

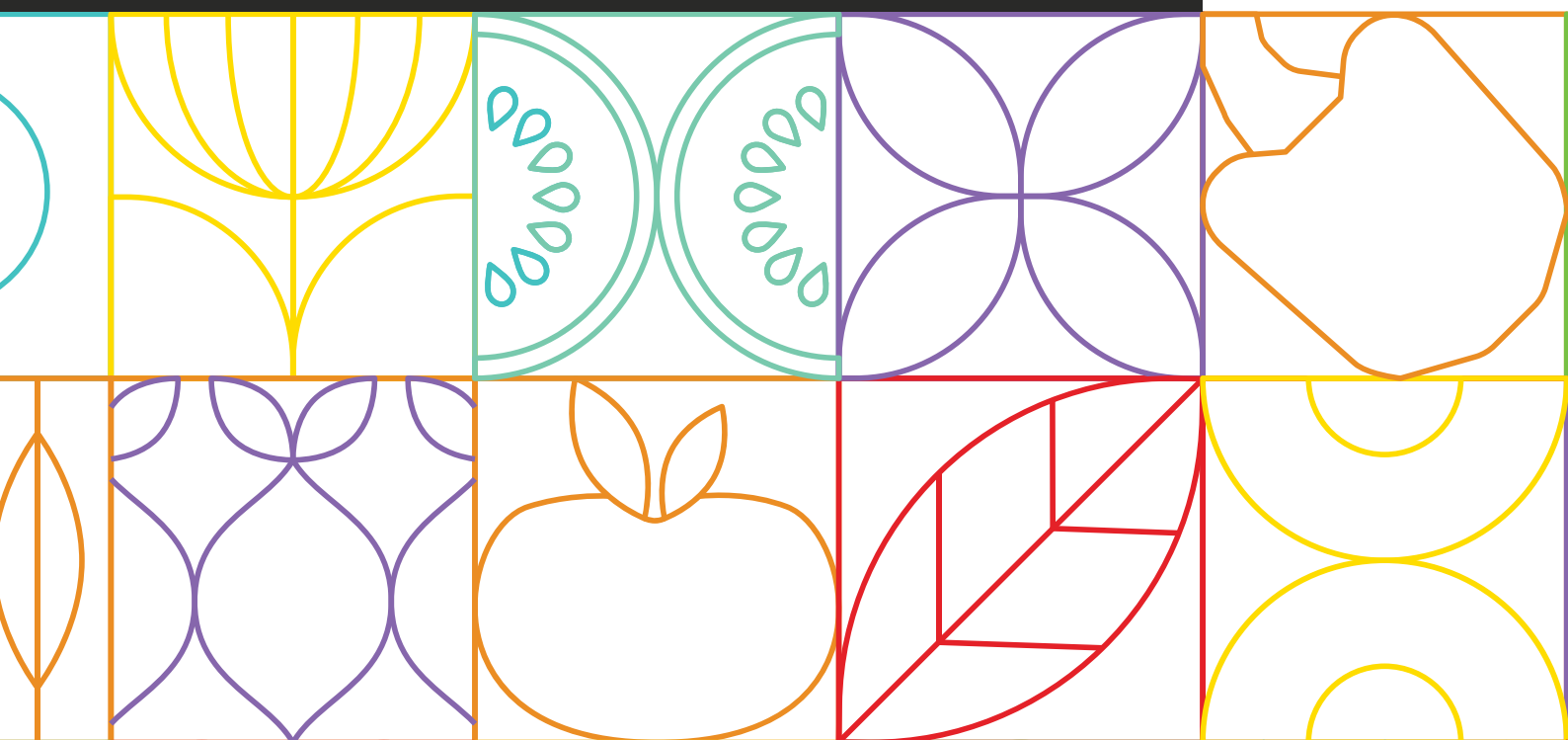
# VegNET3.0 2023 Wrap Up



National Vegetable  
Extension Network  
NORTHERN TERRITORY

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Hort Innovation VEGETABLE FUND

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# Project Summary

## About VegNET3.0

VegNET3.0 is tasked with keeping Australian vegetable growers informed about current industry development, research, and resources in their region - ensuring growers receive the assistance and information that meets their needs to support efficient and profitable businesses.

