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Cover Crops Bridge the Needs of Livestock and Soils

**Neil Rowe Miller, Agriculture and Livelihoods
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One of the most challenging constraints in expansion of Conservation Agriculture (CA) among small holder farmers is competition for plant biomass as forage for livestock versus using them as soil cover. Green manure/cover crops (GMCCs) are helpful tools to bridge this seeming divide.

The quality and quantity of feed provided to livestock is a critically important production factor in animal agriculture. In a recent guidance note on [The Enabling Environment for Animal Source Food Market System Success](#), the authors placed feeds and forages as critical production constraints ahead of improved genetics, animal health services, and access to natural resources such as land and water. Indeed, projects which distribute and promote exotic breeds of livestock inevitably fail if they don't concurrently help communities upgrade their livestock feed production and resources. Farmers know the importance of quality animal feed keenly enough that they will rarely leave crop residues as soil cover if they know it will result in poorer nutrition for their livestock.

Fortunately, for the mixed crop/livestock producers in our CA projects, many of the GMCC species which we promote for soil cover are also very high-quality

forages, often much higher in nutritional value than crop residues. Thus, when GMCCs are intercropped with a main crop, such as maize, the total biomass resources available for animal feed *and* soil cover increases significantly. ***Indeed, we argue that no small-holder maize field should be planted without an accompanying GMCC!!***



GMCCs, like this pigeon pea field in Kenya, can be grazed after harvesting grain for human consumption.

Our tireless slogan is to ***“Give the Best to the Animals, and Leave the Rest for the soil!”*** Thus, we encourage farmers to graze their livestock on late-season GMCC growth. Optimizing these resources requires a higher level of management than that used by many traditional farmers, particularly in communities where free grazing is

common practice. The animals should be monitored closely and taken off the field once they have reduced soil cover to around 30% (the minimum standard for soil cover under CA). Although both biomass and nitrogen are taken up when animals graze GMCCs, both are, to some degree, returned to the soil as manure. Furthermore, the entire below-ground legume biomass remains in the field, including [up to 50% of the nitrogen](#) fixed by the plant.

Achieving this level of management takes training and commitment from the farmers involved. It also requires the education and commitment of their neighbors and local authorities who might otherwise allow outside animals to consume the 30% cover left to benefit the soil. Systems for optimizing livestock grazing of cover crops are much better [researched and developed in temperate regions](#) than in the tropics.

Some of the best low- to mid-altitude GMCC species, which can be used for animal forage as well as soil improvement, include pigeon pea, lablab, mucuna, and crotalaria (see sidebar). In the higher altitude tropics, vetch, faba bean, and other species are more

appropriate. Interestingly, much of the agronomic research on these species has been carried out by forage agronomists. A great, thorough agronomic resource and species selection tool can be found on the [Tropical Forages website](#).



Raciuw Martha, a Church of Uganda/World Renew project farmer, allows her goats to graze this velvetbean field once every three days, so that they benefit from the high-quality forage, but don't eliminate its soil cover.

COVER CROPS FOR LIVESTOCK FORAGE

	Lablab	Pigeon Pea	Velvet Bean	Sunn Hemp	Fava Bean	Vetch
Scientific Name	<i>Lablab purpureus</i>	<i>Cajanus cajan</i>	<i>Mucuna pruriens</i>	<i>Crotalaria juncea</i>	<i>Vicia faba</i>	<i>Vicia spp.</i>
Timing of planting	0-2 weeks after main crop	together with main crop	4 weeks after main crop	at onset of rains	long rains (<i>maher</i>)	short rains (<i>belg</i>)
Cropping system	sole or intercrop	sole or intercrop	sole or intercrop	sole crop	sole or intercrop	sole crop
Planting rate (seeds/sq meter)	4-5	4-5 (tall var's) 8-10 (dwarf var's)	2-3	125-175	20-40	55-70
Planting rate (kg per ha)	8-10	4-6 (tall var's) 10-14 (dwarf var's)	14-20	40-50	120-200	25-35
Human food	yes	yes	no	no	yes	no
Altitude	<1800 m	<1800 m	< 1500 m		>1500 m	>1500 m
Drought tolerance	high	very high	moderate	high	moderate	moderate
Fertility requirement	Moderate	low	moderate	low	moderate	moderate
Crude Protein (leaves)	15-21%	10-18%	12-20%	18-32%	16-20%	18-28%
Digestibility (ruminants)	>67%		68%	75% (can't be eaten fresh)	74%	70%

Monitoring Agricultural Markets

**Lilian Zheke, Agriculture and Livelihoods
Technical Officer for southern Africa**

Markets provide a means through which smallholder farmers derive income by selling their products and through which they access commodities essential to food security and livelihoods. CFGB programs engage with markets through interventions ranging from food assistance to collective marketing, all of which depend on, and may influence, local markets. Understanding how markets function and are affected by crises or project interventions is a critical step in designing effective projects.



Market marketing helps farmer groups, like this Mkothima, Kenya Aggregation Group, to identify when and where to sell their produce for maximum profit.

WHY MONITORING MARKETS IS IMPORTANT

The principal reason for monitoring markets is to map their level of functionality and therefore potential. In addition, market monitoring helps projects to follow the mandate to “do no harm” through unintended consequences of an intervention.

Monitoring markets can help projects to:

- Identify key opportunities for small-scale producers to market their products profitably (e.g. the best season for selling, or buyers willing to

pay higher prices for high-quality or larger quantities of aggregated produce).

