

Full Length Research Paper

Sustainable Agriculture for Health: A Study on Cassava and Sweet Potato Production in HIV/AIDS Affected Smallholder Farms in Zvishavane, Zimbabwe

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This study explored the role of cassava and sweet potato, promoted by the NGO Africare, as a labour saving mitigation strategy in AIDS affected and drought prone Zvishavane District. The study focused on the impact of AIDS on livelihood assets, the current food production and food security, household income, and household coping strategies. A case study among 16 households was conducted. There was a low production of sweet potato whilst cassava was hardly grown, despite the strong promotion of both crops because of their labour saving effects. There was no significant contribution of these crops to food security and income. The households continued to lose productive assets to meet medical expenses and food requirements after the introduction of these crops. The sweet potato cultivation also increased the workload of women who were already burdened with the care giving role. It was recommended to support sweet potato production, which HIV/AIDS affected households are familiar with, to strengthen the community initiative of bartering with maize to meet their food requirements.

Keywords: Food security, HIV/AIDS, sustainable livelihood framework, Zimbabwe

INTRODUCTION

Although the high HIV prevalence rate in Zimbabwe has declined from 33.7% in 2001 to 13.7% in 2009 (ZDHS, 2005-2006), HIV/AIDS is still threatening rural livelihoods due to morbidity and mortality of the productive age group (15-49). The Zimbabwe Demographic Health Survey (ZDHS) 2005-06 showed the impact of the epidemic on gender with a higher number of women living with HIV; in the age groups 20-24 16.3% and 25-29 28.8% against 5.8% and 13.1% for men. The high adult mortality rate associated with HIV/AIDS has greatly contributed to the

increase in the number of orphans from 780,000 in 2001 to one million in 2008.

Food insecurity, poor asset base and low income for HIV/AIDS affected households reflect the wide range of the socio-economic impact of AIDS. Rural households have developed strategies to avert the impact of AIDS. However, their responses show a trend towards household asset depletion. A recent study conducted in Zimbabwe revealed a decline in the area under crop cultivation for AIDS affected households. This decline is considered a response to shortage of labour, lack of inputs and draft power caused by caring for people living with AIDS (PLWA) (Mutangadura and Sandkjaer, 2009). This study confirms Topouzis' indication (2003) that 'HIV/AIDS affected households tend

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to change their cropping patterns, shifting to crops that are less labour intensive, have shorter lengths of time for returns, and require less capital inputs'.

Among development efforts to reduce household vulnerability to the impact of AIDS, cassava and sweet potato production has been promoted as one of the labour saving technologies for households experiencing diminished labour supply (Mutangadura and Sandkjaer, 2009). The non-governmental organisation (NGO) Africare has promoted the cultivation of these crops in Zvishavane district in partnership with the International Fund for Agricultural Development (IFAD). Wiegers (2008) highlighted that the agricultural sector has an important role in reducing the spread and impacts of HIV/AIDS contributing to poverty alleviation in rural areas. The introduction of cassava and improved varieties of sweet potato are initiated to improve household food security and income. In addition, these crops are drought tolerant and require low external input compared to the staple crop maize. The objective of the study was to explore the contribution of cassava and sweet potato production to food security, household income and asset building of HIV/AIDS affected households.

METHODOLOGY

Study area

The study was conducted in Zvishavane district which is a drought prone area located in Midlands Province, Zimbabwe. Africare promotes the production of cassava and sweet potato as a mitigation strategy. The main staple crop grown is maize. The area receives moderate rainfall of 450-650 mm per annum, characterised by mid season dry spells which makes it marginal for maize production (FAO, 2006). The Midlands province had a HIV prevalence rate of 16% (CSO, 2007).

Selected households

Purposive sampling was done to select specific respondents for reasons of comparison. It was assumed that the impact of the intervention depended on stage of disease. Sixteen in-depth interviews were conducted among four smallholder farming household categories: 3 non-affected households (NA); 6 affected households but no deaths (AF); 3 households that were affected and had experienced death of family member(s) (AD); and 4 households caring for orphans (OR). All the households interviewed were previously targeted and classified vulnerable in the cassava and sweet potato intervention.

Data collection

All households were visited once, and household heads were interviewed. Participatory appraisal tools were used to visualise the cropping system of a household and to picture the annual availability of food.

