TOMATO			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0 - 15 days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5–6.5 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Azospirillum, Phosphobacteria, or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 days	Micro Nutrients Management	**Supplementary Feed:** Biological control -At 2 Weeks After Germination: Apply a diluted solution of fish emulsion or compost tea (1:10 ratio). -Spray with seaweed extract (1:15 dilution) to provide potassium and trace elements for root strengthening. Cultural control: -Use well-rotten vermicompost for top-dressing around seedlings to provide a slow-release nutrient source. **Frequency:** -Feed once every 10–14 days, ensuring not to over-fertilize.
Pre-Seedling Stage	15- 25 days	Irrigation Management	**Watering Frequency:** -Keep the growing medium consistently moist but not waterlogged. Overwatering can lead to fungal diseases. -Water once the top 1–2 cm of the medium feels dry to the touch. **Method:** -Use a watering can with a fine nozzle or drip irrigation to avoid disturbing delicate seedlings. -Water early in the morning to reduce humidity and allow leaves to dry, preventing fungal infections.
Pre-Seedling Stage	15- 25 days	Pest Management	**a)Aphids:** Biological control -Spray with neem oil -5ml/L of water + a few drops of liquid soap. -Ladybugs. Cultural control - Crop rotation Physical control - Yellow/Blue Sticky Traps - Pruning **b) Whiteflies:** Biological control -Spray with a garlic or chili extract solution. Cultural control - Remove weeds Physical control -Use yellow sticky traps **c) Cutworms**: Biological conrol - Sprinkle neem cake or wood ash around the seedlings as a natural deterrent. Cultural control - Remove crop residues. Physical control - Handpicking Worms
Pre-Seedling Stage	15- 25 days	Disease Management	**a)Damping-Off:** Biological control -Treat seeds with Trichoderma viride before sowing. -Water with a solution of diluted cow urine or vermi wash to suppress fungal activity. Cultural control - Avoid Excessive Watering. Physical control -Avoid overwatering and ensure proper drainage. **b)Leaf Spot Diseases:** Biological control -Spray a solution of 1% Bordeaux mixture or diluted neem oil. Cultural control - Control Nightshade weeds Physical control - Solarization - Sterilization **c)Powdery Mildew:** Biological control -Spray a mix of milk 10% and water. Cultural control -Proper Plant Spacing Physical control - Periodic clipping of lower leaves

Vegetative Stage	25 - 40 days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	25- 40 days	Nutrient Deficiency Managemer	**1) Nitrogen Deficiency:** -Symptoms: Yellowing of older leaves; stunted growth. -Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Phosphorus Deficiency:** -Symptoms: Purplish tint on leaves and stems; slow growth. -Solution: Add bone meal or fish emulsion. **3) Potassium Deficiency:** -Symptoms: Browning or scorching on leaf edges; weak stems. -Solution: Apply wood ash or potassium-rich organic fertilizers. **4) Magnesium Deficiency:** -Symptoms: Yellowing between leaf veins (interveinal chlorosis) -Solution: Spray a foliar solution of Epsom salt -1 tsp/L of water). **5) Micronutrient Deficiency:** -Symptoms: General stunted growth and discoloration. -Solution: Use seaweed extract or micronutrient-enriched compost teas.
Vegetative Stage	25- 40 days	Irrigation Management	**Watering Frequency:** - Consistency: Maintain consistent moisture in the medium without waterlogging. **Frequency:** - Water deeply 2–3 times a week depending on weather and soil drainage. - Adjust for hotter climates with more frequent watering.
Vegetative Stage	25 - 40 days	Pest Management	**a)Aphids:** Biological control -Spray with neem oil -5ml/L of water + a few drops of liquid soap. -Introduce natural predators like ladybugs. Cultural control - Crop rotation Physical control - Yellow/Blue Sticky Traps - Pruning **b) Whiteflies:** Biological control -Spray with a garlic or chili extract solution. Cultural control - Remove weeds Physical control -Use yellow sticky traps **c) Leaf Miners:** Biological control - Apply neem oil or bio-pesticides like Beauveria bassiana. Cultural control - Pest Deterrent Plant: Columbine, Lambsquarter, Velvet leaf Physical control -Remove infested leaves. **d) Thrips:** Biological control -Lacewing larvae -Ladybird beetle Cultural control - Avoid planting Next to Onion & Garlic Physical control

Vegetative Stage	25- 40 days	Disease Management	**a) Damping-Off:** Biological control - Treat seeds with Trichoderma viride before sowing. - Water with a solution of diluted cow urine or vermi wash to suppress fungal activity. Cultural control - Avoid Excessive Watering. Physical control - Avoid overwatering and ensure proper drainage. **b) Leaf Spot Diseases:** Biological control - Spray a solution of 1% Bordeaux mixture or diluted neem oil. Cultural control - Control Nightshade weeds Physical control - Solarization **c) Powdery Mildew:** Biological control - Spray a mix of milk 10% and water. Cultural control -Proper Plant Spacing Physical control - Periodic clipping of lower leaves **d) Bacterial Spot:** Biological control - Pseudomonas fluorescens - Bacillus subtilis Cultural control - Use disease free seedlings Physical control - Solarization
Flowering Stage	40 - 60 days	Micro Nutrients Management	**1) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **2) Potassium (K):** - Essential for flower and fruit quality. - Application: Use potassium sulfate or banana peel tea. **3) Calcium (Ca):** - Prevents flower and fruit deformities. - Application: Foliar spray calcium chloride every 2–3 weeks. **4) Micronutrients:** - Boron and zinc are crucial for flower retention. - Application: Use seaweed extract or organic trace element solutions. **Frequency:** - Feed plants every 10–14 days with balanced organic fertilizers that are higher in phosphorus and potassium.
Flowering Stage	40 - 60 days	Nutrient Deficiency Managemen	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves and stunted growth. - Solution: Apply a mild organic nitrogen feed, like fish emulsion (low concentration). **2) Phosphorus Deficiency:** - Symptoms: Purplish leaf undersides and reduced flower production. - Solution: Add bone meal or phosphorus-rich organic fertilizers. **3) Potassium Deficiency:** - Symptoms: Yellowing and browning along leaf edges; weak flowering. - Solution: Use wood ash or potassium-rich fertilizers. **4) Calcium Deficiency:** - Symptoms: Blossom-end rot and distorted leaves. - Solution: Apply calcium nitrate or eggshell tea. **5) Magnesium Deficiency:** - Symptoms: Yellowing between leaf veins. - Solution: Foliar spray of Epsom salt -1 tsp/L of water **6) Micronutrient Deficiencies (Zinc, Boron):** - Symptoms: Poor flower development and leaf discoloration.
Flowering Stage	40 - 60 days	Irrigation Management	**1) Regularity:** - Water deeply 2–3 times per week or as needed to maintain consistent moisture. **2) Avoid Overwatering:** - Excess moisture can lead to fungal issues like gray mold or root rot.

Flowering Stage	40 - 60 days	Pest Management	**a)Aphids:** Biological control -Spray with neem oil -5ml/L of water + a few drops of liquid soap. -Introduce natural predators like ladybugs. Cultural control - Crop rotation Physical control - Yellow/Blue Sticky Traps - Pruning **b) Whiteflies:** Biological control -Spray with a garlic or chili extract solution. Cultural control - Remove weeds Physical control -Use yellow sticky traps **c) Leaf Miners:** Biological control -Apply neem oil or bio-pesticides like Beauveria bassiana. Cultural control - Pest Deterrent Plant: Columbine, Lambsquarter, Velvet leaf Physical control -Remove infested leaves. **d) Thrips:** Biological control -Lacewing larvae -Ladybird beetle Cultural control - Avoid planting Next to Onion & Garlic Physical control - Yellow/Blue Sticky Traps **d) Fruit Borers:** Biological control - Spray bio-pesticides like Bacillus thuringiensis (Bt). Cultural control - Sanitation
Flowering Stage	40 - 60 days	Disease Management	**a)Leaf Spot Diseases:** Biological control - Spray a solution of 1% Bordeaux mixture or diluted neem oil. Cultural control - Control Nightshade weeds Physical control - Solarization **b)Powdery Mildew:** Biological control - Spray a mix of milk 10% and water. Cultural control -Proper Plant Spacing Physical control - Periodic clipping of lower leaves **c)Bacterial Spot:** Biological control - Pseudomonas fluorescens - Bacillus subtilis Cultural control - Crop Rotation Physical control - Removal of Infected Plants **d) Flower Drop (Environmental Stress):** Biological control - Azospirillum Cultural control - Maintain temperature Physical control
Fruiting Stage	60- 90 days	Micro Nutrients Management	**1) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **2) Potassium (K):** - Essential for flower and fruit quality. - Application: Use potassium sulfate or banana peel tea. **3) Calcium (Ca):** - Prevents flower and fruit deformities. - Application: Foliar spray calcium chloride every 2–3 weeks. **4) Micronutrients:** - Boron and zinc are crucial for flower retention. - Application: Use seaweed extract or organic trace element solutions. **Frequency:** - Feed plants every 10–14 days with balanced organic fertilizers that are higher in phosphorus and potassium. - Avoid excessive nitrogen to prevent excessive leaf growth over flower formation.

Fruiting Stage	60 - 90 days	Nutrient Deficiency Managemer	**1) Calcium Deficiency (Blossom-End Rot):** - Symptoms: Sunken spots at the blossom-end of fruits. - Solution:Foliar spray with calcium chloride or calcium nitrate. **2) Potassium Deficiency:** - Symptoms: Browning or scorching at leaf edges; poor fruit quality. - Solution: Apply potassium sulfate or banana peel tea. **3) Magnesium Deficiency:** - Symptoms: Yellowing between veins of older leaves. - Solution:Foliar spray with Epsom salt (1 tsp/liter water). **4) Nitrogen Deficiency:** - Symptoms: Pale green leaves and stunted growth of fruits. - Solution: Apply organic nitrogen sources like compost tea sparingly. **5) Micronutrient Deficiencies:** - Symptoms: Poor fruit development and discoloration. - Solution:Use seaweed extract or micronutrient-enriched liquid fertilizers.
Fruiting Stage	60 - 90 days	Irrigation Management	**Watering Frequency:** **1) Consistency:** - Keep the medium consistently moist but avoid waterlogging. - Water deeply 2–3 times a week or more frequently during hot weather. **2) Method:** - Drip Irrigation: Ideal for precise water delivery to roots. - Hand Watering: Water at the base to prevent wetting fruits and leaves. **3) Avoid Water Stress:** - Uneven watering can lead to fruit cracking or blossom-end rot.
Fruiting Stage	60 - 90 days	Pest Management	**a)Aphids:** Biological control -Spray with neem oil -5ml/L of water + a few drops of liquid soap. -Introduce natural predators like ladybugs. Cultural control - Crop rotation Physical control - Yellow/Blue Sticky Traps - Pruning **b) Leaf Miners:** Biological control -Apply neem oil or bio-pesticides like Beauveria bassiana. Cultural control - Pest Deterrent Plant: Columbine, Lambsquarter, Velvet leaf Physical control -Remove infested leaves. **c) Thrips:** Biological control -Lacewing larvae -Ladybird beetle Cultural control - Avoid planting Next to Onion & Garlic Physical control - Yellow/Blue Sticky Traps **d) Fruit Borers:** Biological control - Spray bio-pesticides like Bacillus thuringiensis (Bt). Cultural control - Collect and destroy infected fruits and larvae. Physical control - Handpick larvae and destroy.

Fruiting Stage	60 - 90 days	Disease Management	**a)Damping-Off:** Biological control - Treat seeds with Trichoderma viride before sowing. - Water with a solution of diluted cow urine or vermi wash to suppress fungal activity. Cultural control - Avoid Excessive Watering. Physical control - Avoid overwatering and ensure proper drainage. **b)Leaf Spot Diseases:** Biological control - Spray a solution of 1% Bordeaux mixture or diluted neem oil. Cultural control - Control Nightshade weeds Physical control - Solarization **c)Powdery Mildew:** Biological control - Spray a mix of milk 10% and water. Cultural control -Proper Plant Spacing Physical control - Sanitation. **d)Bacterial Spot:** Biological control - Pseudomonas fluorescens - Bacillus subtilis Cultural control - Crop rotation Physical control - Removal of Infected Plants **e) Anthracnose:** Biological control - Seed treatment - Trichoderma spp. Cultural control - Periodic clipping of lower leaves Physical control - Staking
Harvesting Stage	90 - 120 days	Micro Nutrients Management	**1) Potassium (K):** - Essential for flower and fruit quality. - Application: Use potassium sulfate or banana peel tea. **2) Calcium (Ca):** - Prevents flower and fruit deformities. - Application: Foliar spray calcium chloride every 2–3 weeks.
Harvesting Stage	90 - 120 days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Browning or scorching at leaf edges; poor fruit quality. - Solution: Apply potassium sulfate or banana peel tea. **2) Magnesium Deficiency:** - Symptoms: Yellowing between veins of older leaves. - Solution:Foliar spray with Epsom salt -1 tsp/L of water. **3) Calcium Deficiency:** - Symptoms: Fruit cracking and reduced firmness. - Solution: Apply calcium nitrate or calcium chloride sprays.
Harvesting Stage	90 - 120 days	Irrigation Management	**Watering Frequency:** **1) Consistency:** - Maintain uniform soil moisture to avoid water stress, which can lead to cracking and uneven ripening. **2) Method:** - Use drip irrigation for precise and consistent moisture delivery. - Avoid wetting fruits directly to reduce the risk of fungal infections. **3) Reduce Excessive Watering:** - Excess moisture can cause fruits to become watery and prone to splitting. - Gradually reduce watering as fruits near harvest.

Harvesting Stage	90 - 120 days	Pest Management	**a)Aphids:** Biological control -Spray with neem oil -5ml/L of water + a few drops of liquid soap. -Introduce natural predators like ladybugs. Cultural control - Crop rotation Physical control - Yellow/Blue Sticky Traps - Pruning **b) Whiteflies:** Biological control -Spray with a garlic or chili extract solution. Cultural control - Crop rotation Physical control -Use yellow sticky traps **c) Fruit Borers:** Biological control - Spray bio-pesticides like Bacillus thuringiensis (Bt). Cultural control - Collect and destroy infected fruits and larvae. Physical control - Handpick larvae and destroy.
Harvesting Stage	90 - 120 days	Disease Management	**a) Powdery Mildew:** Biological control - Spray a mix of milk 10% and water. Cultural control -Proper Plant Spacing Physical control - Sanitation **b) Bacterial Spot:** Biological control - Pseudomonas fluorescens - Bacillus subtilis Cultural control - Crop rotation Physical control - Removal of Infected Plants **c) Anthracnose:** Biological control - Seed treatment - Trichoderma spp. Cultural control - Periodic clipping of lower leaves Physical control - Staking
Harvesting Stage	90 - 120 days	Signs of Maturity	Firm, Red fruits.

ONION			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5–6.5 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Azospirillum mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 0.5 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Azospirillum, Neem cake powder, or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Liquid Compost tea:** - Prepare a compost tea by soaking 1 part compost in 10 parts water for 24 hours. Strain and dilute to a 1:10 ratio before use. - Apply every 7–10 days. **2) Seaweed Extract:** - Dilute 2–5 ml/L and spray on leaves every 10 days to provide trace minerals and enhance growth.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen deficiency:** Symptoms: Yellowing of leaves. Solution: Supplement with fish emulsion. **2) Iron deficiency:** Symptoms: Yellowing between veins. Solution:i) Chelated Iron - Natural chelates like citric acid. ii) Rusty Nails- Place a few rusty nails or steel wool in a bucket of water for a week. Use the water for irrigation.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Maintain constant moisture in the cocopeat. - Use a spray bottle or gentle watering to avoid waterlogging.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Crop rotation. Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control -Garlic and Chili Spray- Blend garlic -50 g, chili -50 g, and water, strain and spray every 7–10 days. Cultural control -Use resistant/tolerant varieties. Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow. **b)Basal Rot:** Biological control - Pseudomonas cepacis - Trichoderma viride Cultural control -Mixed cropping -Crop rotation Physical control - Soil solarization
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–60 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.

Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Water when the top layer feels dry. - Overwatering can cause fungal problems.
Vegetative Stage	30–60 Days	Pest Management	**a) Thrips:** Biological control -Garlic and Chili Spray- Blend garlic -50 g, chili -50 g, and water, strain and spray every 7–10 days. Cultural control -Use resistant/tolerant varieties. Physical control - Yellow/Blue Sticky Traps **b) Onion maggot:** Biological control - Ground beetle - Spiders Cultural control -Affected bulbs should be removed Physical control - Field sanitation. - Row covers. **c) Bulb mite:** Biological control - Green lacewings - Predatory mites Cultural control -Avoid planting successive onion or garlic crops. Physical control - Flood irrigation
Vegetative Stage	30–60 Days	Disease Management	**a) Basal Rot:** Biological control - Pseudomonas cepacis - Trichoderma viride Cultural control -Mixed cropping -Crop rotation Physical control - Soil solarization **b) Leaf streak & bulb rot:** Biological control -Trichoderma viride Cultural control -Remove infected plants Physical control - Good sanitation **c) Downy Mildew:** Biological control - Trichoderma spp. - Bacillus subtilis Cultural control -Select healthy bulbs Physical control - Poor drainage - Avoid excessive use of fertilizers. **d) Purple Blotch:** Biological control - Neem oil Cultural control -Use resistant varieties
Flowering Stage	60–75 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Sulfur (S):** - Supplement sulfur if needed for better bulb flavor. - Application: Use organic fertilizers like bone meal-10–20 g/plant or blood meal.
Flowering Stage	60–75 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water. **3) Sulfur deficiency:** - Symptoms: Pale bulbs and weak flavor. - Solution: Use gypsum or elemental sulfur.
Flowering Stage	60–75 Days	Irrigation Management	**Watering Frequency:** - Reduce watering slightly to prevent bulb splitting but ensure moisture consistency.

Flowering Stage	60–75 Days	Pest Management	**a) Root-knot nematode:** Biological control - Poultry manure Cultural control -Remove weeds Physical control - Solarization **b) Thrips:** Biological control -Garlic and Chili Spray- Blend garlic -50 g, chili -50 g, and water, strain and spray every 7–10 days. Cultural control -Use resistant/tolerant varieties. Physical control - Yellow/Blue Sticky Traps **c) Gram pod borer:** Biological control - Tricogramma spp. - T. pretiosum Cultural control - Crop rotation Physical control - Field sanitation - Pheromone traps .
Flowering Stage	60– 75 Days	Disease Management	**a) Leaf streak & bulb rot:** Biological control -Trichoderma viride Cultural control -Remove infected plants Physical control - Good sanitation **b) Downy Mildew:** Biological control - Trichoderma spp. - Bacillus subtilis Cultural control -Select healthy bulbs Physical control - Poor drainage - Avoid excessive use of fertilizers. **c) Purple Blotch:** Biological control - Neem oil Cultural control -Use resistant varieties Physical control - Proper drainage **d) Onion Smut:** Biological control - Bacillus subtilis Cultural control -Crop rotation Physical control
Fruiting Stage	75–120 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen levels to prevent excessive vegetative growth. - Application : Use natural nitrogen sources like compost. **2) Phosphorus (P):** - Supports energy transfer and root activity. Essential for maintaining plant health during bulb growth. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **3) Potassium (K):** - Key nutrient for bulb enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **4) Sulfur (S):** - Supplement sulfur if needed for better bulb flavor. - Application: Use organic fertilizers like bone meal-10–20 g/plant or blood meal. **5) Calcium (Ca):** - Prevents bulb splitting and enhances bulb strength. - Application : Gypsum as a dual calcium-sulfur source.
Fruiting Stage	75–120 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water. **3) Sulfur deficiency:** - Symptoms: Pale bulbs and weak flavor. - Solution: Use gypsum or elemental sulfur.
Fruiting Stage	75–120 Days	Irrigation Management	**Watering Frequency:** - Water deeply but reduce the frequency to avoid bulb splitting. - Ensure the growing medium is moist but well-drained to facilitate nutrient uptake.

Fruiting Stage	75–120 Days	Pest Management	**a) Onion fly:** Biological control - Neem seed extract- 0.75 g/L of water - Neem oil 1% Azadirachtin- 30 ml/L of water Cultural control -Remove weeds Physical control - Yellow sticky traps. **b) Red spider mite:** Biological control - Mirid bugs - Syrphid Cultural control -Water spray washes off the mites Physical control - Sanitation.
Fruiting Stage	75–120 Days	Disease Management	**a) Bacterial Brown Rot:** Biological control - Bacillus subtilis Cultural control -Remove weeds Physical control - Affected bulbs should be discarded before storage. - Proper drainage. **b) Bacterial soft rot:** Biological control -Trichoderma harzianum -Bacillus subtilis. Cultural control -Avoid overwatering Physical control - Storage of bulbs in open baskets, mesh bags and netted bags. **c) White rot:** Biological control - Trichoderma viride Cultural control -Hot water treatment of bulbs at 49 °C Physical control - Solarization **d) Anthracnose:** Biological control - Herbal formulation -2 ml/L of water - Pseudomonas fluorescens - 5 ml/L of water Cultural control - Use of resistant varieties Physical control
Harvesting Stage	120–150 Days	Micro Nutrients Management	**1) Nitrogen (N):** - By this stage, nitrogen's role diminishes as excessive nitrogen can delay bulb maturation and lead to poor storage quality. - Application : Stop nitrogen application at least 2 weeks before harvest. **2) Potassium (K):** - Potassium enhances bulb firmness and boosts resistance to post-harvest diseases. - Application :Wood ash- 20 g/plant around the plants. Stop potassium application 7–10 days before harvest. **3) Sulfur (S):** - Crucial for flavor and pungency, sulfur also supports bulb structure and disease resistance. - Application: Use organic fertilizers like Epsom salts-10–20 g/plant. Stop sulfur application 7–10 days before harvest. **4) Calcium (Ca):** - Strengthens cell walls, preventing splitting and ensuring bulb firmness for storage. - Application : Gypsum as a dual calcium-sulfur source.
Harvesting Stage	120–150 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Premature yellowing and drying of leaves. Reduced bulb size. - Solution : Apply a mild foliar spray of fish emulsion (diluted 1:10). Limit nitrogen application 2 weeks before harvest. **2) Potassium Deficiency:** - Symptoms: Brown or scorched leaf edges. Soft or poorly developed bulbs. - Solution :Use wood ash sparingly 10–20 g/Plant around plants. **3) Sulfur Deficiency:** - Symptoms: Pale bulbs with weak flavor and aroma. - Solution :Apply Epsom salts -1 tbsp/5 L of water. **4) Boron Deficiency:** - Symptoms: Deformed or hollow bulbs. - Solution :Apply a foliar spray of borax -0.5 g/L of water.
Harvesting Stage	120–150 Days	Irrigation Management	**Watering Frequency:** - Stop irrigation completely to dry out the bulbs and harden the necks.

Harvesting Stage	120–150 Days	Pest Management	**a) Thrips:** Biological control -Garlic and Chili Spray- Blend garlic -50 g, chili -50 g, and water, strain and spray every 7–10 days. Cultural control -Use resistant/tolerant varieties. Physical control - Yellow/Blue Sticky Traps. **b) Leaf miner:** Biological control - Azadiractin 10000 PPM -1.5 – 2.5 ml/L of water. Cultural control - Sanitation Physical control - Yellow sticky traps
Harvesting Stage	120–150 Days	Disease Management	**a) Bacterial soft rot:** Biological control -Trichoderma harzianum -Bacillus subtilis. Cultural control -Avoid overwatering Physical control - Storage of bulbs in open baskets, mesh bags and netted bags. **b) Onion Smudge:** Biological control - Trichoderma harzianum - T. asperellum Cultural control -Curing of the bulb after harvesting Physical control -Good drainage **c) Neck rot:** Biological control -Trichoderma viride Cultural control - Drying after harvest. Physical control - Remove waste heaps - Good air ventilation in storage
Harvesting Stage	120–150 Days	Signs of maturity	Leaf Yellowing and Drying - Fully Formed Bulbs

CHILLI			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-6.8 using lime if needed. **b) Seed Treatment:** - Soak seeds in a 2% hydrogen peroxide solution 2 g/L of water for 30 minutes to kill pathogens. - Treat seeds with Trichoderma viride- 2 g/L of water to prevent damping-off. **c) Sowing:** - Sow seeds 0.5 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Use a balanced fertilizer to encourage root and shoot growth. - Incorporate bio-fertilizers like Azospirillum for enhanced nitrogen uptake.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Water lightly when the top layer feels dry. - Use a spray bottle or gentle watering to avoid waterlogging.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Crop rotation. Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control -Garlic and Chili Spray- (Blend garlic -50 g, chili -50 g, and water) strain and spray every 7–10 days. Cultural control -Use resistant/tolerant varieties. Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow. **b) Root Rot:** Biological control - Phosphobacteria - Trichoderma viride Cultural control - Sanitation Physical control - Proper Drainage.
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–60 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Phosphorus Deficiency:** - Symptoms: Purplish tinge to leaves. - Solution: Add bone meal or fish emulsion.
Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days or when the top inch feels dry. - Ensure even moisture distribution. Avoid waterlogging.

