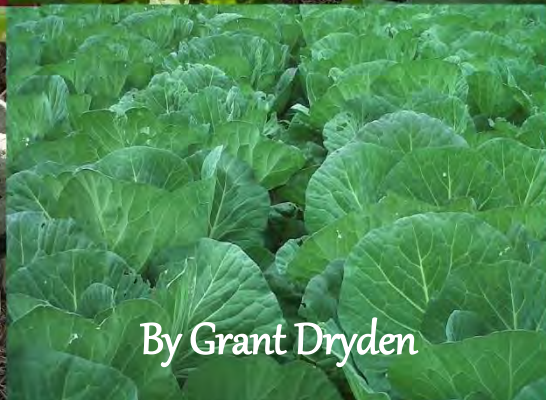




Farming God's Way Vegetable Guide

2nd Edition



By Grant Dryden

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Resources

Farming God's Way resources include:

- DVD Training series
- Trainer's Reference Guide
- Field Guide
- Facilitator Study Guide
- Vegetable Guide

Orders

To order the training DVD series or printed copies of any of the Farming God's Way resources:

Email: info@farming-gods-way.org

Cover Pictures

The pictures are all from Farming God's Way Vegetable gardens mostly in and around Port Elizabeth, RSA including at school nutrition gardens and the model farm.

Farming God's Way

Farming God's Way is not just a technology but a well-balanced biblical, management and technological solution for the agricultural domain, equipping the poor to come out of poverty with what God has put in their hands and revealing the fullness of Jesus' promised abundant life.

Motto

Motivated by obedience,

rooted in compassion

and delivered with love.

Farming God's Way Logo

The new logo produced in 2009 was designed to fully capture the heart of Farming God's Way. The poor across the globe are central in this theme and the orange glow depicts the promise of Isaiah 58 "Your light will break forth like the dawn", starting with Africa as our core focal point and extending to the remotest parts of the earth. The cross and bowl, symbolise Christ like humility and servanthood, where He was prepared to give up His crown and glory to serve the poor wholeheartedly. The horizontal portion of the cross is golden to represent God's Blanket protecting and covering the brown soil, which is such an important inheritance to pass on through generations. The vertical portion of the cross is blue to depict the provision of God's blessing in rainfall passing through the lush green growth and God's golden blanket, penetrating deeply, filling up the soil profile.



Farming God's Way Vegetable Guide

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1. Introduction

In Genesis chapter 1, we read how God, our awesome and wondrous Creator, created everything in the heavens and on the earth and He looked and saw that it was good. He created the light from which all life derives its source. He created air, water and nutrients and their complex cycles upon which all life is supported. He created the soil and all its living organisms both visible and invisible. He created plants bearing fruit and seed after their own kind and He created animals, and finally He created man. Everything He created was good and productive and fruitful. Nothing the Lord created was without purpose and all of creation fitted together in a maze of complex inter-connected relationships which are still trying to be fathomed by man to this day.

An interesting part of the creation story is in Genesis 2, when God made a food garden, in the east of Eden, for Adam and Eve.

Gen 2:8 "And the Lord God planted a garden in the east, in Eden; and He put the man whom He had formed there. ⁹ And the Lord God caused to grow from the ground every tree that is desirable and pleasing to the sight and good for food; the tree of life was also in the midst of the garden, and the tree of the knowledge of good and evil.

¹⁵ The Lord God took the man and put him in the Garden of Eden to work it and take care of it."

God created the very first garden and put Adam in that garden to "work and care for it". God Himself is the first and Master Farmer!!! In that garden God taught Adam everything he needed to know about His creation, how to work the land and care for it.

So what is so important about this to growing Vegetables? Well quite frankly everything!!!

If we understand that God first created all forms of life and the structures on which life are founded then we must acknowledge that He has a Way of doing things that work in the best way possible.

We all know that the very best person to teach you how to use something is its creator. The same applies in agriculture. We need to go back to the Author of Creation, and observe the Way He designed plants to grow within their created environment and be humble enough to learn from the Master Farmer. God's creation still demonstrates all of the attributes of "God's garden in the east of Eden" – he never inverts the soil; there is a continuous blanket or mulch on top of the ground made up of many layers of gradually decomposing plant materials like leaves, branches, fruits and manure on the surface of the ground; and a great biodiversity of species. All we need to do is follow the ways He has shown us since the beginning of all time.

Within these demonstrated boundaries we try to emulate as closely as possible what our Creator has shown us to do, through minimal soil disturbance, keeping a 2.5 cm thick blanket cover on top of the ground and practising rotations.

But this story is far more than just a technological practise...God designed for man to live in a real tangible relationship with Himself and would come to the garden to walk and talk with Adam in the cool of the day.

Why would the Creator of the Universe, the God of all, do that?

Because He loves mankind and His desire was to have a created being who would, according to His own free will, choose to have a heartfelt relationship with Him. No animal or any other earthly created being has this choice.

When man sinned and ate of the tree of the knowledge of good and evil, against the Lord's instruction, he broke that covenant of relationship and as a result of that Adam was kicked out of the garden and cursed with hard labour, sweat and weed growth. None of these curses had been a part of a farming lifestyle prior to the fall.

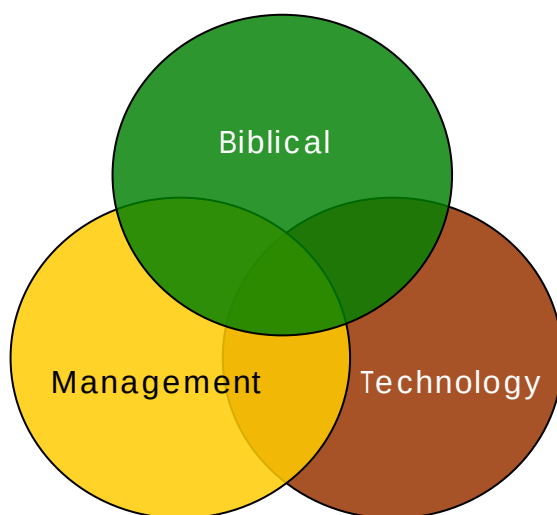
However, the worst thing that took place was that sin now separated mankind from God and he no longer had this privilege of a divine relationship with Him – which was God's ultimate objective.

The great news is that Jesus came to break every curse and to give to everyone that believes in Him the right to be called the children of God and once again to be reconciled to the Father in a real relationship.

Colossians 1 "15 The Son is the image of the invisible God, the firstborn over all creation. 16 For in him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things have been created through him and for him. 17 He is before all things, and in him all things hold together. 18 And he is the head of the body, the church; he is the beginning and the firstborn from among the dead, so that in everything he might have the supremacy. 19 For God was pleased to have all his fullness dwell in him, 20 and through him to reconcile to himself all things, whether things on earth or things in heaven, by making peace through his blood, shed on the cross."

Jesus, who is called the second Adam, has made a way for us to have the ban lifted that we can once again enter into "the garden in the East of Eden" and experience a life in relationship with our Creator. This is ultimately what we want to see happen in all of our Farming God's Way gardens; be that at field or small nutrition garden scale – lives reconciled to a meaningful relationship with the Lord and where His bountiful blessings overflow in the garden.

This Farming God's Way Vegetable Guide is a resource, advocating techniques that are proven and simple, to allow for successful implementation amongst the poor.



Farming God's Way is not just a technology but a well-balanced biblical, management and technological solution for the agricultural domain, equipping the poor to come out of poverty with what God has put in their hands and revealing the fullness of His promised abundant life.

The Word of God is paramount to breakthrough in people's lives and I exhort you to thoroughly work through the **six Farming God's Way Biblical Keys**, as found in the DVD series and Trainer's Reference Guide, whilst teaching this material.

"Do not labour for the food that perishes, but for the food that endures to eternal life, which the Son of Man will give to you. For on him God the Father has set his seal." John 6:27

Jesus said to them, "I am the bread of life; whoever comes to me shall not hunger, and whoever believes in me shall never thirst." John 6:35

The **Management Keys** are just as important and include doing things On Time, to High Standards, with Minimal Wastage and with the Fruit of the Holy Spirit. Don't neglect these essential elements.

The **Technological Keys** include no ploughing, 100% cover with God's Blanket, ensuring biodiversity through rotations, relay and cover cropping.

God's Master Plan was that mankind would live in a divine relationship with Himself and follow in all of His ways. Through Farming God's Way we are encouraging people not to follow a system but rather a Father, Creator and the Master Farmer and what is important is that we keep with the principles of "doing what we see our Father doing".

2. Vegetable Garden Layouts and Land Preparation

Great variations of vegetable production techniques exist from double digging, circle gardens, bag gardens, lasagne gardening, raised composting beds, deep ploughing, rotavating, incorporating inputs, etc. Some work well, others are not viable on large tracts of land, some are ecological disasters, whilst others are just not ever going to catch on due to the effort required.

So can we do Farming God's Way with vegetables?

Vegetables are not as forgiving as field crops because they have:

- a. short growing seasons,
- b. weak, shallow root systems and
- c. very high nutrient demands!!!

To meet these demands we need to have a stable and fertile starting point, with well structured, crumbly soil, which is mostly not the case at establishment year. Farmers or vegetable gardeners are not very patient and want to start planting as soon as possible. Most farmers also want to start with the more difficult vegetables which can result in a negative experience. Be wary and selective of what you try early on with vegetables.

2.1. Clearing, Levelling and Smother Mulching

Clear the garden of shrubs, weeds and creeping grasses, by uprooting and removing them out of the garden area. Level off the garden as best you can by lowering the high points and filling in hollows, and although you might be disturbing soil, it will be the last time you do so.

Preferably, if you have enough time, you can smother mulch the creeping grasses with at least 10cm of God's blanket/mulch for 2 months before land preparation begins, to kill off all creeping grasses. See the later chapter on God's Blanket.

Measure off the size land you will be starting off with and fence it in, keeping in mind that it is better to start small and increase your area as you gain more experience. Ensure that the site is secure, shade free and has easy access to water.

2.2. Making Measuring Ropes

There are many ways to grow vegetables and many arrangements to do so, but we have chosen for simplicity sake to stick to the 75cm row spacing as it fits with a greatest variety of vegetable spacings.



For example, for beans, peas, sweetcorn, peppers, cabbage, cauliflower and eggplant, 75cm is ideal. Tomatoes and squashes are planted at 1,5m intervals so then simply skip to alternate rows. Spinach, rape and amaranth are planted in 37.5cm rows so simply split the 75cm rows in half. The narrow row vegetables such as carrots, onions, spring onion and beetroot, are planted in multiple 18.75cm rows (rounded up to 20cm to keep it simple), so simply split the 75cm rows into half and then half again.



Carrots in double rows & Spring Onion in triple rows downslope of the 75cm Permanent pegs

In order to lay out your garden accurately with permanent 75cm row lines, make a 75cm measuring rope using a non-stretch rope as long as your garden is downslope. Hammer a peg in on the top side, make a loop in the rope and attach it to the peg. Run the rope down to the bottom side of your garden, make a loop in the other end, pull it tight and place it on another peg. With the rope taut, begin placing your 75cm markers onto this rope using either coloured wire or bottle tops or by feeding plastic strips in between the threads of your rope.



Repeat the process to make a 60cm measuring rope for planting stations for sweetcorn, tomatoes, eggplant and peppers and even a 45cm measuring rope for cabbages, cauliflower, broccoli and celery. These measuring ropes are essential to get accurate population densities for the crops that are planted with planting stations, and if they are made to a “high standard” they will be a valuable planting tool for a lifetime.

2.3. Garden Layout for Flat Planting on 75cm Row Lines

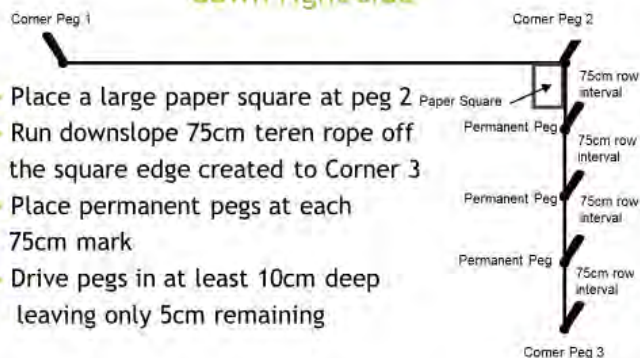
“Whatsoever you do, do your work heartily, as for the Lord rather than for men.” Colossians 3:23

Establishing the Baseline



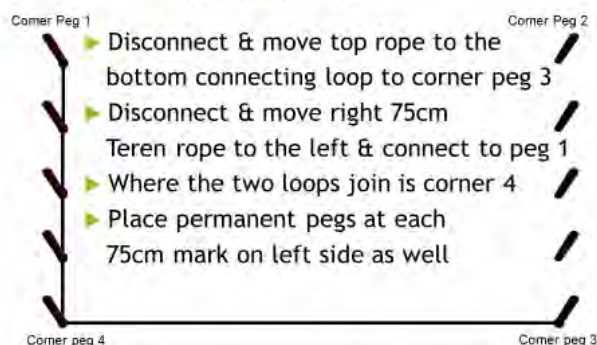
- ▶ Cut pegs 20-30cm long
- ▶ Use hard wooden pegs, steel rods or plastic conduit
- ▶ Start at the topside of the largest square in the field
- ▶ Run a Rope on the contour - that is across the slope
- ▶ Hammer in Corner peg 1
- ▶ Pull rope tight up to other side of the Vegetable garden
- ▶ Hammer in the other Corner peg 2

Permanent Pegs down right side



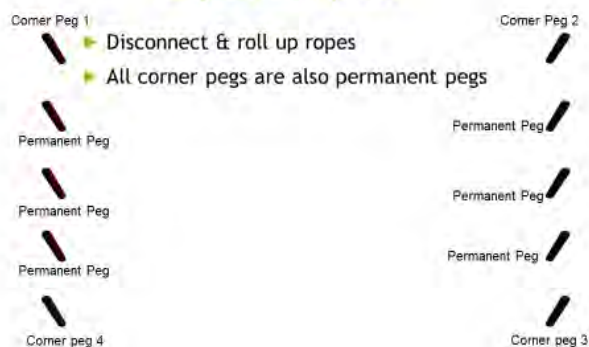
- ▶ Place a large paper square at peg 2
- ▶ Run downslope 75cm then rope off the square edge created to Corner 3
- ▶ Place permanent pegs at each 75cm mark
- ▶ Drive pegs in at least 10cm deep leaving only 5cm remaining

Permanent Pegs down left side



- ▶ Disconnect & move top rope to the bottom connecting loop to corner peg 3
- ▶ Disconnect & move right 75cm Teren rope to the left & connect to peg 1
- ▶ Where the two loops join is corner 4
- ▶ Place permanent pegs at each 75cm mark on left side as well

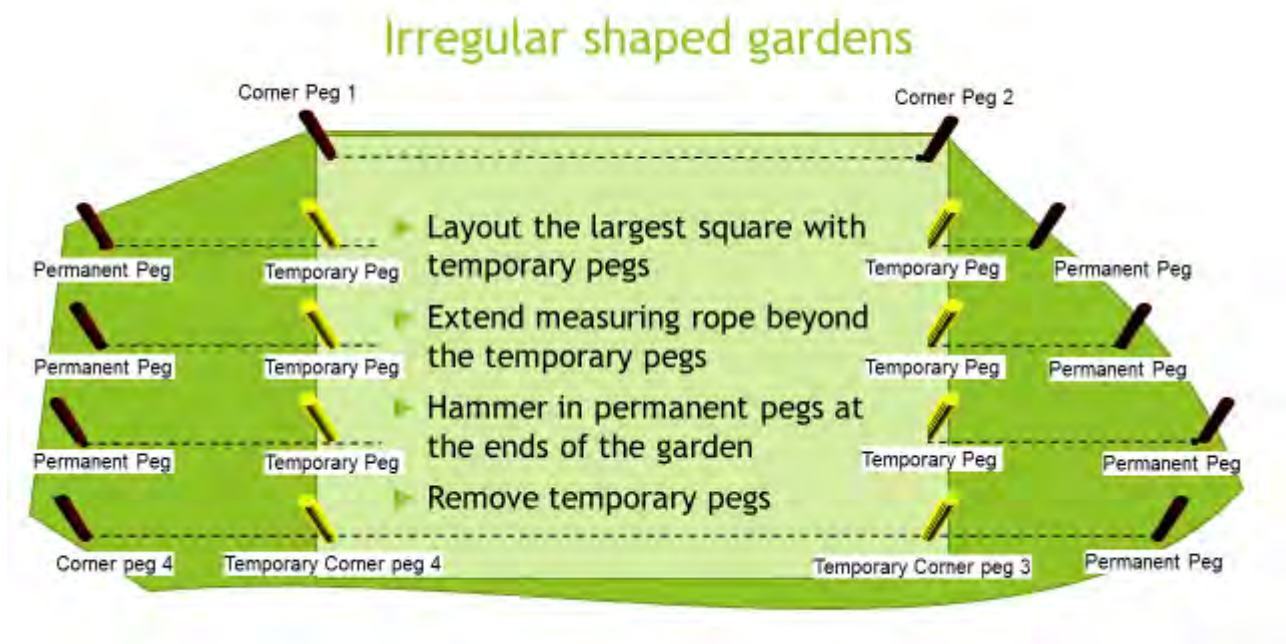
Layout complete



- ▶ Disconnect & roll up ropes
- ▶ All corner pegs are also permanent pegs



If your garden is not square, then by using the 2 adjoining pegs on the contour as a guide, extend each line one at a time, until you reach the outer edges and place your permanent pegs there. Once this is done you can remove all of the inner pegs.



The “permanent pegs” at every 75cm row line on either side of the vegetable garden, will ensure that you get the valuable attribute of permanence in your garden.

The benefits of permanence include:

- 1) improved soil fertility in the planting area
- 2) left over nutrients are available to following crops
- 3) improved soil structure in the planting area
- 4) decomposing root channels allow for greatly improved aeration and permeability
- 5) soil pH is improving all the time in the planting area
- 6) compaction only ever takes place in the walkways
- 7) soil disturbance is minimal resulting in greatly reduced weed incidence etc

One of our management keys is to do everything at “High Standards” and by keeping this design layout with permanent pegs every 75cm, we will reap great rewards from these standards.

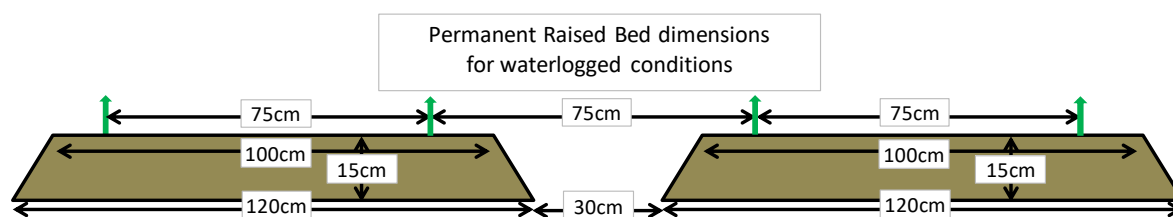
2.4. Permanent Raised Beds for Waterlogged Conditions

In most instances flat planting, as per standard Farming God's Way practises, is perfectly fine. With the correct layout, permanent walkways and heavy composting, a natural raised row system will develop over the years. However, if you have waterlogging risks or problems, then you need to raise the beds, as vegetables are extremely intolerant to having "wet feet".

Design the orientation of the rows downhill, not on the contour. This means your top and bottom sides to your field will have the 75cm permanent pegs instead of the left and right sides. This enables the water to exit down the slope and drain away from the vegetable garden. Recommended dimensions for the permanent beds are 15cm high, 100cm wide on top, 120cm wide bases, with about 30cm permanent walkways. Note that there are two 75cm rows on top of the permanent raised bed and it is not a single row ridge. These two rows can be split to make 3 rows at 37.5cm or split again to 4 rows at 18.75cm with the multi rows going towards each other on the inside of the permanent pegs.

Once you have placed the 75cm pegs, then lift the soil from the 30cm pathways to place on top of the 100cm wide beds until 15cm high, which is enough to keep sensitive roots out of waterlogged soil conditions. If necessary dig a furrow at the bottom side of the field to allow water to exit the pathways more easily.

Although this is highly contrary to the principles of no ploughing, if you design this properly the first time at establishment, then these beds should be kept as permanent beds forever. God's Blanket is used on top of the raised bed and in the walk way in the same way as when doing flat planting. Covering the walkway will help protect the raised bed walls from collapsing and suppress weed growth.



Permanent Raised Bed Dimensions

2.5. Irrigation Options

The land preparation for whether you are using watering cans, overhead sprinklers or drip irrigation has no bearing on the layout of the garden except if you are using flood irrigation in which case you will need to make sunken beds. We use drip irrigation at our model farm in Port Elizabeth, because of the very low rainfall of around 250-350mm annually, but we still use watering cans in the early stages after planting our crops. The principles of Farming God's Way apply irrespective of whether you have a watering can, sprinklers, drip or flood irrigation.

Watering Cans

This is the most common form of irrigation amongst small growers and although time consuming, it is in line with the Farming God's Way principle of using "what is in your hand". Make sure that the nozzles are creating a fine spray and not a jet of water which can easily blast out new seeds and seedlings. Very often farmers are watering literally a few drops as they pass down the line which is really a waste of time. Instead water lightly and frequently when plants are young; and more slowly and deeply but less frequently as the plants get older and deeper rooted. Water on the sides of plants to limit the wetting of leaves of sensitive crops, which makes them susceptible to all kinds of diseases. The benefit of being able to walk down long lines with good traffic control, makes irrigating with watering cans really easy and efficient.

Overhead Irrigation

The use of overhead sprinklers on draglines is also very common and probably the cheapest field scale form of irrigation. When you design your garden layout be sure to allow for walkways to pull the hoses through the field at the required intervals. Ensure that the sprinklers overlap and are running at the required pressure, according to the manufacturers design, to ensure an even wet spread throughout the garden. One problem with overhead irrigation is the unavoidable wetting of leaf surfaces at each watering which makes the plants more susceptible to diseases. The water is also applied over the whole land and not just the planted areas which accounts for considerable wastage.

Drip Irrigation

Our drip irrigation design is a single drip pipe line at each 75cm row, with emitters at 30cm intervals, delivering 2 litres per hour. We water new seedlings daily, but once the plants are up and settled we irrigate only 3 times a week for a maximum of an hour, dependant on the weather. This is a quarter of what is required by conventional farming practices and a great cost and water saving, as a direct benefit of God's Blanket.

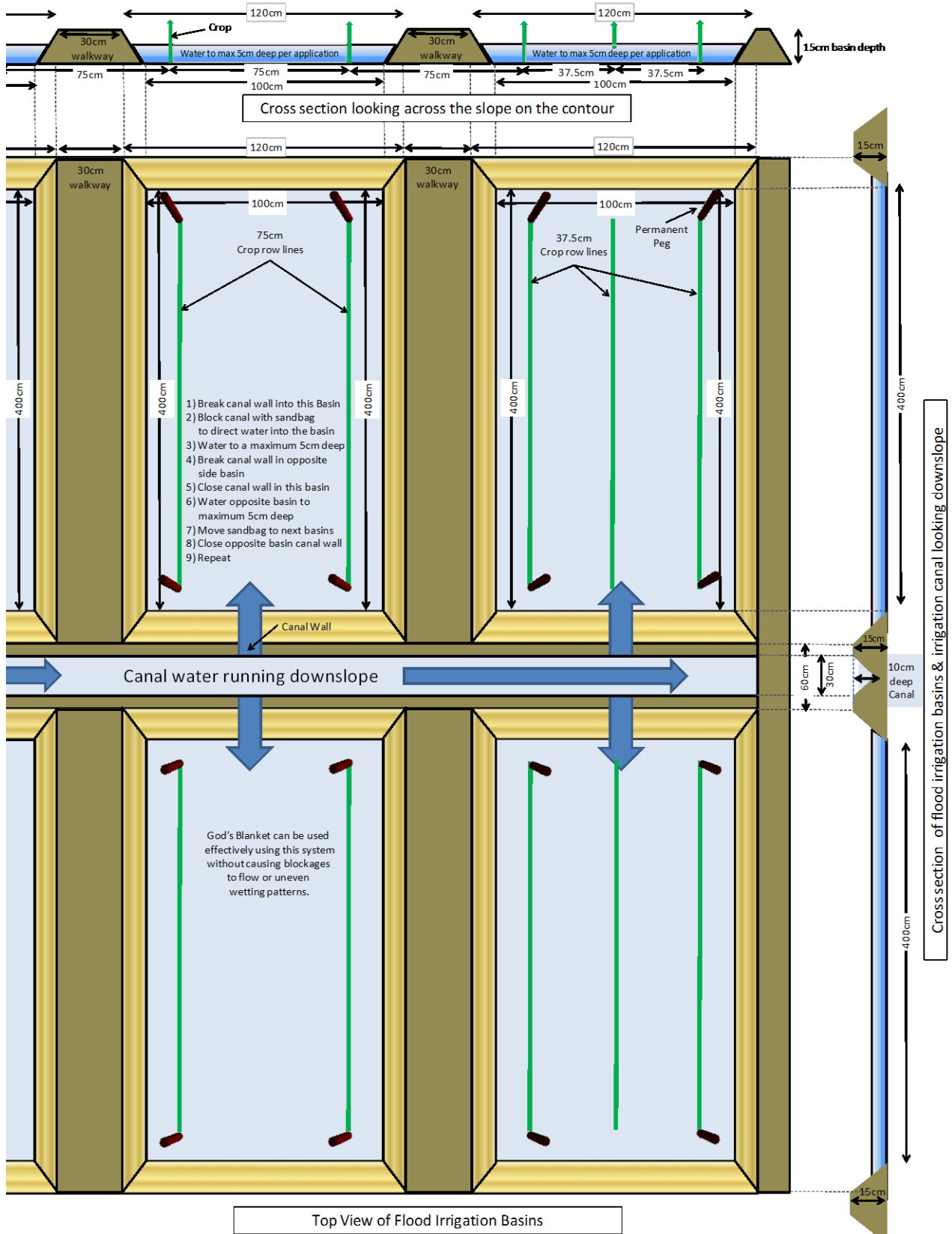
Sunken Bed Design for Flood Irrigation

Many small scale farmers are getting access to treadle pumps and even canalised water, which when used correctly with canals, sunken beds and God's Blanket, can allow for very successful vegetable farming to be done. The 75cm permanent pegs run on the contour lines across the slope as usual. Make level, sunken beds 1m wide down the slope and up to a maximum of 4m long across the slope. See the Flood Irrigation Basins diagram for more details.

