

FareShare Kitchen Garden Program

and Garden Manual



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www.FareShare.net.au

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1. About

The FareShare Kitchen Garden Program and Garden Manual documents FareShare's approach to establishing kitchen gardens to supply additional fresh produce to the FareShare kitchen.

This manual provides information that can potentially contribute to other community groups, individuals or organisations who are developing community food projects.

It is also a 'how to' resource for FareShare garden volunteers, shift supervisors and site managers who work in the gardens.



1.1 Introduction to FareShare

FareShare is a food rescue charity which cooks rescued and donated food into nutritious meals for people in need. Its vision is for a society where food is not wasted and no one goes hungry. FareShare operates Australia's largest charity kitchen in Melbourne with a small team of paid staff and around 900 regular volunteers. Together they cook 1.2 million meals a year for charities such as soup vans, homeless shelters, women's refuges and community food banks. FareShare is establishing a second kitchen in Brisbane with the capacity to cook five million meals a year.

The <u>Foodbank Hunger Report 2017</u> found that 3.6 million Australians (15% of the population) experienced at least one occasion of food insecurity over the previous 12 months. In addition to people experiencing homelessness and unemployment, almost half of those affected were in some form of employment. Two in five households experiencing food insecurity include dependent children. The people who experience the highest levels of food insecurity worldwide are small-scale farmers 50%, Indigenous people/fisher people/herders 10%, landless rural workers and the urban poor 20%. Our global food system is socially and environmentally unsustainable, 795,000 million people experience severe food insecurity and 20 million people are on the brink of starvation (UN 2017).

The vulnerability of Australia's food system is highlighted by the fact that at any time we have approximately nine days' worth of dried goods and seven days' worth of frozen goods to feed the population. At the same time the edible food waste that results from Melbournian's current dietary patterns is estimated at over 900,000 tons per year, this is almost a third of all available food. Around 41% is post-consumer waste, 35% is waste from processing and distribution and 24% is pre-farmgate waste. Melbourne's food-bowl produces the equivalent of 41% of the food needed to feed the local population. The average Australian diet uses approximately nine acres annually, 90% is for beef and sheep and approximately .1% of the land use is for our vegetable intake. Urban development potentially undermines the resilience of our local food system and our capacity to feed ourselves predominantly from the surrounding region (VEIL 2016). The Victorian Eco Innovation Lab (VEIL) has recently

done research looking at greater Melbourne's food bowl and our capacity to increase the resilience of our food system http://www.ecoinnovationlab.com/project_content/foodprint-melbourne/

In general, growing food locally increases community food security.

1.2 Introduction to the FareShare gardens

With the aim of securing sufficient fresh vegetables to provide nutrition for its meals, FareShare started growing food at two small sites in early 2016. General Manager Kellie Watson came up with the idea to create a kitchen garden close to the FareShare kitchen site. FareShare employed a full-time Kitchen Garden Manager at the start of 2016 to oversee the development and management of the garden at Abbotsford and to manage the garden underway at Moorabbin airport. We resumed growing at the Baguley farm in August 2016.



The main aim of the garden program is to grow as much as possible of a select range of vegetables. Our main limitation initially was access to suitable land. After getting access to agricultural land and having the potential to increase the harvest, our greatest limitation then became having enough people in place to help grow the vegetables. Now that we have over 90 volunteers helping at Baguley Farm, our potential to increase growing space is reliant on increasing the capacity to manage volunteer shifts. Since the beginning of the garden pilot, four operational hours in total (for volunteer supervision) have been added to the program.

The three gardens have contributed a significant amount of produce to the FareShare Kitchen. We are one and a half years down the track since creating the first garden. Over 200 people have given their time and energy to make this happen and currently there are around 160 garden volunteers who make the gardens a possibility.



1.3 Organisational structure: FareShare gardens

2. FareShare Garden Program

2.1 Garden sites

Victoria Park, Abbotsford

3000 Acres helped FareShare access this site in Lulie Street, Abbotsford. It was leased from Vic Track for a two year period in September 2015, the lease is now renewed on a monthly basis. RACV was the founding partner for this garden. The size is approximately 2,800m² with approximately 800m² used as growing space. FareShare started developing the site in January 2016 and started planting in March. This site has generated the most interest due to its accessibility and demographics.



There is a long wait list to join the shifts at Abbotsford. There are currently five regular shifts and over 50 regular volunteers. One of the weekly shifts is allocated to corporate groups.

Watch the Gardening Australia clip on the Victoria Park garden here: <u>http://www.abc.net.au/gardening/video/video_index_March2017.htm</u>



Moorabbin Airport

This site is approximately 3000m² with around 600m² growing space. There are currently 46 raised garden beds with half of the area yet to be developed.

This garden has been donated to FareShare by the Goodman Corporation and the garden design was managed by Goodman. The land is leased from Moorabbin Airport Corporation for just over 30 years.

FareShare started growing at this space in April 2016. There are currently two weekly garden shifts and more than 20 volunteers.

The garden program manager contributes a small amount of time to the management of the garden. The day to day running of the garden is totally dependent on volunteers, in particular Roger (pictured) who does site management.

Baguley family farm

FareShare has grown food at the Baguley family farm in the past and we have begun to grow vegetables there again. The farm is a working farm with the Baguley family growing flowers and herbs. The farm is FareShare's greatest opportunity to produce a large amount of fresh food. FareShare started growing at Baguley's again in August 2016. There are four volunteer shifts per week and over 90 volunteers. There are a couple of Gardening Australia clips on the Baguley family farm that can be viewed. The Baguley family gives invaluable guidance and allows FareShare to use their land, resources and infrastructure at no charge.



Watch the Landline about our sweet potato crop at Baguley farm and Abbotsford garden: <u>http://www.abc.net.au/news/2017-07-05/sweet-dreams:-the-community-garden-growing-sweet/8670410</u>

For an historical view of Baguley Farm: ABC Gardening Australia (November 2011) http://www.abc.net.au/gardening/video/video_index_November2011.htm

Baguley Farm ABC Gardening (February 2011): http://www.abc.net.au/gardening/video/video_index_February2011.htm



2.2 Garden site specifics

Garden sites	Vic Park, Abbotsford (A)	Moorabbin Airport (MA)	Baguley Family Farm (BF)
Garden design	Collaborative approach: Advice from Melbourne University (Chris Williams, Peter May and Lia DeGruchny), 3000 Acres, City of Yarra, volunteers - Jac Larsen and others), process guided by Garden Manager	Garden design overseen and gifted to FareShare by Goodman Corporation	FareShare uses existing planting areas and infrastructure. Informal philanthropy
Land tenure	Insecure (VicTrack, two year lease, now one month lease)	Secure (Airport land, >30 year lease)	Insecure (Private freehold)
Volunteers	Approximately 50	Approximately 21 (some people do both MA and BF)	Approximately 90 (some people do both MA and BF)
Growing methods	Organic (not certified)	Organic (not certified). Restrictions: Not allowed to encourage birds or insects. Use of herbicide to control weeds outside of food production areas	Conventional: Synthetic and organic fertilisers, trying to transition to just organic. No herbicides and pesticides
Capacity to produce food	Low, approximately 700m ² Yield Mar-mid Oct Approximately	Low, approximately 600m ² Yield Apr- mid Oct Approximately	Significant, approximately 2.5 acres Started planting Aug 2016
Current roles of each garden	Production Education Community connection Promotion of organisation	Production Community connection	Production Community connection Education- University visits



2.3 Growing methods

The gardens are not certified organic, but we use organic growing principles and methods wherever possible and practical. At Abbotsford and Moorabbin only organic inputs are used to grow the food. Synthetic herbicide is used at Moorabbin to control running grasses. In Clayton South, Frank Baguley has been growing food for over 70 years and Les Baguley for over 50 years; the systems in place have been refined over time. In this context synthetic fertilisers are used alongside organic fertilisers; however we are trialling organic inputs and hoping to transition towards the use of only organic inputs. We aim to use organic production principles, which according to the Australian Certified Organic Standards (2016) are:

- ✓ Production of naturally safe, high quality, nutritionally vital foods;
- ✓ Optimal production output, with rational and minimised use of inputs;
- ✓ Use of recycling and biological cycles within the farming system;
- ✓ Biodiversity protection and enhancement within the farm and surrounding areas;
- ✓ Regeneration of lands and soils and best environmental practice of farming activities.

2.4 Plant selection

All the food grown in the FareShare gardens is intended for the FareShare kitchen. Access to fresh food is inconsistent and is also becoming more difficult due to factors such as the increasing acceptance in the market for fruit and vegetable 'seconds', increasing food insecurity, the decline of small regional farms and improvements in infrastructure that reduce waste. The crops have been narrowed down to 10 top priorities. Key factors in plant selection that override other factors are the ease of preparation, suitability and contribution of bulk to the meals. For example parsley, herbs and most greens take a while to prepare and do not add much bulk to the meals. The prepared meals are eaten by a diverse, numerous and largely unknown group of people. Uncommon vegetables or flavours are not suited to a wide range of people and the meals are made with this in mind.



Some of the qualities that determine how we prioritise the vegetables we grow are:

- Yield vegetables that yield well and contribute bulk to the meals are prioritised
- Suitability FareShare meals feed thousands of people, so growing common vegetables is prioritised
- Versatility can be used in a number of the wet or dry meals
- Ability to freeze FareShare meals are cooked then frozen
- Able to hold form plants that reduce a lot are not prioritised (greens)
- Ease of preparation vegetables need to be easy to prepare in the kitchen

Initial plant selection process diagram

This diagram was used at the start of the garden project to help FareShare identify the crops to be grown.



Revised plant selection process diagram

Taking into consideration yield, preparation time and other kitchen production factors, the plant selection process diagram was revised during the first year.



List of prioritised plants

The 'top priority' plants are the vegetables that FareShare require large amounts of on an ongoing basis.

- Capsicum
- Carrot
- Parsnip
- Pumpkin butternut
- Celery
- Sweet potato

Turnip/Swede

- EggplantLeek
- Zucchini

•

The prioritised planting schedule at **Appendix 5.7** has more information.



2.5 Yield

General annual yield estimates for garden sites - this is based on choosing three winter crops and three summer crops and using agricultural production estimates to evaluate an annual yield from the three garden sites.

Estimation of yield based on winter and summer planting and variety of crops	Vic Park	Moorabbin Airport	Baguley's Farm
1 Year period	616m²	575m²	10,000m² (as of 08/17
Winter planting: 1/3 of garden. Carrot, 42 T/Ha; Veg Grow AG1390	862	805	14,000
Winter planting: 1/3 of garden. Leek, 16 T/Ha; Veg Grow AG1390	329	307	5,333
Winter planting: 1/3 of garden. Turnip, 25-40 T/Ha; WA	667	623	10,000
Summer planting: 1/3rd of garden. Capsicum, 24 T/Ha; Veg Grow AG1390	493	460	8,000
Summer planting: 1/3rd of garden. Zucchini, 12-18 T/Ha; AG0259 VIC	328	307	5,000
Summer planting: 1/3rd of garden. Eggplant, 9-15 T/Ha; AG0124 VIC	246	230	4,000
Total average yield per site	2,925kg/year	2,732kg/year	46,333 kg/year

Total yield per year for all three places 51,990kg/year.

When factoring in variables such as: weather extremes, pests, poor germination, and new soil, it is realistic to say that optimum average agricultural yield will not be achieved. For example, if we allow for crop failure then the total yield per year for all three places, factoring in 30 per cent loss (average loss of agricultural crops due to pests and diseases is estimated at 30-40 per cent per year), then a more realistic estimate = approximately 36,393 kg/year

Yield by Site

For the first three months of 2017 garden yield contributed approximately 36 per cent of the entire vegetable component of the meals. In general FareShare uses approximately three tonnes of vegetables each week.

