Conservation Agriculture

Year 1 Farmer Training Booklet

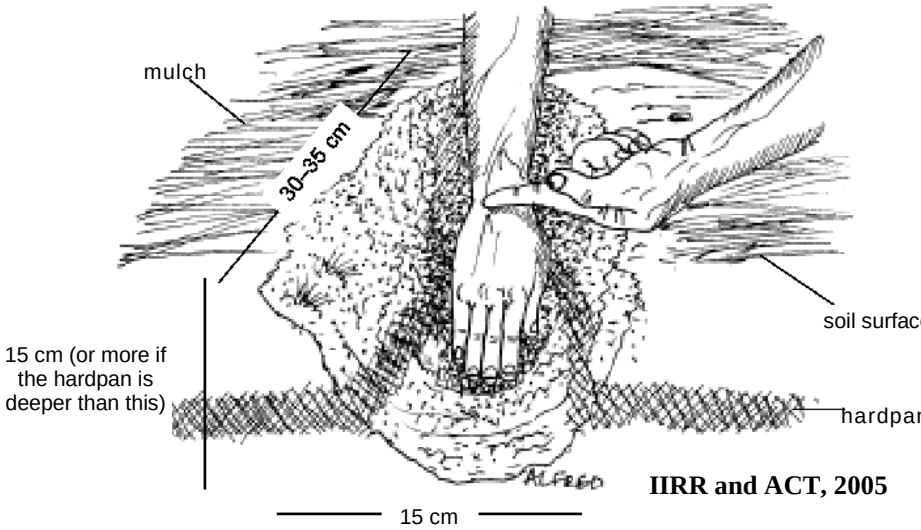
Table of Contents

Why Use Conservation Agriculture?

In the past, with abundant land, farmers could farm small parcels of land, and allow the rest of their land to rest. During this fallow period, growth and decomposition of native plants restored the fertility and productivity of the land.

Today, most farmers do not have enough land to fallow. Productivity declines every year, and families struggle to feed themselves.

Minimizing Soil Disturbance



Step 1: Dig planting basins 15 cm deep if using manure or compost, and 7.5 cm deep if using fertilizer unless the soil has a hardpan.

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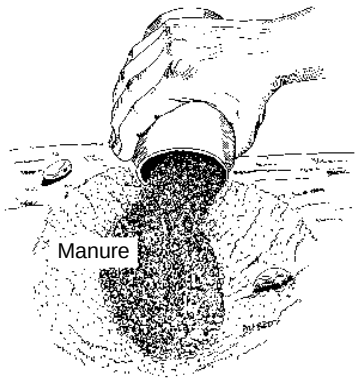

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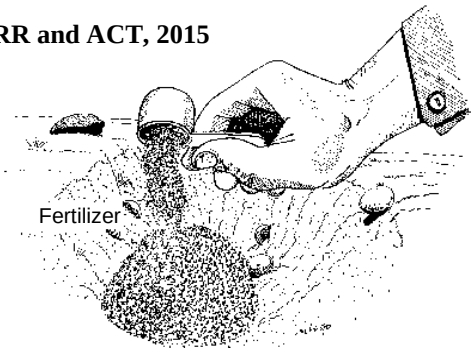
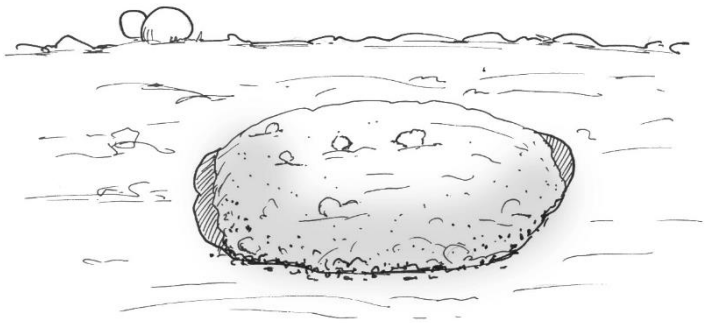


Step 2: Add 350 ml of manure/compost or 1 soda bottle cap of fertilizer and cover with soil.