Canals carry the water downslope, through the sunken bed matrix. To water the beds, block the canal temporarily with a sandbag and break the nearest bed wall to allow for water to enter the bed. Water to a maximum of 5cm deep per watering. Do not overwater as this causes severe soil damage. Once watering is done, repeat this process on the sunken beds below. It's a very simple yet effective system and is particularly useful in the dry seasons where no risk of waterlogging occurs. In order to discourage over irrigation, do not build the raised edges too high.

Some Farming God's Way farmers in Malawi water their sunken beds 3 or 4 times throughout the maize growing season, as compared to the 12 times of the conventional farmers, which is a significant cost and time saving.

Permanent Flood Basin Dimensions for Flood Irrigation



2.6. Garden Design

You now have a well laid out garden with permanent pegs every 75cm. Next you need a carefully thought through plan of Where, What and When you are going to plant.

2.6.1 Divide into 3 Equal Portions

With all your 75cm permanent pegs in place, divide the number of pegs by 3 and remove one or two pegs from either side to define 3 equal portions. Into each of the portions we will plant Fruit, Leaf and Root crops and rotate them every autumn and spring or every six months in the more tropical climates.

Some examples of each include:

Fruit Crops – beans, peas, green maize/sweetcorn, tomato, eggplant, peppers, pumpkin, butternut, zucchini and patty pans.

Leaf Crops – spinach, kale, amaranth, cabbage, cauliflower, broccoli, lettuce, coriander and rocket.

Root Crops – carrots, beetroot, onion, spring onion, radish, sweet potato and irish potato.

2.6.2 Rotations

These three crop types should be rotated every six months to allow for all the benefits of rotation, including spreading risk, breaking disease and pest cycles, fixing of nitrogen and other soil improvements.

Season	Spring Rotation 1	Autumn Rotation 2	Spring Rotation 3	Autumn Rotation 4
Portion A	Fruit	Root	Leaf	Fruit
Portion B	Leaf	Fruit	Root	Leaf
Portion C	Root	Leaf	Fruit	Root

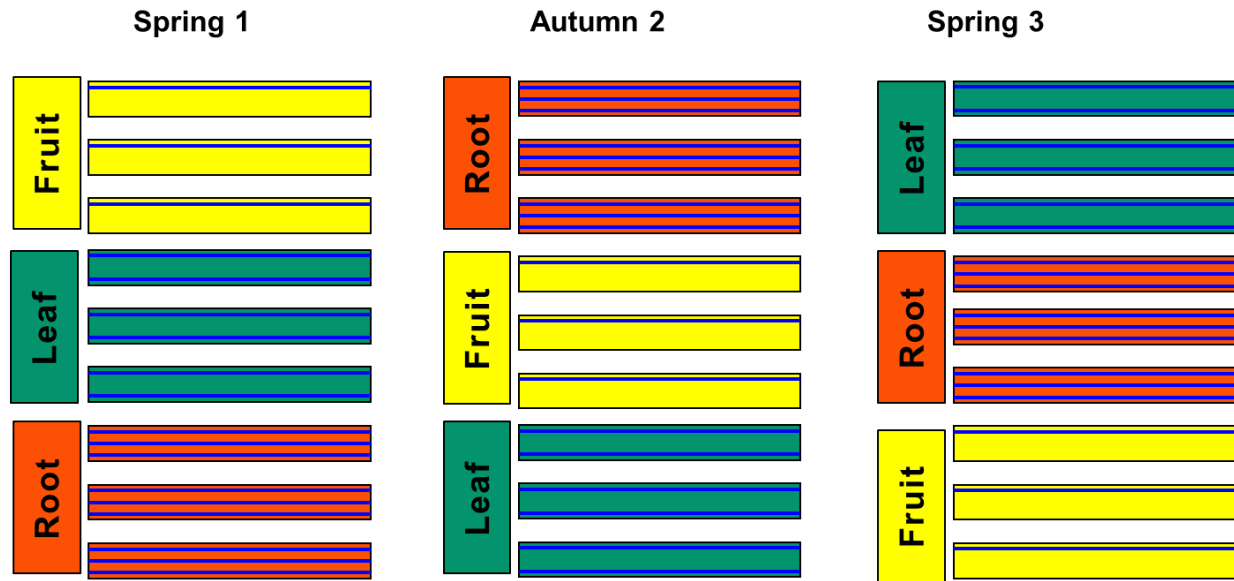
Rotation 1: In the first spring planting the fruit crops would be in portion A; leaf crops in portion B and the root crops in portion C.

Rotation 2: In the autumn rotation 6 months later the fruit crops move down to portion B; the leaf crops to portion C and the root crop come up to the top to portion A.

Rotation 3: In the spring planting 6 months later, the root crop would move to portion B; the fruit crop to portion C and the leaf crop to portion A.

Rotation 4: In the fourth rotation in autumn we would be back to Fruit in portion A, leaf in portion B and Root in portion C.

Vegetable Garden Rotation



2.6.3 Rotations Within Rotations

Another aspect with short season vegetables is rotations within rotations. An example of this would be if you have a root crop that is harvested before the next 6 monthly rotation, then plant a different root crop in the same space. For example we often get 2 plantings of carrots followed by beetroot or spring onion and even up to 3 different root crops like beetroot followed by radish and then spring onion, all planted in the same row lines during a 6 month season. This rotation within a rotation, ensures that pests associated with one particular vegetable are not given a second home. It also allows for the garden to be in a continual state of productivity with each row rarely remaining “empty” for longer than 2 weeks, instead they are replanted immediately.

2.6.4 Staggered plantings

Each garden plan should include a simple 2 weekly staggered planting schedule ensuring a steady stream of income or home nutrition over a longer time period, whilst achieving our management objective of “minimal wastage”. This is particularly important with crops that get harvested at one time like spring onion, sweetcorn, cabbage, cauliflower, broccoli, lettuce and beetroot to name a few.

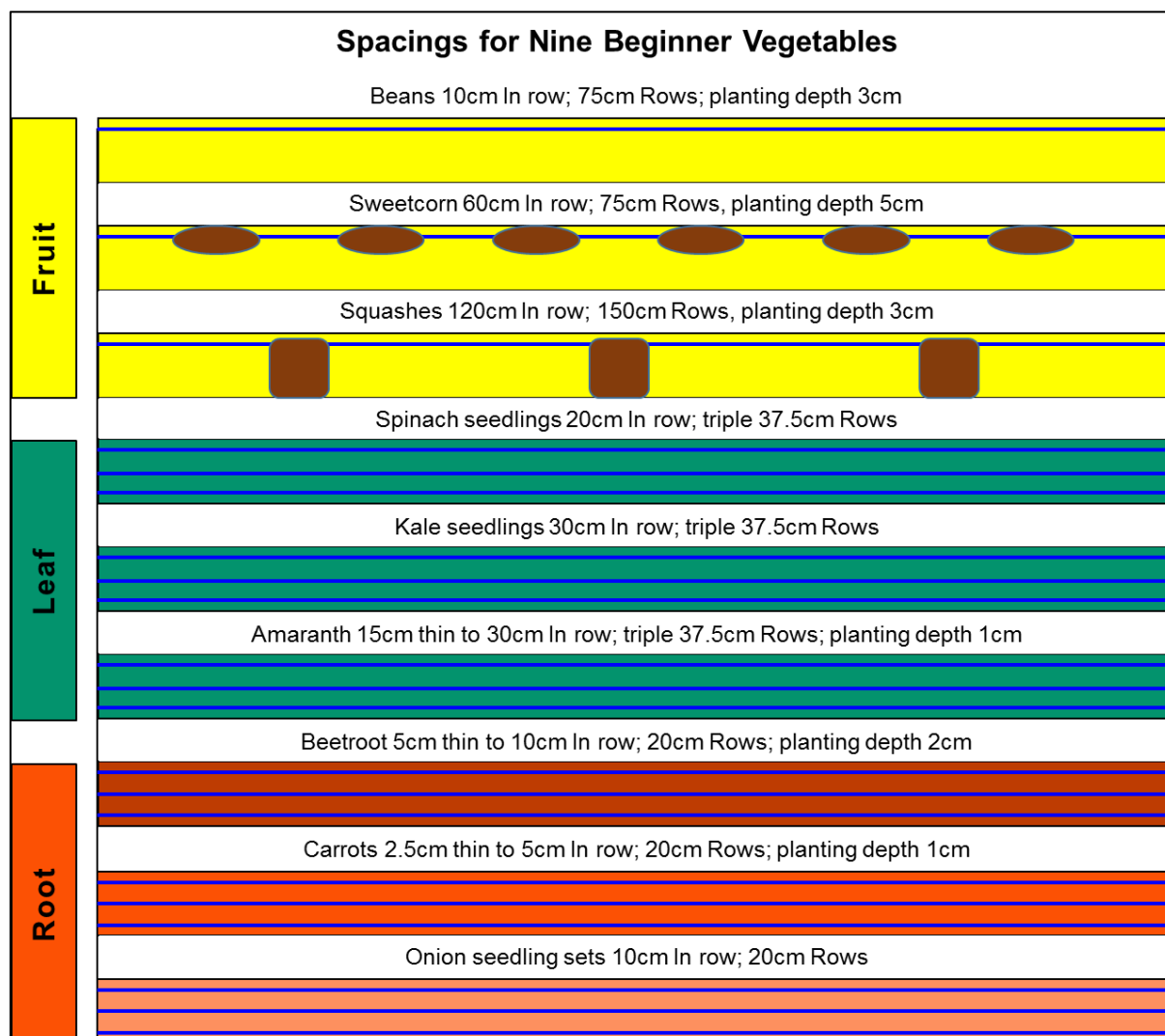


Spring Onion planted at 2 weekly intervals – with newly planted row on far left

2.6.5 Planting “Baskets” of Vegetables

It is always best to start with the easy vegetables because if successful, then farmers will be encouraged to try again. After a few successful seasons, they can then start growing the other more difficult vegetables for their basket.

The recommended “beginner” Fruit crops are beans, sweetcorn and squashes; Leaf crops are spinach, kale and amaranth; Root crops are beetroot, carrots and onions.



See chapter 6 for some more detail on these and other crops.

It is not intended that all of these vegetables be grown at once as per this diagram but the basket could certainly include many more than just 1 crop per portion. Our model Farming God's Way vegetable garden often has 12-15 different crops in it at a time.

2.7 Planting Calendar

In Farming God's Way we encourage the management principle of doing things “On Time”. Every vegetable crop has optimal growing times, based on temperature and sunlight hours, and your planting and rotation planning need to take this into account. Use the planting calendar in the Vegetable guide to decide on when you are going to plant your various vegetable crops to be “On Time”. Feel free to make adaptations to this calendar guide based on your experience and locally available cultivars.

Southern African Summer Rainfall Region Vegetable Planting Guide

Crop	Temperature °C		Month											
	Optimal	Limits	January	February	March	April	May	June	July	August	September	October	November	December
Amaranth	21-28	7-40	*	*							*	*	*	*
Artichokes	15-25	5-30								*	*	*	*	
Asparagus	15-30	6-38									*	*	*	*
Beans	16-25	7-32	*							*	*	*	*	*
Beetroot	15-25	4-35	*	*	*	*				*	*	*	*	*
Broccoli	10-25	5-30	*	*									*	*
Brussel sprouts	12-20	7-25	*	*	*									
Cabbage	15-24	7-32	*	*	*	*				*	*	*	*	*
Carrots	15-24	3-30	*	*	*	*				*	*	*	*	
Cauliflower	10-25	5-30	*	*									*	*
Celery	18-25	4-28		*	*					*	*	*		
Cucumber	18-32	6-38								*	*	*	*	*
Egg Plant	20-27	17-35								*	*	*	*	
Kale/Rape	15-22	7-30		*	*					*	*	*	*	
Lettuce	12-21	5-30	*	*	*	*				*	*	*	*	*
Marrows	17-30	6-40	*							*	*	*	*	*
Melons, sweet	18-27	16-35								*	*	*	*	
Okra	20-30	12-35								*	*	*	*	
Onions	12-25	4-30		*	*	*	*							
Peas	10-24	4-30		*	*	*	*	*	*	*	*			
Peppers	17-30	8-35								*	*	*		
Potato	15-25	7-30	*							*	*	*	*	*
Pumpkin	20-30	9-38									*	*	*	*
Radish	12-25	3-30		*	*	*	*	*	*	*	*	*	*	
Rubharb	15-24	5-30								*	*	*	*	
Spinach	13-20	2-27	*	*	*	*				*	*	*	*	*
Sweetcorn	16-24	12-38									*	*	*	*
Sweet potato	18-28	10-38									*	*	*	
Swiss chard	13-20	2-27		*	*	*				*	*	*	*	
Tomato	20-27	7-35								*	*	*	*	
Watermelon	20-35	15-40								*	*	*	*	

This general sowing guide should be used in conjunction with specific cultivar recommendations and local farmer climate knowledge. Also collect records of your own experiences and use them to plan ahead for future seasons.

Customised Vegetable Planting Guide

Crop	Temperature °C		Month											
	Optimal	Limits	January	February	March	April	May	June	July	August	September	October	November	December
Amaranth	21-28	7-40												
Artichokes	15-25	5-30												
Asparagus	15-30	6-38												
Beans	16-25	7-32												
Beetroot	15-25	4-35												
Broccoli	10-25	5-30												
Brussel sprouts	12-20	7-25												
Cabbage	15-24	7-32												
Carrots	15-24	3-30												
Cauliflower	10-25	5-30												
Celery	18-25	4-28												
Cucumber	18-32	6-38												
Egg Plant	20-27	17-35												
Kale/Rape	15-22	7-30												
Lettuce	12-21	5-30												
Marrows	17-30	6-40												
Melons, sweet	18-27	16-35												
Okra	20-30	12-35												
Onions	12-25	4-30												
Peas	10-24	4-30												
Peppers	17-30	8-35												
Potato	15-25	7-30												
Pumpkin	20-30	9-38												
Radish	12-25	3-30												
Rubharb	15-24	5-30												
Spinach	13-20	2-27												
Sweetcorn	16-24	12-38												
Sweet potato	18-28	10-38												
Swiss chard	13-20	2-27												
Tomato	20-27	7-35												
Watermelon	20-35	15-40												
Collect your localised climatic data and knowledge from experienced farmers in your region to determine your optimal planting calendar.														

2.8 Fracturing

Vegetables have very weak root systems and so it is essential to **loosen compacted soils** to allow for successful production. Move “God’s Blanket” downslope of the band you are going to fracture, **push the fork 30cm deep and gently pull the handle 10cm backwards until you see the soil just loosen or fracture**. Do not be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm moving backwards along the row line. You should only be loosening the soil in a fork width or 20cm band on top of the row lines you are going to plant to allow for “effective rooting depth”.

Before each planting determine if the soil compaction has improved by doing fracturing tests down the line. If the fork passes easily through the soil to fork depth then it doesn’t need to be re-fractured. If not then keep on being faithful to fracture with joy. The soil will be redeemed gradually through fracturing, compost applications and the activity of insects and earthworms.



2.9 Correcting Acidic Soils

Soil acidity is a very common problem in many soil types and climates, but it is also caused by acid rain, ploughing, decreased soil organic matter and chemical fertilisation. Acidic soils bind up plant available nutrients and cause all kinds of limitations to vegetable growth. To correct acidic soils we need to apply woodash, bonemeal or agricultural lime.



Woodash is readily available and is effective at reducing soil acidity with a pH of 10-12 when wet and contains between 25-50% Calcium Carbonates. However, woodash not only mitigates the negative effects of soil acidity, but also contains macronutrients such as Potassium, Phosphorus, Calcium, Magnesium and Sulfur as well as some micronutrients such as Iron, Manganese, Copper and Zinc beneficial for plant health, fruit colouration and vitality.

Bonemeal is made from crushed and finely ground bird, fish or animal bones. It is fairly expensive and not readily available, but it can also be homemade by steaming bones, then allowing them to dry for a month after which they can be ground into a fine powder with a mortar and pestle. Although bonemeal has a very limited influence on improving soil pH, it is high in Calcium (25%) and Phosphorus (12%) with some other nutrients like Iron, Magnesium and Zinc as well. Noticeable evidence of these slow release organic nutrients will

be seen in your crops’ leaf and fruit colouration and overall health.

Lime is a fine white powder from powdered limestone rock deposits and is primarily made up of Calcium Carbonates, whereas dolomitic lime contains both Calcium and Magnesium Carbonates. It is very basic when wet and is very effective at increasing soil pH to good ranges. Lime is much stronger than woodash and so the application volumes need to be halved.

How these soil pH additives are applied will be determined by what input type you choose. A rule of thumb would be to evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, per planting station or every 60cm in the planting band. If you are unsure about the pH of your soil then go ahead and use

woodash anyway for at least the first two seasons, thereafter do trials in your garden to determine the visible benefits between rows with and without it.

2.10 Inputs - Compost or Manure

The decision on “How to prepare and plant?” is dependant on your available input type:

- Either **A) “surface composting”** your whole garden or in bands;
or using **B) “manure or low volume compost”** in planting stations, furrows or shallow basins.

This decision is crucial to make early on and is based on what God has placed in your hand, as is taught in the “Understanding God’s All Sufficiency” teaching. (See Biblical Key number 3 in the Trainers Reference Guide).

A) Surface Composting

God in His amazing wisdom has shown us through His creation how He designed to feed plants from the top, through the gradual decomposition of leaves, twigs and fruits over many years into compost and ultimately releasing stable organic nutrients into the soil profile. Surface composting techniques allow for this process to be sped up for an agricultural context and allows us to follow what our Creator has shown us from the beginning in the garden in the east of Eden.

Generally speaking, vegetables do better with compost than any other organic inputs, as it has nutrients that are bound in stable organic compounds in naturally created ratios, whilst also inoculating our soils with beneficial bacteria and fungi. When we refer to compost, it is to high quality, nutrient rich, mature, aerobic compost, made from appropriate ingredients noting the Green 45%, Woody 10%, Dry 35%, Manure 10% ratios specific to vegetable production where we are wanting more bacteria dominated vs fungal dominated compost. If your compost is still coarse after curing properly, then it is best sieved through a fine 2cm wire mesh, to ensure a fine seedbed without too many woody chunks. See Chapter 3 - Compost.

The basic procedure with surface composting is:

- move the blanket downslope
- fracture
- correct pH
- place surface compost
- press furrows
- plant and cover.

The width of the surface compost band is 10cm wide for single row crops and 25-40cm wide for multi row crops. The depth of compost will vary dependant on the crops’ feeding requirement – 2cm thick for light feeders, 3cm for medium feeders, and 5cm for heavy feeders.



Although your first season’s crop performance will not be at full potential, surface composting will give your soil a great head start towards God’s healing of the land and as you are faithful to sow into the soil, it will get better and better every season. **It is essential to repeat surface composting diligently each planting to guarantee high plant available nutrients for the crops.** However, when planting carrots or onions, the residual nutrients may be sufficient to get them through, depending on the soil’s fertility.

B) Manure/Low Volume Compost

Although it is preferable to use high quality Farming God's Way compost, most farmers/gardeners don't have the volumes required at the start. Manure cannot be used in the same way as we do for surface composting as it will burn sensitive vegetable seeds, stems or leaves. However, it can be used in planting stations, furrows or basins with a 3cm soil separation layer. This separation layer enables Farming God's Way farmers to use fresh manure without any risk of burning seeds or seedlings and allows them to take full advantage of the readily available nitrogen.

If you are using manure or low volumes of compost it is very similar to the typical Farming God's Way field scale techniques. Move the blanket downslope, ensure you fracture to 30cm deep, dig planting stations, furrows or basins, correct the ph, add 500ml manure or compost, cover with at least a 3cm soil separation layer, plant and cover.

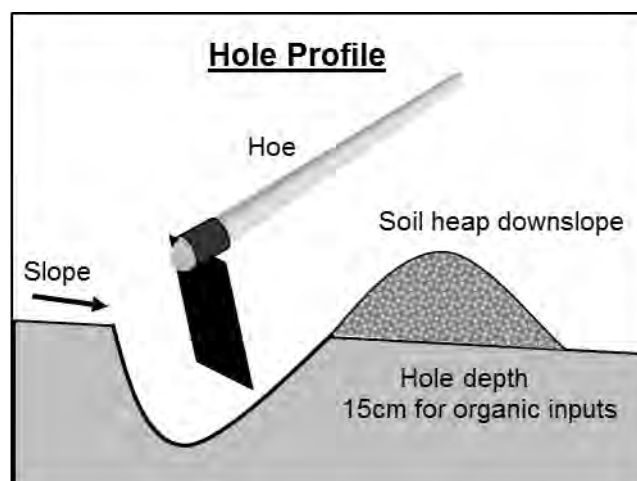


"Whoever sows sparingly will also reap sparingly, and whoever sows bountifully will also reap bountifully." 2 Corinthians 9:6

Planting Stations

Planting stations are small holes that are prepared for many seedlings and seeded plants that have a wide plant spacing including tomato, eggplant, peppers, sweetcorn, cabbage, cauliflower and broccoli, amongst others. They should be about a **standard hoe width 12cm across, 15cm long and 15cm deep**.

Place the measuring rope on the permanent pegs, lift and drop it several times to make sure it is straight and tight. Looking up the slope, line up the centre of the hoe head with the measuring rope marker. Start digging 15cm away from the marker gradually going deeper and deeper as you come closer and closer to the marker on the rope. This usually takes about 5-6 strikes and is a large amount of soil so ensure that it is placed in a neat heap on the downslope side for refilling of the planting station later. Note how they are steep on the upslope side and shallower on the downslope side.



A variation of this planting station standard is when planting squashes, which are prepared a lot deeper to a spade depth and width and are then backfilled with a spadeful of manure/compost mixed in with the soil.



Furrows

Furrows are v shaped soil cuttings **10cm deep and 10cm wide in long straight lines** that are prepared for many crops with close “in row” spacings including beans, peas, spinach, kale and amaranth. Place a rope onto the permanent pegs, lift and drop it several times to make sure it is taut and straight. Looking up the slope begin digging the furrow 10cm away from the rope, gradually going deeper and deeper until you come right up to the rope 10cm deep. The soil should be kept in a neat heap on the downslope side of the furrow for refilling later. A variation of this furrow standard is for sweet potato and irish potato where furrows are dug to 15cm deep.

Triple 10cm deep furrows prepared for spinach at 37.5cm intervals with manure at 500ml/60cm

Shallow Basins

Soil preparation using the “Furrows Technique” for row intervals less than 37.5cm is very difficult to achieve, unless you prepare and plant one row at a time. Instead use “Shallow Basins” which are wide furrows used for planting small crops with narrow “in row” and “row” intervals. These crops are grown in double, triple and quadruple row designs in 25-45cm wide basins, which are 5cm deep, and include beetroot, carrots, onion, spring onion, lettuce, coriander, radish and rocket.



A shallow basin - 5cm deep and 25cm wide – with a 1cm skimming of manure in it.

The techniques for both using surface composting and manure will be discussed for each crop to allow for everyone to start with what God has put in their hands, but it is definitely preferable to shift to a surface compost based system as soon as your compost is ready, from soil health, productivity and sustainable profitability perspectives.

2.11 God's Blanket

God's Blanket is the heavy mulch cover that God in His wisdom designed from the very beginning of creation, and consists of plant leaves, twigs and fruits all in different layered states of decomposition on the surface of the ground. It is this blanket in its various stages of decomposition which creates the climate and food for living organisms to flourish; reduces evaporation, runoff and erosion; improves soil moisture holding capacity and permeability; and prevents UV light sterilisation, amongst many other reasons (see "20 reasons Why We Do the How" in the Farming God's Way Trainers Reference Guide).

Healthy people eat healthy plants which come from healthy soils which are living soils!!!
We must do everything we can to encourage soil life, just like our heavenly Father has shown us
in His Creation since the beginning.

God's Blanket is also exceptionally beneficial for weed control. If we see weeds in our Farming God's Way gardens it is because the blanket has decomposed and become a sheet!!! We don't weed our model garden, we simply apply more blanket to get it up to the 100% cover and 2.5cm thick standard. This method of weeding is called "smother mulching" and is incredibly effective even against the hardest of weeds and creeping grasses.

If you need to weed, then simply pull out the weeds by hand or cut them off at the surface with a hoe without disturbing soil. Do this at the 1 inch or white hair stage to ensure no weed regrowth.



Coriander

When preparing for planting, simply move the blanket downslope of the planting area. Don't remove it out of the garden.

After planting vegetables from seeds, ensure that the blanket is **not covering the area directly above the seeds**, as they are not strong enough to germinate through the blanket. **Leave a narrow space of 5cm to allow for good germination.** Thereafter the blanket can be brought up against the plant bases.

