KITCHEN GARDENING

SKILLS DEVELOPMENT PROJECT

https://portal.skillskp.org/ info@skillskp.org https://www.facebook.com/SDPUETofficial 0300-1559669

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PREFACE

Kitchen gardening plays an increasingly important role in supporting household nutrition, food security, and sustainable living across Pakistan. It enables families to produce fresh vegetables, herbs, and fruits using small spaces such as courtyards, rooftops, balconies, and home plots. This **Kitchen Gardening – Trainer's Guide** has been developed to support trainers, instructors, and facilitators in delivering skill-oriented horticulture training, with a focus on the diverse climatic and socio-economic conditions of **Khyber Pakhtunkhwa (KPK)**.

The guide provides comprehensive material for both theoretical and practical learning. It promotes participatory approaches, encouraging trainees to link horticultural concepts with hands-on gardening practices suited to local household environments. Each module is structured to help trainers deliver sessions systematically, combining classroom discussions, demonstrations, and home-based activities that build practical competency.

Module 1: Introduction to Kitchen Gardening and Urban Agriculture

Module Duration:

- **Theory:** 2 Hours
- **Practical:** 6 Hours

1.1 Module Objectives

By the end of this module, trainees will be able to:

1. Define kitchen gardening and explain its importance for household nutrition and food security.
2. Identify suitable household locations and site selection principles for kitchen gardening.
3. Recognize basic tools, containers, and materials used in home vegetable production.
4. Describe major types and methods of kitchen gardening used in KPK.
5. Demonstrate responsible behavior, hygiene, safety, and ethical practices in home gardening.
6. Study real success stories and best practices from households across Khyber Pakhtunkhwa.

1.2 Learning Units (LUs)

Learning Unit	Description	Key Learning Outcomes
LU 1: Understanding Kitchen Gardening	Meaning, importance, benefits, scope of home gardening.	Define kitchen gardening and explain benefits.
LU 2: Site Selection & Household Space Utilization	Identify suitable household areas for gardening and assess their suitability.	Select proper sites using light, space, and water criteria.
LU 3: LU 3: Tools, Containers & Materials Used in Kitchen Gardening	Identify tools and materials used in home gardening.	Demonstrate safe handling and maintenance of tools.
LU 4: LU 4: Types and Methods of Kitchen Gardening	Explore various gardening types suitable for small households.	Identify and differentiate household gardening methods.
LU 5: Safety, Hygiene & Ethical Practices	Discuss safe tool use, water hygiene, and environmental ethics.	Apply safety and hygiene rules.
LU 6: Success Stories and Case Studies (KPK)	Real household examples of effective kitchen gardens.	Analyze best practices and lessons learned.

1.2.1 Understanding Kitchen Gardening

Kitchen gardening refers to cultivating vegetables, herbs, and small fruits close to the home, using available household spaces. It requires minimal resources and is ideal for both urban and rural families.

A. Importance of Kitchen Gardening

- Provides safe, fresh, chemical-light vegetables.
- Reduces dependency on the market and saves household income.
- Improves nutrition, particularly for women and children.
- Helps families manage rising food prices.
- Encourages use of organic waste through composting.
- Strengthens household-level food security.

1.2.2 Site Selection & Household Space Utilization

This section addresses *where* a kitchen garden should be located in a home.

A. Principles of Site Selection

1. **Sunlight Availability**
    - Minimum 4–6 hours direct sunlight needed.
    - Leafy vegetables tolerate partial shade.
2. **Accessibility**
    - Should be near the kitchen or water source.
    - Easy to monitor daily.
3. **Water Availability**
    - Clean water must be available nearby.
    - Avoid using drainage or contaminated water.
4. **Drainage**
    - Site should not accumulate standing water.
5. **Protection**
    - Safe from animals, children's play areas, heavy winds.

B. Suitable Spaces in a Household

- Rooftops
- Balconies
- Courtyards
- House front/back area
- Window-side shelves
- Verandas
- Boundary walls (vertical gardening)

C. Mapping the Household Garden Area

Trainees sketch a layout indicating:

- Sun direction
- Planting location
- Water source
- Space for compost bin

1.2.3 Tools, Containers & Materials Used in Kitchen Gardening

A. Basic Gardening Tools

- Hoe (Khurpa)
- Hand trowel
- Rake
- Small shovel
- Secateurs/pruning shears
- Garden gloves
- Watering can
- Spray bottle

B. Containers Used

- Plastic pots
- Clay pots
- Grow bags
- Buckets
- Wooden crates
- Plastic bottles (cut for DIY pots)
- Recycled tins
- Styrofoam boxes

C. Characteristics of Good Containers

- Adequate drainage holes
- Durable
- Appropriate size (8–16 inches for most vegetables)
- Lightweight for rooftops

1.2.4 Types and Methods of Kitchen Gardening

Kitchen gardening can be established in different formats depending on available space.

A. Horizontal Gardening

Growing directly on ground soil or beds.

B. Container Gardening

Using pots, bottles, drums, cans, and grow bags.

C. Raised-Bed Gardening

Wooden, brick, or soil-framed beds used in courtyard areas.

D. Vertical Gardening

Gardening upwards using:

- Hanging pots
- Wall-mounted vessels
- Vertical stands
- Old shoe racks
- Bamboo/pallet structures

E. Rooftop Gardening

Utilizing flat roofs (common in Peshawar, Mardan, Swabi):

- Lightweight containers
- Controlled watering

F. Kitchen Shelf & Window Gardening

For herbs like mint, basil, coriander, and lettuce.

