



INTEGRATED PEST MANAGEMENT (IPM) FIELD GUIDE

A Practical Guide to Preventing, Identifying, Monitoring & Managing Crop Pests

Seedlings. Extension. Agronomy.

Rooted in Sustainability, Growing with Farmers.

About This Guide

Integrated Pest Management (IPM) is a decision-making approach that combines prevention, observation, correct identification, monitoring and a range of management options to keep pests below economically damaging levels. This guide places IPM within an **agroecological approach**: designing healthier farm ecosystems that reduce pest pressure, conserve beneficial organisms and improve resilience, while recognising that targeted chemical control may sometimes be justified.

1. What Is Integrated Pest Management?

IPM is not simply a list of pesticides. It is a process for deciding **if, when and how** to intervene. The objective is effective pest management while reducing unnecessary risks to farmers, consumers, beneficial organisms and the environment.

PREVENT → OBSERVE → IDENTIFY → ASSESS → MANAGE → MONITOR

2. Why IPM Matters

- Reduces unnecessary pesticide applications.
- Helps farmers detect problems early.
- Protects beneficial insects and other natural enemies.
- Supports safer and more responsible crop protection.
- Can reduce avoidable production costs.
- Encourages better farm records and decision-making.

3. Agroecological IPM: Start With the Farm Ecosystem

Agroecology applies ecological principles to agricultural production. In pest management, this means looking beyond the individual pest and asking: *What conditions on this farm are allowing the problem to develop, and how can the farm ecosystem be managed to reduce that pressure?*

A healthy agroecosystem is part of the pest-management strategy.

- **Diversity:** use appropriate crop diversification, intercropping and crop rotation to reduce continuous conditions favourable to particular pests.
- **Habitat:** where appropriate, maintain flowering plants, hedges or other habitat that supports beneficial insects and natural enemies.
- **Agroforestry:** integrate suitable trees and perennial vegetation where they fit the production system and do not create excessive competition.
- **Soil health:** support soil organic matter, structure, biological activity and balanced fertility.
- **Water management:** avoid both prolonged water stress and excessive moisture, which can increase susceptibility to certain problems.
- **Healthy planting material:** start with vigorous, clean and appropriately adapted seedlings or planting material.
- **Local and indigenous knowledge:** farmer observations and locally developed practices can inform pest monitoring and ecological management when their effectiveness and safety are understood.

4. Prevention First

- Use suitable, healthy planting material.
- Choose varieties appropriate for the production environment.
- Maintain suitable spacing and canopy management.
- Keep fields and orchards reasonably clean.
- Remove or manage heavily infested plant material appropriately.
- Control weeds where they compete with crops or harbour important pests.
- Maintain balanced crop nutrition rather than excessive or inadequate fertilisation.
- Manage irrigation and drainage.
- Rotate crops where practical.
- Avoid unnecessary movement of infested planting material between farms.

5. Scouting: Learn What Is Happening in the Field

Regular scouting turns pest management from reaction into decision-making. Walk through representative parts of the field rather than examining only plants that already look damaged.

- Inspect new growth, older leaves, stems, flowers, fruits and the root zone where relevant.
- Check the underside of leaves for small or hidden pests.
- Look for both pests and beneficial organisms.
- Record where symptoms occur and whether they are spreading.
- Use clear photographs when seeking remote advisory support.
- Increase scouting frequency when weather or crop conditions favour a known pest or disease.



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6. Identify Before You Intervene

A damaged leaf does not automatically mean an insect is responsible. Similar symptoms can result from pests, diseases, nutrient deficiencies, water stress, chemical injury, physical damage or environmental conditions.

Pest → Symptom → Pattern → Confirmation → Management

Before selecting a treatment, ask: What exactly is present? What part of the plant is affected? Is the problem increasing? Does the symptom match the suspected cause? Are there signs of beneficial organisms? Could the problem have another explanation?



