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Gender, HIV/AIDS and Rural Livelihoods

Micro-Level Investigations in Three African Countries

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Abstract

HIV/AIDS has a severe impact on food security, affecting all of its dimensions: availability, stability, access, utilization. FAO recognizes that HIV/AIDS is a determining factor for, as well as a consequence of, food insecurity. Although the relationships among gender, food security and rural livelihoods have been acknowledged in the growing literature on HIV/AIDS impacts, relatively few studies provide adequate focus and empirical evidence on the gender aspects of these interrelationships among vulnerable rural households. Such gender aspects of these relationships have been explored in detail by FAO in Namibia, Uganda and Zambia This paper presents the main findings of the four baseline studies and discusses the methodologies used to identify vulnerable households and document changes in resource availability, household labour force, livelihood strategies, coping strategies and food security status. These findings offer useful insights for policy formulation purposes and for the development of mitigation strategies that respond to the food security challenges of the epidemic.

Keywords: gender, HIV/AIDS impacts, livelihoods, Sub-Saharan Africa

JEL classification: D1, D13, J16, R2, R20

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Acronyms

CSO	Central Statistics Office
FAO	Food and Agriculture Organization (of the United Nations)
HDI	human development index
MDG	millennium development goal
PLWHA	people living with HIV/AIDS
PRA	participatory rural appraisal
RRA	rapid rural appraisal
SEAs	standard enumeration areas
SEAGA	socioeconomic and gender analysis
SL	sustainable livelihoods framework

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1 Introduction

According to the latest estimates by UNAIDS (2006: 8) there are about 38.6 million people living with HIV worldwide. Within the last five years, there has been a growing recognition that HIV/AIDS is not only a global public health threat, but also a major humanitarian crisis that challenges both global security and threatens achievement of the first millennium development goal (MDG) of *halving the proportion of hungry and extremely poor people by 2015.* 'Where it reaches epidemic proportions, AIDS can be so pervasive that it can devastate whole regions, knock decades off national development and destroy what constitutes a nation' (Kristofferson 2003: 1).

Nowhere can this be more clearly seen than in Sub-Saharan Africa, where HIV/AIDS is the leading cause of death, with 25 million people infected (UNAIDS 2006: 13). The epidemic has placed a great burden on both national health care systems and social services in the region and has for many families deepened poverty and eroded the ability to produce sufficient and nutritious foods. The agricultural sector in Africa is under a particularly severe strain as a result of the HIV/AIDS epidemic. According to FAO estimates for the period 1985-2003, AIDS had claimed the lives of about seven million agricultural workers in the 25 most-affected countries in Sub-Saharan Africa and could kill an additional 16 million, or up to 26 per cent of the agricultural labour force, by 2020 (FAO 2003b: 7). Labour losses and the increasing inability of affected households to invest in agriculture are reducing agricultural production and increasing food insecurity (Wiegers *et al*. 2006). The epidemic further has led to a weakening of rural institutions in their capacity to deliver extension services and has undermined the effectiveness of national agricultural policies (Topouzis 2003: 11; Jayne *et al.* 2004).

To date, various governments and organizations operating in southern Africa have conducted micro-level investigations of HIV/AIDS impacts on rural livelihoods as input for strategy formulation purposes and for the development of mitigation strategies that respond to the food security challenges of the epidemic. These studies are often localized, cross-sectional surveys, the findings of which are disaggregated for affected and non-affected households. Between 2002 and 2003, the Food and Agriculture Organization (FAO) supported the governments of Uganda, Namibia and Zambia in conducting baseline surveys to investigate the relationship between the HIV/AIDS epidemic, gender and rural livelihoods. These three baseline surveys were followed by a fourth one conducted in 2003 in Northern Province, Zambia.

This paper presents the main findings from the surveys, and discusses the principal methodological challenges encountered. The experiences and findings from the studies as described in the paper offer useful insights for similar future research initiatives of countries and development institutions.

2 HIV/AIDS impacts at household level

In their review of HIV/AIDS and rural livelihoods in southern Africa, White and Robinson (2000: 36) note that much of the literature on vulnerability to and coping with the impact of HIV/AIDS has focused analysis principally at the household level. Stokes also observes that HIV/AIDS represents a potentially devastating shock to farm household survival and can affect not only the ability of households to cope, but entire

communities and regions may find their capacities taxed beyond their ability to respond effectively (Stokes 2002: 2).

At the farm household level, HIV/AIDS affects food security and livelihoods in very different ways for households of differing composition. Household-level effects can be due to chronic illness from HIV, death from HIV/AIDS, and from caring for HIV/AIDS orphans (O'Donnell 2004: 12). During HIV-related chronic illness, households experience labour losses due to morbidity and the care requirements of household members; they also incur increased requirements for spending on healthcare, and may no longer be able to purchase agricultural inputs (e.g., fertilizer and improved seed), staple foods or nutritious food supplements. Death leads to an immediate loss of labour for the household, the burden of caring for orphans and changes in livelihood patterns, as remaining members try to optimize their available assets. Further, the death of adult members has inter-generational consequences since adults often die before passing on specific agricultural and livelihood knowledge to their children (O'Donnell 2004: 12-15).

Although much has been written on HIV/AIDS interactions with food security and rural livelihoods, the impact of the epidemic is particularly difficult to measure at the household level. White and Robinson state that HIV/AIDS exacerbates existing problems of poverty and argue that most research does not have a clear theoretical framework for isolating the particular impact of HIV/AIDS in the context of the range of different factors that affect households and communities (White and Robinson 2000: 36-7). HIV/AIDS impacts can initiate a slow process of decline of smallholder agriculture, rural livelihoods and household resilience, with each season producing a new negative change to the farming system or requiring another asset to be sold (Barnett and Whiteside 2002). Further, the extent and severity of the impact are influenced by gender roles, relative wealth, whether periods of sickness or death coincide with peak agricultural seasons, marriage and inheritance systems and the level of institutional support for HIV/AIDS affected households at the community level (Shah *et al.* 2002: 41). Other factors that play a role include which person in the household is sick or has died (e.g., the breadwinner), whether the household has experienced multiple cases and/or the simultaneous occurrence of other shocks that affect people's livelihoods, (e.g., drought). In the case of households taking in orphans, the impacts depend on the existing household composition and the net contribution made by the orphan to the household—a contribution that depends on the orphan's age, gender and skills (O'Donnell 2004: 14-15). In addition, household livelihoods are further influenced by the cumulative effects of chronic poverty, liberalization failures, and weak institutional capacity, all of which are hard to disentangle from HIV/AIDS impacts (Wiegers *et al.* 2006).

The gender context in which HIV/AIDS-related impacts occur is particularly important, and is often poorly understood. Such impacts may affect the lives of women and girls disproportionately due to gender inequality and traditional gender roles (Wiegers 2004: 10). The traditional domestic and nurturing roles of women mean that women, in addition to securing a livelihood for the household, are most often responsible for caring for people living with HIV/AIDS (PLWHA) and for orphans. Girls may drop out of school to care for their sick parents or younger siblings (UNAIDS 2004: 40). Furthermore, limited access to assets means that women are often more vulnerable to HIV/AIDS impacts; gender-based disparities in access to land and other assets are often exacerbated by property grabbing by relatives of the deceased and others.

