Cover Crops

A cover crop can be defined as any type of plant grown to improve any number of conditions associated with regenerative, sustainable, conservation agriculture.

Cover crops are fundamental tools used to manage soil fertility, soil quality, soil water, weeds, pests, diseases, diversity and wildlife in an agro-ecosystem.

Modern agriculture has identified that soil is the most important regenerative resource available to all growers.

Cover crops are one tool that can be employed across the spectrum of commercial agriculture to ameliorate and improve limiting soil functions.

The main aim of cover cropping is to improve profitability.

Cover crops are multifaceted in their use, the grower being the most important person to identify where and how they can be used.

Cover cropping is a universal concept with an individual application.

Each grower needs to start off by identifying their farm's objectives and challenges.

From here it is possible to formulate a cover crop programme.

It is important to track progress. Record your starting point and the impact of your cover crops.

Conservation agriculture principles

There are certain principles that underpin building healthy soils.

These practices are interdependent – violating one reduces the contribution of the others. Look at your system holistically.

- **Minimise soil disturbance:**
  Avoid disturbing the soil.

Tillage disturbs the soil's microbiology, the plant root systems and the valuable cover that protects the soil against erosion and evaporation.

- **Use diverse plants, rotations, and (where possible) animals:**
  Where possible, include multiple species in cover-crop mixes.

Diversity ensures that at least some species will grow and flower for much of the year and feed pollinators and other insects that help control damaging pests.

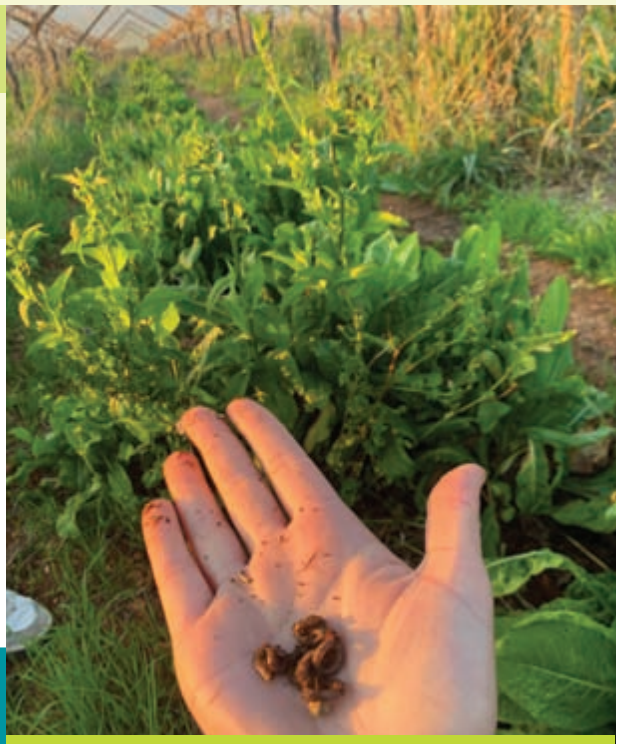
- **Always have live roots going in your soil**
  Keep living roots in the soil as long as possible.

Growing roots loosen and aerate the soil, supporting the below-ground ecosystem. The temperature control of cover crops increases the root-growing season.

- **Build armor on the soil's surface**
  Keep the land covered.

'Armour on the soil surface' blocks weed growth, buffers the heat and cold, stops erosion and feeds microbiology. Residue and living plants serve as cover.

Building "soil armour" layer by layer



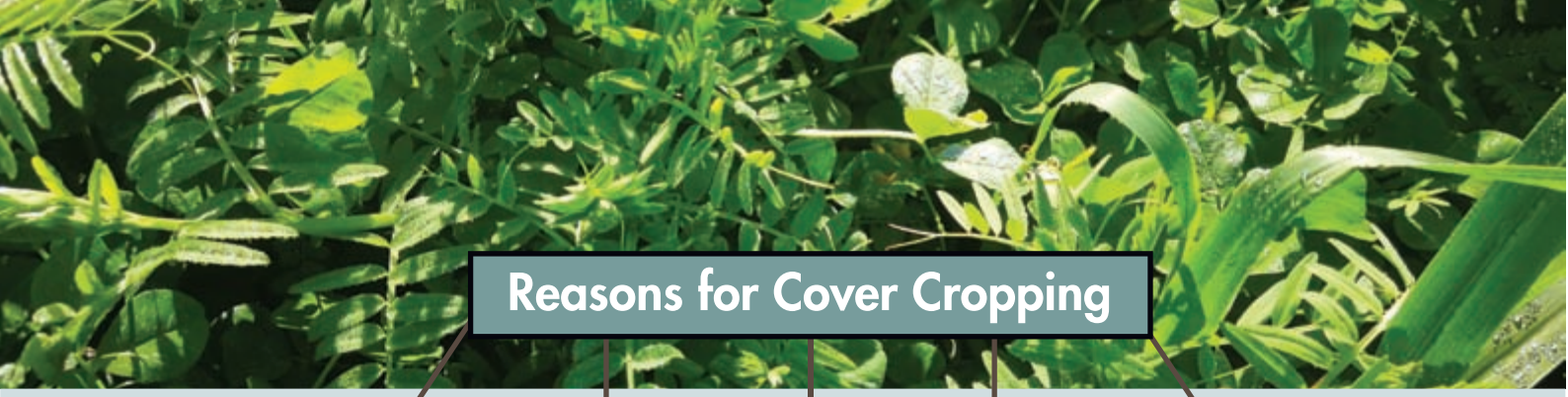
Earthworms in this vineyard's soil. Planted to cereals, plantain, chicory and clovers.

