



Mitigating the impact of HIV/AIDS by labour saving technologies

Authors: K.G. Steiner, GTZ & J. Kienzle, Fatima Ribeiro 2004

Background

The sustained and long-term impact of the HIV/AIDS epidemic is slowly eroding food security and availability, damaging rural livelihoods and exacerbating poverty. The countries with high HIV prevalence are also the countries where the majority of the population lives in rural areas and whose livelihoods largely depend on agriculture. Here the epidemic is plunging communities further into destitution as their labour capacity weakens, incomes dwindle and assets are depleted.

Female-headed households, those fostering orphans and people living with HIV/AIDS are particularly susceptible to the impacts of the epidemic and their vulnerability often leads to a good adoption of innovative survival strategies.

Labour has become a key constraint in HIV/AIDS affected households and there is an urgent need for strategies to be developed to help small holder farmers. Reduced labour (persons/time/strength) results in less land being cultivated and less surplus, if any, to sell to the market for cash income. The situation is a vicious circle. (KCTI, RELMA 2003)

Labour is traditionally one of the most prominent limiting factors in smallholder agriculture. Land preparation and weeding are causing labour peaks, which affect especially poor, vulnerable households, which cannot afford to hire labour or to buy labour saving farm equipment. In addition land preparation is not only time consuming but also hard work, which requires strong, healthy people. Land preparation and weeding have to be done in time in order to avoid reduction in yields. Each day of delayed planting reduces the potential yield. Yield losses in African smallholder agriculture due to delayed planting alone are estimated at up to 50%. Delayed weeding results in strong competition of weeds and further increases yield reduction.

Labour productivity in African smallholder agriculture is low. The majority of farmers do

not have access to power sources, such as animal draught power or tractor power, which could help to increase labour productivity and reduce drudgery.



Recent widow with 5 children (Kienzle/FAO 2004)

HIV/AIDS seriously affects farm households, as further it reduces the labour capacity. HIV infested persons often fall ill, so that they cannot work independent of the work load, and they are weakened, which means they have problems in tilling land and need more time for the work. The death of a family member means the loss of a worker. Women have to spend more time on care-giving for the sick, often relatives from urban centres, and for orphans. Due to the death of men, the number of woman-headed households is increasing.

When you ask people with AIDS in rural communities in the developing world what their highest priority is, very often their answer is food. Not care, not drugs for medical treatment, not relief from stigma, but food. (IFPRI, 2002)

Reduction in yield means less food. While sick people need better quality food, e.g. richer in protein and vitamins, affected households lack the capacity to produce it or the money to buy it. Thus HIV/AIDS ends up in a vicious circle, which affected families can hardly escape without external support.



Coping strategies

Mitigating the impact of HIV/AIDS requires different strategies. An important one is the offer of labour saving technologies. This strategy has the advantage that it can discharge women, overburdened with work, taking care of the sick, producing food, collecting fire wood and fetching water.

Another one is introduction of new food production systems, raising the production level, producing more quality food (rich in protein and vitamins), and increasing the food security, or in other words reducing the risk of crop failure due to drought or pests and diseases.

Conservation agriculture systems relate to both strategies.

Saving and easing labour with conservation agriculture systems

The three principles of conservation agriculture (CA) are

- minimum soil disturbance, wherever possible direct planting without any soil preparation
- maintenance of a permanent soil cover
- crop rotations or associations (intercropping)

Soil tillage, especially when done by hand, is a time and energy consuming work. Minimising soil tillage (minimum or conservation tillage) or stopping tillage at all (no-tillage) not only save labour and energy, but allow also for timely planting. The later is a prerequisite for better and safer yields.

A groundcover of living (green manure/cover crops, intercrops) or dead (crop residues, mulch) material suppresses amongst others weed growth and thus the time required for weeding. In addition it reduces crop losses



Woman with jab-planter planting through a mulch cover

due to weed competition.

Thus conservation agriculture can break labour peaks, i.e. help to spread labour requirements over the entire cropping period, and releases farmers of drudgery. In many parts of Africa the majority of these farmers are women.