The program is nationally coordinated by AUSVEG and delivered "on-the ground" by regional development officers in key vegetable-growing regions who are responsible for developing and delivering regional extension plans.

AUSVEG CEO Michael Coote explained that having a nationally coordinated VegNET program will help ensure that growers all around Australia will have access to a consistent, industry-focused extension program that will put their needs first in their efforts to be productive, profitable, and competitive in an ever-increasingly global marketplace.

NT Farmers is the industry body that delivers the VegNET3.0 project to the Northern Territory and the regional development officer managing this project is Mariah Maughan.

For any questions, assistance, or enquiries on how to get involved please email her at [ido@ntfarmers.org.au](mailto:ido@ntfarmers.org.au) or call 0417 618 468.

*Farm value-add tour*





# 2023

## Events

### Soil and Water Efficiency workshop in Katherine

The VegNET project kicked the season off by speaking to Katherine growers about what VegNET has in store for the year as well as what services are available for them to utilise at a Water and Soil Efficiency workshop in March. The workshop was jointly run by NT Farmers included presentations, field walks, and even the chance to get down and dirty in a 1.9m deep soil pit!

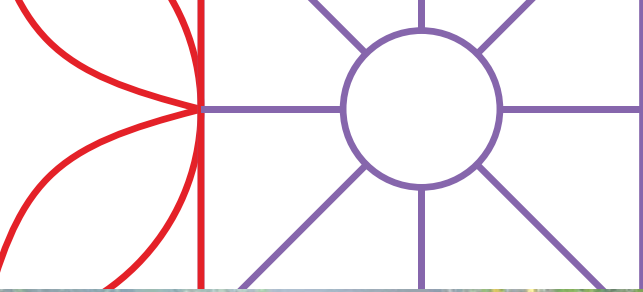
### Pre-season grower meetings and info session in Marrakai and Humpty Doo

Every year VegNET holds grower meetings on farm to provide resources, timely information, and updates to growers. Both the Marrakai and Humpty Doo meetings had a particular focus on water efficiency this year. NT Farmers Water Industry Development Officer, Di Renfree discussed with growers' different technology you can implement on farm from simple to high technology to help you water more efficiently, with the aim of increasing production. Former mango producer Martina Matzner also discussed with growers her experience with using soil moisture probes to help her make better watering decisions. This ultimately helped her increase her productivity and profitability.

The events also showcased the new Pests and Beneficials wheels available for growers to use. These posters show what common pests to look out for in your crop at different stages of the crop lifecycle and the beneficial insects that kill those pests. The posters are available for snake bean, okra, Asian melons and eggplant with page references to the NT Governments Field Guide to Pests, Beneficials, Diseases and Disorders of Vegetables in the Northern Territory.







# 2023

## Industry Tours

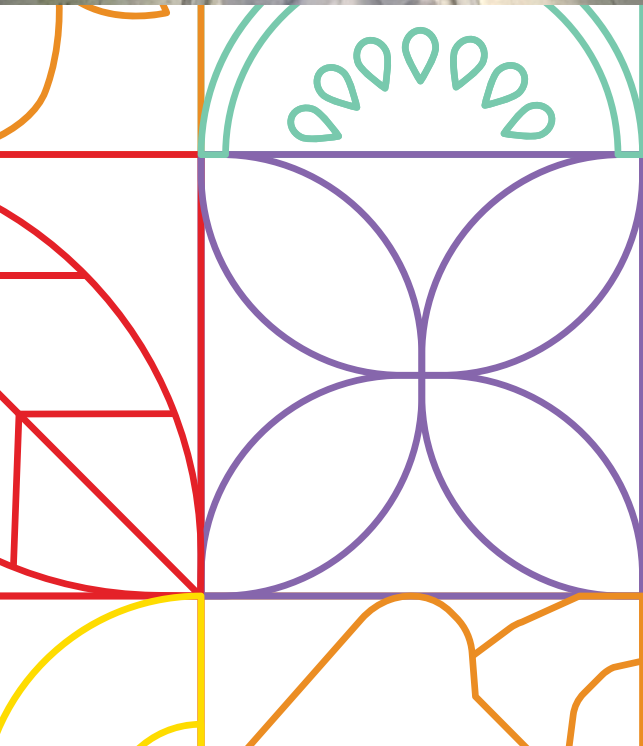
### Protected Cropping Industry Tour, Brisbane

