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Managing Livestock in CA Systems

Neil Rowe Miller, CA Technical Officer, Eastern Africa

Balancing the needs of livestock and the need to keep soils covered is an on-going challenge with conservation agriculture throughout the world. When crop residues, grass, and mulch materials are in short supply, animal health and soil health both suffer. Competition for these materials can lead to serious conflicts between pastoralists and crop producers. In our [March, 2018 newsletter](#), we encouraged readers to address this challenge by increasing forage production. This month we would like to examine other strategies including crop residue management and managed grazing.

At a recent workshop in northern Uganda, participants shared with me some of the strategies they are using to mitigate these challenges. While these strategies are far from perfect, they have been tested and proven by CFGB Partners in the field. We invite you to share your own ideas on this subject on our [Facebook Discussion Group](#).

“Give livestock the best, Give the soil the rest!”

Crop residue management should provide livestock with the highest quality material, and leave the rest for soil cover. In maize production, we encourage producers to cut the tops of their maize plants just after maturity (but before the grain has dried). Other crops can be managed in a similar fashion, keeping in mind the goal of CA is to maintain a minimum of 30% soil cover throughout the year.

Establish and Enforce Grazing Bylaws

Many communities have existing bylaws to control grazing, and to prevent grazing of cropland. However, often these bylaws are not widely understood, and/or not effectively enforced. One Partner in the above-mentioned Uganda workshop printed copies of their local grazing bylaws, and distributed them to local officials, encouraging them to take the laws more seriously. In communities where land is managed communally, planned rotational grazing can maximize forage production, and can separate crop land from grazing land.



Maize field in Tanzania with tops removed for animal feeding.

Fence Crop Fields

The acceptability of this practice is often culturally variable. In some communities, especially where farmers are growing crops on communal lands, fences will not be allowed or respected. In others, a sound fence can make the difference between managed grazing, and a free-for-all. Where ever possible, use living fence posts with species such as *Gliricidia sepium*, which also provides edible forage with its leaves.

Switch to Zero Grazing

In areas with limited farm land, zero grazing systems are becoming more and more prevalent. Animals are kept confined in an enclosure, and forages are brought to them rather than allowing them to graze. Zero grazing does not eliminate the competition between the needs of soil cover and the needs of livestock, but it maximizes a farmer's ability to manage crop residues and other biomass in whatever balance they believe is most advantageous. Although zero grazing systems demand more labor, they provide an additional benefit of maximizing the collection of high-quality animal manure for use in crop production.

Plant Cover Crops

Many of the cover crops we promote in CA also provide high-quality forage for animals. Some, like pigeon pea and lablab, stay green long into the dry season when other forages run out. In some communities, the presence of a growing crop will prevent shepherds from allowing their animals to enter a neighbor's field. In other communities, once the main crop is harvested, livestock herders have free reign to graze their animals. Regardless, where forage materials from cover crops are available, there will be less pressure on grazing of crop residues, which tend to have lower feed value, and can be kept for soil cover.



A zero-grazing cow shed in Embu, Kenya.

Promote Sound Business Models for Livestock Rearing

Cultures which value livestock as a source of prestige, or a means of savings, tend to maintain non-productive animals which consume forage resources without building economic value. A sound livestock business targets forages to growing and reproducing animals, while selling off mature, unproductive stock. Storing wealth in livestock is increasingly risky in an environment of climate uncertainty, and productive, lower-risk investment opportunities are now available in most communities.

Engage the Broader Community in CA Promotion

If only a small portion of the community understands the value of keeping soils covered, it will be extremely difficult to create a consensus on managing livestock in crop land. CA farmers should be challenged to educate their neighbors on the advantages of soil cover, and the need to control livestock grazing. As CA projects expand, they should raise these issues in public meetings and in the media, including radio broadcasts, etc.

Managing Termites in Conservation Agriculture

Mike Salomons, Canadian Foodgrains Bank Agriculture & Livelihoods Technical Advisor

Over 1,000 different species of termites can be found across the continent of Africa! Termites are the longest living insects in the world, with some queens living as long as 50 years. The termite queen, king, soldiers, and workers live together in colonies, and most species feed on dead plant material like wood, leaf litter, or animal dung.

