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A Christian Response to Hunger

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Integrating Livestock and Conservation Agriculture

By John Mbae, CA Technical Specialist, Kenya

Mixed crop-livestock systems support two-thirds of the world's population and produce about half of the world's food (Herrero *et al*., 2010). In Africa, smallholder farming systems are dominated by such systems, primarily because of the positive synergies that result when farms include both crops and livestock.

Livestock/Crop Synergies Include:

- Income and dietary diversification
- Recycling of nutrients that would otherwise be wasted
- Draught power and transportation
- Biological "savings accounts" that mitigate risk and provide cash flow for cropping enterprises
- Broader choice of crops providing for better rotation

If such systems become unbalanced, favouring either crops or livestock, these synergies are lost and detrimental effects result. Excessive livestock numbers destroy soil quality and compromise crop production. On the other hand, failure to value the livestock component means foregoing resources that have benefited communities for many years.

CA and Livestock Conflicts - Effective conservation agriculture (CA) systems require a critical level of crop residues and cover crops to protect soils from erosion, enhance soil fertility and maximize water retention. Competition for crop residues between livestock and soil presents a widespread and serious threat to realising the benefits of CA. In many communities, the removal of crop residues for livestock, either through grazing or cut and carry is a common practice. In cases where residue removal is excessive, insufficient vegetation is left for soil enhancement and conservation purposes.

Win-Win Approaches/Recommendations – During a recent gathering of CFGB Partners, the following strategies were identified to maximize livestock/crop synergies and mitigate conflicts:

1. **Enshrine livestock components in CA projects:** Projects should be designed to incorporate livestock interventions alongside CA promotion.
2. **Establish and conserve forages:** Increasing forage resources reduces the need for removal of crop residues. Many forage species can also stabilize soil bunds on sloping lands. Be sure farmers have access to high-quality forage planting material.
3. **Plant fodder trees:** Agroforestry can provide nutritious fodder as intercropped shrubs or when planted along field-borders.
4. **Introduce green manure/cover crops:** These crops not only improve soil fertility and control weeds. They also reduce the demand for mulch and provide high-quality feed for livestock.
5. **Promote land use management:** Planning ensures that all farm enterprises have space within the farm. A popular slogan we promote is "Give the best to the livestock, leave the rest for the soil!"
6. **Establish and/or enforce grazing bylaws:** These exist in most countries, but implementation is often lacking. CA projects should assist in the implementation of good grazing practices supported with bylaws.

7. **Control grazing:** Pastoralist communal land can be grazed in sections if communities are well organized. This maximizes forages through better pasture regeneration and allows crop production in ungrazed sections.
8. **Establish land tenure:** Without clear ownership, enforcement of controlled grazing is impossible.
9. **Fence rangeland/pastoralist areas/communal land:** Use of live fences, such as sisal or cactus, can enable pasture to regenerate.
10. **Understand the feed gap:** Define the relationship between feed supply and demand. When is the gap largest? What can help to close this gap?
11. **Maintain reasonable stocking rates:** This reduces demand on forage and mulch.
12. **Plant perennial crops:** In some cultures, short-term perennial crops such as pigeon pea and lablab are a deterrent to graziers who would otherwise allow their livestock to feed on dried crop residues.
13. **Diversify incomes:** Economic activities like Village savings groups and kitchen gardens can ease the reliance on livestock for savings and income generation.
14. **Improve livestock marketing:** Choosing the right time to market or cull animals can reduce pressure on pastures.
15. **View forages as a marketable resource:** Crop residues are often considered a free resource for livestock owners. Crop farmers need to manage these and other forages as a valuable commodity.

Zero-grazing systems allow farmers to conserve and control forage resources

Agricultural Value Chains and CA Programming

By Jean Twilingiyumukiza, CA Technical Officer for Central/West Africa

Growth of the human population and its needs have led to a progressive destruction of the world's natural resources. Human pressure on the land through agricultural practices particularly poses a problem for agricultural sustainability. There is a critical need for a shift from destructive agricultural practices to an integrated approach that can guarantee both adequate and sustainable food production, as well as a surplus for commercialization. Conservation agriculture (CA) represents one such approach. However, CA program effectiveness can be enhanced by attention to value chains.

