

# Cover crops

Cover crops are crops sown to protect the soil from exposure to sun and rain, prevent weed growth and maintain soil fertility. **Green manures** are cover crops with main aim to build maximum organic matter.

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## Benefits of cover crops

- **Protection against erosion and runoff:** by covering the soil
- **Improve water holding capacity:** by improving soil structure via root penetration and build-up of organic matter
- **Increase soil fertility:** by improving soil structure, increasing soil life, addition of organic matter and fixation of nitrogen from the air (by legumes)
- **Weed suppression:** by covering the soil and/or breaking the weed cycle
- **Reduction of damage from pests & diseases:** by habitat provision for natural enemies and via specific characteristics of certain cover crops
- **Production of feed or even food** from certain cover crops



Be aware that cover crops do require additional labour; benefits may occur over the longer term and are not always immediately visible

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## Integration of cover crops

**Intercropping:** growing a cover crop in between rows of cash crop

- Cash crops and cover crops can be planted simultaneously
- Cover crop is preferably low growing and/or perennial
- Cash crop is preferably high growing and/or perennial



Banana plants intercropped with *Stylosanthes guianensis* [1]



Maize relay cropped with ryegrass [2]

**Relay cropping:** cash crop and cover crop partly overlap in growth

- Cover crop is planted when the cash crop is starting to mature
- After harvest of cash crop, cover crop will grow to maturity



Field peas grown as cover crop [3]

**In crop rotation:** cover crop planted after harvest of cash crop

Two options how to add a cover crop to your crop rotation:

- Grow cover crop during periods that land would otherwise lie bare
- Add one cycle to grow cover crops to your existing crop rotation such as a grass clover mix

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## Cover crop species

Many species can be used as cover crop, as long as they grow fast and permanently cover the soil.

Choose a crop which fits the problem you want to solve, for example:

**Increase soil fertility:**

choose a leguminous plant, like beans, peas or clover

**Reduce compaction:**

choose a deep-rooting plant, like barley or sunflower

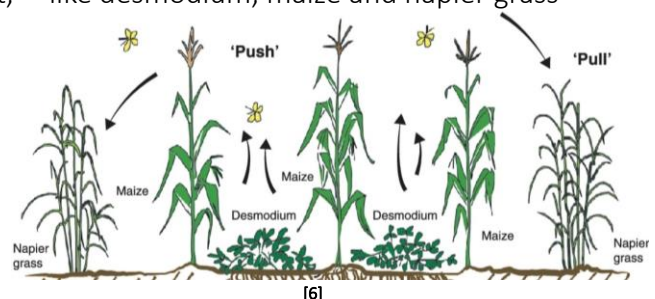
**Suppress pests:** choose a push-pull system, like desmodium, maize and napier grass



Lablab [4]



Barley [5]



## Cover crops

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### Cover crop species

There are some additional considerations when choosing a cover crop:

- Cover crop should fit local growing conditions, like rainfall and soil
- Cover crops should not pose a risk of transmitting diseases and pests to other crops
- If food and space are in short supply, maybe grow a cover crop that provides food or feed
- When intercropping: avoid creeping crops which may suffocate the cash crop

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### Managing cover crops

#### Sowing

##### Time of sowing:

- If intercropping, sow your cash crop and cover crop simultaneously.
- If relay cropping, sow your cover crop when your cash crop is established, for example when weeding
- In a crop rotation, time it so that the cover crop can be cut down before sowing the next crop
- Most cover crops will need water for germination

##### Sowing techniques:

- Small seeds can be broadcasted or sown in lines
- For large seeds, use a hand hoe or animal drawn direct planter
- If legumes are grown for the first time, inoculation of the seeds with rhizobia can help to profit from nitrogen fixation

#### Growing

##### Management during growth:

- Weed once during early growth stage of cover crop for good establishment
- Regularly slash, mow or graze the cover crop to avoid competition with main crop
- Prune creeping or climbing cover crops to prevent suffocation of the cash crop

Incorporation (only applicable to annual cover crops)

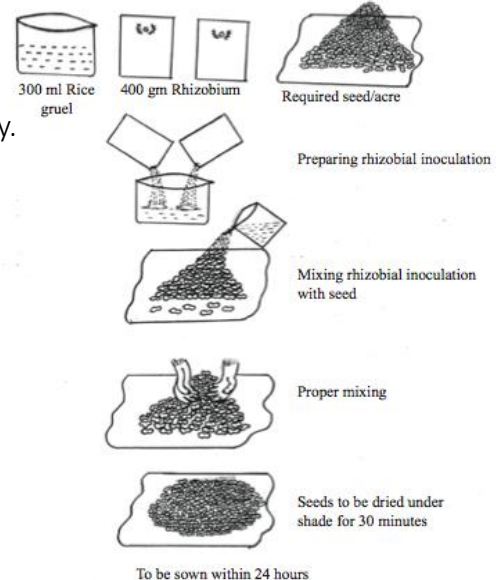
##### Time of incorporation:

- Just before flowering: maximum biomass is accumulated, cover crop should not set seed
- 2-3 weeks before planting the next crop, to prevent nutrient losses from the decomposing cover crop

##### Incorporation techniques:

- Knock down the crop by rolling, cutting or tilling
- Crush the material into pieces
- Incorporate it superficially: in heavy soils 5-15 cm, in light soils 10-20 cm deep
- In warm and humid climates: leave on soil surface as mulch
- Add a light top-dressing of compost after incorporating the cover crop for extra soil quality

#### Seed inoculation [7]



#### Suffocation should be prevented



#### Slashing down a cover crop [8]



Picture sources:

- [1] [www.cirad.fr](http://www.cirad.fr) [2] [www.farmwest.com](http://www.farmwest.com) [3] [www.territorialseed.com](http://www.territorialseed.com)  
 [4] [keys.lucidcentral.org](http://keys.lucidcentral.org) [5] [www.feedipedia.org](http://www.feedipedia.org) [6] Pickett et al. (2014)  
 [7] [agritech.tnau.ac.in](http://agritech.tnau.ac.in) [8] <http://teca.fao.org>