In July VegNET took 6 NT vegetable growers from the outer Darwin, Katherine, and Central regions of the NT to the 2023 Protected Cropping Australia Conference in Brisbane. This conference was a great opportunity for growers who were either already doing protected cropping or interested in moving their business into protected cropping in the future to gain further information. The attendees heard presentations from leading experts, attended grower workshops, met with suppliers, and visited protected cropping farms.

Through obtaining grower feedback several attendees mentioned they met with potential suppliers, gained knowledge on the potential for protected cropping in their region and shared knowledge with other growers.

It's amazing to see where protected cropping is taking Australian horticulture and the NT is already starting to successfully be a part of this, adapting protected cropping techniques to a northern tropical climate.

*Protected cropping industry tour, Brisbane*







## Farm Value-Add Tour, Cairns

In October VegNET partnered with the Department of Industry Tourism and Trade to take 20 people over to Cairns to attend a three-day workshop on how producing a value-add product from produce can increase business profitability and where to start. The tour included vegetable, tropical fruit, and indigenous food producers, as well as government, university, and hospitality staff. It was important to bring all areas of the industry on the tour as producing value-add products in the Northern Territory is most successful with industry support as a whole, particularly in the areas of infrastructure and markets.

The week started off with farm tours to farms that use a portion of their produce (e.g. produce that doesn't meet desired market specifications) to create a value-add product such as a jam. From there participants spent a day in the commercial kitchen at FNQ Food Incubator where they made a food product of their own. They also got an insight into the various technology and machinery that can increase the efficiency and quality of production. The third area of the industry tour was a day looking at the business side of things. This got participants thinking about questions such as: 'does your insurance cover you? Are you following food safety laws? How to determine your use-by date? How will you market your product and is it financially viable? Participants heard from a range of speakers at FNQ Food Incubator, who addressed these questions. There is great potential for value-add food products to be produced in the NT and it is exciting to see what's on the horizon for this area of agriculture in years to come.



# 2023

## In the Paddock

### Compost Trial

The NT naturally has low organic matter in its soils. Organic matter is important for soil health and applying compost is a great way to increase organic matter.

During the 2023 season the VegNET project worked with a number of growers that applied compost to their soil to improve their soil health, in the hope to increase their yields, and decrease disease in their crops.

Soil tests were taken prior to and months after applying compost to test any improvements to the soil as well as seek feedback on the growers on any visual improvements.

### Soil Test Results

The soil tests from 2 out of the 3 farms showed that applying compost to soil improved their Cation Exchange Capacity (CEC) and organic matter considerably.

### What is CEC?

The CEC of soil explains the soils' ability to hold essential nutrients. The higher the CEC, the greater the soil's ability to hold onto essential nutrients and provide a buffer against soil acidification.

### CEC soil results

Farm	Un-composted CEC (cmol(+)/kg)	Composted CEC (cmol(+)/kg)
Farm 1	2.2	3.3
Farm 2	4.0	6.4
Farm 3	No change	No change

### What is Organic Matter?

Organic matter results from partly decayed plants and animal residues. Organic matter assists in maintaining soil structure, the supply and retention of nutrients, soil life and water retention. Essentially, organic matter can greatly improve the health of soil and therefore have an impact on the plants grown from that soil.

### Organic Matter soil results

Farm	Un-composted Organic Matter % (total carbon *1.75)	Composted Organic Matter % (total carbon *1.75)
Farm 1	0.99	1.7
Farm 2	2.3	4.4
Farm 3	No change	No change

### Grower Observations

The owner and manager of Farm 1 saw the okra paddock he applied compost too is less stressed and appears to be up-taking fertiliser better than the paddock he did not apply compost too. This grower also takes into account other soil management techniques he applied to the paddock alongside his compost through consultation with an agronomist.

