Keeping agroforestry relevant in situations of high HIV/AIDS prevalence

FAO and ICRAF

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INTRODUCTION

"Over the past few years, there has been a major revolution in the world’s thinking about HIV. The epidemic has been understood not just as health issue which will always remain, but as a major threat to development and to human security." – Peter Piot, Executive Director, UNAIDS

In its earlier stages, the HIV/AIDS epidemic was predominantly an urban problem, affecting more men than women, and those with relatively higher incomes. Now the epidemic has rapidly moved into the rural areas, hitting those who are least equipped to deal with its consequences. Today, 95% of people living with - and an even higher proportion of those dying of - HIV/AIDS are in developing countries. The overwhelming majority are the rural poor, and among them women figure disproportionately.

The epidemic is undoing decades of economic and social development and causing rural disintegration. For example, in sub-Saharan Africa, HIV/AIDS is depleting the region of its food producers and farmers, decimating the agricultural labour force for generations to come.

In spite of the fact that up to 80% of the people in the most affected countries depend on agriculture for their subsistence, most of the response to the epidemic has come from the health sector. The agricultural sector cannot continue with "business as usual" in communities where vast numbers of adults are dead, leaving only the elderly and children. It has to revise the content and delivery of its services, as well as the process of transferring agricultural knowledge.

The agricultural and natural resources sectors can be developed in such a way as to increase the resilience of rural populations and contribute significantly to HIV prevention. Besides the current health-based strategies in combating HIV/AIDS, agriculture and natural resource responses can play an innovative and essential role in controlling the epidemic. In this regard, efforts to mobilize agricultural, forestry and agroforestry institutions, both public and private, are essential in the face of the present HIV/AIDS pandemic. The purpose of this paper is to show the specific impacts of the pandemic on agroforestry and to propose concrete agroforestry strategies to mitigate these impacts.
THE IMPACTS OF HIV/AIDS ON RURAL LIVELIHOODS

The impacts of HIV/AIDS are many and intertwined. While its health and demographic impacts have been most studied, its effects on agriculture and food security are less well known. The impacts can be felt most dramatically in the reduction of the labour force, impoverishment and in the loss of essential knowledge that is transmitted from generation to generation. All exacerbate food insecurity and contribute to increase poverty. Moreover, these same consequences of HIV/AIDS contribute to making the rural poor more vulnerable to HIV/AIDS infection. This devastating cycle must be broken, and agroforestry has a critical role to play.

The impacts of HIV/AIDS that will have a long-lasting effect on forestry, agroforestry and rural livelihoods, stem from:

i. **Dramatic reduction of the productive age groups and of the agricultural labour force**: FAO has estimated that some countries could lose up to 26% of their agricultural labour by year 2020. The lack of labour available was found to be associated with an increase of forest fires in Malawi, where communities resorted to burning the forest rather than selective cutting/processing. These fires lead to greater destruction of woodlands and the multiple products and services that woodlands can provide to communities. Among other effects, the lack of labour has resulted in a sharp decrease of area of land cultivated and in a shift from cash to food crops.

ii. **Acute impoverishment of households**: when one member becomes infected, households use their resources to pay for medical expenses or for funerals, frequently resulting in the sale of productive assets. The consequent loss in buying power has been shown to result in a decreased expenditure in food. For example, one study in Ethiopia calculated the cost of treatment of one AIDS patient to exceed the average annual farm income (foot note XXX). At the macro economic level, the aggregate effects are significant.

iii. **Loss of knowledge**: The generational loss caused by HIV/AIDS can result in a corresponding loss of agricultural knowledge, practices and skills that are