Number of persons required for planting with different equipment. Data collected from the short season 2002 and long season 2003.

Implement	Number of persons required
Hand hoe	2
Hand jab planter	1
DAP planter	2
Broadcast and ox-plough	5
Broadcast and tractor-plough	4

Results of case studies prove that labour input can be roughly halved in the long run.

The use of herbicides for weed control helps to further reduce the labour requirements. Highest gains are achieved with no-tillage and direct planting through a ground cover. Minimum tillage systems, such as pitting, for manual labour, or ripping with drought animal or tractor power, reduce labour requirements, too, but to a lesser extent. A certain soil cover is always necessary to suppress weed growth. "Clean pitting" or ripping without a soil cover risks to severely increase the weed pressure and thus the time required for weeding.

A widow in Nigeria told how she has lost her husband a few months ago, most likely due to AIDS. She has 6 children, from ages 1 to 18, but the eldest three now stay with her brother. Her husband was only seriously sick for a few months. He was in and out of hospital for four months while also having herbal treatment in between. Whenever his resources were finished he came home, until he or his wife managed to find some new cash. They raised money by selling stored harvest as well as a piece of land. A brother also gave money. In the fifth month of his illness the doctor proposed an HIV test. Her husband must have concluded that there was no more hope and refused the test, preferring not to spend more money on his health at the expense of his household. He died only a few weeks later. The funeral was paid for with the help of his brothers while the women's association provided chairs for the ceremony and moral support. His widow had cared for him and, as a result, she could not attend to her fields. The yield was very low. She was not disinherited and is still farming her husband's fields, but her father-in-law is controlling her expenditures. The household has become food insecure and she was not able to pay her children's school fee and feels hopeless. Only a year ago this family was regarded as of 'average wealth'. (Source: Hilhorst et al., 2003)

In the transition period from conventional to conservation agriculture, the weed pressure increases, as there are ample of seeds stored in the soil. Thus labour requirements for weeding might increase in the first two to three years. This transition phase can be eased and shortened with the use of herbicides. If herbicides are a realistic option depends on the situation, access to markets, knowledge of pesticide application, price o labour in relation to herbicides, etc. Families affected by HIV/AIDS will hardly be in the position to buy herbicides, as they need all the cash they dispose of for buying medicine or feeding additional heads (sick relatives, orphans, etc.). However, experience shows that (women) farmers are quite inventive as to cope with weeds, once they have learned to change the conventional way of cropping.

The agricultural research community must develop farming practices that adapt to the reality of HIV/AIDS and yet maintain productivity levels. (IFPRI, 2002)

Food Quality and Food Security

Food Quality

Integration of leguminous crops either in a rotation, as intercrops or as green manure/cover crops is a means of enriching the diet by protein rich grains or leaves of legumes. One possibility is intercropping maize or sorghum with spreading types of cowpea or short-cycle Mucuna (white grains, no L-Dopa). This can provide at least a relatively good ground cover during the growing season and produces edible grains or protein and vitamin rich leaves (source of information, source of seeds: IITA, CIEPCA, L-Mulch).

In more humid regions (800 mm) the option is real cover crops, i.e. crops which continue to grow into the dry season or even survive the dry season. Farmers in Tanzania made good experience with *Dolichos lablab* which produces high quality edible grains. Mucuna is an excellent cover crop, which efficiently suppresses weeds. It produces many grains, however, the common varieties, however, have the disadvantage that they contain a high level of L-Dopa and need to be treated before they can be consumed without risk.

(for more information see ACT Information Series No.4 or the green manure/cover crop database LEXSYS on the ACT website.)

