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Canadian Foodgrains Bank
A Christian Response to Hunger

foodgrainsbank.ca

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Intercropping: A Traditional Practice with Significant Benefits

Intercropping, the practice of planting two or more crops in the same field at the same time, has been used by farmers around the world for millennia. Unfortunately, its widespread use by traditional farmers has sometimes been misunderstood to mean that it is an old-fashioned, detrimental practice. In fact, just the opposite is true!

Large-scale mechanized farmers have adopted monoculture (planting only one crop at a time) because of the difficulty of mechanically harvesting a field with two crops and because of their widespread use of herbicides, which are often labelled for just one class of crops and are therefore difficult to use in crop mixtures. Small-scale farmers, who harvest by hand and don't use herbicides are best off adhering to the excellent, time-proven practice of intercropping.

Intercropping covers soils more effectively than a monoculture.

The main benefits of intercropping are:

1. Increased production per unit of land: By combining different crop species, a farmer can more fully utilize the soil and sunlight available in a given field. Plants with different rooting patterns, and different above-ground shapes, make the best intercrop companions since they compete less with each other. Together they generally produce more than either crop could alone. This is especially advantageous for farmers with limited land holdings.

2. Reduced risk: If one crop suffers from drought or pests, having another crop in the same field means that the farmer will still harvest something. Pests and diseases also tend to have more trouble spreading in crop mixtures than in monocultures.

3. Improved soil cover and soil health: Maximizing soil cover is a central principle of CA, and intercropping accomplishes this more effectively than monoculture by producing more biomass, and keeping growing crops for more of the year. Furthermore, keeping soils covered with living plants promotes soil biological activity, and soil health, more effectively than dead mulch.

To learn about additional benefits of intercropping visit: http://stipulae.johnvanhulst.com/DOCS/PDF/AB-4%20Intercropping.pdf

Yield implications

When crops are planted together, they will compete with each other to some degree. The yield

of each crop may be somewhat lower than it would be if it was planted by itself. However, in a well-planned intercropping system, the total production per unit of land will almost always be higher. Scientists use the term Land Area Index (LAI) to measure the production of an intercrop compared to sole-cropping. Whenever the LAI is greater than 1.0, it means that intercropping out-performed the individual crops planted alone. In studies of intercropping, LAI values of 1.1 to 1.4 are commonplace, indicating that intercropping produced 10-40% more than the monoculture alternative.

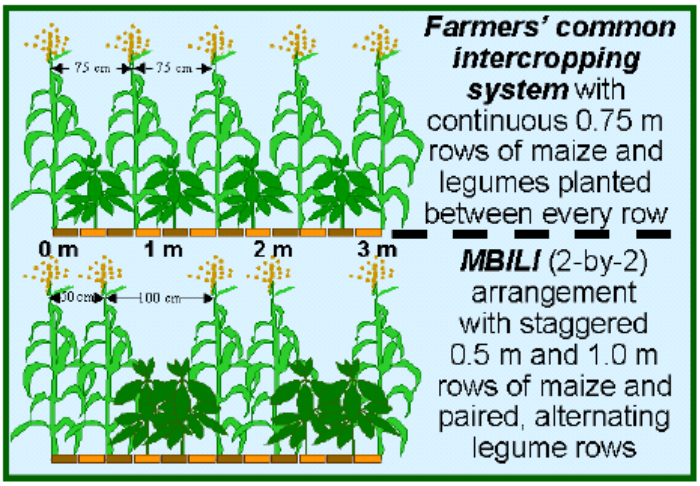
Optimum plant populations for intercropping

The best intercropping systems include a tall main-story crop and an under-story crop that can tolerate a bit of shade. Their relative maturity is also different so that one crop matures early and one matures later. One example of such a system is maize intercropped with pigeon pea, while another is cassava intercropped with beans or cowpea. In these cases, the planting density of the upper story crop (e.g. maize or cassava) is generally kept the same as it would be when planted alone, while the population of the understory crop may be reduced somewhat.

With intercrops that mature at a similar time (e.g. maize and common bean or cowpea), there is more competition, and care should be taken to not to over-plant. This is especially important in drought-prone areas, since high plant densities use more soil moisture and can cause crops to suffer.