Overall yield across three sites - March 2016 to November 2017 = 31,741kg



2.6 Sweet potato crop results

Across the three sites the sweet potato crop was trialled and grown from Nov/Dec 16 and harvested Ari/May 17. The trial was led by Chris Williams. The crop covered approximately 1,000m² (including the spread of the stems). Since growing the crop we have connected with Mark Rathbone, a biodynamic farmer who has been growing sweet potato for years near Echuca.

Total yield = 2,475kg! Total average yield = 2.47kg/m²

This includes poor yielding varieties and low production in some areas due to rats and shade.

Abbotsford = 694kg Moorabbin = 849kg Baguley farm = 932kg

Vic Park Abbotsford



The total was approximately 694kg! Approximately $264m^2$ was planted out which averaged out the kg/m² to $2.6/m^2$. The varieties differed greatly so a revised yield total/m² (taking out two lowest yielding varieties and two heavily shaded beds - $61m^2$; -78kg); 616kg from $203m^2$ = **Approximately 3kg/m²**

Varieties: (highest to lowest yielding)

- Beauregard 3.7/m² in full sun; 1.8/m² in shady area
- Northern Star 3kg/m²
- Evangeline 2.5kg/m² (was partially shaded)
- PNG 1.4kg/m²
- Kumara .7kg/m²

Moorabbin Airport

Approximately $247.5m^2$ was planted out. Each bed was approximately $22.5m^2$ - includes $9m^2$ for overhanging vines. The total yield was 849kg! =**Approximately 3.4kg/m^2**.

The sweet potato grew exceptionally well in the raised beds (same soil as Vic Park) at Moorabbin. The main differences were less compaction (due to beds not being walked on), more direct sunlight, and the great majority of space was planted with high yielding varieties.

Varieties - not all were recorded: (highest to lowest yielding)

- Beauregard 3.9kg/m² (approximately 88kg one bed)
- Kestle 3.3kg/m² (approximately 75kg one bed)
- American White Yam 2.93/m² (approximately 66kg one bed)

Baguley Farm

The total harvest was approximately 932kg from approximately $460m^2 = approximately 2kg/m^2$. Revised average from areas 1, 2 and 3 = $260m^2$. Total yield average from revised estimate $868kg = Approximately 3.3/m^2$ (Revised average yield takes out the three beds that did extremely poorly, these beds were in fully enclosed white-washed green houses, rats and poor root growth meant that from $200m^2$ there was a yield of 64kg).

Area 1 Bed 1	Area 1 Bed 2	Area 3 Bed x 2	Area 4 Bed x 3
Approximately 60m ² . Total 216kg = 3.6/m ² (west side)	1.5 beds approximately 80-90m ² . Total 280kg = 3.5-3.75/m ² (west side)	Approximately 120m ² . Total 372kg = 3.1kg/m ² (east side, 2 beds under glass, no sides) 1m spacing, 1 row per bed	Approximately 200m ² . Approximately 64kg total! Approx. 3kg/m ² (E side, 3 beds- in glasshouse fully enclosed) 1m spacing, 1 row per bed. Did terribly, many were rat eaten. Lush vegetation all, but hardly any tubers!!

Varieties and future plantings

We are concentrating on propagating high yield varieties for late spring-early summer plantings (all to be planted in full sun).

- Beauregard
- Kestle
- Northern Star
- Evangeline
- American White Yam

The Baguley family has given us the use of two propagation beds so we are propagating 1000's [©]. A lot of cuttings died over the winter period (glasshouse is not heated). Northern Star, PNG and American White Yam were the three varieties most resilient to the cold. For some reason aphids prefer to suck on other varieties prior to attacking Northern Star and American White Yam. We are also going to trial the variety 'Red Garnet'.

As a result of the sweet potato trial, a nursery business renting at the Baguley farm got some of the plant material and began selling sweet potato. They could not keep up with the demand from customers.

3. Land use management

3.1 Soil

Soil provides structural support, water, and nutrients for crop growth. The maintenance of healthy soil at FareShare Kitchen Gardens is essential for productive and sustainable crop growth.

This section outlines:

- the components of soil
- the properties of productive soil for crop growth, and
- the management practices used at FareShare Kitchen Gardens to ensure productive soil properties are maintained

This information (3.1 Soil) is provided by Kit Duncan-Jones, who took on the position of FareShare's Abbotsford Garden Manager in late July to December 2017. There are references to additional soil resources at the end of this chapter.

What is soil?

Well that depends on a range factors, including parent material (rocks), climate, topography, soil organisms, the age of soil, and whether the soil occurs naturally (Baguley family farm), or is artificial (Vic Park, Abbotsford and Moorabbin Airport).

The truth is there is no one soil but many thousands of soil types that are continually changing through physical, chemical, and biological additions, loses, transformations, and translocations. Thus, each soil has its own peculiarities. However, every soil has five main components (*Figure 1*):

- 1. **Mineral particles (the inorganic fraction)** containing small particles of rock and other minerals that have been produced from these rocks by weathering.
- 2. Organic materials humus and the dead and decaying parts of plants and soil animals.
- 3. Water the 'soil solution', in which nutrient elements for plants are dissolved.
- 4. Air which fills the spaces between soil particles not filled by soil solution.
- 5. Living organisms ranging in size from small animals to viruses (Handreck 2001)



Figure 1. Components of a well structured loam soil (per cent by volume).

Soils have different proportions of their main components. The proportion of different mineral particles – sand, silt, and clay – in the soil determines soil texture (Figure 2). The textural composition of a given soil influences its physical, chemical, and biological properties, including water holding capacity, infiltration rates, structure, Cation Exchange Capacity (CEC) or ability to store nutrients, and organic matter retention (Ashman and Puri 2002).



Figure 2. The soil textural triangle (Ashman and Puri 2002).

Knowledge of soil texture is important if we are to manage soil for optimal crop growth. More important still is knowledge of the way in which sand, silt, and clay particles, and humus are held together in larger units called 'aggregates' (Handreck 2001). In other words, we must know something about the structure of a soil if we are to manage it wisely. The development of a range of different sized soil aggregates (micro and macro), and the stabilisation of soil aggregates, are critical properties of a healthy soil. It is important to note that aggregates possess particles and pore (void) spaces.

Microaggregates are formed through silt and clay particles being tightly bound by organic materials. Macroaggregates are a collection of silt/clay particles, microaggregates, and organic matter. Plant roots, mycorrhizae and earthworms are major contributors to the formation of macroaggregates (Ashman and Puri 2002).

Soil aggregates are held together by clay, organic matter (like roots), bacterial and fungal glues, and by fungal hyphae (*Figure 3*). Aggregates formation decline and destabilisation can occur from loss of organic matter and subsequent loss of soil organisms, inadequate organic matter input, compaction pressures (walking on beds), and over tilling/digging the soil (Hamza & Anderson 2005).



Figure 3. Formation and stabilisation of soil aggregates (Brady and Weil 2014).

Productive healthy soil

A soil that is healthy supports high crop yields and is non-acidic nor alkaline, saline, compacted, losing nutrients, nor eroding. Equipped with the knowledge of what soil is comprised of, and the importance of soil texture and structure, provides a solid base for FareShare Garden Managers, Volunteers, and other stakeholders to manage soil sustainably. We now recognise why the properties of a well-structured loam illustrated in *Figure 1* exemplify the qualities of a productive soil for optimal crop growth. The next section provides an outline of the management practices required within FareShare gardens to ensure our second most important resource, after volunteers, is healthy and productive.

Guidelines for sustainable soil management

These guidelines have been informed by the Food and Agriculture Organisation of the United States (2017), Victorian Resources Online (2017), and Handreck (2001 and 2010).

1. Prevent and mitigate soil compaction

What: Soil compaction is the process of increasing the density of soil by packing the soil particles closer together causing a reduction in the volume of air. Compaction reduces soil aeration, water infiltration, biological diversity, plant growth, and overall soil health.

Why: Soil compaction reduces soil aeration by destroying soil aggregates and collapsing macropore density. Furthermore, compaction reduces water infiltration, biological diversity, seed germination, plant growth, and overall soil health. **Management practices:**

- Avoid standing on garden beds at all times. Foot traffic causes compaction
- Apply and incorporate organic matter into gardens beds through the regular application of compost and mulch
- Avoid working garden beds when wet. Dry soil will compact less than moist soil

2. Prevent soil erosion

What: Soil erosion is the wearing away of a garden's topsoil by the natural forces of water and wind.

Why: Soil erosion causes the loss of surface soil layers containing organic and mineral nutrient pools.

Management practices:

- With the exception of periods of seed laying and presence of small (less than 5 cm tall) germinated seedlings ensure all garden beds remain mulched with straw at all times
- When manually watering the garden beds ensure the spray unit is set on shower or mist mode. Avoid excessive water power and water application that compacts and erodes soil away
- Avoid compacting the soil. Refer to management practices above

3. Enhance soil organic matter

What: Soil organic matter is any living or dead animal and plant material. It includes living plant roots and animals, decomposed plant and animal remains, and microorganisms and their excretions.

Why: Soil organic matter plays an essential role in maintaining soil functions and preventing soil degradation.

Management practices:

- Apply and incorporate organic matter into gardens beds through the regular application of compost and mulch
- Maintain worm farms, and collect and apply worm castings. Castings should be incorporated within the soil to ensure as much contact as possible. Additionally, mulching over castings is essential. Castings left unincorporated and uncovered loose the potential to boost soil health



- Ensure soil water moisture is kept at above 20-25 per cent refer to the 'feel and appearance method' of monitoring soil moisture (see additional resources below). Moist soils support diverse range of soil micro, meso, and macro-organisms
- Leave crop stubble (plant roots) in ground to maintain soil structure and add organic matter where practically visible

4. Prevent and minimise soil acidification

What: Anthropogenic acidification of soils is primarily associated with removal of alkaline products (plant material, in particular harvested parts, e.g. eggplant fruit) and loss of soil buffering capacity (the ability of the soil to stop nutrient or pH changes by absorption), or increases in Nitrogen and Sulphur inputs

Why: Within the pH range on 6-7.5, most nutrients are available to plants (see *Figure 4*). The availability of nutrients in the soil is affected by the pH level. Acidic soils cause nutrients to be 'locked up' and unavailable to plants in the soil solution.



Figure 4. How soil pH affects availability of plant nutrients (Handreck & Black 2010).

Management practices:

• Follow the advised fertiliser application rate – refer to the soil nutrient management section below. Do not over apply fertiliser

- As part of the Soil Health Card: A soil management tool developed by farmers for farmers test (see additional resources below), a soil pH test should be carried out at a minimum twice per year at even intervals. This is achieved using soil pH colour kit
- Apply and incorporate organic matter into gardens beds through the regular application of compost and mulch. This ensures alkaline products are returned to the soil and increases the soils buffering capacity



• Over time with the continued removal of alkaline plant products and nitrogen fertiliser application the pH may become acidic. In this instance, agricultural lime will be necessary to bring the pH back up to between 6.2-7.3

5. Maintain and enhance soil biodiversity

What: Soil is the most diverse habitat on earth and contains the most diverse assemblages of living organisms. Soil is alive. A single gram of soil may contain billions of bacteria and millions of fungi.

Why: Soil organisms have essential functions in soil, including nutrient cycling, organic matter decomposition, maintenance of soil structure, suppression of pests, parasites and diseases, and other beneficial symbioses with plants.