Two extension workers and one representative of the Midlands Root and Tuber Association were interviewed as key informants. The extension workers were selected on the basis of their collaboration with Africare during the project implementation; the latter because the Midlands Root and Tuber Association is a farmer organisation set up to market cassava and sweet potato, and related products.

Data analysis

Data was clustered according to the four household categories. The sustainable livelihood framework was adapted for data analysis on the socio-economic impact of AIDS on households as well as the impact of cassava and sweet potato intervention on asset building. The socio-economic impact of AIDS was analysed under the five livelihood capitals. The livelihood outcomes in the framework were food security and income which showed the contribution of cassava and sweet potato. Ultimately the cassava and sweet potato intervention was assessed against the influence it had on the livelihood assets. You can find it in table 1 below.

RESULTS AND DISCUSSION

Household characteristics

Female headed households cared for a higher number of orphans than the male headed households. The male headed households had larger household sizes in comparison to the female headed households. Although OR households were all female headed and NA male headed, they resembled AF and AD with respect to the number of orphans and household sizes. You can find it illustrated in table 2

Vulnerability Context

The study showed a combined impact of drought and HIV/AIDS on household food security in Zvishavane district. The extensive dry period in the 2009/10 cropping season contributed to the poor maize harvests whilst HIV/AIDS related morbidity and mortality affected the

Table 1. Adapted Sustainable Livelihood Framework

Component	Aspects considered in data analysis
Vulnerability context	Drought, HIV/AIDS
Livelihood assets	Financial- loans, savings, income sources and expenditure patterns Natural – land (area under cultivation and crops grown), forests, fertiliser use Human – illness or death of household member, orphans, education Social – caring for orphans, membership in farmers association and other social groups, linkage to organizations working in the community Physical- farm implements, housing, livestock
Transforming structures and processes	Africare, other NGOs, Government
Livelihood strategies	Migration Cropping and livestock rearing Off-farm activities
Livelihood outcomes	Food security and improved income

Table2. Household (HH) categories and their characteristics

	HH head	N	Average HH size	Average no. of orphans	No. of persons chronically ill	Average cattle ownership
NA	male	3	8	0	0	10
AF	female	3	4.3	2.3	1	1
	male	3	5.3	1.3	1	0
AD	female	2	4	2	0	3
	male	1	6	0	0	4
OR	female	4	4.8	3.3	0	1

NA=non-affected, AF=affected but no death, AD=affected and death, OR=caring for orphans

purchase of adequate inputs, contributed to loss of draft power and loss of agricultural labour. The adult HIV prevalence rate of 16% in Zvishavane district at the time of study (2010) was higher than the country's estimate of 13.7% in 2009. The high adult HIV prevalence rate in the district is a clear indication that several households have succumbed to the impact of AIDS increasing household vulnerability.

The shorter growing seasons associated with droughts increase the households vulnerability to loss of labour as the timing of agricultural operations becomes less flexible (Barnett and Grellier, 2003). Drought was reported to have caused the drying out of cassava cuttings resulting in poor establishment of the crop in the district. Hillocks *et al*, (2002) highlighted that though there is evidence of cassava production expansion into the semi-arid areas, the available germplasm is mostly adapted to the lowland humid tropics. Therefore, the potential of the cassava intervention to improve food security and income of the HIV/AIDS affected households was greatly limited due to the persistent dry conditions.

Impact of AIDS on livelihood assets

Financial

The study showed no difference between households in AF and AD. AIDS related illness and death caused distress sale of livestock which included poultry, goats and cattle. However, funeral expenses caused further sales of livestock for AD households. It was indicated that cattle sales were the last option when all other sources of income were depleted. AF and AD households sold farm implements and household items such as radios, kitchen utensils, beds, clothes and blankets for transport and medical expenses. Chronic illness caused loss of formal jobs; abandonment of labour intensive activities such as brick moulding and crocheting. The increased expenditures on food and education for households caring for orphans contributed to increase in livestock sale. The sale of livestock by NA households contrasted the sale by HIV/AIDS affected households in that the proceeds were invested in building houses and agricultural inputs.