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1 See FAO XXXX
2 The SADC Food, Agriculture and Natural Resources Vulnerability Assessment Committee (2003) conducted a large-scale quantitative study of the effects of HIV/AIDS on food security in Malawi, Zambia and Zimbabwe, using data from emergency food assessments conducted in August and December 2002. In the three countries, data were collected from about 2700 households in August 2002 and 2500 households in December 2002. Results from Malawi showed that households with extremely high dependency ratios, no active adults, recent adult deaths or more than one chronically ill adult had 30-66% less income per capita than unaffected households. In Zambia, households with a chronically ill head of household cultivated 53% less area than households without a chronically ill person. The reduced area that was planted by households with chronically ill heads, was allocated mostly for food crops (89%), with only 1% allocated to cash crops. Meanwhile, households whose heads were not chronically ill allocated 17% of their land area to cash crops.
3 A recent study by Ferreira et al (2003) estimates that the mortality effect alone (having fewer products adults) has meant that total economic output in those countries in 1999 was between 18% (Malawi) and 35% (Zimbabwe) lower than it would have been without HIV/AIDS.
passed from one generation to the next. This knowledge is critical to both sustainable agricultural production as well as to cultural identity. One study in rural Kenya found that only 7% of the orphan-headed households had enough agricultural knowledge to continue productive tasks. The epidemic is also producing a significant loss in institutional knowledge, as the staff of the institutions that provide services, such as extension services has been hardly hit.\footnote{There is increasing evidence of loss of staff, both at the management and other levels, due to AIDS in agriculture and agriculture-related ministries in sub-Saharan Africa. The minister of Land and Water of one Southern African country reported the loss of 100 senior staff plus 800 other staff that cannot be replaced.}

This paper will show how agroforestry technologies and an overall agroforestry strategy can play a role, and be effective in the mitigation of these kinds of impacts.

Given the specific characteristics of the epidemic and its impact on rural livelihoods, agroforestry can be critical for rural livelihoods in the following ways:

i. labour management possibilities, both short and long term
ii. low labour intensive income generation opportunities
iii. medicinal trees and substances that can aid in the symptomatic relief of opportunistic diseases associated with HIV/AIDS
iv. nutritious food stuffs that can boost the immune system and contribute to protect against opportunistic disease
v. safety nets
vi. improving soil fertility
vii. marking ownership

These will be subsequently described in detail, but to understand the range of agroforestry actions that can mitigate the impact of HIV/AIDS, it is necessary to briefly describe the dynamics of the epidemic. The overall impact of the epidemic depends on the actual stage of evolution of infection of the population. As shown in Figure XXI, the rate of infection of the HIV virus follows concrete phases. In phase I, which can take a long time, prevalence rates remain low and increase very slowly. Phase II starts when a turning point is reached, usually when around 5% of the population becomes infected and exponential growth becomes evident. A new turning point, when the proportion of the population infected levels off, marks the start of Phase III. Finally, the onset of the decrease of HIV prevalence rates leads to Phase IV. The precise shape of the curve and the duration of each phase, will vary by country and by specific areas within countries and depends on a range of factors, including policy and other concrete action taken to prevent and mitigate the epidemic. Early and decisive action may keep rates low, without ever reaching Phase II, as is the case of most developed countries.

HIV/AIDS is a slow epidemic. Its impact starts to be felt at the population level only years after the sharp increase in prevalence rates (see Villarreal, 2003). This time lag varies in duration, but massive deaths can be expected between five to ten years after the onset of Phase II, depending on the level of nutrition of the population and other factors.
Death is one of the main impacts, but before death occurs, there are other impacts, for example weakness and decreased ability to work for about two years (again, depending on nutritional, medical and other factors). Impoverishment is another effect, starting more or less at this time. Impacts at the population level that succeed the death curve are, for example, the occurrence of double orphans, as the death of both parents lags behind the death of one parent by certain years. Impact curves are shown in Figure XX2. The exact shape of all of these is hypothetical, as not enough hard data exists to document them accurately.

Figure 1: Phases in the HIV prevalence curve

The time lag between the impact curves and the prevalence rates means that a population in which prevalence rates are very high may still not have any observable or measurable impact. Likewise, low prevalence rates may coexist with very high levels of impact (Phase IV). Policies, programmes and all initiatives to prevent and mitigate HIV/AIDS need to take the stage of the epidemic into account in the specific area to which they are directed (Topouzis, 19xx).

