On the Job Training

At

Citrus Development Centre

Tansen, Palpa

August 2026

Presented by:

Agro-forestry Polytechnic Institute team
Isha Pandey
Pabitra Nepali
Sunapa Shahi

Madanpokhara Polytechnic Institute team
Holika Baraghare Magar
Mamata Nepali
Sabita Bhusal

ACKNOWLEDGEMENT

We would like to express our deepest appreciation to all those who provided us opportunity to complete our Work Experience Program (WEP). A special gratefulness towards the authorities and technical team of **Citrus Development Center, Palpa** for their valuable guidance, Chief **Jogandra Kandu**, horticulture chief **Sudip Devkota**, Plant protection chief **Suraj Bharati**, **Abdul Salam, Mohan Gyawali, Sunil Pariyar,** and **Nirmal Adhikari** support throughout our training period. We are highly indebted to the office chief and the entire station team for allowing us to experience field practices and engage in different research activities related to citrus cultivation.

We would also like to express our profound gratitude to our colleges **Agro-forestry Polytechnic Institute** and **Madanpokhara Polytechnic Institute** for providing valuaskilled agriculture technicians. ble agricultural education, motivation, and constant support to make us Last but not least, many thanks to our teammates for making this training comfortable and memorable.

TABLE OF CONTENTS

1. Pit Digging and Pit Filling
2. Spraying Fungicide and Insecticide
3. Method of bed preparation and shifting the bed
4. Layout preparation
5. Preparation of Bordeaux paste and mixture
6. Planted nursey seedling in prepared pits
7. Drenching
8. Plant Tagging
9. Survey and seedling selling / plant selling and packaging

10. Preparation of micronutrient solution
11. Application of karathane spray
12. Planting seeds (Cauliflower, cabbage, and marigold)
13. Preparation of pot for planting flowers
14. Media preparation for plant tissue culture
15. Acclimatization of In vitro plants
16. Sample collection and preparation for CTV Diagnosis

1. PIT DIGGING AND PIT FILLING

Pit digging:

Pit digging is the process of excavating pets of the required size and depth in the field before planting trees or other perennial crops.

Fig.: Pit digging

Pit filling:

Pit filling is the process of filling the dug pits with a mixture of topsoil, well-decomposed farmyard manure (FYM) or compost and recommended fertilizers before planting to provide a suitable growing medium for the plant.

Fig.: Pit filling

Drenching and mulching

2. SPRAYING THE FUNGICIDE AND INSECTICIDE

- Fungicide and insecticide were sprayed to control citrus canker, fungal diseases, citrus leaf miner, aphids and scale insects.

Preparation of the fungicide:

Mixing 100 gm of bavistin in 50 liters or water creates a 0.2% concentration solution. This is an ideal and safe dosage used primarily for soil drenching to control diseases like root rot, damping-off and wilt.

- Put on rubber gloves and a protective face mask before handling the fungicide.
- Keep 100 gram of bavistin powder and 50 liters of clean water ready.
- Pour the 100g powder into a small bucket filled with 2 to 3 litres of water and stir until it forms a smooth, lump-free liquid.
- Pour this mixed paste into the main container or spray tank containing the remaining 47 to 48 litres of water.
- Use a power sprayer to efficiently distribute the solution across the field, targeting the base of each crop to thoroughly spray and drench the soil around the plant roots.

Fungicide spraying

Fig.: Preparation of 0.2 % bavistin

Fig.: Spraying bavistin

Fig.: Soil Solarization

3. METHOD OF BED PREPARATION AND SHIFTING THE BED

Bed preparation: Bed preparation is the process of preparing the soil into a suitable bed for sowing seeds or transplanting seedlings .

- For a nursery, the commonly recommended bed size is as follows:

Length: as required, Breadth: 1m , Height: 3 inch

Fig.: Preparation of nursery bed

Shifting the bed: Moving seedling or plants from one nursery bed to another or to the field.

Fig.: Planting trifoliate in nursery bed

4. Layout Preparation

First, a layout of 3 meters in length and 4 meters in width was prepared. The plant-to-plant distance was maintained at 3 meters, and the row-to-row distance at 4 meters.