Termite activity has important benefits for ecosystem health and can help improve agricultural production by breaking soil surface crusts, increasing aeration and water infiltration. Some termites concentrate soil nutrients in their mounds, creating a source of fertility which can be used as an alternative to fertilizer or compost/manure. Finally, termites are an extremely nutritious food and are eaten by many groups across Africa.

At the same time, termites can cause crop damage and remove surface mulching material, a key resource for farmers practicing conservation agriculture. Mulching and reduced tillage both tend to increase termite activity compared to conventional fields. However, as long as some dry soil cover remains, studies have shown that crop damage under CA can



Termites prefer dry residue, but attack living plants when no dry material is available (Whitney Cranshaw, Colorado State University, Bugwood.org).

actually be reduced compared to bare soils (Nyagumbo, et al., 2015). It is only when mulch is removed completely that termites begin damaging the living agricultural crops. **For this reason, a key strategy in reducing termite damage is to maintain some soil cover throughout the growing season.**

Since maintaining soil cover is challenging in termite-prone areas, it is important to integrate this practice with other methods. These include:

- **Reduce crop vulnerability through good crop nutrition and moisture.** A well-fed plant will survive termite damage more effectively than a weak, struggling plant.
- **Intercrop and/or rotate cereals with legumes.** Maize-soybean intercropping has been shown to reduce termite damage by 50% (Sekamatte, et al., 2003). Velvetbean (*Mucuna pruriens*) rotation has also been shown to reduce termite damage on a subsequent maize crop (Thierfelder, et al., 2013). However, the same study found that a pigeon pea rotation increased termite damage, so one should not assume all annual legumes have the same effect.
- **Plant termite-repelling perennial crops** such as *Gliricidia*, *Tephrosia* (fish bean), and *Euphorbia* (pencil cactus or milk bush). Scientific studies and anecdotal reports suggest these plants can be used as improved fallow in rotation with food crops (Sileshi et al., 2005) and/or as a repellent by incorporating leaves in planting stations (Sileshi et al., 2009).
- **Varietal tolerance** is not widely available, but varieties of rice and groundnut have been released with resistance to termite feeding (Otieno, 2018).
- **Increase seeding rates** so that if termites reduce stands at seedling stage, the final stand will still be adequate.
- **Killing of colonies using termiticides and/or physical destruction** is possible with species which form mounds. Spraying insecticides on residues can also reduce termite feeding (Nyagumbo et al., 2015). Fipronil is a commonly used synthetic chemical, and there is some evidence that *Tephrosia* and *Euphorbia* sprays can be used in a similar fashion.



Farmers in Ethiopia place *Euphorbia* branches under harvested grain, which prevents termites from climbing and consuming the grain before it is threshed.

Partner Profile: Brethren in Christ Compassionate and Development Services - Zimbabwe

Putso Nyathi, CA Technical Officer, Southern Africa

Brethren in Christ Compassionate and Development Services (BIC CDS) is a relief, development and peace arm of the Brethren in Christ church in Zimbabwe founded in 2012. The BIC-CDS works to improve the quality of life and self-supporting capacities of communities of women, men, boys and girls irrespective of their religious affiliation, creed, race, ethnicity and gender by co-creating pathways to development with them.

The organization first partnered with Mennonite Central Committee (MCC) and Canadian Foodgrains Bank (CFGF) in 2013 to implement a conservation agriculture (CA) project which reached 250 farmers in Gwanda District. The initial CA package promoted the digging of planting basins, soil cover and crop rotation. Due to the perceived labour intensive nature of digging planting basins and traditional use of the plough for land preparation, the project adapted the CA package by introducing ox-drawn CA rippers and direct seeders in the second year of the project. Rippers can be easily attached to the moldboard plough beam and used to open planting lines, thus achieving the CA principle of minimum soil disturbance. The introduction of rippers resulted in increase in area under CA from an average of 0.25 ha per household to 0.71 ha.