Step 3: Place seed in basin and cover with soil. Be sure to fill the basin well so that water doesn't collect and drown the seedlings.



Importance of Soil Cover

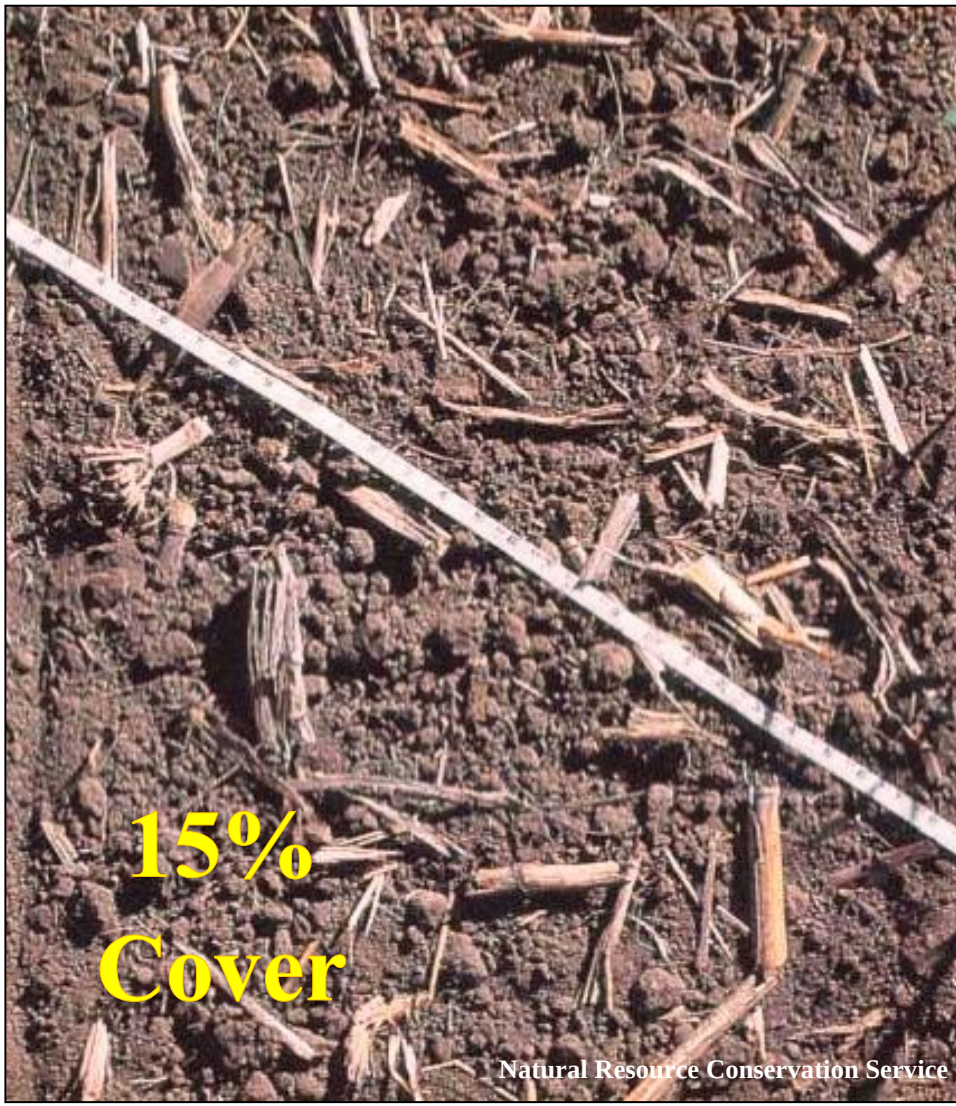
What are the benefits of maintaining permanent soil cover?

