

Managing Conservation Agriculture (CA) Demonstration Plots

How can we demonstrate CA in rural communities?

Farmers believe what they can see and experience. A powerful vehicle for CA extension is the use of demonstration plots. On these defined land areas, new agronomic concepts are shown to farmers.

Demonstration plots are most effective when a new technology is located side by side with the normal farmers' practice (known as a paired plot design)

How can the extension of CA be more successful?

- Demonstrate several CA options to farmers and compare them with a traditional method
- Make farmers aware about the benefits and challenges of different systems by associating an intensive participatory evaluation process with a demonstration plot
- Regularly discuss the benefits of CA on demonstration plots in the short and longer term

It is important that CA demonstration plots are established, tended and observed for at least 3-5 years so longer term benefits can be demonstrated

What are the basic requirements of a demonstration plot?

Before starting a CA demonstration plot it is important to know farmers' preferred crops and what planting method they use in this area (e.g. manual, animal traction or even tractor-powered systems). Depending on the crops and planting system, treatments for the demonstration plot can be identified. Select a uniform land area without trees or anthills. Sufficient plant nutrients are needed either through mineral fertilizers, organic manure or compost. The level of fertilization required will depend on the agro-ecological environment (the soil type and rainfall regime). Fertilizer recommendations for conventional agriculture are usually provided by all National Research and Extension Services (NARES) and can be used as a guideline. For better comparison, both CA interventions and the normal farmer practice should get equal amounts of fertilizers and should also have the same crop varieties.

What other components of CA are important to demonstrate?

Crop rotations should be introduced as soon as possible to demonstrate their additional benefits to farmers. This can be achieved by splitting each treatment into half and rotating one side of the plot with the other side in alternate years. Crop rotations should be carried out on all treatments to better interpret the results. Leguminous cover crops are also important components of the CA system which could be gradually incorporated on the demonstration plot. Cover crops control weeds, enhance soil fertility through nitrogen fixation and provide additional income and nutrition through their seed and biomass. The demonstration plot should be seeded when soil moisture is conducive to rapid germination and crop emergence.



Photo: Christian Thierfelder

Conventionally tilled (right) and CA treatments (left) in a paired demonstration plot



Photo: Christian Thierfelder

Farmer family hosting a CA demonstration plot with soybeans



Photo: Christian Thierfelder

Farmers evaluating a demonstration plot during an exchange visit

What can we observe on CA demonstration plots?

The differences displayed on the demonstration plots are the effects of no-tillage and residue retention; i.e. the traditional method will have been previously tilled and residues will have been removed or burned whereas the CA method will be established on undisturbed soil and residues will be retained on the soil surface.

What is a good size for a demonstration plot?

It is important that the size of the demonstration plot is not too large. A plot of 1000m² for each treatment has proved to be a good size to demonstrate a technology to farmers. This will also be big enough to split the treatments at later stages, e.g. when a rotation or intercrop is introduced on the demonstration plot.

CA demonstration plots for manual farming systems

There are several technology options currently available to demonstrate manual CA systems: **a)** the dibble stick; **b)** the jab-planter; **c)** planting basins. Choose relevant CA seeding techniques - one for each demonstration plot - to give farmers options and compare them with the traditional hoe-based land preparation system. Farmers will gradually see the benefits of each system, its labour requirements, precision and the ability to plant in a timely manner.

CA demonstration plots for animal traction systems

Where animal traction systems are common, two basic systems can be demonstrated to farmers: **a)** the rip-line seeding system and **b)** the animal traction direct seeding system. It is advisable to compare both CA seeding systems with the traditional mouldboard plough. Farmers will have to learn how to operate, calibrate and maintain the seeding equipment and the traction animals also need training with the new implements. It is not advisable to mix manual systems with animal traction systems on a demonstration plot unless farmers in the target community practice both systems and want to know the benefits and challenges of each.

Challenges on demonstration plots

Farmers often expect miracles from a demonstration plot in the first year, but they need to understand that CA benefits will not appear immediately. If fertilizer levels and seed varieties are the same, there will probably be very little difference in yields between treatments in the first season(s). The biggest benefit farmers acknowledge in the short term is the reduction in labour needed for land preparation, seeding and, if herbicides are used, for weeding. Over time, weed pressure goes down and soil quality improves, especially if rotations and cover crops are used in the system.



Photo: Christian Thierfelder

Management problems such as late weeding will cause poor maize growth on a demonstration plot

How can those challenges be overcome?

- ✓ Initially demonstrate CA on small fields to better manage field operations and weeds and maintain high standards
- ✓ Share information between farmers and extensionists
- ✓ Train farmers (and extensionists) on how to use new equipment , how to keep and maintain residues, how to control weeds and how to manage their demonstration plots.

With time and experience the work on CA demonstration plots will be successful both for farmers and extensionists, which will lead to increased adoption of CA systems by many farmers.



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