



Food and Agriculture Organization
of the United Nations

Improving the Nutrition of Syrian Refugees and Host Communities Through Garden Walls

Antoun Maacaroun

Antoun.Maacaroun@fao.org

FAO - National Agricultural Consultant



Food and Agriculture Organization
of the United Nations

Link to Final Report:

<http://data.unhcr.org/syrianrefugees/admin/download.php?id=11801>



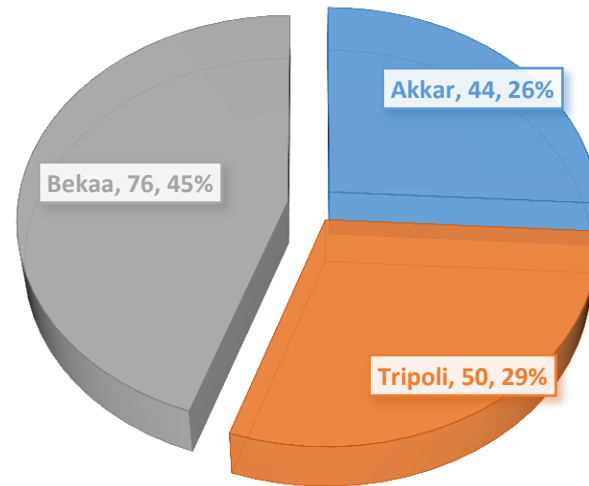
Food and Agriculture Organization
of the United Nations

Objectives:

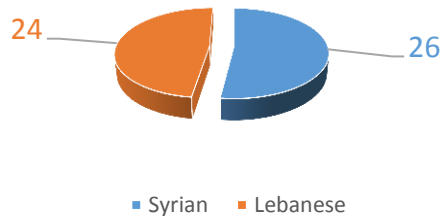
- To cope with the stressful situation through gardening
- To improve social relations between people sharing green units and learning from each other
- To innovate and adapt the production units to camp conditions
- To partially subsidize the diet of the refugees and the hosting communities.