God's Blanket must never be incorporated into the soil as this can cause negative nitrogen periods, so be careful not to press it in whilst fracturing or when using the dibble stick for transplanting seedlings. Also don't cover it with surface compost or soil.

In the 1960's a lady by the name of "Mrs Mulch", Ruth Stout, clearly documented her very simple system of heavy mulching (60cm of straw) in the autumn and planting directly into the decomposing material near the soil level in the spring, with almost a 20cm wall of mulch on either side of the rows. She did no applications of anything else, no compost or fertiliser or manure, no green manure cover cropping, simply heavy mulching. She appropriately honoured God by saying in her book, "Gardening without Work" – "I never invented mulch, God did!!!" Although her heavy mulching is a proven system, it takes some years to be fully productive and the amount she was using is impractical on any large scale.

We advocate God's Blanket to cover 100% of the soil surface and to be 2.5cm thick in most cases. God's Blanket should be continually on our fields whether growing vegetables or field crops, irrespective of whether you are doing 1m² or thousands of hectares.

You can use any organic material at your disposal including grass cuttings, thatch grass, banana leaves, palm fronds, bulrushes, forest leaves or maize stalks, however the finer materials are easier to handle in vegetable gardens.

You can also grow your own blanket material using green manure cover crops (see "Green Manure Cover Cropping" in the Farming God's Way Trainer's Reference Guide).

3. Compost

Compost is an exceptional alternative to fertiliser, which builds up not only the organic nutrient levels in the soil, but helps to restore the natural biotic balances which occur in the soil profile.

2 Corinthians 9:8 "And God is able to make all grace abound to you, that always having all sufficiency in everything, you may have an abundance for every good deed."

God's Word is true. He has made a way for everyone to have the best quality soil supplement... Compost. By putting back good quality compost into the soil, farmers can reap the same, if not better profitability in the long term, when comparing to fertiliser usage.

What is Compost?

Compost is simply decomposed organic matter that has been broken down by micro-organisms, especially bacteria and fungi. To ensure that our compost is of the highest quality we must stick to the recipe and make it **"to a high standard"**. We suggest a compost pile size of 2m long by 2m wide by 2m high. This is small enough for a single person to work in a few hours, while allowing for adequate internal temperature of the pile. The end product compost volume will be around 3.5m³ which will easily be enough for a large home nutrition garden for a year.

If you don't need as much, you can reduce the compost pile size to 1.5m long by 1.5m wide by 1.5m high. Large scale implementers simply join compost piles together keeping the 2m width and 2m build height but extending them to be as long as their required volumes.

When to Make Compost

Start collecting compost materials at the time when there is plenty of green material around, which in Southern Africa would be January or February, to allow enough time for the compost to fully mature before the next spring planting season.

Compost Ingredients

Compost is made of four main ingredients - nitrogen, green, woody and a dry component. Vegetables prefer bacterially dominated compost as compared to fungal dominated, therefore compared to our field crop compost, we reduce the woody component to 10% and increase our dry component to 35%. All the other ratios remain the same. This lowers the overall Carbon to Nitrogen ratio and makes the pile finer, with a higher percentage of bacteria within it.

a) Nitrogen

Nitrogen is the essential fuel of the compost pile and gets the bacteria going. The most readily available Nitrogen component is manure and should make up 10% of the pile or 15 bags of manure (50kg bags). Use the freshest manure that you can find. If there is no manure in your area then you can use 4m³ of legumes for this and just adjust your green and woody/dry components accordingly.

b) Green Component

Green leaves are a great source of sugars, which are necessary for good quality compost. The green component should make up 45% of your pile and should be used within 3-4 days, otherwise the sugars will convert into starch. Collect approximately 8m³ of green materials made up of leaves, grass clippings, weeds, old vegetables or shrubs.

c) Woody Component

The woody material really helps to encourage the fungal growth in the pile because it breaks down so slowly and keeps the pile aerated. Collect approximately 2m³ of woody materials to make up 10% of the pile using maize cobs, stalks, branches, cardboard, wood chips or shavings.

d) Dry Component

The dry material adds bulk and carbon to the compost and should make up 35% of the compost volume. Collect approximately 8m³ of dry materials, made up of thatch grass, leaves or old weeds.

To summarise, the ingredients we need for compost:

15x50kg bags of manure; 8m³ green (45%); 2m³ woody (10%) and 8m³ dry (35%).

Adding a bagful of previously made mature compost or dark organic matter from the forest can be very beneficial in inoculating your compost with healthy naturally occurring microbes.

The materials should be piled separately until such time as enough of each material has been accumulated. Collecting enough material to build a pile takes time, so you must plan properly. Farming God's Way farmers should get themselves into groups of five to pray, disciple and help one another. If these groups get together when there is sufficient green material around, then they can do their compost piles together in community and fellowship.

Building the Pile

Establish two equal 2m by 2m wide squares using 6 poles to 2m tall. You will need 2.6m long poles so you can bury them 60cm deep to prevent them from falling over. When building the pile, it is very important that the right ratios are maintained. The simplest way to achieve this is to build using alternate layers of the 4 main ingredients. As you build each layer dunk the ingredients into a container of water before you place them, so that you wet the layers thoroughly. A good wetting at the outset will mean you will probably only need to add water maybe once or twice during the turning process.

Start with 5cm woody, then 15cm dry, then 20cm of green, then 2 bags of well wetted, fresh manure on top of that. The picture below is only diagrammatic as you will have many more layers, just keep on layering until you get to the 2m height.



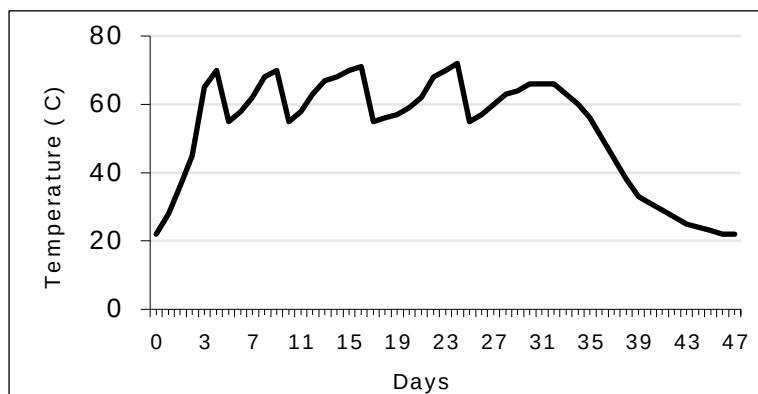
Turning the Pile

Within 3 days, the compost pile will have heated up and needs to be turned. The best way to do this is to mix the pile into the adjoining 2m by 2m position, using a fork or a hoe. The turning process maintains the correct temperature, mixes all the ingredients, brings material from the outside to the inside, aerates the pile with oxygen and allows for moisture levels to be checked and adjusted if necessary. If the pile is not turned it will become anaerobic, have a bad smell and result in poor quality compost.

Temperature

The compost gets hot very quickly because of all the bacterial activity. The ideal temperature of the compost should be maintained between 55°C to 68°C to kill all seeds and unwanted pathogens. If you don't turn your compost, the temperature can easily reach well over 70°C, which is too hot and kills off the desirable microbes, as well as burning up and wasting carbon.

The most accurate way to determine the temperature is by using a temperature probe. Turn the pile before the temperature reaches 68°C. A cheap alternative would be to use an 8mm steel rod. After inserting it for a few minutes, see if you can hold on to it for 5 seconds. If you can, the temperature is less than 68; if not it's ready for another turn.



A really simple turning cycle is to turn the compost pile every 3 days for the first 3 turns and every 10 days for the next 2 or 3 turns.

The temperature goes down after each turn and rises again until the next turn. This cycle will continue until all the nitrogen in the pile has been utilized. If you followed the guideline ingredient volumes of 15 bags of manure, then the compost will get hot enough for adequate decomposition and also will be maturing and cooling after 6-8 weeks.

Mixing

When turning, mix the different materials thoroughly bringing the materials on the outside into the inside so that it also gets exposure to high temperatures and the inside materials to the outside so all the ingredients get exposed to the decomposition process.

Moisture Content

It is important to test to see whether the pile is moist enough, as a lot of moisture is lost as steam and needs to be replaced. Try to keep the moisture content of your compost at 50%.

You can test this when turning the pile, by squeezing it in your hand. If moisture drips out, it is too wet. If no water drips out, but on opening your hand the material does not hold its shape, then it is too dry, so add water. If squeezed, no extra moisture drips out and on opening your hand the material holds its form, then it is close to the desired 50% moisture content.

Leave a gentle slope on the top of the pile and place thatch grass or grain bags on top to keep excess rain water off the pile, which can cool the pile too much.

Curing

After approximately 2 months the turning process is complete, but leave it to cure thoroughly for another 4 months before you use it. You don't need to turn it anymore, but store it in the shade or cover it with a breathable material or thatch grass to prevent it from drying out.

Do not cover the compost with plastic as this deprives the living organisms of oxygen.

When complete, your compost should be a dark brown colour, smell sweet and rich, have a crumbly texture and you should be able to see thick fungal strands.

When cured, the compost can be stored as is for years without degrading or losing its nutrients. At this stage your compost will be in the form of 3.5m³ stable organic nutrients and inoculum.



Utilizing the Compost

Compost is the input that we should see on every farm field as we teach farmers faithfulness with what God, in His all sufficiency, has put in our hand.

Compost can be utilized as a surface application or in planting stations/furrows. The yield potential with good quality compost is very high and the cost of producing it is only a few days labour to collect the materials, build and do the 5/6 turns of the pile. The opportunity to excel as a vegetable grower by cutting input costs and growing healthy nutritious plants depends on what we put in!!!

4. Seedling Nurseries

It is certainly easier for farmers to plant seedlings directly rather than sowing seed, however designing, building and managing seedling nurseries should only be taken on by more experienced growers. The seedling system has a great advantage in that at the early stages of sensitive vegetables, you only need to manage a small area, instead of a whole field of tiny emerging plants. Once the seedlings reach 7-10cm the best of these seedlings can be transplanted and you don't have the difficulty of gapping and unhomogenous stands.

Seedling nurseries can be in the ground on raised beds or else in seedling trays. Good drainage is crucial either way. The seedling nursery site should be in a secure area and close to a water source. Shade is very important in the early establishment phase of the vegetable seedlings. This shade can be from shade netting, palm leaves, thatch grass, bamboo or sticks. The structure should preferably be high enough for the person who will water and manage the beds to be able to have easy access, and about 2m above the ground level. Take into account the sun's movement and design the shade canopy or roof appropriately. It should be wider than the nursery beds, to ensure that there is sufficient shade provided throughout most of the day.

Seedling mixtures are very important for healthy stable plants.

Make a mixture of 1/3rd soil, 1/3rd coarse sand and 1/3rd well sieved, fine compost.

Seedling Nursery Beds

Make a raised bed 100cm wide on top, 15cm high and as long as you need according to seedling numbers required (see chapter 2.4). Place 5cm of the seedling mixture on top of the "fractured" raised seedling bed. Wet the mixture thoroughly. Press the moist seedling soil mixture down firmly with a flat, wooden plank. Then use the narrow edge of the plank to depress a 1cm deep furrow across the bed, repeating every 10cm. Space the seeds 5cm or a matchbox length apart in each row, to allow for safe root extraction. After planting, cover level with the fine seedling mixture, but don't firm up afterwards in order to allow for easy germination.

Seedling Trays

Seedling trays are the most effective technique to get good quality seedlings out, with little wastage of labour and water, whilst also ensuring excellent root mass and structural integrity. An alternative to seedling trays is to use old egg trays or homemade paper rolls. Before using the trays, soak them in a strong bleach solution of 1 part bleach to 10 parts water to ensure they have no pests or diseases. Fill up the seedling trays with seedling mix, then press each plug down to 1cm deep in readiness for planting, and wet thoroughly. In most cases, plant just 1 seed per plug, then fill the remaining 1cm with the remaining moist, seedling mixture, and scrape off any extra material. Don't press or firm up after planting, allowing for easy germination.

Write the crop, variety and sowing date on ice-cream sticks or plastic strips so you know what plants you have where.

Watering

The high compost ratio in the seedling mixture will hold a lot of moisture and the extra shade protection will prevent the seedlings from encountering moisture stress. Watering lightly once a day with a watering can with a very fine nozzle will usually be sufficient, but in very hot conditions it may be necessary to water twice a day. Be careful not to over water as this can cause bacterial wilt and mislead the grower to apply more water. Observe your plants and feel soil mixture regularly to assess the moisture status and make the necessary adjustments.

Transplanting

10 days prior to transplanting, begin to harden off the seedlings by exposing them to more and more sunlight and decreasing their watering. This is easy to do when using shade roofing like palm branch leaves, bamboo or thatch grass, as you can gradually remove more and more roof material, hereby allowing more and more light penetration.

Halve the watering on alternate days initially, then restrict watering by skipping a whole day every second day. However, ensure that several hours prior to transplanting that the seedlings receive plenty of water and are thoroughly turgid.

Seedling Nurseries - Hardening off

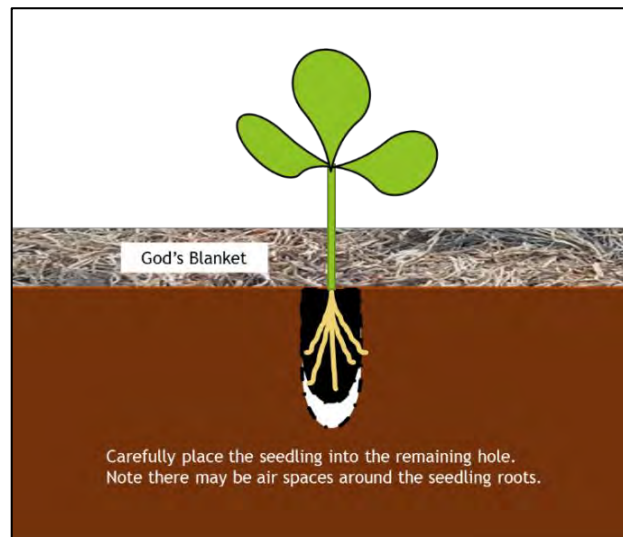
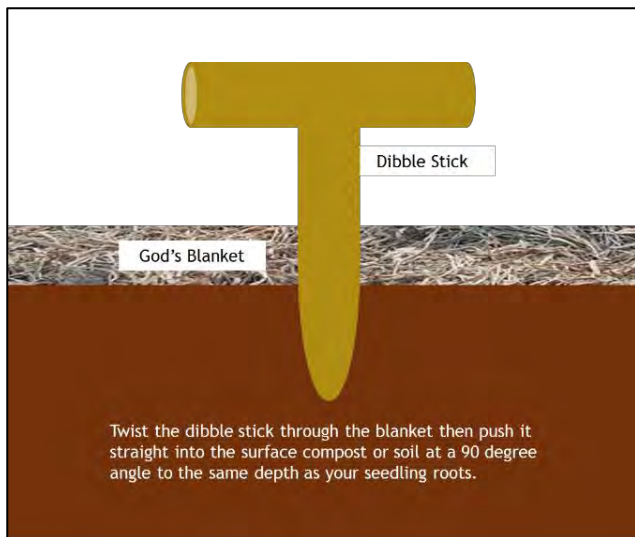
- ▶ 7-10 days before transplanting begin hardening off seedlings
- ▶ This is done by reducing waterings & exposing them to more sunlight
- ▶ Day 10 remove 30% of shade; only water half the usual amount
- ▶ Day 9 normal watering
- ▶ Day 8 only water half the usual amount
- ▶ Day 7 normal watering
- ▶ Day 6 no watering
- ▶ Day 5 Remove another 30% shade so 1/3rd shade remaining; normal watering
- ▶ Day 4 no watering
- ▶ Day 3 normal watering
- ▶ Day 2 no watering
- ▶ Day 1 very good watering - transplant
- ▶ Seedlings should be 7-10cm tall at transplanting
- ▶ Remove seedling roots with sharp handheld spade & remove as much soil mixture with roots as possible
- ▶ Keep seedlings in shade & transplant as soon as possible

When removing seedlings from seedling beds ensure you have a good, sharp, handheld spade to remove sufficient root with seedling mixture intact. Seedlings should be kept in the shade until planting out which should take place as soon as possible into the well prepared vegetable beds.

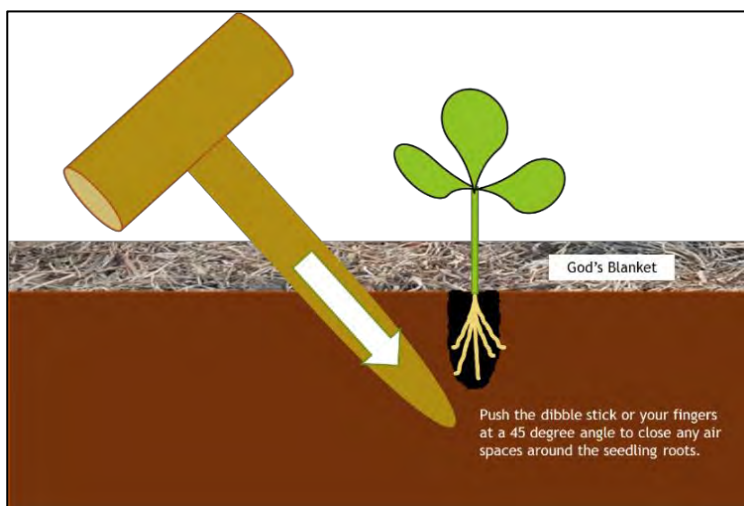


Dibble Stick - T shaped

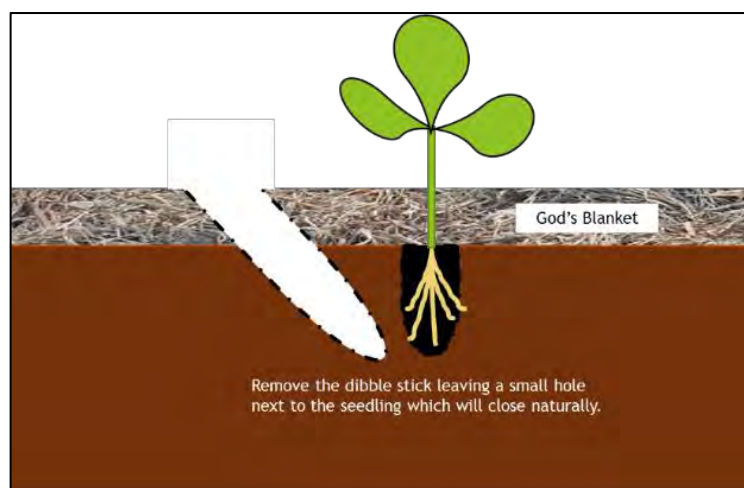
An essential tool for transplanting is the dibble stick, which is a rounded stick used to make a small hole in the ground into which you will plant your seedlings. The dibble stick should be pointed on the end and slightly wider than that of your seedlings, but can be made with many shaped handles such as straight, T shaped or bent. With larger scale plantings a waist high dibble stick with a depth gauge is advantageous. Home vegetable gardeners can simply use a 20-25cm straight, wooden dibble stick made out of a broom handle with some grooves in the handle side to prevent it from slipping.



First twist the dibble stick through the blanket, to make sure you don't push the blanket into the hole. Then press the dibble stick into the soil to make a hole to the required depth. When transplanting seedlings, take care to ensure there are no airspaces left under the roots of the seedling plug which can cause retarded growth and even die back.



Insert the seedling to the right level and then press the dibble stick in again at a 45° angle, close to the seedling, pushing the soil gently against the seedling roots. This allows the seedling to be well set and ensures that there are no airspaces around the root zone.



The small dibble stick hole left in the compost near the seedling can be covered by foot or hand or left to fill naturally.

5. Pest and Disease Management

There can be nothing more disheartening than for a farmer to grow a beautiful crop until close to harvest time and watch it get destroyed before his eyes as a pest or disease obliterates it. We need to understand that we are working in a fallen world and we need to first and foremost be committed to pray over our crops and lands for God's protection against pest and diseases, as well as doing things in a Godly order that would afford us with His protection (see the Biblical Keys in the Trainer's Reference Guide).

Living and Healthy Soils

Outside of the spiritual prayer and alignment coverings that God blesses us with, one of the most overlooked issues in pest management is living and healthy soils. It is within a healthy soil that we find the God created biological balances necessary for good, productive growth of plants and living organisms. Healthy plants have natural pest and disease resistance, but this only occurs when they are well fed and growing in healthy, living soils. The complexity of life inside the soil is a lifetime's worth of work and discovery which is outside of the scope of this Vegetable Guide to even discuss. However it is important to say that we need a great diversity of living creatures to be present to have stable relationships between organisms that eat dead and living plant matter and the organisms that predate on them. Sterile fields and soils are very problematic as they encourage a flair up of pests and diseases that go completely unchecked because there are no natural predators to control these population explosions. Destroying one pest can also often wipe out all the beneficial predators, which in turn causes explosions of other pests or diseases. It is about managing this ecological balance as best possible. The best ways to improve and culture living soils are through applying high quality compost and God's blanket, but the ecological balances required may take a few committed seasons in order to reap the rewards.

We encourage farmers to get to know their biological allies - frogs eat worms, flies, moths, slugs and snails; earthworms build soil structure and porosity; bees and butterflies are essential for pollination and therefore fruitset; ladybirds eat aphids; parasitoid wasps keep problematic caterpillars under control; spiders and birds are also excellent at keeping pests under control etc. The mindset that the garden must be "bare soil with no bugs or living creatures" is one that needs a radical adjustment before success can be achieved.

Rotations

Pests and diseases build up rapidly in the soil when the same crops, or families, are grown in the same soil year after year. It is imperative that the Fruit, Leaf and Root rotations are practiced every 6 months with vegetables, to ensure that these disease cycles are broken. This rotation will be quite successful in preventing pest and disease build up, with a full 12 month break in the design. Rotations within rotations also decrease the risk of disease accumulation even within the 6 month cycle. It is quite alarming to realise how many farmers are still practicing mono-cropping and don't understand why their crops are so frequently under severe attack.

Regular Inspections

Farmers should do daily inspections on their crops to observe the incidence and damage caused by pests and disease, and implement good integrated pest management controls accordingly.

Handpicking and Henpecking

A very effective way of controlling large pests like caterpillars, beetles, snails and slugs is to handpick them, assuming it's a small garden. It is easiest to find snails and slugs in the open at night. Chickens can also be put into the portion of the garden that you will be planting into for a few days to eat cutworms and other pests before planting.

Remove diseased leaves or plants immediately

It is recommended to prune off any infected shoots or simply uproot the diseased plant and throw it a long way from the garden, not leaving it in the rows or at the garden perimeter or with the compost materials. In this way you discourage the spread of the disease or pest infestation to neighbouring plants and can save a crop if caught early enough.

Traps and Deterrents

Pest traps draw pests away from the plants and can be in the form of light, smell or physical traps. A good example of a pest trap is to draw snails and slugs away from your plants by placing small cups, like old yoghurt cups, in the soil and putting 2cm of beer in them. The beer is strong smelling and the snails will drown in their drunken stupor. The cups need to be cleaned out daily and the beer should be replaced every few days.

Placing smooth moist structures, like wooden planks, around susceptible plants can make harvesting slugs and snails easier as they seek refuge there during the daytime.

Scarecrows or old cd's tied above vegetables on fishing line can be effective at keeping away troublesome birds.

Repellents

Preventative measures are by far the best way to combat pests and diseases, as they stop outbreaks before they occur. If you have had a history with a particular pest in the field in the past, then you should apply repellents every 7-14 days to ensure they do not become a problem in the current season.

Plants such as marigolds, petunias, lemongrass, basil, rosemary and mint, amongst many others, are great for repelling problem pests in the garden. These can be easily incorporated into the design of the garden, either in rows or at intervals, throughout the garden.

Onion, chilli and garlic sprays are excellent pest repellent options. There are also many essential oil plants that have aromatic repellent properties including neem, orange, eucalyptus, lemongrass, lavender, sage, rosemary, thyme and clove oil. Many of the mixtures of repellents double up as control sprays.

Spot Spraying

Most people when they see a pest outbreak, will just go ahead and spray the whole field, which is really not the correct way to tackle pest incidence. It is preferable to spray affected areas as spot sprays to sort out problem areas, so that they don't spread into the rest of the field. Remember that these sprays will most likely kill and repel both beneficial and non-beneficial organisms, so try to limit the ecological damage you can cause by limiting the spray coverage to affected areas. Spray infected areas with a fine nozzle spray in the **late afternoon** to prevent the plants from getting stressed. Do trial sprays of plants to ensure you have your mixtures correct and don't cause unnecessary damage. Here are a few examples of hundreds of available concoctions:

Soap sprays are good at controlling aphids, scale, thrips and mites. Spray directly onto all infested surfaces to ensure there is a full coverage on the surface of the insects. 2 teaspoons liquid soap per litre of water.

Soap and Oil sprays are more effective as they combine both the effective agent of soap, with the surface coating effects of the oil, as well as some of the repellent properties to keep pests away for longer. Aphids, thrips, mealybugs, scale and whitefly breathe through their skin, so a surface coating of oil suffocates them. The strong smelling repellent properties from chilli, onion, garlic and other essential oil ingredients are incredibly effective at causing a hasty retreat of pests from the garden.

Option 1 - 1 teaspoon of liquid soap, 1 teaspoon of vinegar, 10ml canola or soya oil and 1 litre of water.