Very importantly for agroforestry initiatives, the dynamics of infection, the dynamics of the various impacts and the lag between prevalence and impact creates a window of opportunity for specific interventions. For example, as will be discussed, some of the proposed labour-saving initiatives are labour-intensive for an initial period of time, before they start to produce their labour-saving benefits. It would be unthinkable to implement them in a population that is hard pressed for labour, such as one with a high impact of the epidemic. However, even population groups with a high prevalence could initiate them if impact is still low. If this is achieved, they could start reaping the labour saving advantages of these techniques when they will need them most.
An analysis at the household level reveals similar results. Between the time of infection of the first adult and full-blown AIDS, there is a time lag in which interventions. Households go through similar stages, but may have different evolutions, leading to different household compositions and in some cases causing its outright disintegration⁵. Recent studies have shown that the precise effects of HIV/AIDS depend upon: 1) the previous demographic structure of the household; 2) who and how many people in the household are chronically ill or die; 3) the length of time that the household has had to cope with the effects of the epidemic; and 3) the resources the household had at its disposal for dealing with the increased demands.

In Figure XX, the evolution and different composition of households affected by AIDS are depicted. Shown are 13 types of households that may exist in an area of high HIV/AIDS prevalence. In many communities all 13 types may exist at the same time. Each type of household has distinct resources, challenges and needs. These types are described in Annex XXI.

⁵ After the deaths of both parents, orphan headed households may appear. However, these tend to be short-lived as they are not usually viable. Recent evidence from Mozambique indicates that rural orphan headed households tend to disintegrate faster than urban ones (FAO, 2003).
AGROFORESTRY POSSIBILITIES FOR THE MITIGATION OF HIV/AIDS

In this paper we will be using a landscape perspective on agroforestry, rather than a plot level focus:

"Agroforestry refers to a dynamic, ecologically based natural resources management system that, through integration of trees in farms and in the landscape, diversifies and sustains production for increased social, economic and environmental benefits of land use at all levels" (Leakey, Editorial, Agroforestry Today, September 1998)

Labour management possibilities

Poor agricultural households are highly dependent on availability of labour at crucial times for their survival. Most (XXX%) of African agriculture is highly labour intensive, as it depends on manual labour with critical peaks throughout the cycle (land preparation, planting, harvesting). Sickness, death and funeral attendance\(^6\) during these periods may mean that the planting season is missed, and with it, a full crop. Care for the sick is also demanding in time and energy, frequently reducing availability of labour, especially women’s labour, for agricultural tasks. In Ethiopia, for example, a study showed that XXXX. It has been calculated that by the time a person dies of AIDS related sickness,

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\(^6\) Funeral rites may have a severe impact on the reduction of available labour. For example, among the Luo of Kenya, a cultural norm prohibits all close relatives to work in the field from the moment of death of the person until four days after he is buried if the deceased is male and three days in the case of a woman. Some calculate the close relatives to be around 50 persons and several days may elapse between death and burial, especially if death occurs away from home and the body has to be transported back. The number of person-days lost for agricultural production may be significant.
about two person-years of labour have been lost due to the weakness of the person and 
the time that others spend caring for him or her.

Agroforestry provides the possibility to: 
- improve labour management throughout the planting cycle or throughout the year 
- provide a longer term horizon for labour management and therefore increase 
  communities' resilience and capacity to withstand shocks as the AIDS epidemic

Reducing labour peaks

Many agricultural practices have labour peaks, requiring a high concentration of labour 
during a specific period of time. For example, land preparation and harvesting. Some of 
the labour saving technologies being promoted to address the specific labour shortages 
created by the AIDS epidemic (FAO, XXXX) have the advantage of reducing these peaks 
and distributing the required labour over a number of months. Agroforestry techniques 
such as XXXXXXXXXX can help reduce labour peaks.

INPUT FROM ICRAF

Focusing on long-term labour management

Communities differ in their capacity to recover from external shocks. The time of 
recovery after, for example, a drought, depends on external factors such as agro-
ecological zone and internal ones such as labour availability, knowledge, skills, existence 
of stocks of food (storage, post-harvest management). HIV/AIDS affects these factors. It 
creates an increased dependency ratio in households, as it kills mostly productive age 
adults.

