



Seasonality Revisited

Perspectives on Seasonal Poverty



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**Seasonal dimensions of the
HIV-hunger nexus in eastern
and southern Africa**

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Introduction

The seasonality of disease, ill-health and hunger were illustrated in multiple contexts in the original IDS conference on seasonality over three decades ago. The subsequent book (Chambers et al. 1981) was published in the same year as the first case of AIDS was reported. Since then, the rapidly accelerating AIDS epidemic of the 1990s and its current state of “hyperendemicity” in southern Africa have affected the levels, intensity and nature of vulnerability of households to livelihood shocks and stresses. The food price crisis of 2008 and the ongoing global financial crisis have further impacted the ability of households, communities, and national governments to achieve food security for large numbers of people in the region. Overlaying these dynamics, various manifestations of climate change are beginning to have an impact -- again, with evidence of interactions with other drivers of vulnerability.

In this paper, we apply a “seasonal lens” to a decade of work on HIV, food and nutrition security in eastern and southern Africa. We investigate the existence and nature of seasonal dimensions to the HIV-hunger nexus. Following the HIV timeline, we examine whether seasonality in food insecurity and malnutrition can affect an individual’s risk of being infected with HIV; whether seasonality is a major issue for people living with HIV, and whether it affects their ability to access and adhere to treatment. We examine how seasonality plays out with regard to the resilience of households in the face of the downstream impacts of AIDS. In the final section, we briefly review the record of international agencies, governments and other stakeholders in addressing the adverse effects of seasonality – before concluding by showing how a combined response to HIV and hunger can be better adapted to such effects.

At the outset we need to state clearly that very few studies in this field explicitly discuss or measure seasonality. Interestingly, most peer-reviewed journal articles that emerge from web searches using keywords of “season” and “HIV” derive from studies undertaken in developed countries where effects are far less common and less serious.

HIV, hunger and how they interact

First, a quick update on the evolution of the AIDS epidemic. Globally, more than 25 million people have died since the first case of AIDS was reported in 1981, from a total estimate of 65 million infected (UNAIDS 2008). An estimated 33 million people were living with HIV in 2007. The annual number of new HIV infections has declined from 3.0 million in 2001 to 2.7 million in 2007. Overall, 2.0 million people died due to AIDS in 2007, compared with an estimated 1.7 million in 2001. While the percentage of people living with HIV has stabilised since 2000, the overall number of people living with HIV has steadily increased as new infections occur each year, HIV treatments extend life, though new infections still outnumber AIDS deaths. One third of the global total of people living with HIV live in southern Africa where HIV prevalence in 2007 exceeded 15% in seven countries (Botswana, Lesotho, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe). Another third of the global total live elsewhere in sub-Saharan Africa, mainly in central and eastern regions.

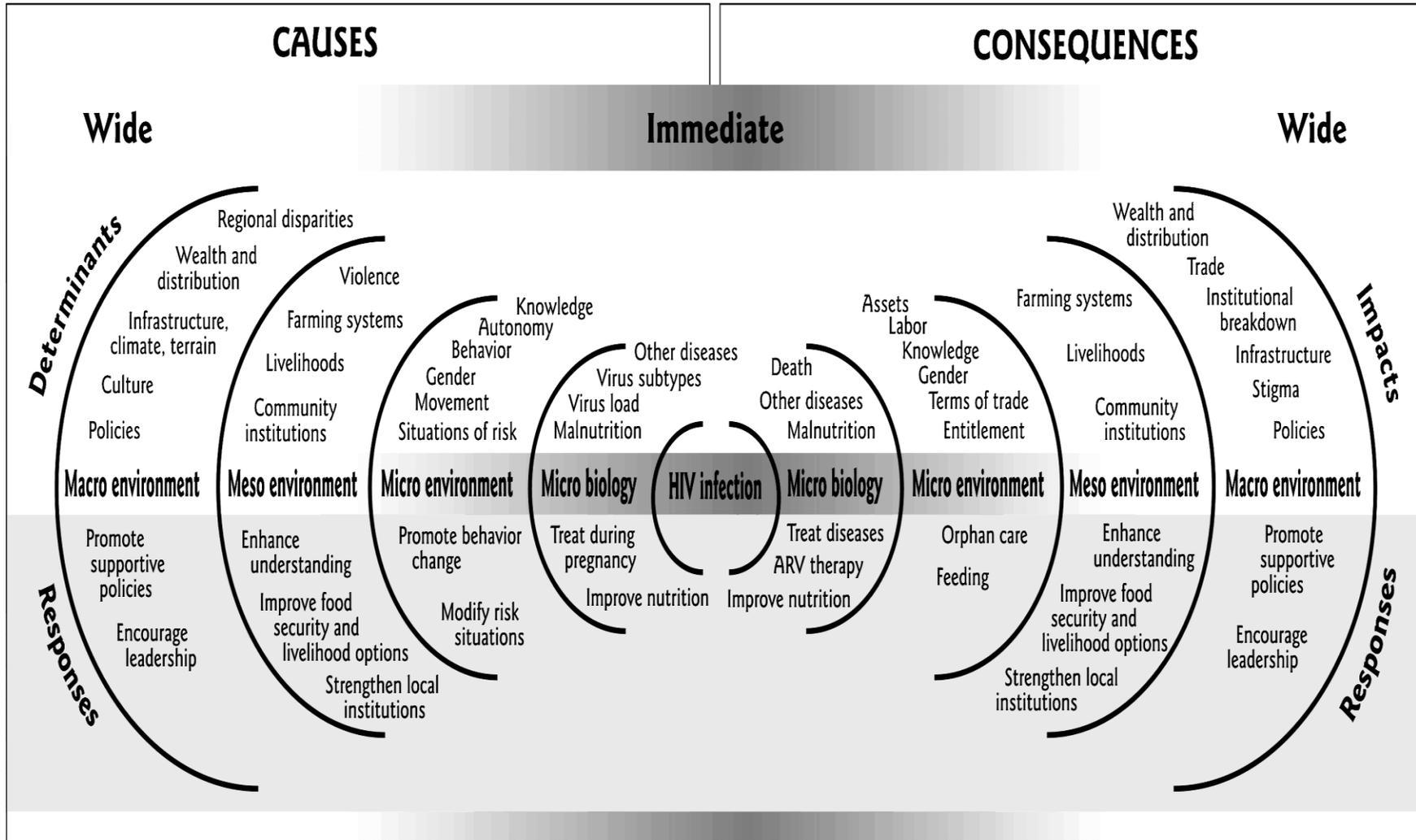
HIV and hunger are entwined in several important ways in sub-Saharan Africa . Not only does HIV co-exist with widespread food insecurity and economic inequality in time and space, it interacts with these conditions. HIV incidence rates are fuelled by food insecurity while subsequent AIDS-related morbidity and mortality, in turn, further exacerbate food insecurity (Gillespie and Kadiyala 2005). In addition, HIV and malnutrition interact negatively within the human body itself. We will discuss this further below.