Social capital

HIV/AIDS affected households had limited support from close relatives and neighbours, and concurrently experienced exclusion from community groups. HIV/AIDS affected households hardly had support from relatives and neighbours which reflected socio-economic burden caused by the epidemic on the rural communities. David and Li (2010) stated that 'HIV/AIDS poses a considerable burden on traditional networks, coping mechanisms and social safety nets especially pertaining to care for orphans or the sick'. Households with chronically ill persons were shunned by neighbours who limited their assistance. In addition they faced exclusion from Lending and Savings clubs because of failure to pay back loans in time. This resulted in loss of access to loans and eventually led to the sale of livestock to meet food, medical or education expenses. Loss of labour caused limited participation in community horticultural projects by households caring for the chronically ill as well as non involvement in community decision making processes. The study also revealed women relocating to stay with their parents for care after their husbands' death resulting from HIV/AIDS related illness.

Human capital

Labour for both agricultural and non-agricultural activities was lost through illness, reallocation of labour to care for the sick and caring for orphans. The loss of labour was not homogenous across HIV/AIDS affected households. Female headed households had the highest losses. This could be attributed to the higher numbers of orphans demanding care as well chronic illness limiting individuals' ability to work. According to Mutangadura and Sandkjaer 2009, the smallholder farming households were highly vulnerable to the impact of HIV and AIDS because they use family members as the main source of labour. Secondary school education was a great challenge for AF, AD and OR households who responded by withdrawing children from school, especially girls. The withdrawal of girls from school compromise future livelihood options and give them a low socio- economic status, an indication of how the epidemic exacerbates gender inequality.

Natural Capital

All households interviewed indicated access to land for cultivation. However all HIV/AIDS affected households highlighted that the area under cultivation had progressively declined due to loss of labour, loss of draft power and inability to purchase inputs. The customary law was found to limit access to land for chronically ill female

headed households who had relocated to their parents for care.

The study also revealed an increased reliance on firewood as a source of income and forests close to the homesteads were heavily deforested. Orphans in the OR households participated in firewood collection and sales in order to buy food or pay school fees. The increased reliance on firewood in exchange for maize or cash by HIV/AIDS affected households is not sustainable and might not be an option in the near future. The households would need sustainable ways of getting income.

Physical capital

Distress sale of livestock, farm implements, household items and agricultural inputs indicated the desperation of HIV/AIDS affected households to meet medical costs, funeral expenses and food requirements. The loss of productive assets was indicated as progressive worsening with the length of period a household cares for a chronically ill member and severity of food insecurity. Loss of physical assets impoverishes households and undermines food production indicating HIV/AIDS as exacerbating poverty (Mutangadura 2005).

Food production and food security

Area under cultivation and crops grown

The farm sizes averaged 3-4 hectares per household whilst maize occupied the largest area under cultivation (Table 3). Maize remains the most important food crop for all households regardless of the impact of AIDS. Cassava, produced as a boundary crop at homesteads and in community gardens, was scarcely grown by all household categories. Nevertheless, Nweke et al (2004) indicated that cassava is one of the easiest crops that can be grown by HIV/AIDS affected households. In contrast, in Malawi the increase in area devoted to cassava and sweet potato was attributed to the reduction in profitability of maize production other than HIV/AIDS related morbidity and mortality (Jayne et al 2005, Mather et al 2005). In Zvishavane the area under cassava was reported to decline each subsequent year after project completion. No shift in cropping patterns favouring cassava was observed. However, sweet potato was grown in all household categories.

The OR households had a higher proportion of the area cultivated with sweet potato compared to AF and AD households. The early maturing sweet potato varieties were ideal for alleviating critical food shortages faced by these households.

Table 3. Area under cultivation and percentage of crops grown per household category

Household category	Total farm area per household (hectares)	total area under cultivation %	% of the cultivated area			
			Maize	sweet potato	cassava	other crops
NA	4.0	100	56	8	0*	36
AF	3.0	49	59	6	0*	35
AD	3.0	52	51	6	0*	43
OR	3.0	77	49	10	0	41

*indicates households had cassava but the area was not significant to be expressed in hectares.