3 Use of a sustainable livelihoods framework

The research adopted a sustainable livelihoods approach in order to understand the impact of HIV/AIDS on household assets and the various responses adopted by different households. The sustainable livelihoods (SL) framework has been widely used and is well-documented elsewhere (see, for example: DFID/FAO 2000). Briefly, households are seen to possess five sets of capital assets essential to their livelihood strategies: human capital, natural capital, financial capital, social capital, and physical capital. Utilizing these assets, households adjust to their physical, social, economic and political environments through a set of livelihood strategies designed to strengthen their wellbeing (Stokes 2002: 2).

O'Donnell (2004) has argued recently that the SL framework can provide a clear basis for understanding how HIV/AIDS can impact on various aspects of livelihoods in many different ways. When considering livelihoods from the perspective of HIV/AIDS, a livelihood system analysis will take on an additional character. The analysis begins with identifying livelihood strategies that are susceptible to HIV/AIDS, then tracks the impact of AIDS on livelihood assets—human, natural, financial, physical, social, and political—and on community-based and service-delivery institutions. Such an analysis should reveal intervention points for reducing the risk of HIV infection and mitigating the negative impact of HIV/AIDS, so that preventive measures can be linked to mitigation efforts to address both the causes and symptoms of the disease (Tango International 2003: 4-5).

4 A brief overview of the study sites

As an introduction to the context of the research, Table 1 summarizes selected characteristics of the three countries that participated in the FAO studies of HIV/AIDS impacts on rural livelihoods. As can be seen, the three partner countries differ in demographic and socioeconomic characteristics, and are at different levels of human development, as measured by the human development index (HDI). These countries have young, predominantly rural populations, exhibit low HDI scores and rankings and have low life expectancies due, in some measure, to the HIV/AIDS epidemic. Agriculture contributes a not insignificant proportion of GDP and employs around half the population.

All three countries are at different stages in the HIV/AIDS epidemic; only Uganda is said to have experienced a clear decline in HIV prevalence, as measured by sentinel surveillance. Such differences are reflected in the level of impact and appropriate response strategies to the pandemic. Another consequence of the epidemic is the increase in the number of orphans in the three countries. By 2003, the estimated number of AIDS orphans was 940,000 in Uganda, 57,000 in Namibia and 630,000 in Zambia (Table 1). Most of these orphans are taken care of by a surviving parent or their rural extended family, thus placing an extra burden on these households (UNAIDS/UNICEF/USAID 2004: 13).

In the first three studies, interviews were conducted in three districts from: the Ohangwena Region in northern Namibia; the Lake Victoria Crescent agroecological

Table 1
Selected population and demographic characteristics
of study countries, 2001

	Uganda	Namibia	Zambia
Total population (millions) (2002)[a]	25.0	2.0	10.7
Population < 15 years (%)[a]	50.1	43.2	46.5
Agriculture population (%)[e]	78	47	68
GNP (US$) (billions) (2002) [a]	5.8	2.9	3.7
GDP per capita (US$) (2002) [a]	236	1,463	361
Agriculture contribution to GDP (%) (2002)[c]	32	11	22
Human development rank (177 countries) (2002) [a]	146	126	164
(HDI) [a]	(0.493)	(0.607)	(0.389)
Life expectancy at birth (yrs) medium variant with AIDS (2000-05) [f]	46.2	44.3	32.4
Life expectancy at birth (yrs) without AIDS variant (2000-05) [f]	55.5	65.4	53.4
HIV/AIDS prevalence rate (15-49 years) 2003 (%)[b]	4.1	21.3	16.5
Estimated number of AIDS orphans (2003) [d]	940,000	57,000	630,000
(AIDS orphans as % of total orphans) [d]	(48)	(48)	(60)

Sources: [a] UNDP (2004);
[b] UNAIDS/WHO (2004);
[c] World Bank (2004);
[d] UNAIDS/UNICEF/USAID (2004);
[e] FAO (2002);
[f] UN Population Division (2003).

zone in southeastern Uganda, and; Southern Province of Zambia. For the fourth study, households and communities in five districts in Northern Province Zambia were interviewed.

In northern Namibia, Ohangwena is a rural region where nearly three-quarters of the people earn their living from subsistence farming. The climate is mild sub-arid. Average rainfall is 592 mm, is highly variable and unreliable. Average farm size is about 2.7 hectares per agricultural household. The farming system is dominated by millet (*mahangu*) cropping combined with cattle rearing. In 1999-2000, the average yield for *mahangu* was 210 kg per hectare, and varies considerably from year to year, and from farmer to farmer. Ox-drawn equipment is used for land preparation and cultivation (AIMS/FAO 2003: 26).

The Lake Victoria Crescent agroecological zone of Uganda receives more than 1,200 mm of rain per year. It is an agricultural area with variable soils; clay to the west of the Nile, and less fertile, acidic, sandy loam to the east, with low to moderate erodability. Population density is fairly high (about 280 people per km^2), and approximately 82 per cent of the land is farmed. Farm sizes for the eastern region of Uganda average about 1.04 hectares per household, according to recent figures. Diverse crops are grown; banana, beans, sweet potatoes, cassava and maize are the main food crops. Robusta coffee is a major cash crop (FAO 2003a: 6-7).

In Southern Province, Zambia, Choma and Monze districts lie in agroecological region II, with average annual rainfalls of between 800 and 840 mm and growing seasons of 90 to 95 days. In both districts, more than 97 per cent of households are fulltime farmers,

most farms are small (less than 5 ha) or medium-sized (5 to 20 ha). The major cropping systems are semi-commercial maize, groundnuts, sunflower, cotton, traditional maize and sorghum. The vast majority of farmers also keep livestock, mainly cattle, but also goats, sheep and pigs. Sinazongwe District is hot and dry, with a short rainy season of 60 to 90 days, and an average annual rainfall of 600 to 700 mm. Most of the population are subsistence farmers growing maize, sorghum, millet and cotton as major crops, and cowpeas, groundnuts and vegetables as minor ones. The main livestock types kept include cattle, goats and chickens. Very little organic matter is used in the farming systems (FASAZ/FAO 2003: 6-7).

Northern Province falls under Zambia's agroecological zone III, with average annual rainfall of more than 1000 mm and a growing season of about 120 to 150 days. It is subdivided into five agroecological zones. The central and northern plateaux are characterized by moderate to high population densities and farming systems based on cultivation of maize, cassava, finger millet, and other crops using slash and burn (*chitemene*) or more intensive techniques based on animal draught power. Other systems include cassava and fishing systems in the Lakes Depression and Chambeshi Bangweulu floodplains, and hand hoe cultivation of sorghum, finger millet and maize in the Luangwa Valley, as tsetse infestation there precludes the raising of cattle. There are two main livelihood zones: Zone 1B, with livelihoods based on crops, fishing and trading, and; Zone 2B, with livelihoods based on crops, game meat, wages, charcoal and/or mining (FAO 2004: 8-12).