Appropriate agroforestry strategies can help increase the resilience of communities to 
external shocks. Adequate combinations of trees and crops can be devised for the short 
and long term needs of different kinds of communities, according to the stage of the 
epidemic they are in. As some techniques require elevated labour inputs to get them 
started, it is important that they be promoted during the low impact periods (see above). 
Trees planted in these stages, when labour is still available, will provide a source of food 
several years later, when the community or the household's labour may have dwindled. 
Traditional agroforestry systems are diverse. They vary among agro-ecological zones and 
are socially and culturally specific.

Externally derived agroforestry systems and traditional systems using indigenous tree 
species have different kinds of labour requirements. A close analysis of prevailing 
agroforestry and production systems in highly HIV/AIDS prevalent areas would reveal 
low-labour agroforestry alternatives that would maintain the capital of the soil and the 
production from the land during a generation of low-labour availability. For 
example...XXX
Soil fertility

Agroforestry can also increase resilience by improving or maintaining soil fertility. For example, improved fallows within the local farming systems would improve soil fertility and food production while reinforcing soil conservation and providing a nearby source of fodder and fuel wood to homesteads. Depending on the species planted, products would be available after two to eight years. Improving fallows can also help to secure land tenure of abandoned farm lands.

Income generation opportunities

Incorporating forestry activities can also be a means of generating income. Forests and trees not only provide food and fuel but also fibre, timber and fodder which can reduce expenditures and generate income. The sale of non-wood products such as mushrooms, and wood products such as poles, can also be a source of income. Proper management would maximize the productivity of biological systems and improve the efficiency of labour through a carefully planned division between forest and farm enterprises.

Forest-based income opportunities that have been tried out in AIDS contexts include making charcoal briquettes as alternative income-generating opportunities for young women who engage in commercial sex (YONECO an NGO working near Zomba) (Ngwira et al., 2001) and processing of exotic and indigenous fruits among youth groups.

Medicinal species

Certain tree species are instrumental in treating the opportunistic infections of HIV/AIDS. Medical plants and tree species are well documented and chemically analysed in South African literature. They could also form part of a programme drawing on the expertise of the forestry sector.

In many villages, basic pharmaceutical drugs are not available, and households rely entirely on medicinal plants, shrubs and trees from the farms and the surrounding woodlands and forests. Wild medicinal plants and trees are for many households the only source of treatment of opportunistic infections associated with AIDS. There are many promising developments in this area, although solid research is still much needed. For example a team of researchers at the University of Lausanne have discovered that the African tree Bobgunnua madascarienis contains an anti-fungal substance that combats Candida alibicans, the bacteria responsible for fungal skin problems and mycosis, a condition that commonly affects the eyes of AIDS patients. It is also said to fight Aspergillus, which can cause a fatal lung disease7

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7 http://www.safnet.org/archive/aids301.htm
See also http://www.worldwilderness.org/live/sessions_day_four.htm for a potential treatment for the later stages of HIV/AIDS based on indigenous plant species.
Safety nets

Forest food stuffs have traditionally complemented agriculture-based diets and may provide the basis of survival at times of severe food shortages (Garf, 2003). Forests have been sources of nutrition (berries, nuts and bushmeat, for example), income and building materials. They have traditionally been a safety net for times of food crises, drought and other shocks. In the context of AIDS, they can serve as a crucial safety net for survival. There is preliminary evidence that HIV/AIDS affected households in Malawi have started to increasingly rely on miombo woodland resources as their capacity to farm the land declines (see below a discussion on miombo woodlands a potential safety nets).

Nutrition

Forests can provide essential nutrients and micro nutrients to a variety of farming systems throughout Africa. Persons living with AIDS have specific nutrition requirements. Epidemiological evidence shows how vitamin deficiency, protein deficiency and low immunity level makes people much more susceptible to the disease (Stillwagon, 2002) 8

People living with HIV face a vicious cycle in which repeated episodes of illness caused by HIV lead to malnutrition, and malnutrition in turn further accelerates the onset of AIDS. HIV damages a person's immune system, and the repeated illness that ensues reduces appetite; moreover, nutrients are lost from vomiting and diarrhoea, and the use of certain medications. Infections also interfere with the body's ability to absorb and use nutrients, which are needed to fight off HIV. This has serious consequences for the poor, who are more likely to be malnourished even before they become infected.