Option 2 – Crush 6 hot chilli peppers (or 2 tablespoons of chilli powder), 2 bulbs of garlic and an onion to a

pulp, add a teaspoon of liquid soap, 2 teaspoons vegetable oil and a cup of warm water. Let it stand overnight, then strain out the solid particles and top this mixture up with water to make up a litre.

Option 3 - Neem oil (an extract from the Neem tree seed) has become the most widely utilised organic oil spray against caterpillars, aphids, mites, mealybugs and whiteflies. A simple spray onto the leaves of plants is enough to disrupt their feeding and lifecycle, and although not instantaneous it will kill pests. Neem oil sprays have also been found effective at deterring grasshoppers and also controlling powdery mildew. Neem oil does not harm beneficial insects. 1 teaspoon liquid soap, 2 teaspoons neem oil and 1 litre of water.

Milk Spray - Using diluted milk and water solutions have proven as effective against powdery mildew as commercial fungicides. Milk solutions are also effective against mosaic virus, blights and other fungal infections on squashes, tomato, cucumber and other crops. Mix 100ml of milk with 900ml of water.

Soap and Baking Soda

Baking Soda/Bicarb is very basic (high pH) and creates a hostile environment for fungal diseases like powdery mildew and early blight on potato, tomato and squashes. 1 teaspoon of liquid soap, 1 teaspoon of bicarb and 1 litre of water. Make sure you test spray before applying to the whole crop.

Bacillus thuringiensis - A commercial option is the use of *Bacillus thuringiensis* or Bt. Bt is a bacterium naturally present in the soil which secretes a toxin which is only harmful to certain insect larvae. Bt is sprayed as a biological insecticide onto the leaf surfaces of many plants and is an excellent biological control mechanism against certain insect pest larvae with no known side effects on other organisms. Bt has to be eaten by the larvae in order to work, and once ingested it attacks the gut lining of the insect causing death.

Dusting

Woodash is very effective in preventing stalk borer and fall army worm infestations in maize/sweetcorn. Place a pinch of woodash down the funnel of every sweetcorn plant at knee high for "stalk borer" control. Post harvest stalk lodging is also very effective at exposing overwintering stalk borer to UV light and opportunistic feeders like guinea fowl and chickens.

For the control of "Fall army worm" in all maize cultivars, apply a pinch of woodash every 2 weeks until the piping stage. This has been proven very effective even when neighbours have had complete failures with chemical control.

Diatomaceous earth is a fine chalk like powder made up of fossilised diatoms. When sprinkled on insect pests it sticks to them drawing the moisture away from their exoskeletons, causing dehydration and even death. It can also be broadcast around the base of valuable crops stems to act as a barrier to cutworm, snails and slugs.

Healthy people eat healthy plants which come from healthy soils which are living soils!!! We must do everything we can to encourage soil life, just like our heavenly Father has shown us in His Creation since the beginning.

In a biologically managed garden, imperfections in the vegetables must be tolerated for the greater good of what you are trying to achieve, but obviously not at the expense of success. Try your utmost to avoid the use of chemical pesticides which are harmful to both humans and the environment. Remember that to wipe out all the insects, fungi and bacteria is not the objective. Instead we are trying to encourage a healthy habitat for all living creatures to co-exist in balance. Ensure you practice good agronomic Farming God's Way practices, look after the soil and its biology, provide ideal environments for healthy plants, practice minimalistic pest control and avoid chemicals if at all possible.

6. Vegetable Guidelines

The simplest way to differentiate between the various vegetable families is to sub divide them into Fruit, Leaf and Root vegetables, which will be rotated out every 6 months at Spring and Autumn planting times. Each vegetable production process will be discussed separately based on whether you are doing Surface Composting or Manure/Low Volume Compost techniques.

6.1 Fruit Vegetables

6.1.1 Green Beans and Peas

A) Green Beans and Peas - Surface Composting Technique

Besides being high in protein, which is especially important in poor communities where there is a dominant carbohydrate portion in the diet, green beans and peas also provide vitamins A, B, C and K, antioxidants and trace elements for healthy living. Green beans prefer a spring to late summer planting with optimal growing temperatures of 16-25°C. Peas on the other hand do best in cooler autumn and winter plantings with optimal temperatures of 12- 23°C.

Layout

Plant beans/peas from seed 10cm between plants and in 75cm rows.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 10cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.



Remove God's Blanket

Move God's Blanket downslope of the 10cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

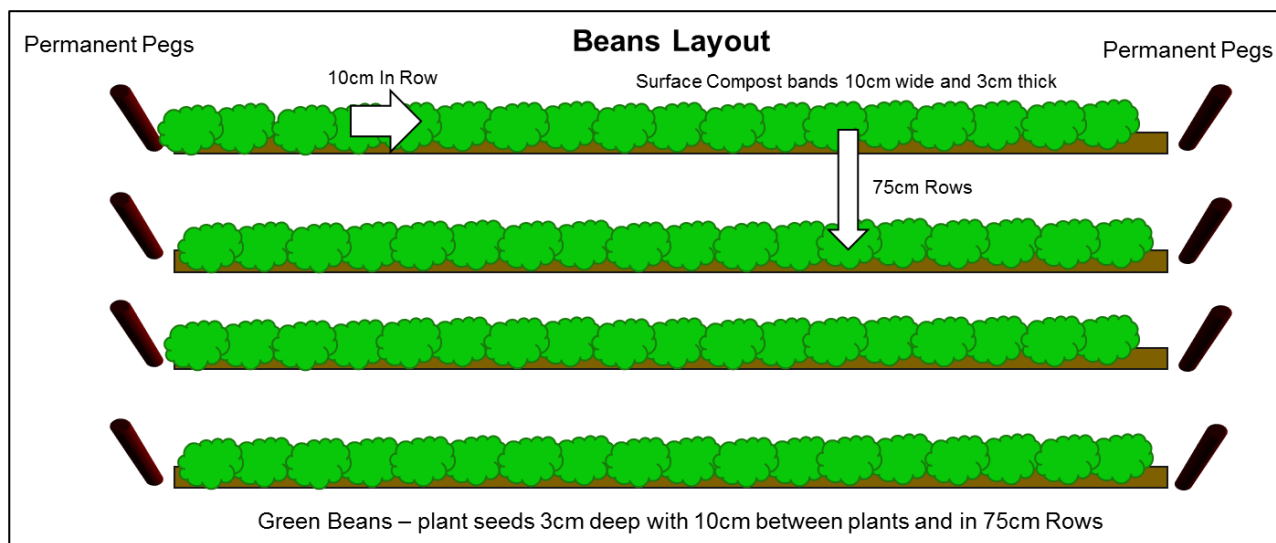
To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash or bonemeal or 1 teaspoon of lime, every 60cm on the planting line.

Surface Composting

Place 3cm of compost on top of the 10cm wide band on each 75cm row. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

Furrowing and Planting

In the middle of the compost band, press down with a hoe edge to establish an accurate and even 3cm planting depth or a matchbox on its side. Then simply place the beans or peas at 10cm intervals, which is basically a hand width apart. Cover the seeds by pinching the compost closed and gently firming up.



God's Blanket

Don't put the blanket on top of the band until after germination whereafter the blanket can be brought up against the plant bases. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Harvest

Harvest your green beans and peas regularly to ensure they carry on flowering and making new pods.

B) Green Beans and Peas - Manure/Low Volume Compost Technique



Besides being high in protein, which is especially important in poor communities where there is a dominant carbohydrate portion in the diet, green beans and peas also provide vitamins A, B, C and K, anti-oxidants and trace elements for healthy living. Green beans prefer a spring to late summer planting with optimal growing temperatures of 16-25°C. Peas on the other hand do best in cooler autumn and winter plantings with optimal temperatures of 12- 23°C.

Layout

Plant beans/peas from seed 10cm between plants and in 75cm rows.

Placing String

Place a top string or measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 20cm downslope from the planting string, to ensure none of it gets buried.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Digging Furrows

Dig furrows 10cm deep, moving the soil downslope of the planting string, taking care to neatly heap the soil for reuse later. Repeat the furrows every 75cm.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm in the furrow.

Manure/Compost

Evenly spread 500ml of manure/compost per meter into the furrow. Beans are not heavy feeders and this should be enough even if the soils are very infertile.

Soil Separation Layer and Seeding Depth

Take a skimming of soil from the heap and cover the inputs with at least 3cm of soil to establish an accurate final planting depth of 3cm and also to ensure a good separation layer between the seed and manure. If you don't separate seed from manure you will get poor germination because of seed burn. This is obviously not the case with high quality compost.

Planting

Plant seeds 3cm deep and 10cm or a hand width apart and cover with fine loose soil, preferably with a slightly raised surface, to allow for good germination.

God's Blanket

After germination has taken place then you can bring the blanket up close to the plant stems. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Harvest

Harvest your green beans and peas regularly to ensure they carry on flowering and making new pods.

6.1.2 Egg Plant – Compost/Manure Technique

Eggplant is relatively low in vitamins and minerals, but they do have a high anti-oxidant concentration. They are also one of the easier large fruit vegetables to grow and far less susceptible to pest and disease as compared to Tomatoes. They should be grown in soils that are deep, well drained and fertile.

Eggplants prefer a spring or early summer planting time with optimal temperature ranges between 20-27°C.

Layout

For ease of access, it is recommended for Field scale growers to plant eggplant in double rows 75cm apart with 60cm between plants, then skip a row leaving a 150cm wide pathway until the next double rows.



Small scale gardeners can grow them at 60 by 75cm intervals for best use of limited space.

Eggplant is very heavy and therefore it is advisable to build a trellis network on the row lines for the plants to gain support.

Placing 60cm Measuring Rope

Place a 60cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope from each planting station, to expose the soil.

Soil Fracturing

Give your Eggplant a good chance of success by fracturing each 75cm row line to 30cm deep.

Digging Planting Stations

The wide plant spacing make them best suited for inputs placed directly into planting stations rather than surface composting. Dig a planting station 15cm deep at each 60cm interval, moving the soil downslope of the measuring rope, taking care to neatly heap the soil for reuse later. Planting stations should be 12cm wide, 15cm long and 15cm deep. Repeat this at each 75cm row or alternatively with field scale prepare double rows at 75cm with a 150cm walkway thereafter.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, in each of the 60cm planting stations.

Compost/Manure

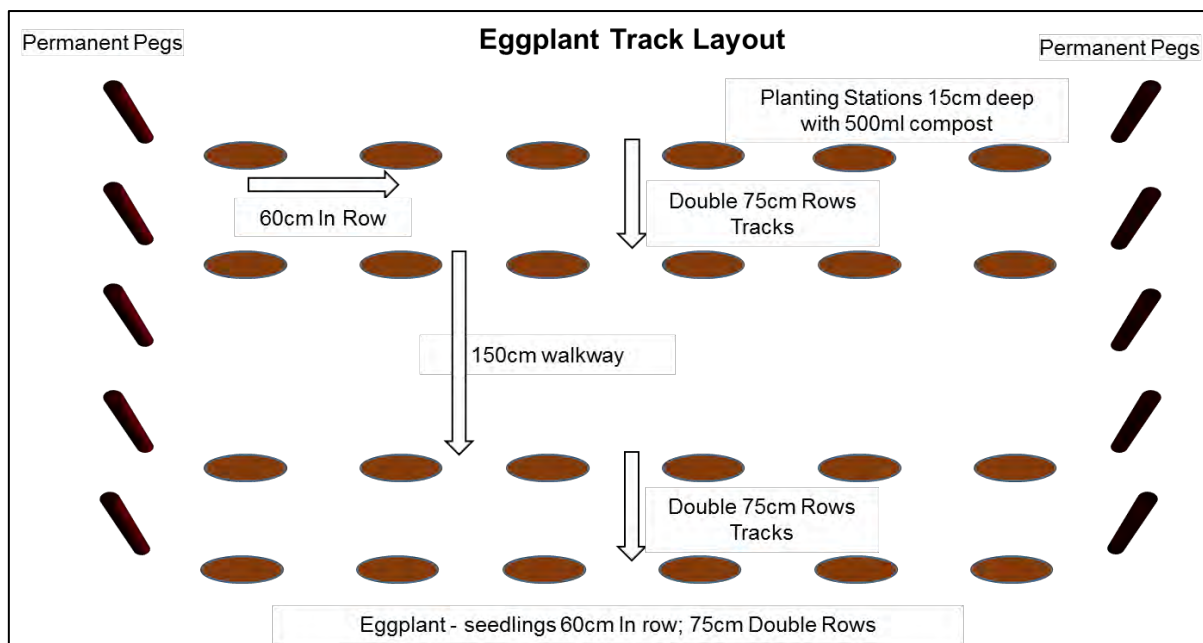
It is preferable to apply 500ml of compost, in each planting station. If you don't have compost, then you should use older, more mature manure as fresh manure results in excessive leaf growth and reduced fruit.

Seed Depth and Soil Separation Layer

Cover all the inputs with soil from the downslope heap until the soil surface is level again. Replace the 2.5cm thick blanket on top of the planting stations.

Planting Seedlings

Twist the dibble stick through the blanket and press it into the centre of each of the planting stations, to the required depth. You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth, is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the Eggplant seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Pest Control

Your first line of defence against pests and disease is to keep the plants stress free by having healthy soils, thick mulch cover and an excellent supply of nutrients. Any organic pest management control must focus on prevention rather than cures (See Chapter 5).

All the solanaceous plants, Eggplant, Tomatoes, Peppers and Potatoes are susceptible to similar pests and diseases, so it is critical to have a 2 year break in your rotation planning with these crops.

Observe your plants regularly and if diseased plants have been identified it is often the best option to simply remove those plants and dispose of them far away from the garden.

6.1.3 Peppers – Compost/Manure Technique

Pepper fruits come in many shapes and colours (green, orange, yellow and red) and are high in vitamin C and anti-oxidants. They are a moderately easy large fruit vegetable to grow, but they are highly susceptible to pests and diseases and need deep, well drained, fertile soils. Peppers prefer a spring or early summer planting time with optimal temperature ranges between 20-27°C.



Layout

Peppers are planted at a higher population density than eggplant. Plant peppers with 45cm between seedlings and 75cm between rows, similar to cabbages. Pepper plants are vulnerable to lodging towards the end of the growing season, therefore it is advisable to build a trellis network on the row lines for the plants to gain support.

Placing 45cm Measuring Rope

Place a 45cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

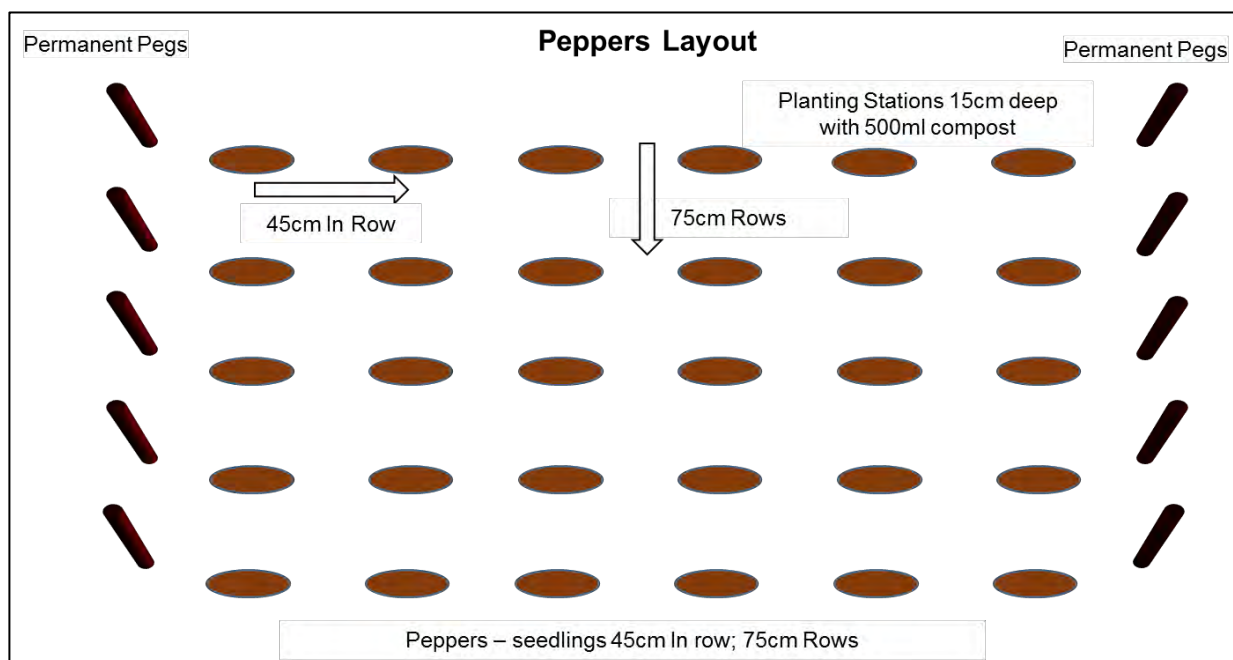
Move God's Blanket 30cm downslope from each planting station to expose the soil.

Soil Fracturing

Give your Peppers a good chance of success by fracturing each 75cm row line to 30cm deep.

Digging Planting Stations

The wide plant spacing make them best suited for inputs placed directly into planting stations rather than surface composting. Dig a planting station 15cm deep at each 45cm interval, moving the soil downslope of the measuring rope, taking care to neatly heap the soil for reuse later. Planting stations should be 12cm wide, 15cm long and 15cm deep. Repeat this every 75cm row interval.



Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients apply 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, in each of the 45cm planting stations.

Compost/Manure

It is preferable to apply 500ml of compost in each planting station. If you don't have compost, you should use older, more mature manure as fresh manure results in excessive leaf growth and reduced fruit.

Seed Depth and Soil Separation Layer

Cover all the inputs with soil from the downslope heap until the soil surface is level again. Replace the 2.5cm thick blanket on top of the planting stations.

Planting Seedlings

Twist the dibble stick through the blanket and press it into the centre of each planting station, to the required depth. You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the Pepper seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.

Pest Control

Your first line of defence against pests and disease is to keep the plants stress free by having healthy soils, thick mulch cover and an excellent supply of nutrients. Any organic pest management control must focus on prevention rather than cures (See Chapter 5).

All the solanaceous plants, Eggplant, Tomatoes, Peppers and Potatoes are susceptible to similar pests and diseases, so it is critical to have a **2 year** break in your rotation planning with these crops.

Observe your plants regularly and if diseased plants have been identified it is often the best option to simply remove those plants and dispose of them far away from the garden.

6.1.4 Squashes – Compost/Manure Technique

Squashes include pumpkin, butternut, gemsquash, water melon, zucchini and patty pans and are excellent sources of Vitamins A, C and E as well as a diverse group of anti-oxidants. Plant squashes in spring to early summer with optimal temperature ranging 18-28°C. They do not tolerate cold and should only be planted after any risk of frost has passed.

Layout

Planting squashes has many options but a simple method is to prepare planting stations at 120cm between plants and 150cm between rows.



Placing the Measuring Rope

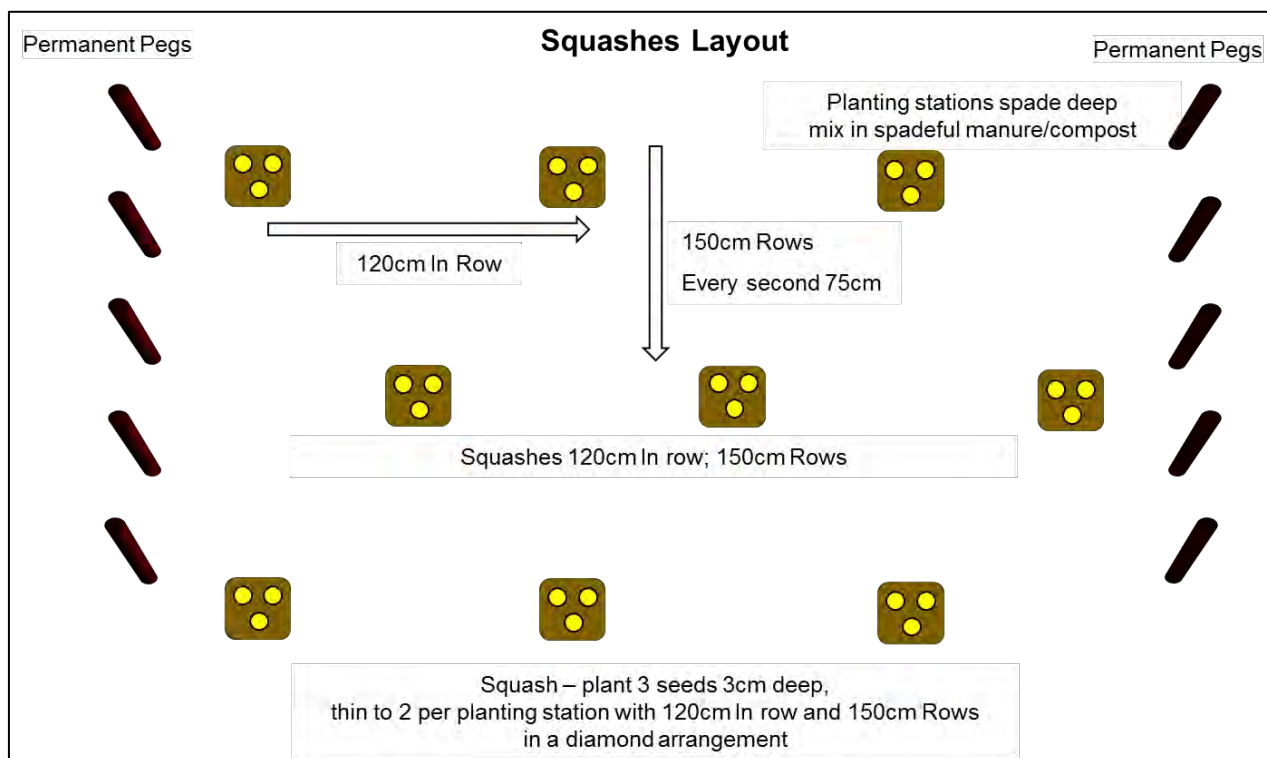
Place a 60cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope from every second measuring rope marker or **120cm** interval to expose the soil.

Digging Planting Stations

Prepare a spade wide and deep sized hole, every 120cm in the row, by removing the soil 20cm deep and 20cm wide. Repeat this every second row at 150cm intervals creating a diamond arrangement.



Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients mix in 2 tablespoons of woodash/bonemeal or 3 teaspoons of lime, with soil from the planting stations.

Compost/Manure

Mix in a spade full of manure or compost with the soil from each planting station. When using manure, fill with the mix leaving 6cm deep and then place a 3cm plain soil separation layer to prevent seed burn. When using compost, fill with the mix leaving the 3cm planting depth remaining as compost won't burn the seed.

Planting Seed

Place 3 seeds in each planting station, 10cm apart in a triangle and cover level with plain soil from the downslope heap. After germination, thin down to just 2 plants per station.

God's Blanket

Once the plants are about 10cm tall replace the blanket right up against the plant stems. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Pest Control

Your first line of defence against pests and disease is to keep the plants stress free by having healthy soils, thick mulch cover and an excellent supply of nutrients. Any organic pest management control must focus on prevention rather than cures.

Powdery mildew can be a major disease with the squashes. After rains or misty conditions, spray twice per week with a mixture of 1 part milk to 9 parts water with a teaspoon of liquid soap, to keep powdery mildew under control (See Chapter 5). Observe your plants regularly and if diseased plants have been identified it is often the best option to simply remove those plants and dispose of them far away from the garden.

6.1.5 Sweet Corn – Compost/Manure Technique



Sweetcorn/Green Maize is relatively low in vitamins and minerals, but is still a very popular, easy large fruit vegetable to grow and also very hardy.

Sweetcorn grows best in temperatures between 15-25°C but is best suited to warmer than cooler temperatures with ideal planting times from spring through summer.

Layout

Plant sweetcorn at 60cm between plants and 75cm between rows. Sweetcorn is a small variety of maize and should be grown at a higher population density than normal maize, so adjust this by not thinning.

Placing 60cm Measuring Rope

Place a 60cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope from each planting station to expose the soil.

Soil Fracturing

If your soils are compacted, give your Sweetcorn a good chance of success by fracturing each 75cm row line to 30cm deep but due to the 15cm deep planting stations this may not be necessary.

Digging Planting Stations

The wide plant spacing make them best suited for inputs placed directly into planting stations rather than surface composting. Dig a planting station 15cm deep at each 60cm interval, moving the soil downslope of the measuring rope, taking care to neatly heap the soil for reuse later. Planting stations should be 12cm wide, 15cm long and 15cm deep. Repeat this process at each 75cm row interval.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients apply 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, in each of the planting stations.

Compost/Manure

It is preferable to apply 500ml of compost, in each planting station. Alternatively use fresh manure which is high in nitrogen, and very beneficial when growing Sweetcorn.

Seed Depth and Soil Separation Layer

Take a skimming of soil from the downslope heap and cover all the inputs with a 3cm separation layer of soil. Leave a final depth of planting of a matchbox length or 5cm deep.

Planting Seed

Plant 3 seeds per planting station - on the left, middle and right.

Cover level with soil from the downslope heap and replace the 2.5cm thick blanket on top of the planting stations. No thinning is necessary with sweetcorn as it is a smaller variety of maize and does better with higher population densities than other cultivars.

God's Blanket

Sweetcorn can germinate right through the blanket, unlike other vegetable seeds which need an open 5cm space for germination to take place. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Top Dressing

If your sweetcorn shows any signs of yellowing or is pale, top dress with urea or manure tea.