5 Methodologies used in the studies

In order to ensure validity and reliability of the information collected, the four baseline surveys sequenced the use of qualitative and quantitative methodologies. The Namibia, Uganda and southern Zambia studies used the most common form of sequencing; i.e., the use of qualitative tools before structured questionnaires, where the primary role of the qualitative study is to define and refine hypotheses which can then be tested – either with qualitative or quantitative methodologies. (Marsland *et al.* 2001: 10). However, the Zambia Northern Province study adopted a sequential strategy in which a qualitative methodology was used as a diagnostic study and the quantitative survey as a baseline, with the results indicating areas that required further exploration through qualitative methods.

5.1 Qualitative methods

Prior to the design of the Namibia, Uganda and southern Zambia baseline field studies, desk reviews of existing literature on the impacts of HIV/AIDS on agriculture and food security and the inter-linkages to gender/youth were undertaken in each country to help identify data-gaps, to refine the research methodology and support the development of a research framework. For the qualitative portion of the field research, the three research teams used focus group discussions, key informant interviews and semi-structured household interviews to characterize the general development context, identify specific livelihood indicators for study, and obtain information on labour constraints, gender roles and decisionmaking, changes in asset ownership, inheritance and existing response strategies. For these, the following socioeconomic and gender analysis (SEAGA) and

participatory rural appraisal (PRA) tools were adapted to the HIV/AIDS context: historical time lines, Venn diagrams, village resource maps, wealth ranking, gender activity clocks, seasonal calendars, problem analysis charts and income and expenditure matrices.

For the 2004 baseline survey in Zambia's Northern Province a more systematic qualitative livelihood analysis was undertaken. The qualitative research sampled five household types in eight locations in four districts in order to gain a representative picture of the dynamics of assets and livelihood strategies that are induced by the presence of HIV/AIDS in communities and households in that province. The livelihood analysis utilized qualitative methods, including gender-disaggregated focus group and single-subject interviews among the various household categories chosen for comparative purposes. The stratification scheme developed for the qualitative study was subsequently used in the quantitative survey, and is described in the next section of the paper.

5.2 Quantitative methods

The Namibia, Uganda and southern Zambia quantitative surveys used multi-stage random sampling designs to select households for interview. In stage 1, each of the national research teams selected three districts as study sites, based on the previously-determined survey focus and research framework specific to the partner country. This created variations in sample design and stratification strategy for the households selected—variations that ultimately affected the quality and comparability of the national samples.

In Namibia, the three districts were selected based on different levels of HIV/AIDS prevalence (low, medium, high) and representing a cross-section of the main health districts in the region. Ohangwena is the poorest region in Namibia and has one of the highest prevalence rates of HIV/AIDS in Namibia. In Uganda**,** three districts chosen reflected three different livelihood options (crops, livestock and fishing) and three different HIV/AIDS prevalence rates: low (pastoral area), medium (crop area) and high prevalence (fishing area) respectively. The districts in Zambia's Southern Province were selected due to their relatively high HIV/AIDS prevalence levels and their importance in terms of agriculture production.

In stage 2, households were stratified and subsequently randomly selected from the different strata in each study site, using local criteria for stratification and selection that reflected the national study purpose and research framework. Stratification was typically based on whether or not the household had experienced the death or chronic illness of a household member from HIV/AIDS or a related illness (e.g., TB, pneumonia or chronic diarrhoea) within the previous five years, and by the sex of the household head. In Uganda, the national research team decided that a higher probability of selection (0.7) should be given to the affected households and a lower probability (0.3) to the non-affected households in order to draw sufficient households in the subsamples to enable comparison for determining impact. In Southern Province, Zambia**,** the standard enumeration areas (SEAs) from the master sampling frame of the Central Statistics Office (CSO) were used as a sampling frame in the chosen districts. It is important to note that, due to respondents' unwillingness to report cases of chronic illness and HIV/AIDS-related deaths in Zambia, another proxy indicator of the impact of the

epidemic was used for disaggregated data analysis: i.e., caring for orphans, with orphans being defined as children up to 18 years old who have lost one or both parents through death.

The final samples for the three studies included 513 households in Namibia, 610 households in Uganda and 770 households in southern Zambia.

In Northern Province, Zambia, the quantitative baseline survey disaggregated the data analysis for the following four household categories (also called vulnerability categories):

- households with people living with HIV/AIDS (PLWHA) and orphans;
- households with PLWHA;
- households with orphans; and
- non-affected households.

The baseline survey was conducted in the same communities as the qualitative livelihood analysis. All households within the corresponding SEAs of the Central Statistics Office were listed and, based on information from health centres, stratified according to their status regarding PLWHA. All households within the PLWHA strata were included in the sample (i.e., purposively selected). To select households from the non-PLWHA strata, a simple circular systematic selection was applied.

In all four studies, households were interviewed by trained enumerators using structured questionnaires containing structured and semi-structured questions. Topics included: household demographic composition, child educational and orphan status, HIV/AIDS mortality/morbidity experience, agricultural holdings and production (crops and livestock) asset ownership, sources of income and expenditure, and household food consumption and food security. The structure and content of the questionnaires used in Namibia and Uganda studies were broadly similar. In the Zambia studies, the designed questionnaires were modelled after ones used by the CSO for the annual post-harvest survey, and adapted to the local HIV/AIDS context in the respective provinces.

6 Results and discussion of research findings

The research conducted in the four sites focused on the effects of AIDS on the different human, natural, financial, social and physical capitals that households possess and through which they seek to earn a living.[1] Consistent with other research, the studies identified the effects on the human, financial and physical asset base as the most direct impacts of the epidemic.

[1] A summary of all findings from the four studies falls outside the scope of this paper. For more information on the different study results, please refer to the following reports in the bibliography: Namibia (AIMS/FAO 2003); Uganda (FAO 2003c); Zambia-Southern Province (FASAZ/FAO 2003) and Zambia-Northern Province (FAO 2004).

6.1 Human capital

One of the most devastating impacts of the AIDS pandemic is the loss of human capital, as the disease robs households of adult labour and knowledge. Rural households rely on available household labour as the primary source of human capital for livelihood, both on and off-farm. Household size and composition are, therefore, important aspects of human capital availability for smallholder agricultural households.