Although often hidden, interactions play out in real time at different levels from the individual to the nation state. In the early days of RENEWAL, as shown in Figure 1, we attempted to capture the myriad factors and processes that drive AIDS epidemics and determine their consequences (Loevinsohn and Gillespie 2003). Our starting point and particular interest was to shine a light on the interactions between HIV, AIDS and the food and nutrition security of individuals, households and communities who were affected by the epidemic. For the purposes of this paper, we employ the shorthand term: *“HIV-hunger nexus”* to encompass these interactions. When looking at this nexus, we are dealing with interactions between several multidisciplinary, fundamentally cross-cutting issues.

The framework depicts the universe of factors and processes conditioning the causes and consequences of AIDS epidemics. With time broadly flowing left to right (although many processes run concurrently), it shows the waves of determinants of HIV infection, from macro to micro-levels, and the subsequent waves of impacts, from micro to macro. It also highlights generic responses at different levels – aligning, from left to right, with strategies for broad-based prevention, care and treatment, and mitigation.

Figure 1 was intended to be illustrative, not comprehensive, and it is currently in need of updating. Its main purpose was to employ a wide-angle lens to show the multitude of actual or potential drivers, determinants and impacts of AIDS epidemics. It depicted the dynamic nature, and the different sources, types and sequential stages of vulnerability, and it showed the positive flipsides of these traits in focusing also on actual or potential responses, again at different levels and by different people.

Figure 1: The Universe of HIV/AIDS Determinants, Impacts and Responses



Source: Loevinsohn and Gillespie 2003

Stages and types of vulnerability

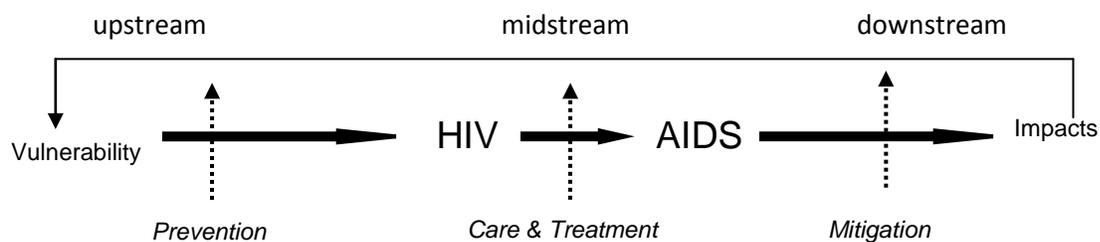
During the evolution of AIDS epidemics, we can see three sequential phases of vulnerability – upstream (relating to risk of an individual becoming exposed to, and infected with, HIV), midstream (individual risk of developing opportunistic infections after HIV infection) and downstream (risk of serious impacts in households or communities living with HIV) (Gillespie 2008; Edstrom and Samuels 2007). Each of these phases have particular drivers and consequences. Among poor southern Africa households, vulnerability is also dynamic as its multiple ingredients are in constant flux – and because people proactively respond to try to reduce their vulnerability. Such responses determine their resilience in the face of concurrent shocks and stresses.

With regard to *upstream* vulnerability, research in the last five years or so, including by RENEWAL, has shown the importance of various inequalities (socio-economic, gender, age). Mobility, food insecurity (especially of young women), and community-level social cohesion are other important drivers, as described below. All these factors will condition and affect the success of prevention strategies.

With regard to *midstream* vulnerability, an individual’s nutritional status is critically important – given the significantly higher energy requirements following infection. Coexisting sexually transmitted infections (especially HSV-2), household food security and the time and capacity of the household to care for the individual with HIV, are key too. Such midstream factors will affect access, adherence and effectiveness of care and treatment programs.

Finally, regarding *downstream* (post-infection) vulnerability, there are numerous factors and processes that will determine vulnerability to the impacts of AIDS morbidity and mortality. The quality and quantity of assets at household and community levels, and the local institutional context and processes are important – but there are also major intra-household effects. Vulnerability is not homogeneous within households – women and children tend to shoulder a disproportionate share of the burden of AIDS. While poverty *per se* may not be as clear-cut as a driver of upstream vulnerability (as compared to economic or gender inequalities, for example) it is clear that looking downstream, AIDS impoverishes households both directly and indirectly (Gillespie 2006). Again, such factors will determine the success of any mitigation approach.

Figure 2: The HIV timeline showing core strategies



Responses to upstream, midstream and downstream vulnerability can be mapped onto the three core pillars of AIDS policy: prevention, care and treatment, and mitigation, as in the HIV timeline shown in Figure 2. It is important to recognise the potentially cyclical nature of this timeline in that impacts of AIDS may increase vulnerability to HIV infection – or the converse, effective mitigation may be preventive.

In this paper, we aim to shed light on the effects of food insecurity and malnutrition on different aspects of vulnerability along the timeline, and on the relevance and effectiveness of the core strategies of the HIV response, while highlighting seasonality along the way.

Different timescapes

In considering AIDS epidemics, chronic and seasonal hunger and other slow-burn, long-wave dynamics such as climate change, following Barnett (1999), we can consider several timescapes.