1.2.5 Safety, Hygiene & Ethical Practices

A. Personal Safety

- Always wear gloves.
- Use tools carefully.
- Avoid barefoot gardening.

B. Garden Hygiene

- Keep tools clean.
- Remove weeds regularly.
- Maintain compost without foul smell.

C. Ethical Practices

- Avoid wasting water.
- Use natural pest control first.
- Do not dispose of waste in neighbors' areas.

1.2.6 Success Stories from Khyber Pakhtunkhwa (KPK)

A. Urban Rooftop Kitchen Gardens – Peshawar

Households in Hayatabad grew tomatoes, chilies, and coriander using recycled containers, producing 40–60% of monthly vegetable needs.

B. Women-Managed Courtyard Gardens – Mardan

Women designed small courtyard beds producing spinach, fenugreek, and okra for home use and occasional selling.

C. School Kitchen Gardens – Swabi & Charsadda

Students maintain gardens to learn plant science and support school kitchens.

D. Community Garden Plots – Abbottabad

Shared garden areas where families collectively produce seasonal vegetables.

1.3 Practical Units (PUs)

PU Code	Activity	Expected Output
PU 1.3.1	Identify and map household gardening site	Site selection sketch with sun/water notes
PU 1.3.2	Demonstrate safe tool use & container preparation	Cleaned, drilled containers; correct tool usage
PU 1.3.3	Identify and classify types of kitchen gardening	Practical identification sheet
PU 1.3.4	Discuss and review success stories	Group discussion summary

1.4 Assessment Criteria

Domain	Indicators	Assessment Method
Knowledge	Defines kitchen gardening; explains site selection; lists types of gardening	Written/oral test
Skills	Prepares container, selects site, handles tools safely	Practical checklist
Attitude	Demonstrates responsibility, hygiene, motivation	Trainer observation

Module 2: Soil Preparation and Fertility for Kitchen Gardening

Module Duration:

- **Theory:** 2 Hours
- **Practical:** 6 Hours

2.1 Module Objectives:

By the end of this module, trainees will be able to:

1. Identify soil types commonly found in Pakistan, specifically in Khyber Pakhtunkhwa (KPK).
2. Understand the role of organic matter and composting in soil fertility.
3. Prepare an ideal potting mix suitable for containers and raised beds.
4. Apply safe and effective natural soil amendments.
5. Conduct soil sterilization using locally available methods.

2.2 Learning Units (LUs):

Learning Unit	Description	Key Learning Outcomes
LU 1	Soil types suitable for container and raised bed gardening	Identify characteristics of loamy, sandy, clay, and alluvial soils found in KPK
LU 2	Organic matter, composting, & natural fertilizers	Understand importance of organic inputs (FYM, leaf mold, compost)
LU 3	Creating the perfect potting mix	Prepare a balanced growing medium for vegetables
LU 4	Natural soil amendments	Use neem cake, bone meal, gypsum, crushed eggshells, and ash safely
LU 5	Soil sterilization methods	Apply solarization and heat sterilization to control pathogens
LU 6	Home Assignment	Prepare soil mix at home for 2

2.2.1 What is Soil?

Soil is the upper layer of the earth's surface in which plants grow. It is composed of minerals, organic matter, air, and water.

Soil is not just dirt — it is a living ecosystem that supports plants, microorganisms, and nutrients vital for agriculture.

In Pakistan, soils vary from sandy deserts in Sindh to loamy plains in Punjab and mountain soils in KPK and Gilgit Baltistan. In KPK, soils are generally loamy and silty, with varying fertility depending on rainfall and management. River valleys such as Peshawar and Mardan have rich alluvial soils, while hilly areas of Malakand and Hazara face erosion and shallower topsoil.

Soil Types in KPK

1. Loamy Soil (Ideal soil)

Found in: Peshawar Valley, Mardan, Swabi, Charsadda.
Characteristics:

- Balanced mix of sand, silt, and clay
- Good drainage and good nutrient retention
- Perfect for vegetables like tomatoes, chilies, spinach, coriander

2. Clay Soil

Found in: Bannu, Lakki Marwat, Kohat.
Characteristics:

- Heavy, compact, poor drainage
- Suitable only when mixed with sand + compost

3. Sandy Soil

Found in: D.I. Khan, Karak, Tank.
Characteristics:

- Drains water too quickly
- Needs a high percentage of compost

4. Mountain Soil

Found in: Swat, Dir, Mansehra, Abbottabad.
Characteristics:

- Low fertility, prone to erosion
- Best for herbs and leafy greens when amended with compost.

2.2.2 Soil Types Suitable for Container and Raised-Bed Gardening

1. Loamy Soil (Best Option)

Areas: Peshawar, Mardan, Swabi, Charsadda
Features: Balanced sand–silt–clay, fertile, drains well, retains moisture.
Why ideal: Supports all vegetables, excellent aeration, easy to work with.
Use: 30% of potting mix.

2. Sandy Soil (Needs Improvement)

Areas: D.I. Khan, Karak, Tank
Features: Fast drainage, low nutrients, gritty texture.
Fix: Add compost + coco peat.

3. Clay Soil (Use with amendments)

Areas: Bannu, Kohat, Lakki Marwat **Fix:** Add sand + compost + gypsum.

4. Silty Soil (Moderately suitable)

Fix: Add compost + coco peat.