Table 2
Significant human capital and natural capital indicators for the four studies

Sample	No. of households	Mean household size (persons/hh)	Mean no. of adults (15-64) /hh 2002	% change in area cultivated 1997-2002	Poor soil fertility: less manure or draught animals now, %	Poor soil fertility: death/illness of HH member, %	Poor soil fertility: can't buy chemical fertilizer/no cash, %
				NAMIBIA			
Namibia[a]	513	8.7	4.7*	-8.0*	7.2***	11.9***	1.0***
Affected female-headed	134	8.6	4.4	-13.0	5.2	24.6	0.7
Non-affected female-headed	141	8.4	4.2	-9.0	5.7	6.4	0.7
Affected male-headed	60	9.3	5.0	-14.0	6.7	23.3	3.3
Non-affected male-headed	178	8.4	5.0	-2.0	10.1	2.8	0.6
				UGANDA			
Uganda[a]	610[c]	6.2*	2.7*	-10.0**	0.2	18.4***	5.0
Affected female-headed	68	5.6	2.5	-23.0	0.0	33.3	5.6
Non-affected female-headed	84	5.1	2.2	-22.0	0.0	29.2	0.0
Affected male-headed	120	6.9	3.2	-10.0	0.0	22.6	12.9
Non-affected male headed	338	6.4	2.8	-4.0	0.3	11.8	3.7
				ZAMBIA			
Zambia, Southern Province[b]	770	6.1*	2.9*	-2.9	12.3	0.4	NA
Female-headed with orphans	95	6.3	2.7	-7.4	11.5	0.0	NA
Non-affected female-headed	141	4.8	2.2	-5.8	10.8	0.0	NA
Male headed with-orphans	142	7.8	3.8	-3.5	19.4	1.6	NA
Non-affected male-headed	391	6.0	2.8	-1.9	10.4	0.3	NA
Zambia, Northern Province[b]	508	5.6*	2.7[d]	-2.2[e]	7.8	1.2	15.0
Female-headed with PLWHA and orphans	54	5.2	2.4	-14.2	9.6	0.0	15.4
Female-headed with PLWHA	36	4.1	2.1	-3.7	6.1	0.0	3.0
Female-headed with orphans	55	5.4	2.5	-11.4	11.1	1.9	9.3
Male-headed with PLWHA and orphans	25	7.0	3.4	5.7	16.0	0.0	20.0
Male-headed with PLWHA	59	5.5	2.8	-15.0	10.7	0.0	21.4
Male-headed with orphans	51	7.1	3.2	-10.0	6.4	2.1	25.5
Unaffected	228	5.4	2.3	5.0	5.5	2.2	14.3

Notes: PLWHA = people living with AIDS; *One-way ANOVA significant at 0.05 level; ** Kruskal-Wallis test statistics significant at 0.05 level; ***Chi-square test statistic significant at 0.05 level.

[a] For Namibia and Uganda, reasons were given for reduction in plot size;

[b] For Zambia, reasons were given for reduction in soil fertility;

[c] Number of valid cases where the sex of the household head and the vulnerability status of the household could be determined;

[d] One way ANOVA significant at 0.05 level (sex of head only);

[e] Two-way ANOVA significant at 0.05 level.

Source: FASAZ/FAO (2003).

Table 2 presents human and natural capital indicators found to be significant for sample households by vulnerable groups in the four research sites. Average household size ranges across the four samples from 8.7 persons (Namibia) to 5.6 persons (northern Zambia), and the range of variation among household vulnerability categories within the samples was found to be statistically significant for the Uganda, and southern and northern Zambia samples. In general, male-headed households have larger household sizes than do female-headed households. For example, male-headed households in Uganda average about 7 persons and 6.4 persons per household for affected and non-affected households, respectively. In contrast, female-headed households averaged 5.6 and 5.1 persons for affected and non-affected households. A similar pattern can also be found in the southern Zambia sample: 7.8, 6.0 persons for male-headed households, and 6.3 and 4.8 for female-headed households in the study. This is also the case for the Northern Zambia sample, and female-headed households taking care of PLWHA have the smallest household size of any reported sub-group (4.1 persons). In Namibia and southern Zambia, mean sizes of affected households are larger than non-affected households. This is to be expected for the southern and northern Zambia samples, since both studies used the presence or absence of AIDS orphans in the household as a criterion for classifying 'affected' households.

Non-affected, female-headed households have the smallest household sizes in each sample; these may, therefore, be expected to experience greater labour shortages than other types of households in the studies.

Although not reported in the tables, it is interesting to note that vulnerable households are increasingly headed by the elderly. Mean age for heads of affected versus non-affected household are: Namibia—59 versus 58 years; southern Zambia—45 versus 43 years; Northern Zambia—46 versus 41 years. Also, female household heads tend to be older on average than male household heads: Namibia—60 versus 57 years; southern Zambia—47 versus 41 years; northern Zambia—48 versus 43 years.

The mean number of adults in the productive years (aged 15-64 years) provides an estimation of the prime labour pool from which the household can draw for agricultural labour and other productive tasks, and is used as the denominator in calculating the household dependency ratio. In the absence of sufficient adult workers from this age group, the household must fill labour gaps by utilizing children or the elderly, by hiring labour, or by exchanging labour with other households.

Study findings show a clear gender variation in adult labour availability between male and female-headed households affected by AIDS, with female-headed households having substantially less labour available than their male counterparts. In general, male-headed households have larger numbers of prime-age adults (women and men 15-64 years of age) in the household labourforce. In the Namibian sample, male-headed households contain on average around 5 prime-age adult members, as compared to around 3 adults for the Uganda and 2-3 adults for the southern Zambia samples. In northern Zambia male-headed households averaged 3.4 and 3.2 adults for households with double burden and hosting orphans, respectively. This gendered pattern is statistically significant in all four of the study samples, with the greatest differences being between non-affected female-headed households, and affected male-headed households in Namibia, Uganda and southern Zambia. In northern Zambia, the largest gap is between female-headed households with PLWHA (2.1) and male-headed households with orphans (3.2).

Other measures of human capital, such as the dependency ratio and the mean number of orphans hosted were also calculated, but are not reported here. The dependency ratio measures the number of dependants (i.e., children and the elderly) for each prime-age adult in the household. Sample dependency ratios were: 0.8 for Namibia, 1.25 for Uganda, 1.18 for southern Zambia and 1.07 for northern Zambia. Within-sample variations by vulnerability groups were not found to be significant. In Uganda and northern Zambia samples, the mean number of orphans hosted was nearly two, while in southern Zambia, the average was 1.5. As expected, female-headed households have slightly higher averages than male-headed households, but such differences are not significant.

6.2 Natural capital

In each study, questions were asked regarding changes in area cultivated within the last five years of the study. As shown in Table 2, all samples experienced reductions in the amount of land households cultivated. These reductions across household vulnerability categories were evaluated using one and two-way between-groups analysis of variance, as well as the non-parametric Kruskal-Wallis test statistic (Blalock 1979: 367-9), and were found to be significant at the 0.05 level for the Namibia, Uganda and northern Zambia samples. Changes were highest for the Uganda sample (-10 per cent) and lowest for households in the northern Zambia sample (-2.2 per cent). In Namibia, households affected by HIV/AIDS mortality and morbidity experienced significantly higher reductions (-13 per cent, -14 per cent) than unaffected households (-9 per cent, -2 per cent). Male-headed unaffected households had the lowest amount of reduction with only a 2 per cent loss in area cultivated. In the Uganda and southern Zambia samples, reductions in cropland were patterned more along gender lines; on average female-headed households reduced cropland about 10-15 per cent more than male-headed households in Uganda and about 4 per cent in southern Zambia.