Seasonality *per se* is short-wave, as it is annual. Hunger may be chronic for many people, seasonal for others, and for many it is both. AIDS epidemics, on the other hand, are long-wave phenomena. In fact there are several waves – the first wave of HIV infection is followed by increased incidence of opportunistic infections and, several years later, by the AIDS death wave (now being attenuated to some extent by the roll-out of antiretroviral drugs which, for a minority, renders AIDS a chronic disease). Beyond this, depending on a host of variables, there lies a stream of economic and social impacts at household, community and national levels. Such impacts – especially when considering the future of children living through this period in southern Africa – will endure for decades, spanning generations. Overlaying these timescapes, there is the long-wave dynamic of climate and environmental change.

Viewing these multiple “waves within waves”, and considering the issue of food security, we can hypothesise that the long wave processes of AIDS epidemics and climate change have the potential to *amplify the adverse short-term effects of seasonality on food security*.

We may thus find that the foundations of food security for many poor households are being progressively eroded such that a) certain communities/households (hitherto protected) will be increasingly hit by seasonal effects, assuming they fail to adapt, and b) those communities which historically have struggled with seasonality will suffer more severe effects, perhaps precipitating destitution. If resilience is undermined, droughts may be more severe for more people. Switching viewpoints, we may also hypothesise that seasonality of food security may also lead to periodic spikes in HIV-related vulnerability.

We turn now to the original questions proposed in the Introduction.

Does seasonality in food security affect the risk of being infected with HIV?

Food insecurity constrains people’s choices about work, education, child feeding and rearing and can lead to increased mobility as people search for work. Mobility and limited options for earning an income in turn can lead to high risk behaviours such as engaging in transactional sex for food or money.

In this section, we discuss several important drivers of upstream vulnerability to HIV – socioeconomic inequality, gender inequality, mobility and malnutrition – highlighting the role of seasonal fluctuations in determining their effects.

There are other indirect structural drivers of the AIDS epidemic which are important, and which may be affected by seasonality. For example, there is a positive association between education and reduction in HIV risk. Better educated children are more likely to absorb prevention information and adopt safer

behaviours. The completion of secondary school, especially among young women, may lower the risk of HIV (De Walque et al 2005). Yet households who are not food secure (often due partly to AIDS) are often forced to take children out of school in order to work to supplement the income lost as a result of their parents' illness and/or death. Such desperate decisions are often precipitated at times of seasonal stress.

Gender and socioeconomic inequalities

Inequalities with respect to gender, socio-economic status, class, caste, and religion are central to the risks people face. Gender inequity shapes power relations, sexual relations, and access to resources, opportunities and assets including land. It thus also shapes the relative risks and vulnerabilities that women face.

Where agriculture is strongly seasonal, it is usually more vulnerable to the effects of labour loss due to HIV and AIDS. If agriculture fails to provide a livelihood, there may be increasing resort – especially among women – to piecemeal casual work (e.g. *ganyu* in Malawi). Recent studies in several countries have shown associations between acute food insecurity and unprotected transactional sex among poor women (e.g. Bryceson and Fonseca 2006; Kim *et al*, 2008; Krishnan *et al*, 2007). In one population controlled study in Botswana and Swaziland, Weiser et al. (2007) reported that women who were food insecure were more likely to practice inconsistent condom use with a non-primary partner, exchange sex, have intergenerational sexual relationships and lack control in sexual relationships. In Nigeria, Oyefara (2007) found that hunger and food insecurity were the main reasons cited for women turning to commercial sex work in Lagos metropolis. Only 25% used condoms regularly, as they were paid more for unprotected sex.

Women's economic dependence on their partners often makes it difficult for them to insist on safer sex, through condom use for example. When overlaid with poverty, poor women are more likely to be food insecure and malnourished, which in turn may lead to a weakening of the immune system, and increased HIV risk.

With regard to socioeconomic inequality, several studies have also shown that it is not poverty *per se* that primarily drives HIV transmission. High HIV prevalence tends to be found in communities where there are large gaps between rich and poor, as well as between male and female power (Gillespie et al 2007).

Mobility

Migration, an important consequence of unequal socioeconomic development between urban and rural areas, is an important factor in HIV transmission. Seasonal migration to take advantage of differing seasonal patterns of farm production (rural-rural migration) and of non-farm jobs in the off-season (rural-urban) is often a core component of diversified livelihood strategies in southern and eastern Africa for the poor and the non-poor alike (Ellis, 2003; de Haan and Rogaly 2002). Migration can reduce vulnerability to food insecurity, enhance social capital through widening social networks, and enable investment in a range of livelihood assets including land improvements, education, and livestock. It can thus provide the poor with a chance to gain a first purchase on virtuous spirals out of poverty.

In southern Africa, a circular type of migration dominates e.g. from Lesotho, Malawi, Mozambique and other countries to the gold mines and commercial farm areas of South Africa (Crush *et al*, 2005a).

Significant numbers of people live temporarily in the cities, maintaining a rural home to which they return on a regular basis.

The gendered nature of migration drivers and processes also needs to be recognised. Internationally, the feminisation of migration refers more to shifts in the character of women's movements, rather than a dramatic increase in numbers, which have always been greater than traditionally acknowledged. In southern and eastern Africa, there are both qualitative and quantitative changes in internal migration under way. The absolute number of female migrants has been increasing rapidly (Crush *et al*, 2006).

Migration has clearly facilitated the rapid spread of HIV in southern and eastern Africa over the last two decades in a number of ways (Crush *et al*, 2005b; Lurie, 2006). The incidence of HIV has been found to be higher near roads, and amongst people who either have personal migration experience or have sexual partners who are migrants (Brockhoff and Biddlecom, 1999; Lurie, 2003). The link between mobility and HIV is determined by the structure of the migration process, the conditions under which it occurs, including poverty, exploitation, separation from families and partners, and separation from the sociocultural norms that guide behaviours within communities (Crush *et al* 2006). Mobility can increase vulnerability to high risk sexual behaviour as migrants' multi-local social networks create opportunities for sexual networking (Lagarde *et al* 1996; Pison *et al* 1993). Mobility also makes people more difficult to reach for preventive, care or treatment services (Zuma *et al* 2003; Boerma *et al* 2003; Bärnighausen *et al* 2007).