Overview on No-tillage and Cover Crop practices

Equipment / tool	Strengths	Weaknesses	Cost	Comment
Hand hoe	<ul style="list-style-type: none"> •Affordable •Adapted to clayey soils 	<ul style="list-style-type: none"> •Labour intensive •Less suitable to penetrate trash 	\$1-5	Price depends in 'brand', 'make' and shape
Jab planter	<ul style="list-style-type: none"> •Saves labour/ decrease drudgery •Affordable •Ability to penetrate trash 	<ul style="list-style-type: none"> •Learning period •Sticks in clayey soils 	\$10 (local) \$15 (import)	Local one needs testing
DAP ripper	<ul style="list-style-type: none"> •Multi purpose tool •Water harvesting •Uniform seed coverage •Requires less power 	<ul style="list-style-type: none"> •Expensive •Not possible to operate with crop residues/ trash •Implications for weed control 	\$60 (only tine) \$75 (planter-attachment) \$45 (standard plough beam)	Made locally, to be attached to DAP standard plough beam
DAP no-till planter	<ul style="list-style-type: none"> •Saves labour •Ability to penetrate trash 	<ul style="list-style-type: none"> •Sticks in clayey soils •Expensive 	\$ 120 (\$60 for standard plough)	Import: local production?
Cover crops/ crop residues	<ul style="list-style-type: none"> •Effective for weed control/ saves labour •Improve soil fertility •Source of fodder/ cash/food •Protection against free grazing (pigeon pea/ lablab) 	<ul style="list-style-type: none"> •Availability of seeds •Pests (lablab) •Mucuna cannot be used as food •No market for pumpkins •Land tenure/free grazing 	\$1.5 -5 per kg	After initial costs, seed multiplication on farm can be done (income generating activity)
Herbicides (knapsack sprayer)	<ul style="list-style-type: none"> •Effectiveness for weed control •Saves labour 	<ul style="list-style-type: none"> •Expensive •Effect on other crops / soil •No benefit for soil fertility 	\$ 60 (knapsack sprayer) \$ 20/ha for herbicide	If FAO knapsack sprayer complies with FAO standards; some labour is required for fetching clean water for spraying



Effect of No-tillage and Cover Crops on labour requirements

Cover crops treatments	Labour requirements (Man-days/season)			
	1999	2000	2001	2002
1. No-till maize + lablab cover crop	72.0 a	60.0 b	46.3 b	34.7 c
2. No-till maize + Mucuna cover crop	71.7 a	62.0 b	40.7 b	38.0 b
3. Conventional tillage maize	64.7 b	65.3 a	66.0 a	65.7 a
Mean	69.4	62.4	51.0	46.1
C.V (%)	2.54	1.07	4.24	1.91
S.D	1.02	0.38	1.25	0.51

Food security

Conservation Agriculture makes better use of rainwater. (1) Stopping ploughing and inverting the soils reduces losses of soil moisture by evaporation, (2) timely planting makes use of the first rains, and pitting or ripping and a soil cover increases rainwater infiltration, (4) breaking hardpans by subsoiling and preventing recompaction by use of deep rooting cover crops, assures that the water can infiltrate in deeper soil layers, where it is not lost by evaporation and increases the soil volume that can store water. Information from Tanzania provides evidence, that the rainwater productivity, i.e. the amount (kg) of grain produced by 1 mm of rain can be tripled. This leads to higher yields and safer yields in the case of drought. (see ACT Information Series no.5).

Conclusion and Recommendations

CA can effectively reduce labour requirements, break labour peaks, reduces drudgery (i.e. reduce the amount of hard work) and assure timeliness of farm operations.

CA is a valid and affordable option for smallholder farm households affected by HIV/AIDS.

CA can discharge women including AIDS widows.

CA can contribute to a better nutrition (quantity and quality) of HIV/AIDS infected persons, and thus improve their strength and work capacity.

CA gives new hope and a new perspective to affected farming communities.

The introduction of CA technologies needs external support: advice and starting aid, i.e. provision of CA implements and cover crop seeds.

Contacts

African Conservation Tillage Network (ACT)
 ACT Secretariat
 No. 9, Balmoral Road,
 Borrowdale, Harare
 Zimbabwe
 Tel: +263-4-882107; Fax: +263-4-885596
 actnetwork@africaonline.co.zw;
 Website: www.act.org.zw

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