Soil fertility and its maintenance is a critical aspect of agricultural production and, consequently, household food security. As part of all four studies, households were asked semi-structured questions, based on qualitative interviews, about perceptions of soil fertility and reasons for reductions in soil fertility. Table 2 also reports the per cent frequency of three responses to these questions by study sample and vulnerability category: less manure or draught animals (for Namibia) now than before; labour loss due to illness/death of a family member, and; lack of cash to purchase fertilizer and other inputs.

Response rates for less manure range from nil (Uganda) to about 12 per cent (southern Zambia). In Namibia, about 10 per cent of non-affected male-headed households cited this as a reason for reduced soil fertility, as compared to 5.2 per cent and 5.7 per cent of affected and non-affected female-headed households, respectively. These differences were found to be significant at the 0.05 level, using the chi-square test of association (Blalock 1979: 280-92). The death/illness response occurred rarely in interviews with households in southern Zambia (0.4 per cent) and northern Zambia (1.2 per cent), but more frequently in Namibia (about 12 per cent) and Uganda (18 per cent). In Namibia, a significantly higher proportion of affected households than non-affected households gave this response, while in Uganda, the response was significantly more frequent among female-headed than male-headed households.

The inability to purchase chemical fertilizer had very low response rates in Namibia (1 per cent) and Uganda (5 per cent) and was unreported in southern Zambia. However, the only significant differences in frequency of response were to be found in Namibia, where female-headed households were more likely than male-headed households to offer this reason for reductions in soil fertility.

6.3 Physical and financial capital

The four studies collected information on ownership of livestock, agricultural equipment and other assets. Table 3 presents physical and financial capital, and food security indicators found to be significant for differences among within-sample vulnerability groups in the four studies.

Cattle are important productive assets, especially in the semi-arid areas of Namibia and southern Zambia where the studies were conducted. Although not reported in the table, the proportion of households owning at least one head of cattle varied across samples; 53 per cent of sample households in Namibia keep cattle, 15 per cent in Uganda, 39 per cent in Zambia and only 6 per cent in northern Zambia, where cattle husbandry is constrained by cattle trypanosomiasis (FAO 2004). Also, the relatively low percentages of cattle ownership reported for southern Zambia may be explained by the fact that the study occurred in a drought year and many cattle may have been lost due to death or distress sales. Within-sample differences of per cent cattle ownership among vulnerability categories were not found to be significant, however. Data on ownership of cattle by study households in Table 3 show that average cattle holdings ranged from 0.3 cattle in northern Zambia to nearly seven heads of cattle in Namibia. In general, male-headed households report higher numbers of cattle kept that do female-headed households. This pattern is statistically significant only in the Namibia sample, however.

The study teams also collected information on asset ownership using checklists of agricultural tools and household items. The lists were locally constructed and contained sample-to-sample variations in the items monitored, making tabulation, analysis and comparison across study samples problematic. Also, three of the four studies did not collect quantitative data on household income or consumption expenditures, but, rather, on whether a certain item was a source of income and expenditure. As subjective measures, however, such assessments of income and expenditure are subject to bias.

In order to provide some measure of wealth status for households in the four studies, an asset index was constructed using data on asset ownership. Following the approach of Filmer and Pritchett (2001), it was assumed that household wealth is the main source of variation in asset ownership levels, and, therefore, levels of asset ownership could provide an indication of the level of financial capital of the household. Although there were a number of assets common to all studies, the group of assets monitored varied from sample to sample. The following assets were selected for inclusion in the index:

- Namibia: hand hoes, single furrow ploughs, tractors;
- Uganda: axes, bikes, hand hoes, *pangas*, fishing vessels, feed/water troughs, fishing nets/gears;
- Zambia, Southern Province: wheel barrows, ox carts, grinding mills, cultivators, bikes, harrows, ploughs, cars, other, radios, tractors, trucks, TVs;
- Zambia, Northern Province: wheel barrows, ox carts, grinding mills, axes, hoes, shovels, guns, cultivators, and bikes.

The index was constructed using principal components analysis to determine the index weights and assist in the construction of four asset index categories that approximate wealth levels; low, medium, medium-high and high asset ownership.

Table 3
Significant physical/financial capital and food security indicators
for sample households in the four studies

Sample	No. of households	Mean cattle kept present (no./hh)	% Households in lowest asset index category	% HHs reporting one meal or less per day	% HHs reporting two meals per day	% HHs reporting three meals+ per day
			NAMIBIA			
Namibia	513	6.8[c]*	25.2[g]	19.1*	75.6*	5.3*
Affected female-headed	134	2.7	24.6	20.9	77.6	1.5
Non-affected female-headed	141	3.5	32.6	20.5	77.3	2.1
Affected male-headed	60	9.5	18.3	16.7	76.7	6.7
Non-affected male-headed	178	11.5	22.0	17.4	72.5	10.1
			UGANDA			
Uganda[a,d,f]	610	3.0	26.9[g]	14.0*	60.0*	26.0*
Affected female-headed	68	0.5	48.5	25.0	50.0	25.0
Non-affected female-headed	84	2.4	29.8	17.0	67.0	17.0
Affected male-headed	120	3.7	30.8	19.0	57.0	25.0
Non-affected male-headed	338	2.9	20.4	9.0	63.0	28.0
			ZAMBIA			
Zambia, Southern Province[a]	770	5.1	37.7[g]	10.1	34.8	55.1
Female-headed with orphans	95	3.1	64.2	7.6	40.2	52.2
Non-affected female-headed	141	3.7	65.7	11.9	32.1	56.0
Male headed with orphans	142	6.2	16.9	10.7	28.6	60.7
Non-affected male-headed	391	5.4	28.7	9.8	36.7	53.5
Zambia, Northern Province[b]	508	0.31	24.8[h]	20.4	69.2	10.3
Female-headed with PLWHA & orphans	54	>0.1	40.7	28.3	66.0	5.7
Female-headed with PLWHA	36	0.5	44.4	22.2	75.0	25.0
Female-headed with orphans	55	>0.1	36.4	27.3	70.9	1.8
Male-headed with PLWHA & orphans	25	0.0	20.0	36	60.0	4.0
Male-headed with PLWHA	59	0.5	15.3	17.2	72.4	10.3
Male-headed with orphans	51	0.5	13.7	19.6	56.9	23.5
Unaffected	228	0.4	15.9	11.8	73.8	14.4

Notes: PLWHA=People living with AIDS;

[a] Present=2002; Past=1997;

[b] Present=2004; Past=1999;

[c] Per cent sample households keeping at least one livestock (cattle) in Namibia;

[d] Cattle figures reported for Uganda include mixed farming subsample only to facilitate comparison with the other studies;

[e] Per cent sample households keeping cattle in mixed farming subsample;

[f] Only those households that reported cattle in 1999 and 2002 are included in the analysis for Uganda;

[g] Chi- Square significant at 0.05 level (vulnerability category versus asset index category);

[h] Chi- Square significant at 0.05 level (sex of head versus asset index category only);

* Chi- Square significant at 0.05 level.

