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**Prime-Age Adult Morbidity and Mortality in Rural Rwanda:**

**Which households are affected and what are their strategies for adjustment?**

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## **Prime-Age Adult Morbidity and Mortality in Rural Rwanda: Which households are affected and what are their strategies for adjustment?**

### **Abstract:**

*In Rwanda for the past decade, rural households have lived with civil unrest and genocide, changing land laws, large population flows both into and out of the country, and climatic threats with droughts and floods. The illness and untimely death of prime age adults from a number of health problems (increasingly HIV/AIDS) adds to the stress of these households and has lasting effects on the ability of households to survive. In this research, the authors use household and member level survey data to increase understanding about what is happening in households with such shocks and how they may be different from other Rwandan rural households.*

*This research finds that households affected by adult illness and death strive to maintain their agricultural production, and work to avoid selling assets, yet some households appear to be in a downward spiral, losing assets and income earning potential. They rely heavily on social networks for labor and skills, but clearly these networks will be stretched beyond their means in any continuing epidemics. Female-headed households in particular struggle to find labor with neighbors or work more themselves. If special programs are developed for the affected families, focusing on increasing land and labor productivity fits into their own strategies. Since households with prime age death and disease appear to be similar to other Rwandan households in the poorest two quintiles, such programs would be beneficial to rural households in general, and possibly strengthen social networks through generalized agricultural and income growth.*

**Keywords:** adult morbidity, adult mortality, HIV/AIDS, agricultural development, Rwanda

### **1. Background and objectives**

Farmers in Rwanda have had to deal with many shocks in recent years. Increasing civil unrest in the early 1990s led to intense conflict in 1994, with large numbers killed, others fleeing into exile or returning after years of exile, and still others facing uncertainty in land use rights. Extreme pressure on the land with the highest population densities in the region contributed to the problems. Adding to the stress are climatic variations with partial drought in 1999/2000. Malaria, tuberculosis and dysentery are now joined by HIV/AIDS as health related risks for farm households, hitting prime age working adults as well as elderly and children. With an estimated

HIV infection rate between 8.9% (UNAIDS 2002) and 11.2 % (Ministry of Health, 2001) of the adult population, Rwanda is facing the loss of thousands of prime-age adults in the coming years. This work is focused on the effects felt by the households when a prime-age member is chronically ill or dies, and the strategies households develop to adjust to the shocks and stress.

Researchers have posited many possible effects or potential interventions to assist households under stress from prime age adult death and illness (Gavian 2002; Gillespie and Haddad 2002), but there is no systematic and representative empirical study in Rwanda that examines which households are most affected and how they respond in their cropping and related livelihood decisions. In a recent address for researchers, Whiteside (2002) emphasized the need for sector-based case studies to understand household and community dynamics under HIV/AIDS. The public and private sectors can develop programs that do not undermine, but rather support, the household's own adjustment strategies along with the community responses.

## **2. Data and methodology**

Over the period 2000 – 2002, collaboration between MINAGRI and MINECOFIN has produced four surveys with overlapping samplings for 1395 rural households.<sup>1</sup> First, FSRP/DSA production and land use survey, for basic cropping and harvest information on a seasonal basis was conducted 2000-2002. Next, FSRP/DSA Demographic survey was conducted in February 2001 covering all household members. The FSRP/DSA rural labor and death history survey (RLDS) that was conducted in March/April 2002, is described below. Finally the Household Living Standards Survey, known as the EICV, its French acronym, a large-scale multiple module survey covering income, expenditures, child anthropometrics and other aspects was conducted in 2000-2001.

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<sup>1</sup> See Donovan et al, 2003 for further information on the methodology and results.

Based on Michigan State University research in several countries in the region, the RLDS was designed to ask about the prior four years' history of mortality and recent (past twelve months) morbidity of each household member, the effects of both adult morbidity and adult mortality and the strategies to respond to the effects on agricultural and livestock activities, as well as non-farm income activities.<sup>2</sup> The combination of data on each household provides an unusual opportunity to improve understanding of how rural households in Rwanda respond to illness and death, particularly the effects on household labor and land allocations and the impact on household income and food security.

Adults between the ages of 15 and 60 are termed “prime-age” adults for they are in their most productive working years, when they can most contribute to labor and income in the rural households. When these prime age adults become chronically ill, they change from productive members to members requiring care and medicines. With death, funerals add expenses, but even more profound can be the effects of loss of labor and skills of core members. We use “chronically ill” for those people who have been unable to work for at least three of the previous twelve months.