In eastern and southern Africa, plantations and related agricultural industries (typically producing tea, coffee, tobacco, sugarcane, and rice) are often associated with situations of significant risk. Risks may be enhanced by regularised single-sex migration; high and seasonal demands for agriculture labour on estates; workers moving on their own, sometimes over considerable distances and lodged in single sex dormitories; long and often irregular pay intervals; often with no social security or unemployment or sickness benefits, and a dependent population of occasional and/or commercial sex workers from nearby villages or further afield (Ngwira *et al* 2001, Byron *et al* 2006; Drimie *et al* 2009).

Ownership structures, the national policy environment, and the economics of the industries are all important drivers of HIV transmission risk. Hargrove (2008) cogently argues that it is "Rhodes not roads": that colonial migratory labour practices that fragmented families and severely compromised family coherence were critical drivers of the southern Africa epidemic.

Although the legacy of circular male-migration remains a powerful explanation of the surging epidemic of the 1990s in South Africa, Hunter (2007) argues that other more recent issues remain poorly understood. By over-emphasising circular male-migration and its roots in colonialism and apartheid, there is a danger of disconnecting the epidemic from contemporary social and economic debates. Migration should be considered alongside rising unemployment and social inequalities that leave some groups, especially poor women, extremely vulnerable – as we have discussed above. Greatly reduced marital rates and the subsequent increase of one person households, with rising levels of women's circular migration (between rural areas and informal settlements/urban areas) are also key (Hunter, 2007).

Malnutrition and ill-health

As a pivotal interface between food security and health security, nutrition is particularly sensitive to the effects of seasonality on income and food security, as well as the seasonality of disease incidence.

An individual's susceptibility to any disease depends on the strength of the immune system, which among other factors is affected by nutrition, stress, and the presence of other infections and parasites. The risk of infection with HIV is heightened by high prevalences of such cofactor conditions, which decrease immune response in HIV-negative persons and increase viral load in HIV-infected persons (Stillwaggon 2006). Worms cause malnutrition through malabsorption and intestinal bleeding, and they weaken the immune response by forcing its chronic reaction to the non-self invaders. Infectious and parasitic diseases and malnutrition thus create an environment of enhanced risk.

Malnutrition, particularly involving vitamin A deficiency, is also associated with an increased risk of sexually transmitted diseases (STDs) including genital ulcers and cervical HSV (herpes simplex virus) shedding (Semba et al 1998; Mostad et al 2000) which in turn has been found to increase the risk of HIV transmission (Auvert et al 2001; Galvin and Cohen 2004). Among pregnant women infected with HIV, to the extent that nutritional deficiency contributes to increased viral load, it may also increase the likelihood of mother-to-child (vertical) transmission.

Many of these structural drivers of HIV risk and vulnerability – including income and gender inequalities, mobility, food insecurity and malnutrition – are affected by seasonality.

Does seasonality affect ability to manage HIV infection, and access and adhere to treatment?

In HIV infected individuals, micronutrient deficiencies and iron loading may accelerate progression of HIV infection. Deficiencies of antioxidant vitamins and minerals and accumulation of the prooxidant iron could lead to oxidative stress, which is known to activate a transcription factor that increases replication of HIV, resulting in increased HIV progression (Friis et al 2008). The iron accumulation may also result in flare-up of latent TB and possibly other infections, which stimulate HIV replication. Deficiencies of micronutrients, essential to immune functions, leads to "Nutritionally Acquired Immune Deficiency Syndrome" (NAIDS), which could contribute to the risk of co-infections, and to the decline in the number of CD4+ cells (ie the cells infected and destroyed by HIV).

Adults living with HIV require 10-30% more energy than before they were infected, and children may need up to 100% more (WHO 2003). Seasonality in food security may seriously constrain their ability to ensure an adequate nutritional intake – leading in turn to more frequent, more severe opportunistic infections and a more rapid progression to AIDS.

In the early 1990s, a study in Uganda (Smallman and Cliff 1992) presents evidence that the growth rate in the AIDS epidemic at the district level in Uganda displayed a seasonally recurring geographical pattern, with epidemic acceleration in some areas of the country in the first 8 months of each year. The spatial and temporal variations in acceleration appear to be correlated with the predominant agricultural systems in different parts of Uganda. At that time, it was conjectured that variations in the incidence of new cases of full-blown AIDS reflected the seasonal patterns of nutritional deficiency widely prevalent in certain systems.

Food security and nutrition are fundamentally important for effective antiretroviral therapy (ART). Patients who begin ART without adequate nutrition have much lower survival rates (Paton et al 2006). Adequate dietary intake and absorption are essential for achieving the full benefits of ART (WHO 2005) - blood plasma concentrations of some drugs have been found to be lower in malnourished individuals.

For people living with HIV on treatment, nutrition is also important for treatment adherence. A recent pilot randomised study of food supplementation among food-insecure adults in Lusaka, Zambia who were on antiretroviral therapy (Cantrell et al., 2008) clearly demonstrated that providing food was necessary for improving adherence to medication. The authors noted that poor nutrition was undermining adherence by accentuating side effects and perceived drug toxicity and also by rendering people too tired to travel to the pharmacy to obtain medications.

In a multicountry study in Uganda, Tanzania and Botswana, Hardon et al (2007) found chief constraints in adherence to be transport costs, clinic user fees, hunger and the opportunity cost of time spent accessing treatment (travel, and long waiting times).

There are other links -- adequate nutrition is also important for patients to satisfy the heightened appetite that accompanies treatment. If limited available cash is diverted to food purchases, transportation to clinics (which may be costly in terms of time and money) may be jeopardised – again threatening adherence.

During the food price crisis of 2008, there was some evidence of urban-dwelling patients interrupting treatment as they were forced to return to rural areas when they could no longer afford to live in the city (Gillespie 2008). Any significant drop-off in population-level adherence induced by such effects could have serious implications for the development of viral resistance to first-line drugs.

We also need to consider the seasonality of other disease incidence and their effects. Malaria transmission, for example, is distinctly seasonal in Southern Africa with notifications generally increasing from November onwards (Sharp et al 2001). Peak rates in health facility malaria outpatients usually occur in April and decline by June. According to the World Health Organisation, the interaction between HIV and malaria is unique in that both diseases can be acute and chronic and can lower the immune system. This seriously compounds the general picture of people with HIV co-infected with malaria, in particular children under five and pregnant women. Evidence suggests that such co-infection contributes to faster rates of HIV disease progression and hence the need to prioritise HIV infected patients for prevention, early diagnosis and treatment of malaria (WHO, 2008). Malnutrition negatively interacts with both HIV and malaria.