Management practices:

- Soil organic matter supports / increases soil biodiversity. Apply and incorporate organic matter into gardens beds through the regular application of compost and mulch
- Crop rotation, inter-cropping, and preservation of field margins, hedges and biodiversity refuges should be maintained
- The use of nitrogen fixing leguminous species, earthworms, warm farms and other beneficial micro-, meso- and macro- soil organisms should be used where appropriate
- Ensure soil water moisture is kept at above 20-25 per cent refer to the 'feel and appearance method' of monitoring soil moisture (see additional resources below). Moist soils support a diverse range of soil micro, meso, and macro-organisms



6. Soil water management

What: A sustainably managed soil has good water infiltration, optimal soil water storage of plant available water and efficient drainage when saturated.

Why: Effective soil water management is crucial for crop growth. Waterlogging, which is related to the saturation of soil with water, creates rooting problems for many plants, thereby reducing yields, and can cause contaminants such as arsenic and methylmercury to become mobile in the soil. On the other hand, water scarcity occurring in areas where water is lost by evaporation, surface runoff and percolation, can cause crop failure.

Management practices:

- In Victoria evapotranspiration exceeds precipitation, particularly in the summer months. Thus, imported
 irrigation water is critical to meet crop water demands. It is important to ensure automated irrigation
 systems are working efficiently. This is achieved through checking pipes and attachments for leaks and
 other issues. This needs to be done regularly. Refer to the Watering and irrigation lines section at
 Appendix 5.5.
- The aim is to keep soil moisture within 25-50 per cent of field capacity (soil saturation) for productive vegetable growth.
- With the exception of periods of seed laying and presence of small (less than 5 cm tall) germinated seedlings ensure all garden beds remain mulched with straw at all times. Reduces evaporation enhances soil moisture
- Another valuable resource: Connellan, G 2013, Water Use Efficiency for Irrigated Turf and Landscape, CSIRO, Melbourne

7. Soil nutrient management

What: Ensuring adequate / necessary additions of essential plant macro (N, K, Ca, Mg, P, and S,) and micro (Cl, Fe, B, Mn, Zn, Cu, Mo, and Ni) nutrients are applied throughout the growing season.

Why: The lack of basic nutrients leads to the underdevelopment of plants and decrease in yields and crop nutritional value. While, excess nutrients in soils causes eutrophication, increased release of the greenhouse gas nitrous oxide from soils to the atmosphere, and crop failure.

Management practices:

- Do not over water garden beds
- Follow the advised fertiliser application rate refer the Fertilising section of Appendix 5.5
- Apply and incorporate organic matter into gardens beds through the regular application of compost and mulch
- Monitor crops for nutrient deficiency and toxicity symptoms refer to the Plant Nutrient Functions and Deficiency and Toxicity Symptoms resource at the end of this chapter

Additional soil resources

- 1. Northern Rivers Soil Health Card: A soil management tool developed by farmers for farmers.
- The soil health card lists the 10 tests and provides space for FareShare Garden Managers, Volunteers, and other stakeholders to rate sites soil. Tests can be undertaken regularly, but at minimum should be carried out twice per year at even intervals. Consistent testing and records will allow for the effect monitoring of our management practices on soil health
- A layout of sample points will need to be set in place at all three FareShare gardens to ensure the sampling procedure is consistent over time
- Reference: NSW Department of Primary Industries 2002, Northern Rivers Soil Health Card: A soil
 management tool developed by farmers for farmers, Good Soil Project; the Good Worm Project;
 initiatives of Tuckombil Landcare Inc.; NSW DPI; and the Natural Heritage Trust, NSW, Australia, access
 available through, http://www.dpi.nsw.gov.au/agriculture/soils/testing/health-Card
- 2. The 'feel and appearance method' of monitoring soil moisture.
- Provides a practical way of monitoring soil moisture to determine when to irrigate and how much water to apply. Useful for FareShare Garden Managers, Volunteers, and other stakeholders
- Reference: United States Department of Agriculture 1998, *Estimating soil moisture by feel and appearance*, Program Aid, USA, access available through; https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_051845.pdf.
- 3. Plant Nutrient Functions and Deficiency and Toxicity Symptoms extension sheet.
- Valuable resource for FareShare Garden Managers, Volunteers, and other stakeholders to recognise plant deficiency and toxicity symptoms. Includes coloured pictures
- Reference: McCauley, A, Jones, C, and Jacobsen, J 2011, *Plant Nutrient Functions and Deficiency and Toxicity Symptoms*, Montana State University Extension, Montana, USA, access available through; www.landresources.montana.edu/nm/documents/NM9.pdf.

3.2 Composting

This section describes why FareShare uses composting and how it is managed across the gardens. This information can also be used across various scales for your home garden or larger projects.

Fortnightly composting volunteer Kersti Nogeste compiled this section. Kersti has also created a community composting framework to assist other community gardens to introduce on-site composting. Contact Kersti directly for a copy of the framework at knogeste@projectexpertise.com.au.

Our composting bays

At the FareShare Abbotsford garden we use a series of side-by-side, three-sided open topped and fronted bays to store our compost.

Each bay

- is about 1.2 metres high, wide and deep
- is made of wood
- includes a raised wooden slat platform in its base, because the compost is not allowed to have direct contact with the soil which may be contaminated. The raised platform also allows for drainage and air to circulate beneath the pile of compost

In addition,

- the front of each bay may also include a series of individual wooden slats that are added as the compost pile increases in height

 to ensure that the compost
- does not spill out of the front of the bay., and
- is easy to access when aerating or harvesting
- Each bay may be covered by a layer of cardboard, thin plywood or old carpet. This top layer helps to keep the compost warm, and for the heat generated to speed up the composting process



What to compost?

Composting is dependent on four key elements



For the FareShare Abbotsford garden

- **fresh green material** comprises food waste from the FareShare kitchen, FareShare volunteers, nearby cafes/restaurants and participating community groups
- **dry brown (carbon rich) material** comprises a number of forms, depending on what is available to the FareShare Abbotsford Garden e.g. straw, dried leaves, paper or cardboard
- **air** is introduced to the composting process by aerating the bays of compost tossing the contents of one bay into another
- **moisture/water** is introduced by a combination of the moisture contained in the fresh green material, hand/hose watering and possibly rain



Fresh gr	een (nitrogen rich) material	Dry brown (carbon rich) material
YES ✓ F ✓ C ✓ C ✓ C ✓ C ✓ C ✓ C ✓ C ✓ C	Fruit and vegetable scraps – the smaller pieces the better (Compost faster) Egg shells - crushed Coffee grounds / paper tea bags Lawn clippings – green/fresh Small quantities only, of Citrus peel e.g. orange, lemon, lime – chopped up into small pieces Pine needles Fresh weeds, but only if the compost pile is very warm, preventing the weeds from germinating	<pre>YES YES Pead flowers, stalks chopped into small pieces Cardboard – small pieces only Paper – crumpled (includes air pockets) Paper - shredded Paper - shredded Paper - shredded Straw/Hay Old vegetable plants (e.g. tomato bushes) chopped into small pieces) Strawl pieces) Soli Soli Lawn clippings – brown/dried</pre>
NO X X X X X X X X X X X X X X X X X X X	Whole fruit or vegetables – vegetable matter needs to be chopped into small pieces Cooking oils and fats Meat Dairy Bones Cooked food like bread, pasta or leftovers – see Note below Seafood shells Diseased fruit or vegetables Synthetic tea bags Problem weeds if the compost pile is cool/cold allowing the weeds to germinate	NO Glossy paper e.g. magazines

The following table provides a list of materials that should and shouldn't be composted:

Note - Vermin (rats and mice)

Compost piles may attract rats and mice. At the Abbotsford garden we have seen no rats and very few mice. However, if you do find that the compost is attracting vermin, this is often a sure sign that material is not being deposited according to the above guidelines.

You may also decide to try and vermin proof your compost bay/s, although that should not be required if the above guidelines are being followed.

How to compost

A layered compost 'lasagne' recipe

As with any recipe, the recipe for delightful compost relies on the right mix of ingredients, and for our compost it means

- the fresh green material and dry brown material are deposited in alternating layers like a lasagne, and
- the ratio of dry brown material and fresh green material is 2:1 i.e. twice as much dry brown material is added as fresh green material



The layers

The steps we use to fill the Abbotsford garden composting bays using pitchforks or shovels are as follows

- 1. Cover the base wooden slat platform with an 8-10 cm layer of dry brown material. This will help with aeration and also to absorb moisture
- 2. Top with a 4-5 cm layer of fresh green material
- 3. If possible, sprinkle with garden soil and/or mature compost
- 4. Repeat steps 1 to 3

At the Abbotsford garden, we have not found it necessary to water the layers after the initial setup of a bay, but if it's decided the layers are too dry (especially in summer), then lightly sprinkle with water to add moisture.

- 5. As described earlier in this Composting section cover the top of the pile with a layer of cardboard, thin plywood or old carpet to help keep the compost warm and speed up the composting process
- 6. Continue to repeat steps 1 to 5 until the bay is full

Leave the bay for 6-12 weeks (depending on the warmth of the pile and outside weather) to allow the combined materials to start decomposing.

During the 6-12 week period of time, you can introduce air and help speed up the decomposing process by using pitchforks or shovels to toss the contents of the bay into another empty bay, adding dry/brown material and/or water as required.



- The compost is ready to be used in the garden when all the fresh/green material and dry/brown material has decomposed to become a consistent brown and crumbly mix
- Once the compost is ready, it can be added to the garden, propagation mix and/or garden beds and boxes, either as a top layer or by lightly digging it into the soil.

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Note - getting the right mix

If, like at the Abbotsford garden, you are 'making do' with available supplies of fresh green material and dry brown material, don't worry too much if you can't get the recommended mix of twice as much dry brown material as fresh green material, 'just right' – do the best you can to get as close as possible to this mix.

Who composts and when?

At the Abbotsford garden, fresh green (nitrogen rich) material is provided by

- the FareShare Kitchen usually delivered by truck on a weekly basis in large white buckets (to coincide with composting volunteers' shifts)
- cafes/restaurants located close to the garden – by pre-arrangement with the Garden Manager
- FareShare Garden volunteers when they come in for a gardening shift, and
- members of prequalified community groups e.g. City of Yarra Food KnowHow program members – as collaboratively agreed by the FareShare Garden Manager and community group coordinators

Dry brown (carbon rich) material is provided by

- a variety of suppliers sourced by the Garden Manager when available
- FareShare garden volunteers, including voluntary pickups of free dry mulch from the City of Yarra depot in Roseneath Street, Clifton Hill – when they come in for a gardening shift

The bays are filled and maintained by FareShare garden volunteers – according to volunteers' weekly or fortnightly shifts.

The compost is harvested from the bays by FareShare Garden volunteers – when all the fresh/green material and dry/brown material has decomposed to become a consistent brown and crumbly mix.



Troubleshootingtips



3.3 Composting resources

- Before you start composting, watch this introductory video by Costa Georgiadis (Gardening Australia)
 <u>https://www.youtube.com/watch?v = GSH0mkkcV8g</u>
- Read through the online fact sheet and video available from Gardening Australia (series 6, episode 5, 4th April, 2015) <u>http://www.abc.net.au/gardening/stories/s4210405.htm</u>
- More information is available via the following links :
- YouTube The Perfect Compost Recipe <u>www.youtube.com/watch?v = M1kIpCBD3UI</u>
- Food KnowHow Smart Composting <u>www.foodknowhow.org.au/take-action/recycle-food-</u> waste/smart-recycling/
- In addition, this section of the FareShare Abbotsford Garden manual was developed in part, by referring to the following sources of information
- City of Nedlands, Western Australia <u>http://www.nedlands.wa.gov.au/document/compost-</u> information-sheet
- City of Whitehorse, Victoria <u>http://www.whitehorse.vic.gov.au/Home-Composting.html</u>
- <u>City of Yarra The Condell Growers and Sharers Composting Pilot booklet</u>

3.4 Community composting framework

For organisations or community gardens interested in community compositing, Kersti Nogeste has prepared a framework to guide decision-making: *Collaborative Composting by the FareShare Vic Park garden and the City of Yarra Food KnowHow program – a work in progress.*

The framework aims to provide neighbourhood/community groups with a framework that will help them **plan a composting solution** which complements

- large scale composting projects/operations conducted by City Councils or similar, and
- individual household level composting practices

The framework specifically addresses key challenges and trends of

- ✓ Minimising organic waste in landfill
- ✓ Increasing levels of medium to high density living
- ✓ Ethnically and socio-economically diverse households



3.4 Integrated pest management (IPM)

Integrated Pest Management (IPM) is a framework that optimises choosing the most sustainable option for managing pests. Over time these practices minimise the potential negative impacts from pests and diseases.