Vegetative Stage	30–60 Days	Pest Management	**a) Thrips:** Biological control - Beauveria bassiana Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps **b) White Fly:** Biological control - Verticillium lecanii - Wasp: Encarsia formosa Cultural control -Proper Irrigation Physical control - Sanitation. **c) Mealy Bugs:** Biological control - Encarsia formosa - Neem Oil Cultural control - Avoid Over-Fertilization Physical control - Yellow/Blue Sticky Traps
Vegetative Stage	30–60 Days	Disease Management	**a) Bacterial Soft Rot:** Biological control - Bacillus subtilis - Trichoderma Spp Cultural control -Avoid Over watering Physical control - Sterilization **b) Powdery Mildew:** Biological control -Trichoderma harzianum - Neem Oil Cultural control - Use Resistant Varieties. Physical control - Remove Infected Leaves **c) Downy Mildew:** Biological control - Trichoderma spp - Bacillus subtilis Cultural control - Sanitation - Avoid Over watering Physical control - Remove Infected Leaves.
Flowering Stage	60–90 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering.
Flowering Stage	60–90 Days	Nutrient Deficiency Manage	**1) Calcium Deficiency:** - Symptoms: Blossom end rot. - Solution: Apply calcium nitrate or eggshell tea. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Flowering Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Water consistently to prevent flower drop.
Flowering Stage	60–90 Days	Pest Management	**a) Spider Mite:** Biological control - Bacillus thuringiensis Cultural control - Proper Watering Physical control -Yellow/Blue Sticky Traps **b) Tobacco Caterpillar:** Biological control - Bacillus thuringiensis Cultural control - Crop Rotation Physical control - Hand Picking **c) Pod Borer:** Biological control - Bacillus thuringiensis - Trichogramma spp. Cultural control -Proper Watering Physical control - Light Traps - Pheromone traps .

Flowering Stage	60–90 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control -Avoid Over watering Physical control - Remove Infected Leaves **b) Bacterial Leaf Blight:** Biological control - Trichoderma spp. Cultural control - Use Resistant Varieties Physical control - Remove Infected Leaves **c) Cercospora Leaf Spot:** Biological control - Bacillus subtilis Cultural control -Use resistant varieties Physical control - Remove Infected Leaves **d) Fusarium Wilt:** Biological control - Bacillus subtilis Cultural control - Avoid Over watering Physical control - Sanitation
Fruiting Stage	90–120 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen levels to prevent excessive vegetative growth. - Application : Use natural nitrogen sources like compost. **2) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **3) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Fruiting Stage	90–120 Days	Nutrient Deficiency Manage	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Fruiting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Fruiting Stage	90–120 Days	Pest Management	**a) Mites:** Biological control - Amblyseius spp Cultural control -Remove weeds Physical control - Yellow sticky traps. **b) Flea Beetle:** Biological control - Predatory Beetles Cultural control - Sanitation Physical control - Hand Picking. **c) Fruit Borer:** Biological control - Bacillus thuringiensis - Nuclear Polyhedrosis Virus Cultural control - Sanitation Physical control - Hand Picking. - Light Traps.

Fruiting Stage	90–120 Days	Disease Management	**a) Branch Rot:** Biological control - Bacillus subtilis Cultural control - Avoid Over watering Physical control - Remove Infected Leaves **b) Root Rot:** Biological control -Trichoderma spp Cultural control -Avoid overwatering Physical control - Remove Infected Leaves **c) Fruit Spot:** Biological control - Bacillus subtilis Cultural control - Use Resistant Varieties Physical control - Pruning **d) Late Blight:** Biological control - Trichoderma spp Cultural control - Use of resistant varieties Physical control - Sanitation.
Harvesting Stage	120–150 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen levels to prevent excessive vegetative growth. - Application : Use natural nitrogen sources like compost. **2) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **3) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	120–150 Days	Nutrient Deficiency Manage	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	120–150 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Harvesting Stage	120–150 Days	Pest Management	**a) Red Spider Mite:** Biological control - Beauveria bassiana - Metarhizium anisopliae. Cultural control - Remove Weeds Physical control - Yellow/Blue Sticky Traps. **b) Grey weevil:** Biological control - Beauveria bassiana Cultural control - Proper Spacing and Pruning. Physical control - Water Spraying
Harvesting Stage	120–150 Days	Disease Management	**a) Bacterial wilt:** Biological control -Neem Oil -Bacillus subtilis. Cultural control - Avoid overwatering Physical control - Sterilization **b) Yellow Leaf Curl Virus Transmitted by WhiteFly:** Biological control - Beauveria bassiana - Verticillium lecanii Cultural control - Proper Irrigation Physical control - Yellow/Blue Sticky Traps **c) Fruit rot:** Biological control -Trichoderma spp Cultural control -Use Resistant Varieties Physical control - Remove infected leaves.
Harvesting Stage	120–150 Days	Signs of maturity	Mature green chilies have a glossy appearance and firm texture.

CAPSICUM			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-6.8 using lime if needed. **b) Seed Treatment:** - Soak seeds in a 2% hydrogen peroxide solution 2 g/L of water for 30 minutes to kill pathogens. - Treat seeds with Trichoderma viride- 2 g/L of water to prevent damping-off. **c) Sowing:** - Sow seeds 0.5-1 cm spacing and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Manage	**1) Nutrient Management:** - Use a balanced fertilizer to encourage root and shoot growth. - Incorporate bio-fertilizers like Azospirillum for enhanced nitrogen uptake.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Mana	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Water lightly when the top layer feels dry. - Use a spray bottle or gentle watering to avoid waterlogging.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–60 Days	Micro Nutrients Manage	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–60 Days	Nutrient Deficiency Mana	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Phosphorus Deficiency:** - Symptoms: Purplish tinge to leaves. - Solution: Add bone meal or fish emulsion. **3) Potassium Deficiency:** - Symptoms: Browning of leaf edges - Solution: Apply wood ash or potassium-rich organic fertilizers.
Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days or when the top inch feels dry. - Ensure even moisture distribution. Avoid waterlogging.

Vegetative Stage	30–60 Days	Pest Management	**a) Gall Midge:** Biological control - Beauveria bassiana - Parasitoid Wasps Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps **b) Leaf Eating Caterpillar:** Biological control - Bacillus thuringiensis Cultural control - Sanitation Physical control - Pheromone Traps **c) Mealy Bugs:** Biological control - Neem Oil Cultural control - Avoid Over-Fertilization Physical control - Yellow/Blue Sticky Traps.
Vegetative Stage	30–60 Days	Disease Management	**a) Bacterial Soft Rot:** Biological control - Bacillus subtilis - Trichoderma Spp Cultural control -Avoid Over watering Physical control - Sterilization **b) Powdery Mildew:** Biological control -Trichoderma harzianum - Neem Oil Cultural control - Use Resistant Varieties. Physical control - Remove Infected Leaves **c) Downy Mildew:** Biological control - Trichoderma spp - Bacillus subtilis Cultural control - Sanitation - Avoid Over watering Physical control - Remove Infected Leaves.
Flowering Stage	60–90 Days	Micro Nutrients Manage	**1) Potassium (K):** - Strengthens stems and disease resistance - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering.
Flowering Stage	60–90 Days	Nutrient Deficiency Mana	**1) Calcium Deficiency:** - Symptoms: Blossom end rot. - Solution: Apply calcium nitrate or eggshell tea. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Flowering Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Water regularly to maintain consistent moisture and prevent flower drop. Avoid wetting flowers and leaves during watering.
Flowering Stage	60–90 Days	Pest Management	**a) Yellow Mite:** Biological control - Bacillus thuringiensis Cultural control - Proper Watering Physical control -Yellow/Blue Sticky Traps **b) Grass Hopper:** Biological control - Metarhizium anisopliae Cultural control - Sanitation Physical control - Hand Picking **c) Gram Caterpillar:** Biological control - Bacillus thuringiensis - Trichogramma spp. Cultural control -Proper Watering Physical control - Light Traps - Pheromone traps.

Flowering Stage	60–90 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control -Avoid Over watering Physical control - Remove Infected Leaves **b) Bacterial Leaf Blight:** Biological control - Trichoderma spp. Cultural control - Use Resistant Varieties Physical control - Remove Infected Leaves **c) Cercospora Leaf Spot:** Biological control - Bacillus subtilis Cultural control -Use resistant varieties Physical control - Remove Infected Leaves **d) Fusarium Wilt:** Biological control - Bacillus subtilis Cultural control - Avoid Over watering Physical control - Sanitation
Fruiting Stage	90–120 Days	Micro Nutrients Managen	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** -Supplement with liquid seaweed extract every 15 days for better yields.
Fruiting Stage	90–120 Days	Nutrient Deficiency Mana	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Calcium Deficiency:** - Symptoms: Wrinkled fruits. - Solution: Calcium nitrate -1 g/L of water weekly.
Fruiting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Fruiting Stage	90–120 Days	Pest Management	**a) Mites:** Biological control - Amblyseius spp Cultural control -Remove weeds Physical control - Yellow sticky traps. **b) Flea Beetle:** Biological control - Predatory Beetles Cultural control - Sanitation Physical control - Hand Picking. **c) Fruit Borer:** Biological control - Bacillus thuringiensis - Nuclear Polyhedrosis Virus Cultural control - Sanitation Physical control - Hand Picking. - Light Traps.

Fruiting Stage	90–120 Days	Disease Management	**a) Branch Rot:** Biological control - Bacillus subtilis Cultural control - Avoid Over watering Physical control - Remove Infected Leaves **b) Root Rot:** Biological control -Trichoderma spp Cultural control -Avoid overwatering Physical control - Remove Infected Leaves **c) Fruit Spot:** Biological control - Bacillus subtilis Cultural control - Use Resistant Varieties Physical control - Pruning **d) Late Blight:** Biological control - Trichoderma spp Cultural control - Use of resistant varieties Physical control - Sanitation.
Harvesting Stage	120–150 Days	Micro Nutrients Manage	**1) Nitrogen (N):** - Reduce nitrogen levels to prevent excessive vegetative growth. - Application : Use natural nitrogen sources like compost. **2) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **3) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	120–150 Days	Nutrient Deficiency Mana	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	120–150 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Harvesting Stage	120–150 Days	Pest Management	**a) Red Spider Mite:** Biological control - Beauveria bassiana - Metarhizium anisopliae. Cultural control - Remove Weeds Physical control - Yellow/Blue Sticky Traps. **b) Grey weevil:** Biological control - Beauveria bassiana Cultural control - Proper Spacing and Pruning. Physical control - Water Spraying
Harvesting Stage	120–150 Days	Disease Management	**a) Bacterial wilt:** Biological control -Neem Oil -Bacillus subtilis. Cultural control - Avoid overwatering Physical control - Sterilization **b) Yellow Leaf Curl Virus Transmitted by WhiteFly:** Biological control - Beauveria bassiana - Verticillium lecanii Cultural control - Proper Irrigation Physical control - Yellow/Blue Sticky Traps **c) Fruit rot:** Biological control -Trichoderma spp Cultural control -Use Resistant Varieties Physical control - Remove infected leaves.

Harvesting Stage	120–150 Days	Signs of maturity	The fruit skin becomes smooth and firm, glossy appearance.

BRINJAL			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-6.8 using lime if needed. **b) Seed Treatment:** - Soak seeds in warm water (50°C) for 30 minutes to kill pathogens. - Treat seeds with Trichoderma viride- 2 g/L of water to prevent damping-off. **c) Sowing:** - Sow seeds 0.5-1 cm spacing and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Use a balanced fertilizer to encourage root and shoot growth. - Begin a light fertilizer schedule using liquid NPK or compost tea.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Water once daily or when the cocopeat surface feels dry. - Avoid waterlogging by ensuring proper drainage in trays.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–60 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Potassium Deficiency:** - Symptoms: Browning of leaf edges - Solution: Apply wood ash or potassium-rich organic fertilizers. **3) Magnesium Deficiency:** - Symptoms:Yellowing between veins - Solution: Use Epsom salt - 1g/L of water
Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days or when the top inch feels dry. - Ensure even moisture distribution. Avoid waterlogging.

Vegetative Stage	30–60 Days	Pest Management	**a) Jassids/ Leaf hopper:** Biological control - Green lacewing - Lady bug Cultural control - Dispose garden debris or waste immediately after harvesting. Physical control - Kaolin clay **b) White Fly:** Biological control - Green lacewing Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps **c) Cut worm / Army worm:** Biological control - Trichogramma Parasitoids Cultural control - Weeds Removal Physical control - Handpicking Worms.
Vegetative Stage	30–60 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Root Rot:** Biological control - Pseudomonas fluorescens Cultural control - Burn affected plants Physical control - Sterilization **c) Collar Rot:** Biological control - Seed treatment - Trichoderma viride 4g/ kg of seeds Cultural control - Collection and Destruction of Diseased parts. Physical control - Sterilization.
Flowering Stage	60–90 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering.
Flowering Stage	60–90 Days	Nutrient Deficiency Manage	**1) Calcium Deficiency:** - Symptoms: Blossom end rot. - Solution: Apply calcium nitrate or eggshell tea. **2) Boron Deficiency:** - Symptoms: Poor flower development - Solution: Use - Azotobacter-1 tbsp/5 L of water.
Flowering Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Water regularly to maintain consistent moisture. Avoid wetting flowers and leaves during watering.
Flowering Stage	60–90 Days	Pest Management	**a) Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps **b) White Fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps **c) Gram Caterpillar:** Biological control - Bacillus thuringiensis - Trichogramma spp. Cultural control -Proper Watering Physical control - Light Traps - Pheromone traps.

Flowering Stage	60–90 Days	Disease Management	**a) Little Leaf:** Biological control - Lacewing larvae" Cultural control - Proper Sanitation Physical control - Insect Nets **b) Powdery mildew:** Biological control - Bacillus subtilis Cultural control - Proper Plant Spacing Physical control - Periodic clipping of lower leaves **c) Yellow leaf mosaic virus:** Biological control - Beauveria bassiana Cultural control - Remove alternate weed Abutilon indicum Physical control - Yellow/Blue Sticky Traps **d) Fusarium Wilt:** Biological control - Bacillus subtilis Cultural control - Avoid Over watering Physical control - Sanitation.
Fruiting Stage	90–120 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	90–120 Days	Nutrient Deficiency Manage	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Calcium Deficiency:** - Symptoms: Wrinkled fruits. - Solution: Calcium nitrate -1 g/L of water weekly.
Fruiting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Fruiting Stage	90–120 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Root-Knot Nematodes:** Biological control - Paecilomyces lilacinus Cultural control - Use nematode free transplants Physical control - Remove weeds.

Fruiting Stage	90–120 Days	Disease Management	**a) Yellow leaf mosaic virus:** Biological control - Beauveria bassiana Cultural control - Remove alternate weed Abutilon indicum Physical control - Yellow/Blue Sticky Traps **b) Fruit & shoot borer:** Biological control -Neem seed kernel extract (NSKE) 5 % Cultural control - Remove the affected fruits and destroy Physical control - Pruning **c) Phythium wilt:** Biological control -Trichoderma spp. Cultural control - Crop rotation with bhendi, tomato, potato should be avoided Physical control - Pruning **d) Phomopsis blight:** Biological control - Trichoderma spp Cultural control -Sanitation. Physical control - Pruning.
Harvesting Stage	120–150 Days	Micro Nutrients Managemen	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	120–150 Days	Nutrient Deficiency Manage	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	120–150 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Harvesting Stage	120–150 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Root-Knot Nematodes:** Biological control - Paecilomyces lilacinus Cultural control - Use nematode free transplants Physical control - Remove weeds.

Harvesting Stage	120–150 Days	Disease Management	**a) Yellow leaf mosaic virus:** Biological control - Beauveria bassiana Cultural control - Remove alternate weed Abutilon indicum Physical control - Yellow/Blue Sticky Traps **b) Fruit & shoot borer:** Biological control -Neem seed kernel extract (NSKE) 5 % Cultural control - Remove the affected fruits and destroy Physical control - Pruning **c) Phythium wilt:** Biological control -Trichoderma spp. Cultural control - Crop rotation with bhendi, tomato, potato should be avoided Physical control - Pruning **d) Phomopsis blight:** Biological control - Trichoderma spp Cultural control -Sanitation. Physical control - Pruning.
Harvesting Stage	120–150 Days	Signs of maturity	The skin is smooth, glossy, and vibrant in color (purple, green, white, or striped, depending on the variety).

OKRA			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-6.8 using lime if needed. **b) Seed Treatment** - Soak seeds in warm water (50°C) for 4–6 hours to soften the seed coat and promote faster germination. - Treat seeds with Trichoderma viride- 2 g/L of water to prevent damping-off. **c) Sowing:** - Sow seeds 1–2 inches deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Use a diluted nutrient solution (1/4 strength) containing nitrogen (N), phosphorus (P), and potassium (K). - Ensure pH is between 6.0 and 6.8
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Maintain consistent moisture in cocopeat without waterlogging. - Use a spray bottle for uniform watering.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) White Fly:** Biological control - Green lacewing Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Calcium Deficiency:** - Symptoms: Blossom end rot. - Solution: Apply calcium nitrate or eggshell tea. **3) Magnesium Deficiency:** - Symptoms:Yellowing between veins - Solution: Use Epsom salt - 1g/L of water.
Vegetative Stage	30–45 Days	Irrigation Management	**Watering Frequency:** - Water regularly, ensuring cocopeat stays moist but not soggy. - Drain excess water to prevent root rot.
Vegetative Stage	30–45 Days	Pest Management	**a) Spider Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps

Vegetative Stage	30–45 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants.
Flowering Stage	45–60 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **3) Micronutrient Deficiencies (Zinc, Boron):** - Poor flower development and leaf discoloration. - Solution: Spray seaweed extract or micronutrient solution once every 2 weeks.
Flowering Stage	45–60 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: Poor flower development - Solution: Use Azotobacter-1 tbsp/5 L of water.
Flowering Stage	45–60 Days	Irrigation Management	**Watering Frequency:** - Reduce watering slightly to avoid excess moisture during flowering. - Use a drip irrigation system for uniform water delivery.
Flowering Stage	45–60 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) White Fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Flowering Stage	45–60 Days	Disease Management	**a) Blossom Blight:** Biological control - Trichoderma spp Cultural control - Ensure good ventilation and reduce humidity. Physical control - Avoid wetting flowers during irrigation. **b) Fusarium Wilt:** Biological control - Bacillus subtilis - Mix Trichoderma with cocopeat before planting. Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Fruiting Stage	60–75 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	60–75 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Calcium Deficiency:** - Symptoms: Wrinkled fruits. - Solution: Calcium nitrate -1 g/L of water weekly.
Fruiting Stage	60–75 Days	Irrigation Management	**Watering Frequency:** - Maintain even watering to avoid stress on fruiting plants. - Avoid wetting leaves to reduce fungal risks.

Fruiting Stage	60–75 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Fruit borers:** Biological control - Bacillus thuringiensis Cultural control - Even watering to avoid stress. Physical control - Maintain hygiene
Fruiting Stage	60–75 Days	Disease Management	**a) Yellow Vein Mosaic Virus:** Biological control - Neem oil -2 ml/L of water Cultural control - Remove weeds Physical control -Remove the affected fruits and destroy **b) Fruit & shoot borer:** Biological control -Neem seed kernel extract (NSKE) 5 % Cultural control - Remove the affected fruits and destroy Physical control - Pruning **c) Anthracnose:** Biological control -Trichoderma spp. Cultural control - Harvest fruits promptly and avoid injury Physical control - Pruning.
Harvesting Stage	75– 90 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	75– 90 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	75– 90 Days	Irrigation Management	**Watering Frequency:** - Increase frequency slightly as fruits develop. - Maintain uniform moisture levels to prevent fruit cracking.
Harvesting Stage	75– 90 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Fruit borers :** Biological control - Bacillus thuringiensis Cultural control - Even watering to avoid stress. Physical control - Maintain hygiene

Harvesting Stage	75– 90 Days	Disease Management	**a) Yellow Vein Mosaic Virus:** Biological control - Neem oil -2 ml/L of water Cultural control - Remove weeds Physical control -Remove the affected fruits and destroy **b) Fruit & shoot borer:** Biological control -Neem seed kernel extract (NSKE) 5 % Cultural control - Remove the affected fruits and destroy Physical control - Pruning **c) Anthracnose:** Biological control -Trichoderma spp. Cultural control - Harvest fruits promptly and avoid injury Physical control - Pruning.
Harvesting Stage	75– 90 Days	Signs of maturity	Pods should feel tender and smooth to the touch. Bright and consistent green

CARROT

Crop Stage	Maturity Days	Management	Control
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-6.8 using lime if needed. **b) Seed Treatment** - Soak seeds in warm water for 12–24 hours to soften the seed coat and speed up germination. - Treat seeds with a fungicide or biofungicide like Trichoderma to prevent fungal infections. **c) Sowing:** - Sow seeds 1/4–1/2 inch deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Add a small amount of calcium nitrate to prevent calcium deficiencies. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Managem	**1) Nutrient Management:** - Start with a diluted nutrient solution (1/4 strength) containing phosphorus (for root development) and a bit of nitrogen.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Manag	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Keep cocopeat consistently moist but not waterlogged. - Use a spray bottle or fine nozzle to avoid disturbing seeds.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Fungus gnats:** Biological control - Bacillus thuringiensis israelensis - Sprinkle cinnamon powder Cultural control - Allow cocopeat surface to dry slightly between waterings. Physical control - Yellow/Blue Sticky Traps.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a) Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–45 Days	Micro Nutrients Managem	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–45 Days	Nutrient Deficiency Manag	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash. **3) Magnesium Deficiency:** - Symptoms:Yellowing leaves - Solution: Use Epsom salt - 1g/L of water.
Vegetative Stage	30–45 Days	Irrigation Management	**Watering Frequency:** - Maintain even moisture levels to prevent uneven growth. - Avoid overwatering to reduce the risk of fungal diseases.
Vegetative Stage	30–45 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Caterpillars:** Biological control - Bacillus thuringiensis Cultural control - Sanitation Physical control - Pheromone Traps

Vegetative Stage	30–45 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Alternaria leaf blight:** Biological control - Spray with copper-based fungicides Cultural control - Remove infected leaves Physical control - Sanitation
Root Development Sta	45–60 Days	Micro Nutrients Manageme	**1) Potassium (K):** - To promote root growth. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages root formation and energy transfer. - Application: Use bone meal or rock phosphate
Root Development Sta	45–60 Days	Nutrient Deficiency Manag	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Root Development Sta	45–60 Days	Irrigation Management	**Watering Frequency:** -Water deeply but less frequently to encourage roots to grow deeper. - Ensure proper drainage to prevent water stagnation.
Root Development Sta	45–60 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) White Fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Root Development Sta	45–60 Days	Disease Management	**a) Soft rot :** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good ventilation and reduce humidity. Physical control - Avoid overwatering **b) Fusarium Wilt:** Biological control - Bacillus subtilis - Mix Trichoderma with cocopeat before planting. Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Fruiting Stage	60–90 Days	Micro Nutrients Manageme	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - To ensure sweet and firm roots. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	60–90 Days	Nutrient Deficiency Manag	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water.

Fruiting Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Reduce watering slightly a week before harvest to enhance flavor and avoid soggy roots.
Fruiting Stage	60–90 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Carrot rust flies:** Biological control - Neem oil Cultural control - Use row covers Physical control - Avoid prolonged exposure.
Fruiting Stage	60–90 Days	Disease Management	**a) Soft rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good ventilation and reduce humidity. Physical control - Avoid overwatering **b) Cercospora leaf spot:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	90–120 Days	Micro Nutrients Manageme	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	90–120 Days	Nutrient Deficiency Manag	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Harvesting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** -Reduce watering slightly a week before harvest to enhance flavor and avoid soggy roots.
Harvesting Stage	90–120 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Carrot rust flies:** Biological control - Neem oil Cultural control - Use row covers Physical control - Avoid prolonged exposure.

Harvesting Stage	90–120 Days	Disease Management	**a) Soft rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good ventilation and reduce humidity. Physical control - Avoid overwatering **b) Cercospora leaf spot:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	90–120 Days	Signs of maturity	Mature carrots feel firmly rooted but can be easily pulled out.

BEETROOT			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0–7.0 using lime if needed. **b) Seed Treatment** - Soak beetroot seeds (technically seed clusters) in warm water for 6–12 hours to soften the seed coat and speed up germination. - Treat seeds with biofungicides like Trichoderma harzianum or neem extract to protect against seed-borne diseases. **c) Sowing:** - Sow seeds 1/2 inch deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Add a small amount of calcium nitrate to prevent calcium deficiencies. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Add a small amount of calcium nitrate for early root growth. - Include micronutrients like magnesium and iron to support healthy foliage.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Keep cocopeat moist but not saturated. - Use a fine spray to avoid displacing seeds.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Fungus gnats:** Biological control - Bacillus thuringiensis israelensis - Sprinkle cinnamon powder Cultural control - Allow cocopeat surface to dry slightly between waterings. Physical control - Yellow/Blue Sticky Traps. **b)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash. **3) Magnesium Deficiency:** - Symptoms:Yellowing leaves - Solution: Use Epsom salt - 1g/L of water.
Vegetative Stage	30–45 Days	Irrigation Management	**Watering Frequency:** - Maintain even moisture levels to prevent uneven growth. - Water deeply but allow the top layer to dry slightly between irrigations.