Source: FASAZ/FAO (2003).

The proportion of households in the lowest asset index category is reported for samples and within-sample vulnerability categories in Table 3. Proportions of households in the lowest asset index category are: about 25 per cent for Namibia, about 27 per cent for Uganda, about 38 per cent for southern Zambia and about 25 per cent for northern Zambia. In general, female-headed households in the samples exhibit a higher proportion of households in the lowest asset index category than households headed by men. In Namibia, nearly one-third of the unaffected female-headed households are in the low asset category, while nearly half on the affected female-headed households in Uganda are similarly asset-poor. In southern Zambia, the proportion in the lowest asset category reaches nearly two-thirds for female-headed households, regardless of category. In northern Zambia, female-headed household categories have between 36 and 44 per cent of households in the low asset category; female percentages are nearly twice as high as their male counterparts. As reported in Table 3, tests of association between asset index category and within-sample vulnerability category were found to be significant at the 0.05 level.

6.4 Food security

Given its effects on agricultural production and other livelihood strategies, HIV/AIDS can contribute to a reduction of the amount of food available to individuals, households and communities. This may lead to lower food intake, thus reducing both individual nutritional status and household food security.

The four studies measured various food security indicators, focussing specifically on household food consumption and food sufficiency. Data collection instruments included food frequency checklists, and structured and semi-structured questions on food intake, eating patterns, and self-assessments of adequate/inadequate food supply. As with the asset and income/expenditure checklists, tabulation, analysis and interpretation of food frequency checklists proved difficult. Questions on food intake, eating patterns, and sufficiency of food supply were not comparable across samples and therefore are not reported here. For example, both the Namibia and northern Zambia studies asked questions about food availability. In Namibia, households were asked how many days in the previous month was the household without food. By contrast, in the northern Zambia study, households were asked how many months in the previous year had the household had sufficient food. Such inconsistencies among the four studies served to limit the food security indicators that could be constructed for cross-study comparison.

However, all studies collected information on the number of meals per day eaten by the household. Low production of food crops means that some households may reduce the number of meals they have to two or one meal a day. Reduction in the number of meals is one of a series of concurrent, or stress, indicators that occur simultaneously with decreased access to food, and that are primarily access/entitlement related (Maxwell and Frankenburger 1992: 93).

The number of meals eaten per day reported by households was obtained as either numeric or categorical responses, which were grouped for the purpose of tabulation and analysis into three categories; one or fewer per day, two meals per day, and three meals+ (included snacking) per day. The percentage of households reporting the number of meals eaten per day for samples and vulnerability groups is shown in Table 3. It is interesting to note that the highest proportion of households reporting three or more

meals per day is the southern Zambia study, which, at the time of the study, was experiencing drought, and was the target for food aid. In Namibia, only about 5 per cent of households reported maintaining the three meals per day pattern, while for Uganda and northern Zambia samples this figure was 26 per cent and 10 per cent, respectively. Households reporting two meals per day ranged from about 35 per cent for southern Zambia to about 76 per cent for the Namibia sample. However, it is in the one meal per day category that we can see some indication of the levels decreased access to food for the sample households. Sample averages for this category are: 10 per cent for southern Zambia, 14 per cent for Uganda and about 20 per cent for Namibia and northern Zambia. In Namibia, there is a gendered pattern in which about 21 per cent of female-headed households report only one meal per day, in contrast to about 17 per cent for male-headed households. In Uganda, more affected households (25 per cent female head, 19 per cent male head) report one meal than non-affected households (17 per cent female head, 9 per cent male head). For southern Zambia, there appears to be no pattern, while for northern Zambia, male-headed households with double burden have the highest proportion reporting one meal (36 per cent), followed by affected female-headed households (22-28 per cent range), the remaining affected male-headed households (17-20 per cent range) and unaffected households (about 12 per cent). As reported in Table 3, tests of association between number of meals eaten by adult household members and within-sample vulnerability category were found to be significant at the 0.05 level for the Namibia and the Uganda samples.

7 Methodological lessons learnt

The four HIV/AIDS impact studies described in this paper provided a rich opportunity not only to explore gender, HIV/AIDS and livelihoods linkages but also to draw lessons for future research and to design and implement HIV/AIDS mitigation programmes for the smallholder agricultural sector. Methodological lessons learnt as a result on the four research studies can be grouped into three major areas: research design issues, measurement and definitional issues, sampling and typology issues.

7.1 Design issues

Given the complex nature of the research, attempts were made in all four of the studies to address issues of total survey design, which Fowler defines as attention to all aspects of a survey, rather than focussing merely on choice of sample designs and survey instrument development (Fowler 1993: 142). Consequently, much time was devoted during the design phase of the studies to discussing the objectives of the study, the level of precision required given the objectives, the quality of the sample needed, the quality of questions as measures, and the quality and mode of data collection.

The design of all four studies called for the collection and analysis of both qualitative and quantitative information on gender-HIV/AIDS-livelihoods. Unfortunately, the qualitative studies undertaken in the Namibia, Uganda and Southern Province, Zambia were not adequately designed and executed. Although familiar with standard PRA/RRA data collection techniques, the qualitative research teams appeared not to have prepared a systematic qualitative research design targeted to gender-HIV/AIDS-livelihoods linkages prior to entering the field. This resulted in generic, ‘flat’ community and

household information that was not focussed sufficiently either to provide insights for design of the quantitative surveys or to offer context for richer interpretation of the quantitative findings.

Moreover, given the sensitivity of the subject, the community group meetings as an entry point to discuss issues related to AIDS and livelihoods presented problems of exclusion of less empowered groups; e.g., persons living with HIV/AIDS (PLWHA) and their caregivers, and AIDS widows/widowers and orphans, who may not be included in such meetings, due to time constraints and stigma attached to the disease. As a consequence, these community meetings did not reveal the required in-depth knowledge and understanding of the issues, thereby preventing an unbiased qualitative analysis.

In light of the previous experiences, the Northern Province, Zambia, the qualitative survey was more carefully designed, actually took precedence in the overall study design, with the quantitative survey expected to provide validation/data on the qualitative results. Although this produced a superior qualitative livelihood analysis to previous studies, this emphasis on qualitative data collection subsequently led to problems in the design and sampling stages of the quantitative study.

The development of survey questionnaires for the studies provided another source of design lessons learnt. The four studies used different data collection tools, i.e., the four questionnaires were *not* fully comparable in terms of similar indicators. This was due in some measure to the desire to: a) maintain local relevance for the respective studies, resulting in little standardization of formats across study sites, and; b) build upon the experiences of previous studies to avoid similar problems. For example, the study in Uganda attempted to sample across communities representing mixed farming, pastoral and fishing livelihood strategies. Also, while the interview schedules used in Namibia and Uganda were broadly similar, each had different strengths and weaknesses in the various sections, and were different from the rather complicated schedules used in the southern and northern Zambia studies. Although perhaps useful for the local research team, such variety made standardization of variables and analyses difficult.