Key factors of IPM are, knowing the pests and diseases to which crops are vulnerable, the level of damage that can be tolerated and various options when taking action. Sustainable gardening practices such as composting, crop rotation, diverse plantings, organic fertilisers and mulching all contribute to increasing soil health which increases plant health. Pest and diseases are more likely to overtake unhealthy plants.



IPM principles and strategies

IPM application

An IPM toolkit has been provided for the identification and management of pests across all garden sites. It includes field sheets, a list of pests and diseases and information on plant susceptibilities. See **Appendix 5.8 Integrated Pest Management (IPM) Toolkit** for more information.

3.5 Crop rotation

Crop rotation is one of the principle practices used for sustainable food production. It builds and maintains soil health and minimises pests and diseases from building up. Through maintaining soil health, plant health is maintained. Crop rotation requires long-term planning but this does not mean deciding exactly what is to be planted long in advance. The rotation is affected by numerous factors including, current crops growth, past crops, seasonal changes and the weather (Mohler & Johnson 2009). With the limited vegetables that FareShare is growing it is essential to plan and keep on track of crop rotation.

Important considerations when planning for crop rotation are:

- plant family
- plant growth/type; legume; leaf; fruit; root
- previous crops (generally try to wait four years before planting the same crop/family)
- breaking disease cycles
- adding nutrients and organic matter e.g. legumes for nitrogen and green manures for organic matter. • Due to the limitations in space we will generally be adding nutrients and organic matter through applications of things such as compost, worm castings, fish fertiliser, blood and bone, and seaweed

Crop rotation example

Fruit crop

Spring: Curcurbitaceae (Pumpkin, Zucchini) Solanaceae

(Capsicum, Eggplant)



Root crop

Anytime: Apiaceae (Carrot, Parsnip) Early spring, autumn, winter: Brassicaceae

(Turnip, Swede)

Spring: Convolvulaceae (Sweet Potato)



Regenerative crop

Anytime: Mix of green manure crops

Fabaceae (Bean, Pea) not a priority for kitchen



Heavy feeder

Anytime, spring is best: Amaranthaceae (Silverbeet) not a priority for kitchen

Anytime, spring is best: Apiaceae (Celery)

Autumn or spring: Amaryllidaceae (Leek)

Early spring, autumn, winter: Brassicaceae: (Broccoli, Cauliflower)



3.6 Crop record and rotation planning

The main reason to record planting details is so that continual crop rotation can occur. It also helps to follow and evaluate over time which plants have been the most successful or unsuccessful. Monitoring the success/failure of growth in particular areas gives a good indication of soil health.

See Appendix 5.7 Crop record and rotation planning for further information.

3.6 Companion planting (Kuepper & Dodson 2001)

FareShare practices companion planting across sites as appropriate. Traditional companion planting is based on the idea that by placing two or more plants in close proximity, some cultural benefit such as increased productivity is achieved. The placement of plants is based on a number of factors such as: water and nutrient needs, soil pH, type of plant, size of plant, etc.

Some of the potential benefits of companion planting are

- ✓ Nitrogen fixation Legumes are often used as a fertiliser for other crops
- ✓ Pest suppression Some plants deter pests by exuding chemicals from their roots and aerial parts
- Maximising space and productivity Growing a diverse range of plants that utilise the available space potentially increases productivity in a given area
- ✓ Habitat provision For beneficial insects and animals
- ✓ Increased diversity Diversity increases food security and resilience to environmental vulnerabilities

4. Garden insights

4.1 Key findings

The FareShare garden program started at the beginning of 2016. Since that time, we have made the following observations that will shape the future of our garden program and potentially be of benefit to anyone wanting to establish a community food project.

In our experience, the main factors to consider when planning similar gardens are:

- access to funding and suitable land
- available skills and resources
- relationships and partnerships
- identifying the garden model that best suits the project's needs
- identifying organisational capacity for growth of a program



Limited access to funds, land and inadequate knowledge, skills and resources can be major limiting factors to not-for-profit urban agriculture. Factors that have enabled the FareShare gardens in the context of Moorabbin and Abbotsford are identified as funds, having a clear project plan, professional and local government support and existing relationships and volunteers (Hickman 2016).

The factors that have enabled the third production site to thrive have been the transfer of staff and volunteers to this site, professional support from a farmer and the generosity of the Baguley family who have given access to part of their farm. Currently the Baguley farm is the only location where FareShare has the capacity to produce large amounts of food at low cost.

The garden program grew quickly, leading to challenges in relation to the increased need for operational and administrative support within the organisation. With specific roles already allocated to FareShare staff, the increasing scale of the food produced and people involved in the garden program added additional tasks to the existing workload. The growth of the garden program has been very positive, but it is very important to have a good understanding of organisational capacity and limitations to supporting the growth of a program that is seen as tangential from the core operation.

4.2 Potential for FareShare garden program development

There is potential to increase access to agricultural land and increase the production of fresh food, but any further development needs to complement FareShare's core operation. The context that is the best fit for FareShare in terms of increasing production is the Baguley model. In this context we use existing infrastructure, have access to fertile land, use bore and recycled water and get guidance from farmers.

Hopefully in time we can grow more food and increase community access to fresh food and to the skills and knowledge of small-scale food production.

5 FareShare garden manual

5.1 Garden volunteer guidelines (this is given to all garden volunteers)

- FareShare's Volunteer Code of Conduct and emergency contact details need to be read and completed by all FareShare volunteers. Contact the FareShare office (details below) if you have not already completed these.
- Volunteers who are new to FareShare may be interested in coming to visit and tour the FareShare kitchen in Abbotsford Australia's largest charity kitchen. This will assist you to understand how FareShare operates and how the kitchen garden harvest contributes to kitchen meal production. Please contact the FareShare office (details below) if you want to do this.
- If you are not able to attend your regular shift, then use the Volunteer Shift Change form online to notify FareShare. The form can be found at http://www.fareshare.net.au/volunteer-shift-change/. If you do not have access to the internet you can notify the FareShare office, details below.
- We ask that people don't do make up shifts at the Abbotsford and Moorabbin gardens. At the Baguley farm you are welcome to do make up shifts if you wish.
- Shift cancellation policy: If a garden shift is to be cancelled due to the weather, you will be notified by the FareShare office. We had a specific weather policy in the past that has caused some confusion for volunteers. Please refer to <u>www.bom.gov.au</u> to ensure that you know what the weather will be during your shift. If the shift is not cancelled, it is up to you to decide if you wish to come to your shift.
- There will be the option of doing general gardening jobs and there will also be the opportunity for volunteers with skills or interests to take on specific roles (within reason) that are self-directed within the gardens. Please discuss with the Garden Manager if you have a specific interest.
- Maximum of two garden shifts per week at any garden, there is the possibility of doing additional shifts with permission from the relevant supervisor.

Health and safety considerations

- If your body is in any way not suited to general garden tasks then please reconsider whether this volunteering opportunity is right for you. We kneel, bend, lift and work in most weather conditions.
- There are bees at all garden sites. Please bring your own epi-pen or other medication if you require it.
- Keep hydrated bring a water bottle.
- Manual handling: lifting don't lift anything that causes strain, lift with legs, never bend and lift, never lift and twist, never put excess pressure on spine.
- Smokers must smoke offsite or in designated areas.
- Minimise exposure to harmful microorganisms. Be cautious of potting mix, mulch, mould, anaerobic soil (soil without air), manure and compost.
- Use of any chemicals will be minimised but at times it may be necessary (organic growing principles are prioritised). Any potentially harmful substance will only be used by a person who has undergone training or who has extensive experience with the product. Volunteers will be notified when needed if any potentially harmful chemicals are used.
- Hygiene: Always wash your hands before eating and after doing gardening activities such as composting or mulching.
- Personal Protective Equipment:
 - It is your choice whether or not to wear gardening gloves but they do minimise exposure to microorganisms and small cuts. We recommend they be worn.

- Sturdy, flat, covered foot wear (such as work boots, gumboots or runners), suitable for tool use and strong enough to minimise damage (i.e. no forks through feet)
- UV protection: we recommend that you wear sunscreen, hat, sunglasses and clothing that minimises risk of sunburn.
- Please alert us to any issues that may affect your ability to perform certain duties in the garden, for example, allergies or physical restrictions.
- It is advisable to wear gloves and long sleeves when working with zucchini and celery plants. A number of people have had skin reactions as a result of coming into contact with these plants.

Holiday periods

- During end of term 1, 2 and 3 school holidays (government school holidays) regular shifts will not occur. The gardens are not closed for the majority of this time but a break in regular shifts is necessary.
- During the Christmas/New Year period there will be also be a two week break in regular shifts. Harvesting will occur during this period and these shifts will be open to all FareShare volunteers.
- People are welcome to take vacations for up to 8 weeks in a row without losing their place. Please use the Volunteer Shift Change form to notify FareShare of your vacation plans. The form can be found at http://www.fareshare.net.au/volunteer-shift-change/

Site specific considerations will be discussed when visiting the garden sites

Contacts

For administrative or general enquiries please contact FareShare on:

info@fareshare.net.au

9428 0044

1-7 South Audley Street, Abbotsford, VIC, 3067

For garden related matters contact:

Susie Scott

FareShare Garden Program Manager

susie.scott@fareshare.net.au

0449 079 127

5.2 Shift supervisor role

The Garden Shift Supervisor (voluntary role)

Having someone take responsibility for supervising a shift allows FareShare to increase the amount of food we grow. The shift supervisor role is suitable for people who are able to give clear instructions and work with a group of people in a positive way. This means the supervisor will need to communicate in a way that is welcoming and encouraging to all volunteers. Shift supervisors need to have experience working with people and ideally have gardening experience.

Shift supervisors access the garden and facilitate sessions by themselves, or co-supervise with another volunteer (ideally a handover period of at least four weeks, working alongside the garden manager will happen prior to taking on the responsibility).

Requirements of the role

Shift supervisors will need to commit to supervising (at a minimum) a regular fortnightly session

- Contact the FareShare office if the shift is cancelled for some unexpected reason, the office will notify volunteers
- Communicate with garden manager on an ongoing basis
- FareShare records all volunteer attendance so this would need to be fed back to the FareShare office before the end of the week. The FareShare office will email an attendance list, this needs to be emailed back to the FareShare office with a record of attendance
- If you have any concerns or issues relating to inappropriate behaviour arising please contact the garden manager or FareShare office straight away
- The safety of volunteers is a top priority, ensure that volunteers are working in a safe manner (all volunteers will have been given information relating to OHS in the FareShare gardens). If there are concerns notify the garden manager or FareShare office straight away
- Open the garden and prepare for the session at least 20 minutes before the session starts. Often someone will come early, if you have something specific you want them to do then let them know. If you are not yet ready to delegate jobs then let the person know you need time to prepare
- The garden shifts run for 3 hours. The general pattern is to work for 1.5 hrs, break for 30 minutes, and then work for close to an hour. Use the last 10 minutes of the shift to pack up
- Walk through the garden to ensure all tools are packed away
- The overall planning for the garden program and growing spaces will be organised by the FareShare Garden Program Manager along with Garden Site Managers and is directed by the needs of the FareShare kitchen
- Please go through the garden jobs checklist and add new jobs/or delete finished jobs on the whiteboard. Note finished jobs in the jobs notebook. If you need guidance with identifying garden jobs read the 'regular garden jobs checklist', **Appendix 5.6**, if still at a loss then contact the garden manager
- We aim to meet four times per year to go over processes, planning and feedback
5.3 Garden site manager role

The Garden site manager is responsible for coordinating the day-to-day management of the garden. This includes garden safety, shift administration, volunteer inductions and overseeing the tasks to be done in the garden.