5. Mountain Soil (Requires major improvement)

Fix: Add compost + leaf mold.

6. Alluvial Soil (Very good for raised beds)

Areas: Peshawar Valley.

2.2.3 Organic Matter, Composting, & Natural Fertilizers

1. Organic Matter

Organic matter includes all natural materials that come from plants or animals and decompose to improve soil health.

In KPK, common sources include:

- **Farmyard manure (FYM)** — cow or buffalo dung mixed with straw
- **Kitchen waste** — vegetable peels, fruit scraps
- **Dry leaves and grass clippings**
- **Crop residues** — maize, wheat, pulses
- **Leaf mold** — decomposed leaves from orchards and hills

Benefits of Organic Matter

- Improves soil structure (loose, airy)
- Enhances water retention (useful for sandy soils in D.I. Khan, Karak)
- Improves drainage (helpful for clay soils in Bannu, Kohat)
- Increases natural fertility
- Adds beneficial microbes
- Eco-friendly and cheap

2. Composting

Composting is the process of breaking down organic material into nutrient-rich compost.

Simple Composting Method (KPK-friendly)

1. Select a pit or container (drum, bucket, wooden box)
2. Add **green waste** (vegetable peels, fresh leaves)
3. Add **brown waste** (dry leaves, cardboard, sawdust)
4. Add a thin layer of soil
5. Keep moist but not wet
6. Turn the pile every 7–10 days
7. Compost is ready in 6–10 weeks depending on season

Why Compost Is Important

- Natural fertilizer for vegetables
- Reduces household waste

- Improves soil fertility without chemicals
- Enhances plant growth

3. Natural Fertilizers

Natural fertilizers come from organic or mineral sources and release nutrients slowly.

Common Natural Fertilizers in Pakistan/KPK

1. **Farmyard manure (FYM)** improves overall fertility
2. **Compost** — increases organic matter
3. **Bone meal** — boosts root development (good for carrots, onions, garlic)
4. **Neem cake** — natural pest repellent
5. **Wood ash** — source of potassium (excellent for fruiting plants)
6. **Crushed eggshells** — adds calcium (helps tomatoes, chilies)
7. **Fish emulsion** (optional, where available) rapid growth booster

Benefits of Natural Fertilizers

- Safe for home-grown vegetables
- Slow, steady nutrient release
- Improve soil health long-term
- Eco-friendly and low cost
- Easily available in local markets and homes

2.2.4 Creating the Perfect Potting Mix

Ideal ratio for vegetables/herbs:

- 40% garden soil or cocopeat
- 30% compost or well-rotted manure
- 20% coarse sand or perlite (for drainage)
- 10% vermiculite (retains moisture and nutrients)

Tips:

- Avoid heavy clay soils in containers.
- Ensure mix is light, airy, and drains well.

2.2.5 Natural Soil Amendments

Natural soil amendments are *organic or mineral materials* added to soil to improve its physical condition, fertility, drainage, and nutrient availability. They are extremely useful for container gardening and raised beds, especially in KPK, where soils vary from sandy to clayey.

1. Neem Cake (Neem Seed Powder)

Source: Crushed neem seeds
Common in: Local pesticide stores, KPK bazaars

Benefits:

- Natural pest repellent
- Controls soil-borne insects and nematodes
- Improves soil fertility

How to Use:

- Add **1–2 tablespoons** per pot
- Mix into the top 2–3 inches of soil

Best for: Tomatoes, chilies, brinjals, cucumbers

2. Bone Meal

Source: Crushed animal bones
Common in: Veterinary shops, agriculture stores

Benefits:

- High in **phosphorus** → promotes strong roots
- Helps flowering & fruiting vegetables

How to Use:

- Add **1 tablespoon per pot**
- Mix lightly into soil

Best for: Carrots, beets, onions, garlic, tomatoes

3. Gypsum (Calcium Sulfate)

Highly useful in: Bannu, Kohat, Lakki Marwat (clay-heavy soils)

Benefits:

- Loosens compact clay soil
- Improves drainage
- Adds calcium & sulfur

How to Use:

- Add **1 cup per square foot** in raised beds
- Mix deeply into the soil

Best for: Clay soil improvement

4. Wood Ash

Source: Burnt firewood (common in rural KPK homes)

Benefits:

- High in potassium (K)
- Increases flowering & fruiting
- Acts as a mild pesticide

How to Use:

- Sprinkle **1–2 teaspoons** per pot
- Do NOT overuse
- Avoid on alkaline soils (some KPK regions have high pH)

Best for: Tomatoes, chilies, brinjals, fruiting crops

5. Crushed Eggshells

Source: Household eggshell waste

Benefits:

- Rich in **calcium**
- Prevents tomato & chili blossom-end rot
- Improves soil structure

How to Use:

- Wash → dry → crush finely
- Add **1 tablespoon** per pot
- Mix into soil or sprinkle on top

Best for: Tomatoes, chilies, capsicum, brinjals

6. Compost

Although compost is a full fertilizer, it is also considered an amendment.