7.2 Measurement/definitional issues

All four studies used to varying degrees the framework for measuring the impacts of HIV/AIDS on livelihoods and food security developed by Stokes (2002). Using an explicit SL framework, Stokes has catalogued numerous potential HIV/AIDS impacts on various asset (or capital) groups, and proposed a range of indicators, largely dynamic, rather than static, to measure and monitor such impacts. Stokes has noted ‘the methodological challenge of separating out the effects of HIV/AIDS from other deleterious effects’, (Stokes 2002: 15), and recommends focussing on a limited subset of key livelihood assets, based on local contextual information, and controlling for major alternative factors that have impacts on livelihoods.

Given the time and financial limitations of the studies, the four studies attempted to collect information on the following indicators in five livelihood capital groups;

- *Human capital*: illness or death of household members; child orphans; school attendance; household size/composition; change in area cropped and cropping patterns;
- *Financial capital*: changes in income and expenditure sources; wage work and remittances;
- *Natural capital*: reductions in soil fertility; fertilizer use; sales of charcoal and forest products; distress sales of land and livestock;
- *Social capital*: fosterage of orphaned children; linkage to community organizations; and
- *Physical capital*: household tangible assets; distress sales of assets; asset stripping (including livestock).

Many of these indicators proved difficult to measure.

Although long-used in studies of the economic behaviour of farm households (e.g., Chayanov 1966; Ellis 1988), and to explore on-farm production and off-farm employment linkages in the southern Africa (Low 1986), the conventional household dependency ratio did not accurately reflect the labour constraints experienced by affected households, since it does not take into account the *de facto* dependency of chronically-ill household members, shifts from productive to reproductive activities by prime-age adults and the substitution of child for adult labour to accomplish both productive and social reproductive tasks (De Waal 2003).

The use of checklists on income and expenditure, frequency of consumption of key dietary items, and questions on estimated food stocks often resulted in data that were difficult to manipulate and interpret, and led to disappointing results. Moreover, many key concepts used in the studies—for example, 'affected/not affected households', 'orphan' and 'school dropout'—were difficult to define and varied slightly from study to study. Particularly difficult was the classification of affected households in the case of *de facto* female-headed households and households in polygamous unions, i.e., female-headed households where the husband was away and affected by HIV/AIDS.

Another problem faced in all four studies that deserves mention was that of the recall period of five years for various indicators. These included livestock ownership, area cultivated, and income and expenditure sources. This created problems of 'recall loss' (Moser and Kalton 1972: 340) that proved to be problematic for obtaining accurate estimates of ownership of important livelihood assets. For example, elderly respondents for some households had difficulty recalling exactly the proportion of land under cultivation five years ago. This problem of recall interval is inherent in many studies utilizing subjective self-assessments as measurements (Fowler 1993: 88-9; Collinson 1972; Moser and Kalton 1972: 340-1).

7.3 Sampling/typology issues

Total error is a component of all sample-survey designs and contains three distinct components: sampling bias, non-sampling bias and sampling variability (Henry 1990: 34). In the four quantitative baseline surveys discussed here, the approach to addressing sampling issues comprised a progressive learning experience aimed at

improving sampling efficiency for subsequent surveys. Important to this process was the evolution from the use of stratification criteria (e.g., 'affected'/'not affected') to construct simple household typologies in the three earlier studies to the development of a more elaborate typology of vulnerable households in the Northern Province, Zambia study.

In the Namibia, Uganda and Southern Province, Zambia studies, major sampling problems were associated with the identification of 'affected' households. As previously indicated, HIV/AIDS-affected households in those studies were identified through indirect measurements (i.e., reported illness and deaths from HIV/AIDS-related causes), since respondents were reluctant to attribute illness or death to AIDS. However, in the southern Zambia study, the team wished not only to compare affected and non-affected households, but also to be able to generalize (extrapolate) results from the communities to larger administrative units. The use of proportional sampling, based on CSO Zambia Standard Enumeration Areas (SEA), coupled with underreporting of HIV/AIDS illness and death due to stigma, resulted in an unexpected low incidence (less than 4 per cent of sample) of 'affected' households in the sample.

Drawing upon these lessons, the study in Zambia's Northern Province adopted an approach involving the integration of a non-probability design with random sampling. Purposive sampling, derived from household lists compiled with the help of rural health centres and community health workers during the qualitative study, was used to identify affected households, which were further classified according to their HIV/AIDS morbidity/mortality experiences and keeping orphans, for inclusion in the sample. Random sampling was subsequently used to obtain data on other households in the population. However, the careful attention paid to stratifying/characterizing 'vulnerable' households during the qualitative study made this typology difficult to replicate in the quantitative study, particularly when the orphan effect was considered. The resulting typology was one of households disaggregated by gender, caring for PLWHA and keeping orphans.

In the Namibia and Uganda studies, much of the total error was attributed to other sources of non-sampling error. Such errors arose from the inability to control factors such as clear-cut instructions to the field staff, literacy, knowledge and cooperation from respondents, experience of field staff, adequacy of supervision and data processing and cleaning. The resulting non-sampling errors slowed down and even impaired the processes of data entry and checking, requiring multiple revisits and the development of additional data cleaning syntaxes to trap and control data errors.

8 Conclusions and suggestions for future work

This paper has explored gender-HIV/AIDS-livelihood linkages and attempted to reflect on the challenges of micro-level quantitative investigation of these linkages by examining four studies undertaken by FAO and various partners in three affected countries in Sub-Saharan Africa. These countries differ in demographic and socioeconomic characteristics, are at different stages in the HIV/AIDS epidemic, and have different policy contexts with respect to their agricultural sector, poverty reduction strategies and responses to the AIDS epidemic. Characteristics of the four study sites also reflect micro-level differences in agroecological conditions, farming systems,

sociocultural background, economic and livelihood strategies, and coping strategies. Although the three countries exhibit different levels of HIV prevalence, it is important to bear in mind that even those countries that do eventually reverse the epidemic's course will have to contend with serious direct and indirect impacts of AIDS for many subsequent years. Even Uganda, which has shown consistent declines in HIV prevalence levels since the mid-1990s, remains burdened with a serious epidemic. Namibia is one of the countries in the southern Africa region where very high HIV prevalence—often exceeding 30 per cent among pregnant women—is still being recorded; there, comparisons of prevalence levels at selected antenatal clinics have shown no evidence of a decline (UNAIDS 2004: 32). In Zambia, HIV infections in pregnant women appear to be stabilizing at lower levels, 16 per cent in 2003. However such a summary perspective hides important aspects; for example, roughly stable HIV prevalence means that more or less equal numbers of people are being newly infected with HIV and are dying of AIDS.

The studies utilized a SL framework to investigate gender aspects of HIV/AIDS effects on SL capital groups, employing a diverse set of operational definitions, indicators and data collection/analysis methods. Despite the analytical challenges such diversity presents, a synthetic analysis of data from the studies has been undertaken, the results of which have been presented in this paper. This analysis has examined differences on a range of livelihood capital indicators among households classified according to their vulnerability to HIV/AIDS-related mortality, morbidity and hosting of orphans. In many cases, these differences are patterned along gender as well as HIV/AIDS vulnerability dimensions.