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7. Common Pest Groups

Pest group	Typical signs / damage
Aphids	Clusters of small insects, curling/distorted young growth, sticky honeydew and sometimes sooty mould.
Whiteflies	Small flying insects disturbed from foliage; sap feeding, honeydew and possible virus transmission.
Thrips	Scarring, silvery patches, distorted young growth and damage to flowers or fruits.
Spider mites	Fine stippling, bronzing, leaf decline and sometimes webbing, especially under hot, dry conditions.
Scale insects	Fixed bumps or scales on stems/leaves; sap feeding and possible honeydew.
Mealybugs	White waxy insects, honeydew, sooty mould and weakened shoots or fruiting structures.
Fruit flies	Egg-laying and larval damage in susceptible fruits; premature fruit drop and internal decay.
Caterpillars	Chewed leaves, holes, frass and feeding damage on foliage, flowers or fruit.
Weevils / borers	Feeding or tunnelling damage; symptoms may include wilting, dieback or damaged roots/stems.
Leaf miners	Winding or blotchy tunnels within leaves.
Nematodes	Root damage, poor growth, uneven crop performance and sometimes root galls depending on species.

8. Common Disease Groups

- **Fungal diseases:** may produce leaf spots, rots, mildews, blights, cankers or dieback depending on the pathogen and crop.
- **Bacterial diseases:** may cause spots, water-soaked lesions, ooze, wilting or dieback.
- **Viral diseases:** can cause mosaics, mottling, distortion, stunting and abnormal growth; management often focuses strongly on prevention and vector control.
- **Root diseases:** may cause poor growth, yellowing and wilting even when soil moisture appears adequate.
- **Wilts:** can have several causes, so diagnosis should not rely on wilting alone.

9. Biological Control

Biological control uses living organisms or naturally occurring enemies to suppress pests. Farmers can support biological control by conserving natural enemies rather than automatically treating every insect encountered.

- Predators such as ladybird beetles, lacewings and predatory mites.
- Parasitoids that attack specific pest species.
- Beneficial microorganisms used in appropriate biological products.
- Microbial agents such as *Trichoderma* and *Bacillus* species where suitable and properly applied.
- Avoiding unnecessary broad-spectrum pesticide use that can kill natural enemies.

10. Cultural, Mechanical & Physical Control

- Crop rotation where practical.
- Intercropping and diversification suited to the crop and farm.
- Pruning and canopy management.
- Removal and appropriate disposal of severely affected plant material.
- Physical barriers or appropriate netting.
- Traps and monitoring devices where appropriate.
- Hand removal of manageable pest populations.

- Sanitation of tools and production areas.

11. Botanical & Lower-Risk Options

Botanical and other lower-risk approaches can form part of an IPM programme where they are appropriate, effective and safely prepared or applied. Their use should not be based on the assumption that 'natural' automatically means harmless. Concentration, exposure, crop sensitivity, beneficial organisms and regulatory requirements still matter.

12. Chemical Control: Targeted, Responsible Use

Chemical pesticides can have a role in IPM when monitoring shows that intervention is justified and other suitable measures are insufficient. The goal is not zero pesticide use at all costs; it is **appropriate, justified and responsible use**.

- **Right pest:** confirm what you are managing.
- **Right product:** select a product registered/approved for the intended use.
- **Right rate:** follow the product label; do not improvise concentrations.
- **Right timing:** treat when the pest is most vulnerable and intervention is justified.
- **Right application:** calibrate equipment and achieve appropriate coverage.
- **Right safety:** use required PPE and observe label instructions, pre-harvest intervals and re-entry requirements.

13. Protect Pollinators & Beneficial Organisms

Pollinators and natural enemies are part of the farm's ecological infrastructure. Where pesticide intervention is justified, consider the presence of bees and other beneficial organisms, avoid unnecessary exposure, follow product restrictions and use the least disruptive effective approach consistent with the crop protection objective.