Vegetative Stage	30– 45 Days	Pest Management	**a) Flea beetles:** Biological control - Use neem oil -2 ml/L of water at weekly intervals. Cultural control -Use row covers Physical control - Sterlization **b) Leaf miners:** Biological control -Apply neem oil or bio-pesticides like Beauveria bassiana. Cultural control - Pest Deterrent Plant: Columbine, Lambsquarter, Velvet leaf Physical control -Remove infested leaves.
Vegetative Stage	30–45 Days	Disease Management	**a) Powdery mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Alternaria leaf blight:** Biological control - Spray with copper-based fungicides Cultural control - Remove infected leaves Physical control - Sanitation
Root Development Stag	45–60 Days	Micro Nutrients Management	**1) Potassium (K):** - To promote root growth. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages root formation and energy transfer. - Application: Use bone meal or rock phosphate
Root Development Stag	45–60 Days	Nutrient Deficiency Managemen	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Root Development Stag	45–60 Days	Irrigation Management	**Watering Frequency:** -Water deeply but less frequently to encourage roots to grow deeper. - Ensure proper drainage to prevent water stagnation.
Root Development Stag	45–60 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) White Fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Root Development Stag	45–60 Days	Disease Management	**a) Soft rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good ventilation and reduce humidity. Physical control - Avoid overwatering **b) Fusarium Wilt:** Biological control - Bacillus subtilis - Mix Trichoderma with cocopeat before planting. Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.

Fruiting Stage	60–90 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - To ensure sweet and firm roots. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Avoid excess nitrogen to prevent overly large foliage at the expense of root development.
Fruiting Stage	60–90 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water or Add boric acid.
Fruiting Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Water lightly as roots approach maturity to enhance sweetness and prevent sogginess.
Fruiting Stage	60–90 Days	Pest Management	**a) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure. **b) Snails:** Biological control - Use barriers like crushed eggshells around plants. Cultural control - Remove infected leaves Physical control - Handpick pests
Fruiting Stage	60–90 Days	Disease Management	**a) Root rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good drainage Physical control - Avoid overwatering **b) Cercospora leaf spot:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	90–120 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	90–120 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Harvesting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** -Reduce watering slightly a week before harvest to enhance flavor and avoid soggy roots.
Harvesting Stage	90–120 Days	Pest Management	**a) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure. **b) Snails:** Biological control - Use barriers like crushed eggshells around plants. Cultural control - Remove infected leaves Physical control - Handpick pests

Harvesting Stage	90–120 Days	Disease Management	**a) Root rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good drainage Physical control - Avoid overwatering **b) Cercospora leaf spot:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	90–120 Days	Signs of maturity	The root should be round or slightly flattened, and the color should be vibrant and consistent red.

RADISH			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0–7.0 using lime if needed. **b) Seed Treatment** - Soak seeds in warm water for 4–6 hours to soften the seed coat and speed up germination. - Soak seeds in a solution of biofungicides like Trichoderma or neem extract to prevent fungal diseases such as damping-off. **c) Sowing:** - Sow seeds 1/2 inch deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Add a small amount of calcium nitrate to prevent calcium deficiencies. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nutrient Management:** - Add a small amount of calcium nitrate for early root growth. - Include micronutrients like magnesium and iron to support healthy foliage.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering Frequency:** - Keep cocopeat moist but not saturated. - Use a fine spray to avoid displacing seeds.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Fungus gnats:** Biological control - Bacillus thuringiensis israelensis - Sprinkle cinnamon powder Cultural control - Allow cocopeat surface to dry slightly between waterings. Physical control - Yellow/Blue Sticky Traps.
Pre-Seedling Stage	15- 25 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	25–35 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	25–35 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash. **3) Magnesium Deficiency:** - Symptoms:Yellowing leaves - Solution: Use Epsom salt - 1g/L of water.
Vegetative Stage	25–35 Days	Irrigation Management	**Watering Frequency:** - Maintain even moisture levels to prevent uneven growth. - Water deeply but allow the top layer to dry slightly between irrigations.
Vegetative Stage	25–35 Days	Pest Management	**a) Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Leaf miners:** Biological control -Apply neem oil or bio-pesticides like Beauveria bassiana. Cultural control - Pest Deterrent Plant: Columbine, Lambsquarter, Velvet leaf Physical control -Remove infested leaves.

Vegetative Stage	25–35 Days	Disease Management	**a) Powdery mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Downy mildew:** Biological control - Spray with copper-based fungicides Cultural control - Remove infected leaves Physical control - Sanitation
Root Development Sta	35–45 Days	Micro Nutrients Management	**1) Potassium (K):** - To promote root growth. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages root formation and energy transfer. - Application: Use bone meal or rock phosphate
Root Development Sta	35–45 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Root Development Sta	35–45 Days	Irrigation Management	**Watering Frequency:** -Water deeply but less frequently to encourage roots to grow deeper. - Radishes prefer even moisture levels but do not like to sit in water.
Root Development Sta	35–45 Days	Pest Management	**a) Cabbage root maggot:** Biological control - Use neem cake Cultural control - Use row covers Physical control - Sanitation. **b) White Fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Root Development Sta	35–45 Days	Disease Management	**a) Root rot:** Biological control - Bacillus subtilis Cultural control - Ensure good drainage Physical control - Avoid overwatering
Fruiting Stage	45–55 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - To ensure sweet and firm roots. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Avoid excess nitrogen to prevent overly large foliage at the expense of root development.
Fruiting Stage	45–55 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water or Add boric acid.
Fruiting Stage	45–55 Days	Irrigation Management	**Watering Frequency:** -Stop watering excessively just before harvesting to prevent the roots from becoming too large and splitting. - Water lightly to ensure the roots stay firm and crisp.

Fruiting Stage	45–55 Days	Pest Management	**a) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure. **b) Slugs and Snails:** Biological control - Use barriers like crushed eggshells around plants. Cultural control - Remove infected leaves Physical control - Handpick pests
Fruiting Stage	45–55 Days	Disease Management	**a) Root rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good drainage Physical control - Avoid overwatering **b) White rust:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	55–60 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	55–60 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or seaweed extract. **2) Boron Deficiency:** - Symptoms: Cracked or hollow roots. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Harvesting Stage	55–60 Days	Irrigation Management	**Watering Frequency:** - Stop watering excessively just before harvesting to prevent the roots from becoming too large and splitting.
Harvesting Stage	55–60 Days	Pest Management	**a) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure. **b) Slugs and Snails:** Biological control - Use barriers like crushed eggshells around plants. Cultural control - Remove infected leaves Physical control - Handpick pests
Harvesting Stage	55–60 Days	Disease Management	**a) Root rot:** Biological control - Pseudomonas fluorescens. Cultural control - Ensure good drainage Physical control - Avoid overwatering **b) White rust:** Biological control - Spray copper-based fungicides Cultural control - Avoid Over watering Physical control -Prune affected leaves.
Harvesting Stage	55–60 Days	Signs of maturity	A mature radish should be crisp, firm, and juicy, with a slightly spicy flavor.

SWEET CORN			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.8 - 6.8 using lime if needed. **b) Seed Treatment** - Soak seeds for 8-12 hours in lukewarm water. - Treat seeds with a bio-fungicide like Trichoderma viride, Allow treated seeds to dry in the shade for 30 minutes before planting. **c) Sowing:** - Sow seeds 2-3 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Introduce a mild liquid fertilizer or compost tea (rich in nitrogen) weekly to promote healthy foliage development.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion or vermicompost tea. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Maintain consistent moisture in cocopeat without waterlogging. - Ensure drainage to prevent standing water.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a) Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–60 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Purplish discoloration on leaves - Solution: Apply bone meal or a phosphorus-rich liquid feed. **2) Potassium Deficiency:** - Symptoms: Browning or curling leaf edges - Solution: Use potassium sulfate or wood ash.
Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Deep water every 2-3 days to encourage root development. - Adjust frequency based on temperature and humidity.
Vegetative Stage	30–60 Days	Pest Management	**a) Spider Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps **b) Aphids:** Biological control - Use neem oil or garlic extract Cultural control - Remove affected leaves Physical control - Yellow/Blue Sticky Traps

Vegetative Stage	30–60 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Rust:** Biological control - Bacillus subtilis - Garlic Extract Cultural control - Use Resistant Varieties Physical control - Burn affected plants.
Flowering Stage	60–90 Days	Micro Nutrients Management	**1) Potassium (K):** - To support flowering and ear development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **3) Micronutrient Deficiencies (Zinc, Boron):** - Poor flower development and leaf discoloration. - Solution: Spray seaweed extract or micronutrient solution once every 2 weeks.
Flowering Stage	60–90 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: Poor pollination or malformed kernels. - Solution: Use Azotobacter-1 tbsp/5 L of water.
Flowering Stage	60–90 Days	Irrigation Management	**Watering Frequency:** - Maintain consistent moisture levels. - Water deeply to avoid stress, especially during pollination.
Flowering Stage	60–90 Days	Pest Management	**a) Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Corn earworms:** Biological control - Bacillus thuringiensis Cultural control - Cover developing ears with fine mesh to prevent pests. Physical control - Remove the bugs. **c) Silk beetles:** Biological control - Bacillus thuringiensis Cultural control - Cover developing ears with fine mesh to prevent pests. Physical control - Remove the beetles.
Flowering Stage	60–90 Days	Disease Management	**a) Corn Smut:** Biological control - Trichoderma spp Cultural control - Plant resistant varieties Physical control - Remove and destroy infected galls **b) Southern Corn Leaf Blight:** Biological control - Garlic or Onion Extract Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants. **c) Fusarium Ear Rot:** Biological control - Bacillus subtilis Cultural control - Ensure good pollination Physical control - Sanitation.
Fruiting Stage	90–120 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	90–120 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or potassium-rich organic fertilizers.
Fruiting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Ensure consistent watering, especially during hot weather - Avoid wetting the ears directly to reduce fungal risks.

Fruiting Stage	90–120 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Stalk borers:** Biological control - Use organic fungicides like sulfur-based sprays Cultural control - Even watering to avoid stress. Physical control - Inspect ears regularly and remove infected parts
Fruiting Stage	90–120 Days	Disease Management	**a) Corn Smut:** Biological control - Trichoderma spp Cultural control - Plant resistant varieties Physical control - Remove and destroy infected galls **b) Southern Corn Leaf Blight:** Biological control - Garlic or Onion Extract Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants. **c) Fusarium Ear Rot:** Biological control - Bacillus subtilis Cultural control - Ensure good pollination Physical control - Sanitation.
Harvesting Stage	120–150 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants.
Harvesting Stage	120–150 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	120–150 Days	Irrigation Management	**Watering Frequency:** - Reduce watering a week before harvest to improve kernel sweetness.
Harvesting Stage	120–150 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps **c) Stalk borers:** Biological control - Use organic fungicides like sulfur-based sprays Cultural control - Even watering to avoid stress. Physical control - Inspect ears regularly and remove infected parts

Harvesting Stage	120–150 Days	Disease Management	**a) Corn Smut:** Biological control - Trichoderma spp Cultural control - Plant resistant varieties Physical control - Remove and destroy infected galls **b) Southern Corn Leaf Blight:** Biological control - Garlic or Onion Extract Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants. **c) Fusarium Ear Rot:** Biological control - Bacillus subtilis Cultural control - Ensure good pollination Physical control - Sanitation.
Harvesting Stage	120–150 Days	Signs of maturity	Kernels should have a bright, consistent color (yellow or white, depending on the variety)

CLUSTER BEANS			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-7.0 using lime if needed. **b) Seed Treatment** - Soak seeds in water for 6-8 hours to improve germination. - Treat seeds with a bio-fungicide like Trichoderma viride or a neem-based solution. **c) Sowing:** - Sow seeds 1.5-2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Apply a diluted nitrogen-rich fertilizer, such as vermicompost tea or fish emulsion, once a week.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion or blood meal. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days, ensuring the top layer of cocopeat is moist but not waterlogged. - Ensure drainage holes in the grow bag are unobstructed.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) White Fly:** Biological control - Green lacewing Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps. **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **4) Micro-Nutrients:** - Include micronutrients like magnesium and calcium for strong growth.
Vegetative Stage	30–60 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Calcium Deficiency:** - Symptoms: Curling or tip burn on new leaves. - Solution: Apply calcium nitrate or eggshell tea. **3) Magnesium Deficiency:** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves. - Solution: Use Epsom salt - 1g/L of water.

Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Deep water once every 3-4 days. - Avoid wetting the leaves to reduce fungal risks.
Vegetative Stage	30–60 Days	Pest Management	**a) Spider Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps
Vegetative Stage	30–60 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants.
Flowering Stage	60–75 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **3) Micronutrient Deficiencies (Zinc, Boron):** - Poor flower development and leaf discoloration. - Solution: Spray seaweed extract or micronutrient solution once every 2 weeks.
Flowering Stage	60–75 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Browning or yellowing at leaf margins - Solution: Use potassium sulfate or wood ash **2) Boron Deficiency:** - Symptoms: Flower drop or malformed pods - Solution: Use Azotobacter-1 tbsp/5 L of water.
Flowering Stage	60–75 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days to maintain consistent soil moisture.. - Do not allow the cocopeat to dry out during flowering, as stress can lead to flower drop.
Flowering Stage	60–75 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Pod borers:** Biological control - Bacillus thuringiensis Cultural control - Remove the bugs. Physical control - Avoid overhead watering t **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.

Flowering Stage	60–75 Days	Disease Management	**a) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Fusarium Wilt:** Biological control - Bacillus subtilis - Mix Trichoderma with cocopeat before planting. Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Fruiting Stage	75–90 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for fruit enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. **Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	75–90 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor fruit development - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Calcium Deficiency:** - Symptoms: Wrinkled fruits. - Solution: Calcium nitrate -1 g/L of water weekly.
Fruiting Stage	75–90 Days	Irrigation Management	**Watering Frequency:** - Maintain even watering to avoid stress on fruiting plants. - Avoid wetting leaves to reduce fungal risks.
Fruiting Stage	75–90 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Pod borers:** Biological control - Bacillus thuringiensis Cultural control - Remove the bugs. Physical control - Avoid overhead watering t **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Fruiting Stage	75–90 Days	Disease Management	**a) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Fusarium Wilt:** Biological control - Bacillus subtilis - Mix Trichoderma with cocopeat before planting. Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Harvesting Stage	90–120 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for pod enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. - Fertilize lightly with a balanced organic fertilizer to support ongoing pod production.

Harvesting Stage	90–120 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Water consistently to maintain plant health and support continuous pod formation. - Avoid waterlogging as it can cause root rot.
Harvesting Stage	90–120 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Pod borers:** Biological control - Bacillus thuringiensis Cultural control - Remove the bugs. Physical control - Avoid overhead watering t **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Harvesting Stage	90–120 Days	Disease Management	**a) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Fungal rots:** Biological control - Bacillus thuringiensis Cultural control - Avoid Over watering Physical control - Remove infected pods.
Harvesting Stage	90–120 Days	Signs of maturity	Pods should be vibrant green (or light green in some varieties), smooth, and tender.

BROAD BEANS			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0-7.0 using lime if needed. **b) Seed Treatment** - Soak seeds in water for 6-8 hours to improve germination. - Treat seeds with a bio-fungicide like Trichoderma viride or a neem-based solution. **c) Sowing:** - Sow seeds 1.5-2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Azospirillum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrient Management:** - Apply a diluted nitrogen-rich fertilizer, such as vermicompost tea or fish emulsion, once a week.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion or blood meal. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** - Water every 2-3 days, ensuring the top layer of cocopeat is moist but not waterlogged. - Ensure drainage holes in the grow bag are unobstructed.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Leaf miner:** Biological control - Ladybugs Cultural control - Sanitation Physical control - Yellow/Blue Sticky Traps. **c) Spider Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. - Add Azospirillum or Rhizobium biofertilizers to enhance nitrogen fixation. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Micro-Nutrients:** - Include micronutrients like magnesium and calcium for strong growth.
Vegetative Stage	30–60 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of lower leaves. - Solution: Apply vermicompost tea or a nitrogen-rich fertilizer. **2) Magnesium Deficiency:** - Symptoms: Yellowing between veins on older leaves. - Solution: Use Epsom salt - 1g/L of water.
Vegetative Stage	30–60 Days	Irrigation Management	**Watering Frequency:** - Water every 2–3 days or when the top layer of cocopeat feels dry. - Ensure the grow bag has adequate drainage.

Vegetative Stage	30–60 Days	Pest Management	**a) Spider Mites:** Biological control - Amblyseius spp Cultural control - Weed Control Physical control -Yellow/Blue Sticky Traps **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps
Vegetative Stage	30–60 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants.
Flowering Stage	60–75 Days	Micro Nutrients Management	**1) Potassium (K):** - Strengthens stems and disease resistance - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - Encourages flower formation and energy transfer. - Application: Use bone meal or rock phosphate at the start of flowering. **3) Micronutrient Deficiencies (Zinc, Boron):** - Poor flower development and leaf discoloration. - Solution: Spray seaweed extract or micronutrient solution once every 2 weeks.
Flowering Stage	60–75 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Browning or yellowing at leaf margins - Solution: Use potassium sulfate or wood ash **2) Phosphorus Deficiency:** - Symptoms: Purplish discoloration on leaves. - Solution: Apply bone meal or rock phosphate.
Flowering Stage	60–75 Days	Irrigation Management	**Watering Frequency:** - Maintain consistent moisture, as flowering plants are sensitive to water stress. - Water every 2–3 days, ensuring the cocopeat remains moist but not waterlogged.
Flowering Stage	60–75 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) White fly:** Biological control - Green lacewing Cultural control - Grow Resistant Varieties Physical control - Yellow/Blue Sticky Traps. **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Flowering Stage	60–75 Days	Disease Management	**a) Powdery Mildew:** Biological control - Use neem oil or milk spray Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Downy mildew:** Biological control - Trichoderma spp Cultural control - Ensure good airflow Physical control - Remove and destroy infected plants.

Fruiting Stage	75–90 Days	Micro Nutrients Management	**1) Potassium (K):** - Supports energy transfer and to pod filling. - Application :Wood ash- 20 g/plant around the plants. **2) Micro-Nutrients:** - Apply liquid seaweed extract every 15 days for better fruit size and quality.
Fruiting Stage	75–90 Days	Nutrient Deficiency Management	**1) Boron Deficiency:** - Symptoms: Hollow pods or flower drop. - Solution: Spray boric acid (0.1 g/liter) on flowers and young pods. **2) Calcium Deficiency:** - Symptoms: Tip burn or malformed pods. - Solution: Calcium nitrate -1 g/L of water weekly.
Fruiting Stage	75–90 Days	Irrigation Management	**Watering Frequency:** - Water deeply every 3–4 days, keeping the cocopeat evenly moist. - Avoid waterlogging to prevent root rot.
Fruiting Stage	75–90 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Pod borers:** Biological control - Bacillus thuringiensis Cultural control - Remove the bugs. Physical control - Avoid overhead watering t **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Fruiting Stage	75–90 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Botrytis:** Biological control - Neem oil Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Harvesting Stage	90–120 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Supports energy transfer and root activity. - Application: Rock phosphate for slow release. Bone meal for organic phosphorus. **2) Potassium (K):** - Key nutrient for pod enlargement and storage quality. - Application :Wood ash- 20 g/plant around the plants. - Fertilize lightly with a balanced organic fertilizer to sustain productivity during the harvest period.
Harvesting Stage	90–120 Days	Nutrient Deficiency Management	**1) Potassium deficiency:** - Symptoms: Brown leaf tips. - Solution: Apply wood ash or potassium-rich organic fertilizers. **2) Magnesium deficiency:** - Symptoms: Yellowing leaf edges. - Solution: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	90–120 Days	Irrigation Management	**Watering Frequency:** - Water consistently to keep the pods tender but reduce the frequency as the plant matures.
Harvesting Stage	90–120 Days	Pest Management	**a)Aphids:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control - Deep summer ploughing Physical control - Yellow/Blue Sticky Traps **b) Pod borers:** Biological control - Bacillus thuringiensis Cultural control - Remove the bugs. Physical control - Avoid overhead watering t **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.

Harvesting Stage	90–120 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control - Ensure proper airflow around plants. Physical control - Burn affected plants. **b) Botrytis:** Biological control - Neem oil Cultural control - Avoid Over watering Physical control - Remove and destroy infected plants.
Harvesting Stage	90–120 Days	Signs of maturity	Mature beans should feel firm and large. Vibrant green.

PUMPKIN			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 6.8. using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Azospirillum mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1-2 inches deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Azospirillum or Azotobacter, Neem cake powder and Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with organic compost or fish emulsion. **2) Magnesium Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Apply Epsom salts -1 tbsp/5 L of water as a foliar spray.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Water lightly but consistently to keep the cocopeat moist. - Ensure good drainage to prevent root rot.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Use neem oil -1 ml/L of water at weekly intervals. Cultural control - 1.5 % fish oil soap. Physical control - Remove affected parts of the plant. **b) Whiteflies:** Biological control - Use neem oil -2 ml/L of water at weekly intervals Cultural control - Remove affected parts of the plant. Physical control - Yellow/Blue Sticky Traps **c) Weeds-Nutsedge :** Biological control - Bactra minima - B. venosana Cultural control - Remove weeds weekly. Physical control -Hand weeding -Hoeing
Pre-Seedling Stage	15- 25 Days	Disease Management	**a)Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control - Remove affected seedlings. Physical control -Avoid overwatering to ensure good airflow.

Vegetative Stage	25- 50 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Supports lush, healthy leaf and stem growth, which are essential for photosynthesis and overall plant health. - Application : Use Vermicompost or fish emulsion - Apply weekly . **2) Phosphorus (P):** - Important for strong root development, which is necessary for the plant to take up nutrients and water efficiently. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Aids in overall plant health, improving disease resistance and promoting strong stems and leaves. - Application : Use Seaweed extract - Every 15 days. **4) Calcium (Ca):** - Strengthens cell walls, supports root development, and prevents issues like blossom end rot. Calcium also plays a role in photosynthesis. - Application :Use gypsum can be used to supply calcium without affecting soil pH. **5) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	25- 50 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with organic compost or fish emulsion. **2) Magnesium Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Apply Epsom salts -1 tbsp/5 L of water as a foliar spray.
Vegetative Stage	25- 50 Days	Irrigation Management	**Watering:** - Water consistently, keeping the cocopeat moist but not soggy. - Ensure that the top layer is dry between watering sessions.
Vegetative Stage	25- 50 Days	Pest Management	**a) Aphids:** Biological control - Use neem oil -1 ml/L of water at weekly intervals. Cultural control - 1.5 % fish oil soap. Physical control - Remove affected parts of the plant. **b) Thrips:** Biological control - Azadiractin 10000 ppm - 2 ml/L of water - Botanical Extracts -2 ml/L of water Cultural control - Neem cake. Physical control - Crop rotation **c) Pumpkin flies:** Biological control - Neem oil -3.0% Cultural control - Neem cake. Physical control - Sanitation. **d) Root Knot Nematode:** Biological control - Bacterium Pasteuria penetrans Cultural control - Clean up and remove garden debris Physical control - Soil solarization
Vegetative Stage	25- 50 Days	Disease Management	**a) Alternaria leaf blight:** Biological control - Parasite - Apanteles sp, Trichogramma pretiosum. Cultural control - Crop debris should be removed. Physical control - Avoid overhead irrigation. **b) Cercospora leaf spot:** Biological control - Trichoderma aureoviride - Trichoderma virens. Cultural control - Diseased plants should be removed and destroyed. Physical control - Crop debris should be removed after harvest.