In general, male-headed households have larger household sizes than female-headed households. Non-affected, female-headed households have the smallest household sizes in each sample, and may, therefore, be expected to experience greater labour shortages than other types of households in the studies. Study findings show a clear gender variation in labour availability between male- and female-headed households affected by AIDS, with female-headed households having substantially less prime-age adult (women and men aged 15-64 years) labour available than their male counterparts. In northern Zambia, the largest gap is between female-headed households with PLWHA and male-headed households with orphans. In addition, there were interesting differences in dependency ratios between and within the samples. Sample averages for mean number of orphans ranged from 1.5 to 2 orphans hosted per household. As expected, female-headed households have slightly higher averages than male-headed households, but such differences are not statistically significant.

All samples experienced reductions in the amount of land households cultivated. Significant reductions across household vulnerability categories were found for the Namibia, Uganda and northern Zambia samples. In Namibia, affected households experienced significantly higher reductions than unaffected households, with male-headed unaffected households having the lowest amount of reduction. In the Uganda and southern Zambia samples, reductions in cropland were patterned more along gender lines, with female-headed households reducing cropland 4-15 per cent more than male-headed households.

In all four studies, households were asked about perceived reductions in soil fertility. In Namibia, significant differences between non-affected male-headed households and female-headed households in attributing reduced soil fertility to less draught power were

found. Also in Namibia, a significantly higher proportion of affected than non-affected households gave labour loss due to illness/death of a family member as a response, while in Uganda, the response of less manure was significantly more frequent among female-headed than male-headed households.

In order to provide some measure of wealth status for study households, an asset index was constructed using principal components analysis of data on asset ownership, and households were grouped into asset endowment categories based on the asset index scores. In general, female-headed households in the samples exhibited a significantly higher proportion of households in the lowest asset index category than male-headed households.

All studies collected information on the number of meals eaten per day by the household to assess the levels of meal reduction and decreased access to food. A gendered pattern of meal reduction was observed for Namibia, with proportionally more female-headed than male-headed households reporting only one meal per day. In Uganda, more affected households reported having only one meal per day than non-affected households. In northern Zambia, male-headed households with double burden had the highest proportion reporting one meal, followed by affected female-headed households. There was a significant association for the Namibia and the Uganda samples between the number of meals eaten and within-sample vulnerability category.

From these studies, a number of lessons were learnt in an iterative fashion in all phases of the social survey research process; design, measurement and definition, sampling, data collection and analysis. The studies discussed in this paper illustrate the inherent limitations of small-scale cross-sectional studies versus longitudinal designs[2] to investigate gender-HIV/AIDS-livelihood linkages. Small-scale cross-sectional studies may fail to capture HIV/AIDS impacts at the household level, other than those immediately preceding the interview with the respondent, as changes in the household resource base are dynamic and long-term processes. As shown in this paper, such studies are mainly able to show 'correlates' of HIV/AIDS-related impacts (i.e., 'differences' across households): they do not, however, demonstrate 'causality'. On the other hand, longitudinal studies are complicated by households dissolving, migrating, or by unaffected households becoming affected during later phases of a given study. This 'statistical orphanhood effect' (De Waal 2003: 3) requires re-sampling to replace either affected households or controls.

Given the sensitivity of the research topic, an integrated research design that sequences qualitative and quantitative research methods is essential to the success of an HIV/AIDS impact study. Qualitative investigations should precede quantitative surveys to help determine what should be investigated and how to characterize the quantitative variables, given local circumstances. Triangulation of qualitative and quantitative information would also yield useful insights into the sociological and anthropological aspects of the epidemic.

In the design phase of the study there is a need to refine interview schedules with probing questions in order to minimize response-biases as a result of respondent

2 See Booysen and Arndt (2003) for a recent review of methodologies used in HIV/AIDS impact studies.

expectations, such as food support. To this end, self-assessed subjective measurements are inadequate to assess household wealth and may lead to distorted or biased estimates. Also, the use of field techniques[3] during pre-testing of survey instruments and processes cannot be overstated.

The studies illustrate the importance of separating out various effects of HIV/AIDS on rural households; i.e., morbidity from mortality from the burden of keeping orphans. Given the fact that the Namibia and Uganda studies lumped together sickness, death and keeping orphans as part of the household 'affected/non-affected households' classification scheme, the effects of the pandemic could not be easily observed.

Quantitative survey questionnaires could be modified in a number of ways in order to improve data accuracy and ease of collection. For certain key concepts/indicators (e.g., 'orphans', 'school dropout', etc.) future studies should balance the use of local definitions to capture local realities with standard international definitions that permit comparison with other studies.

Accuracy in the classification of affected households versus non-affected households posed a serious sampling, as well as a measurement, challenge to the research in all studies. As noted earlier, stigmatization posed challenges not only for obtaining valid responses to survey questions but also for the actual sampling process. More work, therefore, needs to be done to develop ethically sound sampling procedures that allow for selecting affected households without the danger of exacerbating stigma and discrimination.

Given the complex nature of the phenomena under investigation, the wide range of indicators analysed, and financial constraints, small-scale studies of HIV impacts often encounter difficulties in obtaining adequate sample sizes for some analyses. This was certainly the case for the studies discussed in this paper: sample sizes were small and group sizes of the household categories were uneven. This poses a major challenge to designing such studies, and highlights the need to devote considerable effort to constructing an adequate sampling frame in future studies.

Researchers should recognize the limitations of using income/expenditure rating systems to capture information on financial capital effects. These limitations may include the qualitative nature of such systems, the effect of recall loss, and the difficulty of using elaborate (and opaque) rating scales in rural field settings.

Questions on asset grabbing in formal surveys proved to be problematic, due to respondent reluctance to provide responses. Future work in this area may need to rely more on open-ended survey questions and/or qualitative techniques to obtain reliable information. A similar observation can be made for questions on fishing in future surveys, as respondents may be reluctant to report the use of some methods, which may be illegal.

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[3] Pre-field techniques generally are those used during the preliminary stages of questionnaire development. Field techniques are those used to evaluate interview schedules tested under field conditions, in conjunction with a field test, or they may be used in conjunction with production data collection, particularly for ongoing or recurring surveys.

Finally, in addressing the problem of small sample studies by adding 'HIV/AIDS' questions to agricultural surveys, we would caution against this approach. Rather, we would recommend an approach that utilizes data drawn from large-scale studies that are part of an integrated national statistical system. In such a system, HIV impact questions/determinations found out in, for example, health surveys could be linked to rural and agricultural surveys for integrated analysis. The result would provide broader geographic (and perhaps more in-depth statistically) coverage of impact investigation. This is an idea with much currency in debates on international official statistics (e.g., UNSD 2003). Therefore, there is an acute need to 'mainstream' HIV/AIDS concerns throughout the National Statistical System, instead of limiting interest in HIV/AIDS statistics to the health sector.

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