Benefits:

- Improves soil texture
- Increases fertility
- Adds beneficial microbes
- Helps water retention

How to Use:

- 30–50% of the potting mix
- Add monthly as top dressing

7. Leaf Mold

Source: Decomposed dry leaves (common in hilly areas of KPK like Swat, Dir, Abbottabad)

Benefits:

- Excellent water retention
- Adds organic matter
- Improves aeration

How to Use:

- 10–20% of potting mix

Best for: Leafy vegetables, herbs

8. Vermicompost

Source: Worm-processed compost

Benefits:

- Highly nutrient-rich
- Improves plant health & growth
- Increases soil biological activity

How to Use:

- Add **1–2 handfuls per pot** every 3–4 weeks

Amendment	Main Benefit	Best Use	Suitability in KPK
Neem Cake	Pest control	All vegetables	Excellent
Bone Meal	Root + flower growth	Root & fruit crops	Very good
Gypsum	Fixes clay soil	Clay areas	Essential
Wood Ash	Potassium	Fruiting crops	Good in neutral soils
Eggshells	Calcium	Tomatoes, chilies	Excellent
Leaf Mold	Water retention	Green leafy crops	Ideal for hilly regions
Compost	Fertility	All vegetables	Highly recommended

2.2.5 Soil Sterilization Methods

Soil sterilization is the process of killing harmful organisms in the soil such as:

- fungi
- bacteria
- nematodes
- insect eggs
- weed seeds

This ensures healthy seedlings, better plant growth, and reduces diseases in containers and raised beds.

1. Solarization (Best Method for KPK Climate)

Solarization uses sunlight and heat to disinfect soil. Because KPK has strong summer sunlight (especially in Peshawar, D.I. Khan, Mardan), this method is very effective.

How to Do Solarization

1. Spread moist soil on a clean plastic sheet (1–2 inches thick).
2. Cover it completely with a **transparent plastic sheet**.
3. Seal the edges with stones or soil to trap heat.
4. Leave under direct sunlight for **5–7 days** in summer.
5. Heat reaches 55–70°C, killing harmful organisms.

Benefits

- Chemical-free
- Kills fungus, nematodes, pests, weed seeds
- Increases nutrient availability

Best Season: May–August

2. Heat Sterilization (Stove or Fire Method)

Useful for small quantities of soil such as seed starting mixes.

How to Do Heat Sterilization

1. Place moist soil in a metal pot or pan.
2. Heat on low flame for **15–20 minutes**.
3. Temperature should reach **70–80°C**.
4. Allow soil to cool before use.

Benefits

- Quick and effective
- Kills fungal infections and insect eggs

Warning

- Do *not* overheat — can damage soil nutrients
- Never heat dry soil (risk of burning)

3. Boiling Water Method

A safe, simple method for small containers or seedling trays.

How to Use

1. Place soil in a bucket or container.
2. Pour **boiling water** over the soil until fully wet.
3. Cover with a lid and let it sit for **24–48 hours**.
4. Allow soil to dry before planting.

Best For

- Killing weed seeds
- Treating soil used for herbs and leafy greens

4. Steam Sterilization (Where Available)

This method uses steam to kill soil pathogens.

How to Do It

1. Place soil in a perforated container.
2. Put container over boiling water.
3. Steam the soil for **30 minutes**.

Benefits

- Very effective
- Preserves nutrients better than heating

Limitation

- Requires a steamer setup
- Not common in rural areas of KPK

5. Natural Biological Sterilization (Home-friendly)

Uses organic materials that suppress harmful soil organisms.

Methods

- Adding neem cake
- Mixing fresh compost containing beneficial microbes
- Incorporating Trichoderma (biofungus) if available

Benefits

- Builds long-term soil health
- Safe for vegetables

Summary Table: Soil Sterilization Methods

Method	Best For	Duration	Suitability for KPK
Solarization	Large amounts of soil	5–7 days	Excellent
Heat Sterilization	Seed starting soil	15–20 min	Very good
Boiling Water	Small pots, trays	24–48 hrs	Good
Steam Sterilization	Nurseries, precise work	30 min	Moderate
Biological Method	Improving soil ecosystem	Ongoing	Excellent

2.3 Practical Units Table

PU Code	Activity Description	Expected Output
PU 2.3.1	Collect and classify soil samples (loamy, sandy, clay, mountain)	Soil texture comparison chart
PU 2.3.2	Conduct soil moisture, and drainage tests	Recorded test results with observations
PU 2.3.3	Prepare organic compost using kitchen waste & dry leaves	Properly layered compost pile started
PU 2.3.4	Demonstrate soil sterilization (solarization, boiling water, heat method)	Sterilized soil sample ready for potting
PU 2.3.5	Prepare a complete potting mix using recommended ratios	Balanced potting mix sample submitted
PU 2.3.6	Add natural amendments (neem cake, eggshells, ash, bone meal)	Amendment chart with correct dosages
PU 2.3.7	Home assignment: Prepare soil mix for 2–3 containers	Home potting mix report with photos

2.4 Assessment Criteria

Assessment Criteria Table

Domain	Indicators	Assessment Method
Knowledge	Identifies soil types in KPK; explains importance of organic matter; describes composting steps; understands amendments & sterilization methods	Oral questioning, written quiz, concept check worksheets
Skills	Performs soil texture; prepares compost; sterilizes soil correctly; mixes potting mix in correct ratios	Practical demonstration, performance observation checklist, skill-based assessment
Practical Application	Applies correct soil amendments; prepares potting mix for containers; submits home assignment with evidence	Portfolio review, practical task evaluation, trainer observation
Attitude	Shows responsibility, maintains hygiene, practices safe handling, collaborates with peers	Observation during activities, peer feedback,

Module 3: Growing Media, Containers and Bed Preparation

Module Duration:

- Theory: 1 Hour
- Practical: 6 Hours

3.1 Module Objectives

By the end of this module, trainees will be able to:

1. Identify different types of containers suitable for kitchen gardening.
2. Distinguish between raised-bed, ground-bed, and vertical gardening structures.
3. Prepare DIY containers using recycled household materials.
4. Establish proper drainage and aeration systems in containers and raised beds.
5. Demonstrate correct filling and leveling techniques for containers and beds.
6. Maintain safety and hygiene while handling tools and equipment during bed/container preparation.