### **3. Documenting the changing composition of households**

Unlike many countries in sub-Saharan Africa, Rwandan household structure tends to be based on nuclear families consisting of father, mother, and unmarried children (ranging in age from birth through mid-twenties or early thirties) and possibly grandparents. Hence, the loss of prime-age adult labor due to death and/or chronic illness can have important consequences for household income and food security, particularly in households where the children are still

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<sup>2</sup> The sample retention rate was 96%. Of the 64 households not retained, at least 50 were found to have left the sample for reasons unrelated to death or illness and 6 were related to a death. By not including the households that may have dissolved due to a death, this research cannot compare those households that dissolved with those that are still surviving.

young. In this sample, households in 2002 had an average of 2.6 prime-age adults, so that losing one prime-age adult means losing one-third of the most active labor available to the household.

Based on the four year recall, and using only the 1231 households in the combined sample, 15% of the households suffered a death; 5% of the households had a prime-age adult illness death (Table 1)<sup>3</sup>. Another 8% of households had a prime-age adult suffering from chronic illness during 2001/02. Only one case in our sample was a household with two prime-age adult deaths related to sickness and disease. Thus, here we do not capture the households losing both male and female partners in the period covered, although some of those households leaving the sample may have lost both spouses, leading to a household dissolution (part of continuing research).

#### **4. Demographics of the prime-age adults who died and those who are chronically ill**

Evaluating the basic characteristics of the prime age adults who died during the period of recall or were chronically ill shows that they are similar to other rural adults in the sample, regarding age, education level, and primary activity (agriculture) (Table 2). Most of the prime-age deaths due to illness were either heads of households, their spouses, or adult children of the head. The household heads who died tended to be older (average age of 43 years, with males at 45 years) and 57% of the cases were between 35 and 60 years of age. About 21% of the adults who died were between 15-25 years old. The period of illness for those that died averaged 23 months prior to death (Table 2), a long period during which care had to be provided and medicines sought. The long duration is characteristic of HIV/AIDS. For those with a current chronic illness, the enumerator only asked about the most recent twelve-month period, with an

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<sup>3</sup> At least 6 of the households not retained in the FSRP sample over time experienced an adult death, thus this number underestimates the actual prevalence of adult death in the original 1395 household sample.

average of 5 months of inactivity found. The majority of those with current chronic illness are women (72%), although deaths showed an even gender split.

## **5. Effects on households and adjustment strategies of prime-age death and chronic illness**

In the literature, many researchers have posited a range of effects on agriculture of adult mortality in general and specifically due to HIV/AIDS, including loss of agricultural labor and skills and dedication of human and financial resources for caring for the ill and paying for funerals (eg., Gillespie and Haddad 2002; Gavian 2002). Recently household studies have begun to appear that attempt to measure the actual effects for rural households (eg. Yamano and Jayne 2002). Since only a short panel dataset was available in this case to actually measure change over time, surveys were designed to allow enumerators to ask the household members to reveal their perceptions of the effects and how they dealt or were dealing with them. For each adult death and each chronically ill adult, the households were asked about how the death has affected the household with regard to agricultural and livestock activities, other income generation, savings and debt, diet, and the effect on children. The interview then focused on the strategies that the household has adopted to adjust to the effects on cropping and livestock. In this paper the focus will be on the agricultural sector effects and adjustment strategies.

### **5.1 Effects of mortality**

The survey methods used allow for identifying death from illness. Evaluating separately death due to illness from other causes of death is important for several reasons. As shown above, a person may be ill for months prior to death, such that the adjustment occurs over time. The shock to the household is not as abrupt as with an accident or murder, for which a household is ill prepared. Illness may give the household force the household to shift consumption and

production, such that the effects are distributed in time. Unfortunately, though, the overall effect on the household may be severe as assets are sold and other actions taken which result in a permanent decline in livelihoods. With HIV/AIDS, the illness and death of one member may be a precursor of other deaths, threatening the survival of the household and so adjustment strategies may vary. Some of the strategies that are seen here reflect a decline in the household likely to lead to dissolution.

Looking at the cases where a prime-age adult died of illness, more than half (59%) of the households indicated that the main effect was reduced farm labor, with another 9% indicating reduced farm skills and 6% indicating having lost access to land. In one quarter of the households, members indicated that there were no effects on cropping or livestock, but in most cases, the deceased did not have agriculture as a primary activity or the person had been inactive for at least one year.