The owner and manager of Farm 2 found a considerable improvement in his crop since applying compost. He has found he has a longer harvesting window with a stronger and healthier crop. He also found he used slightly less fertiliser than the paddock without compost.

Farm 3, although seeing no change in their soil results, has seen an improvement in their crop. They feel investing in their soil is important and will look into topping up compost every 2 years.



## Hydroponics trial

In 2023 VegNET partnered with a vegetable grower in Acacia Hills to grow cucumbers in a shade house hydroponically to gain an insight into how a simple hydroponics system works. Hydroponics is essentially growing plants in something other than soil. The trial used bagged coco-coir which is made from the husk of a coconut. Growers may choose to use a soilless media to minimise the disease that can live in the soil and to have greater control of the growing environment. For example, coco-coir is known for holding its water and nutrients very well. This means using potentially less water and fertiliser than you would in soil.

### How does hydroponics work?

#### Timer + solenoid

Having a timer and solenoid allows you to program your watering to set times of the day and for set durations. Hydroponics usually requires several waterings a day for short durations. The timer will turn the solenoid on which will start the water flow.

#### Dosage pumps

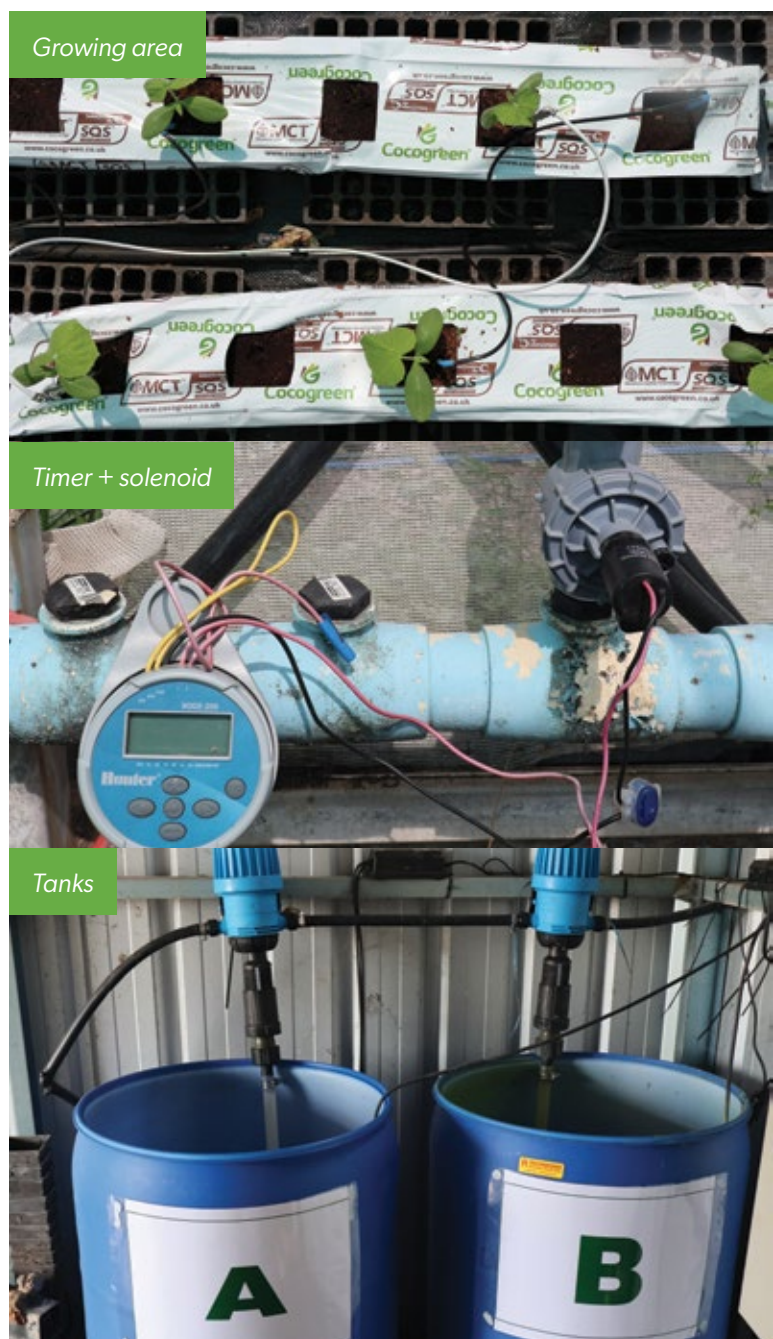
Different from conventional farming, hydroponics pumps a small amount of fertiliser during watering at every watering, to ensure plants have a constant supply of nutrients. This is done by using a dosage pump. These pumps can take up a set percentage of nutrients to put through your water supply.