3.2 Learning Units (LUs)

LU Code	Learning Unit Title	Description
LU 1	Types of Containers (pots, grow bags, crates, etc.)	Introduces various containers suitable for vegetables and herbs based on crop needs, cost, and space.
LU 2	Raised Beds vs. Vertical Gardening	Understanding two major garden structures, their uses, advantages, and suitability for KPK households.
LU 3	DIY Container Preparation	Hands-on activity to create containers using recycled materials (plastic bottles, cans, buckets, etc.).
LU 4	Drainage and Aeration	Techniques for ensuring proper drainage and aeration in pots and raised beds.
LU 5	Home Assignment	Practical reinforcement task.

3.2.1 Types of Containers (pots, grow bags, crates, etc.)

- Types of containers used in kitchen gardening:
    - Plastic pots
    - Clay pots
    - Fabric grow bags
    - Wooden crates

    - Styrofoam boxes
    - Plastic buckets
    - Drum halves
    - Recycled plastic bottles & jars
- Crop–container matching (e.g., tomatoes need 12–16 inch depth, leafy vegetables need shallow containers)
- Advantages & disadvantages of each container type
- Weight considerations for rooftop gardening

3.2.2 Raised Beds vs. Vertical Gardening

The trainee must know:

- Structure and components of raised beds
- Best crops for raised beds (peas, tomatoes, okra, coriander)
- Best crops for vertical gardens (spinach, lettuce, herbs)
- Material options for constructing raised beds (wood, bricks, bamboo)
- Different vertical supports like racks, shelves, bottle towers
- Suitability of each method in KPK climate and small houses

Advantages of Raised Beds:

- Less soil compaction
- Faster warming of soil
- Improved drainage
- Higher yields

Advantages of Vertical Gardening:

- Space-saving
- Better air circulation
- Aesthetic appeal
- Good for balconies

3.2.3 DIY Container Preparation

- Household materials that can be recycled into containers
- Importance of drainage holes
- Safe cutting techniques for plastic and tin
- Environmental benefits of recycling
- Hygiene requirements

Create DIY containers using:

- Plastic bottles
- Tin cans
- Buckets
- Damaged pots
- Styrofoam boxes
    - Cut containers safely
    - Smooth rough edges
    - Add appropriate drainage holes
    - Clean and sterilize containers before use

3.2.4 Drainage & Aeration

Why Drainage is Important?

- Prevents waterlogging
- Avoids root rot
- Supports healthy root development

How to Improve Drainage

- Make holes in bottom
- Add gravel, stones, or broken pot pieces
- Use sand + compost mix
- Avoid compacted soil

Aeration Techniques

- Mix coco peat or leaf mold
- Loosen topsoil weekly
- Use breathable containers like clay or fabric bags

3.2.5 Home Assignment

Trainees will:

- Select 2–3 containers at home
- Prepare them for planting
- Add drainage system
- Submit photos + short write-up

3.3 PRACTICAL UNITS (PUs)

PU Code	Practical Activity	Expected Output
PU 3.1	Identify container types	Trainee identifies & categorizes at least 6 container types
PU 3.2	Compare raised vs vertical structures	Chart summarizing differences and uses
PU 3.3	Prepare DIY container	Completed container with clean edges & drainage holes
PU 3.4	Create drainage layers	Properly drained pot/bed with layering
PU 3.5	Home Assignment	Photos/sketches of containers arranged at home

3.4 Assessment Criteria

Domain	Indicators	Assessment Method
Knowledge	Explains container types, raised bed uses, drainage principles	Written/oral test
Skills	Creates DIY containers, drills holes, arranges drainage layers	Practical checklist
Attitude	Demonstrates safety, cleanliness, proper tool use	Trainer observation

Module 4: Plant Selection, Sowing & Nursery Management

Module Duration

- **Theory:** 1 hour
- **Practical:** 6 hours

4.1 Module Objectives

After completing this module, trainees will be able to:

1. Identify seasonal vegetables and herbs suitable for kitchen gardening in Khyber Pakhtunkhwa.
2. Select high-quality seeds and appropriate varieties based on space, climate, and household use.
3. Apply correct seed sowing techniques for trays, pots, and raised beds.
4. Prepare a nursery using proper media, hygiene, and environmental conditions.
5. Transplant seedlings into containers or beds safely and efficiently.
6. Use companion planting techniques to improve yield, reduce pests, and optimize space.

4.2 Learning Units (LUs)

LU Code	Learning Unit Title	Description
LU 1	Seasonal Vegetables & Herbs	Understanding crop seasons, climate suitability, and selection criteria for KPK.
LU 2	Seed Sowing Techniques	Principles of sowing depth, spacing, methods, moisture, and germination.
LU 3	Nursery Preparation & Transplanting	Establishing a nursery, preparing media, caring for seedlings, and transplanting.
LU 4	Companion Planting	Crop combinations for pest control, yield improvement, and space use.