Flowering Stage	50- 70 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Supports lush, healthy leaf and stem growth, which are essential for photosynthesis and overall plant health. - Application : Use Vermicompost or fish emulsion - Apply weekly . **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Use wood ash or banana peel tea - Every 15 days. **4) Calcium (Ca):** - Calcium is essential for strengthening cell walls and preventing issues like flower drop or poor fruit set. - Application :Use gypsum can be used to supply calcium without affecting soil pH. **5) Magnesium (Mg):** - Magnesium is critical for photosynthesis and energy production, which directly supports flowering. - Application: Use Epsom salts -1 tbsp/5 L of water.
Flowering Stage	50- 70 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with organic compost or fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Slow growth and purplish leaves. - Solution: Apply bone meal or rock phosphate. **2) Magnesium Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Apply Epsom salts -1 tbsp/5 L of water as a foliar spray.
Flowering Stage	50- 70 Days	Irrigation Management	**Watering:** -Water deeply to ensure the roots reach sufficient moisture. - Reduce watering frequency slightly compared to earlier stages to encourage fruit ripening, but don't let the soil dry out completely.
Flowering Stage	50- 70 Days	Pest Management	**a) Aphids:** Biological control - Use neem oil -1 ml/L of water at weekly intervals. Cultural control - 1.5 % fish oil soap. Physical control - Remove affected parts of the plant. **b) Thrips:** Biological control - Azadiractin 10000 ppm - 2 ml/L of water - Botanical Extracts -2 ml/L of water Cultural control - Neem cake. Physical control - Crop rotation **c) Pumpkin flies:** Biological control - Neem oil -3.0% Cultural control - Neem cake. Physical control - Sanitation. **d) Squash bug:** Biological control -Applications of insecticidal soaps and oils. Cultural control -Destroy all crops residue as soon as possible after harvest or on plant death. Physical control

Flowering Stage	50- 70 Days	Disease Management	**a) Alternaria leaf blight:** Biological control - Parasite - Apanteles sp, Trichogramma pretiosum. Cultural control - Crop debris should be removed. Physical control - Avoid overhead irrigation. **b) Cercospora leaf spot:** Biological control - Trichoderma aureoviride - Trichoderma virens. Cultural control - Diseased plants should be removed and destroyed. Physical control - Crop debris should be removed after harvest. **c) Powdery mildew:** Biological control - Neem oil - Sodium bicarbonate Cultural control - Do not overcrowd plants. Physical control -Sanitize equipment regularly. **d) Downy mildew:** Biological control -10% solution of neem or kiriyath preparation. Cultural control - Complete removal and destruction of the affected leaves. Physical control
Fruiting Stage	70- 90 Days	Micro Nutrients Managemen	**1) Calcium (Ca):** - Symptoms: Blossom end rot on fruits, weak fruit walls, or misshapen fruits. - Application: Crushed eggshells soaked in water or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.
Fruiting Stage	70- 90 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves, reduced fruit size, and poor overall plant vigor. - Solution: Apply compost tea or diluted fish emulsion -low nitrogen to maintain moderate nitrogen levels. **2) Phosphorus Deficiency:** - Symptoms: Stunted plant growth, delayed fruit ripening, and poor root health. Leaves may develop a purplish hue. - Solution: Incorporate bone meal or rock phosphate into the soil to provide a slow-release source of phosphorus. **3) Potassium Deficiency:** - Symptoms: Yellowing and browning of leaf edges, weak fruit development, poor fruit quality, or reduced flavor. - Solution:Apply banana peel tea or wood ash sparingly for potassium.
Fruiting Stage	70- 90 Days	Irrigation Management	**Watering:** - Continue to water deeply to avoid stress during fruit filling. - Reduce watering towards the end of the fruit ripening period to prevent waterlogging and encourage curing. - Water at the base to avoid wetting the foliage.
Fruiting Stage	70- 90 Days	Pest Management	**a) Cucumber beetles:** Biological control - Neem oil Cultural control -Kaolin clay Physical control - Use yellow sticky cup traps **b) Fruit fly:** Biological control -Neem oil -3.0 % Cultural control -Bury the damaged fruits deep in the soil Physical control - Install fruit fly trap **c) Pumpkin beetle:** Biological control -Use attractants like citronella oil, eucalyptus oil, vinegar, dextrose and lactic acid to trap flies. Cultural control - Keep 5 g of wet fishmeal in plastic container. Physical control

Fruiting Stage	70- 90 Days	Disease Management	**a) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water. - Herbal formulation -2 ml/L of water. Cultural control - Use healthy, disease-free certified seed. Physical control - Crop rotation - Deep cultivation. **b) Phytophthora blight:** Biological control - Bacillus spp., - B. vallismortis Cultural control -Efficient management of water to avoid saturated soil. Physical control - Avoid long periods of irrigation. **c) Phytophthora Fruit Rot:** Biological control - B. thuringiensis Cultural control - Crop rotation Physical control - Avoid overhead watering **d) Gummy stem blight:** Biological control -Trichoderma viride . Cultural control - Use healthy, disease-free certified seed. Physical control - Crop rotation. **e) Bacterial wilt:** Biological control - Soil application of T.viride - 2.5 g/plant Cultural control - Use healthy, disease-free certified seed.
Harvesting Stage	90- 120 Days	Micro Nutrients Managemen	**Nutrient Management:** Stop Fertilization - No need for fertilization during the last few weeks before harvest as the plant is focused on maturing its fruit.
Harvesting Stage	90- 120 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves, reduced fruit size, and poor overall plant vigor. - Solution: Apply compost tea or diluted fish emulsion -low nitrogen to maintain moderate nitrogen levels. **2) Phosphorus Deficiency:** - Symptoms: Stunted plant growth, delayed fruit ripening, and poor root health. Leaves may develop a purplish hue. - Solution: Incorporate bone meal or rock phosphate into the soil to provide a slow-release source of phosphorus. **3) Potassium Deficiency:** - Symptoms: Yellowing and browning of leaf edges, weak fruit development, poor fruit quality, or reduced flavor. - Solution:Apply banana peel tea or wood ash sparingly for potassium.
Harvesting Stage	90- 120 Days	Irrigation Management	**Watering:** - Stop watering about 7–10 days before harvest to allow the pumpkins to cure and reduce moisture content. - This will also help harden the skins for storage.

Harvesting Stage	90- 120 Days	Pest Management	**a) Cucumber beetles:** Biological control - Neem oil Cultural control -Kaolin clay Physical control - Use yellow sticky cup traps **b) Fruit fly:** Biological control -Neem oil -3.0 % Cultural control - Bury the destroyed fruits deep in the soil. Physical control - Install fruit fly trap **c) Pumpkin beetle:** Biological control -Use attractants like citronella oil, eucalyptus oil, vinegar, dextrose and lactic acid to trap flies. Cultural control - Keep 5 g of wet fishmeal in plastic container. Physical control -Hand collection and destruction of infested leaves and fruits. **d) Cabbage looper:** Biological control - Bacillus thuringiensis - Trichogramma wasps. Cultural control - Plant debris should be removed. Physical control
Harvesting Stage	90- 120 Days	Disease Management	**a) Phytophthora blight:** Biological control - Bacillus spp., - B. vallismortis Cultural control -Efficient management of water to avoid saturated soil. Physical control - Avoid long periods of irrigation. **b) Phytophthora Fruit Rot:** Biological control - B. thuringiensis Cultural control - Crop rotation Physical control - Avoid overhead watering **c) Gummy stem blight:** Biological control -Trichoderma viride . Cultural control - Use healthy, disease-free certified seed. Physical control - Crop rotation. **d) Bacterial wilt:** Biological control - Soil application of T.viride - 2.5 g/plant Cultural control - Use healthy, disease-free certified seed. Physical control
Harvesting Stage	90–120 Days	Signs of maturity	Vibrant color, orange, green, white, or striped.

CUCUMBER			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 6.8. using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Azospirillum mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1 inch deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus or Pseudomonas, Neem cake powder and Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Use chelated iron foliar spray.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering:** - Water daily in small amounts to keep the cocopeat moist. - Ensure good drainage to avoid waterlogging.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Seedcorn Maggot:** Biological control - Bacillus thuringiensis Cultural control - Late plantings during cool springs. Physical control - Good field sanitation **c) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control -Remove weeds. Physical control - Pheromone lure.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a) Collar rot/Root rot:** Biological control - Trichoderma spp - Streptomyces spp - Bacillus subtilis Cultural control -Destroy infected plants Physical control - Improve drainage **b) Bacterial wilt:** Biological control -Trichoderma viride -Trichoderma koningii Cultural control -Destroy infected plants Physical control

Vegetative Stage	30- 45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Switch to a nitrogen-rich fertilizer to support leaf and vine growth. - Application : Use fish emulsion - Apply weekly **2) Phosphorus (P):** - Important for strong root development, which is necessary for the plant to take up nutrients and water efficiently. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Aids in overall plant health, improving disease resistance and promoting strong stems and leaves. - Application : Use Seaweed extract - Every 15 days.
Vegetative Stage	30- 45 Days	Nutrient Deficiency Management	**1) Magnesium Deficiency:** - Symptoms:Yellowing between veins of older leaves. - Solution: Remedy with Epsom salts -1 tbsp/5 L of water. **2) Calcium Deficiency:** - Symptoms: Leaf tip burns and curling. - Solution: Apply calcium nitrate.
Vegetative Stage	30- 45 Days	Irrigation Management	**Watering:** - Increase watering frequency as the plant size grows, keeping cocopeat consistently moist. - Avoid wetting the foliage to reduce fungal risks.
Vegetative Stage	30- 45 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Leaf miner:** Biological control - Neem kernel extract 4% Cultural control -Remove plant residues Physical control - Yellow sticky traps **c)Whitefly:** Biological control - Ladybugs - Lacewings Cultural control -Avoid excessive nitrogen fertilizer Physical control - Yellow sticky traps **d) Mites:** Biological control - Ladybugs - Lacewings - Predatory mites Cultural control -Regular Monitoring Physical control
Vegetative Stage	30- 45 Days	Disease Management	**a) Powdery mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. Cultural control -Remove plant residues Physical control - Sanitation. **b) Downy mildew:** Biological control - Plant extracts - 2.5 ml/L of water - Pseudomonas fluorescence - 2.5 ml/L of water. Cultural control -Plucking and destruction of affected leaves Physical control - Remove infected leaves. **c) Bacterial leaf spot:** Biological control - Bacillus subtilis. Cultural control -Use healthy, disease-free certified seed. Physical control - Remove and destroy infected leaves manually.

Flowering Stage	45- 50 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	45- 50 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Purplish leaves and poor flowering. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms: Browning of leaf edges and weak flowers. - Solution: Use banana peel tea.
Flowering Stage	45- 50 Days	Irrigation Management	**Watering:** -Water deeply to ensure the roots reach sufficient moisture. - Reduce watering frequency slightly compared to earlier stages to encourage fruit ripening, but don't let the soil dry out completely.
Flowering Stage	45- 50 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Deep ploughing **c)Whitefly:** Biological control - Ladybugs - Lacewings Cultural control -Avoid excessive nitrogen fertilizer Physical control - Yellow sticky traps **d) Epilachna beetle:** Biological control - Neem oil Cultural control -Remove the bugs and destroy Physical control

Flowering Stage	45- 50 Days	Disease Management	**a) Powdery mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. Cultural control -Remove plant residues Physical control - Sanitation. **b) Downy mildew:** Biological control - Plant extracts - 2.5 ml/L of water - Pseudomonas fluorescence - 2.5 ml/L of water. Cultural control - Plucking and destruction of affected leaves Physical control - Remove infected leaves. **c) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water - Herbal formulation -2 ml/L of water Cultural control -Use healthy, disease-free certified seed. Physical control - Crop rotation - Deep cultivation. **d) Fusarium wilt:** Biological control - Pseudomonas sp - 2ml/L of water - Herbal formulation - 2 ml/L of water Cultural control -Cultivation of resistant varieties Physical control
Fruiting Stage	50- 65 Days	Micro Nutrients Management	**1) Calcium (Ca):** - Symptoms: Blossom end rot on fruits, weak fruit walls, or misshapen fruits. - Application: Crushed eggshells soaked in water or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.
Fruiting Stage	50- 65 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea. **3)Sulfur Deficiency:** - Symptoms: Pale fruits with weak flavor. - Solution: Add gypsum or elemental sulfur.
Fruiting Stage	50- 65 Days	Irrigation Management	**Watering:** - Continue to water deeply to avoid stress during fruit filling. - Reduce watering towards the end of the fruit ripening period to prevent waterlogging and encourage curing. - Water at the base to avoid wetting the foliage.
Fruiting Stage	50- 65 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Deep ploughing **c) Fruit fly:** Biological control - Neem oil- 3.0% Cultural control -Collect the affected plants and destroy Physical control - Fruit fly trap.

Fruiting Stage	50- 65 Days	Disease Management	**a) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water - Herbal formulation -2 ml/L of water Cultural control -Use healthy, disease-free certified seed. Physical control - Crop rotation - Deep cultivation. **b) Fusarium wilt:** Biological control - Pseudomonas sp - 2ml/L of water - Herbal formulation - 2 ml/L of water Cultural control -Cultivation of resistant varieties Physical control - Sanitation. **c) Vascular Wilt:** Biological control - Trichoderma koningii - Trichoderma polysporum Cultural control -Use healthy, disease-free certified seed. Physical control - Sanitation. **d) Scab:** Biological control - B. subtilis - B. amyloliquefaciens Cultural control -Crop rotation with corn Physical control
Harvesting Stage	65- 90 Days	Micro Nutrients Management	**1) Nutrient Management:** - Stop applying fertilizers 7–10 days before harvesting to avoid excessive vegetative growth and allow the plant to focus on fruit maturation. - Maintain a low-level nutrient supplement (e.g., compost tea or diluted seaweed extract) if harvesting is staggered over weeks to support plant vitality and extend fruiting.
Harvesting Stage	65- 90 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea.
Harvesting Stage	65- 90 Days	Irrigation Management	**Watering:** - Before Harvest: Reduce watering 2–3 days prior to harvesting to enhance fruit firmness and flavor. Do not let the plants wilt, as it can stress the plant and affect subsequent yields. - After Harvest: Water the plants lightly to maintain soil moisture and support further fruiting if the plant will continue producing.
Harvesting Stage	65- 90 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Fruit fly:** Biological control - Neem oil- 3.0% Cultural control -Collect the affected plants and destroy Physical control - Deep ploughing - Fruit fly trap.
Harvesting Stage	65- 90 Days	Disease Management	**a) Fruit rot:** Biological control - Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -Destroy infected fruits. Physical control - Avoid overhead watering to keep foliage and fruits dry.
Harvesting Stage	65- 90 Days	Signs of maturity	Vibrant color,Dark green - light green.

RIDGE GOURD			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 7.5. using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Azospirillum or Azotobacter mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1-2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus or Pseudomonas, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients. - Incorporate micronutrients -iron, zinc, magnesium, every 2 weeks.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Water 1-2 times a day depending on ambient temperatures. - Avoid wetting the leaves to prevent fungal infections.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control -Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Leaf miner:** Biological control -Neem kernel extract 4% Cultural control -Remove plant residues Physical control -Yellow sticky traps **c) Thrips:** Biological control - Botanical Extracts -2 ml/L of water - Organic blend of botanical extracts - 2 ml/L of water - Azadiractin 10000 ppm - 2 ml/L of water Cultural control -Neem cake. Physical control - Crop rotation.
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Root rot:** Biological control - Trichoderma spp - Bacillus subtilis Cultural control - Remove affected plants Physical control - Avoid over watering **b) Damping Off:** Biological control - Trichoderma harzianum. Cultural control - Remove affected seedlings. Physical control - Proper drainage.
Vegetative Stage	25- 45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development and vine growth. - Application : Use fish emulsion - Apply weekly
Vegetative Stage	25- 45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: Pale new leaves with green veins. - Solution: Foliar spray of chelated iron.

Vegetative Stage	25- 45 Days	Irrigation Management	**Watering:** - Water regularly but ensure no stagnant water in the grow bag. - Maintain 50-60% moisture in cocopeat.
Vegetative Stage	25- 45 Days	Pest Management	**a) Aphids:** Biological control - Neem oil emulsion 2.5% with garlic paste-20g/L of water Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Mealybugs:** Biological control - Lacewings - Ladybugs Cultural control -Avoid Over-fertilization Physical control - Yellow sticky traps - Mealy Bug Lure **c) Whiteflies:** Biological control - Neem oil -2 ml/L of water Cultural control -Remove weeds Physical control - Yellow sticky traps **d) Gall fly:** Biological control - Neem oil with garlic mixture. Cultural control - Restrict irrigation and nitrogen fertilizers. Physical control
Vegetative Stage	25- 45 Days	Disease Management	**a) Collar rot/Root rot:** Biological control - Trichoderma spp - Bacillus subtilis Cultural control - Remove affected plants Physical control - Improve drainage - Avoid over watering **b) Powdery mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. Cultural control - Remove affected plants Physical control - Sanitation. **c) Downy mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. - Plant extracts - 2.5 ml/L of water Cultural control - Plucking and destruction of affected leaves. Physical control - Remove infected leaves
Flowering Stage	45- 60 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **2) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering. **3) Magnesium (Mg):** - Symptoms: Interveinal chlorosis yellowing between veins on older leaves. - Application: Use Epsom salts -1 tbsp/5 L of water.
Flowering Stage	45- 60 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Potassium Deficiency:** - Symptoms: Brown edges on older leaves. - Solution: Use banana peel tea.
Flowering Stage	45- 60 Days	Irrigation Management	**Watering:** - Reduce watering slightly to avoid water stress, which can lead to flower drop. - Water early in the morning or late evening.

Flowering Stage	45- 60 Days	Pest Management	**a) Epilachna beetle:** Biological control - Neem oil Cultural control - Remove the bugs and destroy Physical control - Collection and destruction of egg masses and grubs. **b) American serpentine leaf miner:** Biological control - Neem oil emulsion 2.5%. Cultural control - Remove plant residues Physical control - Yellow sticky traps **c) Red Pumpkin Beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water. Cultural control - Remove the bugs and destroy. Physical control - Deep ploughing **d) Gall fly:** Biological control - Neem oil with garlic mixture. Cultural control - Restrict irrigation and nitrogen fertilizers. Physical control
Flowering Stage	45- 60 Days	Disease Management	**a) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water - Herbal formulation -2 ml/L of water Cultural control - Use healthy, disease-free certified seed. Physical control - Crop rotation - Deep cultivation. **b) Powdery mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. Cultural control -Remove plant residues Physical control - Sanitation. **c) Downy mildew:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. - Plant extracts - 2.5 ml/L of water Cultural control -Plucking and destruction of affected leaves Physical control - Remove infected leaves. **d) Fusarium wilt:** Biological control - Pseudomonas fluorescence -2.5 ml/L of water. - Plant extracts - 2.5 ml/L of water Cultural control - Cultivation of resistant varieties.
Fruiting Stage	60-80 Days	Micro Nutrients Management	**1) Calcium (Ca):** - Symptoms: Blossom end rot on fruits, weak fruit walls, or misshapen fruits. - Application: Crushed eggshells soaked in water or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water. - Incorporate seaweed extract to boost fruit size and quality.
Fruiting Stage	60-80 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea. **3)Sulfur Deficiency:** - Symptoms: Pale fruits with weak flavor. - Solution: Add gypsum or elemental sulfur.
Fruiting Stage	60-80 Days	Irrigation Management	**Watering:** - Maintain even moisture but avoid overwatering. - Reduce watering towards the end of the fruit ripening period to prevent waterlogging and encourage curing.

Fruiting Stage	60-80 Days	Pest Management	**a) Epilachna beetle:** Biological control - Neem oil Cultural control - Remove the bugs and destroy Physical control - Collection and destruction of egg masses and grubs. **b) American serpentine leaf miner:** Biological control - Neem oil emulsion 2.5%. Cultural control - Remove plant residues Physical control - Yellow sticky traps **c) Red Pumpkin Beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water. Cultural control - Remove plant residues Physical control - Deep ploughing **d) Fruit fly:** Biological control - Neem oil- 20-50 ml/L of water Cultural control - Collect and destroy affected fruits Physical control
Fruiting Stage	60-80 Days	Disease Management	**a) Alternaria blight and fruit rot:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea. Cultural control - Use of disease free seeds Physical control - Sanitation **b) Mosaic Virus:** Biological control - B. diffusa root extract - C. aculeatum leaf extract - A. indica leaf extract. Cultural control - Cultivation of tolerant/resistant varieties. Physical control - Clean cultivation. **c) Gummy stem blight:** Biological control - Pseudomonas - Bacillus spp. Cultural control -Treat seeds prior to planting. Physical control
Harvesting Stage	80-100 Days	Micro Nutrients Management	**1) Nutrient Management:** - Stop applying fertilizers 7–10 days before harvesting to avoid excessive vegetative growth and allow the plant to focus on fruit maturation. - Reduce fertilizer application gradually but continue small doses of potassium.
Harvesting Stage	80-100 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea.
Harvesting Stage	80-100 Days	Irrigation Management	**Watering:** - Water sparingly to maintain fruit hydration and prevent splitting. - Before Harvest: Reduce watering 2–3 days prior to harvesting to enhance fruit firmness and flavor. Do not let the plants wilt, as it can stress the plant and affect subsequent yields. - After Harvest: Water the plants lightly to maintain soil moisture and support further fruiting if the plant will continue producing.

Harvesting Stage	80-100 Days	Pest Management	**a) Epilachna beetle:** Biological control - Neem oil Cultural control - Remove the bugs and destroy Physical control - Collection and destruction of egg masses and grubs. **b) Red Pumpkin Beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water. Cultural control - Remove plant residues Physical control - Deep ploughing **c) Fruit fly:** Biological control - Neem oil- 20-50 ml/L of water Cultural control - Collect and destroy affected fruits Physical control
Harvesting Stage	80-100 Days	Disease Management	**a) Alternaria blight and fruit rot:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea. Cultural control - Use of disease free seeds Physical control - Sanitation **b) Mosaic Virus:** Biological control - B. diffusa root extract - C. aculeatum leaf extract - A. indica leaf extract. Cultural control - Cultivation of tolerant/resistant varieties. Physical control - Clean cultivation. **c) Gummy stem blight:** Biological control - Trichoderma viride - Pseudomonas - Bacillus spp. Cultural control -Treat seeds prior to planting. Physical control
Harvesting Stage	80-100 Days	Signs of maturity	Ridged appearance, Dark green

BITTER GOURD			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5 - 6.8. using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Phosphobacteria or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1-2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus or Pseudomonas, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients. - Incorporate micronutrients -iron, zinc, magnesium, every 2 weeks.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Keep the cocopeat moist but not waterlogged. - Water lightly once or twice daily, ensuring consistent moisture.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Mites:** Biological control - Ladybugs - Lacewings - Predatory mites Cultural control -Regular Monitoring Physical control - Proper irrigation. **c) Beetles:** Biological control - Bacillus thuringiensis - Aspergillus spp. Cultural control -Remove and destroy infected plants Physical control
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Damping Off:** Biological control - Trichoderma harzianum. Cultural control -Remove and destroy infected plants Physical control - Good aeration - Avoid waterlogging.
Vegetative Stage	25- 45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development and vine growth. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Add micronutrients like magnesium, calcium, and boron using a chelated micronutrient mix once a week.
Vegetative Stage	25- 45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: Pale new leaves with green veins. - Solution: Foliar spray of chelated iron.

Vegetative Stage	25- 45 Days	Irrigation Management	**Watering:** - Increase watering frequency as the plant grows, but ensure proper drainage. - Avoid overwatering to prevent root rot.
Vegetative Stage	25- 45 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Proper irrigation. **c) Beetles:** Biological control - Bacillus thuringiensis - Aspergillus spp. Cultural control -Remove and destroy infected plants Physical control - Handpick and destroy beetles. **d) Epilachna beetle:** Biological control - Neem oil Cultural control -Remove and destroy egg masses,grubs.
Vegetative Stage	25- 45 Days	Disease Management	**a) Angular Leaf Spot :** Biological control - Trichoderma viride -3 g/L of water Cultural control -Avoid overhead irrigation Physical control - Sanitation **b) Cercospora Leaf Spot:** Biological control - Trichoderma viride -3 g/L of water Cultural control -Remove crop debris and weeds. Physical control - Sanitation **c) Powdery mildew:** Biological control -Ampelomyces quisqualis -2.5 ml/L of water Cultural control -Do not overcrowd plants. Physical control - Sanitation. **d) Downy mildew:** Biological control - Pseudomonas fluorescence 2% - 20 g/L of water - Plant Extracts -2.5 ml/L of water Cultural control - Complete removal and destruction of the affected leaves. Physical control - Remove infected leaves
Flowering Stage	45- 55 Days	Micro Nutrients Management	**1) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **2) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering. **3) Magnesium (Mg):** - Symptoms: Interveinal chlorosis yellowing between veins on older leaves. - Application: Use Epsom salts -1 tbsp/5 L of water. - Continue providing micronutrients every 7–10 days.
Flowering Stage	45- 55 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Potassium Deficiency:** - Symptoms: Brown edges on older leaves. - Solution: Use banana peel tea.

Flowering Stage	45- 55 Days	Irrigation Management	**Watering:** - Reduce watering slightly to avoid water stress, which can lead to flower drop. - Maintain even moisture levels. Water deeply but less frequently to promote deep root growth.
Flowering Stage	45- 55 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Proper irrigation. **c) Hadda Beetles:** Biological control - Bacillus thuringiensis - Castor oil Cultural control -Plant resistant varieties Physical control - Handpick and destroy beetles. - Proper irrigation **d) Gall fly:** Biological control - Neem oil with garlic mixture Cultural control - Restrict irrigation and nitrogen fertilizers.
Flowering Stage	45- 55 Days	Disease Management	**a) Anthracnose:** Biological control - Herbal formulation -4 ml/L of water - Pseudomonas fluorescens -5 ml/L of water Cultural control -Use resistant varieties Physical control - Sanitation **b) Bacterial Wilt::** Biological control - Trichoderma viride -3 g/L of water - Trichoderma koningii Cultural control -Use disease-free seeds Physical control - Soil solarization **c) Powdery mildew:** Biological control -Ampelomyces quisqualis -2.5 ml/L of water Cultural control -Do not overcrowd plants. Physical control - Sanitation. **d) Downy mildew:** Biological control - Pseudomonas fluorescence 2% - 20 g/L of water - Plant Extracts -2.5 ml/L of water Cultural control - Complete removal and destruction of the affected leaves. Physical control - Remove infected leaves.
Fruiting Stage	55- 75 Days	Micro Nutrients Management	**1) Potassium (K):** - Symptoms: Poor fruit quality and flavor. - Application: Use a potassium-dominant fertilizer like Banana peel. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.