What is a Value Chain? A value chain is a concept first developed by Michael Porter in 1985, which involves the set of linked activities necessary for an agricultural product to move from the production stage to the final consumer. Participating in the value chain offers small-scale farmers the opportunity to capture added income at each of these stages. As they engage with value chains, they gain added value for their products, whilst reducing their risk and increasing their resilience.

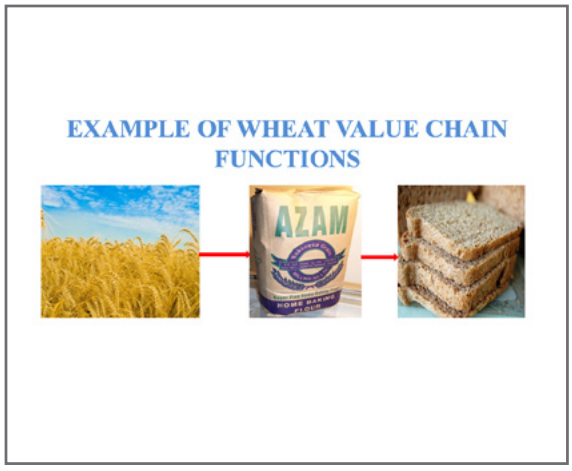
Linking Farmers to Markets - Small-scale farmers and cooperatives can be incorporated into existing or new value chains through "contract farming," in which farmers supply agreed quantities with pre-established prices, quality standards, time, and purchaser requirements. Whereas individual farmers may be in a poor position to negotiate such contracts, CA projects can help farmers strengthen their position through joint marketing with established quality standards, thus gaining a competitive advantage in the value chain.

For example, the Kinazi Cassava Plant in Rwanda, which is currently running under 50% of its capacity due to insufficient supply, could contract with farmer groups to help them increase their production of high quality cassava by helping them adopt CA cassava technology. This high-value production would create a lasting market and reduce risk for both producers and buyer.

Market Forces Encourage CA Practices - Crops grown under CA provide significant benefits, including soil cover, improvement of soil fertility, animal feed, etc. However, farmers choose to grow crops based on not just these factors, but also on the social and economic forces of the food system in which they operate

TABLE: High Potential Fodder Tree Species

Species	Altitude (m)	Annual rainfall (mm)
Acacia angustissima	0–2600	900–2800
Calliandra calothyrsus	0–2200	>800
Chamaecytisus palmensis	1500–3000	600–1600
Gliricidia sepium	0–1600	600–3500
Leucaena diversifolia	<2000	1500–3500
Leucaena leucocephala	0–1900	650–1,500
Leucaena pallida	1000–2000	500–2000
Leucaena trichandra	700–2000	1000–1800
Morus alba	1000–3000	1500–2500
Sesbania sesban	100–2500	>500



A wheat value chain from production through consumption

(Snapp, *et al*. 2005). When environmental and economic forces work together, everyone wins. If farmers have access to reliable markets for cover crops, for example, they can accomplish two goals at once (soil improvement and income generation). Over the past decade, market opportunities have driven pigeon pea production (one of the most effective cover crops for maize producers) to over a million tons per year in eastern and central Africa. Lablab, climbing beans, and soybean are other crops useful for soil cover, nitrogen fixation, and human and/or animal food, as well as high market potential. Other soil-benefitting crops such as crotalaria, mucuna, and desmodium need more market development.

CA practices also offer opportunities for increasing the marketing potential of staple crops. By increasing plant productivity and quality, farmers have a larger quantity of high-value products with which to enter the market with a competitive advantage. For example, CA farmers in an Anglican Development Services project near Mt. Kenya report that local buyers prefer their potatoes because mulching leaves them cleaner and healthier. Similar results are reported for mulched cassava, horticultural crops, banana and coffee.

The environmental potential of CA in African is unquestioned. However, the economic return of CA for small-scale farmers has been less consistent. Improving the functionality and accessibility of agricultural value chains can change this equation. Participation in well-functioning value chains brings CA farmers a more stable, resilient and predictable income. It also provides better products for consumers and job opportunities in the wider economy.