If the understory crop is of high value, and the farmer wants to maximize its production, the planting density of the upper-story crop should be reduced. This is commonly practiced with maize-bean intercropping when beans are the main interest of the farmer. Maize is also planted at a low population with tomatoes in hot climates since the maize provides shade, and helps the main crop (tomato) stay cool and produce more.

An innovative intercropping system, developed in Kenya, maximizes production from maize-legume intercropping. Mbili (which means "two" in Kiswahili) involves planting two rows of beans between two rows of maize (see diagram). The total number of plants is the same as if the farmer alternated single rows of maize and beans, but the total yield is consistently higher.



Systems Assessments

Imagine you have some guests coming over to visit and you'd like to serve them tea. While this sounds like a relatively simple task, making tea depends on a whole host of steps, processes, and assumptions that we often don't think about. If you're going to buy the tea, sugar, and milk, is there a reliable store with fair prices and good quality products close to you? Do you have enough money to pay for these things? If not, where are you going to get the money? Do you have a pot big enough to make the tea in, and a stove or a fire to cook it over? Do you have enough cups for all of your guests, or are you going to have to borrow cups from the neighbours? Do you have piped water in your house, or will you have to fetch water, and if so, is it clean, healthy water? Are you strong enough and do you have enough time to do all of the work involved? Do you know how to make good tea?

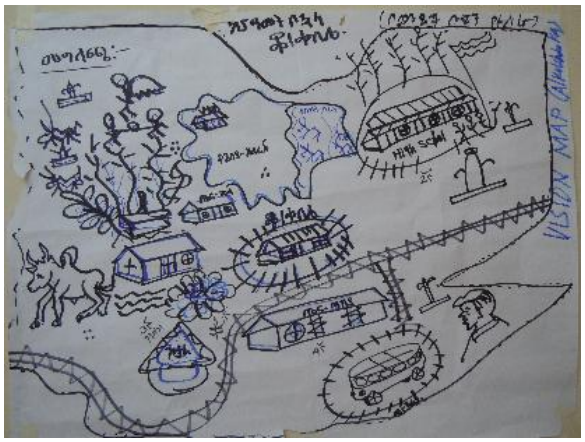
This may seem like a silly example, but often when we are planning projects in a community we don't carefully think through all of the steps involved and all of the things that are needed in order for conservation agriculture to succeed. Will farmers be able to buy seeds and appropriate tools? Is there sufficient labour and access to markets? Do farmers have secure tenure of sufficient amounts of productive land? These are some examples of things that can be just as important as the technical knowledge about how to plant a CA plot.

A systems assessment is a process designed to help us think through all of these steps, processes, and assumptions we're making when we design a conservation agriculture project. It attempts to reach a holistic understanding of the local context; challenges pre-conceived ideas and assumptions; takes into account the interactions between the different parts of a system; includes different ideas and perspectives; emphasises co-learning and co-creation together with stakeholders; and searches for context specific solutions.

There are many ways of conducting systems assessments, but a good process should take into account the overall complexity of a farming system, but also identify the most critical elements that the project needs to address. It should be simple enough to be implemented by local partners with only minimal amounts of training, and it should be

highly participatory, involving a wide range of stakeholders. At the end of a systems assessment process partners should have the basic elements of a context specific change strategy that they can further develop into a project proposal.

Canadian Foodgrains Bank has been experimenting with systems assessments over the past year, first with a partner in Ethiopia (see below) and more recently with other partners involved in CA in East Africa. While the process of conducting these assessments has been challenging, feedback from partners has been very positive. If you'd like more information about systems assessments and systems thinking, Oxfam GB has short video and discussion guide on systems which can be found at https://www.youtube.com/watch?v=WfyWgp95kgA. If you'd like to learn more about how the Canadian Foodgrains Bank is using systems assessments in their work, please contact Mike Salomons (msalomons@foodgrainsbank.ca).



This "Rich Picture" illustrates a community vision for food security in Humbo and Damot Woydie in 10 years.