### **5.2 Effects of morbidity**

When asked about how the prime-age current chronic illness affected the household over a range of aspects, the results were qualitatively similar to the responses on the effects of an adult death due to illness. The most important cropping and livestock effect was to reduce labor. There were 2 households who indicated that they had lost land and another 2 indicated reduced knowledge or skills due to illness. About 17% of the households indicated that there were no effects, generally when the illness was long lasting or the person was not primarily in agriculture.

### **5.3 Strategies for adjusting to a mortality or morbidity among prime age adults**

There were 63 households with a prime age adult death who indicated their adjustment strategies related to agricultural and livestock activities. Each household could respond with up to three strategies. The most important strategies were related to trying to maintain labor time in



the cultivated fields, by reducing their own leisure time or working more in the fields (14%) or by seeking labor sharing with other households (11%). To retain labor intensity in fields, about 11% indicated reducing the quantity land worked or leaving some land fallow (Figure 1).

Regardless of the sex of the person who died, households seemed to struggle to maintain their production by somehow replacing the labor lost. When a woman died, households were more likely to seek new members than when a man died. Renting out land was selected more frequently than selling land (13% of households compared to 5%, respectively). Asset sales (other than land) were found in 5% of the cases of an adult death. Very importantly among the other strategies, only 1 household indicated switching to less labor-intensive crops as the primary strategy, a commonly hypothesized strategy. Seeking funds for loans or gifts was another way to get income to pay expenses. In general, strategies to increase the flow of funds through sales, gifts, renting land, or loans were used by 34% of households overall. Most of those strategies (with the exception of renting out land) are short-term responses to the need for funds, but these strategies may reduce the income or survival prospects in the longer run.

In the 103 (95 in the joint FSRP/EICV data) households with a chronically ill adult, most of the chronically ill adult members are or were primarily involved in agricultural activities, such that the effects to the crop and livestock can be quite strong. As with a death, the most common strategies involved trying to increase the availability of agricultural labor, through hiring in labor, or working more hours in the field (Figure 2). When it is a woman member who is seriously ill, about one-fourth of the households indicated hiring labor and another 17% indicated cultivating less land. When it is a male member who is ill, working more hours in the field is more common (19%), along with seeking to share labor from other households (19%). When men are ill, there is also a greater tendency to sell assets (land and livestock) than when women

are ill. The lack of hiring in labor when the man is ill may indicate the lack of resources available for family members to hire in labor, particularly if the man had off-farm income.

Few households with a chronically ill member indicated shifting to less labor-intensive crops (only 2 households). Across the households, about 15% of households used strategies that involved selling assets, sometimes combining livestock and other asset sales. If households use these strategies when there is a chronically ill member, it is likely that they would have little recourse to them once that member dies, thus setting the stage for declining livelihoods.

## **6. Assessing Differences Among Households**

With the 1994 genocide and the high levels of poverty in Rwanda (73% of the rural population live below the poverty line, according to EICV estimates (MINECOFIN, 2002 #9)), a key question is whether or not households affected by death, especially prime-age death, or prime-age illness are different from other households in terms of poverty or other characteristics. Given some of the strategies indicated above it would be expected that some differences would appear. Table 2 presents preliminary results. One notable difference between the overall sample and those with a prime-age adult death is the proportion of female-headed households and widows. Rwanda has a relatively high percentage of female headed households (34 % in 2002) which is up from 22 % in 1984 (MINAGRI, 1985), pre-genocide and pre-HIV/AIDS. Yet women currently head more than half of the households with an adult mortality. Of households with current chronic illness among adults, the households tend to be married households with a male head (67%), even though the majority of people ill are women.

Households with a prime-age adult death due to illness show important differences from other households. These households are more likely to be in the two poorest quintiles (Table 1). Mean expenditures of 50,000 Rwanda francs per year per adult equivalent for those with a prime

age death due to illness are lower than the 66,000 Rwandan francs for most households, but the difference is not significant given the high variability. There are no significant differences in total land area or cultivated area among the different groups.

Households with a chronically ill adult tend to be poorer, with 46% in the lowest poverty level. As above, they have about the same average land area and land area per adult equivalent as found in the overall rural population. While the average expenses per adult equivalent are relatively high, these households are more likely to be in the lowest two expenditure quintiles than occurs with the overall population (Table 1). Given strategies that include selling productive assets, leaving land fallow and cultivating less land, income will be reduced.

## **7. Conclusions**

Given the growing health problems from HIV/AIDS and other major diseases, to understand what is happening to agricultural production and to rural households, policymaking organizations and others need to know how rural households deal with mortality and morbidity. This work was based on a set of surveys which provide a range of information necessary for multi-sectoral household analysis. While this preliminary report focuses on agriculture, further work will be done with other aspects.