#### Tanks + dosage pumps

Tanks can range in size and quality. An A and a B tank is required as some fertilisers don't mix well when stored in the same tank. For this trial calcium nitrate was in tank A and nitrogen, potassium, sulphur, magnesium and other trace elements were in tank B. The fertiliser is put into the correct tanks at a rate provided by your local supplier/ agronomist. From here the pumps will slowly take up the fertiliser solutions. As the fertiliser is suspended in the tanks, it requires some form of agitation to ensure it doesn't sink to the bottom. Larger and higher quality tanks can come with an agitator installed, for this simple setup we used air-pumps which have air stones that agitate the water through bubbles.

#### Growing area

Water (solution) is provided to the plants via drippers placed into the coco-coir bags. The bags require drainage holes in the bottom. Some bags come with holes and others require cutting. The growing area needs to be free of weeds to minimise the pests and diseases the weeds may harbour. Weed matting is a common solution for the flooring of the shade house. Crops such as cucumbers and tomatoes commonly grow up a string attached to a structure above. The coco-coir bags should be raised off the ground. Many setups will have the bags on a knee-high bench for ease of maintenance and picking. In this trial we used what we have access to – seedling trays.





## How to maintain a hydroponic system

Hydroponics is an intensive system, and you may find that it requires more management and time than a conventional system. Below are some areas to monitor.

### Electrical Conductivity (EC)

EC measures the strength of nutrient solution by measuring the level of salts in the water. This gives an indication if the plants require a stronger or weaker fertiliser concentration. The EC of the water solution going into the bag and the EC of the drainage water coming out of the bag should be measured regularly. This can be simply done by putting a dripper in a cup and a container underneath a coco-coir bag. For cucumbers an EC range of 1.5-2.5mS/cm is ideal for the solution coming out of the dripper and an EC range of 2.0-3.0mS/cm is good for the solution draining out of the bag. If the EC of the drainage solution is too high it indicates there is a build up of salts in the bag and flushing the bags with water to drain the salts may be required.

### pH

pH indicates the acidity or alkalinity of the solution. pH affects how available nutrients are to the plant. The pH should be tested regularly. The optimal feed of pH for cucumbers ranges from 5.0-6.5. If the pH is outside this range, you may want to consider adding substances to the water tanks to influence the pH. For advice on this, talk to your local agronomist.

### Devices to measure pH and EC

The technology used to measure and manage EC and pH varies in capability and price. For the trial we used a simple yet effective pH pen and nutrient/ conductivity meter for the EC. More complex technology at the higher price end can read the pH and EC automatically at the tanks and adjust the solution concentration automatically to achieve the desired EC and pH!

### Water Management

As mentioned previously, in a hydroponic system the plants are often watered from a short duration several times a day. An indication of if you are watering the correct amount is by measuring the drainage percentage. This can be done by measuring the amount of water input and water drainage which can simply be done by putting a dripper in a beaker and a container underneath the coco-coir bag. The drainage amount should be around 20% of the amount of solution going into the bag.