Malnutrition in itself also leads to the suppression of the immune system, giving rise to more frequent illnesses and accelerating the development of AIDS. It may also be associated with increased risk of HIV transmission from mother to child. 9

Good nutrition can slow the progression from HIV to full-blown AIDS. Forest resources can contribute to satisfy the nutritional needs of HIV positive persons. For example, the baobab tree has been shown to be a god source of Vitamin A and Vitamin C (Sidibé et al., 1996). 10

Marking ownership

In many social systems present in sub-Saharan Africa, upon the death of a man, his relatives grab all productive assets (and sometimes other property) from the widow. Some cultures contemplate the “inheritance” of the widow by one of the brothers of the deceased, ensuring that land, property and sometimes children remain in the clan. With the spread of AIDS, and with the perception of the risk of “inheriting” a person who may

9 See http://www.fao.org/hivaid/impacts/nutrition_en.htm  
carry the virus, widows are frequently left without productive assets, undermining their capacity to feed themselves and their children. Access to and ownership of land is a determining factor for the viability of HIV/AIDS-affected households. Trees have long been an indicator of tenure in Africa. Tree-related interventions should be placed within the context of customary land tenure and emerging legal and traditional responses to land tenure issues in each tribal area affected by HIV/AIDS. Trees planted in abandoned fallows can preserve the land for the family, rehabilitate wasted soils and provide products (fuelwood, fodder, fruits) for consumption or sale for up to eight years, depending on the species planted. However, trees can also encourage others to grab that portion of land where they have been planted. Interventions will necessarily vary even between adjacent communities sharing the same cultural heritage and in the same agro-ecological zones.

AGROFORESTRY STRATEGY FOR HIV/AIDS CONTEXTS

One of the defining attributes of agroforestry is its complexity. Across the African continent, farmers have adopted agroforestry systems that vary greatly in terms of types of goods and services produced, length of production period, market and environmental risks, ecological complexity, land, labour and managerial intensity, and dependence on input and output markets. This complexity can work against the widespread adoption of agroforestry: a common presumption is that low adoption of agroforestry stems from the high knowledge-intensity of the techniques. But the complexity of agroforestry can also be its major attraction. Agroforestry can be made relevant to the wide range of circumstances encountered by households and communities affected by HIV / AIDS.

The understanding that farmers access and use trees throughout their landscape, whether they are on their farm, on communal lands, on the margin of forests – and that their access and use of these trees interplays and influences decision on what trees they preserve, what trees they plant, and how they manage trees on their farms.

It is also an understanding that agroforestry extension projects do not start from a basis of no trees – the entry point of NGO and govt. agroforestry projects in the past has been tree nurseries and planting, with little reference to what trees are already in the landscape, (sometimes even not recognizing what naturally occurring trees they already have on their farms), and the trees that farmers already can access and use. Any agroforestry intervention should start with assessing which trees and tree products are already available to farmers, and matching this with their needs (fodder; fruits; marketable products; soil conservation) to which improved tree management, species selection and tree based interventions can contribute. There is much agroforestry extension literature on this, and practice (Diagnosis and Design; agroforestry extension manuals etc.) These kind of issues are well known and recognized amongst practicing agroforestry professionals. However, to many other professionals who work both in agriculture and forestry, agroforestry extension is simply the establishment of trees nurseries and planting trees on farms. This mis-conception needs to be eliminated.
**Preserving knowledge and strengthening institutions**

Agroforestry systems depend upon a wealth of local agricultural and biodiversity knowledge that is essential for maintaining and sustaining production. The loss of productive and reproductive generations takes with it the channel for passing livelihood skills and agroforestry knowledge from generation to generation. The consequence is a young population ill-equipped to manage the impacts of the epidemic and to maintain successful production. Other types of community knowledge, such as knowledge of the environment and maintaining local genetic diversity, are often passed orally from generation to generation and are fundamental for nurturing and preserving cultural identity. The death of a generation means a break in the chain, and with it a disruption of the oral tradition. Preserving and transmitting such knowledge can be achieved at various levels.

