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IMPACT OF HIV/AIDS-RELATED ADULT MORTALITY ON RURAL HOUSEHOLDS' WELFARE IN ZAMBIA

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Major Findings:

- The effects of mortality on rural households depend on the gender and household position of the deceased and initial characteristics of the household.
- Mortality of male household heads is associated with the most severe impacts on household size, farm production, and livestock assets than any other adult death. AIDS mitigation programs should target their scarce resources particularly toward widow-headed households, especially those that were relatively poor to begin with.
- The impact of adult mortality appears to be more severe for households in the bottom half of the distribution of assets in 2000.
- Contrary to conventional wisdom, there is no clear pattern of shifts to labor-saving crops among afflicted households. Capital constraints may be more binding than labor constraints for many afflicted households.
- AIDS mitigation interventions should be based on the productivity and food security impacts of alternative allocations of public resources across sectors.

BACKGROUND: Fully two decades since the HIV/AIDS epidemic in Africa has been characterized as a major economic development crisis, there remains a dearth of micro-level information on how farm households respond to, and are affected by, the disease. Most micro-level HIV/AIDS impact studies in the literature hypothesize about the impacts of the epidemic but rarely quantify them (e.g., FAO, 2003). This has given rise to some conventional wisdom used to guide donors' interventions to the crisis, although they may or may not be accurate.

OBJECTIVES: This study estimates the impacts of prime-age (PA) adult morbidity and mortality on crop production and cropping patterns, household size, livestock and non-farm income in Zambia using nationally representative rural farm household longitudinal survey data. The findings provide important information to assist policy makers, donors, and development planners in designing interventions to mitigate the impacts of the AIDS on vulnerable households.

METHODS AND DATA: The study uses nationally-representative longitudinal data on 5,420 households in Zambia, surveyed in May 2001 and May 2004. The survey was carried out by the Central Statistical Office (CSO) in conjunction with the Ministry of Agriculture and Cooperatives (MACO) and Michigan State University's Food Security Research Project.

This study uses this household data panel to measure the impacts of HIV/AIDS-related prime-age mortality on livelihoods. The availability of a nationally representative longitudinal data allowed analysis of the impacts of disease-related prime-age death across two time periods and between households that experienced mortality of adults aged 15 to 59 compared to households not experiencing mortality or chronic illness. A comparison of the changes in household outcomes (e.g. household composition, farm and crop production, value of livestock and off-farm income) over time between the treatment (households with prime-age death and/or chronic

illness) and control group (household without prime-age chronic illness and death) provides an estimate of the impact of prime-age mortality. However, rural households are heterogeneous in many variables that change and evolve differently for different households and one would expect the effects of prime-age death to differ between households depending on their initial conditions in terms of assets, income and dependency ratios. To control for these heterogeneous factors the analysis takes into account the household initial conditions enumerated in 2001, in particular value of assets, land holding size and effective dependency ratio.¹

SUMMARY OF FINDINGS: The study highlights several findings:

First, irrespective of gender and/or position in the household of the deceased person, rural farm households in Zambia attempt to cope with the death of PA adults through changes in household composition. In all cases household size declined by a factor less than one member, suggesting that afflicted households are partially successful in replenishing their family size to restore their supply of labor. However, in response to the death of a male household head, poorer households are much less able to attract new members than non-poor households, which are almost fully able to restore household size to former pre-death levels. These results imply that the widespread view that death of productive members of the family results into labor shortages needs to be more carefully nuanced, taking into account the position of the deceased person and the initial conditions of the household. Nevertheless, the loss of adult members, especially heads and spouses, may have longer run impacts not measured in the relatively short three-year period of this analysis, such as the loss of inter-generational knowledge in terms of farming skills and knowledge.

Second, the effects of PA death on farm production were sensitive to the gender and position in the household of the deceased. The death of a PA male and female resulted in a 13% and 5% decline in cultivated land, while the death of male household heads resulted in a 21% reduction in land cultivated. Mortality of younger adults resulted in statistically insignificant declines in land cultivation.

One might find it puzzling that the impacts of mortality appear to be larger in the case of male mortality, given that women provide most of the labor input into agricultural production. However, in about 33% of the cases among households experiencing male head of household mortality, the widow ended up cultivating substantially less land in 2004 compared to pre-death levels in 2001. This could be due to loss of land, capital and livestock assets to other relatives after the death of their husband. We also find that relatively wealthy widow-headed households are particularly vulnerable, as they have more land and assets that can be claimed by relatives than afflicted households that are poor to begin with. Household that were relatively wealthy in 2001 and then lost their household head faced more severe declines in land cultivation and cattle assets. The implication of this finding implies that the responses to mitigating the social and economic impacts of HIV/AIDS in Zambia may not be successful if they ignore the gender inequalities that exist in terms of land access and other productive assets important for rural livelihood. Therefore, efforts to safeguard widows' rights to land and productive assets through changes to traditional inheritance institutions through educational programs involving local community authorities may be an important component of social protection and poverty alleviation strategies in this era of HIV/AIDS.