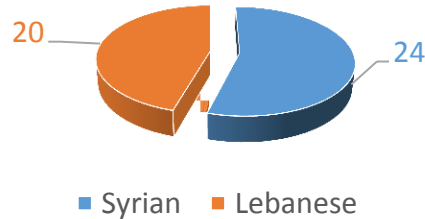
Beneficiaries distribution



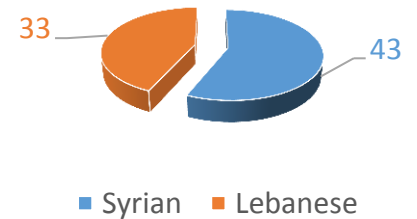
Beneficiaries Tripoli



Beneficiaries in Akkar

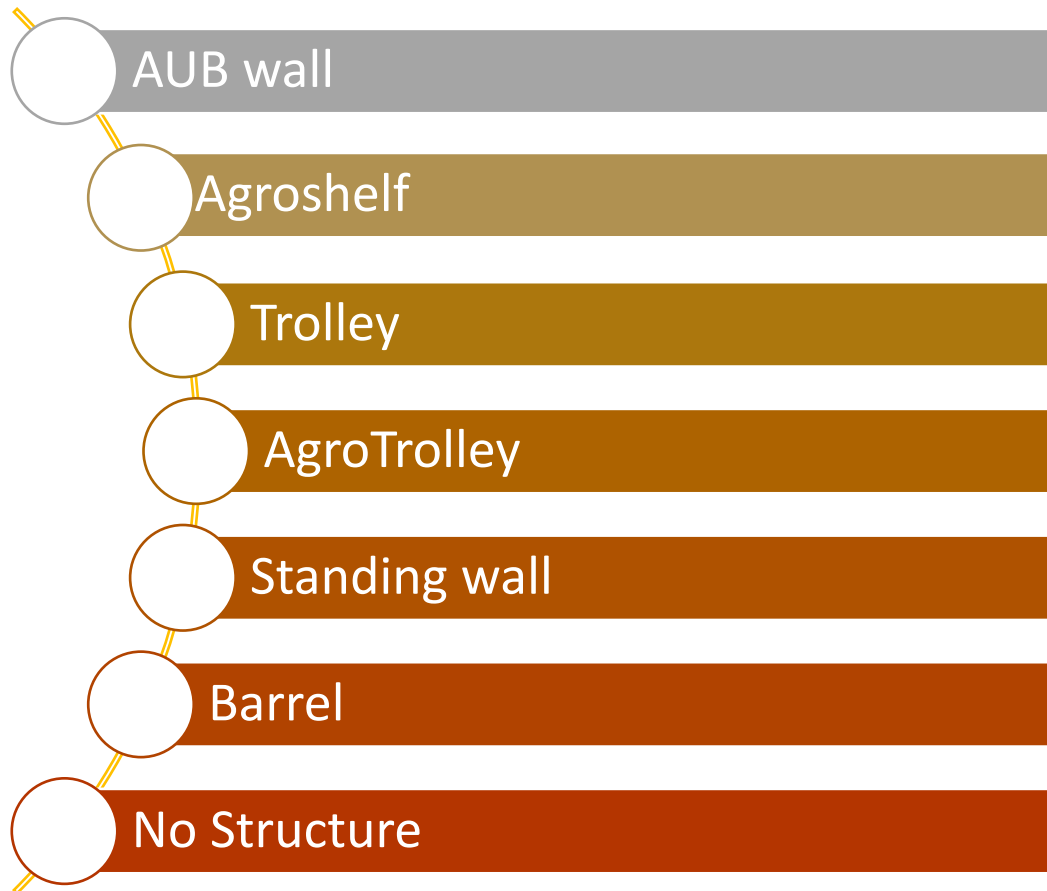


Beneficiaries Bekaa





Units Adopted :





AUB wall

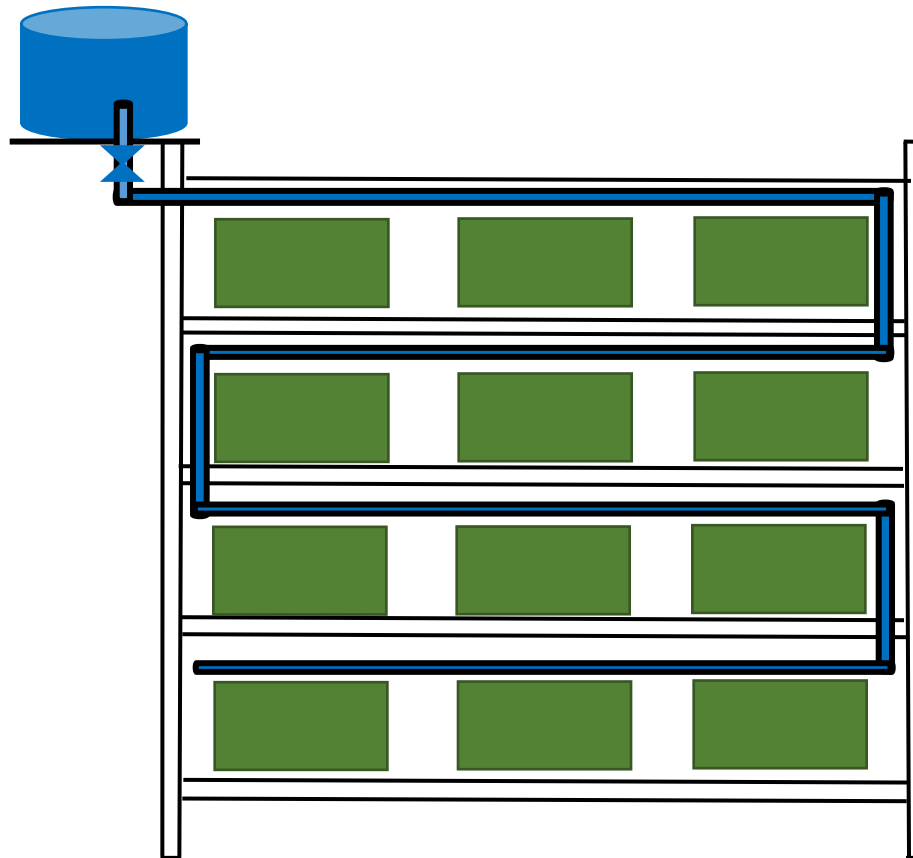


- Dimensions : 1.6 m x 1.4 m x 0.5 m
- 12 plastic boxes (45 cm x 30 cm x 10 cm)
- Space needed : 1.5 m²
- Planting area 1.6 m²
- planting mix volume needed : 162 l
- Drip Irrigation