Terepeza Development Association (TDA), based in southern Ethiopia, conducted a systems assessment as part of the planning process for a new CA project in the Humbo and Damot Woydie communities. This process began with two focus group discussions in April, 2015 attended by government and cooperative leadership. TDA presented the project idea, and farmers who were involved in a previous CA project shared their experiences. Participants helped develop "Rich Pictures" to illustrate their vision of community food security in ten years' time.

Following these meetings, TDA staff conducted key informant interviews, household surveys, and other participatory methods to gather information about the local food security situation.

In June, 2015 a four-day stakeholder workshop was convened during which TDA staff presented their findings. During this workshop participants identified further opportunities and constraints, and developed a "Theory of Change" which highlighted key areas of intervention for their CA project.

Following the 2nd stakeholder workshop, TDA developed a project proposal based on this theory of change. They are currently in the process of conducting their baseline survey and beginning work on this new CA project.

Discussions From the Network

Abdi Gamba: Give your comments on this new CA field.

Jimmy Wa'Ezinass Mgamba: Need additional mulching though its new CA field. Maize looks nice.

Ruwona Erick: Crops look healthy. Mulch looks low. Add mulch until you no longer see the ground, that is 100% cover at 5-15cm high...

Boniface Wairimu: Abdi I've realised you are my colleague at ACT! … I'm also managing AGRA project here in Laikipia, Kenya… Lets keep in touch.

Neil Miller: I recently visited the ACT-AGRA project near Machakos, Kenya... After 4 season with improved plant growth and residue retention, they were able to maintain soil cover through the dry season to near 30%.

Boniface Wairimu: Importation of residue is not sustainable and we normally urge farmers to retain at least 30% of the total residue...

Jal Zackis Jrecko Godfred: Scaling with residue is…the hardest task ever…I think we should introduce cover crops since they will be able to cover the soil like residue.

Abdi Gamba: Use of cover crops…is the best one since it has multiple benefits to farmers

The CA Technical Officers 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/CAinAfrica.

Partner Profile: Growing Nations Trust (Lesotho)

Growing Nations Trust (GNT) is a church-based development organization formed in 2002 in Lesotho to assist rural people struggling to feed their families. GNT started in 2002, and was registered in 2008 as a trust under the Lesotho Evangelical Church. Initially GNT focused on biblical worldview teaching, orphan care, and home-based care, but with time they began to implement agriculture development projects.

GNT currently partners with MCC and CFGB in implementing the GNT Conservation Agriculture Demonstration Farm. The partnership started in April 2012 when GNT introduced conservation agriculture to the community of Maphutseng Valley, Mohale's Hoek District.

In addition to promoting conservation agriculture practices with traditional cereal crops, GNT is encouraging farmers to plant fodder crops in their fields. They had Roland Bunch train their staff on green manure cover crops, and they have introduced some winter cover crops to the communities they work in.

To encourage young people to farm, GNT established a one-year residential program. The graduates are expected to go back to their communities and demonstrate what they have learnt. In 2013, six students graduated from the residential program. Nine students graduated in 2014 and 11 in 2015. Four graduates from the resident program are currently involved in GNT's agriculture extension support.

GNT has calculated gross margin budgets for CA systems comparing planting basins, locally known as Likoti, with conventional systems. The findings reveal that Likoti produce significantly higher gross margins than conventional systems, due principally to dramatically higher yields.

Fodder radish, oats and rye relayed into a maize crop are some of the cover crops introduced by the project in Lesotho

2014/2015 residential programme students celebrate their graduation

CATO Schedule: Neil Rowe Miller

18-22 January
Embu, Kenya
Kenya CA Training of Trainers

1-5 February
Nebbi, Uganda
End of Project Evaluation: Kucwiny IFSP

2-6 February
Moshi, Tanzania
MCC retreat

16-19 February
Harare, Zimbabwe
CFGB CA Partner Annual Meeting

CATO Schedule: Putso Nyathi

1-2 December
Pretoria
FAO Regional CA working Group

13-17 December
Durban, South Africa
MCC retreat

January
Dates to be confirmed
Tete, Mozambique

February 8-19 February
Harare, Zimbabwe
CFGB partners workshop