Third, in contrast to the widespread view that households experiencing prime-age mortality cope with the reduction in family size by switching to labor-saving crops such as roots and tubers, the results show positive but statistically insignificant effects on the cultivation of these crops except among households experiencing the death of non-head/spouse females. The death of other adult women in the household results in a 5% decline in area under roots and tubers. Afflicted and non-afflicted households had virtually identical effective dependency ratios (the ratio of children, elderly and chronically ill adults divided by the number of healthy PA adults) in the 2004 survey. These findings indicate that afflicted households are not necessarily more labor-constrained or more likely to increase cultivation of labor-saving crops than non-afflicted households. While some studies have identified HIV/AIDS as a contributing factor in

the rise of labor-saving root and tuber cultivation in Zambia as well as other parts of southern Africa, it is important to take into account other exogenous factors contributing to changes in crop mix. Recent agricultural policy changes in the region associated with structural adjustment and food market reform have affected the relative output/input price ratios for grain crops relative to roots and tubers, reducing the profitability in some areas of grains as compared to roots and tubers (Jayne et al., 2005). This example highlights the importance of properly controlling for other factors when assessing the impact of HIV/AIDS on rural livelihoods to avoid spurious conclusions. These results suggest that for afflicted households as a group, the loss of family labor due to a death in the household may not necessarily mean that agricultural labor becomes the limiting input in agricultural production (any more so than capital assets, for example, which are likely to be drawn down due to foregone income, medical treatment, and funeral expenses among afflicted households).

Fourth, the macro-level picture emerging from recent demographic population projections, which include the impact of AIDS-related deaths, demonstrates that although the epidemic will reduce life expectancy and population growth considerably in the hardest-hit countries, the epidemic has not caused a decline either in the aggregate labor supply or in the labor-to-available-land ratios in agriculture. In fact, between 1990 and 2000, the rural population of Zambia has grown at a considerably faster rate than the overall population – 43.6% vs. 33.9% according to the 1990 and 2000 national population censuses. Therefore, prioritization of public sector investment in the development and dissemination of technologies aimed at mitigating the effects of prime-age adult mortality ideally requires in-depth evaluation of household- and community-specific constraints and opportunities, as well as consideration of the need for balance between investments in long-term rural economic productivity growth and targeted assistance to both afflicted and non-afflicted households. Assessing which labor-saving technologies to prioritize should involve investigation of the characteristics of affected households, whose labor time is most constrained, the productivity impacts of these technologies, and the overall

payoffs from alternative allocations of public resources across sectors.

Fourth, in terms of value of crop output and gross output per hectare, the results do not strongly support the contention that households incurring prime-age death suffer large declines in crop output -- except among initially poor households experiencing the death of a male household head. Among this group of afflicted households, the gross value of crop production per hectare declined by 19% relative to non-afflicted households. There is evidence to suggest that wealthier households incurring male head-of-household death attract boys and other males to join the household, while initially poor households have greater difficulty in doing so. This finding supports the need for creating or and/or strengthening community-based networks to assist poorer households experiencing mortality of household heads and spouses. Government and interested donor agencies may also assist with agricultural extension programs to reach afflicted poor households in order to strengthen their capacity to cope with the loss of prime-age core members.

Fifth, the value of cattle assets appear to suffer greatly from the death of a PA male head of household whilst the impacts of death of other prime-age members are negative but not statistically significant. Afflicted households appear to liquidate small animals as the first line of defense to mitigate the impact of PA death. The sale or liquidation of cattle is a more extreme coping mechanism, as it may compromise the household's future livelihood (Stokes, 2003). Cattle assets are not only a stock of wealth but are also an input into agricultural production (through draft power for land preparation). Fortunately, adult mortality is not associated with significant declines in cattle assets except in the case of male household head mortality, which indicates the relative severity of impacts in this case. Another reason why households experiencing male head-of-household death show a significant decline in cattle assets is that property of the deceased man (including cattle) is often redistributed to the man's relatives.

Sixth, in contrast to the general assumption that HIV-related mortality is typically associated with household heads/spouses, the survey findings show that only 36.6% of households with PA

death incurred household heads/spouse death. About 30% of all the disease-related PA mortality reported in this nationally-representative rural longitudinal survey involved chronically ill persons who joined the household after the first survey – presumably to receive terminal care. While all adults are likely to make important contributions to their families, both materially, in their roles as nurturers and teachers, and in less tangible ways, it appears that the most severe economic effects occur when the death is the household head or spouse. The fact that less than 40% of the prime-age deaths observed in Zambia’s rural areas involved a household head or spouse suggests that the potential magnitude of rural PA mortality on rural household agricultural and off-farm incomes and orphaning rates -- while still very serious -- may be somewhat less severe for many households than often suggested in the conceptual literature on this topic.

CONCLUSIONS: The results of this study question the usefulness of a homogeneous conceptualization of “afflicted households,” especially in the context of proposals for targeted assistance, technology development, and other programs/policies. In most cases the gender and household position of the deceased and the initial (pre-death) conditions of the household strongly conditions the impacts on the household.

Overall, these findings indicate that poorer households headed by HIV/AIDS widows are in especially precarious positions. This would imply that AIDS mitigation programs should target their scarce resources particularly toward widow-headed households, especially those that were relatively poor to begin with.

A few caveats of this study are in order. The findings from this study only measured short run effects of prime-age mortality between April 2001 and April 2004 on a few aspects of Zambia rural farm households. Future research studies need to be designed in order to measure full long-run effects of prime-age adult death. This would entail tracking affected households over a long time frame.

Endnotes

¹Using prior death and age group-specific drought shocks as instruments for prime-age deaths’ between 2001 and

2004, the Hausman-Wu chi square test for endogeneity shows that indeed death variables are endogenous for pooled OLS models. However, after differencing out the time-invariant unobserved characteristics, the Hausman-Wu test indicates that the endogeneity problem is addressed and that OLS estimation using household fixed effects is appropriate. See Chapoto (2006) for details.

*This *Policy Synthesis* is a condensed from a FSRP Working Paper 15 by the same name. The full working paper in PDF form may be downloaded from: www.aec.msu.edu/agecon/fs2/zambia/index.htm

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