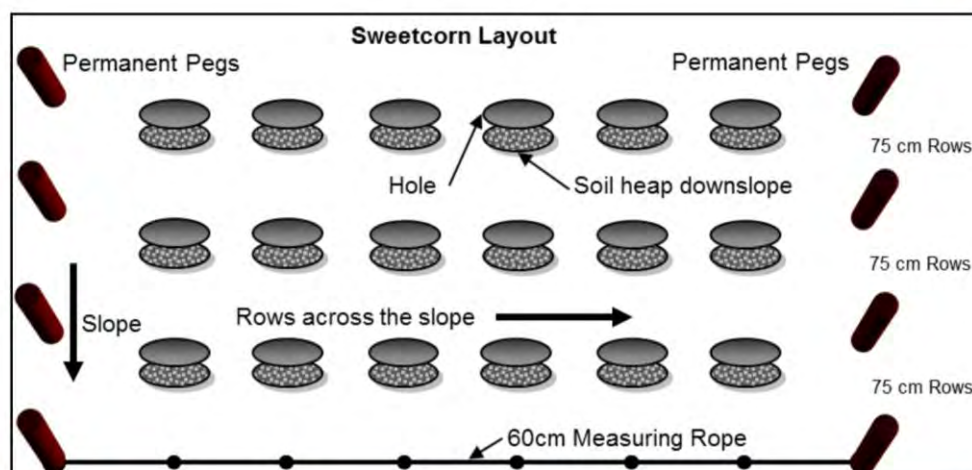
Push a small hole 3cm deep, a hand width away from each planting station on the upslope side of each planting station. Then place a teaspoon of urea in each hole and cover it level. When applying diluted manure tea, apply 350ml to each plant base. Repeat the applications at knee height and piping stage.

Harvest

Harvest sweetcorn when the last silks coming out of the cobs have just started drying off to ensure they are sweet and succulent.



Farming God's Way Sweetcorn



1 Mark holes 60cm by 75cm. Dig holes 15cm deep for manure/compost/anthill. Soil heap on downslope side.



2 Place a heaped tablespoon of woodash or a teaspoon of lime in the bottom of each hole.



3 Place 500ml cup of manure/compost/anthill soil in the bottom of each hole.



4 Cover with 3cm of soil leaving a 5cm or match-box depth for planting & water in well or wait for the rains.



5 Select quality seeds. Plant 3 seeds/hole 5cm deep in an evenly spaced line across the row. Cover the seed closing the holes level using remaining soil.



6 There is no need to thin sweetcorn. Ensure God's Blanket is 2.5cm thick & evenly spread over the entire field.



7 Topdress with Urea when plants are 30cm tall & again before tassling. Place 5ml teaspoon 10cm on the upslope side of each hole and cover with soil.



8 Harvest sweetcorn when the end kernels are just filling out to ensure they are sweet and succulent.

**Trust in the LORD, and do good;
dwell in the land and cultivate faithfulness. Psalm 37:3**

6.1.6 Tomato – Compost/Manure Technique

Tomatoes are the most popular of all the vegetables and are full of healthy ingredients including vitamins A, C and E as well as anti-oxidants. However tomatoes are also one of the most difficult to grow successfully requiring excellent management; deep, fertile well drained soils; and excellent pest and disease control which is not common amongst poor communities. Tomatoes should therefore be avoided until sufficient experience has been gained and the soil has had good care and healthy compost inputs for a few seasons. Tomatoes prefer a spring to early summer planting time with optimal growing temperatures of 20-27°C.

Layout

Field scale growers mostly grow **determinate** varieties at 60cm between plants and 150cm between rows for better light penetration and ease of movement, whereas small scale or home gardeners can grow them at 60 by 75cm intervals.

Indeterminate varieties climb a lot more and also set fruit over a much longer timeframe, so plant these at 60cm between plants and 150cm between rows.

Tomato fruit is very heavy and the plants are prone to lodging, therefore it is advisable to build a trellis network on the row lines for the plants to gain support.

Placing 60cm Measuring Rope

Place a 60cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope from each planting station, to expose the soil.

Soil Fracturing

Give your tomatoes a good chance of success by fracturing each 75cm row line to 30cm deep.

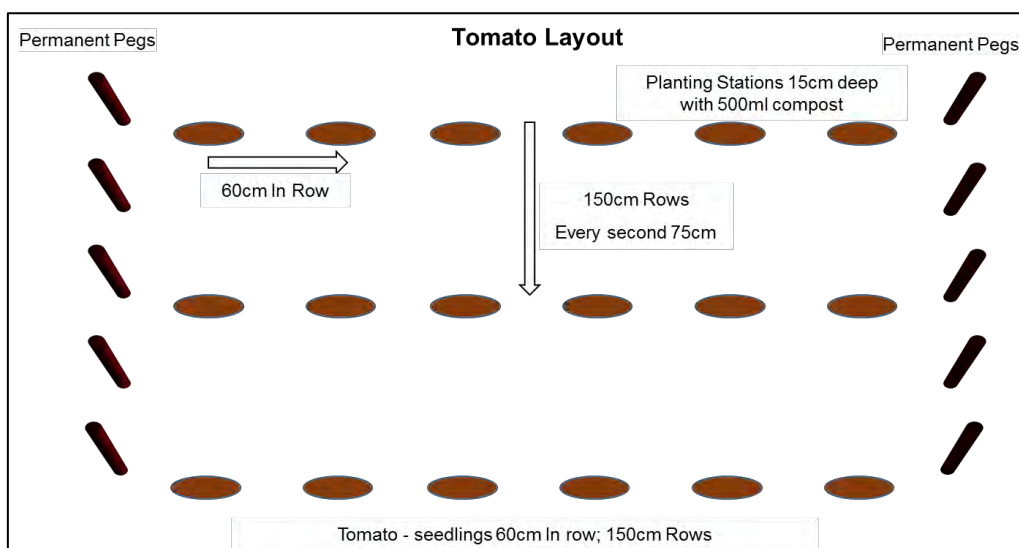
Digging Planting Stations

The wide plant spacing make them best suited for inputs placed directly into planting stations rather than surface composting. Dig a planting station 15cm deep at each 60cm interval, moving the soil downslope of the measuring rope, taking care to neatly heap the soil for reuse later. Planting stations should be 12cm wide, 15cm long and 15cm deep. For **home grown determinate tomato varieties** repeat planting stations every 75cm row, whereas with **field scale and all indeterminate tomato varieties** repeat every alternate row at 150cm.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients apply 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, in each planting station.





Compost/Manure

It is preferable to apply 500ml of compost in each planting station. If you don't have compost, then you should use older, more mature manure otherwise the tomatoes will produce too many leaves and less fruit. Cover all the inputs with soil from the downslope heap until the soil surface is level again. Replace the 2.5cm thick blanket on top of the planting stations.

Planting Seedlings

Once seedlings are at about 10-12cm tall they are ready for transplanting. Twist the dibble stick through the blanket and press it into the centre of each planting station, to the required depth. You must ensure the seedling roots are not bent into a J shape which will adversely affect the plant's growth, so make sure the dibble stick hole depth is sufficient, but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the Tomato seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.

Pest Control

Tomatoes are susceptible to many pests and diseases but your first line of defence is to keep the plants stress free by having healthy soils, thick mulch cover and an excellent supply of nutrients. Any organic pest management control must first focus on prevention rather than cure. All the solanaceous plants, (Tomatoes, Eggplants, Peppers and Potatoes) are susceptible to similar pests and diseases, so it is critical to have a 2 year break in your rotation planning with these crops.



There are countless organic pest and disease control options available from insecticidal repellent oils, such as Neem oil, to diluted milk to keep powdery mildew under control, to mention just a few (See Chapter 5).

Observe your plants regularly and if diseased plants have been identified it is often the best option to simply remove those plants and dispose of them far away from the garden.

6.2 Leaf Vegetables

6.2.1 Amaranth

A) Amaranth - Surface Composting Technique

Amaranth can be grown for both its leaf and grain value, however most cultivars are best suited to one or the other use. The leaves are very nutritious and high in Vitamins A, B and C, with higher levels of Calcium and Iron than Spinach leaves. Amaranth is a very hardy plant and tolerant of poor soil fertility, high temperatures and dry conditions. Amaranth is well suited to spring through summer plantings as it needs 15°C for germination. Amaranth has optimal growing temperatures of 23-35°C and is a better suited summer leafy green vegetable than Spinach or Kale.



Layout - 37.5cm Triple Rows

Leafy Amaranth final plant spacing is 30cm between plants in triple 37.5cm rows. Split the 75cm rows in half with triple rows at 0; 37.5; 75cm then start again on the next 75cm permanent peg to allow for access for easy harvesting of the leaves. **Grain** Amaranth is grown wider apart as it can get up to 2m tall, with 30cm between plants and 75cm rows.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 10cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 10cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

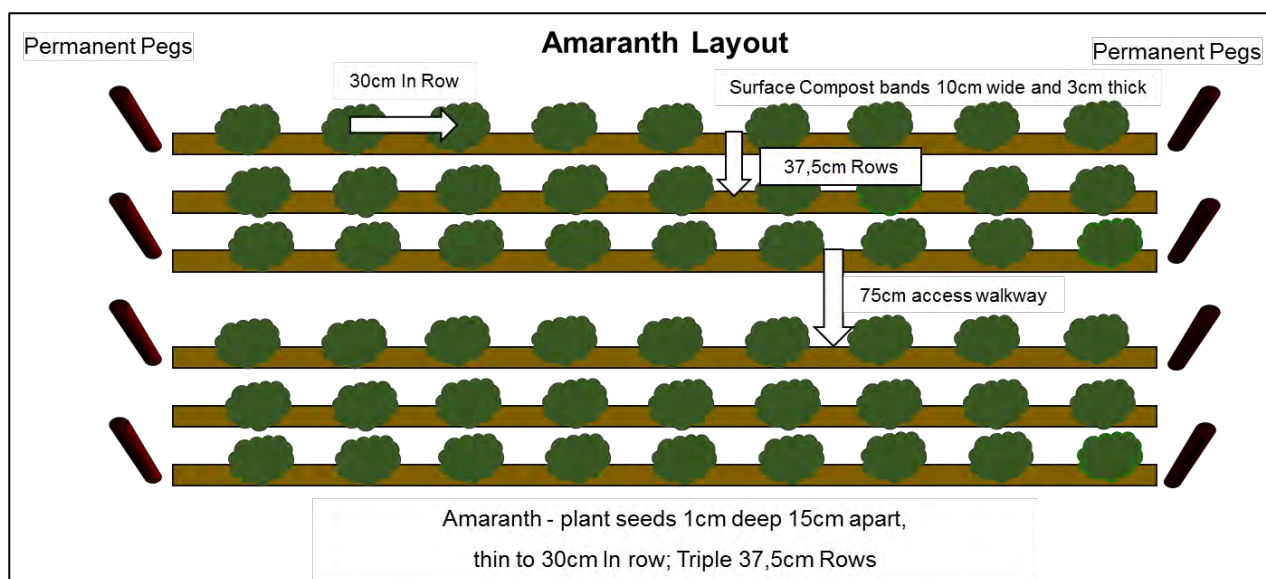
Push the fork 30cm deep and pull it backwards a little until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash or 1 teaspoon of lime, every 60cm on the planting line.

Surface Composting

Leaf Amaranth is a medium feeder so place just 3cm of surface compost on top of the 10cm wide band. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top. Repeat this process again for each 37.5cm row, which will allow your Leaf Amaranth to establish a good canopy closure, but leave a 75cm wide access walkway after every triple row to allow for easy harvesting.



Furrowing and Planting Seed

In the middle of the compost band press down lightly with a hoe edge to establish a furrow 1cm deep or a matchbox flat. Planting amaranth seed deeper will result in very poor germination. Plant the seeds 15cm apart and cover by pinching the compost closed and gently firming up. Thin down to **30cm** intervals after germination.

God's Blanket

Don't put the blanket on top of the band until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Harvest

When harvesting amaranth for leafy greens, trim off the two lowest leaves, allowing the upper leaves to fill out. The plants will continue to produce leafy greens for a few months.

B) Amaranth - Manure/Low Volume Compost Technique

Amaranth can be grown for both its leaf and grain value however most cultivars are best suited to one or the other use. The leaves are very nutritious and high in Vitamins A, B and C, with higher levels of Calcium and Iron than Spinach leaves. Amaranth is a very hardy plant and tolerant of poor soil fertility, high temperatures and dry conditions. Amaranth is well suited to spring through summer plantings as it needs 15°C for germination. Amaranth has optimal growing temperatures of 23-35°C and is a better suited summer leafy green vegetable than Spinach or Kale.



Layout - 37.5cm Triple Rows

Leafy Amaranth final plant spacing is 30cm between plants in triple 37.5cm rows. Split the 75cm rows in half with triple rows at 0; 37.5; 75cm then start again on the next 75cm permanent peg to allow for access for easy harvesting of the leaves. **Grain** Amaranth is grown wider apart as it can get up to 2m tall, with 30cm between plants and 75cm rows.

Placing String

Place a top string or measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 20cm downslope from the planting string, to expose the soil. Don't move it too far as it will interfere with the next 37.5cm row.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line

Digging Furrows

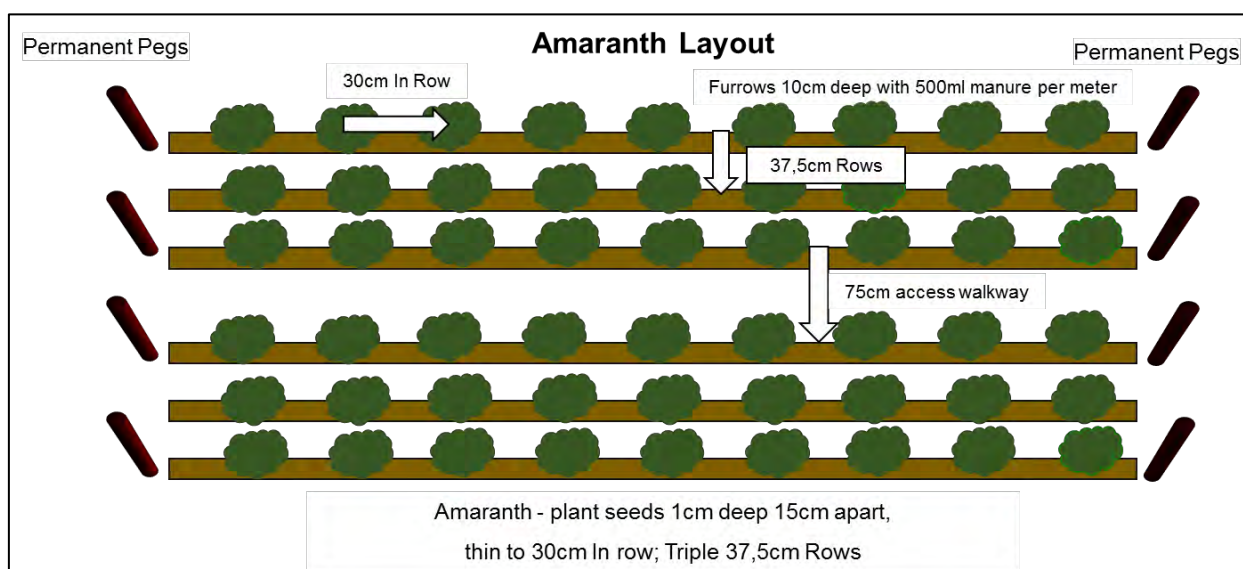
Dig a furrow 10cm deep, moving the soil downslope of the planting string, taking care to neatly heap the soil for reuse later. For leafy amaranth, repeat this process again every 37.5cm which will allow your amaranth to establish a good canopy closure, but leave an access walkway after every triple row to allow for easy harvesting.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients we need to apply woodash or lime. Evenly sprinkle 1 tablespoon of woodash or 1 teaspoon of lime, every 60cm on the planting line.

Manure/Compost

Evenly spread 500ml of manure/compost per meter into the furrow.



Seed Depth and Soil Separation Layer

Take a skimming of soil from the heap and cover the inputs with at least 3cm of soil to establish an accurate final planting depth of 1cm deep and also to ensure a good separation layer between the seed and manure. If you don't separate seed from manure you will get poor germination because of seed burn. This is obviously not the case with high quality compost.

Planting

Plant leafy amaranth seeds 1cm deep, at 15cm apart and cover with fine loose soil, ensuring an even or preferably slightly raised furrow surface for good germination. Thin down to 30cm intervals after germination has taken place.

God's Blanket

Leave the blanket off until after germination has taken place and then you can bring the blanket up close to the plant stems. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Harvest

When harvesting, trim off the two lowest leaves, allowing the upper leaves to fill out. The plants will continue to produce leafy greens for a few months.

6.2.2 Cabbage, Cauliflower and Broccoli – Compost/Manure Technique

The Brassica family are very popular leafy vegetables and are all high in Vitamin C and K. Cabbages are by far one of the most popular vegetables worldwide with double the nutritional value compared to Broccoli and Cauliflower. However the Brassicas all need good management, fertile soils, high volumes of inputs and good pest control and should therefore be avoided until good experience has been gained with other crops.

They are best suited to relatively cool and humid climates with optimal growing temperatures of 15-24°C, but with a range limit of 0-30°C showing their preference for cold rather than hot growing conditions. Certain cultivars can even withstand frost.



Layout

It is recommended to have medium sized, rather than large heads, with 45cm between plants and 75cm between rows. If you prefer very large heads then space your seedlings at 60 by 75cm instead.

Placing Measuring Rope

Place a 45cm measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope from each planting station to expose the soil.

Soil Fracturing

Give your cabbages a good chance of success by fracturing each 75cm line to 30cm deep.

Digging Planting Stations

The wide plant spacing make them best suited for inputs placed directly into planting stations rather than surface composting. Dig a planting station 15cm deep at each 45cm interval, moving the soil downslope of the measuring rope, taking care to neatly heap the soil for reuse later. Planting stations should be 12cm wide, 15cm long and 15cm deep. Repeat the planting stations every 75cm row.

Correcting Acidic Soils

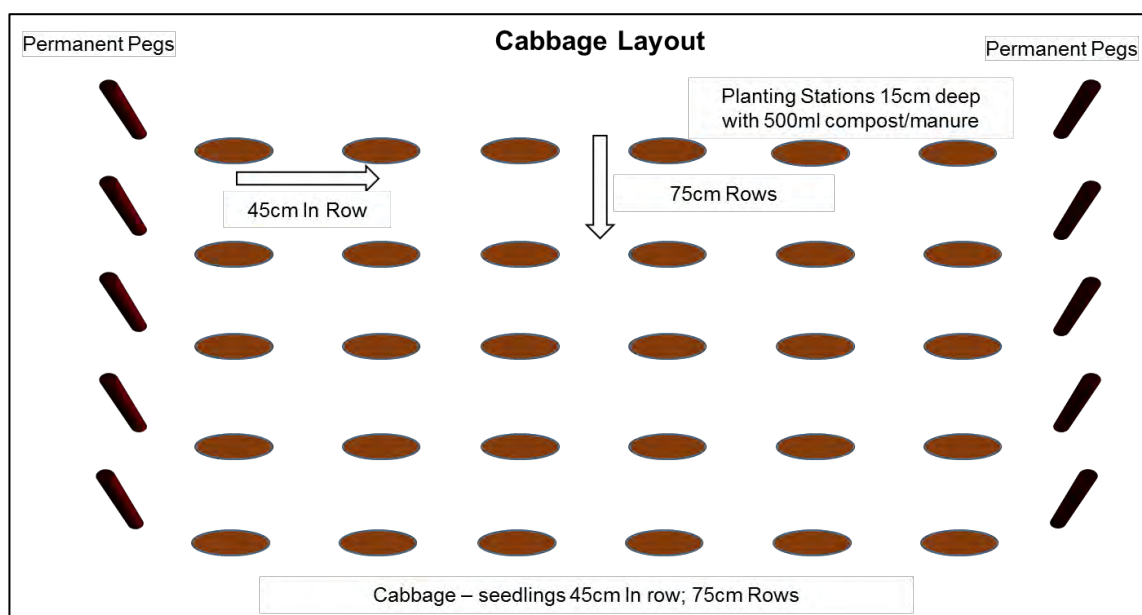
To correct acidic soils and allow for readily available plant nutrients apply 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, in each planting station.

Compost/Manure

It is preferable to apply 500ml of compost or alternatively manure, in each planting station. Take soil from the downslope heap and cover all the inputs until the soil surface is level again. Replace the 2.5cm thick blanket on top of the planting stations.

Planting Seedlings

Once seedlings are at about 10-12cm tall they are ready for transplanting. Twist the dibble stick through the blanket and press it into the centre of each planting station, to the required depth. You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Top Dressing

These are very high nutrient demand plants so if they shows any signs of yellowing, then top dress with urea or manure tea. When applying diluted manure tea, apply 350ml to each plant base. When applying Urea, push a small hole 3cm deep, three finger widths away, on the upslope side of each plant. Place a teaspoon of Urea in each hole and cover it with soil. Repeat the applications every second week if necessary until 6 weeks old.

Pest Control

Cabbages, Cauliflower and Broccoli are susceptible to many pests and diseases but your first line of defence is keep the plants stress free by having healthy soils, thick mulch cover and an excellent supply of nutrients. Any organic pest management control must focus on prevention rather than cures. It is critical to have a 12 month break in your rotation planning with these crops. Observe your plants regularly and if diseased plants have been identified it is often the best option to simply remove those plants and dispose of them far away from the garden.

Harvest

Be watchful towards the harvest stage to ensure that the crop doesn't bolt, as then cabbages will split whilst cauliflower and broccoli will go into flower.

6.2.3 Kale/Rape/Collard Greens

A) Kale/Rape/Collard Greens - Surface Composting Technique

This leafy vegetable is popular in Africa and many variants occur from more traditional Kale to Sukuma wiki in Kenya. They are all from the Brassica oleracea family and although similar to cabbage, they are much easier to grow. They are similar to spinach in that they also produce leaves which can be harvested for long periods of time. In Rape's instance the plant just continues to grow taller and taller. The leaves are very high in Vitamin C as well as Vitamin K and anti-oxidants.



Kale has an optimal growing temperature from 7-24°C and should be planted in spring and again in autumn, as it does not handle extremely high temperatures at seedling stage.

Layout - 37.5cm Triple Rows

Final plant spacing is 30cm between plants in triple 37.5cm rows. Split the 75cm row in half, planting at 0; 37.5 and 75cm, then start again on the next 75cm permanent peg to allow for access for easy harvesting of the leaves. If you have a small home garden then use the 37.5cm spacing throughout to make best use of your space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 10cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 10cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm on the planting line.

Surface Composting

Place compost on top of the 10cm wide band, 5cm deep evenly across the line. It is not necessary to work the compost into the soil. Repeat this process again for each 37.5cm row which will allow your Kale to establish a good canopy closure, but remember to leave an access walkway after every triple row to allow for easy harvesting of the leaves.

Kale is a medium feeder, but it will be in the ground for up to 6 months so is essential to feed it well from the start. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

Furrowing and Planting Seed

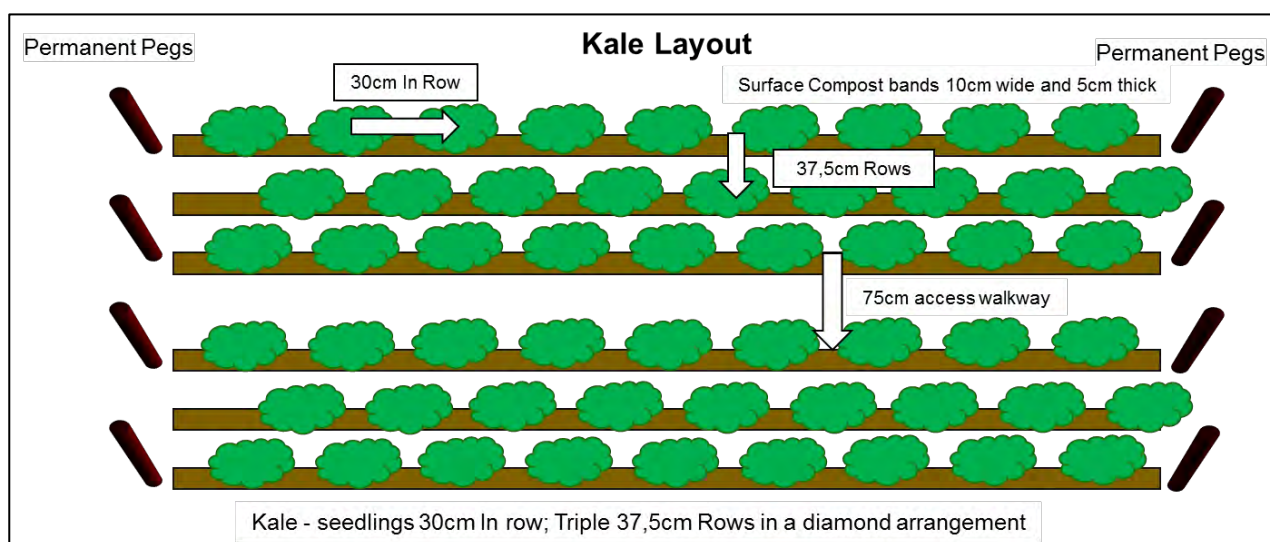
In the middle of the compost band, press down with a hoe edge to establish an accurate and even 2cm planting furrow. Plant the Kale seeds 2cm deep and at 15cm apart. Cover the seeds by pinching the compost closed and gently firming up the compost. Thin down to **30cm** intervals after germination.

