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Agroecology and
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Organic Vegetable Farming: A Practical Guide



Prepared by BanSuanAiOun

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Introduction

This guide, prepared by **BanSuanAiOun**, provides practical guidance for establishing resilient and productive home gardens under the **ALiSEA Small Grant Facility 2023**. The methods presented are based on direct field experience and successful local trials, with a focus on organic soil health, natural pest management, and resource efficiency. The guide aims to support households and young farmers in improving food security and generating income through sustainable organic vegetable farming.

It is designed for **tropical conditions** and should be adapted to local contexts and soil types. While these practices are drawn from our own experiences, we recognize that different environments may require adjustments. We encourage the integration of local knowledge and new ideas to ensure the methods remain effective under varying conditions. By applying these principles with flexibility, communities can promote healthy ecosystems and sustainable food production. For more information and community resources, please visit: <https://kh.ali-sea.org/>

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(1) Home garden considerations

- 1. Site selection:** Choose fertile soil close to water sources and the home to save time and energy for daily care and harvesting.
- 2. Vegetable selection:** Select a diversity of vegetables for household consumption. Choose crops that are well adapted to local climate and suitable for the growing season. If the goal is income generation, base crop selection on market demand.
- 3. Light and shade:** Plants require sunlight for photosynthesis, and the number of daylight hours affects plant growth.
 - **Partial sunlight:** Grow vegetables that tolerate shade, such as galangal, ginger or lemongrass.
 - **Full sunlight:** Grow common vegetables such as lettuce, Chinese cabbage, chilli.



Celebrating Our Network Members:



(1.1) Garden designs

Traditional garden



Off ground garden



Vertical garden



(1.2) Different methods of vegetable planting

Layer raised garden



Raised garden



Roof-terrace garden



(2) Soil preparation

2.1 Soil preparation for a traditional garden



2.2 Soil preparation for a growing on tray



(2.1) Soil preparation for a traditional garden

- Maintain 50 cm spacing between rows to allow easy care and harvesting;
- Make rows about 1 m wide, length can be flexible depending on space;
- Dig or plow the soil to a depth of about 30 cm and leave it to sun-dry for at least 2 days;
- Apply 0.5-1 kg of composted manure per m² (added litter or coconut mesocarp can be mixed well into the soil);
- Mulch with rice straw and moisten adequately with Effective Microorganisms (EM);
- The bed is then ready for direct planting.



(2.2) Soil preparation for growing on tray

- **Mixing ratio:**
 - 1 unit of soil
 - 1 unit of coconut mesocarp soaked overnight
 - 1 unit of dry, fine manure (cow dung or poultry manure)
 - Optional: 1 unit of rice husk or job's tear husk
- Mix thoroughly, then spread the mixture evenly in a tray before planting. Moisten the soil before planting.



Video: Preparing soil for planting



Video: An easy way to make soil from dry leaves



(3) Seedling methods

3 main methods:

- 1) Traditional direct seedling
- 2) Nursery raising
- 3) Vegetative propagation



(3.1) Traditional direct seeding

- 1) **Direct seeding by spreading seed:** fast growing and short time, more dense, available and cheap seeds e.g., morning glory, celery
- 2) **Direct seeding then replanting:** Ideally, best for cabbage, lettuce... It can be planted after the seedlings have 4-5 leaves.
- 3) **Direct seeding by clumping:** Commonly suits large seeds such as beans and cucumbers. Prepare holes with appropriate spacing, then keep a suitable number of plants per hole.



(3.2) Nursery raising

Suitable for expensive varieties such as lettuce, tomatoes, sweet peppers...

- **Peat Moss (Specific material):** Available at agricultural supply stores. If unavailable, the soil preparation recipe can be used as a seed starting mix.
- **Prepare peat moss in a tray:** Prepare peat moss in a tray, filling it about three-quarters full. Moisten it, then spread the seeds evenly and water lightly.
- **Once the seeds have sprouted, place the tray in sunlight for healthy seeding growth.** After 4–5 days, the seedlings will develop a pair of leaves and can be transferred into individual pots.



Video: Lettuce seedling growing technique



Hello everyone,
today we meet again with me, I'm Top, an organic market gardener



For tomatoes, eggplants, and peppers, sow seeds in sand to ensure better germination than in soil. Soak the seeds in warm water for about 28-30 minutes. Place the prepared sand in a tray at a depth of about 3 cm.

Moisten the sand and make shallow lines with a stick. Place the soaked seeds into the lines, cover lightly with soil, and water in the morning and evening.

Once the seeds have sprouted, place the tray in sunlight for 7–10 days to support healthy seedling growth. The seedlings will develop a pair of leaves and can then be transplanted into individual pots.

(3.3) Transplanting seedlings

Use a sharp stick to lift the seedling with its roots. Handle the seedling by the leaves and place it in the prepared tray, one per hole. Firm the soil gently around the roots, keeping the stem and leaves intact.

Water lightly, then place the seedling tray in the shade for one day before moving it into sunlight. The seedlings can be transplanted when they have 3–4 leaves.



