HIV/AIDS –The True Tragedy of the Commons? Exploring the Effects of HIV/AIDS on Management and Use of Local Natural Resources*

Ternström[**]

Abstract

Analyses of existing empirical studies show that local natural resource use is intensified and social structures are modified as result of HIV/AIDS. The literature on common-pool resource management and on resilience clearly shows that sustainable resource use is dependent on a well-functioning institutional structure, which is embedded in the social structure. Linking these sources of knowledge strongly suggest that HIV/AIDS is affecting the institutions that control local natural resource use. At the same time, other aspects of the pandemic are working to increase the demand for local natural resources as an important source of food and income.

A number of links between the direct effects of HIV/AIDS (such as reduced labour force, loss of leadership, changed customs and migration) and the institutions that govern the use of local natural resources are examined. The results show that there are a number of different ways in which HIV/AIDS is likely to affect local natural resources use and management. Some of these work via changes in the demand for the resources, some via changes in the cost/benefit structure of using the resources and some via changes in the institutional structures governing their use and management. The main conclusions are that this is an alarmingly under-researched area and that there is a serious risk that HIV/AIDS will become the true Tragedy of the Commons, making the already harsh conditions for victims of the pandemic even worse.

[**] The Beijer Institute of Ecological Economics, The Royal Swedish Academy of Sciences, Box 50005, SE-10405 Stockholm, Sweden, www.beijer.kva.se. Email: ingela@beijer.kva.se.

1 INTRODUCTION

The AIDS epidemic started in the mid 80's in Africa – it has since then developed into a global crisis. According to UNAIDS/WHO (2007) 33.2 million people were living with HIV in 2007 and over 2 million died in that year alone. Of those infected, the largest proportion lives in sub-Saharan Africa (SSA). In the most severely hit countries, the proportion of the adult population that is infected is around 25 percent. HIV/AIDS is different from other diseases and causes of death in that it targets mainly the productive part of the population, leaving the young and the old to care and mourn and to take on the tasks of providing food and governing resources.

Initially HIV/AIDS was regarded as a health problem. However, the pandemic is increasingly recognized to have much wider implications, on all levels of society. Dramatic decreases in the size of the labour force are documented in e.g. Southern Africa as productive capacity is lost, not only to death and illness but also to caring and mourning. Rural households suffer doubly as infected urban relatives move back to the villages: income from remittances is lost and the burden of care increases. Meanwhile, medical bills, funeral costs, etc. increase. The economic consequences are dramatic. For the rural population, the solutions so far include a shift to less labour intensive, but also less nutritious, crops - which further decreases productivity; an increased dependence on gifts and loans - which places the social fabric of affected communities under severe stress; and an increased use of alternative sources of food and income – which increases the pressure on local natural resources.

These are the primarily short-run effects of the HIV/AIDS pandemic. What will happen in the long run? How will the social fabric of norms, rules, traditions and customs be affected by the pandemic? What happens when village leaders die and the transfer of local traditional knowledge is lost? When children are forced to take on their parents' tasks? When agricultural production decreases due to a reduced ability to supply labour and purchase fertilizers? When the pressure on local natural resources, such as wild foods, medicinal plants and firewood, increases further? Such resources are an important source of both food and income, especially for poor people living in rural areas. They are often used in common by groups of people, with intricate webs of rules, norms and traditions governing their use and ensuring long-term sustainability. Will these intricate webs survive the challenges, or will there be extensive resource deterioration? Will HIV/AIDS become the True Tragedy of the Commons?

The purpose of this paper is use knowledge about common-pool resource management to explore the likely effects of the HIV/AIDS pandemic on the way that local non-agricultural natural resources are used and managed. The analysis is carried out by applying a common-pool resource perspective on the social effects of the pandemic, thereby linking changes in customs, norms and traditions to disruptions of institutions (rules, norms, traditions) that ensure an efficient use of local natural resources. The motivation for undertaking this analysis is that this is an area that has been largely ignored but has a potentially huge effect on people's livelihoods: If local natural resources are deteriorated, the situation for people that rely on them for their subsistence will also deteriorate, adding to the burden already put on them by the epidemic.