Orphans and female-headed households, as well as widowers, need information to be able to maintain production. Indigenous knowledge and frequently technology related knowledge are typically gendered. As husband or wife die, the other lacks specific kinds of knowledge necessary for production is missing in the unit. Effective initiatives need to be designed, implemented and evaluated in order to meet the informational needs of these households. There is also a great need for youth education in HIV/AIDS awareness.

Informal and formal community institutions, such as extension services and schools, need to be reoriented to meet the information needs of households that have lost an adult. Through these institutions, the local knowledge, including biodiversity and landscape diversity, can be preserved. Natural resource programmes working in close collaboration with traditional leaders and using traditional entertainment media such as theatre, song and dance can both raise awareness and support communities in the sustainable management of their natural resources in response to the epidemic.

**Strengthening local level institutions** is an essential component of the sustainability of any agroforestry response. Such an approach also marries well with the current trend in extension towards supporting collective action, and empowering local communities to design and manage their own development initiatives.

**Strengthening formal institutions** is critical also, given that the loss of essential human resources from ministries of forestry and of agriculture is hampering the possibilities of developing and implementing agroforestry strategies. In general, the loss of all types of government cadres is creating serious governance problems in the AIDS affected countries. However, instead of developing strategies to replace lost human resources, which is in any case already impossible for the worst hit countries, it is necessary to rethink government functions and streamline them to adapt to the situation created by the epidemic. Extension workers, for example, need to be trained to address the emerging clientele (widows, orphans, etc) with their very specific information and knowledge needs.
Specific staff policies need to be developed in the relevant ministries, including awareness, voluntary counseling and testing, provision of medicine, etc.

**Agroforestry technologies**

Many agroforestry technologies currently promoted in Africa have a potential AIDS mitigation effect. In particular improved fallows …

Effect on: reducing labour inputs – improving short and long term labour management possibilities / increasing soil fertility /

**ICRAF INPUT**

**Creating and reinforcing safety nets**

Miombo woodlands provide subsistence for around 55 m persons in Angola, Malawi, Mozambique, Tanzania, Zaire, Zambia and Zimbabwe, all (with the exception of Angola) among the most highly affected countries in the world.

Miombo is the predominant agro-ecological system in southern Africa, and its geographical spread corresponds to much of the area of southern Africa currently facing the more severe ravages of the pandemic. It is therefore logical and appropriate to attempt to understand better the impact of the pandemic on this ecology and also on the possible ways that this ecology can be managed to better support HIV/AIDS affected households. The current set of studies aims to provide recommendations for both policy and implementation levels.

Miombo woodland covers 2.7 million kms² in Angola, Malawi, Mozambique, Tanzania, Zaire, Zambia and Zimbabwe. Miombo is distinguished from other wooded savannas, by the presence of certain leguminous species, notably: *Brachystegia ssp.*, *Julbernardia ssp.* and *Isoberlinia*.

Despite the mediocre fertility of the soils that characterize the miombo ecology, the vegetation offers a whole range of products, and includes, foods, medicinal plants, firewood, construction wood. A large number of people survive from the products of miombo woodlands. According to Campbell, Cavendish and Coote (1996) in 1990 the populations surviving from the resources of miombo woodlands comprised: 40 million rural inhabitants, and 15 million urban dwellers.

**Forestry policy and HIV/AIDS**

Forestry policy needs to take into account the effects of HIV/AIDS in order to be effective. For example, it needs to take account of the labour availability and the labour implications of its interventions. Extension services need to adapt to a new clientele, with very specific knowledge and service needs.
CONCLUSION

Agroforestry interventions may play a unique role in the mitigation of the impacts of HIV/AIDS. They can improve the communities’ long term resilience against this and other external shocks, in a way that agricultural interventions on their own cannot achieve.

Agroforestry technology can be finely tuned to respond to the AIDS affected communities’ shortcomings regarding labour availability, both in the short term and in the long term. By providing labour management possibilities, agroforestry technologies may mean the difference between hunger and food security.

With their ability to generate alternative low-input income generating activities, and provide essential nutrients, agroforestry interventions can contribute to break the vicious cycle of impoverishment – malnutrition – and more AIDS. Medicinal plants and trees are frequently the only kind of symptomatic relief that the rural poor have access to.