Don't put the blanket on top of the band until after germination has taken place whereafter the blanket can be brought up against the plant bases. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Planting Seedlings

It is always better to plant Kale seedlings into the garden compared to seeds. Place the blanket on top of the surface compost before planting, then use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the centre of the 10cm wide surface compost band, to the required depth at 30cm intervals. Plant the second or middle line of seedlings in a diamond arrangement for best use of space.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Harvest

When harvesting, break off the two lowest leaves, allowing the inner leaves to fill out. The plants will continue to produce leaves for a long period of time. Also remove any older or diseased leaves to encourage new leaf growth and plant health. We have had 6-8 harvests from our Kale crops in our 6 monthly rotations at the model Farming God's Way garden.

B) Kale/Rape/Collard Greens - Manure/Low Volume Compost Technique



This leafy vegetable is popular in Africa and variants thereof occur from more traditional Kale to Sukuma wiki in Kenya. They are all from the Brassica oleracea family and although similar to cabbage, they are much easier to grow. They are similar to spinach in that they also produce leaves which can be harvested for long periods of time. In Rape's instance the plant just continues to grow taller and taller. The leaves are very high in Vitamin C as well as Vitamin K and anti-oxidants.

Kale has an optimal growing temperature from 7-24°C and should preferably be planted in spring and again in

autumn, as it does not handle extremely high temperatures at seedling stage.

Layout - 37.5cm Triple Rows

Final plant spacing is 30cm between plants in triple 37.5cm rows. Split the 75cm row in half, planting at 0; 37.5 and 75cm, then start again on the next 75cm permanent peg to allow for access for easy harvesting of the leaves. If you have a small home garden then use the 37.5cm spacing throughout to make best use of your space.

Placing String

Place a top string or measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 20cm downslope from the planting string to expose the soil. Don't move it too far as it will interfere with the next 37.5cm row.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Digging Furrows

Dig a furrow 10cm deep, moving the soil downslope of the planting string, taking care to neatly heap the soil for reuse later. Repeat this process again every 37.5cm which will allow your Kale to establish a good canopy closure but leave an access walkway after every triple row to allow for easy harvesting.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm on the planting line.

Manure/Compost

Evenly spread 500ml of manure/compost every 60cm or shoulder width into the furrow. Although Kale is a medium feeder they are in the ground for at least 6 months and so it is best to feed them well from the beginning.

Seed Depth and Soil Separation Layer

Take a skimming of soil from the downslope heap and cover the inputs with at least 3cm of soil to establish an accurate final planting depth of 2cm deep and also to ensure a good separation layer between the Kale

seed and manure. If you don't separate seed from manure you will get poor germination because of seed burn. This is obviously not the case with high quality compost.

Planting Seed

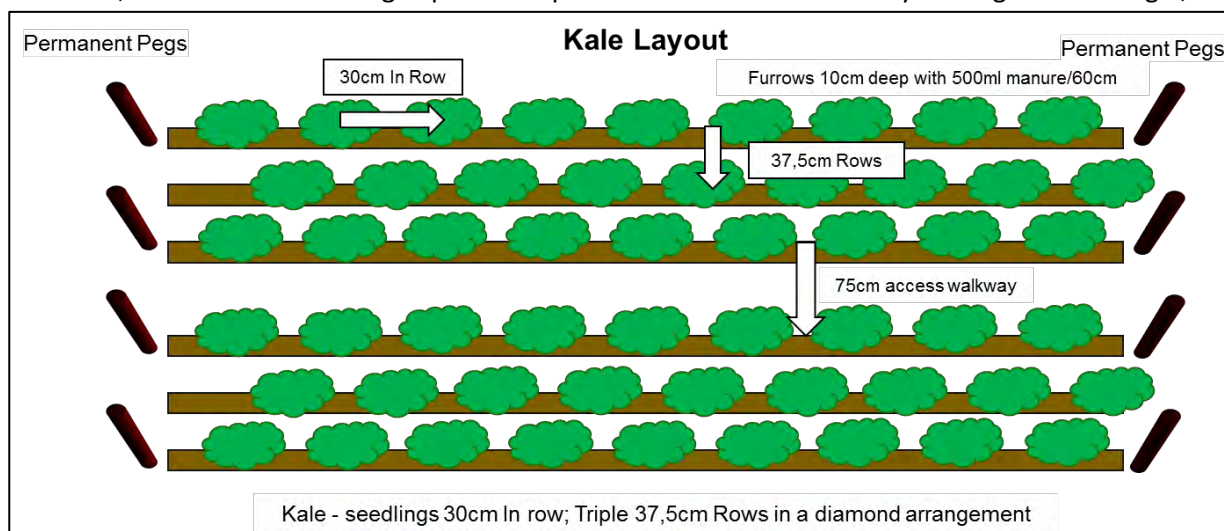
Plant Kale seeds at 15cm intervals or hand width apart, 2cm deep and cover with fine loose soil, ensuring an even surface for good germination. Thin down to **30cm** intervals after germination.

Leave the blanket off until after germination has taken place and then you can bring the blanket up close to the plant stems. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Planting Seedlings

It is always better to plant Kale seedlings into the garden compared to seeds. Cover all the inputs in the furrow with soil from the downslope heap until the soil surface is level again. Place the 2.5cm thick blanket on top of the surface compost then use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the centre of the prepared furrow to the required depth, every 30cm. Plant the second or middle line of seedlings in a diamond arrangement for best use of space.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the Kale seedling in place and press with the dibble stick or your fingers at an angle,



pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airtspaces around the root zone.

Harvest

When harvesting, break off the two lowest leaves, allowing the inner leaves to fill out. The plants will continue to produce leaves for a long period of time. Also remove any older or diseased leaves to encourage new leaf growth and plant health. We have had 6-8 harvests from our Kale crops in our 6 monthly rotations at the model Farming God's Way garden.

6.2.4 Lettuce

A) Lettuce - Surface Composting Technique

Lettuce is a very popular salad leaf crop that is particularly high in Vitamin A. Lettuce comes in many cultivars with lots of colourful varieties.

Lettuce has ideal growth temperatures between 5-15°C. Although they have a preference for cooler temperatures, they can tolerate hotter temperatures up to 30°C. Plant lettuce from spring through autumn months.



Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access. In a small home garden, widen the surface compost band to 45cm and plant three rows 20cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 25cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide band, evenly sprinkle one handful of woodash/bonemeal per meter.

Surface Composting

Lettuce are light feeders so place a 2cm layer of surface compost on top of the 25cm wide band. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

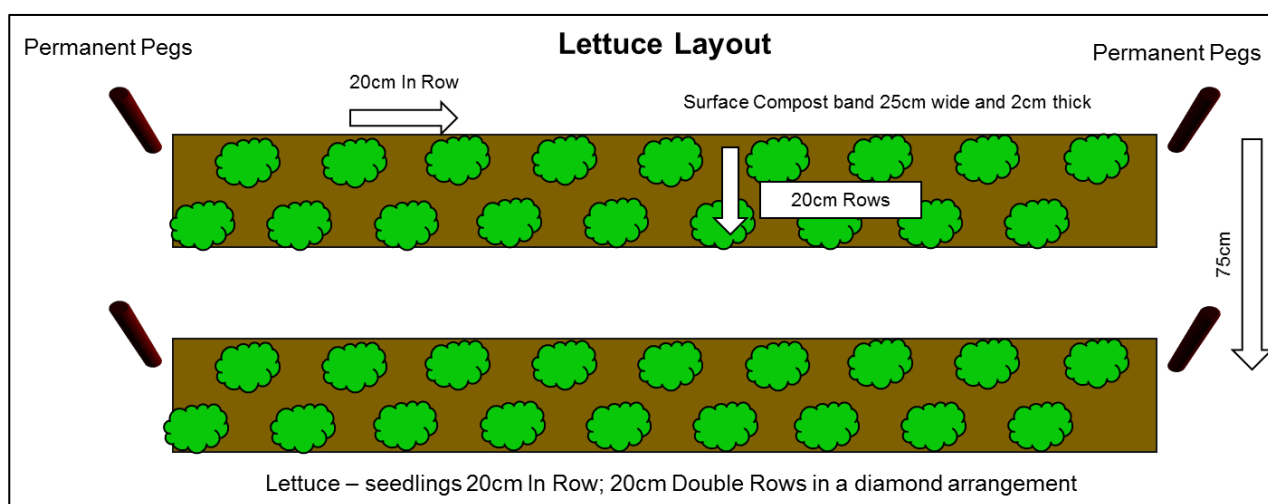
God's Blanket

Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Seedlings

Lettuce are best planted from seedlings, giving a quick and easy homogenous stand. Use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the surface compost band to the required depth. Push these holes in at 20cm between plants and 20cm between rows in a diamond arrangement.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient, but not too deep either. If the hole is too deep it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Harvest

Lettuce have many different varieties and growth patterns. Some are harvested as baby leaf, others as large leaves throughout a growing cycle and others as heads.

B) Lettuce- Manure Technique



Lettuce is a very popular salad leaf crop that is particularly high in Vitamin A. Lettuce comes in many cultivars with lots of colourful varieties.

Lettuce has ideal growth temperatures between 5-15°C. Although they have a preference for cooler temperatures, they can tolerate hotter temperatures up to 30°C. Plant lettuce from spring through autumn months.

Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access.

In a small home garden, simply widen the basin to 45cm and plant three rows 20cm apart to make best use of your limited space.

Lay Strings for Shallow Planting Basin

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the shallow planting basin. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket 10cm downslope of the planting basin to expose the soil.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Preparing Shallow Basins

Due to the closeness of the 20cm row intervals, it is very difficult to dig furrows for these narrow row crops. Instead, prepare a shallow basin by digging out 5cm of soil between the 25cm strings and placing it downslope.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide basin, evenly sprinkle one handful of woodash/bonemeal per meter.

Manure Inputs

Skim a 1cm layer of manure into the bottom of this shallow basin and rake it in lightly. Cover the manure with soil making it level once again.

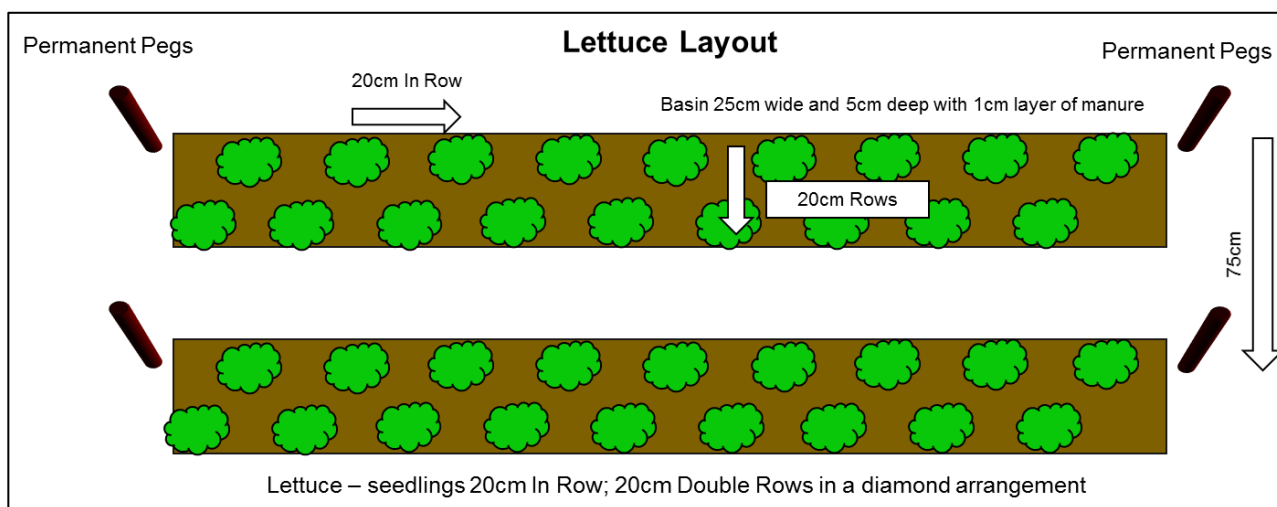


God's Blanket

Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Seedlings

Lettuce are best planted from seedlings, giving a quick and easy homogenous stand. Use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the prepared basin to the required depth. Push these holes in at 20cm between plants and 20cm between rows in a diamond arrangement. You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient, but not too deep. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Harvest

Lettuce have many different varieties and growth patterns. Some are harvested as baby leaf, others as large leaves throughout a growing cycle and others as heads.

6.2.5 Spinach

A) Spinach – Surface Composting Technique

Spinach has the highest level of anti-oxidants of all vegetables, with high levels of vitamins A, B, C and K, and is rich in iron amongst other essential minerals. This leafy vegetable is not only an essential part of healthy nutrition, but is surprisingly easy to grow and manage.

Spinach can be planted from spring until autumn, with optimal growing temperatures of 13-20°C, taking note that it does not do well in temperatures over 27°C.



Layout - 37.5cm Triple Rows

Final plant spacing is 20cm between plants in triple 37.5cm rows. Split the 75cm row in half, planting at 0; 37.5 and 75cm, then repeat the series of triple rows from the next 75cm permanent peg. This 75cm gap is a walkway to allow for easy access to harvest the leaves. If you have a small home garden then use the 37.5cm spacing throughout to make best use of your space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 10cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 10cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

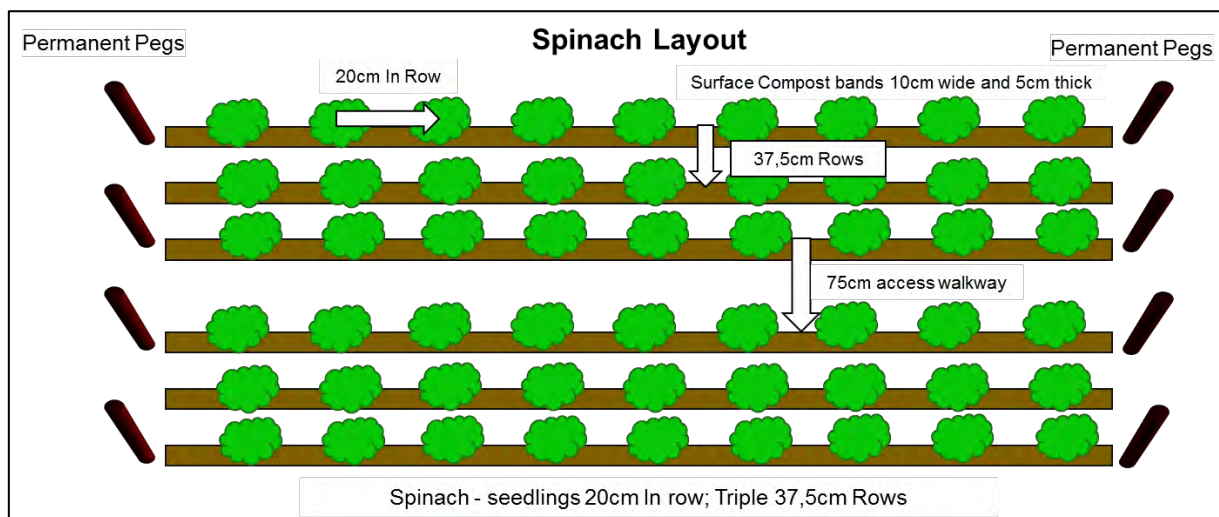
Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm on the planting line.

Surface Composting

Place compost on top of the 10cm wide band, 5cm deep evenly across the line. It is not necessary to work the compost in to the soil. Spinach is a medium feeder but due to the fact that it will be in the ground for 6-8 months it is essential to feed it well from the start. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top. Repeat this process again for each 37.5cm row but leave a 75cm wide access walkway after every triple row to allow for easy harvesting.



Furrowing and Planting Seed

In the middle of the compost band press down with a hoe edge to establish an accurate and even 2cm planting furrow. Plant the spinach seed 2cm deep and at 10cm intervals, which is approximately one hand width apart. Cover the seeds by pinching the compost closed and gently firming up the compost. Thin down to 20cm apart after germination, using the thinned plants for relish or salad. Don't put the blanket on top of the band until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Planting Seedlings

It is always better to plant Spinach seedlings into the garden compared to seeds. When planting seedlings, put the 2.5cm thick blanket on top of the surface compost before planting. Use a dibble stick with a depth marker on it, twisting the dibble stick through the blanket and pressing it into the centre of the 10cm wide surface compost band to the required depth, every 20cm across the row. You must ensure the seedling roots are not



bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient, but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone. Triple rows give good canopy closure and also allow for easy harvesting from either side.

Top Dressing

If the Spinach shows any signs of yellowing or is pale, top dress with urea or manure tea. When applying diluted manure tea, apply 350ml to each plant base. When applying Urea, push a small hole 3cm deep, three finger widths away, on the upslope side of each plant. Place a teaspoon of Urea in each hole and cover it with soil. Repeat the applications after every second harvest of leaves.

Harvest

When harvesting, break off the two largest spinach leaves, allowing the other leaves to fill out. The plants will continue to produce leaves for long periods of time. Keep removing any older yellow leaves to encourage new leaf growth. We have had up to 8 harvests from a crop in the model Farming God's Way garden.

B) Spinach - Manure/Low Volume Compost Technique

Spinach has the highest level of anti-oxidants of all vegetables, with high levels of vitamins A, B, C and K, and is rich in iron amongst other essential minerals. This leafy vegetable is not only an essential part of healthy nutrition, but is surprisingly easy to grow and manage.

Spinach can be planted from spring until autumn, with optimal growing temperatures of 13-20°C, noting that it does not do well in temperatures over 27°C.



Layout - 37.5cm Triple Rows

Final plant spacing is 20cm between plants in triple 37.5cm rows. Split the 75cm row in half, planting at 0; 37.5 and 75cm, then repeat the series of triple rows from the next 75cm permanent peg. This 75cm gap is a walkway to allow for easy access to harvest the leaves. If you have a small home garden then use the 37.5cm spacing throughout to make best use of your space.

Placing String

Place a top string or measuring rope from one 75cm permanent peg to its adjoining 75cm permanent peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

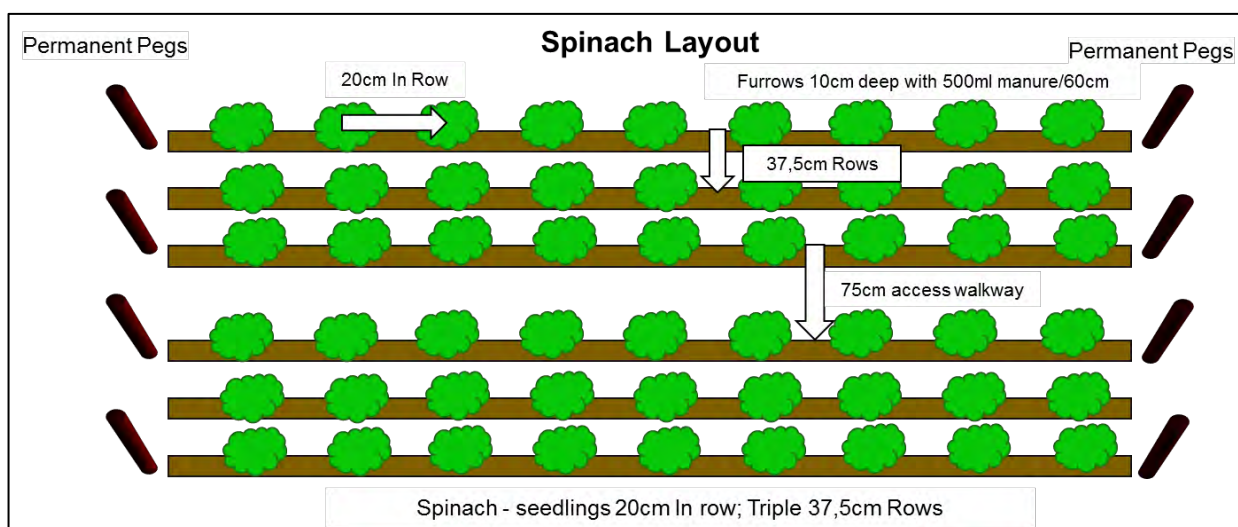
Move God's Blanket 20cm downslope from the planting string to expose the soil. Don't move it too far as it will interfere with the next 37.5cm row.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil; you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Digging Furrows

Dig a furrow 10cm deep, moving the soil downslope of the planting string, taking care to neatly heap the soil for reuse later. Repeat this process again every 37.5cm but leave an access walkway after every triple row to allow for easy harvesting.



Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients we need to apply woodash, bonemeal or lime. Evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime every 60cm on the planting line.

Manure/Compost

Evenly spread 500ml of manure/compost every 60cm, or shoulder width, into the furrow. Although spinach is a medium feeder they are in the ground for 6-8 months and so it is best to feed them well from the beginning.

Seed Depth and Soil Separation Layer

Take a skimming of soil from the heap and cover the inputs with at least 3cm of soil to establish an accurate final planting depth of 2cm and also to ensure a good separation layer between the seed and manure. If you don't separate seed from manure you will get poor germination because of seed burn. This is obviously not the case with high quality compost.

Planting Seed

Plant the spinach seed 2cm deep and at 10cm intervals which is approximately one hand width apart and cover with fine loose soil, ensuring an even or preferably slightly raised furrow surface for good germination.

Thin down to 20cm intervals after germination, using the thinned plants for relish/salads.

Leave the blanket off the furrow until after germination has taken place and then you can bring the blanket up close to the plant stems. Ensure the blanket is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Planting Seedlings

Cover all the inputs in the furrow with soil from the downslope heap until the soil surface is level again. Replace the 2.5cm thick blanket on top of the covered furrow. Use a dibble stick with a depth marker on it, twisting the dibble stick through the blanket and pressing it into the centre of the furrow to the required depth, every 20cm across the row.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.

Triple rows give good canopy closure and also allow for easy harvesting from either side.

Top Dressing

If the Spinach shows any signs of yellowing or is pale, top dress with urea or manure tea. When applying diluted manure tea, apply 350ml to each plant base. When applying Urea, push a small hole 3cm deep, three finger widths away, on the upslope side of each plant. Place a teaspoon of Urea in each hole and cover it with soil. Repeat the applications after every second harvest of leaves.

Harvest

When harvesting, break off the two largest spinach leaves, allowing the other leaves to fill out. The plants will continue to produce leaves for long periods of time. Also keep removing any older yellow leaves to encourage new leaf growth. We have had up to 8 harvests from a crop in the model Farming God's Way garden.

6.3 Root Vegetables

6.3.1 Beetroot

A) Beetroot - Surface Composting Technique



Beetroot is regarded as a source of excellent nutrition by dieticians, with high percentages of anti-oxidants and minerals. The leaves can also be eaten like spinach, bringing a versatility to the crop which is quite unique in cases where other leafy greens are temporarily unavailable in the garden.

Beetroot has a similar growing period to carrots, ideally in temperatures between 15-24°C, but can tolerate hotter temperatures up to 35°C. Plant beetroot from spring through autumn.

Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access. In a small home garden, widen the band to 45cm and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 25cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide band evenly sprinkle one handful of woodash per meter.

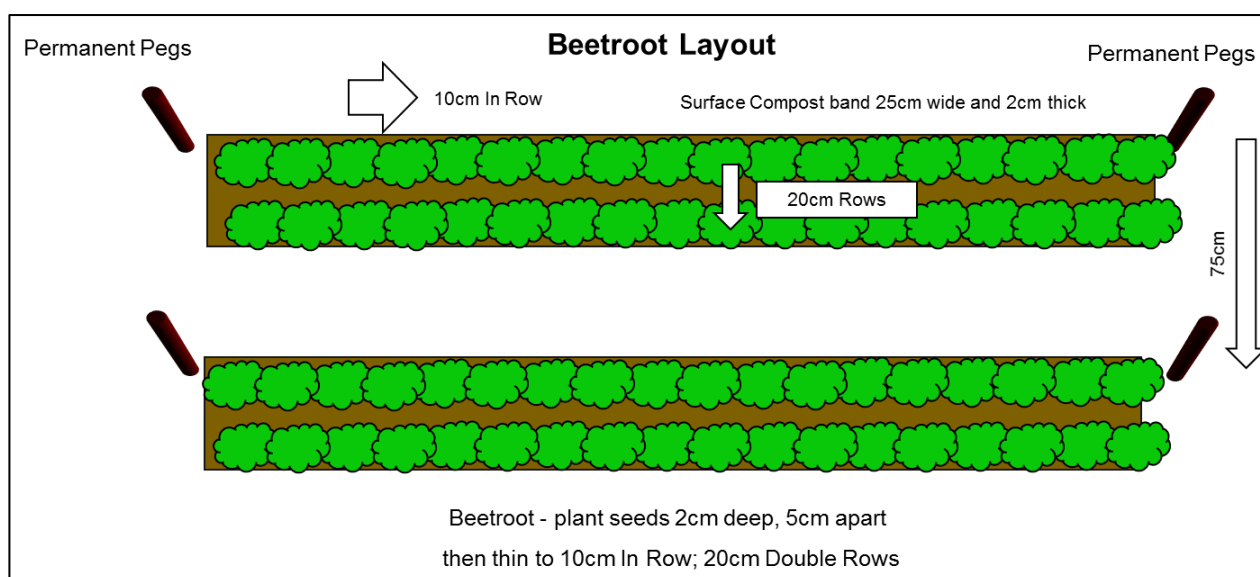
Surface Composting

Beetroot are light feeders so place a 2cm layer of surface compost on top of the 25cm wide band. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

Furrowing and Planting Seed

Press a 2cm deep furrow into the prepared 25cm wide band and repeat again for each 20cm row down the slope. Plant beetroot seeds 2cm deep and 5cm apart. It is very important to get good beetroot seed to compost contact, so cover the seeds by pinching the furrow closed and then firming up lightly. After emergence, thin Beetroot down to 10cm intervals between plants.