2 BACKGROUND

There is by now a large literature on HIV/AIDS and food security. De Waal and Whiteside (2003) introduced the term *New Variant Famine*, which together with papers by Gillespie (1989), Barnett and Blaikie (1992), Brown et.al. (1994), Rugalema (2000), Barnett and Whiteside (2002), Haddad and Gillespie (2001) and others contributed to the view of interdependency between HIV/AIDS and food security. This view has contributed to an increased research and a resulting large number of empirical studies on HIV/AIDS and food security (see Gillespie and Kadiyala (2005) for an extensive overview). However, few studies focus on non-agricultural local natural resources, and even fewer touch upon the institutional aspects of managing them.

Campbell et.al. (2002) and Serra and Zolho (2003) provide evidence that non-agricultural local natural resources are important sources of food and income for rural people in southern Africa, and especially so in times of duress (Pattanayak and Sills 2001, and Loibooki et.al. 2002). Often, local natural resources are managed as common-pool resources, with a limited group of users and a well developed set of rules regulating their use (see e.g. Ostrom 1990). These rules are often informal and take the shape of traditions, customs, norms etc., and are referred to as institutions. There is a large literature on common-pool resources, but a lack of attempts at linking it to the effects of the HIV/AIDS pandemic.

Another rapidly growing strain of research studies resilience of social-ecological systems (see e.g. Berkes et.al. 2003). This literature treats ecosystems and their human users as one system, using the term resilience to refer to the magnitude of disturbance that can be absorbed before the system changes its structure (Gunderson et.al. 2002). Here too there is a lack of attention to the effects of HIV/AIDS – both as a short-term shock and as a long-term factor that seriously affects the adaptability of the social part of the system.[1]

One of the most commonly stated effects of HIV/AIDS on local natural resources is that the reduction in the labour force, although varying among societies (Mather et.al. 2004), increases the demand for other sources of food and income, such as firewood, wild fruits and vegetables. FASAZFAO (2003), in a survey of 770 Zambian households, found that increased collection of fuel wood and wild foods had contributed to decreased soil fertility and increased deforestation. Barany et.al. (2005) found numerous interactions between HIV/AIDS and forest resources in their analysis of case-studies carried out in six communities in Malawi and Mozambique. One example is an increased demand and decreased availability of medicinal plants used in traditional remedies.

Most of the studies that discuss the effect of the pandemic on local institutions use the term institution as synonymous to organisation. One exception is NAADS (2003), a study of 631 smallholder households in Uganda, which provides evidence that while some new institutions have emerged, several others, e.g. mutual assistance networks, have collapsed and that coping strategies are eroding.

[1] An illustration of this is that the words HIV or AIDS appear a total of 3 times in the abstracts of papers, panels and posters presented at the Resilience 2008 conference.

There is so far limited research regarding the more long-term effects of HIV/AIDS on institutions that control the use of local natural resources. Morton (2003) speculates about the effects of HIV/AIDS on collective-action among pastoralist societies and is one of the few studies that touch upon the effect of HIV/AIDS on institutions that regulate collective decision-making. Mather et.al. (2004) comment on the need for further research on the interactions between households and communities and how HIV/AIDS may affect social networks, as these can be very important in times of stress. In their conclusions, Gillespie and Kadiyala (2005) point to the need for research that captures the local dynamics of impact and response, particularly among households and communities that show resistance and resilience. They comment that resilient community institutions can provide the space and opportunity for people to secure their livelihoods and food and nutrition. Similarly, FAO identifies "structural impacts and woodland resources (i.e., use, management, and governance)" as being one of four key elements of the relationships between the impacts of HIV/AIDS, livelihoods and forest resources (Barany et.al. 2005).

2.1 Putting local natural resources on the HIV/AIDS map

Barnett and Whiteside (2002) describe HIV/AIDS as a long-term crisis, made up of four waves: The first is the wave of HIV infections; the second opportunistic diseases; the third, 5 to 8 years later, consists of AIDS illness and death; the fourth and final wave is the impact on households, communities and nations. The main effects of HIV/AIDS on local natural resources are likely to result from the impact on communities and households during the second, third and fourth wave of impact. Loevinsohn and Gillespie's (2003) oft-cited figure captures immediate and wider causes and consequences of HIV/AIDS on different levels or scales, moving from micro biology to the micro, meso and macro environments. They predict that HIV/AIDS may, for example, affect community institutions in the meso environment and lead to institutional breakdown in the macro environment. In terms of their framework, the effects of HIV/AIDS on local natural resource use and management are effects of the impacts on knowledge at the micro environment, livelihoods and community institutions at the meso environment, and institutional breakdown at the macro environment.