Fig.: Layout preparation

5. PREPARATION OF BORDEAUX PASTE AND MIXTURE

- Dissolve 1kg of copper sulphate in 5 l of water and separately dissolve 1 kg of quicklime in 5 l of water (for paste) using plastic buckets.
- Slowly pour the copper sulfate solution into the lime slurry with a wooden stick until a uniform blue paste is formed.
- Dip a clean iron nail into the preparation for 1 minute. If it turns reddish brown, add more lime to neutralize it. But if it stays clean, it is safe.
- 100 liters of water for mixture.

Fig.: Mixing of lime and copper sulphate

Fig.: Paste of lime and copper sulphate formed

Fig.: Power sprayer intake in Bordeaux paste

6. PLANTED NURSEY SEEDLING IN PREPARED PITS

- Before planting the seedling, DAP, potash, and chamatkar fertilizer were mixed with the soil and filled into the pits.
- Put DAP and potash fertilizer in each pit before planting the seedlings, then mix the fertilizers thoroughly with the soil. Such as DAP per plant 150gm, potash 100gm.

Fig.: Planting Baaskharka mandarin

7. DRENCHING

- After planting the seedling, Bavistin (Carbendazim) is applied as a soil drench around the root zone to control soil-borne fungal diseases and root rot.
- Recommended dose per plant: 10 liters Bavistin.

Fig.: Applying Bavistin to the plant

8. PLANT TAGGING

Plant tagging is the process of attaching a tag to a plant for identification and record keeping. The tag may contain information such as the plant name, variety, planting date and other necessary details. This helps in easy identification and proper management of the plants.

Fig.: Tagging the plant

9. SURVEY AND SEEDLING SELLING / PLANT SELLING AND PACKAGING

Survey: It is the process of collecting information about seedlings, farmers, planting area, demand, varieties, and other necessary details. It helps to understand the demand and requirements of farmers and plan seedling production accordingly.

Seedling selling: It is the process of selling healthy and quality seedling to farmers and customer.

Fig.: Uprooting the plant

Plant Packaging: Plant packaging is the process of carefully packing healthy plants and selling them to farmers or customers. Proper packaging protects the plants from damage during handling and transportation.

Fig.: Plant packaging

10. PREPARATION OF MICRONUTRIENT SOLUTION

Chemicals required for 50 l micronutrient solution

- Zinc sulphate – 245 g
- Copper sulphate - 147.5 g
- Magnesium sulphate - 97.5 g
- Ferrous sulphate - 97.5 g
- Manganese sulphate – 97.5 g
- Lime - 450 g
- Water – 50 l

Fig.: Packaging the micronutrients

- The required amounts of micronutrients were measured, mixed, and packed together to prepare a solution for 50 L of water.

11. APPLICATION OF KARATHANE SPRAY

- Karathane is applied as a foliar spray to control fungal disease, especially powdery mildew.
- The recommended quantity of karathane is mixed thoroughly with water and sprayed uniformaly on the leaves and others affected parts of the plant.
- Recommended dose: 1 ml karathane per liter of water.

Fig.: Spraying the karathane on citrus plant

12. Planting Seeds (Cauliflower, Cabbage, and Marigold

- A growing medium by mixing vermicompost, farmyard manure, sand, cocopeat (1:1:1:2) and SAAF (fungicide) was prepared. Then, the seeds were planted in seedling trays after filling the tray with the prepared medum.

Fig.: Mixing the vermicompost, farmyard manure, sand and cocopeat

Fig.: Filling the seedling trays with prepared medium

Fig.: Planting seeds in the prepared seedling trays

13. PREPARATION OF POT FOR PLANTING FLOWERS

Pot preparation: A growing medium by mixing vermicompost, sand, soil, and cocopeat was prepared in a suitable proportion. Meanwhile, a thin layer of small stones was placed at the bottom of the pot for proper drainage. Then the pot was filled with the prepared growing medium and the flower was planted carefully.

Fig.: Mixing the vermicompost, soil, sand and cocopeat

Fig.: Planting aloe vera in the prepared medium

14. MEDIA PREPARATION FOR PLANT TISSUE CULTURE

- Plant tissue culture requires a **nutrient-rich and sterile growth medium** to support the growth and development of plant cells, tissues, and organs under controlled conditions. The medium provides essential **macro- and micronutrients, vitamins, a carbon source, and plant growth regulators** required for different stages of in vitro culture.
- Commonly used media – Murashige and Skoog (MS) media

Fig.: Media for plant tissue culture

Process of media preparation

- Prepare stock solutions of MS A, MS B, MS C, MS D and plant growth hormones.
- Add the required volume of stock solutions to distilled water.
- Add sucrose and other supplements.
- Adjust the pH to the required level, around 5.7–5.8 for citrus species.
- Add required amount of agar (gelling agent)to make the media solid.
- Make up the final volume with distilled water.
- Dispense the medium into culture jars or test tubes (desired culture vessels)
- Autoclave the media at 121°C, 15 psi pressure for 15 min.