AF and AD households had the lowest area under cultivation and this was attributed to labour constraints, insufficient seed, insufficient fertiliser and lack of draft power. These constraints confirmed the results of an earlier study in Zimbabwe which also showed a decline in the area under cultivation for AIDS affected households (Mutangadura and Sandkjaer 2009). The study revealed no difference between AF and AD households in relation to area under cultivation. However, the AF female headed households had the lowest area under cultivation. Wiegiers et al (2006) indicated that smallholder agriculture is vulnerable to the impact of AIDS because it is labour demanding and relies mostly on family labour especially that of women. The NA households cultivated their total farm which was attributed to availability of inputs, draft power, and the ability to hire labour for planting and weeding.

Food availability from own farm production

A timeline was constructed to show the projected time for maize, cassava and sweet potato availability for household consumption. Fifty percent of the affected households had no maize harvests whilst the other fifty percent had the maize harvested expected to be exhausted by the month of October. All AD and OR households had no maize harvests and would need to acquire maize from other sources. Sweet potato became a survival crop for these households and was consumed earlier in AF, AD and OR households compared to NA households. Sweet potato was more important to food availability than cassava. Cassava was available in July-August, a too short a period considering the poor maize harvests. NA households showed later consumption of sweet potato (from May)

which revealed less pressure on current harvests to meet household food requirements (Figure 1). The low quantities for cassava and sweet potato harvested by the HIV/AIDS affected households could not permit storage for future consumption.

The own food production constituted the smallest percentage of food consumed by all HIV/AIDS affected households. The period October to March was reported to have critical food shortages for all HIV/AIDS affected households. It reflected the new variant famine hypothesis where the current food shortages in Sub Saharan Africa were attributed to constraints caused by HIV/AIDS (de Waal and Whiteside 2003). However, the study revealed a positive relationship between female headed households and the quantities of sweet potato harvested. The AF and OR female headed households had higher quantities compared to male headed in AF and AD categories.

Income sources and household responses to food insecurity

October to March showed critical food shortages for all HIV/AIDS affected households. Therefore the AF, AD and OR households employed different strategies in order to meet household food requirements. Due to the inability of HIV/AIDS affected households to exchange goods and services for cash, bartering became an important strategy to obtain maize. Vegetables, firewood and sweet potato were bartered with maize. The OR households bartered with sweet potatoes. Although AD households exchanged firewood with maize the household members had to travel 6-10 km for firewood collection, a strategy which the households with AF did not employ because of labour constraints.

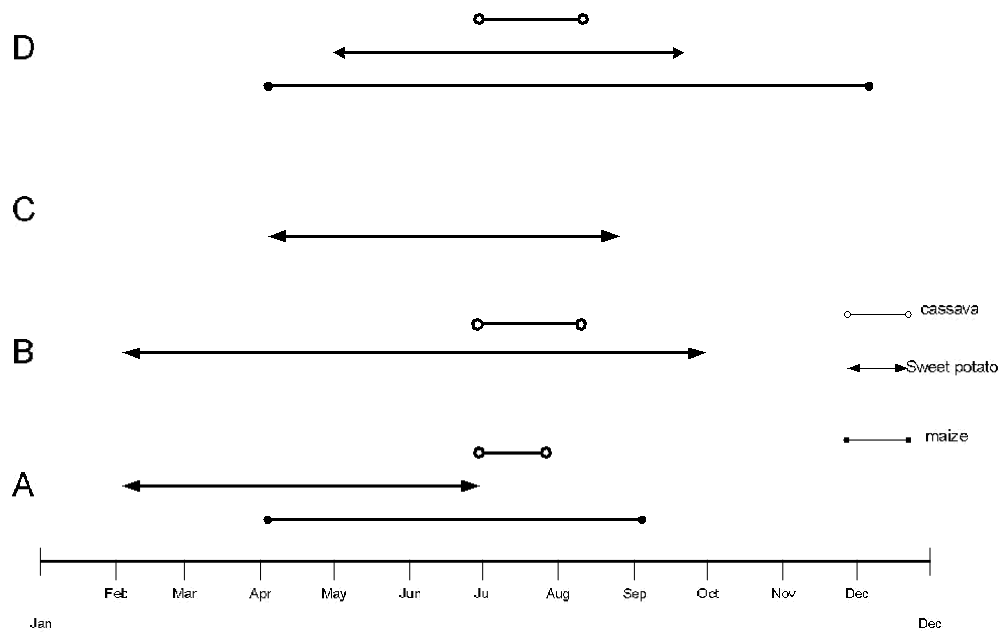


Figure 1. Food availability calendar for maize, cassava and sweet potato at household level. A=affected, B=affected+deaths, C=orphans, D=non-affected