3 Analyzing the Links Between HIV/AIDS and Resource Management

As stated above, the objective of this paper is to examine the effect of the HIV/AIDS pandemic on the use and management of local natural resources. In this section I apply the lenses of a common-pool resource scholar to discuss how the pandemic may affect resource management. A number of potential links between HIV/AIDS and local natural resources are examined by combining knowledge about how local natural resources are managed by groups of interdependent users with some of known the effects of the HIV/AIDS pandemic. While some of the links affect the demand-side of resource use, others affect the way resources are managed. Similarly, some links work through changes in the costs and benefits of using of the resources and some via the institutional structure.

3.1 Reduced labour force

As discussed above, the pandemic is having a negative effect on the size of the labour force. This has decreased agricultural productivity and production, resulting in a

reduction of cash incomes and direct consumption of agricultural products. Furthermore, the reduced labour force at farm-level has resulted in a shift to less labour intensive crops. As these crops are often also less nutritious, this contributes to a further decrease in labour productivity and hence production. Apart from agricultural labour, there is also a decrease in the amount of skilled labour and thus in cash incomes from wage-earnings and remittances. The reduced labour force, via reduced cash incomes and harvest sizes, results in:

3.1.1 Increased demand for local natural resources

Empirical studies already show that the demand for local natural resources increases in affected communities. The increased demand is a result both of the reduced agricultural production and of the reduced cash incomes. For example, wild foods are used to complement agricultural produce, firewood is collected for consumption and to give cash income, and medicinal plants are collected both as a substitute for purchased medicines and as a source of cash income.

3.1.2 Increased pressure on social networks

When cash income and agricultural production decreases, there is an increased dependence on loans and gifts from friends and relatives; that is from within the social network. However, when the mutuality of exchanges becomes skewed because the affected individual can not repay the favours received, the social networks are put under stress. If these social networks break down, as they according to for example NAADS (2003) have started doing, there are at least two links to local natural resources. The first is to further increase the demand for local natural resources to cover for the loss of gifts and loans from other parties of the social network. The second is to remove some of the interdependencies among individuals using the local natural resources. Often, people depend on each other in many aspects of life in a village society, not only for resource use and management. These interdependencies provide a source of reciprocity so that for example breaking a rule regarding the way a local natural resource is used can be punished by refusing to let this person benefit from some other common endeavour. If one or more of these sources of interdependency disappears, the scope for reciprocity decreases and so does the cost of misusing the resource. Hence, if the social networks are disrupted, the mechanisms that govern the management of local natural resources are also affected.

3.2 Decreased life expectancy

The average life expectancy at birth has decreased dramatically because of HIV/AIDS. A related aspect is that the individual life expectancy changes when a person becomes infected, and so does the life expectancy of the affected individual's children. Hence, even if we argue that as people have an interest in their children's well-being a change in their own life expectancy should not affect their behaviour much, in this case we must consider that their children's life expectancy is also affected. One standard argument in game theoretic analyses of common-pool resource management is that as long as people value future harvests high enough, they will use their common resources in a cooperative and sustainable manner. With a decreased life expectancy follows a decreased value of preserving a resource for the future. Hence, the expected benefit of

using a local natural resource in a sustainable manner may very well decrease as a result of HIV/AIDS, thus removing or lowering one of the barriers to resource depletion.

3.3 Loss of leadership

Several studies confirm that leaders play a crucial role in local natural resource management, see for example Ternström (2005 and 2002) and Folke et.al. in Berkes et.al. (2003). It is often the leader's task to organise joint maintenance efforts, punish rule breaking, solve conflicts as well as to take the initiative in adapting rules to changing environments. When leaders are lost due to AIDS, the effect is both that the present set of rules governing the use of local natural resources are less well enforced, and that the adaptation of these rules to the new needs and capacities of the resource users is disturbed. Furthermore, there may also be an indirect effect of the loss of key persons as these tend to be crucial in several areas of interaction among the people in a village. If a leader is responsible for many areas of cooperative efforts, many areas of village life will be affected by the loss of this person. Thus, not only the institutional structure but also the level of production in e.g. irrigated agriculture, and hence the demand for local natural resources as a complementary source of food, may be affected.

3.4 Loss of traditional knowledge

HIV/AIDS hits people in the productive ages hardest, thus removing those most intensively involved in food production and resource management. As these people are lost, knowledge about sustainable methods for using local natural resources and knowledge about alternative sources of food may be lost. Furthermore, these are the people involved in maintaining and sustaining both the resources and the rules for their management. Thus, not only information about how to use for example wild foods may be lost, but also information about sustainable harvesting methods and information about which rules are efficient for keeping the use of the resources at a sustainable level.