Requirements of the role

In addition to overseeing garden safety, volunteer inductions and shift administration, garden site managers

- supervise and coordinate FareShare garden volunteers to plant and harvest crops, and assist with weeding, watering and other maintenance tasks as required
- manage the watering system
- maintain equipment as needed
- identify necessary jobs when the listed jobs are completed

5.4 How to run a garden shift

New volunteer induction (this may need to be overseen by site supervisor, site manager or long term volunteer)

Give new volunteers a tour of the garden. This can be done by any person who is familiar with the FareShare kitchen operation and is a regular FareShare garden volunteer. During the tour it would be ideal to go over:

- Site specific considerations: Emergency evacuation points (Abbotsford-end of platform; Baguley's-near figs; Moorabbin-shelter); First aid kit; Machinery? Bees? Other?
- OHS considerations: Lifting, straining, covered shoes
- FareShare (what we do, the reason we grow food, what we grow)
- Introduction to garden supervisor and regular volunteers
- Attendance/nonattendance; notify FareShare administration
- Cancelation of shift-if a shift is cancelled people will be notified
- General garden jobs
- Sign in process
- Morning/afternoon tea
- Location of tools/water/toilets/lockers
- Watering system/dripper lines/poly pipe on edge of beds (Vic Park and Moorabbin)
- Ask volunteers if they have read FareShare's Garden Volunteer Guidelines, located at **Appendix 1**

The basics

- Don't stand on the garden beds, compaction inhibits growth
- If you don't recognise it, don't pull it out
- Organic gardening practices are used wherever possible

Task management

• There will be a list of jobs to be done each day or shift, listed on the white board

Moorabbin (jobs list is updated by garden site manager Roger) Abbotsford (jobs list is updated by garden site manager Kit) Baguley Farm (jobs list is updated by garden manager Susie)

Cancellation of shifts

- If a supervisor needs to cancel a shift, please notify FareShare administration ASAP
- Notification ideally needs to be done by 4pm the previous day so that people can be advised
- If the weather forecast is unsuitable for Monday you can notify of cancelation for a Friday shift
- Cancelling for personal reasons is completely acceptable; please try to give FareShare administration as much notice as possible. The FareShare office will try to contact a back-up supervisor before cancelling a shift

5.5 Garden task breakdown

Weeding

Place weeds in the buckets and then add to the most recent compost. At Baguley's, weeds are placed on the garden beds. Plants such as ivy, running grasses and mint need to be left in the sun to die before adding them to the compost or pathways. Walk around the garden and identify areas that need weeding as a priority.

Harvesting

Vegetables that need to be harvested can be listed on the whiteboard. Have a walk through the garden to identify what is ready to be harvested.

General rules for harvesting:

- If a heavy vegetable is being harvested do not overfill the crates. Crates need to be able to be stacked correctly (they lock into each other). Stack no more that 4-5 crates high
- Two people should lift the crates when they contain heavy vegetables (carrot, pumpkin, turnip, zucchini)
- Make sure the crates are put together correctly, if they aren't the vegetables will fall out. If a crate is broken don't use it. When putting the crates together be careful not to pinch your skin
- Always store the harvest in a cool area when possible
- Minimise the damage to the plant whilst harvesting. Any damage will increase the possibility of rot
- Use a tool to harvest if necessary, clean after use. Use a wiper and methylated spirits
- Think about the order of harvest, for example anything that degrades quickly will be harvested last
- Don't compact the soil whilst harvesting
- Minimise unwanted matter heading to the kitchen Soil, mulch, inedible parts of the plant and insects
- Any above ground part of the plant does not need to be washed; the exception would be if there was a lot of soil. Any root vegetables need to be rinsed well

Process for harvesting and washing vegetables

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Harvest at a suitable time of day using black crates	Take off any organic matter that will not be utilised in the kitchen; this can be added to the compost or used as mulch e.g. carrot tops	First rinse any soil and mulch off	Second rinse	Place in clean black crates	Place crates in shady cool area for collection

Harvesting of priority vegetables

Vegetable	Description for harvesting
Capsicum	Capsicum can be harvested at any size but we are aiming for ones that are well developed. Organic capsicums grown outdoors are rarely as large as supermarket capsicums. Capsicums as large as, or larger than, tennis balls can be harvested. The exceptions are: if one is changing colour (harvest); good weather (and still green), can leave a bit longer
Carrot	A few carrots need to be pulled out to check the general growth. If well developed, then harvest. With small-scale plantings, larger plants can be harvested. With large-scale plantings or relatively uniform growth it makes more sense to harvest one bed at a time
Celery	Whole plants should be taken at once, cut at soil level. Celery has exceptionally uniform growth! Be prepared to harvest on mass if need be-insight gathered through hindsight
Eggplant	With the larger varieties don't be hasty to harvest. Feel the eggplant, if it is a little soft, then harvest. Eggplants should be glossy, if they are changing to a mat colour, then harvest. If the eggplants are of good size and still very firm they can be harvested
Leek	Harvest whole plant; the stems need to be at least 3cm diameter
Parsnip	As for carrots
Pumpkin	For storage purposes it is best to wait until the vine dies back. If the fruits are starting to rot or crack, harvest them. The orange colour of butternut pumpkins will darken as they mature. When cutting the pumpkins leave approximately 10cm of the stalk. When storing lay the pumpkins sideways so that moisture runs off
Silverbeet	Large leaves can be harvested on an ongoing basis. In general, don't take more than a third of the plant. Leafy greens should be harvested last
Sweet potato	Dig around as the weather starts to get colder. The plants will struggle in the cold and die back if there is a frost. Beds can be cleared once the growth is limited by the cold. Remember to save and propagate plant material
Turnip	Harvest larger turnips, they will be partially visible. The 'purple top white globe' variety can grow larger than a baseball. With large-scale plantings or relatively uniform growth it makes more sense to harvest one bed at a time
Zucchini	Zucchinis are prolific and will need at least twice weekly harvesting. The FareShare kitchen can use them at any size but prefers that the skin and seed have not hardened. It is best to not pick the small ones (under 20cms) so that they develop and yield more. Aim to harvest when 30-40 cm's long

Planting

- Always plant prioritised vegetables in the main planting areas. The garden programs manager will organise seed and seedlings. For example, as spaces free up over January, February, March and April we can focus on planting carrot, parsnip and turnip
- Plant at suitable times (not when hot or windy)
- Minimise damage to roots and stem, remove from pot carefully. Try not to hold stem
- Make sure plant and planting area are well watered, water in after planting as well
- Make sure the planting hole is the right size
- Bury plant to the depth it was in the pot (there are some exceptions)
- Make sure all potting mix is covered with soil
- Mulch around plant, keep mulch away from stem

Fertilising

When in doubt follow product instructions for application.

- Seaweed and fish concentrations there is flexibility with the quantities. Generally we put 2-4 capfuls in a nine litre watering can. This can water approximately 10m²
- Worm castings there is flexibility with the quantities. Generally we apply a large handful per square metre or apply a handful directly around plants. The castings need to be kept moist or the beneficial organisms will die. Make sure they are placed under mulch or watered in
- Blood and bone (use gloves) follow suggested application rates for vegetables
- Concentrated fertilisers (use gloves) follow suggested application rates for vegetables

Mulching

Mulching is essential for many reasons including:

- Minimising evaporation
- Minimising erosion
- Building up organic matter and soil life

Always mulch and cover bare soil where possible. Don't use woody material to mulch quick growing annuals. Straw is one of the best things to use. Mulch needs to be maintained: clear mulch away from plant stems and remove straw from paths and place around plants or on bare soil.

Ongoing garden maintenance (maintenance jobs such as cleaning the shed or fixing mulch will be listed on the whiteboard)

Compost (composting jobs will be listed on the whiteboard)

Plant nursery care

- Hot house and shade house: remove empty pots, diseased or stunted plants, dead leaves, consolidate healthy plants. Add used potting mix and other organic matter to most recent compost. See Appendix 5.8 for nursery specific Integrated Pest Management
- Rinse potting mix off pots
- Sieve compost. The fine material is used in potting mix (the larger material can be placed on the most recent compost)
- Potting mix can be made with sand and organic matter. The organic matter can be sieved compost or worm castings or a combination of both. Ratio of sand to organic matter 1:1, this is just a guide
- See Appendix 5.7 for a list of plants to propagate

Watering and irrigation lines

- A lot of pipe is underground at Vic Park and at Moorabbin. Please be aware of where the pipes are before digging! At Moorabbin it is best not to dig in the pathways outside of the beds
- At Vic Park poly pipe surrounds most of the planting blocks. In some cases it runs along the middle of the planting block

Abbotsford

The **water meter** is along the eastern fence near the FareShare sign. If there is a burst pipe, turn the valves off. They are located along the line closest to the portable. Note: the two Northern valves are for the Metro meter, please don't touch. Fix the problem if you can.

Blue-line pipe – If pierced it will need 32mm fittings/joiners specific to the type of pipe

Black poly line – If pierced it will need 25mm fittings/joiners

Dripper line – If pierced it needs 13mm fittings/joiners

- The shade house and hot house have automatic watering
- All wooden planter boxes and pots need to be watered by hose regularly (when needed)
- The two garden beds in front of the gate at northern end need to be watered by hose
- The front entrance area will need to be watered occasionally

Moorabbin

Water meter is just outside the western fence near the FareShare sign. If there is a burst pipe turn the valves off. The valves are close to the entrance, next to the closest raised bed. Fix the problem if you can (as above).

- Small raised planters and any beds without automatic watering will need to be watered by hose
- Indigenous plantings can be watered by hose when needed

Baguley Farm

There are three pumps that need to be operated. The system is complicated and anyone responsible for operating the pumps will have gone through the process multiple times. If there are any major issues contact Les Baguley. For issues like 'sprinklers not working' try to fix them before contacting Les.

Transportation of produce to the kitchen

Any issues with the harvest pick-up please contact Patrick Lanyon, if Patrick isn't available contact the garden program manager. It is best to let Patrick know as early in the day as possible if a pick up is needed.

Vic Park Garden Abbotsford: If people are willing to transport the harvest to the FareShare kitchen in their own vehicles, that's great! If no one is available, or the harvest is large, then the FareShare Ute can be used, or FareShare can arrange pick-up in one of the vans. To arrange a pick-up, contact Patrick Lanyon as soon as possible on the morning of the harvest.

Moorabbin Airport: Harvesting happens when needed on Tuesday and Thursday mornings. Pick-up is between 11am -12pm on both days. Note: It won't be assumed that a pick-up from Moorabbin Airport is always necessary. The supervisor will need to notify Patrick Lanyon. Unless the weather is cold, place the harvest in the shade under the shelter.

Baguley Farm: Harvesting happens when needed on Tuesday, Thursday and every second Friday. Pick-up is between 11am -12pm on both days, directly from the Clayton Rd side of the farm unless otherwise notified. It will always be assumed that a pick up from the Baguley's is necessary. Produce can be stored in the cool room, but the size of the harvests usually means loading produce is best done during shift times so that there are people available to help. Place excess produce under the trees near the shed (with crates in it), cover with a tarp.