Don't put the blanket on top of the planted band until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.



Seedlings

Beetroot can also be planted from seedlings, giving a quick and easy homogenous stand. In this case, put the blanket on top of the surface compost then use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the surface compost band, to the required depth. Push these holes in at 10cm between plants and 20cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either.

If the hole is too deep, it will cause there to be an air space under the roots which is not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.

B) Beetroot - Manure Technique



Beetroot is regarded as a source of excellent nutrition by dieticians, with high percentages of anti-oxidants and minerals. The leaves can also be eaten like spinach, bringing a versatility to the crop which is quite unique in cases where other leafy greens are temporarily unavailable in the garden.

Beetroot has a similar growing period to carrots, ideally in temperatures between 15-24°C, but can tolerate hotter temperatures up to 35°C. Plant beetroot from spring through autumn.

Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access. In a small home garden, widen the basin to 45cm and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Shallow Planting Basin

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the shallow basin. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket 10cm downslope of the planting basin, to expose the soil.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Preparing Shallow Basins

Due to the closeness of the 20cm row intervals, it is very difficult to dig furrows for these narrow row crops. Instead, prepare a shallow basin by digging out 5cm of soil in between the 25cm strings and place it downslope.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide basin evenly sprinkle one handful of woodash per meter.

Manure

Skim a 1cm layer of manure into the bottom of this shallow basin and rake it in lightly.

Seed Depth and Soil Separation Layer

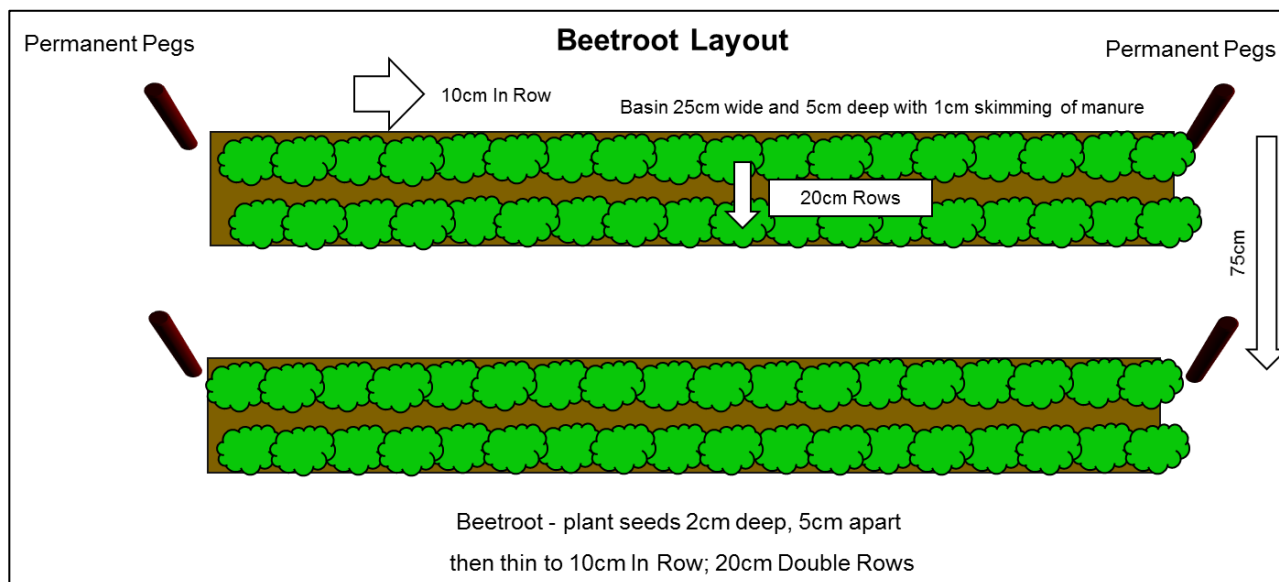
Cover the manure with soil making it level once again. This will ensure a good separation layer between the seed and manure which is vital to avoid seed burn.

Furrowing and Planting Seed

Press a 2cm deep furrow into the prepared basin and repeat again for each 20cm row down the slope. Plant beetroot seeds 2cm deep and 5cm apart. It is very important to get good beetroot seed to soil

contact, so cover the seeds by pinching the soil closed and then firm up the soil lightly. After emergence, thin Beetroot down to 10cm intervals between plants.

Don't put the blanket on top of the planted basin until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.



Seedlings

If you are planting Beetroot seedlings, cover the inputs with soil from the downslope heap levelling the basin and replace the 2.5cm layer of blanket. Use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the prepared basin, to the required depth, with 10cm between plants and 20cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.

6.3.2 Carrots

A) Carrots - Surface Composting Technique

Carrots are a very healthy addition to any nutrition garden as they contain very high levels of beta carotene (source of Vitamin A), Vitamins C, K and B6, anti-oxidants and minerals. Carrots are relatively easy to grow and can be sown nearly all year round, ideally in growing temperatures between 15-24°C. Very hot temperatures are unfavourable for carrots. Prepare beds, preferably following after previous crops that had healthy applications of inputs.



Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access.

In a small home garden, widen the band to 45cm and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide band evenly sprinkle one handful of woodash per meter.

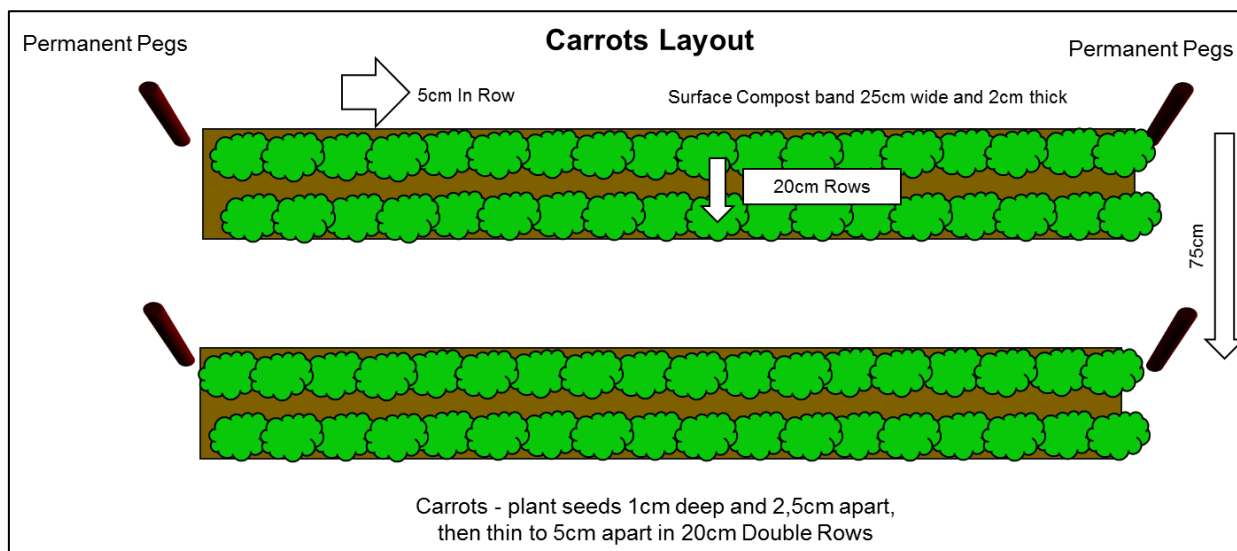
Surface Composting

Carrots are light feeders and if provided with too much food, their roots will be deformed and branch. Therefore, it is usually best to let carrots follow after other crops in the rotation cycle that have been surface composted without the necessity of having to reapply compost.

However, in a new infertile garden, place just 2cm of surface compost on top of the 25cm wide band. It is not necessary to work the compost in to the soil.

Furrowing and Planting Seed

Press a 1cm deep furrow into the prepared 25cm wide band and repeat again at the next 20cm row down the slope. Plant carrot seeds 1cm deep and 2.5cm apart, but after germination thin down to 5cm between plant seedlings. Planting carrot seed deeper will result in very poor germination.



It is very important to get good carrot seed to compost contact, so cover the seeds by pinching the compost closed and then firm up the compost by walking on the broad side of a wooden plank.



God's Blanket

Don't put the blanket on top of the surface compost band until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

B) Carrots - Manure Technique

Carrots are a very healthy addition to any nutrition garden as they contain very high levels of beta carotene (source of Vitamin A), Vitamins C, K and B6, anti-oxidants and minerals. Carrots are easy to grow and can be sown nearly all year round, ideally in growing temperatures between 15-24°C. Very hot temperatures are unfavourable for carrots. Prepare beds, preferably following after previous crops that had healthy applications of inputs.



Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access.

In a small home garden, widen the basin to 45cm and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Shallow Planting Basin

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket 10cm downslope of the planting basin, to expose the soil.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Preparing Shallow Basins

Due to the closeness of the 20cm row intervals, it is very difficult to dig furrows for these narrow row crops. Instead, prepare a shallow basin by digging out 5cm of soil in between the 25cm strings and place it downslope.

Correcting Acidic Soils

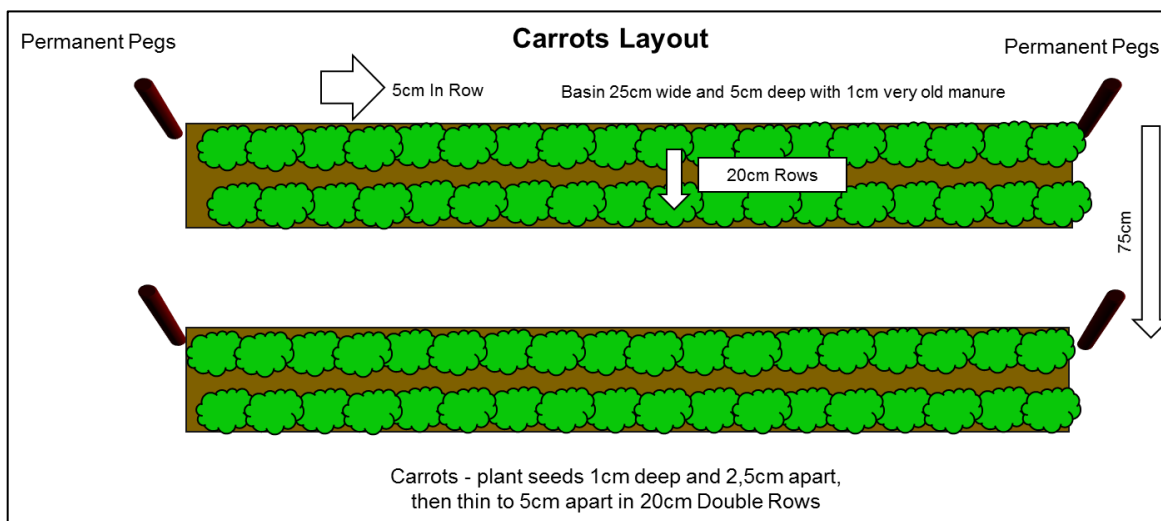
To correct acidic soils in the 25cm wide basin evenly sprinkle one handful of woodash per meter.

Manure

Carrots are light feeders and if provided with too much food, their roots will be deformed and branch. Therefore, it is usually best to let carrots follow after other crops in the rotation cycle that have had compost so that there would be no need to reapply inputs at all. However in a new garden with very poor soils you can skim a 1cm layer of **very old manure** into the bottom of the shallow basin and rake it in lightly.

Seed Depth and Soil Separation Layer

Cover the shallow basin with soil making it level once again. This will ensure a good separation layer between the seed and manure which is vital to avoid seed burn.



Furrowing and Planting Seed

Press a 1cm deep furrow into the prepared basin and repeat again at the next 20cm row down the slope. Plant carrot seeds 1cm deep and 2.5cm apart but after germination thin down to 5cm between plant seedlings. Planting carrot seed deeper will result in very poor germination.



It is very important to get good carrot seed to soil contact, so cover the seeds by pinching the soil closed and then firming up by walking on the broad side of a wooden plank.

God's Blanket

Don't put the blanket on top of the seed planted basin until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

6.3.3 Onion

A) Onion - Surface Composting Technique

Onions are popular additions to most African dishes. They are high in Vitamin C and Folate and they also have a high peptide content which helps fight against osteoporosis.

Onions are ideally grown in temperatures between 12-25°C and are more suited to cold snaps rather than extreme heat. Onions take a long time to reach maturity (from 4-7 months), therefore in a “small scale home nutrition garden” there are better crops to use in that space, including spring onions. Plant onions from the end of summer through autumn and remember they need a lot of water in their vegetative stage of growth, so in “summer rainfall regions with dry winters”, make sure you have a suitable irrigation option.



Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access. In a small home garden, widen the band to 45cm wide and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 25cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide band, evenly sprinkle one handful of woodash per meter.

Surface Composting

Onions are light feeders so place a thin 2cm layer of surface compost on top of the 25cm wide band. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

Furrowing and Direct Seeding

Press a 2cm deep furrow into the prepared 25cm wide band and repeat again at the next 20cm row down the slope. Plant Onion seeds 2cm deep and 5cm apart. It is very important to get good Onion seed to compost contact, so cover the seeds by pinching the compost closed and then firm up the compost by walking on the broad side of a wooden plank. After emergence, thin Onions down to 10cm intervals between plants and use the thinned onion sets in other areas.

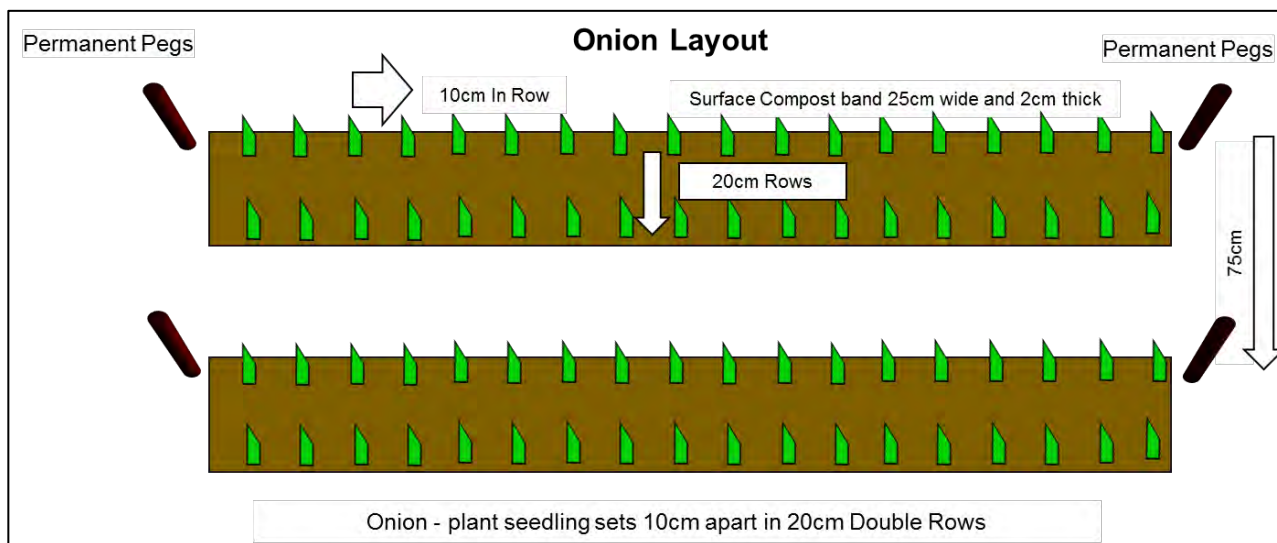
Don't put the blanket on top of the planted bands until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Onion Seedlings

Onions are best suited to planting as seedling sets. After about 7-8 weeks, the seedling sets will have reached pencil thickness in the nursery and are ready to transplant.

Put the 2.5cm thick blanket on top of the surface compost then use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the surface compost band, to the required depth with 10cm between plants and 20cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Onion Harvest

Onions take long to mature (4-7 months) and should be dried properly before storing. Firstly once leaf yellowing begins bend the leaves over, without snapping them off which will speed up the drying process. After lifting the bulbs, store them in a shady, dry, well ventilated place. Use any damaged bulbs first and inspect the drying crop frequently for storage diseases.

B) Onion - Manure Technique



Onions are popular additions to most African dishes. They are high in Vitamin C and Folate and they also have a high peptide content which helps fight against osteoporosis.

Onions are ideally grown in temperatures between 12-25°C and are more suited to cold snaps rather than extreme heat. Onions take a long time to reach maturity, from 4-7 months, therefore in a “small scale home nutrition garden” there are better crops to use in that space, including spring onions. Plant onions from the end of summer through autumn and remember they need a lot of water in their vegetative stage of growth, so in “summer rainfall regions with dry winters”, make sure you have a suitable irrigation option.

Layout

If you are planting on field scale, then prepare double rows 20cm apart to allow enough space for access. In a small home garden, widen the basin to 45cm and plant triple rows 20cm apart to make best use of your limited space.

Lay Strings for Shallow Planting Basin

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the shallow basin. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket 10cm downslope of the planting basin, to expose the soil.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Preparing Shallow Basins

Due to the closeness of the 20cm row intervals, it is very difficult to dig furrows for these narrow row crops. Instead, prepare a shallow basin by digging out 5cm of soil in between the 25cm strings and placing it downslope.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide basin evenly sprinkle one handful of woodash per meter.

Manure

Skim a 1cm layer of manure into the bottom of this shallow basin and rake it in lightly.

Seed Depth and Soil Separation Layer

Cover the manure with soil making it level once again. This will ensure a good separation layer between the seed and manure which is vital to avoid seed burn.

Furrowing and Planting Seed

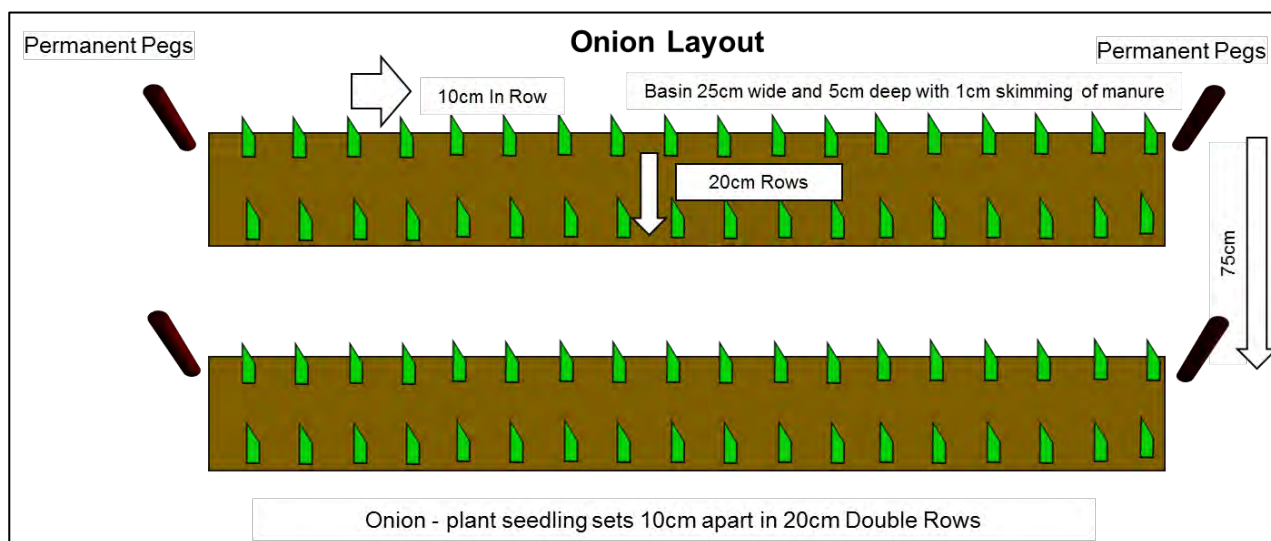
Press a 2cm deep furrow into the prepared basin and repeat again at the next 20cm row down the slope. Plant onion seeds 2cm deep and 5cm apart. Onion seeds are very small and so it is very important to get good seed to soil contact. Cover the seeds by pinching the soil closed and then firm up the soil by walking on the broad side of a wooden plank. After emergence, thin Onions down to 10cm intervals between plants and use the thinned onion sets in other areas.

Don't put the blanket on top of the seed planted basin until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Seedlings

It is far better to plant Onion seedling sets rather than seed. Cover the basin level and replace the 2.5cm thick blanket on top of it. Use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the prepared basin, to the required depth, 10cm apart and with 20cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Harvest

Onions take long to mature (4-7 months) and should be dried properly before storing. Firstly once leaf yellowing begins bend the leaves over, without snapping them off which will speed up the drying process. After lifting the bulbs, store them in a shady, dry, airy place. Use any damaged bulbs first and inspect the drying crop frequently for storage diseases.

6.3.4 Spring Onion

A) Spring Onion - Surface Composting Technique

Spring Onions are becoming more and more popular additions in vegetable gardens. They are high in Vitamin C and Folate and they also have a high peptide content.

Spring Onions are ideally grown in temperatures between 12-25°C and can be grown year round in temperate climates. They have a significant advantage over Onions as they reach maturity in 6-10 weeks, with a much higher plant density making them a far better option for “small scale home nutrition gardens”.



Layout

If you are planting on field scale, then prepare triple rows on 10cm apart to allow enough space for access. In a small home garden, widen the band to 45cm wide and plant five rows 10cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket downslope of the 25cm planting band, to ensure none of it gets buried. If you bury the blanket which has not yet decomposed, it can cause the soil to go through a negative nitrogen period and reduce crop yield.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide band evenly sprinkle one handful of woodash per meter.

Surface Composting

Spring Onions are light feeders so place a thin 2cm layer of surface compost on top of the 25cm wide band. It is not necessary to work the compost in to the soil. This system of surface composting is following exactly what the Lord of all Creation has shown us since the beginning of all time, where He designed for plants to feed from the top.

Furrowing and Direct Seeding

Press a 2cm deep furrow into the prepared 25cm wide band and repeat again 10cm down the slope establishing either three rows for field scale or five rows for home gardens.

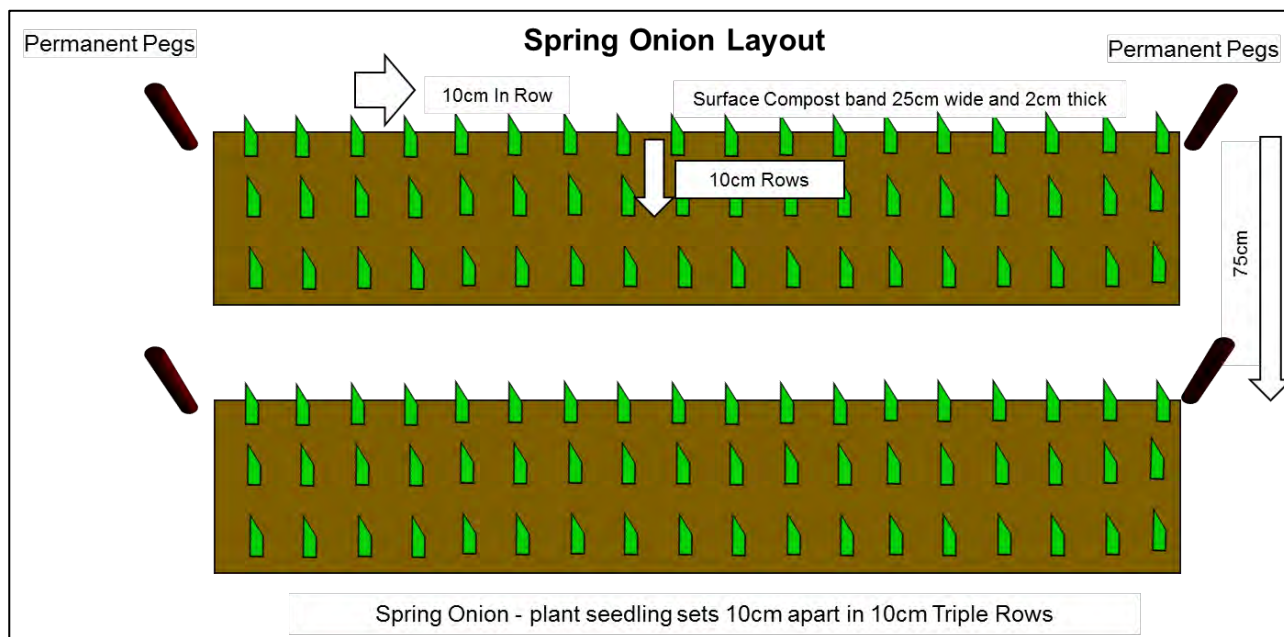
Plant Spring Onion seeds 2cm deep and 5cm apart. It is very important to get good seed to compost contact, so cover the seeds by pinching the compost closed and then firm up the compost by walking on the broad side of a wooden plank.

Don't put the blanket on top of the seed planted band until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Spring Onion Seedlings

Spring Onions are best suited to planting as seedling sets. Plant 3 seeds per seedling plug and plant them out once they are larger than 10cm tall. With the blanket on top of the surface compost use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the surface compost band, to the required depth with 10cm between seedling plugs and 10cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either. If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the compost gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Spring Onion Harvest

Spring Onions take just 6-10 weeks to harvest after transplanting. Once the stems are wide enough remove the plants and trim the roots and tips in preparation for market. Spring onions are harvested whenever you have need of them, and can therefore be added to the vegetable basket at regular intervals.

B) Spring Onion - Manure Technique

Spring Onions are becoming more and more popular additions in vegetable gardens. They are high in Vitamin C and Folate and they also have a high peptide content.