3.5 Changes in customs

There is rather extensive evidence of changes in customs related to how HIV/AIDS affected individuals are treated by their societies. This includes for example widow inheritance and inheritance of property, stigmatisation of infected people, denied access to common resources, and land-grabbing by relatives of widows. Some of these changes have direct effects on the use of local natural resources, such as the decision to exclude affected individuals from use of common resources. Others may have an indirect effect, either via changes in the demand for a local natural resource, via changes in the relative costs and benefits of using it or via changes in the institutions governing its use. Land grabbing is a clear example of the first indirect effect: As relatives of a widow take possession of her land, one of her options is to turn to other local natural resources for food and income. Often widow-headed households have several children, sometimes both own and orphaned, making the added pressure on local natural resources substantial.

Stigmatization of affected people is another example. Stigmatization implies exclusion from more or less substantial parts of the social network. However, exclusion from

social interactions is sometimes used as a punishment or threat to achieve rule-conformance in the management of common resources. Thus stigmatization decreases the scope for punishing rule-breaking by stigmatized people and makes it less costly for them to break rules for resource use.

Finally, an aspect that has more far-reaching effects is the potential repercussions that changes in these customs and norms have on other traditions. If we see customs, traditions and norms as an intricate web of control and support mechanisms for individual and group behaviour, the effect of destroying one part of this web may have substantial repercussions in other parts of the web.

3.6 Relocation and demographic changes

HIV/AIDS causes demographic change. Firstly, there is a large variation in death rates among age groups, with people in productive ages being the most susceptible to infection. Thus the remaining population to a large extent consists of young and old individuals. Secondly, there is a trend of infected people moving from cities to their rural relatives as they become too ill to manage by themselves. Thirdly, households that have become landless, for example because of land-grabbing or orphaning, are moving. Hence, there is a demographic change in the groups of individuals using a resource caused by the overall demographic changes and a change in membership in the user communities due to migration. This implies changes in the age, gender and status composition of users, which is likely to affect the harvesting and management of the resources: There may be changes in the preferred product to be harvested, the way it is harvested, and the way the institutions for governing the resources are adhered to. Migration implies that new people, with different norms and traditions enter pre-existing groups of users. This has lead to conflicting views on resource management and subsequent deterioration of institutions in other common-pool resource management systems (see for example Ternström 2002 and 2005).

4 CONCLUSIONS AND RECOMMENDATIONS

Analyses of existing empirical studies show that local natural resource use is intensified and social structures are modified as result of HIV/AIDS. The literature on common-pool resource management and on resilience clearly shows that sustainable resource use is dependent on a well-functioning institutional structure, which is embedded in the social structure. Linking these sources of knowledge strongly indicates that HIV/AIDS is affecting the institutions that control local natural resource use. At the same time, other aspects of the pandemic are working to increase the demand for local natural resources as a source of food and income.

The explorations in this paper have shown that there are a number of different ways in which HIV/AIDS may affect local natural resources use and management. Some of these work via changes in the demand for the resources, some via changes in the cost/benefit structure of using the resources and some via changes in the institutional structures governing their use and management.

The literature review shows a lack of attempts at examining these links. When the indirect effects of HIV/AIDS on local natural resources are taken into consideration it is often the demand for other sources of food or income as substitutes for agricultural

production that is discussed. In some other studies of non-agricultural local natural resources, the focus is on their function as provider of natural medicines and alternative farming methods. There are also studies focussing on links from local natural resources to HIV/AIDS, for example by discussing how they can be used to improve nutrition.

The management and governance aspects of the effects of the pandemic are still largely white areas on the research map. However, one glance at the literature on management of local natural resources is enough to show that this is an area that desperately needs attention. The risk is otherwise that people already engulfed by disaster are forced into a situation of resource degradation similar to that described by Harding as the tragedy of the commons.

REFERENCES

Barany, M., C. Holding-Anyonge, D. Kayambazinthu and A. Sitoe. 2005. Firewood, food and medicine: Interactions between forests, vulnerability and rural responses to HIV/AIDS. Paper presented at: The International Food Policy Research Institute Conference on HIV/AIDS and Food and Nutrition Security: From Evidence to Action. April 14-16, 2005. Durban: South Africa.

Barnett, T. and P. Blaikie. 1992. *AIDS in Africa: Its present and future impacts*. New York: Guilford Press.