4.2.1 Seasonal Vegetables & Herbs

Kitchen gardening requires selecting crops that match local climate conditions. KPK has three distinct zones:

1. **Hot plains** (Peshawar, Mardan, Charsadda)
2. **Semi-cool areas** (Haripur, Abbottabad)
3. **Cool northern regions** (Swat, Dir, Chitral)

A. Summer Vegetables (March–August)

These crops grow well in high temperatures:

- Tomato (summer hybrid)
- Okra
- Eggplant
- Chillies
- Cucumber
- Pumpkin
- Bottle gourd
- Bitter gourd
- Cowpeas and beans

B. Winter Vegetables (September–February)

Suitable for cool conditions:

- Spinach
- Lettuce
- Peas
- Coriander
- Carrot
- Radish
- Garlic
- Fenugreek
- Cauliflower

C. Year-Round Herbs

- Mint
- Thyme
- Oregano
- Lemon balm
- Basil (summer)
- Spring onion

D. Crop Selection Criteria

- **Space:** Small balconies → leafy veggies; rooftops → fruiting crops.
- **Light:** Tomatoes need 6–8 hrs; coriander grows in partial shade.
- **Growth Duration:** Fast-growing (spinach) for beginners; long-duration (tomato) for experienced gardeners.

- **Household Preference:** Crops used daily give best value.
- **Pest Resistance:** Heat-tolerant hybrids recommended for plains.

4.2.2 Seed Sowing Techniques

Seed sowing determines germination success, seedling vigor, and uniform plant growth.

A. Principles of Seed Sowing

1. Sowing Depth

General rule: sow seeds at a depth **1–2 times their diameter**.

- Tiny seeds (lettuce, basil): surface sow.
- Medium seeds (tomato, coriander): 0.5–1 cm deep.
- Large seeds (beans, peas): 2–3 cm.

2. Moisture Requirements

- Soil must be moist but never waterlogged.
- Mist spraying is ideal to avoid seed displacement.

3. Temperature Needs

- Tomato, chili: 20–28°C
- Cucumber, gourds: 25–35°C
- Lettuce, spinach: 10–20°C

4. Light Requirements

- Lettuce needs light for germination.
- Most vegetables prefer darkness until sprouting.

B. Sowing Methods

1. Direct Sowing

Suitable for:

- Spinach
- Coriander
- Radish
- Carrot
- Beans

Advantages: Less shock, rapid growth.

2. Nursery Sowing

Used for:

- Tomato
- Chili
- Eggplant
- Lettuce
- Cabbage family

Advantages: Controlled environment → stronger seedlings.

C. Common Mistakes

- Sowing too deep
- Heavy clay soil
- Overwatering
- Wrong season sowing
- No labeling

4.2.3 Nursery Preparation & Transplanting

A nursery ensures healthy seedlings before transplanting into the main container or bed.

A. Nursery Requirements

1. **Site:**

- Partial shade (50–60%)
- Away from direct noon heat
- Good airflow
- Close to water source

2. **Medium Composition (Recommended):**

- 1 part compost
- 1 part fine sand
- 1 part cocopeat or leaf mould

Light, loose, disease-free.

3. **Soil Sterilization:**

- Solarization for 2–3 days
- Removing stones & debris

4. **Watering:**

- Use spray bottle
- Avoid compacting soil

B. Nursery Preparation Steps

1. Fill trays/pots with nursery medium
2. Level the surface
3. Draw shallow lines
4. Sow seeds evenly
5. Cover lightly
6. Mist water
7. Shade trays for 2–3 days

C. Seedling Care

Thinning:

Remove weak seedlings to prevent overcrowding.

Hardening:

Expose seedlings gradually to outdoor conditions for 2–3 days.

D. Transplanting Techniques

Ideal stage: 2–4 true leaves

Method:

- Water nursery before removing seedlings
- Lift seedlings with soil ball
- Make hole in container
- Place seedling upright
- Press soil gently around roots
- Water lightly
- Provide shade for 24 hours

4.2.4 Companion Planting

Companion planting improves garden productivity and reduces pests naturally.

A. Benefits

- **Pest control:** basil repels whiteflies; marigold repels nematodes
- **Improved nutrition:** beans fix nitrogen
- **Better space use:** tall + short crops combination
- **Higher yields:** reduced competition

B. Good Companion Pairs

Crop	Companion	Benefit
Tomato	Basil, garlic	Pest control
Cucumber	Beans	Nitrogen fixation
Lettuce	Peas	Shade from pea vines
Spinach	Spring onion	Efficient space use
Carrot	Radish	Radish loosens soil

C. Bad Combinations

- Tomato + Potato → disease spread
- Onion + Beans → growth inhibition
- Mint + any crop → invasive

4.3 Practical Units (PUs)

PU Code	Practical Activity	Expected Output
PU 4.3.1	Identify seasonal vegetables & herbs	Correctly categorized list of crops
PU 4.3.2	Demonstrate proper seed sowing	Evenly sown trays/pots
PU 4.3.3	Prepare nursery & perform transplanting	Healthy transplanted seedlings
PU 4.3.4	Prepare a companion planting layout	Functional planting design

4.4 Assessment Criteria

Domain	Indicators	Assessment Method
Knowledge	Explains seasonal crops, sowing depth, and nursery principles	Oral/written test
Skills	Performs sowing, nursery preparation, transplanting correctly	Practical observation
Attitude	Works neatly, handles seedlings gently, follows safety	Trainer checklist

Module 5: Water, Nutrients, and Pest Management

Module Duration
Theory: 1 hour
Practical: 6 hours

5.1 Module Objectives

After completing this module, trainees will be able to:

- Apply appropriate irrigation methods for container and raised-bed gardening.
- Prepare natural pest repellents using neem, garlic, chili, and other safe ingredients.
- Make and use compost tea and liquid organic fertilizers.
- Identify and control weeds in small-scale gardens.
- Identify common pests and diseases and use organic, low-cost solutions for prevention.
- Develop safe, eco-friendly pest and weed management habits.