In doing so, special care has to be taken to take into consideration the specific needs of a new clientele created by the epidemic, with high dependency ratio households and unique compositions. Efforts to ensure that basic agricultural skills are transmitted to orphans and to the young generation, and that local knowledge, including biodiversity and gender-specific skills, are preserved. If a strategy can be developed that can respond effectively to these needs, a significant contribution will be made to preventing and mitigating the consequences of HIV/AIDS within agroforestry communities.
An HIV/AIDS lens on agroforestry technologies currently being promoted in southern Africa.

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<tr>
<th>Technology (indicative list only, for the purpose of discussing the best layout and format of this table)</th>
<th>Agro-ecozone/farming system(^\text{1})</th>
<th>Tenure regime characteristics(^\text{12}) (matriarchal/patriarchal/communal/individual/private)</th>
<th>Labour saving</th>
<th>Time saving</th>
<th>System productivity enhanced</th>
<th>Enhanced land tenure</th>
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\(\text{1}\) ICRAF has characterized the agro-ecological zones, farming systems and tenure regimes, these columns can draw on that characterization.

\(\text{12}\) Sesanbia fallows, indeed all technologies, can be introduced/adopted within different farming systems and tenure regimes – there would therefore be a need for at least one or two rows for each technologies indicated reflecting the variety of farming systems on the region. I have attempted to indicate this in the draft layout. The table cannot however aim to be all inclusive. On reflection, it may be easier to gain a cohesive set of information if we start the table from the farming systems and tenure regime, and then indicate the different technologies appropriate for each system, and then the HIV/AIDS lens assessment.
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<tr>
<td>Sesbania fallow (bareroot seedlings)</td>
<td>System c</td>
<td>Tenure regime 2</td>
</tr>
<tr>
<td>Sesbania with inoculant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gliricidia intercropping A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gliricidia intercropping B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tephrosia fallow A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tephrosia fallow B</td>
<td></td>
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</tbody>
</table>

**Acknowledgements**

Tage Michaelson - for his belief in, and his strong support of, our endeavours in the field of forestry and HIV/AIDS.

\[16\] Sesbania fallows, indeed all technologies, can be introduced/adopted within different farming systems and tenure regimes – there would therefore be a need for at least one or two rows for each technologies indicated reflecting the variety of farming systems on the region. I have attempted to indicate this in the draft layout. The table cannot however aim to be all inclusive. On reflection, it may be easier to gain a cohesive set of information if we start the table from the farming systems and tenure regime, and then indicate the different technologies appropriate for each system, and then the HIV/AIDS lens assessment.
ANNEXES

Table 1: AIDS profile for 8 countries in the East and Southern Africa region

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>6.4</td>
<td>990,000</td>
<td>160,000</td>
<td>NA</td>
<td>1,900,000</td>
<td>230,000</td>
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<tr>
<td>Kenya</td>
<td>15.0</td>
<td>890,000</td>
<td>190,000</td>
<td>9</td>
<td>2,300,000</td>
<td>220,000</td>
</tr>
<tr>
<td>Malawi</td>
<td>15.0</td>
<td>470,000</td>
<td>80,000</td>
<td>6</td>
<td>780,000</td>
<td>65,000</td>
</tr>
<tr>
<td>Mozambique</td>
<td>13.0</td>
<td>420,000</td>
<td>60,000</td>
<td>NA</td>
<td>1,000,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Rwanda</td>
<td>11.2</td>
<td>172,000</td>
<td>40,000</td>
<td>11</td>
<td>370,000</td>
<td>22,000</td>
</tr>
<tr>
<td>South Africa</td>
<td>20.1</td>
<td>660,000</td>
<td>360,000</td>
<td>NA</td>
<td>4,700,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Uganda</td>
<td>5.0</td>
<td>880,000</td>
<td>84,000</td>
<td>NA</td>
<td>1,300,000</td>
<td>170,000</td>
</tr>
<tr>
<td>Tanzania</td>
<td>7.8</td>
<td>810,000</td>
<td>140,000</td>
<td>6</td>
<td>510,000</td>
<td>110,000</td>
</tr>
<tr>
<td>Zambia</td>
<td>21.5</td>
<td>570,000</td>
<td>120,000</td>
<td>12</td>
<td>1,000,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>33.7</td>
<td>780,000</td>
<td>200,000</td>
<td>16</td>
<td>2,000,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Total for 10 countries</td>
<td>6,442,000</td>
<td>1,434,000</td>
<td>15,860,000</td>
<td>1,537,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>8.8</td>
<td>2,400,000</td>
<td>26,400,000</td>
<td>3,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>1.2</td>
<td>3,100,000</td>
<td>35,800,000</td>
<td>3,200,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: (1) UNAIDS Epidemiological Fact Sheets on HIV AIDS and sexually transmitted infections, 2002 Update. (2) Ferriera, PC, S. Pessoa and FG Vergas, 2003. "The long-run economic impact of AIDS."