14. Resistance Management

- Avoid repeatedly using the same mode of action when alternatives are available.
- Follow label recommendations for maximum applications and intervals.
- Do not increase dosage because a treatment appears slow to work.
- Use non-chemical and biological approaches as part of the overall programme.
- Monitor treatment effectiveness and investigate control failures.

15. Economic Thresholds & Spray Decisions

Pest detected $\neq$ spray immediately. A decision should consider pest abundance, crop stage, damage, expected crop value, weather, natural enemies and the likely consequences of doing nothing. Where crop-specific thresholds are available, use them. Where they are not, seek crop-specific agronomic guidance rather than inventing a universal threshold.

16. Spraying Best Practices

- Inspect and calibrate the sprayer.
- Use clean water and appropriate spray volume.
- Avoid unsuitable weather conditions that increase drift or reduce effectiveness.
- Wear the PPE specified by the product label.
- Keep people and animals away from treated areas as required.
- Avoid contamination of water sources.



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- Observe pre-harvest and re-entry requirements.
- Clean and store equipment safely after use.
- Record what was applied, when, where and why.



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17. A Practical IPM Decision Guide

STEP	QUESTION
1. OBSERVE	What has changed in the crop?
2. LOCATE	Where is the problem occurring—field edge, hotspots, whole field, specific trees or specific plant parts?
3. IDENTIFY	What pest, disease, deficiency or environmental factor is most likely responsible?
4. ASSESS	How serious is the problem? Is it increasing? What is the crop stage?
5. CONSIDER ECOLOGY	What natural enemies, biodiversity, soil, water or management factors are influencing the situation?
6. CHOOSE ACTION	Can prevention, cultural, mechanical, biological or other lower-risk approaches work?
7. INTERVENE IF JUSTIFIED	If chemical control is necessary, use the appropriate registered product responsibly and according to its label.
8. MONITOR	Did the intervention work? What should change in the next scouting round?

18. What Farmers Should Record

Date → Crop → Field → Pest/Symptom → Severity → Action → Follow-up

- Date and location of observation.
- Crop and variety.
- Growth stage.
- Pest, symptom or suspected cause.
- Estimated extent or severity.
- Natural enemies observed.
- Management action taken.
- Product used, if any.
- Rate and application method.
- Follow-up observations and outcome.

19. Farmer IPM Golden Rules

1. Scout before you spray.
2. Identify before you intervene.
3. Prevention is cheaper than correction.
4. Not every insect is a pest.
5. Design the farm to support beneficial organisms.
6. Build soil health and crop resilience.
7. Use pesticides only when justified and responsibly.
8. Rotate modes of action to reduce resistance risk.
9. Keep records.
10. Monitor after every intervention.

20. When to Seek Professional Agronomic Advice

Seek professional advice when symptoms are severe, rapidly spreading, repeatedly returning, difficult to identify or not responding to reasonable management. When requesting remote support, provide clear photos of the whole plant and



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affected parts, crop

and variety, farm location, crop stage, recent weather, soil/water information where available, and any products or interventions already used.

UkulimaModern's Approach

UkulimaModern integrates **Seedlings, Extension and Agronomy** to help farmers establish healthy crops, make informed decisions and manage farms sustainably. Our approach recognises that productive farms depend on healthy planting material, informed observation, sound soil and crop management, ecological balance and timely technical support.

Need help identifying a crop problem?

Share clear photos, crop details, location, symptoms and what you have already done.

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Website: www.ukulimamodernseedlings.co.ke

Email: info@ukulimamodernseedlings.co.ke

Disclaimer

This guide is provided for general educational and farm-management purposes. Pest, disease and crop-management decisions should be adapted to the specific crop, production system, location and field conditions. Product labels, applicable Kenyan regulations, safety instructions, registered-use requirements and professional recommendations should be followed. Where a pest or disease cannot be confidently identified, seek qualified agronomic or plant-health advice before applying a pesticide.

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