Fruiting Stage	55- 75 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves - Solution: Apply nitrogen-rich fertilizers like fish emulsion. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea. **3) Calcium Deficiency:** - Symptoms: Blossom-end rot on fruits. - Solution:Use calcium nitrate
Fruiting Stage	55- 75 Days	Irrigation Management	**Watering:** - Water deeply every 2–3 days or as needed to avoid water stress, especially during fruit formation. - Mulch the cocopeat surface with straw or dried leaves to retain moisture.
Fruiting Stage	55- 75 Days	Pest Management	**a) Caterpillars:** Biological control - Apanteles spp. Cultural control - Collect and destroy early stage caterpillars Physical control - Pheromone traps. **b) Cucumber moth:** Biological control - Bacillus thuringiensis. Cultural control - Avoid overlapping crops Physical control - Collect and burn the bugs **c) Hadda Beetles:** Biological control - Bacillus thuringiensis - Castor oil Cultural control -Plant resistant varieties. Physical control - Handpick and destroy beetles. - Proper irrigation **d) Fruit fly:** Biological control - Neem oil - 20 - 50ml/L of water Cultural control - Clean cultivation
Fruiting Stage	55- 75 Days	Disease Management	**a) Bacterial Wilt::** Biological control - Trichoderma viride -3 g/L of water - Trichoderma koningii Cultural control -Use disease-free seeds Physical control - Soil solarization **b) Bitter gourd Witches Broom:** Biological control - Pseudomonas sp -2 ml/L of water - Neem oil Cultural control -Remove infested leaves and fruits Physical control - Row cover **c) Bitter Gourd Mosaic:** Biological control - Verticillium lecanii -2 ml/L of water - Azadirachtin 5% EC -0.5 ml/L of water Cultural control -Uprooting and destruction of affected plants Physical control - Row cover. **d) Fusarium Wilt:** Biological control - Pseudomonas sp -2 ml/L of water - Trichoderma viride -Seed treatment: 10 gm/lit water. Cultural control -Reduce nitrogen Physical control - Disinfect tools.
Harvesting Stage	75- 90 Days	Micro Nutrients Management	**1) Potassium (K):** - Symptoms: Poor fruit quality and flavor. - Application: Use a potassium-dominant fertilizer like Banana peel or compost. **2) Phosphorus (P):** - Symptoms: Poor fruit setting, and reduced fruit size. - Application: Liquid seaweed extract or compost tea can improve fruit size and taste.

Harvesting Stage	75- 90 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Potassium Deficiency:** - Symptoms: Fruits may appear misshapen or lack taste. - Solution: Use banana peel tea. **3) Calcium Deficiency:** - Symptoms: Blossom-end rot may occur. - Solution: Use Eggshell tea. **4) Magnesium Deficiency:** - Symptoms: Interveinal chlorosis on older leaves. - Solution: Spray Epsom salt -1 g/L water on foliage.
Harvesting Stage	75- 90 Days	Irrigation Management	**Watering:** - Water sparingly to maintain fruit hydration and prevent splitting. - Before Harvest: Reduce watering 2–3 days prior to harvesting to enhance fruit firmness and flavor. Do not let the plants wilt, as it can stress the plant and affect subsequent yields. - After Harvest: Water the plants lightly to maintain soil moisture and support further fruiting if the plant will continue producing.
Harvesting Stage	75- 90 Days	Pest Management	**a) Caterpillars:** Biological control - Apanteles spp. Cultural control - Collect and destroy early stage caterpillars Physical control - Pheromone traps. **b) Cucumber moth:** Biological control - Bacillus thuringiensis. Cultural control - Avoid overlapping crops Physical control - Collect and burn the bugs **c) Hadda Beetles:** Biological control - Bacillus thuringiensis - Castor oil Cultural control -Plant resistant varieties. Physical control - Handpick and destroy beetles. - Proper irrigation **d) Fruit fly:** Biological control - Neem oil - 20 - 50ml/L of water Cultural control - Clean cultivation Physical control - Collection and destruction of dropped fruits.

Harvesting Stage	75- 90 Days	Disease Management	**a) Bacterial Wilt::** Biological control - Trichoderma viride -3 g/L of water - Trichoderma koningii Cultural control -Use disease-free seeds Physical control - Soil solarization **b) Bitter gourd Witches Broom:** Biological control - Pseudomonas sp -2 ml/L of water - Neem oil Cultural control -Remove infested leaves and fruits Physical control - Row cover **c) Bitter Gourd Mosaic:** Biological control - Verticillium lecanii -2 ml/L of water - Azadirachtin 5% EC -0.5 ml/L of water Cultural control -Uprooting and destruction of affected plants Physical control - Row cover. **d) Fusarium Wilt:** Biological control - Pseudomonas sp -2 ml/L of water - Trichoderma viride -Seed treatment: 10 gm/lit water. Cultural control -Reduce nitrogen Physical control - Disinfect tools.
Harvesting Stage	75- 90 Days	Signs of maturity	Firm,Bright green

SPONGE GOURD			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 6.8. using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Phosphobacteria or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1-2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus or Pseudomonas, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to support early root and shoot growth. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Add a pinch of humic acid or seaweed extract to stimulate root development.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Keep the cocopeat evenly moist but not soggy. - Mist lightly 1–2 times daily to maintain optimal moisture.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Leaf miner:** Biological control - Neem kernel extract @ 4% - Neem oil with garlic mixture. Cultural control -Burning infested dried leaves Physical control - Use Traps - Use Yellow sticky cards **c) Red spider mites:** Biological control - Neem oil with garlic mixture. Cultural control -Collect and destroy the crop debris. Physical control
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Damping Off:** Biological control - Trichoderma harzianum. Cultural control -Remove and destroy infected plants Physical control - Good aeration - Avoid waterlogging.
Vegetative Stage	25- 40 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development and vine growth. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Supplement with micronutrients like calcium, magnesium, and boron every 10 days.
Vegetative Stage	25- 40 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Weak stems - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium deficiency:** - Symptoms: Leaf edge browning - Solution:Use Seaweed extract - Every 15 days.

Vegetative Stage	25- 40 Days	Irrigation Management	**Watering:** - Water deeply every 2–3 days, ensuring proper drainage to prevent waterlogging. - Avoid overwatering to prevent root rot.
Vegetative Stage	25- 40 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Leaf hopper:** Biological control - Neem oil with garlic mixture. Cultural control -Avoid excessive use of nitrogen Physical control - Phermone traps. **c) Thrips:** Biological control -Lacewings -Minute pirate bugs Cultural control -Proper Plant Spacing Physical control - Use of insect netting or fine mesh screens.
Vegetative Stage	25- 40 Days	Disease Management	**a) Collar rot:** Biological control - Trichoderma viride -3 g/L of water - Trichoderma harzianum Cultural control - Remove affected plants Physical control - Deep plowing - Sanitation. **b) Powdery mildew:** Biological control - Neem oil - Milk spray Cultural control - Pruning and Trellising Physical control - Proper water management **c) Downy mildew:** Biological control - Bacillus subtilis Cultural control -Air Circulation Physical control - -Plucking and destruction of affected leaves.
Flowering Stage	40- 55 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	40- 55 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Purplish leaves and poor flowering. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms: Browning of leaf edges and weak flowers. - Solution: Use banana peel tea.
Flowering Stage	40- 55 Days	Irrigation Management	**Watering:** - Keep moisture consistent, as fluctuating water levels can cause flower drop. - Avoid wetting flowers during watering.

Flowering Stage	40- 55 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Deep plowing **c) Gall fly:** Biological control - Neem oil with garlic mixture Cultural control -Avoid excessive use of nitrogen Physical control - Restrict irrigation **d) Nematodes:** Biological control -Pseudomonas fluorescens Cultural control -Cultivation of resistant varieties. Physical control
Flowering Stage	40- 55 Days	Disease Management	**a) Fusarium wilt:** Biological control - Pseudomonas sp -2 ml/L of water Cultural control -Cultivation of resistant varieties. Physical control - Regular weeding **b) Anthracnose:** Biological control - Herbal formulation -4 ml/L of water - Pseudomonas fluorescens -5 ml/L of water Cultural control -Use resistant varieties Physical control - Proper water management **c) Gummy stem blight:** Biological control - Pseudomonas - Bacillus spp Cultural control -Treat seeds prior to planting. Physical control - Crop rotation.
Fruiting Stage	55- 80 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving fruit quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote fruit set. - Continue providing micronutrients like magnesium and zinc once every 10–14 days.
Fruiting Stage	55- 80 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms: Blossom-end rot - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Browning of leaf edges and weak flowers. - Solution: Use banana peel tea.
Fruiting Stage	55- 80 Days	Irrigation Management	**Watering:** - Water every 2–3 days, depending on weather conditions, to prevent water stress during fruit development. - Reduce watering slightly as fruits mature to improve sweetness and flavor.

Fruiting Stage	55- 80 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Deep plowing **c) Fruit fly:** Biological control - Neem oil - 20-50 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Use light trap **d) Nematodes:** Biological control -Pseudomonas fluorescens Cultural control -Cultivation of resistant varieties. Physical control - Deep ploughing.
Fruiting Stage	55- 80 Days	Disease Management	**1) Mosaic Virus Disease:** Biological control - Verticillium lecanii -2 ml/L of water - Azadirachtin 5% EC -0.5 ml/L of water Cultural control -Use disease free seeds Physical control - Sanitation. **b) Alternaria blight and fruit rot:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea Cultural control -Use of disease free seeds. Physical control - Sanitation **c) Gummy stem blight:** Biological control - Pseudomonas - Bacillus spp Cultural control -Treat seeds prior to planting. Physical control - Crop rotation.
Harvesting Stage	80-100 Days	Micro Nutrients Management	**1) Potassium (K):** - Symptoms: Poor fruit quality and flavor. - Application: Use a potassium-dominant fertilizer like Banana peel or compost. **2) Phosphorus (P):** - Symptoms: Poor fruit setting, and reduced fruit size. - Application: Liquid seaweed extract or compost tea can improve fruit size and taste. - Use compost tea or diluted seaweed extract to enhance fruit taste.
Harvesting Stage	80-100 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Potassium Deficiency:** - Symptoms: Fruits may appear misshapen or lack taste. - Solution: Use banana peel tea.
Harvesting Stage	80-100 Days	Irrigation Management	**Watering:** - Keep moisture levels consistent. Avoid waterlogging, as mature plants are more susceptible to root rot. - This will also help harden the skins for storage.

Harvesting Stage	80-100 Days	Pest Management	**a) Aphids:** Biological control - Ladybugs - Parasitic Wasps Cultural control -1.5 % fish oil soap Physical control - Remove affected parts of the plant. **b) Red pumpkin beetle:** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Deep plowing **c) Fruit fly:** Biological control - Neem oil - 20-50 ml/L of water Cultural control -Remove the bugs and destroy Physical control - Use light trap.
Harvesting Stage	80-100 Days	Disease Management	**1) Mosaic Virus Disease:** Biological control - Verticillium lecanii -2 ml/L of water - Azadirachtin 5% EC -0.5 ml/L of water Cultural control -Use disease free seeds Physical control - Sanitation. **b) Alternaria blight and fruit rot:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea Cultural control -Use of disease free seeds. Physical control - Sanitation **c) Gummy stem blight:** Biological control - Pseudomonas - Bacillus spp Cultural control -Treat seeds prior to planting. Physical control - Crop rotation.
Harvesting Stage	80-100 Days	Signs of maturity	Firm but pliable -Bright to medium green.

WATERMELON			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 7.0 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1 inch deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Use chelated iron foliar spray.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Keep the cocopeat moist but not soggy. - Mist or water lightly once a day to ensure consistent moisture.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Verticillium lecanii -2 ml/L of water - Azadirachtin 5% EC - 0.5 ml/L of water Cultural control -Avoid excessive use of nitrogen fertilizer Physical control - Yellow sticky traps **b) Red Pumpkin Beetle:** Biological control - Metarhizium anisopliae -10 gm/L of water - Activated neem oil - 5 ml/L of water Cultural control -Neem seed cake Physical control - Chromatic trap **c) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water -Beauveria bassiana -2.5 ml/L of water Cultural control - Proper tillage Physical control
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Damping Off:** Biological control - Trichoderma harzianum. - Bacillus subtilis Cultural control -Use sterile soil or soilless mix for transplant production Physical control - Good aeration - Remove weeds
Vegetative Stage	25- 40 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Calcium (Ca):** - Strengthens cell walls, supports root development, and Calcium also plays a role in photosynthesis. - Application :Use gypsum can be used to supply calcium without affecting pH. **3) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	25- 40 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Weak stems and slow growth - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Vegetative Stage	25- 40 Days	Irrigation Management	**Watering:** - Water deeply every 2–3 days, allowing excess to drain. - Maintain consistent moisture, as cocopeat can retain water well without becoming waterlogged.

Vegetative Stage	25- 40 Days	Pest Management	**a) Aphids:** Biological control - Green lacewing - Verticillium lecanii -2 ml/L of water Cultural control -Avoid excessive use of nitrogen fertilizer Physical control - Yellow sticky traps **b) White Fly:** Biological control - Verticillium lecanii - 2 ml/L of water - Azardiractin 300 PPM EC formulation - 5-10 ml/L of water Cultural control -Remove weed -Sanitation Physical control - Yellow Sticky Trap - Use insect proof mesh **c) Thrips:** Biological control - Botanical Extracts -2 ml/L of water - Azadiractin 10000 ppm - 2 ml/L of water Cultural control -Soil application of neem cake. Physical control - Yellow sticky traps
Vegetative Stage	25- 40 Days	Disease Management	**a) Alternaria Leaf Spot:** Biological control - Trichoderma viride- 2.5 ml/L of water - Pseudomonas fluorescens - 8 – 10 ml/L of water Cultural control -Avoid overhead irrigation Physical control - Sanitation. **b) Cercospora leaf spot:** Biological control - Plant extracts - 2.5 ml/L of water - Pseudomonas fluorescence - 2.5 ml/L of water. Cultural control "-Breakdown and /or remove pruning debris entirely from the field. Physical control - Remove crop debris. **c) Sudden wilt:** Biological control - Trichoderma viride- 2.5 ml/L of water Cultural control -20 g -Farmyard manure or Well decomposed Cowdung. Physical control - Good drainage.
Flowering Stage	40- 60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	40- 60 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Purplish leaves and poor flowering. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms: Browning of leaf edges and weak flowers. - Solution: Use banana peel tea.
Flowering Stage	40- 60 Days	Irrigation Management	**Watering:** - Increase watering frequency slightly to meet the plant's increased demand during flowering - Avoid wetting flowers during watering to prevent fungal infections.

Flowering Stage	40- 60 Days	Pest Management	**a) Red Spider Mite:** Biological control - Plant extracts -1 – 2 ml/L of water - Phyto-extracts – 30% Cultural control -Provide irrigation at critical stages of the crop. Physical control - Chromatic trap **b) Serpentine leaf miner:** Biological control - Neem oil @ 10-20 ml/L of water - Azadiractin 10000 PPM - 1.6 – 2.4 ml/L of water Cultural control -Remove weeds Physical control - Chromatic trap **c) Cucumber Beetle:** Biological control - Pongamia Pinnata Extract - 2-3gm/L of water Cultural control -Intercropping Physical control - Beetle removed with a strong spray of water.
Flowering Stage	40- 60 Days	Disease Management	**a) Bud necrosis:** Biological control - Trichoderma viride- 2.5 ml/L of water Cultural control -Intercropping Physical control - Inter-cropping with maize (1:3) **b) Powdery mildew:** Biological control - Botanical extracts - 1.5 – 2 ml/lit water. - Pseudomonas fluorescence - 2.5 ml/L of water. Cultural control -Remove weeds Physical control - Remove infected leaves **c) Downy mildew:** Biological control - Plant extracts - 2.5 ml/L of water - Pseudomonas fluorescence - 2.5 ml/L of water Cultural control -Trellising watermelon. Physical control - Remove crop debris.
Fruiting Stage	60- 90 Days	Micro Nutrients Management	**1) Potassium(K):** - Symptoms: Potassium plays a critical role in improving fruit size, sweetness, and color. - Application: Use Banana peel tea or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.
Fruiting Stage	60- 90 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea.
Fruiting Stage	60- 90 Days	Irrigation Management	**Watering:** - Maintain consistent moisture without waterlogging to avoid cracking or irregular fruit development. - Water deeply every 2–3 days.
Fruiting Stage	60- 90 Days	Pest Management	**a) Pumpkin caterpillar:** Biological control - Encourage activity of parasioid - Apantheles spp. Cultural control -Remove weeds Physical control - Hand pick them off and drop them into a bucket of soapy water. **b) Cucumber Beetle:** Biological control - Pongamia Pinnata Extract - 2-3gm/L of water Cultural control -Flaming Physical control - Beetle removed with a strong spray of water. **c) Fruit fly:** Biological control - Azadiractin 10000 PPM - 3 ml/L of water - Neem oil - 20 - 50ml/L of water Cultural control -Remove all unharvested fruits or vegetables from a growbag by completely burying them deep into the soil. Physical control - Put fly traps - Pheromone lure.

Fruiting Stage	60- 90 Days	Disease Management	**a) Watermelon mosaic virus:** Biological control - C. aculeatum leaf extract - A. indica leaf extract Cultural control -Remove weeds Physical control -Use clean, disease-free seed **b) Bacterial fruit blotch:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea Cultural control -Planting pathogen-free seed and transplants. Physical control - Crop rotation **c) Gummy stem blight:** Biological control - Trichoderma viride - Pseudomonas Cultural control -Treat seeds prior to planting. Physical control - Crop rotation. **d) Verticillium wilt:** Biological control - B. amyloliquefaciens Cultural control -Farm yard manures Physical control - Use plastic mulch.
Harvesting Stage	90- 120 Days	Micro Nutrients Management	**1) Potassium(K):** - Symptoms: Potassium plays a critical role in improving fruit size, sweetness, and color. - Application: Use Banana peel tea or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	90- 120 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea. - Ensure consistent potassium and calcium supply to maintain fruit quality.
Harvesting Stage	90- 120 Days	Irrigation Management	**Watering:** - Gradually reduce watering as fruits near harvest to concentrate sugars and improve sweetness. - Avoid waterlogging at this stage to prevent fruit cracking.
Harvesting Stage	90- 120 Days	Pest Management	**a) Pumpkin caterpillar:** Biological control - Encourage activity of parasioid - Apantheles spp. Cultural control -Remove weeds Physical control - Hand pick them off and drop them into a bucket of soapy water. **b) Cucumber Beetle:** Biological control - Pongamia Pinnata Extract - 2-3gm/L of water Cultural control -Flaming Physical control - Beetle removed with a strong spray of water. **c) Fruit fly:** Biological control - Azadiractin 10000 PPM - 3 ml/L of water - Neem oil - 20 - 50ml/L of water Cultural control -Remove all unharvested fruits or vegetables from a growbag by completely burying them deep into the soil. Physical control - Put fly traps - Pheromone lure.

Harvesting Stage	90- 120 Days	Disease Management	**a) Watermelon mosaic virus:** Biological control - C. aculeatum leaf extract - A. indica leaf extract Cultural control -Remove weeds Physical control -Use clean, disease-free seed **b) Bacterial fruit blotch:** Biological control - Paenibacillus polymyxa - Sinomonas atrocyanea Cultural control -Planting pathogen-free seed and transplants. Physical control - Crop rotation **c) Gummy stem blight:** Biological control - Trichoderma viride - Pseudomonas Cultural control -Treat seeds prior to planting. Physical control - Crop rotation. **d) Verticillium wilt:** Biological control - B. amyloliquefaciens Cultural control -Farm yard manures Physical control - Use plastic mulch.
Harvesting Stage	90- 120 Days	Signs of maturity	Tendril turns brown and dry -Pale green to a creamy yellow

MUSKMELON			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 7.0 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1–2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: Yellowing between veins, starting from the lower leaves. - Solution: Use chelated iron foliar spray.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Keep the cocopeat moist but not soggy. - Mist or water lightly once a day to ensure consistent moisture.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Green lacewing - Verticillium lecanii -2 ml/L of water Cultural control -Hot pepper extract or soap solution. Physical control - Yellow sticky traps **b) Seedcorn maggot:** Biological control - Neem oil Cultural control -Late plantings during cool springs. Physical control - Sanitation **c) Cutworms:** Biological control -Bacillus thuringiensis -10 ml/L of water Cultural control -Destruction of plant residues from previous crops. Physical control
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Damping Off:** Biological control - Trichoderma harzianum. - Bacillus subtilis Cultural control -Use sterile soil or soilless mix for transplant production. Physical control - Good aeration - Remove weeds
Vegetative Stage	25- 45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Calcium (Ca):** - Strengthens cell walls, supports root development, and Calcium also plays a role in photosynthesis. - Application :Use gypsum can be used to supply calcium without affecting pH. **3) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	25- 45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Weak stems and slow growth - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Vegetative Stage	25- 45 Days	Irrigation Management	**Watering:** - Water deeply every 2–3 days, ensuring proper drainage to avoid waterlogging. - Maintain consistent moisture levels to support vine development.

Vegetative Stage	25- 45 Days	Pest Management	**a) Aphids:** Biological control - Green lacewing - Azadirachtin 5% EC - 0.5 ml/L of water Cultural control -Hot pepper extract or soap solution. Physical control - Yellow sticky traps **b) Leaf miner :** Biological control - Azadiractin 10000 PPM -1.5 – 2.5 ml/L of water Cultural control -Remove and destroy plant debris Physical control - Yellow Sticky Trap **c) Red Pumpkin Beetle :** Biological control - Metarhizium anisopliae -10 g/L of water - Activated neem oil - 5 ml/L of water Cultural control -Neem seed cake Physical control - Collection and destruction of adult beetle.
Vegetative Stage	25- 45 Days	Disease Management	**a) Alternaria Leaf Spot:** Biological control - Trichoderma viride- 2.5 ml/L of water - Pseudomonas fluorescens - 8 – 10 ml/L of water Cultural control - Plant disease-free seed Physical control - Sanitation. **b) Angular Leaf Spot:** Biological control - T. koningi - T. polysporum Cultural control -Plant disease-free seed Physical control - Avoid excessive nitrogen. **c) Vascular Wilt:** Biological control - Trichoderma harzianum - Trichoderma viride Cultural control -Remove infected plants Physical control - Sanitize equipment
Flowering Stage	45- 60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering and fruit set. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	45- 60 Days	Nutrient Deficiency Management	**1) Phosphorus Deficiency:** - Symptoms: Purplish leaves and poor flowering. - Solution: Remedy with bone meal or liquid phosphorus. **2) Boron Deficiency:** - Symptoms: Deformed flowers - Solution :Apply a foliar spray of borax -0.5 g/L of wate.
Flowering Stage	45- 60 Days	Irrigation Management	**Watering:** - Increase watering frequency slightly during flowering to meet the plant's higher demand. - Avoid wetting flowers during watering to prevent fungal infections.

Flowering Stage	45- 60 Days	Pest Management	**a) Leaf eating caterpillar:** Biological control - Lacewings Cultural control -Crop rotation Physical control - Pheromone trap **b) Squash Bug:** Biological control - Trichopoda pennipes Cultural control -Removing debris and squash bugs Physical control - Early season row covers, such as thin cloth or screens, can reduce squash bug access to plants. **c) Squash Vine Borer:** Biological control - Trichopoda pennipes Cultural control -Destroy vines after harvest to destroy any larvae still inside stems. Physical control - Stems covered with barriers - Catch and destroy the moths.
Flowering Stage	45- 60 Days	Disease Management	**a) Powdery mildew:** Biological control - Eugenol, Thymol, potassium salts, cationic surface agent, sodium salts & preservatives - 1.5 – 2 g/L of water Cultural control -Remove afected leaves Physical control - Remove infected leaves. **b) Downy Mildew:** Biological control - Plant extracts - 2.5 ml/L of water - Pseudomonas fluorescence - 2.5 ml/L of water Cultural control -Crop rotation Physical control - Remove infected leaves. **c) Bacterial wilt:** Biological control - Trichoderma viride - Trichoderma koningii. Cultural control -Crop rotation Physical control - Remove crop debris.
Fruiting Stage	60- 80 Days	Micro Nutrients Management	**1) Potassium(K):** - Symptoms: Potassium plays a critical role in improving fruit size, sweetness, and color. - Application: Use Banana peel tea or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water. - Apply seaweed extract or compost tea to improve overall plant health.
Fruiting Stage	60- 80 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Small or deformed fruits - Solution: Use banana peel tea.
Fruiting Stage	60- 80 Days	Irrigation Management	**Watering:** - Water deeply every 2–3 days, ensuring even moisture without waterlogging. - Mulch around the plant base with straw or dry leaves to retain moisture and regulate root temperature.
Fruiting Stage	60- 80 Days	Pest Management	**a) Aphids:** Biological control - Green lacewing - Azadirachtin 5% EC - 0.5 ml/L of water Cultural control -Hot pepper extract or soap solution. Physical control - Yellow sticky traps **b) Leaf miner:** Biological control - Azadiractin 10000 PPM -1.5 – 2.5 ml/L of water Cultural control -Remove and destroy plant debris Physical control - Yellow sticky traps **c) Fruit fly:** Biological control - Azadiractin 10000 PPM - 3 ml/L of water - Neem oil - 20 - 50ml/L of water Cultural control -Sanitation. Physical control - Put fly traps - Pheromone lure.