Using the FareShare Ute

FareShare needs to have a photo of the driver's license for our records. There is also a 'processes and procedures' document that people need to sign if they are delivering to the FareShare warehouse (Patrick Lanyon has this). **Any fines are to be paid by the driver**.

Reason	Primary Contacts	Secondary Contacts	Contact Details
Garden program enquiries Garden site enquiries	Susie Scott		Susie Scott FareShare Garden Program Manager <u>susie.scott@FareShare.net.au</u> 0449 079 127
Volunteering enquiries Attendance Contact details Shift cancellations Incident reporting General FareShare inquiries	FareShare office (you will be passed on to an appropriate person)	Ask for Emmy Hickman or Kirsty Sheppard	FareShare Administration: info@FareShare.net.au 9428 0044 1-7 South Audley Street Abbotsford
Harvest pick up Crate requests Supplies running low	Patrick Lanyon	FareShare office	Patrick Lanyon Logistics Manager 0425 112 225 <u>patrick.lanyon@FareShare.net.au</u>

FareShare contacts for supervisors

5.6 Garden task templates and checklists

Regular Gardening Jobs checklist	
Watering	Do the plants need watering? Are plants being over/under watered? Are there patches that are drying out? Do plants need to be hand watered?
Harvesting	What needs to be harvested? What is the best order to harvest? (Harvest things that are quick to perish last). Never overfill crates-they need to be stacked, always place harvested vegetables in the shade
Fertilising	Do plants need a feed? Wear gloves when spreading the fertilisers. Follow recommended application rates
Mulching	Do areas need to be mulched? Does mulch need to be cleared from stems? Can excess mulch be raked from paths?
Planting	What needs to be planted?
Worms	Do the worms need food? Are they too hot/cold/wet/dry. Do some of the castings need to be removed? If worms are looked after by designated persons then please leave
Compost	Can the compost be added to the garden beds? Does the compost need maintaining? If garden has compost jobs notice board, then follow direction
Weeding	What needs to be weeded? Place a bucket (at Baguley's place a hoe) in that area
Pest management	Are any crops damaged? Try to work out what/why. Try to Minimise damage- remove diseased plants, control pests
Propagation	What needs to be propagated? If garden has propagation jobs notice board, then follow direction
General maintenance of crops	Does any growth need to be managed? Pumpkin vines trained? Sweet potato runners layered? Dead leaves composted? Mulch removed from stems? Stake plants?

Daily jobs template

Garden jobs	Today?	Comments
Composting		
Watering		
Fertilising		
Harvesting		
Mulching		
Planting		
Plant maintenance		
General maintenance		
Weeding		
Propagation		
Pest management		
Worm farm care		

Garden jobs: fo	ur week cycl	e (four shift	s per week –	a guide only)			
	Week		Week		Week	Week	
Composting							
Fertilising							
Harvesting							
Mulching							
Planting							
Plant maintenance							
General maintenance							
Weeding							
Propagation							
Pest management							
Worm farm care							

5.7 Plants – propagation, planting and planning

List of plants for propagation

Initially propagation was aimed at supplying plants for the FareShare gardens. Due to the expansion of the growing spaces FareShare cannot propagate a reliable and sufficient supply. FareShare has also received large amounts of seedlings from Metropolitan Remand Centre, Burnley-Melbourne University and currently we have a relationship with Boomaroo Nurseries who have committed to supplying all our current seedling needs. Now the focus with propagation is to grow hardy, popular herbs and edible plants that can be passed on to schools and community groups for free. The plants will also be available to the public by donation.

Propagation	n List															
The plants b the FareSha community	elow will be propag re gardens, some w groups and others v	gated, some will vill be given to so will be sold for d	be planted in chools and lonation	Planting Period (from Gardening Australia Veggie Guide; Mag S. Vegetables growing guide; Diggers; word of mouth)												
Need to propagate /Amount needed	Common name	Propagation method; Seed = S; Division = D; Cutting = C	Scientific name	Jan	Feb	Mar	Apr	May	unſ	lul	Aug	Sep	Oct	Νον	Dec	
	Basil	S	Ocimum basilicum													
	Chilli	S	Capsicum frutescens													
	Chives	S; D	Allium schoenoprasum													
	Comfrey	D	Symphytum sp.													
	Lemon Balm	S	Melissa officinalis													
	Mint	D;C	Mentha sp.													
	Okra	S	Abelmoschus esculentus													
	Oregano	D;C	Origanum vulgare													
	Parsley	S	Petroselinum crispum													
	Pineapple sage	С	Salvia elegans													
	Rosemary	С	Rosmarinus officinalis													

	Sage	С	Salvia officinalis						
	Silverbeet	S	Beta vulgaris var. cicla						
	Spring onion	S	Allium cepa						
	Sweet potato	C (tuber can)	lpomoea batatas						
	Thyme	С; D	Thymus vulgaris						
	Tomato	S	Lycopersicon esculentum						
	Vietnamese mint	C; D	Persicaria odorata						
	Water Spinach 'Kang Kong'	С	lpomoea aquatica		?				
	Yarrow	D	Achillea millefolium						
Indigenous gr	roundcovers								
	Creeping Boobialla	C,D	Myoporum parvifoloium						
	Creeping Saltbush	S,C, layer	Atriplex semibaccata						
	Cut leaf Daisy	С	Brachyscome multifida						
	Pigface	S,C,D	Carpobrotus modestus						
	Ruby saltbush	S,C	Enchylaena tomentosa						

Prioritised planting schedule

Common name and propagation method	Scientific name	Family	Harvest : Weeks (Gardening Aust, website)	Harvest : Weeks (Mager, S. Vegetables growing guide)	Agricultural estimates: Yield	Hq	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Νον	Dec
Capsicum (Boomaroo donating, 50 cm apart, rows 50cm apart)	Capsicum annum	Solanaceae	12	10 to 16	24 T/Ha; (VegGrow AG1390)	5.5-7												
Carrot (direct seed, approximately 6mm deep, thin to 5cm, rows 30cm apart)	Dacdus carota	Apiaceae	10	12 to 16	42 T/Ha; (VegGrow AG1390)	6 to 6.8 (will tolerate higher and lower)												
Celery (Boomaroo donating)	Apium graveolens	Apiaceae	12 to 14	18 to 24	50 T/Ha; (VegGrow AG1390)	6 to 7												
Eggplant (Boomaroo donating, 50 cm apart, rows 50cm apart)	Solanum melongena	Solanaceae	14	14 to 16	9-15 T/Ha; (AG0124)	5.5 to 6												
Leek (Boomaroo donating, 20cm apart, rows 20cm apart)	Allium ampeloprasum	Amaryllidaceae	16 to 22	12 to 20	16 T/Ha; (VegGrow AG1390)	pH 6 to 7.5												
Parsnip (direct seed, approximately 6mm deep, thin to 10cm, rows 30cm apart)	Pastinaca sativa	Apiaceae	14 +	18 to 20	27.3 T/Ha; (VegGrow AG1390)	рН 6-7												
Pumpkin - Butternut (Boomaroo donating, 1m apart)	Cucurbita sp.	Cucurbitaceae	12 +	14 to 16	10-25 T/Ha butternut; 20-40 T/Ha- other (AG0283)	tolerant to 5.5												

Common name and propagation method	Scientific name	Family	Harvest : Weeks Gardening Aust, website)	Harvest : Weeks (Mager, S. Vegetables growing guide)	Agricultural estimates: Yield	Ha	Jan	Feb	Mar	Apr	May	nn	InL	Aug	Sep	Oct	Nov	Dec
Not a priority- Silverbeet (direct seed, can seed in hothouse)	Beta vulgaris var. cicla	Amaranthaceae	6+	8 to 12	14 t/ha (DPI NSW)	5.8-7												
Sweet potato (stem cuttings- Baguley's, plant 50-60cm apart, rows 1m apart)	Ipomoea batatas	Convolvulaceae	4-6 month s (in gener al)		20-30 T/Ha (WA)	5.8-7												
Turnip (direct seed, approximately 6mm deep, thin to 10cm apart, rows 20cm apart)	Brassica rapa var. rapa	Brassicaceae	4 to 10	10 to 12	25-40 T/Ha (WA)	5.2-6.2												
Zucchini (Boomaroo donating, 1m spacing)	Cucurbita pepo sp.	Cucurbitaceae	6 +	8 to 14	12-18 T/Ha (AG0259)	6-6.5												

Crop record and rotation planning

The template below was initially used but currently the recording is just focusing on the bare essentials. These being: planting area, plant, plant family and date sown.

1st Crop)									2nd Cro	0
Planting Block (Area = A)	Garden Bed Number (B)	Plant Name, Variety, Seed Company	Plant Family	Planting Date	Harvest Date	Yield, best Estimates	Actual Yield	Comments: Pests, diseases, deficiencies	Comments: Growth	Planting Block (Area = A)	Garden Bed Number (B). Potential crops

FareShare now uses a simplified Excel spreadsheet to record crops and rotation planning.

1	A.	B	E.	D	E	E.	G	н	<u> </u>		K.:
1	in g	round	Next crog, si	abject to change	2	0			Bagaley (rop rotation	v
2	Planting Block (Area=A)	Garden Bed Number (B)	Plant Namé, Variety, Seed Company	Plant Family	Planting Date	Plant Nome, Variety, Seed Company	Plant Family	Planting Date	Plant Name, Variety, Seed Company	Plant Family	Planting Date
-	Gorden beds near car perk	5-N 1	Zucchini	Cucurbitaceae	25/10/16- seeded again	Carrier 'Stefanio Precision' F1 from Les	Aplacese	18/05/17	Swnet		
4			2 Zucchini	Cucurbitaceae	25/20/16- seeded again	Carrot 'Stefano Precision' F1 from Les	Apiaceae	18/05/17	Sweet		
5			1 Zucchini	Cucurbitaceae	25/10/16- seeded again	Carrot 'Stefand Precision' F1 from Les	Apiaceae	18/05/17	Sweet		
6			Zucchini	Cucurbitaceae	25/10/15- seeded again	Parsnip 'Melbourn e White' from Les	Аріасеае	18/05/17	Sweet potato		
					25/30/16-	Parsnip 'Melbourn					

Indigenous and native plants list for Abbotsford garden

Indigenous and native plants were planted around the fence line and on the edges of the beds. They add diversity and attract native fauna. They also provide various other functions in the garden such as; wind break, screen, groundcover, erosion control and water and nutrient capture. The information below came from Melbourne Water's advice on grey water plants and the 'Flora of Melbourne'