(3.4) Vegetative propagation



This involves taking parts of the plant such as roots, stems, leaves, and other parts that can be planted by using various methods of propagation such as cuttings, layering, budding, or dividing.



(4) Taking care

1. Watering at least twice daily, in the morning & evening.
2. After seven days, apply 0.5 L of fish extract diluted in 200 L of water and spray on the leaves.
3. After 10 days, apply a handful of compost or manure per plant and spread some around the base. Loosen the soil to incorporate the compost.
4. After two weeks, apply 20 ml of Synthesis EM diluted in 5 L of water, Spray or water weekly.
5. Apply organic fertilizers and bio extract (BE) every 7-10 days to prevent insects and plant diseases.



Celebrating Our Network Members:



(5) Harvesting



Celebrating Our Network Members:



1. The harvest age varies by crop. For example, mustard greens and cauliflower can be harvested in 30–45 days, Chinese cabbage in 45–55 days, and head cabbage and lettuce in about 50–60 days.
2. The cucumber and bean group includes cucumbers, pumpkin varieties, squashes, beans, long beans, butter beans, and related crops, with a harvest age of approximately 40–60 days.



(6) Disease & insects



1. Bottom rot
2. Frog-eye leaf spot
3. Leaf miners
4. Whitefly
5. Aphids
6. Slugs and snails
7. Beetles
8. Flea beetles 

(6.1) Bottom rot



Caused: The fungus

Affected season: Occurs year-round but is more severe during rainy season.

Symptoms: Leaves wilt from the top of the shoots and roots become brown or black and begin to rot.

Prevention and control: Remove infected plants, although this may not be fully effective. Applying *Trichoderma* is recommended.



(6.2) Frogeye leaf spot



Caused: Fungus

Affected season: Occurs all year-round but is more severe during the rainy season.

Symptoms: Brownish-purple spots appear on the leaves and gradually enlarge.

Prevention and control: Remove infected plants, although this may not be fully effective. Applying *Bacillus subtilis* (BS) is recommended.



(6.3) Leaf miners



Caused: Larvae of small gray or white flies.

Affected season: More common in hot season

Symptoms: White, winding trails appear on the leaves due to larval (worm) feeding, leading to leaf distortion.

Prevention and control: Use bio-fermented insect repellent or apply *Bacillus Thuringiensis* (BT).



(6.4) Whitefly



Symptoms: Both nymphs and adult whiteflies can attack plants at any stage of growth. They feed by sucking sap from leaves and young shoots, causing yellow spots, leaf curling, and downward rolling of the edges. As a result, the plant's growth becomes stunted, and the plant may eventually wither and dry out.

Control: Use bio-fermented insect repellent, sticky traps, and apply *Beauveria bassiana* (BB).

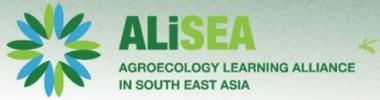
(6.5) Aphids

Aphids suck sap from various parts of the plant. They excrete a sticky, sweet substance that promotes the growth of black sooty mold on the leaves, reducing photosynthesis.

This can lead to stunted growth, leaf curling, misshapen leaves, yellowing, and eventually plant death.



(6.6) Natural prevention and control methods



Celebrating Our Network Members:



- Remove infected plant parts. Where aphids are present, prune affected areas and dispose of them properly.
- Control ants, as they protect aphids and help spread them to other parts of the plant in exchange for honeydew. Managing ants can significantly reduce aphid infestations.
- Use bio-fermented insect repellent as needed.



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(6.7) Slugs and snails

Affected season: Raining season

Symptoms of damage : Young shoots are eaten or severely damaged.

Prevention and control: Hand-pick and remove slugs or snails. Apply lime around the planting area and use coffee grounds around affected plants.



(6.8) Beetles

Beetles commonly attack young cucumber plants and feed on the leaves.

Severe infestations can stunt plant growth.

Beetles are most common in areas with dense weeds, where the larvae feed on plant roots and leaves.



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(6.9) Natural prevention and control methods



Celebrating Our Network Members:



- If possible, hand-pick and destroy the beetles. Regularly inspect the garden early in the morning.
- Spray wood vinegar diluted in water.
- Use fermented insect repellent spray.
- Apply *Beauveria bassiana* (BV).



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(6.10) Flea beetles

- Widely distributed in nature, two main species are recognized: striped and metallic blue. The striped species is the most damaging.
- Larvae bore into and feed on stems, roots, and flower buds, causing plants to wilt. Severe infestations can kill plants.
- Adult beetles feed on the underside of leaves, leaving holes. Adults often cluster together and will jump or fly when disturbed.
- They are commonly found on brassica crops such as kale, cabbage, and Chinese cabbage.