Fruiting Stage	60- 80 Days	Disease Management	**a) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water - Herbal formulation -2 ml/L of water Cultural control -Collection and destruction of infected plant. Physical control - Using clean, disease-free seed **b) Gummy Stem Blight:** Biological control - Pseudomonas - Bacillus spp Cultural control -Transplants is essential to prevent serious crop losses. Physical control - Crop rotation **c) Sudden Wilt:** Biological control - Trichoderma viride Cultural control -Apply with 50 g -Farmyard manure Physical control - Destroy diseased plant debris.
Harvesting Stage	80- 100 Days	Micro Nutrients Management	**1) Potassium(K):** - Symptoms: Potassium plays a critical role in improving fruit size, sweetness, and color. - Application: Use Banana peel tea or bone meal. **2) Magnesium (Mg):** - Symptoms: Interveinal chlorosis (yellowing between veins) on older leaves, poor fruit setting, and reduced fruit size. - Application: Use Epsom salts -1 tbsp/5 L of water.
Harvesting Stage	80- 100 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms:Blossom-end rot on fruits. - Solution: Remedy with bone meal or liquid phosphorus. **2) Potassium Deficiency:** - Symptoms:Poor fruit quality and flavor. - Solution: Use banana peel tea. - Ensure consistent potassium and calcium supply to maintain fruit quality.
Harvesting Stage	80- 100 Days	Irrigation Management	**Watering:** - Gradually reduce watering as fruits near maturity to concentrate sugars and improve sweetness. - Avoid waterlogging at this stage to prevent fruit cracking.
Harvesting Stage	80- 100 Days	Pest Management	**a) Aphids:** Biological control - Green lacewing - Azadirachtin 5% EC - 0.5 ml/L of water Cultural control -Hot pepper extract or soap solution. Physical control - Yellow sticky traps **b) Squash Bug:** Biological control - Trichopoda pennipes Cultural control -Removing debris and old squash bugs Physical control - Early season row covers, such as thin cloth or screens, can reduce squash bug access to plants. **c) Fruit fly:** Biological control - Azadiractin 10000 PPM - 3 ml/L of water - Neem oil - 20 - 50ml/L of water Cultural control -Sanitation. Physical control - Put fly traps - Pheromone lure.

Harvesting Stage	80- 100 Days	Disease Management	**a) Anthracnose:** Biological control - Botanical extracts - 1 –2 ml/L of water - Herbal formulation -2 ml/L of water Cultural control -Collection and destruction of infected plant. Physical control - Using clean, disease-free seed **b) Damping-off:** Biological control - Bacillus spp Cultural control -Farmyard manure - 50 g Physical control - Remove weeds **c) Scab:** Biological control - B. subtilis - B. amyloliquefaciens. Cultural control -Grow resistant varieties Physical control - Crop rotation - Plant cultivars resistant to scab.
Harvesting Stage	80- 100 Days	Signs of maturity	Sweet, aromatic fragrance - Pale green to a creamy yellow or golden color.

MARIGOLD			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 6.5 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma or Bacillus subtilis mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1–2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 25 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Use a foliar spray of seaweed extract for additional micronutrients.
Pre-Seedling Stage	15- 25 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Apply compost tea or diluted fish emulsion.
Pre-Seedling Stage	15- 25 Days	Irrigation Management	**Watering:** - Water lightly to maintain moisture. Allow the top layer of cocopeat to dry slightly between waterings to prevent fungal growth.
Pre-Seedling Stage	15- 25 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 2-5 ml/L of water Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Leaf miner:** Biological control - Ladybugs - Lacewings Cultural control -Remove infected leaves Physical control - Remove and destroy infected leaves manually **c) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Removal of crop residues Physical control
Pre-Seedling Stage	15- 25 Days	Disease Management	**a) Damping Off:** Biological control - Trichoderma harzianum. - Bacillus subtilis Cultural control -Removal of affected plants Physical control - Good aeration **b) Collar rot/Root rot:** Biological control - Seed treatment with Trichoderma viride at 6 ml/kg of seed. Cultural control -Avoid over watering Physical control - Sanitation.
Vegetative Stage	25- 45 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Calcium (Ca):** - Strengthens cell walls, supports root development, and Calcium also plays a role in photosynthesis. - Application :Use gypsum can be used to supply calcium without affecting pH. **3) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	25- 45 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale green leaves - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Purple edges - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Vegetative Stage	25- 45 Days	Irrigation Management	**Watering:** - Water when the cocopeat feels dry an inch below the surface. - Ensure good drainage to prevent waterlogging.

Vegetative Stage	25- 45 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 2-5 ml/L of water Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Mealy bug:** Biological control - Fish oil rosin soap - 25 gm/L of water. Cultural control -Prune the infected plant parts Physical control - Remove the bugs. **c) Whiteflies:** Biological control - Lacewings - Ladybugs Cultural control -Avoid excessive nitrogen fertilizer Physical control - Yellow / Blue sticky trap.
Vegetative Stage	25- 45 Days	Disease Management	**a) Leaf spot and blight:** Biological control - Pseudomonas fluorescence - 5 g/L of water - Bacillus subtilis - 5 g/L of water Cultural control -Remove infected leaves Physical control - Remove and destroy infected leaves manually **b) Collar rot/Root rot:** Biological control - Seed treatment with Trichoderma viride at 6 ml/kg of seed. Cultural control -Avoid over watering Physical control - Sanitation.
Budding Stage	45- 55 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Budding Stage	45- 55 Days	Nutrient Deficiency Management	**1)Calcium Deficiency:** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Small or discolored buds - Solution: Use banana peel tea.
Budding Stage	45- 55 Days	Irrigation Management	**Watering:** - Regular but moderate watering. Avoid wetting the leaves to reduce fungal issues.
Budding Stage	45- 55 Days	Pest Management	**a) Bud borer:** Biological control - Bacillus thuringiensis at 2 g/L of water Cultural control -Collection and destruction of damaged buds Physical control - Blue sticky traps **b) Hairy caterpillar:** Biological control - Neem oil - 30 ml/L of water Cultural control -Remove the caterpillars at night Physical control - Handpick the caterpillars **c) Red Spider Mites:** Biological control - 100% derived from plant extracts - 2ml/L of water - Ladybugs Cultural control -Cow urine diluted with water - 1:20 Physical control - Mites removed with a strong spray of water.

Budding Stage	45- 55 Days	Disease Management	**a) Bud rot:** Biological control - Chaetomium globosum - Bacillus subtilis Cultural control -Allium cepa Physical control - Remove infected leaves and buds **b) Wilt and Stem rot:** Biological control - Pseudomonas fluorescence - 10 ml/L of water -Trichoderma viride 1.5% WP - 20 g/L of water Cultural control -Farmyard manure Physical control - Sanitation. **c) Septoria leaf spot:** Biological control - Leaf extract of A. indica - Aerated compost tea Cultural control - Thinning Physical control - Removal of crop debris from the planting area.
Flowering Stage	55- 75 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	55- 75 Days	Nutrient Deficiency Management	**1)Calcium Deficiency:** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Small or discoloured flowers - Solution: Use banana peel tea.
Flowering Stage	55- 75 Days	Irrigation Management	**Watering:** - Regular but moderate watering. Avoid wetting the leaves to reduce fungal issues.
Flowering Stage	55- 75 Days	Pest Management	**a) Beetles and Weevils:** Biological control - Metarhizium anisopliae -10 ml/L of water. Cultural control -Remove infected leaves Physical control -Remove the beetles. **b) Helicoverpa:** Biological control - Neem oil - 30 ml/L of water Cultural control -Remove and discard any Helicoverpa caterpillars Physical control - Heli lures and floral lures **c) Earwigs:** Biological control -Remove hiding places like fallen leaves Cultural control - Thinning Physical control - Homemade traps - Sanitation
Flowering Stage	55- 75 Days	Disease Management	**a) Alternaria Leaf Spot:** Biological control - Volatile oils from A. indica and Eucalyptus sp Cultural control -Good watering practices Physical control - Removal of crop debris from the planting area. **b) Cercospora Leaf Spot:** Biological control - Garlic Extract + Cow urine +Soap Nut Cultural control -Crop Rotation Physical control - Tillage buries residue and decreases innoculum. **c) Powdery mildew:** Biological control - Cinnamomum cassia (M.C.)7.0% - Anethum graveolens (M.C.) 5.0% Cultural control -Remove afected leaves Physical control - Avoid water logging.
Harvesting Stage	75- 90 Days	Micro Nutrients Management	**1) Nutrients Management:** - Use a balanced liquid fertilizer (NPK 10:10:10) every two weeks to promote continuous flowering.

Harvesting Stage	75- 90 Days	Nutrient Deficiency Management	**1)Calcium Deficiency:** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Small or discoloured flowers - Solution: Use banana peel tea. **3) Nutrient Deficiency Management:** - Minimal deficiencies occur if managed well earlier.
Harvesting Stage	75- 90 Days	Irrigation Management	**Watering:** - Reduce watering slightly but avoid drying out the cocopeat entirely.
Harvesting Stage	75- 90 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 2-5 ml/L of water Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Removal of crop residues Physical control - Yellow / Blue sticky traps **c) Whiteflies:** Biological control - Lacewings - Ladybugs Cultural control -Avoid excessive nitrogen fertilizer Physical control - Yellow / Blue sticky trap.
Harvesting Stage	75- 90 Days	Disease Management	**a) Damping off:** Biological control - Trichoderma Viride - 10 gm/L of water Cultural control -Crop rotation Physical control - Proper drainage should be maintained. **b) Botrytis blight / Gray mold:** Biological control - Ampelomyces Quisqualis - 5-10ml/L of water Cultural control -Crop rotation Physical control - Sanitation. **c) Aster yellows:** Biological control - Ladybugs - Lacewings Cultural control -Clear of leaf debris and weeds Physical control - Infected plants are removed.
Harvesting Stage	75- 90 Days	Signs of maturity	Full bloom with vibrant,bright colors -Rich yellows, Oranges, or Reds (depending on the variety).

TUBEROSE			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 21 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 6.5 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma or Bacillus subtilis mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1–2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	21- 45 Days	Micro Nutrients Management	**1) Nutrients Management:** - No heavy feeding needed initially. Mix cocopeat with a small amount of organic compost for a slow nutrient release.
Pre-Seedling Stage	21- 45 Days	Nutrient Deficiency Management	**1) Nutrient Deficiency Management:** - Not significant at this stage since bulbs store nutrients.
Pre-Seedling Stage	21- 45 Days	Irrigation Management	**Watering:** - Water sparingly to keep the cocopeat moist but not wet. - Avoid overhead watering to prevent fungal growth.
Pre-Seedling Stage	21- 45 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Grasshoppers:** Biological control - Nosema locustae Cultural control -Hand pick and remove the hoppers. Physical control - Row covers - Nets or screens **c) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap
Pre-Seedling Stage	21- 45 Days	Disease Management	**a) Bulb rot:** Biological control - Bulb treatment with Trichoderma viride - 6 ml/L of water Cultural control -Farmyard manure Physical control - Avoid waterlogging. **b) Basal rot (or) stem rot:** Biological control - Drenching with Pseudomonas fluorescens- 2g/L of water Cultural control -Farmyard manure Physical control - Sanitation.
Vegetative Stage	45- 60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	45- 60 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale, yellowing leaves - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Magnesium Deficiency:** - Symptoms: Weak growth - Solution: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	45- 60 Days	Irrigation Management	**Watering:** - Water regularly to maintain consistent moisture, but avoid overwatering. - Ensure proper drainage as tuberose is sensitive to waterlogging.

Vegetative Stage	45- 60 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap **c) Nematodes:** Biological control - Neem based formulation of Pochonia chlamydosporia Cultural control -Use of resistant varieties Physical control - Deep plowing - Weed control.
Vegetative Stage	45- 60 Days	Disease Management	**a) Basal rot (or) stem rot:** Biological control - Drenching with Pseudomonas fluorescens- 2g/L of water Cultural control -Farmyard manure Physical control - Sanitation. **b) Leaf blight or Botrytis blight:** Biological control - Bacillus subtilis - Trichoderma spp. Cultural control -Removing and properly disposing of plant debris, fallen leaves, or flowers. Physical control - Sanitation. **c) Alternaria leaf spot:** Biological control - Trichoderma asperellum - P. fluorescens Cultural control -Good watering practices Physical control - Removal of crop debris from the planting area.
Budding Stage	60-75 Days	Micro Nutrients Management	**1) Magnesium (Mg):** - Essential for chlorophyll production and to enhance bud quality. - Application: Use Epsom salts -1 tbsp/5 L of water. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Budding Stage	60-75 Days	Nutrient Deficiency Managem	**1) Potassium Deficiency:** - Symptoms: Small or undeveloped buds - Solution: Use Banana peel tea. **2) Phosphorus Deficiency:** - Symptoms: Purple edges on leaves - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Budding Stage	60-75 Days	Irrigation Management	**Watering:** - Reduce watering slightly but maintain consistent moisture. - Avoid waterlogging at this stage to prevent root rot.
Budding Stage	60-75 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap **c) Bud borer:** Biological control - Neem oil 1% Cultural control -Collection and destruction of damaged buds Physical control - Setting up of light traps.

Budding Stage	60-75 Days	Disease Management	**a) Alternaria leaf spot:** Biological control - Trichoderma asperellum - P. fluorescens Cultural control -Good watering practices Physical control - Removal of crop debris from the planting area. **b) Bud rot:** Biological control -T. viridae - Bacillus subtilis. Cultural control -Diseased plants should be uprooted and destroyed Physical control - Remove infected leaves and buds. **c) Sclerotial Wilt:** Biological control - Penicillium spp - Gliocladium virens. Cultural control - Crop Rotation - Plowing. Physical control - Soil solarization
Flowering Stage	75- 120 Days	Micro Nutrients Management	**1) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application :Add liquid seaweed extract every 10 days to enhance bloom quality.
Flowering Stage	75- 120 Days	Nutrient Deficiency Managem	**1)Calcium Deficiency:** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium or Boron Deficiency:** - Symptoms: Reduced flower size or discoloration - Solution: Use wood ash or banana peel tea - Every 15 days.
Flowering Stage	75- 120 Days	Irrigation Management	**Watering:** - Water lightly and regularly to keep the medium moist. - Ensure that excess water drains out to prevent root or bulb rot.
Flowering Stage	75- 120 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap **c) Red Spider Mites:** Biological control - Neem oil 1% - Beauveria bassiana Cultural control -Weed management Physical control - Mites removed with a strong spray of water.
Flowering Stage	75- 120 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control -Cultivating resistant crop varieties Physical control - Sanitation. **b) Blossom blight:** Biological control - Trichoderma virens - Mustard oil cake - 3% Cultural control -Use of disease free soil for cultivation Physical control - Affected flowers should be collected and destroyed. **c) Peduncle blight:** Biological control - Fluroescent pseudomonads - Bacillus spp. Cultural control -Reducing moisture level. Physical control - Sanitation.
Harvesting Stage	120- 180 Days	Micro Nutrients Management	**1) Nutrients Management:** - Stop feeding fertilizers after flowering is complete.

Harvesting Stage	120- 180 Days	Nutrient Deficiency Management	**1) Nutrient Deficiency Management:** - No active management needed during dormancy.
Harvesting Stage	120- 180 Days	Irrigation Management	**Watering:** - Gradually reduce watering as the foliage dies back. - Allow the cocopeat to dry out if bulbs are left in the medium for storage.
Harvesting Stage	120- 180 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap **c) Rodents:** Biological control - Predators - Snakes, vultures, mongoose, cats and dogs. Cultural control -Clean cultivation Physical control - Poison bait - Traps.
Harvesting Stage	120- 180 Days	Disease Management	**a) Anthracnose:** Biological control - Bacillus subtilis Cultural control -Cultivating resistant crop varieties Physical control - Sanitation. **b) Blossom blight:** Biological control - Trichoderma virens - Mustard oil cake - 3% Cultural control -Use of disease free soil for cultivation Physical control - Affected flowers should be collected and destroyed. **c) Peduncle blight:** Biological control - Fluroescent pseudomonads - Bacillus spp. Cultural control -Reducing moisture level. Physical control - Sanitation.
Harvesting Stage	120- 180 Days	Signs of maturity	Peak fragrance and display vibrant, fresh color.

CHRYSANTHEMUM			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6.0 - 7.0 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma or Bacillus subtilis mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1–2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nutrients Management:** - Use a diluted liquid fertilizer weekly to promote initial growth. - Supplement with seaweed extract to encourage root development.
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Manageme	**1) Nutrient Deficiency Management:** - Minimal as seedlings rely on stored nutrients.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering:** - Keep cocopeat moist but not soggy. - Use a spray bottle for uniform moisture without washing away seedlings.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) White fly:** Biological control - Garlic oil - Lacewings Cultural control -Remove and destroy infected leaves Physical control - Use sticky traps **c) Thrips:** Biological control - Azardiractin -3 ml/L of water. Cultural control -Alternate host plants Physical control - Yellow / Blue sticky trap
Pre-Seedling Stage	15- 30 Days	Disease Management	**a) Root rot:** Biological control - Seed treatment with Trichoderma viride -6 ml/kg of seed Cultural control -Provide good drainage conditions to prevent water logging Physical control - Avoid waterlogging. **b) Stem Rot:** Biological control - Seed treatment with Trichoderma viride- 6 ml/kg of seed Cultural control -Crop rotation Physical control - Sanitation. **c) Rust:** Biological control - Leucanthemum - Argyranthemum Cultural control -Early removal of infected leaves. Physical control - Roughing of infected plants
Vegetative Stage	30- 60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	30- 60 Days	Nutrient Deficiency Manageme	**1) Nitrogen Deficiency:** - Symptoms: Yellowing lower leaves - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Magnesium Deficiency:** - Symptoms: Stunted growth - Solution: Use Epsom salts -1 tbsp/5 L of water.

Vegetative Stage	30- 60 Days	Irrigation Management	**Watering:** - Water when the top inch of cocopeat feels dry. - Ensure proper drainage to prevent root rot.
Vegetative Stage	30- 60 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Leaf miner:** Biological control - Encourage natural predators like spiders,solider beetles. Cultural control -Remove and destroy infected leaves Physical control - Remove weeds. **c) Termites:** Biological control - Predators - Snakes, vultures, mongoose, cats and dogs. Cultural control -Avoid dry soil condition Physical control - Deep plowing - Weed control.
Vegetative Stage	30- 60 Days	Disease Management	**a) Leaf spot:** Biological control - Pseudomonas fluorescence - 5 g/L of water - Bacillus subtilis - 5 gm/L of water Cultural control -Remove and destroy infected leaves Physical control - Avoid splashing water onto plant foliage **b) Wilt:** Biological control - Pseudomonas fluorescence - 10 ml/L of water - Trichoderma viride 1.5% WP - 20 g/L of water. Cultural control -Periodical monitoring Physical control - Sanitation. **c) Gray mold:** Biological control - Ulocladium - Bacillus species. Cultural control -Early removal of infected leaves. Physical control - Practice good sanitation.
Budding Stage	60- 90 Days	Micro Nutrients Management	**1)Calcium (Ca):** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium or Boron :** - Symptoms: Reduced flower size or discoloration - Solution: Use wood ash or banana peel tea - Every 15 days.
Budding Stage	60- 90 Days	Nutrient Deficiency Manageme	**1) Potassium Deficiency:** - Symptoms: Small or undeveloped buds - Solution: Use Banana peel tea. **2) Phosphorus Deficiency:** - Symptoms: Purple discoloration - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Budding Stage	60- 90 Days	Irrigation Management	**Watering:** - Maintain consistent moisture, as drying out can stress the plants and affect bud development. - Avoid waterlogging to prevent fungal diseases.

Budding Stage	60- 90 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control -Wash them off the plants with a strong jet (water) Physical control - Blue sticky traps **b) Bud borer:** Biological control - Neem seed kernel extract 4% - Neem oil 1% Cultural control -Collection of mature larvae and destroy Physical control - Use pheromone traps. **c) Leaf folder:** Biological control - Lacewings - Neem oil Cultural control -Cutting and burning the infested plants Physical control - Weed control.
Budding Stage	60- 90 Days	Disease Management	**a) Powdery mildew:** Biological control - Cinnamomum cassia 7.0% - Anethum graveolens 5.0% Cultural control -Proper plant spacing Physical control - Adequate light levels. **b) Fusarium Wilt:** Biological control - Bacillus thruingiensis Cultural control --Adjust pH Physical control - Sanitation. **c) Verticillium Wilt:** Biological control - B. amyloliquefaciens Cultural control -Use pathogen-free cuttings Physical control - Use white, reflective plastic mulch.
Flowering Stage	90- 120 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	90- 120 Days	Nutrient Deficiency Manageme	**1)Calcium Deficiency:** - Symptoms: Weak stems or drooping flowers - Solution: Remedy with bone meal. **2) Potassium or Boron Deficiency:** - Symptoms: Discolored or smaller blooms - Solution: Use wood ash or banana peel tea - Every 15 days.
Flowering Stage	90- 120 Days	Irrigation Management	**Watering:** - Reduce watering slightly but maintain even moisture. - Water at the base of the plant to prevent wetting flowers and foliage, which can cause fungal issues.
Flowering Stage	90- 120 Days	Pest Management	**a) European corn borer:** Biological control - Parasitic wasp Trichogramma Cultural control -Remove the caterpillars at night Physical control - Blue sticky traps **b) Mexican mealybug:** Biological control - Fish oil rosin soap at 25 gm/L of water. - Horticultural oil Cultural control -Prune the infected plant parts Physical control - Remove the bugs **c) Spider mite:** Biological control - Pongamia or neem oil or jatropa oil -5ml/L of water Cultural control -Avoid overcrowding Physical control - Cutting and burning of infested parts.

Flowering Stage	90- 120 Days	Disease Management	**a) Alternaria leaf spot:** Biological control - Volatile oils from A. indica and Eucalyptus sp Cultural control -Good watering practices Physical control - Removal of crop debris from the planting area **b) Blossom blight:** Biological control - Trichoderma virens - Mustard oil cake - 3% Cultural control -Avoid frequent use of nitrogenous fertilizers. Physical control - Keep humidity at low level. **c) Petal Blight:** Biological control - B. subtilis - Fluroescent pseudomonads Cultural control -Keep flowers dry Physical control - Control weeds - Dispose of severely infected plants and flowers.
Harvesting Stage	120- 180 Days	Micro Nutrients Management	**1) Nutrients Management:** - Stop fertilizing gradually. - Allow the plant to enter dormancy or prune it for a new growth cycle.
Harvesting Stage	120- 180 Days	Nutrient Deficiency Manageme	**1) Nutrient Deficiency Management:** - No significant deficiencies as the plant prepares for dormancy.
Harvesting Stage	120- 180 Days	Irrigation Management	**Watering:** - Gradually reduce watering as the plant stops growing actively.
Harvesting Stage	120- 180 Days	Pest Management	**a) European corn borer:** Biological control - Parasitic wasp Trichogramma Cultural control -Remove the caterpillars at night Physical control - Blue sticky traps **b) Mexican mealybug:** Biological control - Fish oil rosin soap at 25 gm/L of water. - Horticultural oil Cultural control -Prune the infected plant parts Physical control - Remove the bugs **c) Spider mite:** Biological control - Pongamia or neem oil or jatropa oil -5ml/L of water Cultural control -Avoid overcrowding Physical control - Cutting and burning of infested parts.
Harvesting Stage	120- 180 Days	Disease Management	**a) Ray Blight:** Biological control - Trichoderma viren Cultural control -Avoid overhead irrigation Physical control - Avoid wetting foliage and flowers **b) Aster yellows:** Biological control - Lacewings - Neem oil Cultural control -Use good sanitation Physical control - Remove and destroy infected plants **c) Crown gall:** Biological control - Agrobacterium tumefaciens K-84 - Agrobacterium radiobacter Cultural control -Avoid wounding plants Physical control - Dig out and destroy infected plants.
Harvesting Stage	120- 180 Days	Signs of maturity	Vivid and Bright - Red, Pink, Purple, White, etc... (Depending on variety)

CROSSANDRA			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 21 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5 - 6.5 using lime if needed. **b) Seed Treatment:** - Prepare a slurry using Trichoderma viride or Pseudomonas fluorescens mixed with water. - Coat the seeds thoroughly and let them dry in shade before sowing. **c) Sowing:** - Sow seeds 1–2 cm deep and cover lightly with coir pith. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Bacillus orPhosphorus-Solubilizing Bacteria, Neem cake powder and Trichoderma harzianum to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	21- 45Days	Micro Nutrients Management	**1) Nutrients Management:** - Use a diluted liquid fertilizer weekly to promote initial growth. - Supplement with seaweed extract to encourage root development.
Pre-Seedling Stage	21- 45Days	Nutrient Deficiency Management	**1) Nutrient Deficiency Management:** - Minimal nutrient requirements as seeds rely on stored nutrients.
Pre-Seedling Stage	21- 45Days	Irrigation Management	**Watering:** - Maintain even moisture in the cocopeat, but do not saturate. - Use a spray bottle to avoid displacing seeds or damaging young seedlings.
Pre-Seedling Stage	21- 45Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control - Remove infected leaves Physical control - Blue sticky traps **b) Mealy bugs:** Biological control - Lacewings Cultural control - Remove infected leaves Physical control -Physical barriers such as ant fences **c) White files:** Biological control - Garlic oil Cultural control -Remove and destroy infected leaves Physical control
Pre-Seedling Stage	21- 45Days	Disease Management	**a) Foot and Root rot:** Biological control - Neem- cake Cultural control -Crop rotation Physical control - Sanitation. **b) Stem Rot:** Biological control - Seed treatment with Trichoderma viride- 6 ml/kg of seed Cultural control -Roughing of infected plants Physical control - Sanitation.
Vegetative Stage	45- 60 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Magnesium (Mg):** - Essential for chlorophyll production and efficient photosynthesis. - Application: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	45- 60 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing lower leaves - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Magnesium Deficiency:** - Symptoms:Weak growth - Solution: Use Epsom salts -1 tbsp/5 L of water.
Vegetative Stage	45- 60 Days	Irrigation Management	**Watering:** -Water regularly to keep the cocopeat moist but well-drained. - Avoid waterlogging, as Crossandra roots are sensitive to excess water.

