Malawian cases. Several respondents noted that men have begun collecting and even selling forest resources including mushrooms, edible caterpillars, firewood, and fruits. These were traditionally the domain of women.

Social coping strategies

Regardless of HIV-affectedness, a variety of social coping strategies are being used in the Malawian households to ensure health and forest resources are protected. For the former, these come in the forms of health clinics, hospitals, and traditional healers. For the latter, several types of *in situ* knowledge-specific, forest education projects have been developed in the study sites to retain and perpetuate the use of knowledge about forest resources. These include: the use of oral folktales are explained to younger generations as a method of teaching them how to use the forest sustainably; using demonstration projects to teach the children how to plant trees around the homestead; teaching children to identify medicinal plants in the wild; and using role playing and organizing dances in the village to educate about caring for the forest. These are important because the death of prime-aged adults from AIDS erodes the traditional transmission of context-specific knowledge and skills about natural resources (Lengkeek 2005, Lopez 2008, Slater and Wiggins 2005). McPherson (2005) notes that knowledge and information could be collected and disseminated, with some agencies acting as knowledge brokers to help stem the loss of institutional

memory. Several respondents noted that the demonstration of traditional medicinal plants works well, but that the use of folktales and initiation ceremonies are regarded as outdated and old-fashioned. A number of respondents suggested that they need more assistance to document the use of forest products so their knowledge is passed on. In particular, there appears to be a genuine desire to train children how to care for the trees and forests.

Specific to the affected respondents were two types of social coping strategies that were not mentioned by unaffected respondents: family-related support networks, and community-related institutions. In the first case, affected households will draw upon intra-family support by sending their children away to stay with relatives or friends as a way to reduce the burden on the affected household; having grown children return home to look after the household while adults go into the hospital; or having siblings assist in forest resource-related activities.

New institutions at the community level appear to be enabling local people to cope with and innovate in the face of HIV/AIDS. Elsewhere, these institutions have ranged from formal to informal networks, and have involved engagement in productive activities (such as land preparation, weeding or harvesting); addressing issues of water supply and nutrition; and improving access to health services and assisting in times of sickness and death (Barnett and Grellier 2003, Bishop-Sambrook 2003). In the Malawian sites, respondents noted that assistance provided in times of sickness and death is particularly important and has taken the form of burial committees or savings clubs. Local burial committees assist in times of bereavement by buying coffins for the deceased if their families cannot afford it, and collecting firewood for meals and warming during the funeral. Local bee keeping committees are seen as a means to conserve the forest while enabling members to collect and consume honey for sale or personal consumption. Malawian respondents also credited the Forestry Department for giving them extension advice, and noted that a European Union-sponsored program called *Improved Forest Management for Sustainable Livelihood Program* (IFMSLP) builds capacity in participatory forest management.

Nutritional coping strategies

There are complex links between HIV/AIDS, forest resources, and human health and nutrition. "AIDS epidemics are most severe in the regions of the world where food insecurity is most severe, Sub-Saharan Africa" (Gillespie 2006:6). Food insecurity and malnutrition may accelerate the spread of HIV infection both by increasing people's exposure to the virus and increasing the risk of infection following exposure (Gillespie and Kadiyala 2005). Nutritionally, people with HIV/AIDS require up to 50% more protein and 15% more energy than those unaffected by the disease (Piwoz and Preble 2000). Yet forests, wild biodiversity, and agrobiodiversity support human health in a number of important ways, including for improved food security; nutrition; and medicinal relief (Arnold *et al.* 2011, Lengkeek 2005, Powell *et al.* 2011). For people living with HIV in particular, nutritional support from forests is a salient issue as forest resources play a fundamental role in ensuring affected people meet these increased nutritional requirements (Lengkeek 2005). Some non-timber forest resources have been found to be high in key nutrients required by people living with HIV/AIDS, particularly protein, fat, iron, zinc, and vitamins A and C (Barany *et al.* 2004). Wild foods, fruits, berries, and leaves can boost the immune system and help protect against opportunistic disease (Villarreal *et al.* 2006), while "wild meats, insects and fruit kernels provide high quality protein and wild leafy vegetables are key sources of micronutrients" (Kaschula 2008: 163). Forest foods can also provide emergency nutritional support at specific times of the year, such as between agricultural harvests (Colfer *et al.* 2006).

Study respondents reported that they have broadly coped with the dietary impacts of HIV/AIDS by collecting mushrooms and wild fruits for direct consumption. Several respondents noted that they would like to try intercropping with *Senna siamea*, *Khaya anthotheca*, *Eucalyptus* spp., *Afzelia quazensis*, and *Bauhinia thonningii*, while other noted a desire to plant indigenous fruit trees around their homesteads, notably *Flacoutia indica*, *Amisophylla pomifera*, and *Friesodielsia obovata* (Benth.) Verdc. Elsewhere, Villarreal *et al.* (2006) noted that indigenous fruits can be a significant source of food and cash income, especially for poorer households, women and children. In this context, efforts to cultivate and market fruits can be seen as both a nutritional and an economic coping strategy

Two dietary practices mentioned by affected respondents deserve special mention. First, several respondents mentioned eating less food or eating foods that don't require cooking. It is unclear from their comments whether this was due to a lack of firewood or water for cooking purposes, or an inability to grow or purchase the food for consumption. Regardless, this desperate coping strategy warrants further investigation in an already impoverished country like Malawi given the caloric intake required for AIDS sufferers to be able to ingest anti-retroviral medications. Second, gender roles appear to be relaxing as women are now more commonly charged with hunting bushmeat for their families, which has traditionally been the domain of men.