Following a situation assessment of Gwanda district at the end of the first phase of the CA project in 2016, an integrated CA project titled 'Sustained Conservation Agriculture & Livestock Enterprise' (SCALE) program was developed. In this current phase, BIC-CDS is promoting CA, seed multiplication, fodder production and irrigated agriculture. The project is currently reaching 800 farmers (70% women), and planning to reach 1000 households by end of the 3rd year.

Gwanda district falls into agro-ecological region IV, which is semi-arid, and receives less than 600 mm of rainfall per annum. Livestock production is crucial to the livelihoods of Gwanda people as it is used as an insurance against frequent droughts, and other emergencies. Livestock also provide draught power and manure for crop production.

However, conflicting uses of crop residues for mulching and livestock feeding have limited CA scale up. Fodder production has been one of the strategies promoted by the project to address this challenge. Farmers are trained on how to grow fodder crops and how to make hay



Making rip lines (photo by BIC-CDS).

bales and silage which they sell to neighbouring farmers.

Fodder production has been one of the success stories of the SCALE project. "I managed to save my livestock from drought," says Okay Ndlovu a fodder producer who is part of the SCALE project. "In the previous years, I lost up to 15 head of cattle to drought. But since I started fodder production, I lost nothing. In fact, I generate extra income by selling hay bales to other farmers." Mr. Ndlovu made 251 hay bales which have not only been highly sought after but also priced to protect his herd.



Farmers make a hay bale at a training session (photo by BIC-CDS).

During the dry season, some farmers traditionally feed crop residues to livestock or take them to grazing areas locally called 'emlageni', where the risk of theft is high. With fodder production, livestock farmers can afford zero grazing. Fodder production guarantees good condition for livestock at the beginning of the cropping season which is necessary for tilling the land.

The BIC-CDS project is helping meet the needs of both CA and livestock and recognizes that crop and livestock production are not mutually exclusive in the smallholder farming communities of semi-arid Gwanda District.

Discussions from the Network

Vurayayi Pugeni posted a video of CA farmers from SCORE, in Zimbabwe, singing a song about Conservation Agriculture. Pugeni reports that he was "honoured to be mentioned in the song by these dedicated CA farmers!"



The CA Technical Officers manage a Facebook Discussion Group from which allows individuals and organizations to discuss issues and ask questions related to CA. If you'd like to join the discussion, sign up at www.facebook.com/groups/CAinAfrica.

CA Technical Officer Travel Schedules

PUTSO NYATHI

18-21 December 2018
KZN, South Africa
MCC Retreat

6-12 January 2019
Beira and Tete, Mozambique
Partner Training and Planning

12-14 February 2019
Arusha, Tanzania
ECHO symposium on Sustainable Agriculture and Appropriate technologies

End Feb 2019 - Tentative
Mwandi, Zambia
World Renew Partner visit

NEIL ROWE MILLER

30 November - 3 December 2018
Katakwi, Uganda
KIDO project visit

4-8 December 2018
Moroto, Uganda
Northern Uganda CA Partner Workshop

January 2019
Tharaka Nithi, Kenya
Mt. Kenya CA Partner Workshop

4-5 February 2019
Addis Ababa, Ethiopia
National CA Workshop

6-9 February 2019
Kucha, Ethiopia
EKHC Situation Assessment Review

12-14 February 2019
Arusha, Tanzania
ECHO Symposium on Sustainable Agriculture and Appropriate Technologies

JEAN TWILINGIYUMUKIZA

7-10 January 2019
Uganda
Exchange visit with HC Burundi (Tentative)

14-18 January 2019
Niamey, Niger
Partner visit and Situation Assessment Workshop

23-25 January 2019
Fizi, DR Congo
MCC Partner Project visit

28-30 January 2019
Katana NK, DR Congo
ERDO-CEPAC Project visit

4-8 February 2019
Bujumbura, Burundi
Project visit & Team Building with HCB

12-15 February 2019
Arusha, Tanzania
ECHO Symposium on Sustainable Agriculture and Appropriate Technologies

18-20 February 2019
Tanzania
Exchange visit with CEPAC team (Tentative)

26-28 February 2019
Kigali, Rwanda
CFGB Conference



Conservation Agriculture in Africa Discussion Group