In sum, for people living with HIV, nutrition is absolutely critical to their survival (indeed body mass index (BMI) is a better indicator of survival than CD4 count). The seasonal coincidence of household food stress, increased incidence of certain diseases, even without the additional seasonal peaks in labor demand – can affect the health and nutritional status of an individual living with HIV as well as her/his access and adherence to treatment.

Does seasonality affect household resilience to the impacts of AIDS?

The threat that AIDS posed for food security was first recognised in the late 1980s (Gillespie 1989). Many studies in Sub-Saharan Africa have since shown that subsistence farmers are vulnerable to the impacts of AIDS because the disease reduces the resources that households can devote to agriculture. Labor loss occurs not only as a result of sickness and premature adult death, but also as a result of its reallocation to nurse the ill, while working capital and income is siphoned off to pay mounting medical bills. However, the specific levels and types of vulnerability depend on the characteristics of families, livelihoods and farming systems. Livelihood systems that exhibit a high degree of seasonality of labor demand, significant specialisation by age and sex, high interdependence of labor inputs, increasing returns to scale of labor and low substitutability of labor for capital tend to be particularly vulnerable (Gillespie 2006).

Unlike upstream vulnerability to HIV - which is more related to *inequality* than poverty per se - evidence from southern and eastern Africa clearly shows that it is the poor and food insecure who suffer greater and more enduring downstream livelihood impacts from AIDS (Gillespie and Kadiyala 2005). Chronic food insecurity and ultra-poverty constrains resilience and forecloses options to adapt to any stress.

Using demographic projections and household survey evidence, Jayne *et al* (2005) considered the likely future consequences of AIDS epidemics for poor smallholder households in sub-Saharan Africa. Land, they suggest, will remain a primary constraint on income growth. AIDS-induced de-capitalisation of highly-afflicted rural communities (involving the loss of savings, cattle assets, draft equipment, and other assets) may come to pose the greatest limits on rural productivity and livelihoods for such households and communities.

Overlaying this with a seasonal hunger lens, it becomes clear that as the determinants of resilience become eroded, so seasonal fluctuations become more difficult to manage. Cyclical seasonal hunger is quiet and hidden, hitting remote places worst where services are minimal and safety nets unreliable.

In many parts of southern Africa the rainfall pattern permits only one major harvest a year, usually in April. For families struggling with HIV, missing this harvest could be disastrous. Many poorer families, including those impacted by AIDS may struggle to gain access to additional assets such as river-fed plots, which means that a single harvest is required to feed the family all year round. As the hunger season ends and young crops become available, particularly maize in southern Africa, vulnerable families often consume them “green” before their full nutritional value is reached (Devereux *et al*, 2008). When overlaid with chronic illness, the dietary needs of chronically ill persons, and the constant need to search for income, food and medicines, particularly during the hunger season, a bleak picture emerges. Existence increasingly revolves around survival, not development, and there is little respite.

A recent study commissioned by RENEWAL in Mpumalanga, South Africa investigated the role of woodland resources in maintaining household food security in the context of AIDS mortality (Twine and Hunter, 2009). Although not explicitly focused on seasonality, the results show how households become more reliant on woodland resources (including indigenous wild vegetables, wild fruit, edible insects) following an adult death.

Other studies have examined the seasonal stress of poverty in southern Africa - for example, the pressure of paying school fees in January and February after the December holiday expenditure (May, 2000) - pressures which are often exacerbated by a lack of home-produced food, decreased wage labour and a need to invest for next season.

Major seasonal effects revolve around food access and food prices. When the hunger season ends and markets are full, prices are inevitably low, when many families are forced to sell. During the 2008 food price crisis, markets in main towns were well stocked with food but most people simply could not afford it (Gillespie *et al*, 2009). Being poor makes you poorer.

The issue of food prices and the HIV response has recently been addressed in two regional assessments undertaken by RENEWAL in eastern and southern Africa (Gillespie *et al* 2009). Spikes in food prices in both regions were associated with detrimental effects on each of the core HIV control strategies (prevention, care and treatment and mitigation), due to declines in household access to food, availability of cash for travel to clinics and for medication, and the knock-on effects of the crisis on the caring capacity within households.

In addition to the seasonality of food security, seasonal spikes in disease incidence are highly relevant. After the winter period in southern Africa, the arrival of the rains also brings disease (e.g. diarrhoea, malaria and TB) at a time when family labour is most urgently required in the fields. These illnesses all have important relationships with HIV, malnutrition and immune function decline. The example of malaria was cited in the previous section with regard to its impact on individuals living with HIV, but it can affect whole families at a time when their resources and capacity is most stretched.

As discussed in the section on upstream vulnerability, HIV affects both richer and poorer households. In the face of HIV-induced cash constraints on the part of richer families who would normally hire in seasonal labour, the epidemic may drive a reduction in unskilled wage rates. Some evidence for this trend has been found in Malawi (Dorward and Mwale 2006). Such links may, in turn, further drive inequality within rural communities and impose ever more pressures on poorer households. Jayne *et al* (2005) also point to the inequality-driving aspect of capital asset loss. Unlike the loss of labour and knowledge, which represent a loss to entire communities -- capital assets lost by afflicted households are generally re-distributed within the rural economy rather than lost entirely.

Where socioeconomic inequality in communities is widening (partly due to AIDS), there may again be an increasing resort to more risky livelihood strategies, as we have demonstrated above. Here we begin to see the feedback loop in Figure 2 in action – an inability to respond effectively to AIDS may heighten subsequent risk to HIV on the part of other household members, including orphaned children.

Land acquisition by better-off households may also increase as widows and orphans fail to keep access and/or ownership rights to land after the death of the husband/father (Chapoto *et al* 2007). The fear of such a loss may also foreclose the option of renting out land as a response – another example of the intertwining of vulnerabilities and inequities, in this case, relating to gender and HIV. Indeed property disputes may surface when there are opportunities to contest inheritance because institutions governing landholding are complex (Aliber *et al*, 2004; Izumi, 2006). The AIDS epidemic is thus intertwined with the way in which power, authority, value and opportunity are distributed within societies.