DISCUSSION AND CONCLUSION

This paper has explored local forest-related coping strategies that are being, or could be, used to alleviate some of the HIV/AIDS burden on rural households in Malawi. It has done so by drawing on data obtained from sixty local respondents in four regions of the country. Specifically, this paper has tried to illuminate the efforts being made locally, and to highlight local knowledge about what efforts appear to be working best and what interventions people would like to try. The results of this study demonstrate that the case study Malawian households are employing a range of coping strategies to address their household's labour availability, and economic, social, and nutritional standing. This section recommends

interventions that policy makers and development practitioners could provide in order to foster the most promising coping strategies that enable the Malawian respondents to obtain and manage important forest resources. It then addresses the study's limitations before providing a short conclusion on moving this research domain forward.

The results of this study could help policy makers and development practitioners to foster the most promising coping strategies that enable local people to obtain and manage important forest resources. Policy makers and development practitioners recognise that HIV/AIDS affects the allocation of family labour, and could support the adoption of labour-saving practices and technologies in Malawi through a number of key interventions, including:

- providing grants and extension services for innovative technologies which immediately ease the workload of household members, such as fuel efficient stoves, groundwater boreholes, planting materials for intercropping, and encouraging roof water harvesting using corrugated iron sheets for domestic use (Bishop-Sambrook 2003, Mutangadura *et al.* 1999);
- directly provisioning households with the required forest resources such as firewood and water reserves like dams or tanks;
- investing in agroforestry projects and the domestication of important medicinal plants, wild vegetables and indigenous fruits; and
- improving rural households' access to limited land and labour resources (Mutangadura *et al.* 1999).

Several interventions could foster the development of forest-related economic, social, and nutritional coping strategies in Malawi, including:

- directly supporting local forest-related income generating activities and better targeting support to households that are highly vulnerable (Mutangadura *et al.* 1999);
- investing in agroforestry projects (Jayne *et al.* 2005), village forestry efforts (Villarreal *et al.* 2006), beekeeping enterprises, and the domestication of important medicinal plants, wild vegetables and indigenous fruits;
- providing agroforestry extension to support collective action and empower local communities to design and manage their own development initiatives (Villarreal *et al.* 2006); and
- strengthening indigenous responses such as savings clubs and labour and draught power clubs (Mutangadura *et al.* 1999).

Jayne *et al.* (2005) note that female-headed households tend to be poorer in general than their male-headed household neighbours, and are tenuously poised in terms of maintaining control over land. Therefore, many of the recommendations listed above to support the adoption of labour-saving practices and technologies could also help to reduce women's work burden. For example, the development and promotion of fuel-efficient stoves can reduce the time women spend collecting firewood, while making more water points available reduces the distance women must walk to fetch water (Mutangadura *et al.* 1999).

There are three possible limitations to the research as presented. First, the interview questions were not designed to elicit change across time; hence the data did not permit an analysis of the *extent* to which coping strategies changed over time for unaffected and affected households. This could be remedied in future research by asking respondents more detailed questions about the coping strategies they used before HIV was evident in the household, during the period of HIV-related morbidity, and after AIDS-related mortality. Second, a larger sample of affected and unaffected households would provide a clearer indication of those coping strategies employed by all respondents, regardless of HIV-affectedness, and those that are specific to HIV/AIDS-affected households. Given that 1/3 of this study's respondents were from unaffected households, with the remaining 2/3 from affected households, it is not possible to discern whether it is only affected households relying on some of the more serious coping strategies (such as eating less), or whether these are common strategies used by all households. Finally, agroforestry-related coping strategies could be disentangled from wild foraging practices in future research to further clarify the extent to which these different types of forest-related coping strategies could mitigate the impacts of HIV/AIDS.

One of the strongest arguments for supporting local forest-related coping strategies is that they are often mutually reinforcing, rather than mutually exclusive. Thus, there are linkages between the categories used in this paper, whereby support for one labour-related coping strategy, for instance, could foster positive change in terms of economic, social, and nutritional standing as well. For example, supporting village forest areas and woodlots can be both a labour-saving mechanism as well as an income generating measure given that tree resources (customary woodlands, village plantations, and trees on farms) have enabled communities to weather periods of severe hardship in the past (Villarreal *et al.* 2006). Likewise, pursuing many of the labour-saving options, such as reducing the time spent collecting firewood or adopting and subsequently adapting innovative low-fuel clay stoves (which can be made locally, such as the *Chitetzo mbaula* stove), can also reduce women's work burden associated with these tasks, enabling them to participate in more productive activities such as income generating activities.

While the government has developed the 'Forestry and HIV and AIDS Strategy' (Malawi Government 2007), it does not go far enough in terms of addressing local and village-level forest resource needs. More policy and developmental practitioner support for local forest-related coping strategies is needed in Malawi. However, a balance between long-term innovations and short-term coping strategies must be found. The pursuit of innovations, which may require lengthier training and capacity building periods or which could be potentially more expensive, should not be overlooked in favour of supporting short-term coping strategies that may have adverse long-term consequences for survival. Coping strategies such as eating less food or eating foods that don't require cooking

to economise on firewood, indicate the depths of the disease's impact on rural households. However, some of the coping strategies mentioned by respondents in this study may indeed be worth supporting in the near future, such as the provisioning of firewood to meet immediate demand. And locally-evolved coping strategies, such as using agricultural by-products in place of firewood, might just become long-term innovations if the right fostering environment is provided. The ultimate goal should be supporting the most effective coping strategies in the short-term while fostering innovations, such as those with low-fuel stoves or planting fast-growing species in village areas to meet future firewood demands, over the long-term.

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