Food and Agriculture Organization
of the United Nations

AUB wall Irrigation Layout





Food and Agriculture Organization
of the United Nations

Agroshelf



- Dimensions : 1 m high, 1.5 m long, and 0.5 m wide
- 15 plastic boxes (45 cm x 30 cm x 10 cm)
- Space needed : 1.5 m²
- Planting area : 2 m²
- planting mix volume needed : 202 l
- Irrigation : Water cane



Food and Agriculture Organization
of the United Nations

Trolley



- Dimensions : 1.2 m x 1.1 m x 1.1 m
- 32 plastic boxes (45 cm x 30 cm x 10 cm)
- Space needed : 4.4 m²
- Planting area : 4.3 m²
- planting mix volume needed : 432 l
- Irrigation : Water cane



Food and Agriculture Organization
of the United Nations

Agrotrolley



- Dimensions : 1.2 m high x 2 m wide x 2 m deep
- 27 plastic boxes (45 cm x 30 cm x 10 cm)
- Space Needed : 9 m²
- Planting area 3.6 m²
- planting mix volume needed : 364 l
- Irrigation : Water can



Standing Wall



- Dimensions : 1 m H x 2 m L x (0.5 m x 0.3 m) W
- plastic ECO boards are pierced
- # holes 176 holes (7 cm diameter each)
- Space needed : 3 m²
- Planting area 1.27 m²
- planting mix volume needed : 800 l
- Irrigation : Water can



Food and Agriculture Organization
of the United Nations

Barrel



- Dimensions : 1 m H x 0.5 m diameter
- 25 holes (5 on each level)
- Space needed : 2.3 m²
- Planting area 0.375 m²
- planting mix volume needed : 186 l
- Irrigation : Water can





No Structure



- Dimensions : (45 cm x 30 cm x 15 cm)
- 20 plastic boxes
- Space Needed : 2.7 m²
- Planting area : 2.7 m²
- planting mix volume needed : 405 l
- Irrigation : Water can





Characteristics of a good planting mix

- ✓ Well drained, which means an air-filled porosity of at least 15%
- ✓ Re-wets easily – some media are difficult to re-wet if they dry out
- ✓ Suitable pH, between 5.5 and 7 is satisfactory for most plants
- ✓ Free of pests, weed seeds and fungal pathogens



The chosen planting mix

Planting mix
(1)

- Peat moss (33 %)
- Potting soil (33%)
- Perlite (33%)

Planting mix
(2)

- Potting soil (90%)
- Perlite (10%)



Site selection recommendations:

- **Must have abundant water supply**
- **Space availability**
- **Willingness of the beneficiaries to be part of such agricultural techniques**



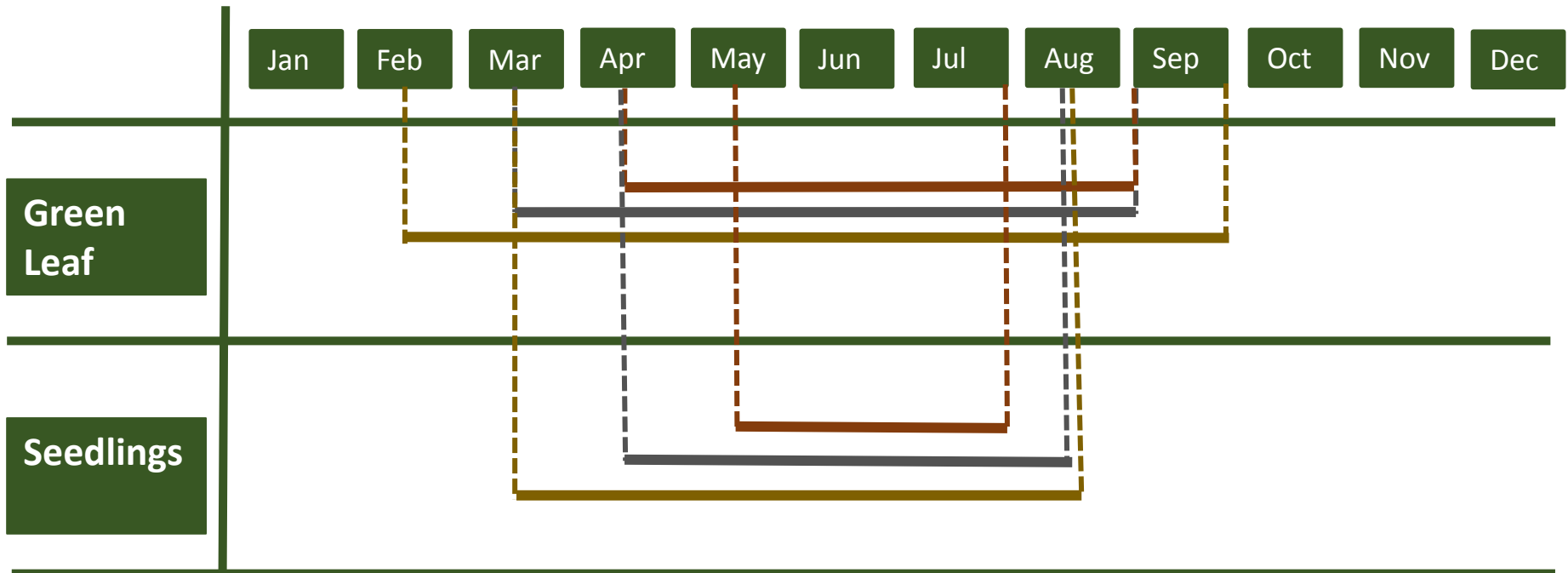
Seeds used:

1. Bakla or Purslane
2. Parsley
3. Green zaatar or Thyme
4. Spinach
5. Lettuce
6. **Radish (Not recommended)**
7. Rocca
8. Hindbeh or Dandelion
9. Rashad or Garden cress Coriander





Planting time versus altitude



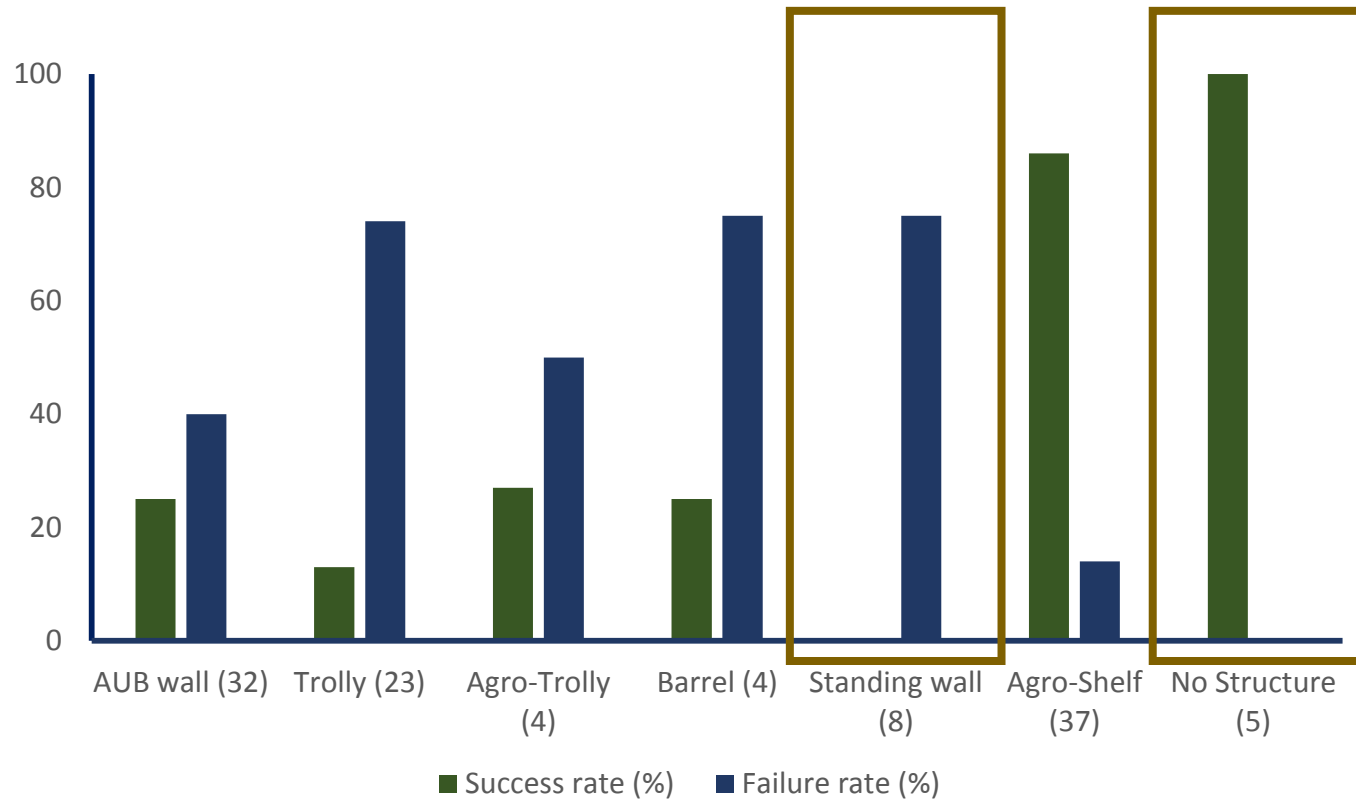
- 550- 1200 m above sea level
- 250- 550 m above sea level
- 0 – 250 m above sea level