What are your objectives?

It all begins with your objectives…

The key to the effective use of cover crops is the correct identification of your soil and broader farming concerns. Once the objectives have been identified, selecting an appropriate plant species or mix thereof becomes a simple task.

• Improve soil health	• Increase biodiversity
• Build organic matter	• Attract beneficial insects
• Alleviate soil compaction	• Create a trap crop for insect pests
• Increase organic nitrogen	• Improve drainage
• Cycle nutrients	• Protect water quality
• Reduce soil erosion (by wind or water)	• Control nematodes
• Improve water infiltration	• Increase aggregate stability
• Increase water retention	• Graze livestock
• Suppress weeds	• Improving soil tilth



Reasons for Cover Cropping

Soil properties

Erosion control
Increase water infiltration
Reduce compaction
Stabilise soil aggregates
Build organic matter

Soil nutrients

Nitrogen fixation
Nitrogen scavenging
Phosphorous scavenging

Soil toxicity

Remediation of heavy metals
Salt build-up
Remediation of pollutants

Pest managment

Weed control
Nematode control
Disease control

Biodiversity

Forage
Attract beneficial insects
Attract game birds and wildlife

Selecting cover crops for a purpose

When selecting a cover crop, start by defining your objectives and challenges! Choose cover crops to fulfil your particular purpose or a combination thereof, while taking into account your timing, planting window and resources.

- **FIX NITROGEN:**

Increase soil nitrogen levels using legumes. Plants such as sun hemp, velvet beans and cow peas fix atmospheric nitrogen, making it available to the subsequent cash crop.

Clovers and lucerne can be included in perennial pastures and permanent orchard floors to increase the biodiversity and benefit the other pasture components.

- **BUILD ORGANIC MATTER:**

Grass species generally produce the highest yields and greatest biomass. Grasses tend to have a higher carbon to nitrogen ratio and can provide large amounts of residue if allowed to go to maturity.

Often used in cover crop mixtures to 'add bulk' and as a palatable component to mixes that can be grazed too. Examples include forage sorghum in the warm seasons and black oats in the cool seasons.

- **INCREASE WATER INFILTRATION:**

As the effects of climate change become more noticeable, moisture (or the lack thereof) becomes of greater concern. Building soil organic matter to hold previous rainfall becomes increasingly important.

Usually added to mixtures for their compaction-breaking ability and their palatability to livestock, certain Brassica species assist in improving water infiltration. The Tillage Radish's large tap root disintegrates to create voids into which moisture can flow and be retained.

Mixed-species, warm-season cover crop, including forage sorghum, open-pollinated maize, sunflower and sun hemp

Why mix cover crops?

Planting a cover crop mixture allows you to achieve multiple objectives at once. A blend of plant species allows you to combine benefits. Further to this, multi-species cover crops tend to produce more biomass, are more tolerant to varied conditions, attract a wider spectrum of beneficial insects and pollinators and provide more forage options.

What are the advantages of a multi-species mix?

Cool-season mixture including lupins, temperate cereals, vetch, and radish

1. No one species can deliver all the advantages multiple cover crops deliver in combination. Some fix nitrogen, some scavenge phosphorous and some control weeds or attract beneficial insects.

2. Each plant species offers a different food source for bacteria and fungi in the soil. More variety in the food source creates the habitat for a greater variety of soil organisms, most of which have a positive impact on the soil.

3. Organic matter production is put on the fast track.
A diversity of plants above ground creates an underground habitat with a healthy balance of predator and prey organisms in the soil, resulting in improved nutrient cycling.

Questions to ask before planting a cover crop

Apart from defining your objectives:

1. What is the best time and place to fit cover crops into my rotation?
2. What equipment do I have available to plant the crop?
3. How will I terminate the cover crop to ensure maximum benefit to the soil and the following cash crop?
4. Will I have the time and resources to make this work?
5. What is my contingency plan? What are the risks and factors that "could go wrong"?

Temperate cereals and lupins in vineyard

Different seed types

Invest the same time and effort into your cover crops as you do into your cash crops!

AGT COVER CROPS & FORAGES AFRICA

The **InteliSeed** seed portfolio is supplied by AGT Cover Crops & Forages, a division of AGT Foods Africa. AGT produces and supplies high quality seed varieties that are suited to the South African context. AGT owns Agricote Coated Seeds, specialising in the application of beneficial agricultural products in order to improve seed to soil contact and plant establishment.

InteliSeed
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