ANNEX XXI

<table>
<thead>
<tr>
<th>Household type</th>
<th>Major challenges</th>
<th>Major coping and survival strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older adults with support</td>
<td>Support and care for neighbours</td>
<td>Support community and group efforts</td>
</tr>
<tr>
<td>Older adults without support, caring for</td>
<td>Increased number of dependents, with fixed income</td>
<td>Liquidate savings and assets, reduced consumption and investment per</td>
</tr>
<tr>
<td>young children</td>
<td>dependent</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Older adults without support, caring for young children and ill adults</td>
<td>Health care costs, resources diverted from production to care, increased number of dependents</td>
<td>Liquidate savings and assets, reduced consumption and investment per dependent</td>
</tr>
<tr>
<td>Two resident adults, older children</td>
<td>Provide employment and resources to neighbours, support and care for orphans and widows</td>
<td>Expand farming area, support community and group efforts,</td>
</tr>
<tr>
<td>Male headed, male adult chronically ill</td>
<td>Health care costs, loss of external income, loss of income from cash crops</td>
<td>Borrowing, reduced consumption, remove children from school,</td>
</tr>
<tr>
<td>Male headed, female adult chronically ill</td>
<td>Health care costs, loss of household maintenance, loss of food crop production</td>
<td>Depend on relatives for family maintenance, girls stay home from school</td>
</tr>
<tr>
<td>Male headed, two adults chronically ill</td>
<td>Treatment costs, loss of external income, loss of cash crops, discrimination in village</td>
<td>Borrowing, reduced consumption, disposal of productive assets, children forced out of school and into destitution strategies</td>
</tr>
<tr>
<td>Recent male death, female headed</td>
<td>Funeral costs, maintain integrity of household unit and resource base, avoid absorption into another household</td>
<td>Abide by or find alternatives to customary funeral and inheritance arrangements, absorb young relatives into household, seek community and external support</td>
</tr>
<tr>
<td>Recent male death, woman &amp; children absorbed into another household</td>
<td>Funeral costs, loss of land rights, discrimination of women and children in extended households</td>
<td></td>
</tr>
<tr>
<td>Recent female death, male headed</td>
<td>Funeral costs, loss of household maintenance, imminent male illness likely</td>
<td>Absorb young relatives into household, re-marry, short-time horizon</td>
</tr>
<tr>
<td>Orphan headed</td>
<td>Loss of land rights, loss of knowledge base, maintain integrity of household unit, seek support from other households, discrimination in village</td>
<td>Simplify agriculture, day and long-term labour outside of farm, prostitution, temporary migration, degrade resources</td>
</tr>
<tr>
<td>Children absorbed into another household</td>
<td>Loss of land rights, discrimination in extended families</td>
<td>Day labour</td>
</tr>
</tbody>
</table>

<p>|</p>
<table>
<thead>
<tr>
<th>Children leave area</th>
<th>Disconnection from village networks, disconnection from family networks</th>
<th>Day labour, begging, prostitution</th>
</tr>
</thead>
</table>

Source: Information synthesized from a number of sources including Ngwira et al. (2001), UNAIDS (1999), Mango (2003), SADC (2003), Yamano and Jayne (2002),

BIBLIOGRAPHY

Campbell, Cavendish and Coote (1996)