Fig.: Pouring the MS media in culture jar

15. Acclimatization of in Vitro Plants

- Acclimatization is the gradual adaptation of in vitro-grown plants to external (ex-vitro) environmental conditions.
- In vitro-grown plants develop under:
  - High humidity
  - Low light intensity
  - Stable temperature
  - Sugar-rich/artificial growth conditions
  - Limited air exchange

Therefore, they may have:

- Poorly developed cuticle
- Limited control of water loss
- Less functional stomatal

Fig.: Citrange saplings about to undergo acclimatization

Primary hardening

- Substrate used: Cocopeat : Sand (2:1 and 3:1)
  Cocopeat : Sand : Soil (2:1:1)
- Firstly, plants are taken out from culture jar and are washed to make sure that no agar is attached to the plant.
- Then, the plants are treated with fungicide and rooting solution.
- Finally, the plants are planted in the seedling tray (containing the prepared substrate.

Primary hardening

Fig.: Preparation of 0.2 % bavistin

Fig.: Spraying bavistin

Fig.: Soil Solarization

Secondary hardening

After about 2–3 weeks of primary hardening, you can transfer the citrus plantlets to a new substrate for secondary hardening

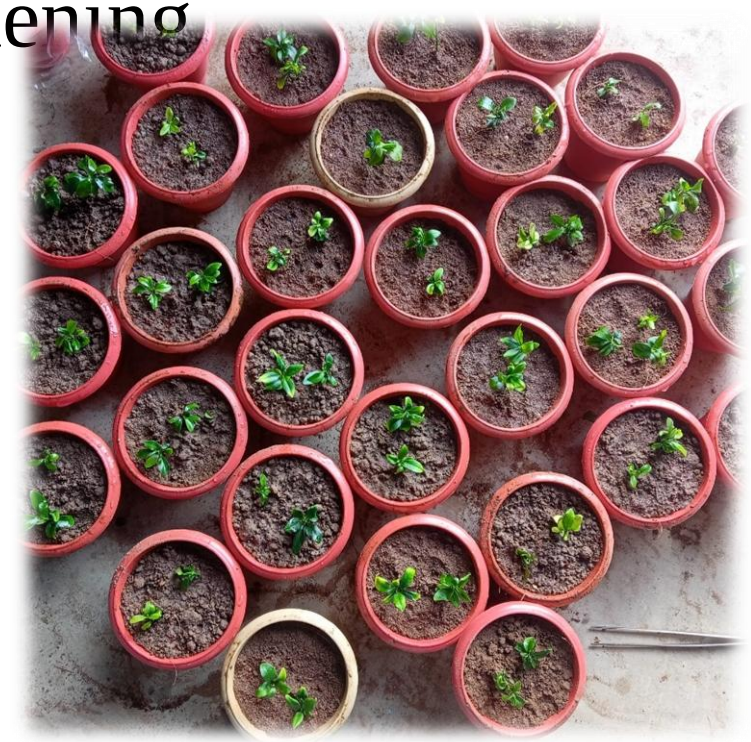

Fig.: Transferring Citrus plants to new substrate

Fig.: Tagging the pots

16. SAMPLE COLLECTION AND PREPARATION FOR CTV DIAGNOSIS

Sample Collection:

- Young flushes, leaf petioles, fruit peduncles and flowers are collected from the four directions of the *Citrus aurantifolia* (Acid lime) tree.
- Samples were then placed properly in labeled bags (while also tagging the tree) and kept in ice box.

Sample Preparation:

- In the laboratory, samples were gently rinsed with distilled water using tissue paper to remove soil/dust.
- Required weight of the sample (0.5 g) was then taken and homogenized in extraction buffer using mortar and pestle.

Sample analysis for CTV detection

Fig.: Crushing the sample in extraction buffer

Fig.: Homogenized sample after centrifuging

Fig.: Batch of centrifuged sample

THANK YOU