Spring Onions are ideally grown in temperatures between 12-25°C and can be grown year round in temperate climates. They have a significant advantage over Onions as they reach maturity, in 6-10 weeks, with a much higher plant density making them a far better option for “small scale home nutrition gardens”.



Layout

If you are planting on field scale, then prepare triple rows on 10cm apart to allow enough space for access.

In a small home garden, widen the shallow basin to 45cm wide and plant five rows 10cm apart to make best use of your limited space.

Lay Strings for Planting Band

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Next place temporary pegs 25cm down from the permanent pegs and place another string there to establish the surface composting band. Make sure both the ropes are taut and straight by lifting and dropping them.

Remove God's Blanket

Move God's Blanket 10cm downslope of the planting basin, to expose the soil.

Soil Fracturing

Push the fork 30cm deep and pull it backwards a little, until you see the soil loosen or fracture. Remove any stones or rocks that you feel with the fork, but don't be tempted to lift or turn the soil, you should be merely fracturing it. Keep on repeating this every 10cm along the row line.

Preparing Shallow Basins

Due to the closeness of the 10cm row intervals, it is virtually impossible to dig furrows for Spring Onions. Instead, prepare a shallow basin by digging out 5cm of soil in between the 25cm strings and placing it downslope.

Correcting Acidic Soils

To correct acidic soils in the 25cm wide basin evenly sprinkle one handful of woodash per meter.

Manure

Skim a 1cm layer of manure into the bottom of this shallow basin and rake it in lightly.

Seed Depth and Soil Separation Layer

Cover the manure with soil making it level once again. This will ensure a good separation layer between the seed and manure which is vital to avoid seed burn.

Furrowing and Planting Seed

Press a 2cm deep furrow into the prepared basin and repeat again every 10cm down the slope. If you are planting on field scale, then prepare triple rows 10cm apart. However In a small home garden, widen the basin to 45cm and plant five rows 10cm apart to make best use of your limited space.

Plant Spring Onion seeds 2cm deep and 5cm apart. Spring Onion seeds are very small and so it is very important to get good seed to soil contact. Cover the seeds by pinching the soil closed and then firm up the soil by walking on the broad side of a wooden plank.

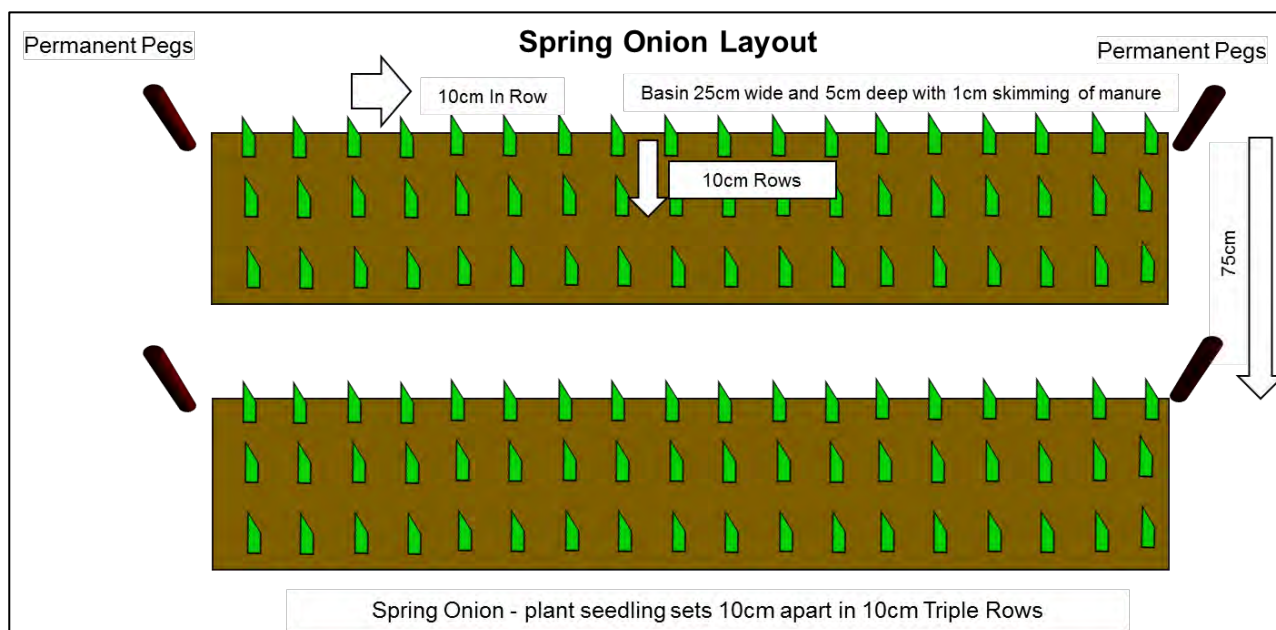
Don't put the blanket on top of the seed planted basin until after germination has taken place, whereafter the blanket can be brought up against the plant bases. Ensure the blanket in the walkways is at 100% cover and 2.5cm thick to suppress weed growth and conserve moisture.

Seedlings

Spring Onions are best suited to planting as seedling sets. Plant 3 seeds per seedling plug and plant them out once they are bigger than 10cm tall. Cover the inputs and basin levelling with soil from the downslope heap. Use a dibble stick with a depth marker on it, twisting it through the blanket and pressing it into the soil, to the required depth with 10cm between seedling plugs and 10cm between rows.

You must ensure the seedling roots are not bent into a J shape which will adversely affect the plants growth, so make sure the dibble stick hole depth is sufficient but not too deep either.

If the hole is too deep, it will cause there to be an air space under the roots which is also not desirable. To ensure you don't have that, hold the seedling in place and press with the dibble stick or your fingers at an angle, pressing the soil gently around the seedling roots. This ensures the seedling roots have no bend and ensures that there are no airspaces around the root zone.



Spring Onion Harvest

Spring Onions take just 6-10 weeks to harvest after transplanting. Once the stems are wide enough remove the plants and trim the roots and tips in preparation for market. Spring onions are harvested whenever you have need of them, and can therefore be added to the vegetable basket at regular intervals.

6.3.5 Irish Potato – Compost/Manure Technique

Irish Potato is the world's 4th largest crop after maize, wheat and rice. Potatoes have a high starch component of 17% making them a staple food source for many people. Although they have some Vitamin B6 and C, their nutritional value relative to other vegetables is very low.

Irish potato grows in temperature ranges of 7-30°C but with optimal ranges between 15-25°C. In Southern African summer rainfall regions, it is recommended to plant in August through to January. They are classified as a cool season crop as once temperatures go above 27°C tuber formation stops.

Layout

Potatoes are planted at 30cm between plants and 75cm between rows on the flat or on permanent raised beds.



Lay Strings for Furrow

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God's Blanket

Move God's Blanket 30cm downslope of the string to expose the soil.

Soil Fracturing

If your soils are compacted give your potatoes a good chance of success by fracturing each 75cm line to 30cm deep but due to the 15cm deep furrows this may not be necessary.

Furrows

Prepare furrows 15cm deep, every 75cm row line, being careful not to throw the soil too far downslope.

Correcting Acidic Soils

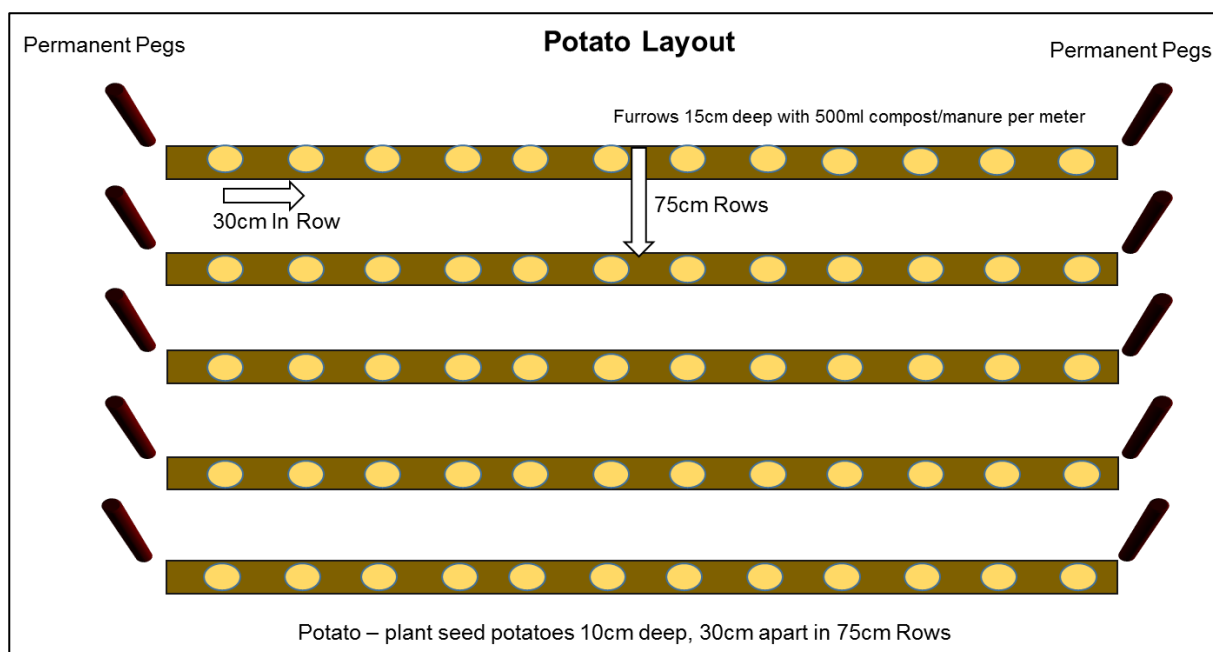
To correct acidic soils and allow for readily available plant nutrients evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm on the planting lines.

Manure/Low Volume Compost Inputs

Evenly spread 500ml of compost or manure per meter then cover with at least 3cm of soil to attain the 10cm planting depth.

Planting Seed Potatoes

Potatoes are grown from small disease free tubers or from tuber cuttings with 2 or 3 eyes or growth points on each cutting. Place seed potatoes at 30cm intervals in the row and cover level.



God's Blanket

No hilling up is necessary for good tuber formation but a good blanket is. Leave a 5cm gap on top of the furrow to allow for germination. After germination place a very thick blanket between 5-10cm thick, to prevent potato tuber greening and also to encourage shallow tuber formation.

Harvest

The thicker the blanket the easier it is to harvest the potatoes and the less soil disturbance there will be. Use a fork to gently lift the potatoes, which will be found just below the surface because of the moisture conservation from God's Blanket.

6.3.6 Sweet Potato – Compost/Manure Technique



Sweet Potato is highly regarded as one of the most nutritious root crops, with a good mix of carbohydrate and very high levels of Vitamin A, amongst others. Sweet Potato should become a much larger staple crop amongst African families because of its superior nutritional value when compared to other starch crops. It is easy to grow, has a high heat and drought tolerance, is very palatable and produces 10-40 tons per hectare.

Sweet Potato grows in temperature ranges of 15-33°C but with optimal ranges between 20-25°C. In Southern African summer rainfall regions, plant in September through to November, but due to it having a 4-7 month growing period it is best to plant earlier rather than later. In lower lying, warmer climates and in the tropics Sweet Potato could be grown nearly all year round.

Layout

Due to the vining nature of Sweet Potato, demarcate enough space to prevent the vines interfering with other vegetable crops. Sweet Potatoes **do not do well in waterlogged conditions**, so where this is a risk use the permanent raised bed system as discussed in chapter 2.4. Avoid planting in high clay content soils, as these also have poor drainage. In Uganda, the team at “Double Portion Farm” grow acres of Sweet Potato on the flat very successfully in well drained soils. Plants are grown from cuttings planted at 30cm between plants and 75cm between rows.

Lay Strings for Furrow

Place a top string or measuring rope from one 75cm permanent peg to its adjoining peg on the opposite side. Make sure the rope is taut and straight by lifting and dropping it.

Remove God’s Blanket

Move God’s Blanket 30cm downslope of the string, to expose the soil.

Soil Fracturing

If your soils are compacted give the Sweet Potatoes a good chance of success by fracturing each 75cm line to 30cm deep but due to the 15cm deep furrows this may not be necessary.

Furrows

Prepare furrows 15cm deep, every 75cm row line, being careful not to throw the soil too far downslope.

Correcting Acidic Soils

To correct acidic soils and allow for readily available plant nutrients, evenly sprinkle 1 tablespoon of woodash/bonemeal or 1 teaspoon of lime, every 60cm on the planting lines.

Manure/Low Volume Compost Inputs

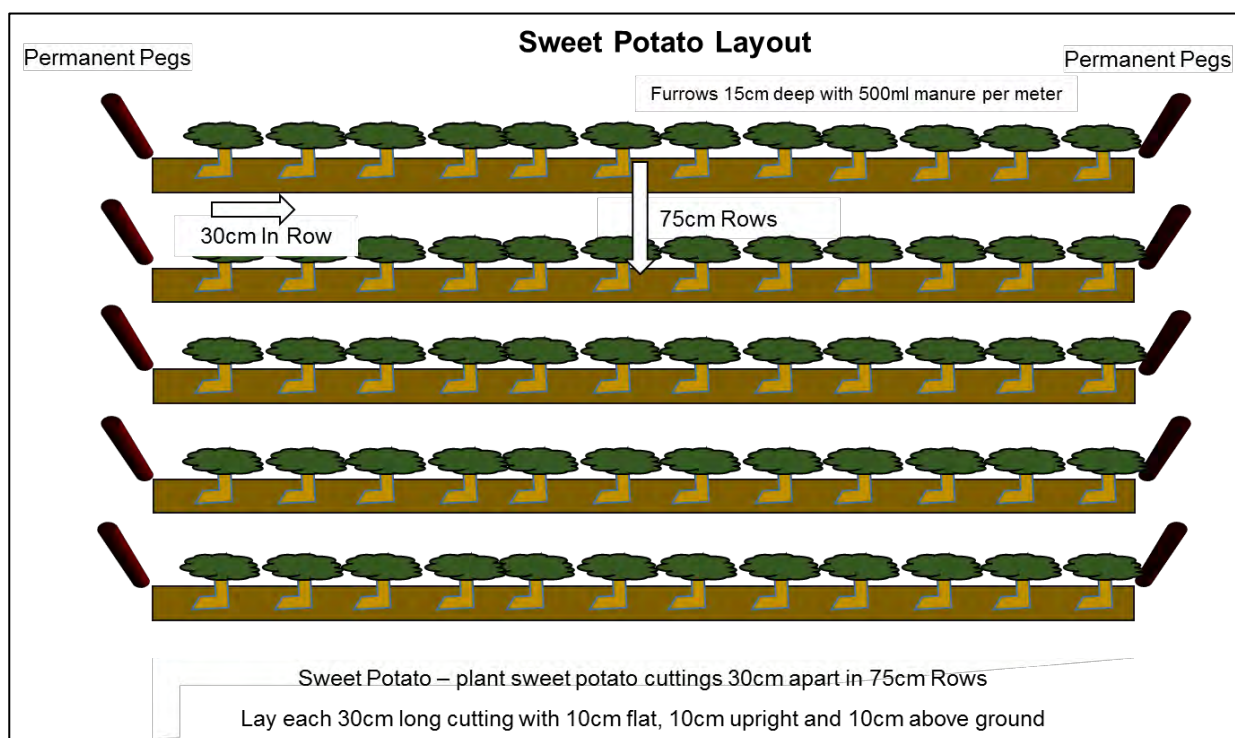
Evenly spread 500ml of compost or manure per meter and cover with at least 3cm of soil to attain the 10cm planting depth.

Cuttings

Sweet Potatoes are best grown from virus free cuttings of vines that have been in the field for 3 months. Store the 30cm cuttings in the shade for up to 3 days to stimulate root formation before planting out.

Planting Cuttings

Ensure each cutting has nodes on it for root establishment. Place the 30cm long cuttings, touching top to tail in the furrow. Bend the topside of the cutting upwards in an L shape and cover with soil, leaving just 10cm of the topside above the ground. You should have 10cm lying horizontal, 10cm vertical but still underground, and 10cm above the ground. Cover the next cutting in the same way ending with 10cm lengths of cuttings every 30cm along the row.



God's Blanket

No hilling up is necessary for good tuber formation but a good blanket is. Place a very thick blanket, between 5-10cm thick, right up around the cuttings, to encourage the tuber formation to take place right near the soil surface under the blanket. The thicker the blanket the better the yield and the easier it is to harvest the Sweet Potatoes with far less soil disturbance.

Harvest

Follow the runners to find the tubers and then use a fork to gently lift the Sweet Potatoes which are most often just below the blanket. This nutritious vegetable can be harvested as and when you have need of them making them a flexible addition to a home garden.



7. Summary Table – Farming God's Way Compost

Compost Inputs Design Standards - Farming God's Way													
Fruit Crops	Surface Compost, Planting Stations or Furrows	Row Arrangement	Row Intervals	In Row Intervals	Fracture	Preparation Depth & Width	Woodash or Bonemeal	Compost	Seeding Depth	Planting	Blanket	Arrangement	Thinning
Beans & Peas	Surface Compost	Single	75cm	10cm	Yes	Surface	1 Tablespoon per 60cm	3cm deep 10cm wide	Press a 3cm furrow	1 Seed per 10cm	After Germination	No	No
Egg Plant	Planting Stations (PS)	Single or Tracks	75cm or 2*75cm;150cm	60cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	1 Seedling per PS	Before planting	Aligned	No
Peppers	Planting Stations (PS)	Single	75cm	45cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	1 Seedling per PS	Before planting	Aligned	No
Squashes	Planting Stations (PS)	Every 2nd row	1.5m	1.2m	No	20cm Spade depth and width	Mix in 2 Tablespoons	Mix in a Spade	Cover leaving 3cm	3 Seeds per PS	After Germination	Diamond	Yes 2 per PS
Sweetcorn	Planting Stations (PS)	Single	75cm	60cm	If necessary	15cm	1 Tablespoon per PS	500ml/PS	Cover leaving 5cm	3 Seeds per PS	After Planting	Aligned	No
Tomato	Planting Stations (PS)	Single or every 2nd row	75cm or 150cm	60cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	1 Seedling per PS	Before planting	Aligned	No
Leaf Crops													
Amaranth	Surface Compost	Triple 37.5cm then 75cm	37.5cm	30cm	Yes	Surface	1 Tablespoon per 60cm	3cm deep 10cm wide	Press a 1cm furrow	1 Seed per 15cm	After Germination	None	Yes 1 per 30cm
Cabbage/Cauliflower/Broccoli	Planting Stations (PS)	Single	75cm	45cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	1 Seedling per PS	Before planting	Aligned	No
Celery	Surface Compost	Double	20cm	45cm	Yes	Surface	1 handful per m	5cm deep 25cm wide	-	1 Seedling per 45cm	Before planting	Diamond	No
Coriander	Surface Compost	Triple	10cm	1cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	Press a 1cm furrow	1 Seed per 1cm	After Germination	None	No
Kale	Surface Compost	Triple 37.5cm then 75cm	37.5cm	30cm	Yes	Surface	1 Tablespoon per 60cm	5cm deep 10cm wide	-	1 Seedling per 30cm	Before planting	Diamond	No
Lettuce	Surface Compost	Double	20cm	20cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	-	1 Seedling per 20cm	Before planting	Diamond	No
Rocket - baby leaf	Surface Compost	Double	20cm	3cm	Yes	Surface	1 handful per m	3cm deep 25cm wide	Press a 1cm furrow	1 Seed per 3cm	After Germination	None	No
Spinach	Surface Compost	Triple 37.5cm then 75cm	37.5cm	20cm	Yes	Surface	1 Tablespoon per 60cm	5cm deep 10cm wide	-	1 Seedling per 20cm	Before planting	None	No
Root Crops													
Beetroot	Surface Compost	Double	20cm	10cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	Press a 2cm furrow	1 Seed per 5cm	After Germination	None	Yes 1 per 10cm
Carrots	Surface Compost	Double	20cm	5cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	Press a 1cm furrow	1 Seed per 2.5cm	After Germination	None	Yes 1 per 5cm
Onion	Surface Compost	Double	20cm	10cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	-	1 Seedling per 10cm	Before planting	Aligned	No
Spring Onion	Surface Compost	Triple	10cm	10cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	-	1 Seedling per 10cm	Before planting	Aligned	No
Potato	Furrows	Single	75cm	30cm	If necessary	15cm	1 Tablespoon per 60cm	500ml/m	Cover leaving 10cm	1 Seed potato per 30cm	After planting	None	No
Radish	Surface Compost	Double	20cm	5cm	Yes	Surface	1 handful per m	2cm deep 25cm wide	Press a 1cm furrow	1 Seed per 2.5cm	After Germination	None	Yes 1 per 5cm
Sweet Potato	Furrows	Single	75cm	30cm	If necessary	15cm	1 Tablespoon per 60cm	500ml/m	Cover leaving 10cm	1*30cm Cutting per 30cm	After planting	None	No

8. Summary Table – Farming God's Way Manure

Manure Inputs Design Standards - Farming God's Way														
Fruit Crops	Planting Stations Furrows or Basins	Row Arrangement	Row Intervals	In Row Intervals	Fracture	Preparation Depth and Width	Woodash or Bonemeal	Manure	Soil Cover	Seeding Depth	Planting	Blanket	Arrangement	Thinning
Beans & Peas	Furrows	Single	75cm	10cm	Yes	10cm	1 Tablespoon per 60cm	500ml/m	Cover leaving 3cm	3cm	1 Seed per 10cm	After Germination	No	No
Egg Plant	Planting Stations (PS)	Single or Tracks	75cm or 2*75cm;150cm	60cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	-	1 Seedling per PS	Before planting	Aligned	No
Peppers	Planting Stations (PS)	Single	75cm	45cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	-	1 Seedling per PS	Before planting	Aligned	No
Squashes	Planting Stations (PS)	Every 2nd row	1.5m	1.2m	No	20cm Spade depth and width	Mix in 2 Tablespoons	Mix in a Spade/ful	Cover leaving 3cm	3cm	3 Seeds per PS	After Germination	Diamond	Yes 2 per PS
Sweetcorn	Planting Stations (PS)	Single	75cm	60cm	If necessary	15cm	1 Tablespoon per PS	500ml/PS	Cover leaving 5cm	5cm	3 Seeds per PS	After Planting	Aligned	No
Tomato	Planting Stations (PS)	Single or every 2nd row	75cm or 150cm	60cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	-	1 Seedling per PS	Before planting	Aligned	No
Leaf Crops														
Amaranth (leaf)	Furrows	Triple 37.5cm then 75cm	37.5cm	30cm	Yes	10cm	1 Tablespoon Woodash per 60cm	500ml/m	Cover level	Press a 1cm furrow	1 Seed per 15cm	After Germination	None	Yes 1 per 30cm
Cabbage/Cauliflower/ Broccoli	Planting Stations (PS)	Single	75cm	45cm	Yes	15cm	1 Tablespoon per PS	500ml/PS	Cover level	-	1 Seedling per PS	Before planting	Aligned	No
Celery	Basins	Double	20cm	45cm	Yes	5cm deep 25cm wide	1 handful per m	2cm layer	Cover level	-	1 Seedling per 45cm	Before planting	Diamond	No
Coriander	Basins	Triple	10cm	1cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	Press a 1cm furrow	1 Seed per 1cm	After Germination	None	No
Kale	Furrows	Triple 37.5cm then 75cm	37.5cm	30cm	Yes	10cm	1 Tablespoon per 60cm	500ml/60cm	Cover level	-	1 Seedling per 30cm	Before planting	Diamond	No
Lettuce	Basins	Double	20cm	20cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	-	1 Seedling per 20cm	Before planting	Diamond	No
Rocket - baby leaf	Basins	Double	20cm	3cm	Yes	5cm deep 25cm wide	1 handful per m	2cm layer	Cover level	Press a 1cm furrow	1 Seed per 3cm	After Germination	None	No
Spinach	Furrows	Triple 37.5cm then 75cm	37.5cm	20cm	Yes	10cm	1 Tablespoon per 60cm	500ml/60cm	Cover level	-	1 Seedling per 20cm	Before planting	None	No
Root Crops														
Beetroot	Basins	Double	20cm	10cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	Press a 2cm furrow	1 Seed per 5cm	After Germination	None	Yes 1 per 10cm
Carrots	Basins	Double	20cm	5cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer old manure	Cover level	Press a 1cm furrow	1 Seed per 2.5cm	After Germination	None	Yes 1 per 5cm
Onion	Basins	Double	20cm	10cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	-	1 Seedling per 10cm	Before planting	Aligned	No
Potato	Furrows	Single	75cm	30cm	If necessary	15cm	1 Tablespoon per 60cm	500ml/m	Cover leaving 10cm	10cm	1 Seed potato per 30cm	After Germination	None	No
Radish	Basins	Double	20cm	5cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	Press a 1cm furrow	1 Seed per 2.5cm	After Germination	None	Yes 1 per 5cm
Spring Onion	Basins	Triple	10cm	10cm	Yes	5cm deep 25cm wide	1 handful per m	1cm layer	Cover level	-	1 Seedling per 10cm	Before planting	Aligned	No
Sweet Potato	Furrows	Single	75cm	30cm	If necessary	15cm	1 Tablespoon per 60cm	500ml/m	Cover leaving 10cm	10cm	1*30cm Cutting per 30cm	After planting	None	No

9. Bibliography

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*“Whatsoever you do, work heartily, as unto the Lord,
and not unto men; knowing that from the Lord you
will receive the reward of the inheritance.*

It is the Lord Christ whom you serve.”

Colossians 3:23,24