On the agricultural side of household activities, the loss of labor is the most important identified effect, and many of the identified adjustment strategies seek to bring labor into the household, either through reduced leisure, sharing labor with neighbors, hiring in labor, or in the case of a woman's death, bringing in new household members. Rather than reducing the labor dedicated to cropping and switching to less labor-intensive crops, we find that the households indicate that they are seeking to maintain their production. An important implication of these findings points to the need for improving land and labor productivity for these households, using

fertilizers and other productivity enhancing technologies. Increased agricultural training and extension could also contribute to the efforts of the household to keep producing.

There are households that sell assets, including land and livestock. Another implication of the findings is that more specific work is needed to understand and mitigate the negative effects of such strategies. Some households indicated losing access to land. When productive assets are decreased, the likelihood increases of a downward spiral into greater poverty or dissolution of the household. Also, men who die are more likely to have had an income-earning primary activity, leaving the widows with a decline in other income. Here we find that household with a prime age death due to illness are more likely to fall into the lowest poverty level, based on EICV estimates with reduced household expenditures. Rather than the higher income, urban, and more mobile population found during the initial wave of HIV/AIDS, these findings identify both deceased and ill prime age members of poorer households in rural areas. As more households in these communities are affected, the social networks used to survive will become stretched beyond their capacity. Additional analysis is planned to sort out these important issues. Given the differences between strategies chosen in cases of illness and those in cases of death due to illness, future research should seek to identify the interventions and the appropriate time to assist families so that they can avoid adopting the strategies with long term damaging effects on livelihoods.

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**Table 1 Characteristics of rural households, including those with a prime age chronically ill person, or with a prime age adult death due to illness**

Characteristics of the households	Units	Household category		
		HHs w/o chronic illness or death (all ages)	HHs w/prime age chronic ill	HHs w/prime age death due to illness
		(A)	(B)	(C)
<b>Number of households (cases)</b>				
Number of households <sup>1</sup>		1074	95	67
% of estimated population (using population weights)		76	8	5
<b>Average household value</b>				
Household Adult Equivalents	Ae	4.6	5.1	4.7
Total land area	Ha	0.9	0.9	0.8
Cultivated land area	Ha	0.7	0.7	0.6
Total land area per adult equivalent	ha/ae	0.2	0.2	0.2
Cultivated land per adult equivalent	ha/ae	0.2	0.1	0.1
Number of cattle	number	1.5	0.5	1.3
Deflated expenses per adult equivalent	FRw	66224	71862	49807
Food expenditure	FRw	175127	190028	152835
Non-food expenditure	FRw	86301	92308	69890
Household health expenses <sup>2</sup>	FRw	1335	0	2387
<b>% of households</b>				
Households in lower two expenditure quintiles		38	44	55
Households in lowest poverty level		40	46	55
Households with a member working for wages		27	24	24
<b>Characteristics of the Household heads in 2002</b>				
Age	Years	45	45	41
% female	%	32	28	55
% never attended school	%	46	39	38

Source: FSRP/DSA Rural Labor and Deaths Survey, 2002, and MINECOFIN Enquetes Nacionales des Menages sur les Conditions de Vie 2002/2001.

Notes: <sup>1</sup> Out of 1395 households in the combined EICV and FSRP/DSA sample, only 1231 had the information needed for inclusion in this table; 5 households have both prime age death and illness. About 15% of households experienced a death, including infants, children and elderly.

<sup>2</sup> None of the households with current prime age illness had any health expenditures in the EICV. In households with prime age death due to illness, only two households had any health expenditures.

**Table 2: Characteristics of deceased and ill prime age adults<sup>1</sup>**

	Prime age adults who died from illness			Prime age adults who are/have been chronically ill			Other prime age adults		
	Male	Female	All	Male	Female	All	Male	Female	All
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Average Age (in years)	40	35	37	37	36	36	28	29	29
Average Age of those who are heads or spouses (in years)	45	41	43	44	39	40	38	37	38
People in the 15-24 age group (%)	17	24	21	26	28	28	52	48	50
Education level:									
People with incomplete primary (%)	46	42	44	42	38	39	47	42	44
People with complete primary or higher (%)	20	22	21	29	26	27	29	24	26
Months unable to work <sup>2</sup> (months)	28	21	23	5	5	5	na	na	na
Household head or spouse (%)	64	42	53	71	79	77	45	51	48
Primary activity in agriculture (%)	78	79	79	71	81	79	72	81	77
Primary activity is income earning, non-agricultural (%)	20	7	13	13	0	4	7	2	4
Sample counts <sup>3</sup>	36	37	73	31	81	112	1867	2362	4229

Source: FSRP/DSA Demographic Survey 2001 and Rural Labor and Deaths Survey, 2002.