Vegetative Stage	45- 60 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control - Remove infected leaves Physical control - Blue sticky traps **b) Leaf eating caterpillar:** Biological control - Bacillus thuringiensis - Neem oil Cultural control -Remove the caterpillars at night Physical control - Handpick the caterpillars **c) Root-Knot Nematode:** Biological control - Pseudomonas fluorescence Cultural control -Interculturing and bordering of Tagetes Physical control - Hot water treatment of corms at 57.8 C for 30 mins.
Vegetative Stage	45- 60 Days	Disease Management	**a) Leaf blight:** Biological control - Bacillus subtilis - Trichoderma spp. Cultural control - Removing and properly disposing of plant debris,fallen leaves, or flowers. Physical control - Irrigation management **b) Alternaria leaf spot:** Biological control - Bacillus subtilis - 5 gm/L of water Cultural control -Use healthy seeds Physical control - Avoid moisture and stagnant condition **c) Cercospora leaf spot:** Biological control - Garlic Extract + Cow urine +Soap Nut Cultural control -Crop Rotation Physical control - Tillage buries residue and decreases innoculum
Budding Stage	60- 75 Days	Micro Nutrients Management	**1)Calcium:** - Symptoms: Weak stems - Solution: Remedy with bone meal. **2) Potassium or Boron:** - Symptoms: Reduced flower size or discoloration - Solution: Use wood ash or banana peel tea - Every 15 days.
Budding Stage	60- 75 Days	Nutrient Deficiency Management	**1) Potassium Deficiency:** - Symptoms: Poor bud development - Solution: Use Banana peel tea or Wood ash. **2) Phosphorus Deficiency:** - Symptoms: Purple discoloration - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability.
Budding Stage	60- 75 Days	Irrigation Management	**Watering:** - Water deeply but less frequently to encourage deeper root growth. - Ensure the cocopeat remains moist, especially as buds develop.
Budding Stage	60- 75 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control - Remove infected leaves Physical control - Blue sticky traps **b) Leaf eating caterpillar:** Biological control - Bacillus thuringiensis - Neem oil Cultural control -Remove the caterpillars at night Physical control - Handpick the caterpillars **c) Root-Knot Nematode:** Biological control - Pseudomonas fluorescence Cultural control -Interculturing and bordering of Tagetes Physical control - Hot water treatment of corms at 57.8 C for 30 mins.

Budding Stage	60- 75 Days	Disease Management	**a) Brown Scale:** Biological control - Pseudomonas fluorescence - 5 g/L of water - Bacillus subtilis - 5 gm/L of water Cultural control -Removal and burning of infested portion of plants Physical control - Avoid splashing water onto plant foliage **b) White scale:** Biological control - Bacillus subtilis - 5 gm/L of water Cultural control -Removal and burning of infested portion of plants Physical control - Sanitation **c) Powdery mildew:** Biological control - Cinnamomum cassia 7.0% - Anethum graveolens 5.0% Cultural control - Proper plant spacing Physical control - Adequate light levels
Flowering Stage	75- 90 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Reduce nitrogen slightly - Application : Use fish emulsion - Apply 15 days once. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Potassium plays a critical role in improving flower quality, boosting disease resistance. - Application : Seaweed extract every 10 days to promote flowering.
Flowering Stage	75- 90 Days	Nutrient Deficiency Management	**1)Calcium Deficiency:** - Symptoms: Weak stems or drooping flowers - Solution: Remedy with bone meal. **2) Potassium Deficiency:** - Symptoms: Discolored or smaller blooms - Solution: Use wood ash or banana peel tea - Every 15 days.
Flowering Stage	75- 90 Days	Irrigation Management	**Watering:** - Water consistently, keeping the medium moist but not soggy. - Avoid wetting the flowers to prevent fungal infections.
Flowering Stage	75- 90 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control - Remove infected leaves Physical control - Blue sticky traps **b) Leaf eating caterpillar:** Biological control - Bacillus thuringiensis - Neem oil Cultural control -Remove the caterpillars at night Physical control - Handpick the caterpillars **c) White files:** Biological control - Garlic oil Cultural control -Remove and destroy infected leaves Physical control - Yellow / Blue sticky trap
Flowering Stage	75- 90 Days	Disease Management	**a) Brown Scale:** Biological control - Pseudomonas fluorescence - 5 g/L of water - Bacillus subtilis - 5 gm/L of water Cultural control -Removal and burning of infested portion of plants Physical control - Avoid splashing water onto plant foliage **b) Flower blight:** Biological control - Trichoderma virens Cultural control -Remove infected flowers Physical control - Avoid water stagnation **c) Powdery mildew:** Biological control - Cinnamomum cassia 7.0% - Anethum graveolens 5.0% Cultural control - Proper plant spacing Physical control - Adequate light levels

Harvesting Stage	90- 150 Days	Micro Nutrients Management	**1) Nutrients Management:** - Reduce fertilizer application gradually. - Allow the plant to rest or prepare for a new growth cycle by feeding with a diluted balanced fertilizer
Harvesting Stage	90- 150 Days	Nutrient Deficiency Management	**1) Nutrient Deficiency Management:** - Minimal deficiencies occur in this stage if plants are pruned and cared for.
Harvesting Stage	90- 150 Days	Irrigation Management	**Watering:** - Reduce watering frequency during dormancy but do not let the cocopeat dry out completely.
Harvesting Stage	90- 150 Days	Pest Management	**a) Aphids:** Biological control - Lady beetles Cultural control - Remove infected leaves Physical control - Blue sticky traps **b) Leaf eating caterpillar:** Biological control - Bacillus thuringiensis - Neem oil Cultural control -Remove the caterpillars at night Physical control - Handpick the caterpillars **c) White files:** Biological control - Garlic oil Cultural control -Remove and destroy infected leaves Physical control - Yellow / Blue sticky trap
Harvesting Stage	90- 150 Days	Disease Management	**a) Brown Scale:** Biological control - Pseudomonas fluorescence - 5 g/L of water - Bacillus subtilis - 5 gm/L of water Cultural control -Removal and burning of infested portion of plants Physical control - Avoid splashing water onto plant foliage **b) Flower blight:** Biological control - Trichoderma virens Cultural control -Remove infected flowers Physical control - Avoid water stagnation **c) Powdery mildew:** Biological control - Cinnamomum cassia 7.0% - Anethum graveolens 5.0% Cultural control - Proper plant spacing Physical control - Adequate light levels
Harvesting Stage	90- 150 Days	Signs of maturity	Flowers open fully and display vibrant colors - Orange, Yellow, Pink,etc...

CORIANDER			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak seeds in clean, lukewarm water for 12-24 hours. - Coat seeds with Trichoderma viride powder - 4-5 g /kg of seeds. Air-dry the seeds before sowing. **b) Sowing:** - Sow coriander seeds at a depth of 1-2 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate compost or liquid organic fertilizers like seaweed extract or vermiwash.
Seedling Stage	7- 15 Days	Micro Nutrients Management	**1) Nutrient Management:** - No additional nutrients are required yet.
Seedling Stage	7- 15 Days	Nutrient Deficiency Managem	**1) Nutrient Deficiency Management:** - No deficiencies appear at this stage.
Seedling Stage	7- 15 Days	Irrigation Management	**1) Watering:** - Keep the cocopeat consistently moist by misting. Ensure proper drainage to avoid waterlogging.
Seedling Stage	7- 15 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Cutworms:** Biological control - Sprinkle Wood ash around the base to deter cutworms. Cultural control - Remove weeds Physical control - Pheromone lure.
Seedling Stage	7- 15 Days	Disease Management	**a) Damping-off:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Vegetative Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use diluted fish emulsion or seaweed extract once every 7-10 days.
Vegetative Stage	15- 30 Days	Nutrient Deficiency Managem	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves. - Solution: Apply compost tea or diluted fish emulsion.
Vegetative Stage	15- 30 Days	Irrigation Management	**Watering:** - Water once the top layer of cocopeat feels dry, ensuring even moisture without waterlogging.
Vegetative Stage	15- 30 Days	Pest Management	**a) Leaf Miner:** Biological control - Bacillus thuringiensis Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil or insecticidal soap sprays. Cultural control - Maintain humidity Physical control - Yellow sticky traps.
Vegetative Stage	15- 30 Days	Disease Management	**a) Leaf Spot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Remove and destroy infested leaves. Physical control - Avoid overwatering.
Flowering Stage	30- 40 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use diluted fish emulsion or seaweed extract once every 7-10 days. **2) Phosphorus (P):** - Important for strong root development, high-phosphorus fertilizer to support flowering. - Application :Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium (K):** - Aids in overall plant health, improving disease resistance and promoting strong stems and leaves. - Application : Seaweed extract every 10 days to promote flowering.

Flowering Stage	30- 40 Days	Nutrient Deficiency Managem	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves. - Solution: Apply compost tea or diluted fish emulsion. **2) Potassium Deficiency:** - Symptoms: Curling or browning leaf edges. - Solution: Use banana peel tea.
Flowering Stage	30- 40 Days	Irrigation Management	**Watering:** - Increase watering frequency slightly if plants are exposed to higher temperatures. Always water in the early morning or late evening.
Flowering Stage	30- 40 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil or insecticidal soap sprays. Cultural control - Maintain humidity Physical control - Yellow sticky traps.
Flowering Stage	30- 40 Days	Disease Management	**a) Leaf Spot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Remove and destroy infested leaves. Physical control - Avoid overwatering.
Harvesting Stage	40- 45 Days	Micro Nutrients Management	**1) Nutrient Management:** - After harvesting, apply diluted organic fertilizers to promote regrowth.
Harvesting Stage	40- 45 Days	Nutrient Deficiency Managem	**1) Nutrient Deficiency Management:** - No new deficiencies typically arise during this stage, but weakened plants may need additional nitrogen if regrowth is expected. - Solution: Apply compost tea or diluted fish emulsion.
Harvesting Stage	40- 45 Days	Irrigation Management	**Watering:** - Water immediately after harvesting to support regrowth. Reduce watering frequency if temperatures drop.
Harvesting Stage	40- 45 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil or insecticidal soap sprays. Cultural control - Maintain humidity Physical control - Yellow sticky traps.
Harvesting Stage	40- 45 Days	Disease Management	**a) Damping-off** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Harvesting Stage	40- 45 Days	Signs of Maturity	- Lush green leaves with a full aroma. Leaves are broad and well-formed.

MINT			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak seeds in lukewarm water for 12-24 hours. - Treat seeds with a fungicide like Trichoderma viride or a mild hydrogen peroxide solution (1%) for 15 minutes to prevent fungal diseases. **b) Sowing:** - Sow seeds at a depth of 1-1.5 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate compost or Blood meal, Bone meal, wood ash to promote lush and green foliage.
Seedling Stage	7- 15 Days	Micro Nutrients Management	**1) Nutrient Management:** - Apply diluted organic liquid fertilizer like vermiwash once every 7 days.
Seedling Stage	7- 15 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and pale seedlings. - Solution: Use diluted liquid compost tea or seaweed extract.
Seedling Stage	7- 15 Days	Irrigation Management	**1) Watering:** - Mist lightly twice daily to keep the cocopeat evenly moist but not soggy.
Seedling Stage	7- 15 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. - Natural predators like Dragonfly, Spiders, etc,.. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps.
Seedling Stage	7- 15 Days	Disease Management	**a) Damping-off** Biological control - Trichoderma solution -4-5 g/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Vegetative Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Foliar spray with micronutrients once every two weeks.
Vegetative Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Purpling leaves - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium deficiency:** - Symptoms: Browning edges - Solution:Use Seaweed extract - Every 15 days.
Vegetative Stage	15- 30 Days	Irrigation Management	**Watering:** - Water every 2–3 days or when the top layer feels slightly dry. - Avoid waterlogging.
Vegetative Stage	15- 30 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Whiteflies:** Biological control - Garlic oil - Lacewings Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps.
Vegetative Stage	15- 30 Days	Disease Management	**a) Powdery mildew:** Biological control - Baking soda spray- 1-2 tsp/L of water. Cultural control - Increase ventilation Physical control - Avoid overwatering.
Harvesting Stage	30– 60 Days	Micro Nutrients Management	**1) Nutrient Management:** - Post-harvest, add organic compost or fertilizer to cocopeat for continued production.
Harvesting Stage	30– 60 Days	Nutrient Deficiency Management	**1) Nutrient Deficiency Management:** - Switch to a higher potassium fertilizer (e.g., NPK 5:5:15) to enhance flavor and resilience. - Solution: Apply compost tea or diluted seaweed extract.
Harvesting Stage	30– 60 Days	Irrigation Management	**Watering:** - Water daily to maintain consistent moisture without waterlogging.

Harvesting Stage	30– 60 Days	Pest Management	**a) Spider mites:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Caterpillars :** Biological control - Neem oil or insecticidal soap sprays. Cultural control -Wash leaves with water Physical control - Hand-pick and destroy the caterpillars.
Harvesting Stage	30– 60 Days	Disease Management	**a) Root rot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Avoid overwatering. Physical control - Proper drainage.
Harvesting Stage	30– 60 Days	Signs of Maturity	- Leaves are fully developed, broad, and vibrant green.

SPINACH			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak seeds in water for 6-8 hours. - Treat seeds with a neem oil solution -3-5 ml/L of water to prevent fungal infections. Air-dry the seeds for 15-20 minutes before sowing. **b) Sowing:** - Sow seeds at a depth of 1-1.5 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate compost or liquid organic fertilizers like seaweed extract or vermiwash.
Seedling Stage	7- 15 Days	Micro Nutrients Management	**1) Nutrient Management:** - Apply diluted organic liquid fertilizer like vermiwash or seaweed extract once every 7 days.
Seedling Stage	7- 15 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and slow growth. - Solution: Apply compost tea or diluted fish emulsion.
Seedling Stage	7- 15 Days	Irrigation Management	**1) Watering:** - Water when the top layer of cocopeat feels dry. Avoid waterlogging to prevent fungal diseases.
Seedling Stage	7- 15 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps.
Seedling Stage	7- 15 Days	Disease Management	**a) Damping-off** Biological control - Trichoderma solution -4-5 g/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Vegetative Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use diluted fish emulsion or seaweed extract once every 7-10 days.
Vegetative Stage	15- 30 Days	Nutrient Deficiency Manage	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and slow growth. - Solution: Apply compost tea or diluted fish emulsion. **2) Iron Deficiency:** - Symptoms:Yellowing between leaf veins - Solution: Foliar spray of chelated iron.
Vegetative Stage	15- 30 Days	Irrigation Management	**Watering:** - Water thoroughly but avoid waterlogging. - Irrigate 2-3 times per week depending on weather conditions.
Vegetative Stage	15- 30 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Leaf Miner:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps.
Vegetative Stage	15- 30 Days	Disease Management	**a) Leaf Spot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Remove and destroy infested leaves. Physical control - Avoid overwatering.
Harvesting Stage	30– 45 Days	Micro Nutrients Management	**1) Nutrient Management:** - Post-harvest, add organic compost or fertilizer to cocopeat for continued production.
Harvesting Stage	30– 45 Days	Nutrient Deficiency Manage	**1) Nutrient Deficiency Management:** -Regular monitoring will help prevent deficiencies at this stage, but weakened plants may need additional nitrogen if regrowth is expected. - Solution: Apply compost tea or diluted fish emulsion.
Harvesting Stage	30– 45 Days	Irrigation Management	**Watering:** - Water after harvesting to encourage regrowth.

Harvesting Stage	30– 45 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil or insecticidal soap sprays. Cultural control - Maintain humidity Physical control - Yellow sticky traps.
Harvesting Stage	30– 45 Days	Disease Management	**a) Damping-off** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Harvesting Stage	30– 45 Days	Signs of Maturity	- Spinach leaves are broad, tender, and vibrant green.

SORREL/GONGURA			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak seeds in water for 12-24 hours before planting to improve germination. - Treat seeds with a neem oil solution -3-5 ml/L of water to prevent fungal infections. Air-dry the seeds for 15-20 minutes before sowing. **b) Sowing:** - Sow seeds at a depth of 1-1.5 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate compost or liquid organic fertilizers like seaweed extract or vermiwash.
Seedling Stage	7- 21 Days	Micro Nutrients Management	**1) Nutrient Management:** - Start applying a balanced NPK fertilizer (preferably 2:1:1) after the plants have established 2-3 leaves. Do this every 7-10 days.
Seedling Stage	7- 21 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and slow growth. - Solution: Apply compost tea or diluted fish emulsion. **2) Iron Deficiency:** - Symptoms: leaves turn yellow with green veins - Solution: Apply chelated iron or iron sulfate.
Seedling Stage	7- 21 Days	Irrigation Management	**1) Watering:** - Water when the top 2-3 cm of the cocopeat feels dry. Avoid waterlogging and ensure good drainage.
Seedling Stage	7- 21 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps.
Seedling Stage	7- 21 Days	Disease Management	**a) Damping-off** Biological control - Trichoderma solution -4-5 g/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Vegetative Stage	21- 40 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use diluted fish emulsion or seaweed extract once every 7-10 days. - Use organic compost or vermicompost for long-term fertility.
Vegetative Stage	21- 40 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Leaves turn pale or yellow - Solution: Supplement with fish emulsion or compost tea. **2) Phosphorus Deficiency:** - Symptoms: Growth is slow and leaves are dark green with red edges - Solution: Use a Bone meal or Rock phosphate **3) Potassium Deficiency:** - Symptoms: Browning of leaf edges - Solution: Apply a potassium-rich fertilizer like Banana peel tea or Vermicompost.
Vegetative Stage	21- 40 Days	Irrigation Management	**Watering:** - Water thoroughly but avoid waterlogging. - Irrigate 2-3 times per week depending on weather conditions.
Vegetative Stage	21- 40 Days	Pest Management	**a) Caterpillars and Bugs:** Biological control - Bacillus thuringiensis Cultural control - Maintain clean and weed-free Physical control -Hand-pick pests. **b) Leaf Miner:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps.
Vegetative Stage	21- 40 Days	Disease Management	**a) Leaf Spot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Remove and destroy infested leaves. Physical control - Avoid overwatering.
Harvesting Stage	40– 60 Days	Micro Nutrients Management	**1) Nutrient Management:** - Post-harvest, add organic compost or fertilizer to cocopeat for continued production.
Harvesting Stage	40– 60 Days	Nutrient Deficiency Management	**1) Calcium Deficiency:** - Symptoms: Causes leaf deformation and tip burn. - Solution: Apply calcium nitrate or Eggshells **2) Nutrient Deficiency Management:** -Regular monitoring will help prevent deficiencies at this stage, but weakened plants may need additional nitrogen if regrowth is expected. - Solution: Apply compost tea or diluted fish emulsion.
Harvesting Stage	40– 60 Days	Irrigation Management	**Watering:** - Water regularly, especially during dry spells. Ensure proper drainage to avoid waterlogging.

Harvesting Stage	40– 60 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil or insecticidal soap sprays. Cultural control - Maintain humidity Physical control - Yellow sticky traps.
Harvesting Stage	40– 60 Days	Disease Management	**a) Powdery Mildew** Biological control - Apply baking soda solution -1 tbsp/L of water Cultural control - Avoid overwatering. Physical control - Good aeration. **b) Leaf Spot:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Remove and destroy infested leaves. Physical control - Avoid overwatering.
Harvesting Stage	40– 60 Days	Signs of Maturity	Leaves should be large, deep green, and vibrant.

METHI			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak methi seeds in lukewarm water for 8–12 hours before sowing. - Treat seeds with a natural fungicide like Trichoderma viride or neem oil - 2–3 ml/L of water to prevent fungal diseases. **b) Sowing:** - Sow seeds at a depth of 1–2 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate compost or Bone meal, wood ash to promote lush and green foliage.
Seedling Stage	7- 15 Days	Micro Nutrients Management	**1) Nutrient Management:** - Apply diluted organic liquid fertilizer like vermiwash once every 7 days.
Seedling Stage	7- 15 Days	Nutrient Deficiency Managen	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and pale seedlings. - Solution: Use diluted liquid compost tea or Fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Poor root development. - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Potassium Deficiency:** - Symptoms: Weak stems. - Solution:Use Seaweed extract - Every 15 days.
Seedling Stage	7- 15 Days	Irrigation Management	**1) Watering:** - Water lightly every 2–3 days, ensuring even moisture. - Use a spray bottle or gentle watering can.
Seedling Stage	7- 15 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 5 ml/L of water. - Natural predators like Ladybugs, Green Lacewings. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps.
Seedling Stage	7- 15 Days	Disease Management	**a) Damping-off:** Biological control - Trichoderma solution -4-5 g/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration. **b) Fungus gnats:** Biological control - Neem oil - 5 ml/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration.
Vegetative Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Add micronutrients (Fe, Zn, Mg) via foliar sprays every 10–14 days.
Vegetative Stage	15- 30 Days	Nutrient Deficiency Managen	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Feed a nitrogen-rich fertilizer diluted fish emulsion or mustard cake solution. **2) Phosphorus Deficiency:** - Symptoms: Slowed growth, dark green or purple lower leaves. - Solution: Bone meal or Rock phosphate can be used to ensure phosphorus availability. **3) Iron Deficiency:** - Symptoms: Interveinal chlorosis yellowing between leaf veins on younger leaves. - Solution: Foliar spray with fermented compost tea (high in iron)
Vegetative Stage	15- 30 Days	Irrigation Management	**Watering:** - Water every 2–3 days or when the top layer of cocopeat feels slightly dry. - Avoid waterlogging by ensuring proper drainage.

Vegetative Stage	15- 30 Days	Pest Management	**a) Thrips:** Biological control - Pirate Bugs Cultural control - Maintain clean and weed-free Physical control - Use Blue sticky traps. **b) Whiteflies:** Biological control - Garlic oil - Lacewings Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps. **c) Mites:** Biological control - Neem oil or insecticidal soap. Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps.
Vegetative Stage	15- 30 Days	Disease Management	**a) Powdery mildew:** Biological control - Baking soda spray- 1-2 tsp/L of water. - Use sulfur-based sprays if needed. Cultural control - Increase ventilation Physical control - Avoid overwatering. **b) Downy mildew:** Biological control - Trichoderma viride-2 g/L of water. Cultural control - Good Drainage. Physical control
Harvesting Stage	30– 45 Days	Micro Nutrients Management	**1) Nutrient Management:** - Post-harvest, add organic compost or fertilizer to cocopeat for continued production.
Harvesting Stage	30– 45 Days	Nutrient Deficiency Managen	**1) Calcium Deficiency:** - Symptoms: Curling or distorted leaves, weak stems. - Solution: Apply egg shell tea. **2) Potassium deficiency:** - Symptoms: Browning leaf tips and edges, weak stems. - Solution: Foliar spray with banana peel tea or use wood ash solution.
Harvesting Stage	30– 45 Days	Irrigation Management	**Watering:** - Water every 1–2 days, keeping the cocopeat evenly moist. - Avoid overwatering to prevent leaf yellowing and root rot.
Harvesting Stage	30– 45 Days	Pest Management	**a) Spider mites:** Biological control - Neem oil - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Leaf miner:** Biological control - Neem oil or insecticidal soap sprays. Cultural control -Wash leaves with water Physical control - Remove and destroy infected leaves.
Harvesting Stage	30– 45 Days	Disease Management	**a) Rust:** Biological control - Neem oil - 1-2 ml/L of water. Cultural control - Avoid overwatering. Physical control - Alernate host.
Harvesting Stage	30– 45 Days	Signs of Maturity	- Leaves are fully developed, vibrant green, and tender.