One of the key principles of CA is maintaining soil cover throughout the year using dry mulch, crop residues, or cover crops. In doing so, farmers reap the following benefits:

When soils are left bare (left picture), they dry out quickly, causing crops to suffer. Mulching (right picture) protects against drought

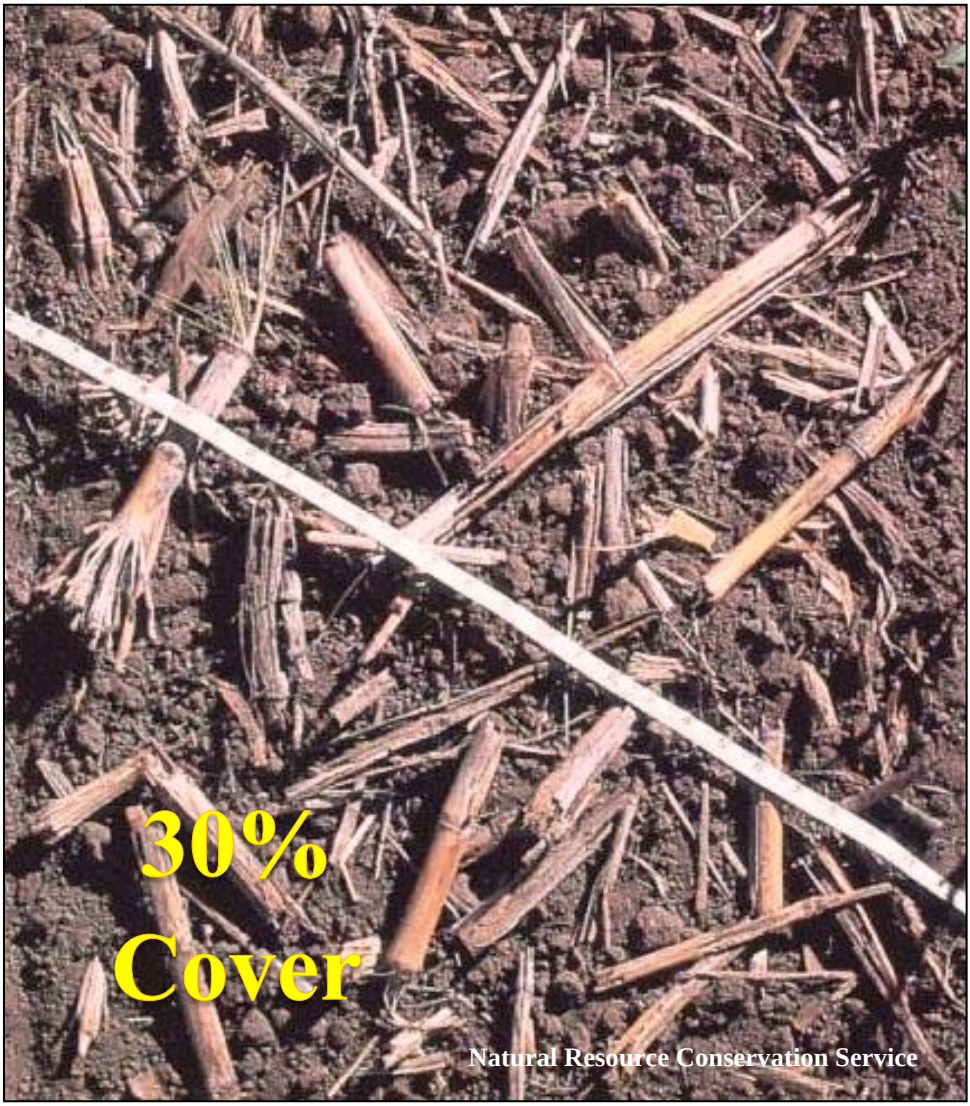
Keeping soils covered prevents erosion from water and wind.

How much is enough



Too little soil cover will not produce the benefits of moisture retention and soil erosion prevention

soil cover?



30% soil cover is the minimum that Conservation Agriculture farmers should maintain throughout the year.

How much is enough

Farmers who maintain more than 30% soil cover will gain even greater benefits!

soil cover?

Farmers who can maintain 100% soil cover will also benefit from greatly improved weed control.

Planting with Precision

Precision planting includes:

- **Planting in lines** – to keep consistent plant spacing and make weeding easier
- **Using optimum plant spacing** – see page 15.
- **Using proper planting depth** – 3-4 cm deep for large-seeded crops like maize and beans, and 1-2 cm for small seeded crops like sorghum and millet.
- **Timely planting** – Fields should be prepared during the dry season so that they can be planted as soon as the rains start.