Table 4. Coping strategies' for accessing maize

Coping strategies	AF	AD	OR
Bartering	+	+	+
<input type="checkbox"/> with vegetables			
<input type="checkbox"/> with firewood	-	+	-
<input type="checkbox"/> with sweet potatoes	-	-	+
Sale of productive assets			
<input type="checkbox"/> Livestock sales	+	+	+
<input type="checkbox"/> Sale of farm implements			
<input type="checkbox"/> distress sale of seed and fertiliser	+	+	-
	+	-	-
casual work in exchange for maize	+	+	+
temporary migration			
	+	+	-
food relief			
	+	+	+
sale of manure			
	-	+	-
gold panning			
	-	+	+
sale of craft work			
	+	+	+

Key:
 + indicates the households use the strategy
 - indicates the households do not use the strategy

The AF, AD and OR households also responded by sale of productive assets like livestock. AF and AD household had little options to reallocate labour reallocation. Therefore they risked selling productive assets which made them less resilient. The AF households had the most prominent assets loss reflected by the sale of farm implements, a 'coping strategy' that reveals further impoverishment of the households. Loevinsohn and Gillespie (2003) highlighted that though the impacts are not one time events, they are processes often hidden, slow moving but destructive. Furthermore, sale of farm implements, livestock, distress sale of seed and fertilisers undermines the households' capacity for coping by pushing a household towards livelihood collapse (Masanjala 2007). AF households had distress sale of maize seed and fertilizer. Therefore they risked being caught in a downward going spiral. Although food relief was short-lived it was an important source of maize for all the HIV/AIDS affected households.

Despite labour constraints, AF, AD and OR households exchanged casual labour for maize at the beginning of the cropping season which coincides with the October-March food availability gap. The strategy shortened the time these households devoted to own production and relates to the lower area under cultivation and poor harvests. Table 4 shows the range of coping strategies employed by HIV/AIDS affected households to meet their maize requirements.

Impact of cassava and sweet potato intervention

The low levels of production of cassava and sweet potato limited the crops' contribution to household food security and income. Therefore AF, AD and OR households had to meet food requirements and HIV/AIDS related expenses from other sources. The strategies employed by the households also included destructive ones. Thus, the intervention alone could not significantly preserve the households' assets through its contribution to food availability and income. External forces like drought also limited the crops' potential yields. Drought conditions in Zvishavane were harsh for cassava and sweet potato though they are more drought tolerant than maize. In addition, HIV/AIDS affected households confirmed that cassava and sweet potato production has less labour requirement compared to maize.

The root and tuber association was established for commercialization of cassava and sweet potato. Membership in the association did not contribute positively to the HIV/AIDS affected households because their production did not exceed subsistence level. The distress sale of sweet potato could not sustain education of children especially girls, a situation which compromises future

livelihood options.

CONCLUSIONS AND RECOMMENDATIONS

Cassava was hardly grown by both HIV/AIDS affected and non-affected households whilst sweet potato was grown across all household categories. The low production of cassava and sweet potato limited their contribution to food security and income. Sweet potato was used as a strategy to access maize, however at limited scale.

Households responded to HIV/AIDS related mortality and morbidity in ways which negatively impacted on their crop production, including sale of livestock and farm implements. Sweet potato and cassava were considered to mitigate the impact of AIDS because of the lower labour requirements compared to maize. Sweet potato was revealed as a survival crop for the households caring for orphans when these households face critical food shortages. However, the introduction of cassava and sweet potato also increased the workload of women who were also burdened with the care giving role.

Zvishavane district remains a priority area for food security interventions given the six months food availability gap (October- March). This is the period when the HIV/AIDS affected households are more likely to lose assets due to critical food shortages.

Africare is recommended to target the six month food gap for its food security interventions in Zvishavane district. The organisation should also strengthen the strategy used by HIV/AIDS affected households bartering sweet potato with maize through supporting the availability of planting materials of sweet potatoes. Cognisance of gender roles regarding sweet potato production and flexibility of the roles with the expansion of the area under cultivation would be important. In addition, Africare should collaborate with organisations working on orphans and vulnerable children to support secondary school education of girls contributing towards reducing gender inequality.

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