Structures	Advantage	Disadvantage
AUB wall	<ul style="list-style-type: none">• can utilize space more efficiently	<ul style="list-style-type: none">• Vertical plants will tend to dry up fast and soil will be lost during the irrigation.
Agroshelf	<ul style="list-style-type: none">• Can utilize space more efficiently	<ul style="list-style-type: none">• Cost high compared to others
Trolley	<ul style="list-style-type: none">• Can accommodate significant amount of boxes	<ul style="list-style-type: none">• Vertical plants will tend to dry up fast and soil will be lost during the irrigation• Heavy and needs a flat surface
Agrotrolley	<ul style="list-style-type: none">• Can accommodate significant amount of boxes• Easier to irrigate	<ul style="list-style-type: none">• Heavy and needs a flat surface
Barrel	<ul style="list-style-type: none">• More plants per square meter	<ul style="list-style-type: none">• Difficult to manufacture
Standing wall	<ul style="list-style-type: none">• High production	<ul style="list-style-type: none">• High amount of soil• Expensive• Heavy
No structure	<ul style="list-style-type: none">• Low cost	<ul style="list-style-type: none">• Needs more space

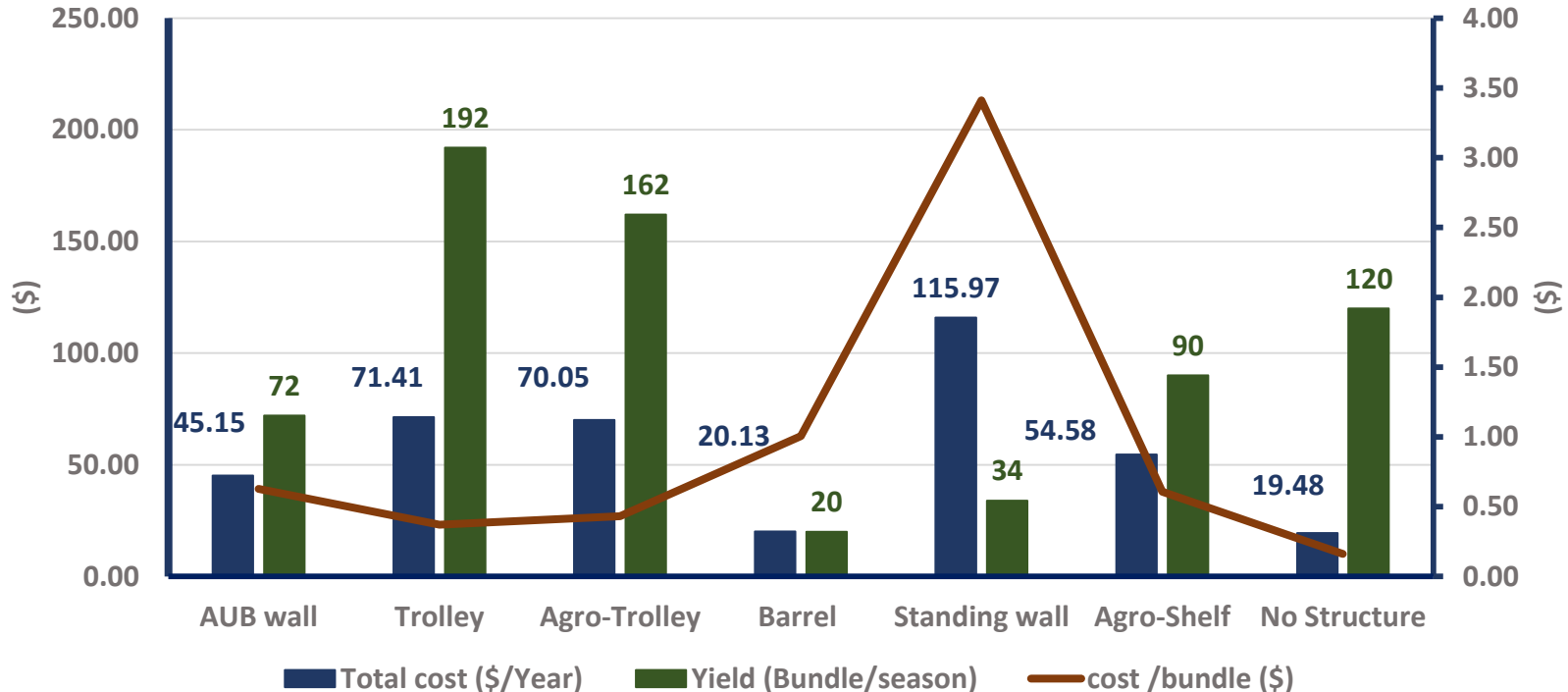


Performance rates of each one of the units





Comparative economic return per units



Costs: Material costs discounted over 3 years

Yield: sale value of total bundle produced over one season

Costs/bundle: Over 3 years, average production costs for a single bundle of parsley.



Recommendations :

- Visit the site daily , especially the first 2 weeks
- Choosing the site is critical, example some Syrian sites in Bekaa receive water weekly through UN agencies and in some cases delivery might be late 1 or 2 days , which might damage the crop
- Give all beneficiaries same types of units
- If tomato and other vegetables are used , a plant protection program should be adopted prior to implementation. As most pests travel by air.



- The beneficiaries need to express clearly their interest in gardening