5.2 Learning Units (LUs)

LU Code	Learning Unit Title	Description
LU 1	Irrigation Techniques	Drip, manual, and efficient watering methods for small gardens.
LU 2	Natural Pest Repellents	Preparing neem spray, garlic-chili spray, and other organic repellents.
LU 3	Compost Tea & Liquid Fertilizers	Making nutrient-rich compost tea, bio-extracts, and organic feeds.
LU 4	Weed Control	Methods for controlling weeds in small containers and raised beds.
LU 5	Common Pests & Diseases	Identification and prevention using organic pesticides and DIY traps.
LU 6	Home Assignment	Applying irrigation, feeding, and pest control at home.

LU 5.2.1 Irrigation Techniques

Efficient irrigation increases plant growth and reduces water waste.

A. Manual Irrigation

- Watering cans, small mugs, plastic bottles.
- Ideal for balconies and rooftops.

Rules:

- Water at soil level
- Early morning or evening only
- Avoid splashing leaves

B. Drip Irrigation

- Slow and targeted watering
- Uses pipes or small holes near roots
- Saves up to 50% water

Useful for **KPK hot plains** where evaporation is high.

C. Moisture Check

- Insert finger 2–3 cm into soil → if dry, water
- Overwatering causes fungal problems

5.2.2 Natural Pest Repellents

Chemical pesticides are unsafe for kitchen gardening; natural sprays are safer.

A. Neem Spray

- Crush 10–15 neem leaves
- Boil in 1 liter water
- Cool + strain + add 1 tsp soap
- Spray weekly

Controls: whiteflies, aphids, mealybugs.

B. Garlic–Chili Spray

- Blend 5 garlic cloves + 2 green chilies
- Mix with 1 liter water
- Strain + add liquid soap (few drops)

Controls: caterpillars, mites, leaf miners.

C. Soap Spray

- 1 tsp liquid soap + 1 liter water
- For soft-bodied insects (aphids).

5.2.3 Compost Tea & Liquid Fertilizers (Practical)

Organic liquid fertilizers strengthen plants naturally.

A. Compost Tea

- 1 cup compost + 1 liter water

- Rest 24–36 hours
- Filter
- Dilute 1:3
- Apply every 10–15 days

B. Manure Tea

- Soak a handful of cow manure in water overnight
- Strain + dilute
- Use for leafy vegetables

C. Banana Peel Extract

- Soak banana peels in water for 2–3 days
- Potassium-rich feed for fruiting crops

5.2.4 Weed Control

A. Manual Weeding

- Hand removal
- Weekly soil loosening

B. Mulching

- Dry leaves, straw, or newspaper
- Prevents weed growth
- Reduces evaporation

C. Preventive Measures

- Do not over-fertilize
- Avoid contaminated soil

5.2.5 Common Pests & Disease Prevention

A. Common Pests

- Aphids
- Whiteflies
- Caterpillars
- Mealybugs
- Red mites

B. DIY Pest Traps

1. **Yellow Sticky Trap**
    - Apply oil on yellow paper

- Attracts whiteflies and aphids

2. **Yogurt Trap**
    - Attracts snails and slugs
3. **Light Trap**
    - For moths and night pests

C. Disease Prevention

- Avoid overhead watering
- Use sterilized soil
- Maintain spacing
- Remove diseased leaves immediately.

5.2.6 Home Assignment

Trainees will:

- Apply irrigation and pest control methods at home
- Prepare one natural spray
- Submit photos + short reflection

5.3 Practical Units (PUs)

PU Code	Practical Activity	Expected Output
PU 1	Demonstrate manual & drip irrigation	Correct watering technique
PU 2	Prepare neem or garlic-chili spray	Natural pest spray
PU 3	Prepare compost tea	Ready-to-use fertilizer
PU 4	Perform weeding & mulching	Weed-free, mulched container
PU 5	Identify common pests & set traps	DIY pest trap setup
PU 6	Home Assignment	Photos + activity report

5.4 Assessment Criteria

Domain	Indicators	Assessment Method
Knowledge	Understands irrigation methods, pest life cycles, and fertilizer use	Written/oral test
Skills	Prepares sprays, compost tea, performs irrigation correctly	Practical observation
Attitude	Works safely, avoids chemical misuse, maintains cleanliness	Trainer checklist

Module 6: Harvesting, Storage and Business Ideas

Module Duration

Theory: 1 hour

Practical: 6 hours

6.1 Module Objectives

After completing this module, trainees will be able to:

- Identify maturity stages for commonly grown vegetables and herbs.
- Harvest vegetables safely without damaging plants.
- Apply simple post-harvest cleaning and storage techniques.
- Prepare vegetables for short-term storage and household use.
- Market surplus produce using basic selling techniques.
- Explore micro-entrepreneurship opportunities in kitchen gardening (seedlings, potting mix, starter kits).
- Participate in final practical assessment and viva.