One other consideration is the potential for lagged effects with regard to impacts – further demonstrating the importance of looking at multiple timescapes. Using anthropological and ethnographic methods, Drinkwater et al (2006) restudied two communities, one peri-urban and one rural, 12 years after the original study, in Zambia’s Copperbelt and Central Provinces, using the concept of “cluster” as the unit of analysis. The objective was to understand how individuals, households and production networks adapted or disintegrated over time as a result of ill health and death, specifically AIDS-related. The chronic illness or death of a primary producer had the most significant impacts on the household. One interesting finding however was that prime-aged mortality tended to be more concentrated among “secondary producers” i.e. younger adults who would in future be expected to become primary producers. This suggests the full impact of AIDS on agriculture should be viewed over a relatively long – even intergenerational – period of time.

Having shone a light on the dynamic relationship between livelihoods, food insecurity and seasonality in a context of high HIV prevalence, how can affected households respond to this “entangled crisis”?

Households are often perceived as “coping”, but it is often not clear that households themselves would classify their responses in this way, nor that such “coping” is sustainable. The notion of coping may be a convenient smokescreen, an externally-applied value judgement that may or may not correspond to what is actually happening. Barnett and Whiteside (2006) make the point well: *“Coping is a way of escaping from the challenge of confronting how people’s capabilities are stunted, how their entitlements are blocked, and how their abilities to function as full human beings with choices and self-definitions are frustrated”*. Many responses are those of distressed households without much conscious strategy – “struggling not coping”, as Rugalema (2000) put it.

Responses may have a veneer of coping, but the costs may need to be paid further down the line (e.g. a child pulled out of school to work). An example from a comparative qualitative study conducted in a rural site in Chikwawa District, Malawi, and a peri-urban site in Amajuba District, South Africa, revealed that households reduced food intake and dietary diversity to deal with a lack of food and other stressors, with obvious implications for family members’ health, children’s school attendance and adults’ income-earning ability in the long run (Drimie and Casale, 2009).

Change may be incremental, up to a certain point when effects become irreversible. Gradual changes include leaving fields uncultivated which are easily reversible in the short-term but increasingly difficult as the bush encroaches or others lay claim to the land (Drimie 2003; Hunter *et al*, 2007). One study in Malawi found that, following a shock to household income, households affected by AIDS took up to 18 months to stabilise, with a new equilibrium income that was about half the pre-shock income levels (Masanjala, 2006). Similar findings were reported in Kenya (Yamano and Jayne, 2004). Such limited resilience is likely to increase vulnerability to other shocks.

Finally, a word on children. Progress in understanding the effects of the epidemic on young children and youth has been made with the recent Joint Learning Initiative on Children and AIDS (www.jlica.org) but in terms of the long-term psychosocial effects and intergenerational sequelae, we are still flying blind. There is much evidence of children being taken out of school to work for cash or food. As well as being denied an education, they may be at greater risk of being exposed to HIV out of school. The 2008 food price crisis showed how increased costs of supporting an orphan often resulted in a decline in fostering of orphaned children – as well as a reduction in the quantity and quality of essential care and support programs for orphans and vulnerable children. The struggle to work to raise income to buy food affects

intra-household time allocations. Care for the youngest children (feeding, health care and psycho-social stimulation) is often compromised. More work is needed in this area, building on the JLICA.

AIDS, resilience and disaster theory

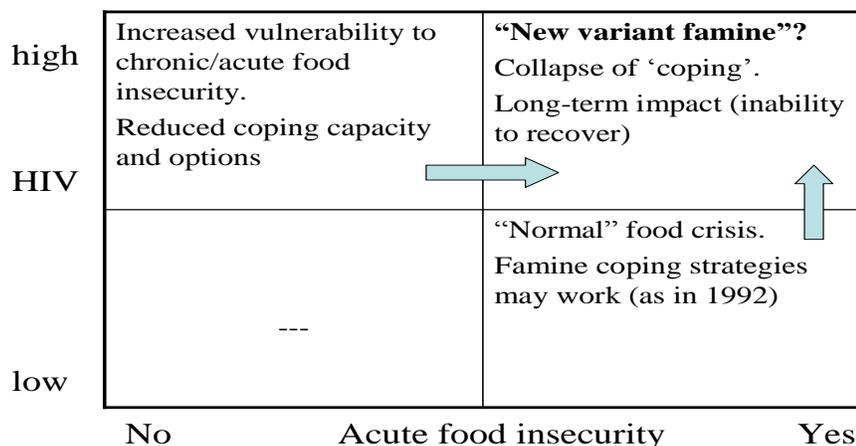
Any discussion of seasonality, HIV, food insecurity and the resilience of households in southern Africa needs to engage with the “new variant famine” hypothesis that was floated some 6-7 years ago when the region was struggling with a particularly severe food crisis (de Waal and Whiteside 2003).

A lot has since been written about this hypothesis. In simple terms, it states that the coexistence and interaction between acute food insecurity and high HIV prevalence could precipitate a downward spiral of households and communities into destitution, thus precipitating famine. Not only does AIDS interact with and worsen other livelihood shocks – the hypothesis states -- but it selectively undermines the very strategies that historically were employed to respond to such shocks.

Figure 3 depicts this in another way, plotting HIV prevalence against existence or not of acute food insecurity. The new variant hypothesis would suggest that high-HIV without acute food insecurity (top left square) might undermine vulnerability over time, while acute food insecurity without the presence of high-HIV (bottom right) might still be managed with traditional coping strategies. The new variant famine might be expected to materialise where high HIV prevalence and acute food insecurity co-exist (top right). The figure also shows how this dangerous co-existence may be reached through two routes, which themselves may become increasingly entwined – increasing HIV spread in a situation of acute food insecurity, and/or increasing food insecurity where HIV prevalence is high.