Indigenous and native Plants	Plant type and growth habit	Growing conditions Flowering times	Tolerances	Placement	Propagation
Billardiera scandens Family- Pittosporaceae Apple berry Native	Vine – light climber. Stems up to three metres long. In an open position the form may take that of a small shrub to 1.5 m high. Fruit can be eaten	Flowers- Green-yellow, June to January		Fence, shady areas, damp areas (needs well drained soil)	Seed, cuttings
Clematis aristata Ranunculaceae (or buttercup) Australia Clematis; Goatsbeard, Old Man's Beard Native (grew further upstream)	Vine - vigorous climber, dioecious	Grown in a position with some overhead shade and in deep cool soil, well drained soil Flowers August to March		Fence, shady areas, damp areas (needs well drained soil)	Fresh seed sown in the summer. Semi- hardwood cuttings.
Clematis microphylla 52 Ranunculaceae (or buttercup) Small Leafed Clematis Indigenous	Vine- Variable medium sized climber, dioecious Taproot traditionally cooked and eaten	Full sun, well drained soil Flowers Sept-Oct	Compacted soil	Fence, full sun (needs well drained soil)	Fresh seed sown in the summer. Semi-hardwood cuttings.
Hardenbergia violacea Fabaceae Native (or false) sarsaparilla; Purple coral pea Indigenous	Vine- Fast growing dense creeper or wiry scrambler	Flowers- mauve or purple, July to November		Fence, (needs well drained soil)	From seed, requires pre-treatment to break the physical dormancy, abrasion or water. Semi- hardwood cuttings.
Atriplex semibaccata Chenopodiaceae Creeping Saltbush	Ground cover- 10-30cm-1-3m, open grey spreading perennial shrub, dioecious Seeds used to be eaten	Flowers most of the year peaking Nov-Feb	Salt Wind Seasonal waterlogging	Edges of bed, can be in moist areas- not water logged.	Seed, cuttings from firm new growth, layering
Brachyscome multifida Asteraceae Cut leaf Daisy Native	Ground cover- Perennial herb 10-40cm by 20-100cm	Full sun Flowers most of the year peaking spring and summer	Moist clay soils	Edges of bed, moist areas	Stem cutting
Carpobrotus modestus Aizoaceae Pigface Indigenous	Ground cover- Perennial succulent, prostrate 1-3m Fruit and leaves eaten raw- leaves sometimes cooked	Needs well drained soils Flowers- purple, Aug to Jan	Salt Drought	Edges of bed, well drained areas	Seed, cutting, division of layered stem

<i>Kennedia prostrata</i> Fabaceae Running postman Indigenous	Ground cover- prostrate 1- 2.5m Nectar was traditionally sucked out	Needs well drained soils Flowers scarlet, Apr-Dec	Drought	In clump near front	Scarified seed, cuttings
<i>Myoporum parvifoloium</i> Scrophulariaceae Creeping Boobialla Native	Ground cover- 1-6m x 3m Edible green to purplish drupes	Needs well drained soils Flowers- white, aromatic, Nov- Feb	Drought	In areas where it can spread along the ground	Cutting, division at nodes
Poa labillardieri Poaceae Common Tussock Grass Indigenous	Perennial tussock grass .38m	Moist or slightly dry soils Flowers Oct-Feb	Drought	Edges of garden, can also go along fence	
<i>Dianella revoluta</i> Liliaceae Indigenous	Tufted perennial Berries can be eaten	Moist well drained soil Flowers Aug-Jan	Most conditions- needs drainage	Edges of garden, alongside of platform	Fresh seed, division
<i>Lomandra longifolia</i> Xanthorrhoeaceae Indigenous	Large tussock plant, perennial. Base of <i>L. longifolia</i> leaves were eaten.	Flowers Sept-Dec, male and female plants	Dry conditions, range of soils	Edges of garden, in moist areas	Seed, division
<i>Themeda triandra</i> Poaceae Kangaroo Grass Indigenous	Perennial tussock grass .475m	Wide spread grass Flowers Sep-Feb	Most soils, soil needs to drain	Edges of garden, tolerates moist areas, can also go along fence	Seed, division
Carex Appressa Cyperaceae Tall sedge	Tufted perennial sedge.5-1.2m x .5-1m	Riparian areas Flowers Aug-Jan	Flooding	Grey water beds, around drain, in boggy areas	
Isolepis nodosa Syn; Ficinia nodosa Cyperaceae Knobby Club-rush	Tufted perennial rush .5-1.5 x .6-2m	Riparian areas	Flooding Dry periods once established	Grey water beds, around drain, in boggy areas	
Juncas amabilis Juncaceae Hollow Rush Native	Tufted perennial rush .2-1.2 x .25m	Riparian areas Flowers Nov-May	Flooding	Grey water beds, around drain, in boggy areas	
Juncas flavidus Juncaceae Yellow Rush Native	Tufted perennial rush .4-1.2 x .2-1m	Riparian areas	Flooding	Grey water beds, around drain, in boggy areas	

5.8 Integrated Pest Management (IPM) toolkit

This toolkit is largely the work of Soraya Nour who works in the field of Integrated Pest Management. She has created the first four resources in this section. Soraya has run workshops for the FareShare gardens and is available to share her expertise.

Toolkit contents

Scouting overview IPM Field sheet IPM Nursery field sheet IPM Scouting summary Sheet IPM Plant susceptibilities IPM Pests and diseases

Scouting overview

The purpose of scouting is to get an overview of the general pest and disease pressure in the garden, and decide whether it is causing enough production loss, or risk to the garden health to justify action. It's an ongoing process- ideally it will be checked weekly to track trends. IPM aims to keep a garden in balance- this relies on identifying any potential issues before they become major problems. To do this, walk through and look at the plants and see what we can identify, then look at what action is needed

Equipment needed

- Hand lens
- Ribbon for marking suspicious plants
- Tubes for catching unknown insects for ID
- Sandwich bags for plant samples
- Knife for cleanly cutting samples
- A field sheet printout & pen
- Ideally, a microscope for looking in detail (nice but not necessary)

Scouting procedure- garden crops:

- Do a detailed visual inspection of plants.
- Look on top of leaves for feeding marks (holes from chewing insects, or discoloration from sucking insects)
- Look on top of leaves for insect/skins or honeydew
- Look at whole plant for wilting, brown or yellow marks on stems or leaves
- Gently turn leaves over, look underneath for insects

- Always check gently in the plant heads/curled new growth for insects, and in any blossoms. The best way to do this is to blow gently and see if anything moves!
- Record anything seen on field sheet. If you can know what it is, write the name. Check the surrounding plants is it just on one plant or in the entire section? If multiple plants, try to estimate a percentage of plants in the garden bed with symptoms.
- If you find something you are unsure about, mark the plant and write a short description on the field sheet. If possible, take a sample of plant or insect.
- If you identify an insect, try to see if there are multiple life stages around (e.g. eggs, pupae, adults) this is important information for management
- If you see any beneficial insects that look like they might be parasitizing or feeding on pest insects

Pest and disease management questions (after revising field sheets)

Insect problems

- Are the insects found feeding on the plants? Are they doing damage (especially to fruit or new growth)? If it is an ongoing problem is it going up compared to last week, down, or stable?
- What life stages of the insect are there?
- Are there good bugs about that might be controlling the problem? What are the ratios like?
- Is there anything we can do to help the good-bad bug ratio?
- Is there some kind of 'soft' spray we can use? What are the pros and cons of potential treatment?

Fungal problems

- Is it a new problem? If pre-existing, is it up or down?
- Is it mostly active or stressed (tip- use your hand lens and look at the hairs)
- If downy or powdery mildew, is it helpful/possible to remove leaves?
- Is it possible/advisable to remove highly infected plants?
- Is crop work or watering schedule contributing to problem? If so, can it be altered?
- Is there a 'soft' spray treatment that can be used? What are the pros and cons?

Diseased plants

- What is the risk of spreading?
- What is the risk to production if disease does spread?
- What could be increasing the risk of spreading (e.g. crop work, insects)?

Cultural controls to be possibly implemented to minimise/contain problems

Cultural controls for garden

- Don't harvest/remove leaves in afternoon and try to make sure any cuts on plants are 'clean'- reduces risk of Botrytis/Fusarium and other fungal diseases
- If you have known problems, try to make sure that people aren't moving from infected areas into 'clean' parts of the garden- mites, etc, are easily spread on clothes
- If you find any plants with a bacterial disease (spot on leaves/fruit, do 'ooze' test) remove plants immediately. Don't compost these plants, dispose of them in bags they can be very contagious. Wash any equipment that has been in contact with plants in the area well.
- Try to minimise weeds around beds
- If one area of the garden is showing higher beneficial, i.e. aphidius, potentially 'transplant' some to other parts of the garden to get better distribution throughout site.

Cultural controls for nursery

- Mark which seedlings are coming from different batches of seeds- very important for tracking mosaic virus, etc.
- Check all plants well before planting- easier to discard than to risk problems getting into soil
- Any plants with suspected root knot nematodes (stunting, wilting, nodes on roots) should be removedthey will be almost impossible to treat and will spread if they are planted into beds. Suspected plants should not be added to compost.
- Where possible, don't have people working in garden then coming into nursery.
- Try to keep secateurs, gloves, etc., that are only used in the nursery

Date		Scout			Crops che	ecked
		50040				
Live Insec	cts? Diseases (fungal	, viruses)î	P Deficiency	? Weed bu	uild-up?	
Garden	Name of	Type of crop	Location	#/%	Feeding	Comments: Location of plant/general health of plants
number	known - or draw and describe	or crop		plants		

IPM nursery field shee	t					
On leaves/stems						
		Y/N	Level	# plants		
	Whitefly				Encarsia?	y/n
	Caterpillar					
	Aphids				Aphidius?	y/n
	Russet mite					
	Spider mite					
	Caterpillar					
	Black flies					
	Other insect (describe below)					
	Powdery mildew					
	Downy Mildew					
	Wilting					
	Stunting					
	Mottled leaves					
	Yellowing leaves					
	Dead spots					
	Other (describe below)					
On roots	Larvae/maggots					
	Small lumps (nematodes?)					
	Brown/black tips on roots					
	Brown roots					

Scouts Issue Description #/%/level of damage Suggested action F Number Image Image <th>Date:</th> <th></th> <th></th> <th></th> <th></th> <th></th>	Date:					
Bed Crop Issue Description #/%/level of damage Suggested action F damage damage	Scouts					
Number house beschption hy where on baggested action of damage dama Amage damage damag	Rod	Crop	Issue Description	#/%/loval of	Suggested action	Follow
	Number	Сгор	issue Description	damage	Suggested action	date

IPM plant susceptibilities

Vegetable	Root and Tuber Pests	Leaf and Stem Pests	Fruit and Pods Pests	Vegetable	Root and Tuber Pests	Leaf and Stem Pests	Fruit and Pods Pests
Capsicum		Powdery mildew Aphids Botrytis Red spider mite White fly	Blossom end rot Corn earworm Bacterial soft rot	Pumpkin	Stem and root rots	Cucumber mosaic virus Powdery mildew Slugs and snails	Fruit set failure
Carrot	Bacterial soft rot Nematodes Bolting	Aphids Downy mildew Powdery mildew		Silverbeet		Leaf spot (fungal) Leaf hopper Leaf miner Bolting	
Celery	Bacterial soft rot Nematodes Bolting	Aphids Caterpillars Downy mildew Powdery mildew		Sweet Potato	Bacterial soft rot	Aphids Red spider mite White fly	
Eggplant		Aphids Downy mildew Red spider mite White fly Verticillium wilt	Botrytis Slugs	Turnip	Clubroot Cutworm Wireworm Slugs and snails Bolting	Downy mildew Powdery mildew Flea beetle	
Leek		Aphids Powdery mildew		Zucchini		Cucumber mosaic virus Powdery mildew Slugs and snails Red spider mite White fly	Bitter fruits Poorly formed fruits Slugs
Parsnip	Bacterial soft rot Parsnip canker Bolting	Downy mildew Powdery mildew Red spider mite					

IPM pests and diseases

	•			
Image	Pests and Diseases	Plants affected	Symptoms	Potential strategies - from within the IPM
				framework
				- Mechanical/physical?
				- Biological?
				- Chemical?
				- Cultural?