CA potatoes bring a premium price in Murang'a, Kenya

Partner Profile: Diocese of Central Tanganyika, Dodoma

By Godfrey Magoma, CA Technical Specialist, Tanzania

The Development Services Company (DSC) was established by the Anglican Diocese of Central Tanganyika (DCT) in 1999 as a semi-autonomous organization striving to "support and empower marginalized communities in Dodoma rural and urban districts." DCT has implemented food security programming in partnership with World Relief Canada (WRC) and Canadian Foodgrains Bank (CFGB) since 2007, including the Tanzania Food Security Project, which first trained farmers in Conservation Agriculture (CA) methods.

In 2015, DCT became part of CFGB's Scaling-Up of Conservation Agriculture program. Through this five-year program, they plan to reach a total of 4,000 farmers in Dodoma Municipality and seven surrounding villages. The government of Tanzania is also providing an enabling environment and technical support through their extension officers.

The area receives one rainy season which begins in late-November or mid-December and tails off in April, with a long dry spell in February. Crops promoted by the project include early-maturing sorghum and millet as staple food crops; as well as early-maturing cowpea, Bambara groundnuts, pigeon pea, and lablab which provide families with a source of protein. Farmers in the area also grow groundnuts, sunflower and some sesame as cash crops.

In the first year of the current project, DCT trained 605 farmers whereas their target was 500. They expect to reach about 800+ farmers this year. A Champion Farmer extension approach has helped achieve these numbers and has given farmers good extension information for adopting CA. Of the 605 farmers trained last year, 90% adopted at least two principles of CA and the majority have been women.

Due to the climatic challenges in the area, CA has advantages for crop production and food security in the communities where DCT is working. Production has increased for those who have used CA, in some cases up to 200%. Some of this increase is due to good agronomic practices (timely and precise planting, manure

A service provider rips a farmer's CA plot using a 2-wheeled tractor

An ox-drawn ripper with a coulter to cut through residues

application, appropriate spacing, etc.) which are promoted along with CA practices.

Mechanization has also played a crucial role for scaling up numbers of farmers and expanding CA plot sizes. Through service providers, DCT has promoted the use of oxen and two-wheel tractor drawn rippers. Men and youth are more attracted to use mechanization than women, which reduces the workload on women.

Challenges faced by CA farmers in the area include controlling livestock, which threaten the maintenance of soil cover from crop residues and green manure cover crops (GMCCs). As a result, some farmers are fencing their plots with trees, and the project is sensitizing the community to enforce existing grazing bylaws. Also, the use of rippers is challenged by the crop residues and GMCCs as they are dragged while ripping. This has prompted some farmers to collect the residues and rip and then return them back, which adds to labour. Another strategy which is being tested is to attach a cutting blade which cuts the residues while ripping.

Regardless of these challenges, CA is gaining acceptance in the community and more farmers beyond those directly trained are adopting CA. The Diocese has trained pastors in all its 265 parishes and asked them to promote CA and to establish demo sites for the communities around to see and learn from. With these trends, and the support from village governments and the District extension system, CA has a bright future in Dodoma.

Introducing Jean Twilingiyumukiza

We are pleased to welcome Jean Twilingiyumukiza as CFGB's third CA Technical Officer serving projects in Central and West Africa. Jean is from Nyanza, Rwanda and comes to us with degrees in Agronomy and Development Studies. His professional experience includes project management, agriculture extension, cassava promotion, and value chain development. He has worked for and directed various NGOs in Rwanda and Tanzania, and has travelled widely in Africa, Asia, Europe and the USA. Jean is a committed Christian, married with two children. Please help us welcome him to the broader CFGB community!

CATO Schedule:

JEAN TWILINGIYUMUKIZA

19- 26 March
Malawi
Learning tour to CA Projects

4-13 May
Rwanda and DR Congo
CA Projects visits

PUTSO NYATHI

19- 26 March
Malawi
SOLDEV, Ekwendeni Hospital
& Univ. of MI projects visits

24-28 April
Zambia
FRB project visit

May (date to be determined)
Zimbabwe
Ex- post Evaluation of CA projects

NEIL ROWE MILLER

6-10 March
Mitunguu, Kenya
CA workshop (4 Partners)

19- 29 March
Malawi & S. Africa
Learning tour to CA Projects

19- 27 April
Arba Minch & Sodo, Ethiopia
Project visit, Soil Fertility workshop

4-13 May
Rwanda and DR Congo
CA Projects visits