Figure 3:

AIDS, food crises and famine



Source: Gillespie and Kadiyala 2005

New variant famine (NVF) is hypothesised as being qualitatively and quantitatively quite different to a ‘normal’ famine, demanding qualitatively and quantitatively different responses. In southern Africa the response during recent crises has largely revolved around the provision of food aid supported by longer-

term development initiatives intended to move people back into sustainable livelihoods. Yet the crisis has continued to unfold across southern Africa throughout this decade, with many more people than during the 1990s now living 'close to the edge' and increasingly unable to absorb shocks or stresses. (Wiggins, 2003; Maunder and Wiggins, 2006). Arguably, something dramatic has changed in the region, and most assessments understand this to be as much a crisis of livelihoods or of development in general, as a series of simple food shocks. Understanding the underlying causes of this crisis inevitably means untangling the knot of 'multiple stressors' which lie at the root of regional food insecurity, compounded in particular by the AIDS epidemic (Drimie and Casale, 2009).

A recent paper focused on Swaziland interrogates recent data to evaluate whether the four key indicators of NVF explain the current food security crisis in that country (Naysmith et al, 2009). The authors concluded that Swaziland has indeed been experiencing a new variant famine in recent years. The indicators include a) household-level labor shortages due to adult morbidity and mortality, and the related increase in numbers of dependents; b) loss of assets and skills due to adult mortality; c) the burden of care for sick adults and children orphaned by AIDS; and d) the vicious cyclical interaction between malnutrition and HIV.

NVF examines the processes of increasing vulnerability that lead to destitution, malnutrition and death. It aligns with 'New Famine' thinking by emphasising the ways that AIDS exacerbates pre-existing social, political and economic pathologies in a society (de Waal, 2007; Devereux, 2007).

In addition the NVF hypothesis has enabled two parallel fields to connect around the issue of HIV, at least theoretically. Until this time, there had been little interaction between the humanitarian and development communities on the common challenges posed by AIDS epidemics. This, despite calls for better integration between these processes over a long history in the development literature (Buchanan Smith and Maxwell, 1994).

Responding to the adverse effects of seasonality on the HIV-hunger nexus

To what extent, if at all, is seasonality taken into account by agencies and governments seeking to combat both HIV and hunger in the region? And how may a combined response to HIV and hunger be better adapted to such seasonal effects?

As elaborated by Standing (2005), long wave shocks are complex and difficult in policy terms – as they involve dealing with multiple dislocations, diverse agencies and a much longer time horizon than governments or international bodies are accustomed (or willing) to.

Unfortunately there is not much evidence that agencies and governments are proactively responding at large-scale to the HIV-hunger nexus itself, let alone its seasonal dimensions.

When considering structural drivers of HIV incidence, for example, Kim *et al* (2008) report that, despite numerous calls to 'mainstream AIDS' in economic development, cross-sectoral responses have not been widely taken up by government or other stakeholders. The authors go on to show how programmes such as microfinance, livelihood training and efforts to safeguard women's food security and access to property can build in an HIV prevention focus, highlighting small-scale examples of where this has been done successfully. This has positive implications for dealing with seasonality as well.

A range of large-scale responses are required to deal with the coexistence and interactions between AIDS epidemic and chronic and seasonal hunger. Most of these have been described elsewhere (e.g. Gillespie 2006; Edstrom and Samuels 2007). Here we highlight a few with more relevance to the issue of seasonality.

In the short term, better systems of assessment, monitoring and tracking of vulnerability, food insecurity and the interactions between HIV and hunger are needed. Nutrition indicators need to be more routinely incorporated into HIV monitoring and evaluation activities, including national AIDS strategies. In particular, indicators are needed that capture the likely impacts on women and children, given that they are directly or indirectly shouldering much of the additional burdens imposed by HIV-hunger nexus.

Sustained food and nutritional assistance needs to be linked with treatment programmes in areas of chronic food insecurity, and wherever there are clear seasonal peaks in hunger and/or disease. In recent years, a lot of experience has emerged in such integrated programming, but many challenges still remain, including the perennial problem that most examples of successful programming are small-scale, while the epidemic continues to be large-scale (see Byron et al 2008).

Social protection

Nutritional support for individuals on treatment often needs to be complemented by effective state-led systems of social protection including transfers of food, cash or vouchers, with due attention to targeting and conditionality.

Social protection schemes are needed that kick in seasonally, when other sources of livelihoods and income are less available. Protection, after all, implies security. Cash transfers are usually year round but can be short-term and seasonal. The level of grant could also be adjusted seasonally, although there is not much evidence of this. In the case of the Malawi programmes discussed below, these were designed as one-off emergency programmes, but the basic design could nonetheless be adapted to a seasonal social protection programme.

Public works have been used seasonally for decades – for example, the National Rural Employment Guarantee Act (NREGA) in India -- an innovative ‘demand-driven’ approach to the provision of relief that protects the incomes, consumption and assets of all rural Indian families (Devereux 2009).

Social protection can also address food price seasonality. Since the role of agricultural marketing parastatals in food price stabilisation (through consumer subsidies, price banding, and grain reserve management) was scaled down or abolished, food price fluctuations have re-emerged as a major source of vulnerability for the poor. High food prices, as discussed, can significantly undermine vulnerability all along the HIV timeline (Gillespie et al 2009). As Devereux *et al* (2006) argue there is a strong and causal link between maize price rises and malnutrition and mortality rates in Malawi. In general, maize prices and malnutrition rates are low during the post-harvest months of April through September, but then they start to rise, peaking around the same time in January- February each year before falling when the new harvest comes in. A ‘seasonal safety net’ could be implemented as a disaster risk reduction measure, at least until markets become better integrated and function competitively to smooth demand and supplies across communities and from season to season.

Similarly an evaluation of the Dowa Emergency Cash Transfer Project (DECT) run by Concern Worldwide in Malawi provides interesting perspectives on how social protection can mitigate recurrent and predictable problems of cash-flow seasonality. The DECT evaluation found that cash transfers were preferable to food aid, because of their flexibility and versatility for beneficiaries and because of their multiplier effects on local markets (Devereux *et al*, 2007). Cash transfers were also preferred by most beneficiaries, provided that food staples and other basic commodities were reliably available on local markets at reasonable prices, throughout the 'hungry season' or crisis period. DECT also had a stimulating effect on local trade -- interviews with traders revealed increases between early 2006 and early 2007 in sales volumes for various commodities, such as bread, meat and clothes. Similarly a positive indirect benefit of DECT was that *ganyu* workers were empowered to demand higher wages and enjoyed higher incomes than they normally earn during the hungry season.