Notes:

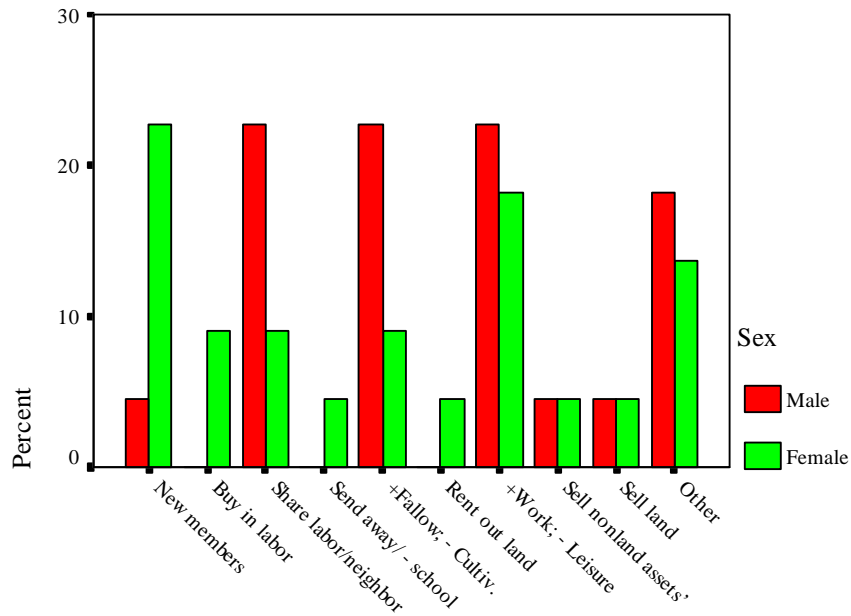
<sup>1</sup> Figures are based on valid responses to survey questions. This may be less than the sample count.

<sup>2</sup> For those who are deceased, the recall period was 48 months; for those who are currently chronically ill, the recall period was 12 months.

<sup>3</sup> This table is at the member level and uses the full set of 1520 FSRP households.

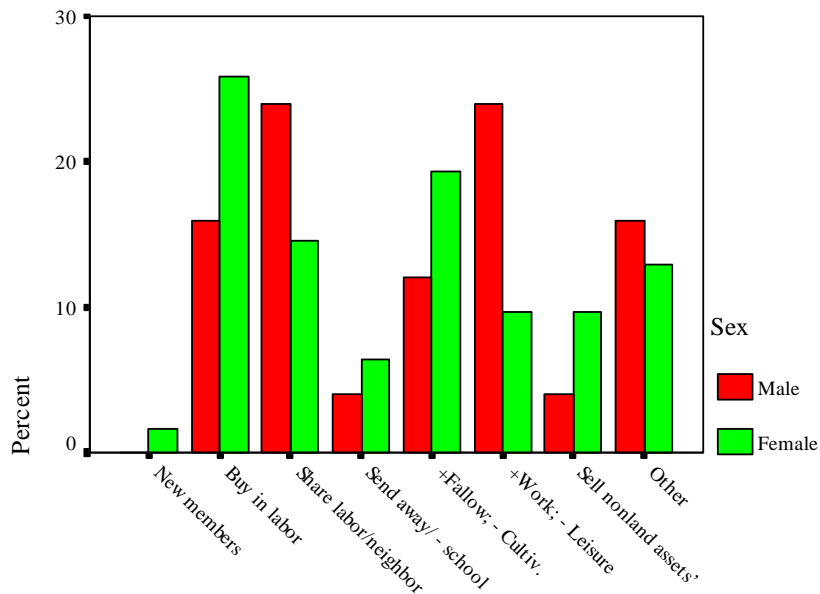


Figure1: Most important strategies for households with a deceased prime age adult, for those households with strategies, by sex of person affected



Most important strategy for agriculture and livestock

Figure 2: Most important strategies for households with a chronically ill prime age adult, for those households with strategies, by sex of person affected



Most important strategy for agriculture and livestock

Source: FSRP/DSA Demographic Survey 2001 and Rural Labor and Deaths Survey, 2002.