*Information sourced mostly from 'Fruit and vegetable gardening in Australia' Michael Pollock 2004

Aphid - sap sucking insect about 2mm long, multiple colours. They also transmit diseases	Most crops: Capsicum; Eggplant; Sweet potato	Reduced growth, leaf distortion, can cause sooty mould	 mechanical/physical: if small area it's possible to hose them off biological: ladybug, lacewing, wasps (aphidius) chemical: pyrethrum, white oil cultural: encourage beneficial insects, remove weeds that are hosts, monitor and act quickly
Bacterial soft rot - bacteria	Fleshy parts of vegetables: Capsicum; Carrot; Celery; Parsnip; Sweet potato	Soft slimy rotten flesh, can occur in growth and storage	- cultural: don't over water, improve airflow, improve soil drainage

Bolting - usually caused by exposure to low temperatures at critical growth stage	Many crops are affected: Carrot; Celery; Parsnip; Silverbeet; Turnip	Premature production of flowers and seeds	- cultural: avoid early varieties that are prone to bolting
Blossom end rot - Calcium deficiency and inconsistent watering	Capsicum	Sunken patch at blossom end of fruits, skin at base turns leathery then black or brown	 mechanical/physical: remove infected fruits chemical: make sure calcium levels are sufficient and accessible cultural: ensure consistent water supply
Botrytis - Fungus, spread by water splash and air currents	Capsicum; Eggplant	Grey/off white/grey - brown fungal growth	 mechanical/physical remove plant debris cultural: don't use overhead irrigation, use mulch to minimise water splashing
Clubroot - Soil borne slime mould	Brassicas including turnip	Swollen and distorted roots, pale and chlorotic foliage	 mechanical/physical: burn infected plants biological chemical cultural: improve drainage, source seedlings with resistance or from reputable source, remove hosts (wild radish, shepherds purse)
Caterpillars	Many fruit and vegetables		 biological: Wasps, organic applications with BT (soil organism) cultural: encourage beneficial insects and birds

	Cucumber mosaic virus	Many plants including: Pumpkin; Zucchini; Eggplant	Stunted and deformed plants, leaves have yellow mosaic pattern	 mechanical/physical: destroy infected plants, clear weeds cultural: control aphids and other insects that spread the virus, remove host plants
	Cutworm - Soils dwelling caterpillar	Brassicas including turnip: Leek: root vegetables	Young plants will and die, roots can have cavities	- mechanical/physical: can sift soil near infected plants, control weeds
Downy Mildew Powery Mildew	Downy mildew - Range of fungi	Many crops: Carrot; Eggplant; Parsnip; Turnip	Yellow or discoloured areas on upper leaf, corresponding grey/purple fungal growth underneath leaves	 mechanical/physical: remove infected leaves, remove weeds cultural: improve airflow, don't use overhead watering, don't plant too densely
	Earwig - insect	Many fruit and vegetables	Holes in stems, flowers, leaves, adults will creep into split fruit	- mechanical/physical: Newspaper traps - cultural: clean up debris
	Leaf hopper - sap sucking insect, transmits diseases	A lot of plants	Mottled leaves	- chemical: pyrethrum

Leaf miner - larvae of wasp, beetle, moth, sawflies	Wide range of crops affected	White lines on the leaves caused by tunnelling larvae	- mechanical/physical: remove affected parts
Leaf spot - Range of fungi	Silverbeet; Celery	Grey or brown spots	- mechanical/physical remove infected leaves and debris
Parsnip canker - Fungus	Parsnip	Cankers appear on the root, usually red/brown, orange/brown or black	 mechanical/physical biological chemical cultural: Ensure good soil drainage, grow resistant cultivars, minimise damage to roots
Powdery mildew - Various fungi	Many crops are affected	White fungal growth, first on upper leaves	 mechanical/physical: remove infected leaves, remove weeds chemical: suitable fungicides such as Sulphur. Milk and water 1:10 applied as a preventative cultural: improve airflow, don't use overhead watering, don't plant too densely
Red spider mite	Many crops are affected: Capsicum; Eggplant; Parsnip; Sweet potato; Zucchini	Foliage has silvery sheen and loses green colour, mites will be visible, webbing will be visible with heavy infestation	 biological: predatory mite cultural: humidity suppresses spider mite

TEALTHY INFESTER	Root knot nematode - microscopic eelworm	A wide range of root crops	Failure to grow well, poor foliage colour, root swellings	- mechanical/physical: remove affected plants
	Slugs and Snails	Many crops including: Celery; Eggplant; Pumpkin; Turnip; Zucchini	Irregular holes, all parts of above ground growth are eaten, trails are visible	 mechanical/physical: (small - scale) create places for snails to hibernate then destroy them; remove by hand; place sawdust/eggshells around gardens biological: birds chemical: Copper tape, yeast traps (vegemite or beer), organic snail pellets cultural: remove debris
	Verticillium wilt - Fungus	Eggplant	Plant foliage wilts, leaves may turn yellow between veins and die	 mechanical/physical: remove infected plants cultural: no affective control, try new species
	White fly - Small sap sucking insect, can transmit diseases	Brassicas; Capsicum; Eggplant; Sweet potato; Zucchini; Pumpkin	Infestations are on the underside of leaves, excreted sap causes sooty mould	 biological: Wasp (Encarisia formosa) chemical: Insecticidal soaps, pyrethrum
Wireworn Lave Rick Betie Felse Wreevern	Wireworm - Larval stage of click beetle	Root vegetables and seedlings	Seedlings severed just below soil level, tunnelling in root vegetables	- cultural: dig up root vegetables as early as possible

5.9 Garden designs



1 FEB 2016 A3 1:400 FRHESHARE FRAM LULUE ST COLUMISMOOD 3067 PLANTING PLAN POG

Abbotsford

The initial garden design was based on advice from Chris Williams and Peter May (Burnley, Melbourne University). The aim was to maximise the growing space and create 'paddock like' growing areas. The garden was developed with ongoing advice from Burnley and other professionals and volunteers involved in the development of the garden. This process was guided by the Garden Program Manager.

Garden beds

- Size: 1.2m wide, at least 40cm height, length depended on size of area
- Pathways 60cm
- In the end 70 garden beds were formed by volunteers, a huge effort!

Process of making the garden beds

- Sandstone layer (gently sloping towards pathway)
- Plastic layer, builders plastic
- Soil dumped, levelled with the machinery, beds forked and shaped
- Woodchips placed around garden beds
- Reticulation/irrigation
- Straw mulch on beds



01/16 Sandstone layer: Excavators were unable to shape the requested earthworks due to the waste that had been dumped on the site over the years. As a result approximately 530m³ of sandstone was laid down. The sandstone layer delivered a number of benefits:

- A layer was created between the existing site and the growing media
- A raised area that deflects the runoff from the existing site was created
- Gentle slope towards the inner driveway which controls run-off from the garden beds
- Flat surface area that decreases the chances of puncturing the layer of plastic

Plastic layer

Due to the existing site soil having potential contamination there needed to be an impermeable layer between the ground and any topsoil that was bought in. A layer of builders plastic was put on top of the sandstone. Whilst the plastic layer helps to retain water it can create a layer of anaerobic soil. The plastic was placed on a slight slope but if replicated the angle of the slope should be steeper.





02/16 1. Mounds of soil

2. The first volunteer shift, making the garden beds



02/16 Plastic layer, gravel drive

02/16 Woodchips

03/16 Last of the soil mounds

Soil

Approximately 400m³ of soil was purchased to make the garden beds. The soil mix was 70 per cent topsoil, 20 per cent compost, 10 per cent chicken manure.

The soil has a very high sand content.

Benefits of sandy soils:	Disadvantages of sandy soils:	
Good root growth and penetrationGood drainage	Low water retention, soil dries quicklyLow nutrient retention	

The soil has high levels of organic matter (OM).

Benefits of Organic Matter:	Disadvantages of OM:
 Nutrient retention Nutrient provision Water retention Good root growth and penetration Increased soil fertility Increased soil microbiology 	 High levels of nitrogen can be unsuitable for root crops (increases vegetative growth instead of root growth) If not decomposed can burn crops





02/16 Getting there

02/16 Garden beds



03/16 70 garden beds are finished and, irrigation is working

Woodchips

We brought in 160m³ of leaf mulch/wood chips, over four loads on separate dates. We were advised by Burnley to use the woodchips as edging rather than a wooden barrier.

The benefits of woodchips:	Disadvantages of woodchips:
 Hold the soil and garden beds in place Drainage in the pathways Capture rainfall Capture nutrient and water runoff Create an environment for fungal growth Worms have proliferated in the woodchip pathways 	 Nitrogen drawdown, to breakdown the woodchips microorganisms may use nutrients from the soil The woodchips are a home for earwigs

Gravel

Laid along the vehicle track and ramp. 78t of gravel laid.

The benefits of gravel:	Disadvantages of gravel:
Vehicle track Drainage	• The gravel has compacted a lot and now and doesn't slow the run off anymore
Slow down and Minimise runoff	 gravel and concrete contribute to heating urban environments
Clear pathway	

✓ The first plantings of seasonal vegetables at the Abbotsford site were parsnip, zucchini, carrot, turnip, silverbeet and parsley.

Moorabbin

The design of the Moorabbin site was overseen by Goodman. FareShare had very little input into the garden design and initial development of the site. Goodman and Moorabbin Airport Corporation (MAC) called on a number of companies to implement various stages of the design. FareShare hand loaded most of the soil and put the shelter and greenhouse together.

Citywide now do regular site maintenance on the areas outside the raised gardens. Herbicide is used to control the weeds as hand weeding was not a viable option. The only large tree on site was taken down by MAC as it was partly rotten and seen as a liability. Amazingly, the resident bee hive that inhabited the space long before FareShare is still living in the trunk and helping to fertilise our crops.



Baguley Farm

The infrastructure at the farm was put in years ago and is designed based on maximising growing space and being able to utilise the space in an efficient manner. The water comes from catchment of rainfall, recycled water and also from bore water. Mains water is connected but is only used if absolutely necessary, we haven't had to use it yet. The cost of production would increase greatly if we had to start using mains water. Synthetic and organic fertilisers are used at this site. Initially the plan was to only use organic inputs, but the scale of the growing and FareShare's focus on production has meant that we started using chemical fertilisers that are made available at no financial cost to FareShare.



5.10 References and picture credits

General references

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Soil Health Card information can be downloaded from:

http://www.dpi.nsw.gov.au/agriculture/soils/testing/health-card

Picture credits

Page	Caption	Credit
Cover photo	FareShare volunteers at the Abbotsford kitchen garden	Lucy Farmer
Page 4	First carrot harvest at Abbotsford with Jennie and Catherine	Susie Scott
Page 5	Ashleigh, Matthew, Darcy and Stefanie with a Moorabbin haul	Lucy Farmer
Page 6	The garden at Victoria Park, Abbotsford	Susie Scott
	Turnip harvest with Roger at Moorabbin	
Page 7	Sue, Terry, Pauline and Beth sowing seeds at Baguley Farm	Susie Scott
Page 7	Carlos handles the harvest from Baguley Farm	Susie Scott
Page 9	Emily putting the harvest to good use in the FareShare kitchen	Adrian Lander
Page 11	Turnip and parsnip harvest at Abbotsford	Ali Morrow
Page 14	Kit with a giant sweet potato at Abbotsford	Lucy Farmer
Page 19	Tirelle, Laura and Colin manage the worm farm at Abbotsford	Susie Scott
Page 21	Thinning out turnips at Abbotsford	Susie Scott
Page 22	Zucchini, turnips and capsicum at Abbotsford Kitchen Garden	Ali Morrow
Page 24	Compost bays at Abbotsford	Kersti Nogeste
Page25	Compost from the kitchen	Lucy Farmer
Page 28	Our compost manager John is very hands on	Susie Scott
Page 29	Kitchen volunteers bringing compost buckets to the garden	Adrian Lander
Page 33	Phil inspecting the sweet potato crop at Baguley Farm	Susie Scott
Pages 66-68	Abbotsford garden establishment	Susie Scott
Page 70	Celery plants donated by Boomaroo Nursery	Susie Scott
5.11 Contact details

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