- Assess how well the market is functioning and identify opportunities and/or potential bottlenecks (e.g. seasonal shortages, lack of transport, trader capacity/capability).
- Track whether project activities positively or negatively distort local markets (e.g. in-kind distribution of seed or other inputs may compete with, and reduce, prices for local merchants).
- Assess the appropriateness of an assistance modality (e.g. if food is readily available in the local markets, the project should delay distribution and/or use cash or vouchers rather than in-kind distribution).
- Help improve project design and strategies.

It is important to first establish a market baseline in order to understand how “normal” markets function. The baseline will help in selecting which markets to monitor, understanding commodity flows/integration, and identifying what variables to monitor. After establishing these parameters, on-going monitoring will have a standard against which to compare price fluctuations.

STEPS IN MONITORING MARKETS

Price tracking is central to monitoring markets. Prices are mainly influenced by supply and demand, but they can also provide insight into market functionality and other drivers such as monopolization or undue influence of individual traders. For guidance on collecting price data specific to food security programmes, consult the World Food Program publication, [Collecting Prices for Food Security Programming](#). Price monitoring may need to be supplemented by non-price indicators (NPIs) such as total stocks, volume of sales, and fuel prices.

The [CRS MARKit toolkit](#) uses the following phases to monitor market prices:

Initial phase - An initial market analysis/baseline should be included in the pre-project situation analysis. The information obtained should help to inform the project strategy for marketing activities and food or input distribution. To be able to adapt to

potential changes in the market, flexibility should be incorporated into the initial project design.

Phase A: Prepare - Identify which market places are accessed by project participants and use this to select which markets and commodities to monitor. The number of commodities to monitor depends on which ones will be impacted by the project and on the staff's capacity to collect, manage and analyze data. The total number of commodities monitored should not, however, exceed five. Identify key risk factors that may affect prices (e.g. conflict, weather, etc.) and include them in your monitoring plan. Identify how the commodities you are tracking move from areas of surplus to areas of deficit. Create tools for monitoring both prices and non-price indicators. Establish a database where collected data can be entered and analysed.

Phase B: Collect and enter data - Identify and collect available secondary data (data collected by government or other NGO agencies). Collect primary data (through direct observation and recording at individual markets). Monitor three to five traders for each commodity, but calculate the median or average price for each marketplace. Review data and clean up any errors in preparation for analysis.

Phase C: Analyse - Calculate monthly price changes and investigate causes of variations. Market price variation is normal, and does not necessarily indicate a problem with the market. Once the variation exceeds normal thresholds, however, further investigation is necessary to identify the cause. Additional qualitative information should be collected through interviews with traders and other stakeholders to discuss the causes. Include community members who use the market to triangulate information provided by traders. Understanding the cause of an abnormal price fluctuation allows the project to determine whether there is a need for adjustments to their strategy.

Phase D: Report and adapt - Report and disseminate information and adjust interventions as necessary. The decision to change project strategy should be taken in collaboration with the whole project team, with buy-in from the project participants, and approval from the donor.

Partner Profile: The Evangelical Fellowship of Sierra Leone

Jean Twilingiyumukiza, Agriculture and Livelihoods Technical Officer for central and West Africa

The Evangelical Fellowship of Sierra Leone (EFSL) is a faith-based alliance of 90 evangelical churches and para-church organizations founded in 1959 to uphold biblical truth and work toward the evangelization of Sierra Leone. EFSL has also been involved in community development activities with a focus on agriculture and livelihoods programs in different parts of the country.

From 1991 to 2002, Sierra Leone was embroiled in a brutal civil conflict which saw tens of thousands of people killed and thousands more mutilated. In 2014-2015, an Ebola outbreak dealt a severe blow to the population and economy. The EFSL pioneered humanitarian and development programs during and after this crisis.



Dry season production of cassava leaves, a nutritious green vegetable staple, is supported with disease-free, modern planting material.

In 2019, EFSL with support from CFGB through Tearfund Canada, started implementing the four-year Port Loko Food Security and Livelihood Project. The project focuses on six farming villages with a high number of Ebola survivors, and reaches 300 households of approximately 2,100 individuals within Port Loko District. Though the six villages have fertile land with soils which are good for agriculture, a lack of agricultural inputs, farming skills, clean water and gender inequalities still contribute to food insecurity.

The climate is humid and tropical with two distinct seasons: a rainy season from April to October, and a dry season from November to March. The average rainfall is between 3,500 and 4,500 mm. The main crops and food staples include cassava, rice, groundnut, maize and vegetables. Cashew, oil palm and banana also thrive in some villages.



EFSL has promoted expanded cashew production through education and distribution of seedlings.

The EFSL project supports the communities to mitigate their challenges and reduce hunger; focusing mainly on improved agricultural production and value addition. Farmer groups were formed and trained in group leadership, soil fertility management, diversification of nutrition, and gender roles and responsibilities. Planting materials were distributed, including modern, disease-free cassava cuttings, cashew seedlings and groundnut seed. Finally, the farmer groups are being assisted in establishing cassava processing facilities.

Discussions from the Network

Daniel Masanduko: My farm, well conserved (posts pictures).



Charles Mithowa: Looks good 👍👍 praise the Lord!!!

Swallie Gerald: AMEN

Keke Phoko: Good job, keep it up

Neil Miller: great work! Where are you located?

Daniel Masanduko: I'm located in Gogo village, Traditional Authority Ngabu in Chikwawa district of Malawi.



Tristin Bouwman: Nicely done! Where did you find so much crop residue?

Boniface Mutio: Farming GODS WAY

Hariso Halcho: When we are thinking about food security the only way is to keep the soil healthy and the only method to keep our soil healthy is constantly implementing conservation agriculture. So your activities are good & continue...

The Agriculture and Livelihoods Technical Advisors manage a Facebook Discussion Group from which the above conversations were copied. If you'd like to join the discussion, sign up at www.facebook.com/groups/CAinAfrica