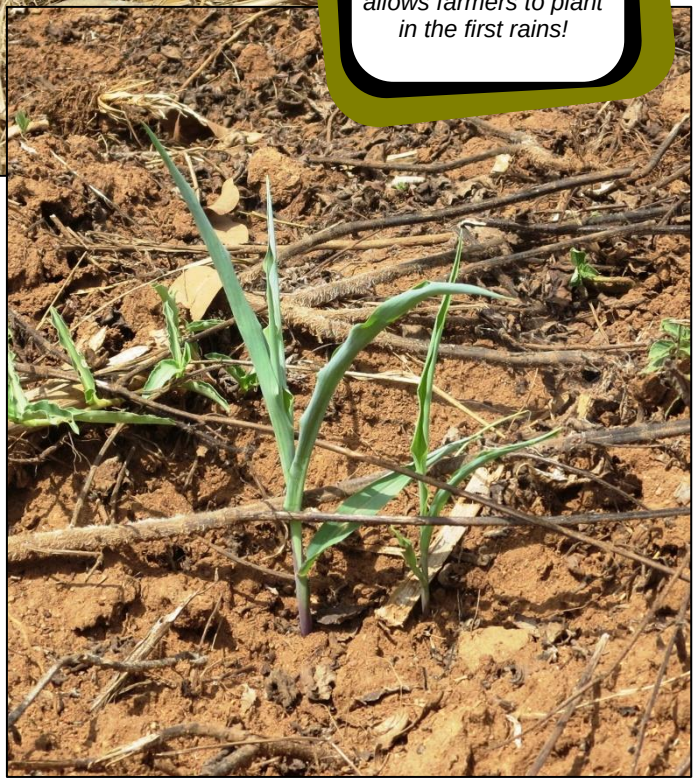
What is the proper spacing for crops?

The best plant spacing depends on many factors:

- Soil fertility
- Anticipated rainfall
- Intercropping
- Variety
- Etc.

Soil cover allows early planting

Early-planted crops risk drying up if rains don't continue. Keeping soils covered allows farmers to plant in the first rains!



Cover Crops

Why are our soils becoming less healthy and productive?

With land becoming scarcer and scarcer, there is no longer time to fallow fields to let them recover naturally. Cover crops can help reverse this trend.

Cover crops help restore soils by:

- **Keeping soils covered**, one of the main principles of CA!
- **Building organic matter levels** in the soil.
- **Producing nitrogen and mobilize other fertilizer elements** from deep in the soil.
- **Suppressing weed growth**


Cover crops
produce fertilizer


Cover crops produce
food for humans


Cover crops produce
food for livestock


Cover crops provide
late-season weed control


Pigeon pea in maize


Cowpea in sorghum


Jackbean in cassava


Velvet bean in banana

Controlling Weeds with CA

Weed control under Conservation Agriculture can be challenging, especially in the first few years

Since plowing is eliminated, farmers need to find other ways to control weeds.

By combining CA tactics, weeds can be controlled effectively:

- Soil cover (mulch)
- Optimum crop spacing
- Crop rotation
- Intercropping
- Cover crops
- Shallow hoeing
- Herbicides

If you use herbicides, be sure to follow safety guidelines to protect you and your family!!


Shallow hoeing may be used
with minimum disturbance


Optimum crop spacing
shades out weed growth

Crop Residue Management

What challenges do we face in maintaining soil cover?

Crop residues are used for many purposes including livestock feed, fuel, construction materials, etc. We need to take all these needs into account as we build a strategy to maintain soil cover throughout the dry season.

Strategies include:

- Planting fodder grasses and legumes
- Zero-grazing systems using forages and crop residues
- Fencing
- Controlled grazing (maintain at least 30% soil cover)
- Establishment or enforcement of grazing bylaws
- Etc.


“Give livestock the best…


…Give the soil the rest.”

Adapted from training materials developed by:

- **Canadian Foodgrains Bank (CFGB)**
- **Africa Conservation Tillage Network (ACT)**
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