Building bridges between agriculture and health

In the medium/longer term, there is an urgent need to build bridges between agriculture and health sectors to ensure longer term support to livelihoods where HIV and hunger coexist. The majority of people affected by AIDS epidemics globally are primarily dependent on agriculture for their livelihoods. Creative ways of fostering convergence of social and health services with agricultural support should be explored. The regeneration of small-scale agriculture (e.g. homestead food production) could be linked with health and education services, so that produce may be used as food assistance in HIV treatment programs and/or school feeding to improve school retention, and reduce child hunger. The private sector too could, for example, develop local food fortification initiatives that generate income and build capacity to immediately link to treatment interventions and also serve to mitigate the impacts of AIDS in the longer term.

Agriculture and development policy could reduce distress migration by incentivising adoption of local livelihood strategies in and around the community, extending the growing season through developing small-scale irrigation, subsidising agricultural inputs, product diversification, agro-processing, strengthening existing, and creating new, market linkages, and developing the farm input supply chain. Policy reform could help overcome barriers experienced by affected households in participating in agricultural production and marketing, such as their depleted resource base, their need to be close to home to tend to the sick, loss of key skills and their inability to take on risk.

Seasonal shortages and bottlenecks in labour demand could be addressed by smoothing labor peaks, reducing labour-intensity of systems of cropping (including improved seed varieties, zero or minimum tillage, intercropping), soil conservation (using soil-holding grasses not labour-intensive ridging), animal husbandry (rearing smaller stock such as poultry), pest control (using trap crops to attract pests away from crops) and post-harvest storage. Innovative approaches to agricultural risk management, such as weather-indexed crop insurance, has the potential to buffer farmer income and consumption against production variability (Devereux 2009). Approaches to generating community-level incentives for inter-household labour exchange need to be explored. Seasonality also applies to women's domestic work burden – on top of the extra AIDS-induced stress – and innovations in labour-economising methods of food preparation, water and fuel supply need to be sought.

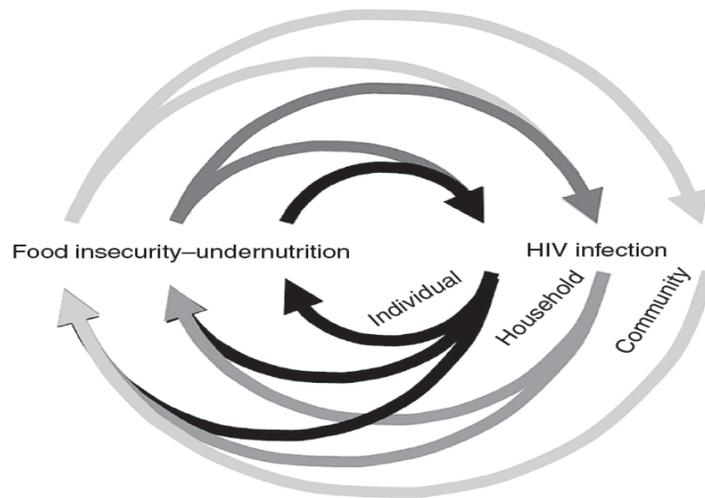
Cooperatives and farmer organisations can be used as entry points for mitigation, care and support activities in communities e.g. by developing income generating activities, savings, health insurance, or establishing a social fund to provide care for orphans. There are many opportunities. Many responses

are basic development, viewed through an HIV lens, some are more specifically geared to addressing the epidemic.

Conclusions

Poverty, food insecurity, malnutrition and hunger have been around a lot longer than the human immunodeficiency virus. AIDS is one of many sources of vulnerability and stress, exposing the fragility of people's livelihoods, especially in southern Africa. The fact that HIV and AIDS interact with food insecurity and malnutrition necessitates a more integrated analysis of food systems and the dynamics of food and nutrition insecurity. We can summarise the interactions in Figure 4.

Figure 4: Spirals within spirals: Interactions between food insecurity, malnutrition and HIV infection



Vicious cycles do play out at different levels, although so much is clearly context-specific. Despite the fact that there is little direct evidence of the seasonality of HIV incidence or its downstream effects (mainly because few researchers have looked for it), so many of the drivers and the impacts of the epidemic are seasonally variable, as we have shown. The confluence of several long-wave shocks, including the AIDS epidemic and climate change, compound and amplify the adverse effects of seasonality on disease incidence, food insecurity and malnutrition.

Upstream of HIV, acute food insecurity has been associated with unprotected transactional sex among poor women. Sudden increases in food insecurity often lead to distress migration as people search for work and food, which may enhance risk of HIV exposure, both for the person moving, and for other adults who may remain at home. Household food insecurity may translate into increased adult malnutrition with possible detrimental effects on immune status. Maternal undernutrition is associated with low birth weight among infants who will be at higher risk of vertical (mother to child) HIV transmission.

In midstream, food insecurity and malnutrition affect strategies for care and treatment. Adults living with HIV require up to one third more energy than before they were infected, and children may need double their calorie intake. High or rising costs of food, and other socioeconomic shocks, can seriously

constrain the ability to ensure an adequate nutritional intake, leading to more frequent and severe opportunistic infections and a more rapid progression to AIDS disease. Individuals who are malnourished at the onset of antiretroviral therapy have much lower survival rates. Nutrition is critically important to maintain treatment adherence (via reduced side effects, and ensuring the ability to respond to raised appetite), and to maximise the actual effectiveness of some of the drugs.

On the downstream side of the epidemic, food insecure households undoubtedly suffer more severe and enduring livelihood impacts from concurrent health and economic shocks. There are a range of impacts over different time scales, and many of these may iterate back and cause heightened vulnerability of other household members to HIV infection.

We have briefly outlined several responses, both short-term and longer term, for breaking the vicious cycles described. Nutritional support for malnourished individuals living with HIV will save lives and dramatically and quickly restore health and productivity. AIDS-sensitive, seasonally appropriate social protection systems are needed to protect families. Agriculture and health sectors need to capture synergies and work together more. All of this requires an understanding of the different wavelengths of shocks and stresses, and the way they intertwine.

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