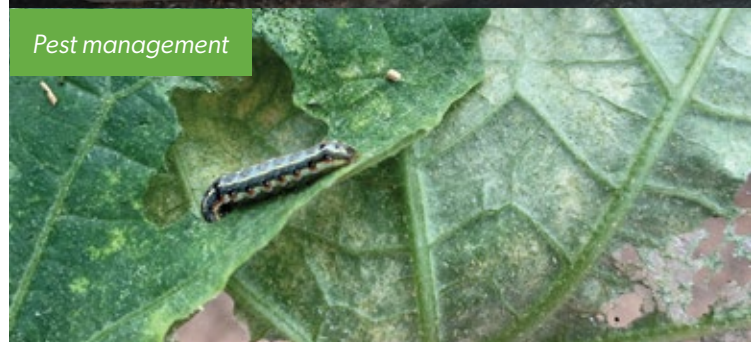
## Pest Management

Unfortunately, a shade house does not mean the crops grown inside are free from pests. A shade house can protect crops from larger insects but not necessarily from pests such as mites, thrips, caterpillars, and aphids. Monitoring the plants regularly and applying an integrated pest management (IPM) program is recommended. For this trial spider mites were a particular issue and was managed through a combination of selective chemicals and beneficial releases through consultation and supply from a local agronomist. Keeping weed pressure down is important as weeds create a great environment for pests to live in, increasing the pest pressure in the shade house.

Water management



Pest management



pH and EC devices



## Soil Your Undies Trial

The VegNET project purchased a pair of white cotton underwear and buried them on a local organic vegetable grower's farm. The aim was to see how the underwear decomposed over an 8-week period to tell us something about the soil and the life within it.

The land in which the undies had been buried had compost applied several times over several years. After 8-weeks when the undies were dug up, they were predominantly de-composed.

So, what can the rate at which cotton underwear decomposes in soil tell us about the health of the soil? Essentially, it's all about soil life. If the undies have decomposed significantly, there is good soil life which is linked to good soil health!

### Why is soil life important?

Soil life such as insects, earth worms, and certain bacteria and fungi can benefit your soil by performing a range of functions:

1. **Soil Aeration** – Soil organisms such as insects and earthworms assist in soil drainage and aeration as they move in the soil. They can create space for roots to grow and oxygen and carbon dioxide to transfer through the soil.
2. **Nitrogen Fixation** – Microorganisms (mainly bacteria) assist processing atmospheric nitrogen to ammonia so it is available for plants to use.
3. **Organic matter decomposition** – A variety of soil organisms and microorganisms can break down organic matter in a similar way they broke down the cotton underwear. By breaking down the organic matter they are returning the nutrients to the soil for plant roots to absorb.
4. **Soil structure and stability** – Soil organisms help to develop stable soil structure by producing a range of sticky compounds that help bind clay, silt, and sand particles. Fungi (and roots) help to then bind these into larger aggregates. Good soil structure is important for aeration, better drainage, and root proliferation (to access water and nutrients).