6.2 Learning Units (LUs)

LU Code	Learning Unit Title	Description
LU 1	Identifying Maturity Stages	Recognizing when vegetables and herbs are ready for harvest.
LU 2	Post-Harvest Storage	Cleaning, sorting, drying, and storing produce.
LU 3	Marketing Surplus Produce	Basic techniques to sell extra vegetables locally.
LU 4	Micro-Entrepreneurship	Generating business ideas related to kitchen gardening.
LU 5	Practical Assessment & Viva	Final skill evaluation.
LU 6	Certificates Distribution	Awarding certificates to trainees.

6.2.1 Identifying Maturity Stages

Recognizing the right time to harvest ensures better taste, quality, and plant health.

A. Leafy Vegetables

- Spinach: soft, full leaves
- Coriander: ready in 20–25 days
- Lettuce: firm heads

B. Root Vegetables

- Radish: root shoulders visible above soil
- Carrot: bright tops, firm roots
- Beetroot: round firm bulbs

C. Fruiting Vegetables

- Tomato: red or pink depending on variety
- Chili: shiny and firm
- Eggplant: glossy, passes thumb-press test

D. Herbs

- Harvest before flowering for best aroma

E. Harvesting Rules

- Harvest early morning
- Use clean scissors or shears
- Avoid pulling to prevent plant damage

6.2.2 Post-Harvest Storage

Proper handling increases shelf life and reduces waste.

A. Cleaning & Sorting

- Remove damaged leaves
- Rinse lightly if required
- Air-dry before storing

B. Storage Methods

- Leafy greens → wrap in moist cloth, refrigerate
- Tomatoes → room temperature
- Herbs → hang in bundles to dry
- Roots → remove tops, refrigerate

C. Packaging Options

- Paper bags
- Small baskets
- Newspaper wraps
- Reusable plastic crates

6.2.3 Marketing Surplus Produce

A. Selling Options

- Community groups
- Neighbors
- WhatsApp family circles
- Small local markets

B. Pricing Methods

- Simple cost + profit
- Bundle pricing (3 bunches for Rs. 30)

C. Presentation

- Clean produce
- Neat and simple packaging
- Clear labeling (optional)

6.2.4 Micro-Entrepreneurship

Kitchen gardening offers small business opportunities for home-based income.

A. Possible Business Ideas

- Selling vegetable seedlings
- Selling potting mix or compost
- Organic fertilizer kits
- Fresh herbs
- Kitchen gardening starter kits

B. Basic Business Skills

- Cost calculation
- Estimating selling price
- Communicating with customers
- Keeping simple records

6.3 Practical Units (PUs)

PU Code	Practical Activity	Expected Output
PU 6.3.1	Identify maturity stages & harvest crops	Properly harvested produce
PU 6.3.2	Clean and store vegetables	Fresh, ready-to-use produce
PU 6.3.3	Prepare a marketable bundle	Neatly packed sample product
PU 6.3.4	Prepare a micro-business idea	Written idea or small prototype
PU 6.3.5	Final assessment and viva	Demonstrated competency

6.4 Assessment Criteria

Domain	Indicators	Assessment Method
Knowledge	Explains maturity signs and storage methods	Oral/written test
Skills	Correctly harvests, cleans, stores, and packages produce	Practical observation
Attitude	Works neatly, handles produce hygienically	Trainer checklist
Entrepreneurship	Presents a feasible micro-business idea	Viva + evaluation

KP-RETP – Component 2: Classroom SECAP Evaluation Checklist

Purpose:

To ensure that classroom-based skills and entrepreneurship trainings under KP-RETP are conducted in an environmentally safe, socially inclusive, and climate-resilient manner, in line with the Social, Environmental, and Climate Assessment Procedures (SECAP).

Evaluator: _____

Training Centre / Location: _____

Trainer: _____

Date: _____

Category	Evaluation Points	Status		Remarks /Recommendation
		Yes	NO	
Social Safeguards	Is the training inclusive (equal access for women, youth, and vulnerable groups)?			
	Does the classroom environment ensure safety and dignity for all participants (no harassment, discrimination, or child Labor)?			
	Are Gender considerations integrated into examples, discussions, and materials?			
	Is the Grievance Redress Mechanism (GRM) process, along with the relevant contact number, clearly displayed in the classroom			

	Are the Facilities and activities being accessible and inclusive for specially-abled (persons with disabilities)			
Environmental Safeguards	Is the classroom clean, ventilated, and free from pollution or hazardous materials?			
	Is there proper waste management (bins, no littering)			
	Are materials used in practical sessions environmentally safe (non-toxic paints, safe disposal of wastes)?			
	Are lights, fans, and equipment turned off when not in use (energy conservation)?			
Climate Resilience	Are trainees oriented on how their skills link with climate-friendly practices (e.g.,			

	renewable energy, efficient production, recycling)?			
	Are trainers integrating climate-smart examples in teaching content?			
	Are basic health and safety measures available (first aid kit, safe exits, fire safety)?			
	Is the trainer using protective gear or demonstrating safe tool use (where relevant)?			
Institutional Aspects	Is SECAP awareness shared with trainees (via short briefing, posters, or examples)?			
	Are trainees encouraged to report unsafe, unfair, or environmentally harmful practices?			
Overall Compliance	Overall SECAP compliance observed	☐ High ☐ Medium		

		☐ Low	

Overall remarks/ recommendations			
Name	**Designation**	**Signature**	**Date**