AMARANTHUS			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 7 Days	Seed Sowing	**a) Seed Treatment:** - Soak Amaranthus seeds in lukewarm water for 4–6 hours to enhance germination. - Treat seeds with a natural fungicide like Trichoderma viride -2 g /kg of seeds to prevent fungal infections. **b) Sowing:** - Sow seeds at a depth of 0.5–1 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add neem cake or neem powder with cocopeat as a natural pest deterrent. - Incorporate Bone Meal or Rock Phosphate to promote lush and green foliage.
Seedling Stage	7- 15 Days	Micro Nutrients Manage	**1) Nutrient Management:** - Apply diluted organic liquid fertilizer like Vermicompost tea or Fish emulsion-5 ml/L water.
Seedling Stage	7- 15 Days	Nutrient Deficiency Man	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and stunted growth. - Solution: Lightly top-dress with vermicompost or apply diluted compost tea.
Seedling Stage	7- 15 Days	Irrigation Management	**1) Watering:** - Water lightly every 2–3 days or when the top cocopeat feels slightly dry. - Use a spray bottle or gentle watering can.
Seedling Stage	7- 15 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 5 ml/L of water. - Natural predators like Ladybugs, Green Lacewings. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Thrips:** Biological control - Neem oil - 5 ml/L of water. Cultural control - Remove weeds. Physical control - Use sticky traps.
Seedling Stage	7- 15 Days	Disease Management	**a) Damping-off:** Biological control - Trichoderma solution -4-5 g/L of water. Cultural control - Avoid overwatering. Physical control - Good aeration. **b) Root rot:** Biological control - Neem oil - 5 ml/L of water. Cultural control - Use well-drained cocopeat. Physical control - Avoid overwatering.
Vegetative Stage	15- 30 Days	Micro Nutrients Manage	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Foliar spray of seaweed extract or fish emulsion every 10–15 days.
Vegetative Stage	15- 30 Days	Nutrient Deficiency Man	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Apply compost tea or fermented mustard cake solution. **2) Phosphorus Deficiency:** - Symptoms: Poor root development, purple leaves - Solution: Use bone meal or banana peel tea. **3) Potassium Deficiency:** - Symptoms: Leaf curling or browning edges - Solution: Apply wood ash solution or seaweed extract.
Vegetative Stage	15- 30 Days	Irrigation Management	**Watering:** - Water every 2–3 days, keeping cocopeat moist but not waterlogged. - Reduce watering frequency if the weather is cool or humid.

Vegetative Stage	15- 30 Days	Pest Management	**a) Thrips:** Biological control - Pirate Bugs Cultural control - Maintain clean and weed-free Physical control - Use Blue sticky traps. **b) Whiteflies:** Biological control - Garlic oil - Lacewings Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps. **c) Leaf miner:** Biological control - Neem oil or insecticidal soap sprays. Cultural control -Wash leaves with water Physical control - Remove and destroy infected leaves.
Vegetative Stage	15- 30 Days	Disease Management	**a) Powdery mildew:** Biological control - Baking soda spray- 1-2 tsp/L of water. - Use sulfur-based sprays if needed. Cultural control - Increase ventilation Physical control - Avoid overwatering.
Harvesting Stage	30– 45 Days	Micro Nutrients Manage	**1) Nutrient Management:** - Reduce fertilizer application 7–10 days before harvesting to maintain a natural taste. - Apply compost tea lightly if regrowth is expected for a second harvest.
Harvesting Stage	30– 45 Days	Nutrient Deficiency Man	**1) Potassium deficiency:** - Symptoms: Weak stems or Browning leaf edges. - Solution: Add banana peel tea or wood ash.
Harvesting Stage	30– 45 Days	Irrigation Management	**Watering:** - Water daily or as needed to keep cocopeat evenly moist. - Avoid overwatering to prevent leaf yellowing and root rot.
Harvesting Stage	30– 45 Days	Pest Management	**a) Caterpillars:** Biological control - Bacillus thuringiensis - 3-5 ml/L of water. Cultural control - Maintain clean and weed-free Physical control - Handpick and destroy. **b) Leaf miner:** Biological control - Neem oil or insecticidal soap sprays. Cultural control -Wash leaves with water Physical control - Remove and destroy infected leaves.
Harvesting Stage	30– 45 Days	Disease Management	**a) Downy mildew:** Biological control - Trichoderma viride-2 g/L of water. Cultural control - Good Drainage. Physical control - Trim infected leaves. **b) Leaf spots:** Biological control - Neem oil or copper-based organic fungicide. Cultural control - Avoid overwatering. Physical control - Trim infected leaves.
Harvesting Stage	30– 45 Days	Signs of Maturity	- Leaves are fully developed, vibrant green or red (depending on the variety), and tender.

CURRY LEAVES			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery Stage	0- 15 Days	Seed Sowing	**a) Seed Treatment:** - Soak the seeds in lukewarm water for 12–24 hours to soften the seed coat and accelerate germination. - Treat seeds with an organic fungicide like Trichoderma viride -0.2 g/L of water. **b) Sowing:** - Sow seeds at a depth of 1–2 cm to allow easy sprouting and prevent rotting. - Maintain proper spacing to avoid overcrowding. **c) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add Neem Cake or Mustard Cake with cocopeat as a natural pest deterrent. - Incorporate Bone Meal or Rock Phosphate to promote lush and green foliage.
Seedling Stage	15- 45 Days	Micro Nutrients Mana	**1) Nutrient Management:** - Seaweed extract-5 ml/L of water as a foliar spray or root drench. - Fish emulsion- 5 ml/L of water for root drenching.
Seedling Stage	15- 45 Days	Nutrient Deficiency M	**1) Nitrogen Deficiency:** - Symptoms: Yellowing leaves and stunted growth. - Solution: Lightly top-dress with vermicompost or apply diluted compost tea. **2) Phosphorus Deficiency:** - Symptoms: Poor root development, dark purple leaves. - Solution: Add bone meal or banana peel tea.
Seedling Stage	15- 45 Days	Irrigation Management	**1) Watering:** - Water every 2–3 days, ensuring cocopeat is moist but not soggy.
Seedling Stage	15- 45 Days	Pest Management	**a) Aphids:** Biological control - Neem oil - 5 ml/L of water. - Natural predators like Ladybugs, Green Lacewings. Cultural control - Maintain clean and weed-free Physical control - Use sticky traps. **b) Mealybugs:** Biological control - Neem oil - 5 ml/L of water. Cultural control - Remove the bugs. Physical control - Maintain proper Drainage.
Seedling Stage	15- 45 Days	Disease Management	**a) Root rot:** Biological control - Neem oil - 5 ml/L of water. Cultural control - Use well-drained cocopeat. Physical control - Avoid overwatering.
Vegetative Stage	45–180 Days	Micro Nutrients Mana	**1) Nitrogen (N):** - Increase the nitrogen level to promote leaf development. - Application : Use fish emulsion - Apply weekly **2) Micronutrients:** - Foliar spray of seaweed extract or fish emulsion every 10–15 days.
Vegetative Stage	45–180 Days	Nutrient Deficiency M	**1) Nitrogen Deficiency:** - Symptoms: Pale or Yellowing of leaves. - Solution: Apply compost tea or fermented mustard cake solution. **2) Iron Deficiency:** - Symptoms: Yellowing between leaf veins (interveinal chlorosis). - Solution: Foliar spray with chelated iron or seaweed extract. **3) Magnesium Deficiency:** - Symptoms: Yellowing edges on older leaves - Solution: Use Epsom salt solution -1 tsp/L of water.
Vegetative Stage	45–180 Days	Irrigation Management	**Watering:** - Water every 3–4 days or when the top 2–3 cm of cocopeat feels dry. - Increase frequency during hot weather and reduce in cooler months.

Vegetative Stage	45–180 Days	Pest Management	**a) Thrips:** Biological control - Pirate Bugs Cultural control - Maintain clean and weed-free Physical control - Use Blue sticky traps. **b) Whiteflies:** Biological control - Lacewings Cultural control -Remove and destroy infested leaves. Physical control - Use sticky traps. **c) Scale insects:** Biological control - Garlic spray Cultural control -Wash leaves with water Physical control - Remove and destroy infected leaves.
Vegetative Stage	45–180 Days	Disease Management	**a) Powdery mildew:** Biological control - Baking soda spray- 1-2 tsp/L of water. - Use sulfur-based sprays if needed. Cultural control - Increase ventilation Physical control - Avoid overwatering. **b) Leaf spot:** Biological control - Baking soda spray- 1-2 tsp/L of water. Cultural control - Good Drainage. Physical control - Avoid overwatering.
Harvesting Stage	180 + Days	Micro Nutrients Mana	**1) Nutrient Management:** Fertilize monthly with: - Compost or Vermicompost- 1–2 handfuls per grow bag. - Seaweed Extract or Fish Emulsion-10 ml/L of water as foliar spray or root drench. - Wood Ash: Sprinkle lightly around the plant for potassium.
Harvesting Stage	180 + Days	Nutrient Deficiency M	**1) Potassium deficiency:** - Symptoms: Browning leaf edges and weak stems - Solution: Use banana peel tea or wood ash. **2) Calcium Deficiency:** - Symptoms: Distorted young leaves - Solution: Apply eggshell tea or lime water. **3) General Deficiencies:** - Symptoms: Stunted growth and pale leaves. - Solution: Monthly application of compost tea.
Harvesting Stage	180 + Days	Irrigation Management	**Watering:** - Deep watering once every 4–5 days. - Avoid overwatering to prevent root rot, especially in cooler months.
Harvesting Stage	180 + Days	Pest Management	**a) Mealybugs:** Biological control - Horticultural soap sprays. - 5 ml/L of water. Cultural control - Remove the bugs. Physical control - Maintain proper Drainage.. **b) Mites:** Biological control - Neem oil or insecticidal soap sprays. Cultural control -Wash leaves with water Physical control - Remove and destroy infected leaves.

Harvesting Stage	180 + Days	Disease Management	**a) Downy mildew:** Biological control - Trichoderma viride-2 g/L of water. Cultural control - Good Drainage. Physical control - Trim infected leaves. **b) Sooty mold :** Biological control - Neem oil or copper-based organic fungicide. Cultural control - Improve airflow. Physical control -Prune affected leaves.
Harvesting Stage	180 + Days	Signs of Maturity	- The leaves will be dark green, aromatic, and glossy.

TURMERIC			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 30 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5 - 7 using lime if needed. **b) Seed Treatment** - Soak the turmeric rhizomes in water for 12–24 hours before planting. This helps in hydrating the rhizomes and encourages sprouting. - Treat seeds with a fungicide or biofungicide like Trichoderma to prevent fungal infections. **c) Sowing:** - Plant the turmeric rhizomes at a depth of 2-4 inches in cocopeat. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Add bone meal or superphosphate for phosphorus, which is vital for root and rhizome development. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	30- 60 Days	Micro Nutrients Manageme	**1) Nitrogen:** - Focus on nitrogen-rich fertilizers (like urea) to support early vegetative growth. Apply once a month. **2) Phosphorus:** - Add bone meal or phosphate-based fertilizers at planting to stimulate early root development..
Pre-Seedling Stage	30- 60 Days	Nutrient Deficiency Manag	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	30- 60 Days	Irrigation Management	**Watering Frequency:** - Cocopeat retains moisture well, so water regularly to keep it evenly moist but avoid overwatering. - Keep humidity high by misting occasionally or using a humidifier, as turmeric thrives in a humid environment.
Pre-Seedling Stage	30- 60 Days	Pest Management	**a) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps. **b) Root Maggots:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Ensure good drainage.
Pre-Seedling Stage	30- 60 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Leaf Spot:** Biological control - Neem oil Cultural control -Remove affected leaves Physical control -Avoid overwatering to ensure good airflow
Vegetative Stage	60–180 Days	Micro Nutrients Manageme	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	60–180 Days	Nutrient Deficiency Manag	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of older leaves. - Solution: Apply organic fertilizers like vermicompost or compost tea. **2) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash. **3) Zinc and Iron Deficiency:** - Symptoms:Yellowing leaves - Solution: Foliar spray with fermented compost tea (high in iron)
Vegetative Stage	60–180 Days	Irrigation Management	**Watering Frequency:** - Maintain consistent moisture in the cocopeat, but ensure proper drainage. Water when the top layer of cocopeat begins to dry out. - Avoid overwatering to reduce the risk of fungal diseases.

Vegetative Stage	60–180 Days	Pest Management	**a) Spider Mites:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control -Weed management Physical control - Mites removed with a strong spray of water. **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Vegetative Stage	60–180 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Bacterial Wilt:** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Root Development Stag	180– 270 Days	Micro Nutrients Manageme	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and rhizome development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate
Root Development Stag	180– 270 Days	Nutrient Deficiency Manag	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water. **3) Zinc and Iron Deficiency:** - Symptoms:Yellowing leaves - Solution: Foliar spray with fermented compost tea (high in iron)
Root Development Stag	180– 270 Days	Irrigation Management	**Watering Frequency:** -Reduce watering frequency as the plant approaches maturity to prevent waterlogging. Allow cocopeat to dry slightly between waterings. - Ensure proper drainage to prevent water stagnation.
Root Development Stag	180– 270 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps.
Root Development Stag	180– 270 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Bacterial Wilt:** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Harvesting Stage	270– 360 Days	Micro Nutrients Manageme	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and rhizome development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate

Harvesting Stage	270– 360 Days	Nutrient Deficiency Manag	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water. **3) Zinc and Iron Deficiency:** - Symptoms:Yellowing leaves - Solution: Foliar spray with fermented compost tea (high in iron)
Harvesting Stage	270– 360 Days	Irrigation Management	**Watering Frequency:** -Reduce watering frequency as the plant approaches maturity to prevent waterlogging. Allow cocopeat to dry slightly between waterings. - Ensure proper drainage to prevent water stagnation.
Harvesting Stage	270– 360 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps.
Harvesting Stage	270– 360 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Bacterial Wilt:** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Harvesting Stage	270– 360 Days	Signs of maturity	Mature rhizomes are plump, well-developed, and have a deep orange or yellow color

GINGER			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 30 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 5.5 - 6.5 using lime if needed. **b) Seed Treatment** - Soak rhizomes in a solution of seaweed extract or a biofertilizer (e.g., Trichoderma) for 30 minutes to enhance sprouting and disease resistance. - Treat seeds with a fungicide or biofungicide like Trichoderma to prevent fungal infections. **c) Sowing:** - Plant the turmeric rhizomes at a depth of 2-4 inches in cocopeat. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Add 1–2 tablespoons per grow bag for phosphorus to support root and rhizome development. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	30- 60 Days	Micro Nutrients Manag	**1) Nitrogen:** - Focus on nitrogen-rich fertilizers (like urea) to support early vegetative growth. Apply once a month. **2) Phosphorus:** - Add bone meal or phosphate-based fertilizers at planting to stimulate early root development..
Pre-Seedling Stage	30- 60 Days	Nutrient Deficiency Ma	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	30- 60 Days	Irrigation Management	**Watering Frequency:** - Maintain even moisture without waterlogging. Cocopeat retains water well, so check the top 1-2 inches for dryness before re-watering.
Pre-Seedling Stage	30- 60 Days	Pest Management	**a) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps. **b) Fungus gnats:** Biological control - Bacillus thuringiensis israelensis - Sprinkle cinnamon powder Cultural control - Allow cocopeat surface to dry slightly between waterings. Physical control - Yellow/Blue Sticky Traps.
Pre-Seedling Stage	30- 60 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	60–180 Days	Micro Nutrients Manag	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	60–180 Days	Nutrient Deficiency Ma	**1) Magnesium Deficiency:** - Symptoms: Interveinal chlorosis in older leaves - Solution: Apply magnesium sulfate or Epsom salts. **2) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash. **3) Zinc and Iron Deficiency:** - Symptoms:Yellowing leaves - Solution: Foliar spray with fermented compost tea (high in iron)
Vegetative Stage	60–180 Days	Irrigation Management	**Watering Frequency:** - Maintain a humid environment by misting or using a humidifier, especially in dry climates. - Avoid overwatering to reduce the risk of fungal diseases.

Vegetative Stage	60–180 Days	Pest Management	**a) Mites:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control -Weed management Physical control - Mites removed with a strong spray of water. **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Vegetative Stage	60–180 Days	Disease Management	**a) Leaf spot:** Biological control - Bacillus subtilis Cultural control - Control Nightshade weeds Physical control - Remove weeds and infected plants. **b) Soft Rot:** Biological control -Trichoderma harzianum -Bacillus subtilis. Cultural control -Avoid overwatering Physical control - Storage of bulbs in open baskets, mesh bags and netted bags.
Root Development Sta	180– 270 Days	Micro Nutrients Manag	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and rhizome development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate
Root Development Sta	180– 270 Days	Nutrient Deficiency Ma	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water. **3) Potassium Deficiency:** - Symptoms: Leaf edges turn brown; stunted roots. - Solution: Use banana peel compost or wood ash.
Root Development Sta	180– 270 Days	Irrigation Management	**Watering Frequency:** - Reduce frequency slightly but ensure the cocopeat remains moist. Allow slight drying between waterings.
Root Development Sta	180– 270 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps. **c) Mites:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control -Weed management Physical control - Mites removed with a strong spray of water.
Root Development Sta	180– 270 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Bacterial Wilt:** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation

Harvesting Stage	270– 300 Days	Micro Nutrients Manag	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and rhizome development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate
Harvesting Stage	270– 300 Days	Nutrient Deficiency Ma	**1) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate. **2) Boron Deficiency:** - Symptoms: To prevent hollow roots and improve root structure. - Solution: Use Azotobacter-1 tbsp/5 L of water. **3) Zinc and Iron Deficiency:** - Symptoms:Yellowing leaves - Solution: Foliar spray with fermented compost tea (high in iron)
Harvesting Stage	270– 300 Days	Irrigation Management	**Watering Frequency:** - Allow the top layer of cocopeat to dry slightly before harvest to make rhizome extraction easier and prevent diseases.
Harvesting Stage	270– 300 Days	Pest Management	**a) Root-knot nematodes:** Biological control - Use neem cake Cultural control - Avoid planting in the same cocopeat repeatedly without sterilizing. Physical control - Sanitation. **b) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps.
Harvesting Stage	270– 300 Days	Disease Management	**a) Rhizome Rot:** Biological control - Rhizome treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Bacterial Wilt:** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Harvesting Stage	270– 300 Days	Signs of maturity	Mature rhizomes are larger, have a robust aroma, and exhibit a characteristic golden-brown outer skin.

GARLIC			
Crop Stage	**Maturity Days**	**Management**	**Control**
Nursery stage	0- 15 Days	Seed Sowing	**a) Nursery Tray Preparation:** - Fill bags with sterilized coir pith (soaked in water for 24 hours and excess water drained). - Ensure the pH is adjusted to 6 –7 using lime if needed. **b) Seed Treatment** - Soak cloves in a solution of 1% baking soda and a few drops of liquid soap for 30 minutes to kill pathogens. - Treat seeds with a fungicide or biofungicide like Trichoderma to prevent fungal infections. **c) Sowing:** - Plant the turmeric rhizomes at a depth of 1–2 inches in cocopeat. - Maintain proper spacing to avoid overcrowding. **d) Grow Bag Preparation:** - Mix 70% cocopeat + 30% vermicompost to create a nutrient-rich, aerated medium, and fill the grow bag, leaving 2–3 inches of space at the top for watering. - Add biofertilizers like Neem cake powder, Bone meal or Trichoderma to the medium. - Evenly distribute the biofertilizers into the top layer of the growing medium before Transplanting/sowing the seeds to promote healthy microbial activity.
Pre-Seedling Stage	15- 30 Days	Micro Nutrients Management	**1) Nitrogen:** - Focus on nitrogen-rich fertilizers (like urea) to support early vegetative growth. Apply once a month. **2) Phosphorus:** - Add bone meal or phosphate-based fertilizers at planting to stimulate early root development..
Pre-Seedling Stage	15- 30 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Phosphorus Deficiency:** - Symptoms: Stunted growth - Solution: Add Bone meal or Rock phosphate.
Pre-Seedling Stage	15- 30 Days	Irrigation Management	**Watering Frequency:** -Keep cocopeat evenly moist but not waterlogged. - Water lightly to ensure sprouting without causing rot.
Pre-Seedling Stage	15- 30 Days	Pest Management	**a) Fungus gnats:** Biological control - Bacillus thuringiensis israelensis - Sprinkle cinnamon powder Cultural control - Allow cocopeat surface to dry slightly between waterings. Physical control - Yellow/Blue Sticky Traps. **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Pre-Seedling Stage	15- 30 Days	Disease Management	**a) Damping-Off:** Biological control - Trichoderma harzianum. - Cinnamon Powder- Sprinkle ground cinnamon over seedlings as a natural antifungal Cultural control -Farmyard manure Physical control -Avoid overwatering to ensure good airflow.
Vegetative Stage	30–90 Days	Micro Nutrients Management	**1) Nitrogen (N):** - Encourages foliage and stem growth. - Application: Feed with diluted fish emulsion or organic nitrogen sources every 10–14 days. **2) Phosphorus (P):** - Supports root and early flowering preparation. - Application: Add bone meal or organic phosphate fertilizers during the initial weeks. **3) Potassium (K):** - Strengthens stems and disease resistance. - Application: Use banana peel compost or potassium-rich liquid fertilizers.
Vegetative Stage	30–90 Days	Nutrient Deficiency Management	**1) Nitrogen Deficiency:** - Symptoms: Yellowing of leaves. - Solution: Supplement with fish emulsion. **2) Magnesium Deficiency:** - Symptoms: Interveinal chlorosis in older leaves - Solution: Apply magnesium sulfate or Epsom salts.
Vegetative Stage	30–90 Days	Irrigation Management	**Watering Frequency:** - Water every 2–3 days, depending on the climate, keeping the cocopeat consistently moist. - Avoid waterlogging to prevent root rot.

Vegetative Stage	30–90 Days	Pest Management	**a) Aphids:** Biological control - Neem oil or insecticidal soap. Cultural control - Avoid overwatering Physical control - Yellow/Blue Sticky Traps. **b) Mites:** Biological control - Use neem oil -5 ml/L of water at weekly intervals. Cultural control -Weed management Physical control - Mites removed with a strong spray of water. **c) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Vegetative Stage	30–90 Days	Disease Management	**a) White rot:** Biological control - Trichoderma viride Cultural control -Hot water treatment of bulbs at 49 °C Physical control - Solarization **b) Soft Rot:** Biological control -Trichoderma harzianum -Bacillus subtilis. Cultural control -Avoid overwatering Physical control - Storage of bulbs in open baskets, mesh bags and netted bags.
Root Development Stag	90– 150 Days	Micro Nutrients Manageme	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and bulb development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate
Root Development Stag	90– 150 Days	Nutrient Deficiency Manag	**1) Boron Deficiency:** - Symptoms: Poor bulb development or hollow bulbs. - Solution: Use Azotobacter-1 tbsp/5 L of water. **2) Potassium Deficiency:** - Symptoms: Leaf tips turn brown and edges curl. - Solution: Use banana peel compost or wood ash.
Root Development Stag	90– 150 Days	Irrigation Management	**Watering Frequency:** -Reduce watering frequency slightly but maintain consistent moisture in the medium.
Root Development Stag	90– 150 Days	Pest Management	**a) Leaf miner:** Biological control - Encourage natural predators like spiders,solider beetles. Cultural control -Remove and destroy infected leaves Physical control - Remove weeds.. **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Root Development Stag	90– 150 Days	Disease Management	**a) Fusarium Rot:** Biological control - Bulb treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Botrytis (Gray Mold):** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Harvesting Stage	150– 210 Days	Micro Nutrients Manageme	**1) Potassium (K):** - Ensure adequate potassium levels to enhance disease resistance and bulb development. - Application: Use banana peel compost or potassium-rich liquid fertilizers. **2) Phosphorus (P):** - A small dose of phosphorus may be required to aid in tuber formation and development. - Application: Use bone meal or rock phosphate

Harvesting Stage	150– 210 Days	Nutrient Deficiency Manag	**1) Boron Deficiency:** - Symptoms: Poor bulb development or hollow bulbs. - Solution: Use Azotobacter-1 tbsp/5 L of water. **2) Potassium Deficiency:** - Symptoms: Leaf tips turn brown and edges curl. - Solution: Use banana peel compost or wood ash.
Harvesting Stage	150– 210 Days	Irrigation Management	**Watering Frequency:** - Gradually reduce watering as the plants approach maturity. - Allow the cocopeat to dry slightly before harvesting to ensure firm, well-formed bulbs.
Harvesting Stage	150– 210 Days	Pest Management	**a) Leaf miner:** Biological control - Encourage natural predators like spiders,solider beetles. Cultural control -Remove and destroy infected leaves Physical control - Remove weeds.. **b) Thrips:** Biological control - Pirate bugs - Lacewing larvae Cultural control - Avoid planting Next to Onion & Garlic. Physical control - Yellow/Blue Sticky Traps.
Harvesting Stage	150– 210 Days	Disease Management	**a) Fusarium Rot:** Biological control - Bulb treatment with Trichoderma viride - 6 ml/L of water Cultural control -Use disease-free Rhizome Physical control -Avoid overwatering to ensure good airflow. **b) Botrytis (Gray Mold):** Biological control - Spray with copper-based fungicides Cultural control - Avoid watering Physical control - Sanitation
Harvesting Stage	150– 210 Days	Signs of maturity	Bulbs are fully formed, with tight skin around the cloves.