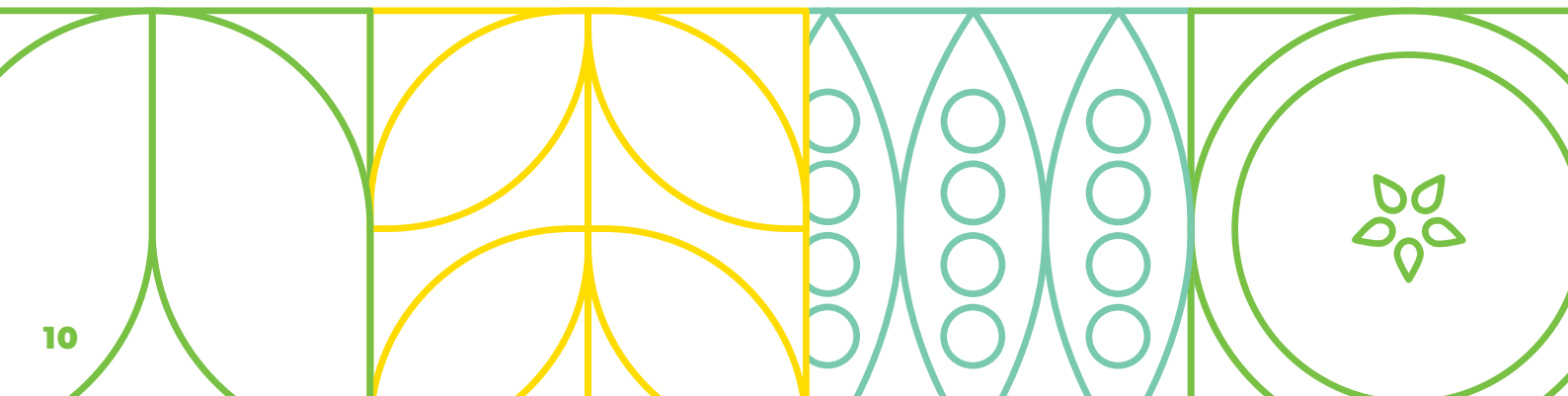
## How to increase your soil life

Planting a cover crop over the wet season- A cover crop is one or a variety of types of plants, planted in the wet season for the purpose of improving soil life and health. The cover crop can increase organic matter once ploughed back into the soil at the start of the season and provides an ideal habitat for soil life.

Inoculate legume seeds (wet season cover crop) with the correct Rhizobium bacteria- Rhizobia are a group of soil bacteria that form small growths (nodules) on the roots of legumes. They convert nitrogen gas from the atmosphere into a form that can be absorbed by the plant as mentioned earlier under the heading Nitrogen Fixation. By inoculating (coating) the seeds with the right bacteria, the bacteria is able to fix nitrogen for the plant. This is particularly important if you are planting a particular legume crop for the first time, or you haven't used an inoculum with that legume crop previously. Talk to your local seed supplier for advice.

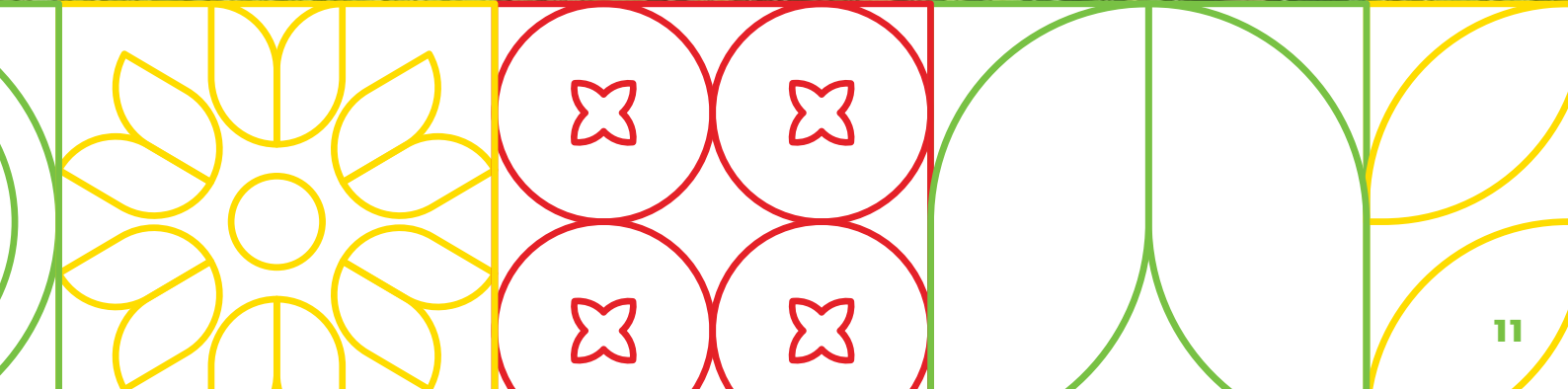
Rotate your vegetable crops in the Dry Season- Planting the same crop in the same area repeatedly can increase disease by promoting the bad soil bacteria and fungi to thrive. An example is planting snake bean in the same area repeatedly often causes an increase in Fusarium. By rotating your crops, you can break disease cycles and increase soil life diversity.

Apply compost to your soil annually – applying compost to your soils is a great way to increase soil organic matter which not only provides 'food' for soil life but also when broken down returns nutrients back into the soil.





Soil Your Undies Trial





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