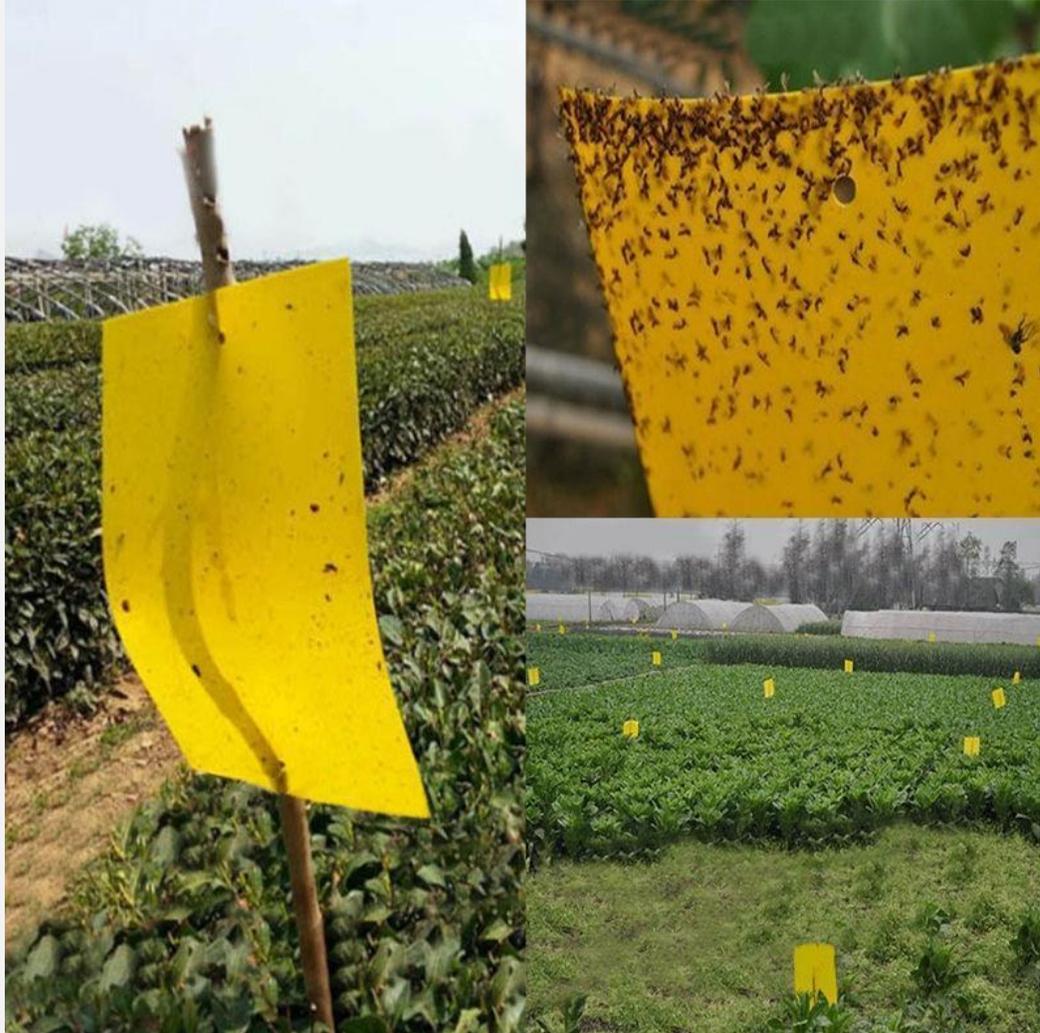


(6.11) Prevention and control

1. Plow the soil and expose it to sunlight to help destroy larvae and pupae.
2. Plant crops that beetles do not prefer, alternating with those in the cabbage family, to break the beetle's life cycle.
3. Use insect traps (sticky traps).
4. Spray fermented insect repellent every 7 days.
5. Apply biological agents such as *Bacillus thuringiensis* and *Beauveria bassiana*, spraying every 7 days to reduce pest population and disrupt the life cycle.



(6.12) Prevention and control



Sticky Trap

Sticky traps work by taking advantage of insects' natural attraction to yellow-colored objects. They help reduce insect populations and can minimize the need for chemical insecticides.



(7) Fish fertilizer (fish extract)



Benefits:

- Helps accelerate plant growth
- Promotes larger, greener leaves
- Enhances the plant's ability to produce food

Method:

- Mix **1 kg of fish** with **1 kg of brown sugar**
- Let the mixture **ferment for 15 days**
- When the fish is fully decomposed, it is ready for use.

How to Use:

- Dilute the fish fertilizer at a ratio of **0.5 liters per 200 liters of water**
- Stir well, then apply to plants

(8) Photosynthesis



Benefits:

- Helps accelerate plant growth
- Increases photosynthesis efficiency
- Makes vegetables greener and more attractive

Materials to Prepare:

1. Natural water source
2. A 1.5 liters bottle
3. One chicken egg
4. Fish sauce (as needed)



How to make a photosynthesis booster



Celebrating Our Network Members:



- Pour water into a 1.5-liter bottle.
- Add one chicken egg and fish sauce, mix well in a container, then strain into the bottle.
- Place the bottle in the sun for about one month until it develops into a culture of photosynthesis-boosting microorganisms.

How to Use:

- Dilute 100 cc per 20 liters of water and spray on leaves.
- Dilute 200 cc per 20 liters of water and apply to the soil.



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