- Water need to be available free of charge without competing with any human need
- Sufficient space and shade need to be available. In no circumstance the micro garden units should represent a hazard e.g. in obstructing emergency exit.
- It should be restricted to vegetables which can grow fast, with little soil and with no chemical pest and disease control measures
- Since the benefit from micro gardens is as much the occupational therapy side as the real production, it is recommended to include micro garden activities within a social support program like establishment of educational school gardens, women's group support, etc.



Organic Pest Control Remedies

Link to Training Document:

http://www.2shared.com/document/XD5tSkeQ/Brochure_2.html



What makes the agricultural product Organic?

- ✓ "organic" does not automatically mean "pesticide-free" or "chemical-free". In fact, under the laws of most countries, organic farmers are allowed to use a wide variety of chemical sprays and powders on their crops.
- ✓ Pesticides, if used, must be derived from natural sources, not synthetically manufactured
- ✓ Pesticides must be applied using equipment that has not been used to apply any synthetic materials for the past three years



Why using organic pest control remedies?

- ✓ Inexpensive
- ✓ Natural
- ✓ Efficient

1- Garlic Spray

Garlic spray is a general **pest deterrent**

Ingredients

- 10 garlic heads
- 5 small hot chillies
- 3 medium onions
- 1 litre of water
- 2 tablespoons of milk

Directions:

- 1) Mix garlic, chillies and onions with water, bring to boil and simmer for 10 minutes
- 2) Let it stand over night then add 2 tbs of milk
- 3) Store in labelled glass jars
- 4) Use by diluting 1 cup of the mixture to 9 litres of water



Don't apply on sunny day, can cause foliage to burn

2- Molasses Spray

Molasses Spray is a feeding deterrent for chewing insects (caterpillars, grasshoppers, cabbage moths and grubs) on the cabbage family

Ingredients

- 1 tbs of molasses
- 1 litre of water
- 1 tbs of liquid organic soap
- 1 tbs of vinegar (optional)

Directions:

- 1) Mix molasses with hot water until you obtain the colour of light tea
- 2) Mix in dishwasher to help the molasses stick to the leaves
- 3) **Spray with undiluted solution on top and under the leaves**
- 4) Add vinegar to make it stronger

3- Onion Spray

Onion spray is used to control aphids, spiders and other pests

Ingredients

- 2 cups of onion and ends (and/or garlic pieces)
- 1 litre of warm water



Directions:

- 1) Collect 2 cups of onion skins, peels and ends in a container. Garlic pieces can also be added
- 2) Fill the container with warm water. Soak for a few days (up to a week)
- 3) After one week, strain or sieve out the onion bits (and garlic bits if used) and store the solution in spray bottles
- 4) **Spray the undiluted solution on top and bottom of leaves**
- 5) You can bury the sieved onion and garlic bits pieces around the plants

4- Vinegar Spray

Vinegar spray is for cabbage moths and grubs affecting the cabbage family, caterpillars and sap-sucking insects such as stink bugs, aphids and mealy bugs

Ingredients

- 1 cup of vinegar
- 3 cups of water
- 1 teaspoon of liquid organic soap

Directions:

- 1) Mix the vinegar and water
- 2) Add the liquid organic soap to help the vinegar to stick to the insects and leaves of the plant
- 3) Spray on top and bottom of leaves

5- Chamomile Tea Spray

Chamomile tea is a mild fungicide

Ingredients

- 1 chamomile tea bag
- 1 cup of boiling water

Directions:

- 1) Pour boiling water over a chamomile tea bag
- 2) Leave to soak for 10 minutes then remove the tea bag
- 3) **Once cool, use as a spray**



6- Pepper/Garlic Pesticides Spray

Pepper/Garlic pesticide is a general pesticide for control of caterpillars, ants, mites and other insects

Ingredients

- 3 hot green pepper
- 2 or 3 garlic cloves
- 1 teaspoon of liquid organic soap
- 3 cups of water



Directions:

- 1) Crush the garlic and pepper together
- 2) Add liquid organic soap and water and mix. Let the mixture stand for 24 hrs
- 3) **Strain out the pulp and spray the liquid onto infested plants, making sure to coat both tops and bottoms of leaves**

7- Milk Spray

Milk spray is a fungicide spray (e.g. used for treatment of powdery mildew)

Ingredients

Equal parts of full cream milk and water

Directions:

- 1) Mix equal parts of full cream milk and water
- 2) Spray plants every 2 days to control fungal diseases on pees, green peppers and pumpkin family



8- Vegetable Oil Spray

Vegetable oil spray is used for scaled and soft bodies insects such as mites, aphids, mealy bugs (oil suffocates insects)

Ingredients

- 1 tbs of liquid organic soap
- 1 cup of vegetable oil

Directions:

- 1) Mix the liquid organic soap and the vegetable oil
- 2) Mix together until it turns white then store it in an air tight bottle
- 3) Dilute 1 to 2 tbs of the mixture to 1 cup of water in a spray bottle. Spray on plants covering all leaf and stem surfaces



There are other plants you can use for general pesticides

The following plants also contain anti-fungal or antibacterial chemicals that can be extracted and sprayed onto crops



Chamomile



Chives



Eucalyptus



Garlic



Horseradish



Marigolds



Parsnips



Turnips



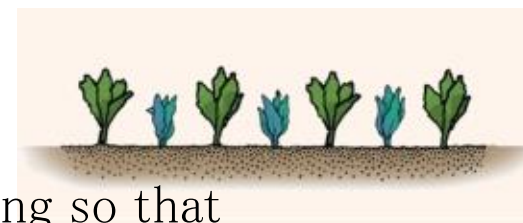
Rhubarb



Thyme

Other Pest Control Hints

- Pull out weak, infected plants and destroy them away from garden
- Build healthy soil through use of compost, manure and mulch
- Minimize insect habitats by weeding regularly
- Interplant and rotate crops so that pests and diseases do not spread throughout the garden
- Spray the pest remedies over plants early in the morning so that leaves remain dry most of the day, as wet leaves encourage insect activity and fungal damage to plants



Other Pest Control Hints cont.

Use companion plants to mask smells

Herbs and highly aromatic plants such as



and other herbs that have spicy/bitter scents, can be used to mask the scent or appearance of crops that are desirable to pests.



Food and Agriculture Organization
of the United Nations

THANK YOU