Barnett, T and Whiteside A. 2002. *AIDS in the 21st century: Disease and globalization*. New York: Palgrave Press.

Berkes, F., J. Colding and C. Folke, eds. 2003. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. Cambridge University Press.

Brown, L.R., P. Webb and L. Haddad. 1994. The role of labour in household food security: Implications of AIDS in Africa. *Food Policy*. 19(6): 568-573.

Campbell. B., S. Jeffrey, W. Kozanayi and M. Luckert. 2002. *Household Livelihoods in Semi-Arid Regions: Options + Constraints*. Center for International Forestry Research (CIFOR). Jakarta: Indonesia.

De Waal, A. and A. Whiteside. 2003. New variant famine: AIDS and food crisis in southern Africa. *Lancet* 362 (9391): 1234-1237.

FASAZ (Farming Systems Association of Zambia)/FAO. 2003. Interlinkages between HIV/AIDS. agricultural production and food security: Southern province. Zambia. Rome: Integrated Support to Sustainable Development and Food Security Program (IP), FAO.

Folke, C., J. Colding and F. Berkes. 2003. Synthesis: Building Resilience and Adaptive Capacity in Social-Ecological Systems in *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*, Berkes, F., J. Colding and C. Folke, eds. 2003. Cambridge University Press.

Gillespie, S.R., 1989. Potential impact of AIDS on farming systems: A case study from Rwanda. *Land Use Policy* 6(4): 301-312.

Gillespie, S. and S. Kadiyala. 2005. HIV/AIDS and Food and Nutrition Security: From Evidence to Action. Food Policy Review 7. International Food Policy Research Institute. Washington. D.C.

Gunderson, L.H. and C.S. Holling, eds. 2002. *Panarchy*. London: Island Press.

Haddad, L., and S.R. Gillespie. 2001. Effective food and nutrition policy responses to HIV/AIDS: What we know and what we need to know. *Journal of International Development* 13 (4): 487–511.

Loevinsohn, M. and S. Gillespie. 2003. HIV/AIDS. Food Security and rural livelihoods: Understanding and responding. Food Consumption and Nutrition Division Discussion Paper 157. Washington. D.C.: International Food Policy Research Institute.

Loibooki, M., H. Hofer, K. Campbell and M. East. 2002. Bushmeat hunting by communities adjacent to the Serengeti National Park. Tanzania: The importance of livestock ownership and alternative sources of protein and income. *Environmental Conservation* 29(3): 391-398.

Mather, D., C. Donovan, T.S. Jayne, M. Weber, E. Mazhangara, L. Bailey, K. Yoo, T. Yamano and E. Mghenyi. 2004. A cross-country analysis of household responses to adult mortality in rural sub-Saharan Africa: Implications for HIV/AIDS mitigation and rural development policies. *MSU International Development Working Paper No. 82*. Draft for Review-2004. Department of Agricultural Economics. Department of Economics. Michigan: Michigan State University.

Morton. J. 2003. Conceptualising the Links between HIV/AIDS and Pastoral Livelihoods. Paper presented to the Annual Conference of the Development Studies Association. http://www.devstud.org.uk/publications/papers/conf03/dsaconf03morton.pdf.

NAADS (National Agricultural Advisory Services). 2003. *The impact of HIV/AIDS on the agricultural sector and rural livelihoods in Uganda.* Rome: Integrated Support to Sustainable Development and Food Security Program (IP), FAO.

Ostrom E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press.

Pattanayak, S.K. and E.O. Sills. 2001. Do tropical forests provide natural insurance? The microeconomics of non-timber forest product collection in the Brazilian Amazon. *Land Economics* 77(4): 595-612.

Rugalema. G. 2000. Coping or struggling: A journey into the impact of HIV/AIDS in Southern Africa. *Review of African Political Economy* 86: 537–545.

Serra, A. and R. Zolho. 2003. Inquérito Sobre a Produção e Consumo de Combustível Lenhoso na Cidade da Beira. SAfMA Internal Report.

Ternström, I. 2005. Adaption to Disturbances in Common-Pool Resource Management Systems. *Beijer Discussion Papers* 197.

Ternström, I. 2002. The management of common-pool resources: Theoretical essays and empirical evidence. Ph.D. Diss, Department of Economics, Stockholm School of Economics.

UNAIDS/WHO. 2007. *AIDS epidemic update: December 2007*. Geneva: UNAIDS/WHO.