Course Title: Integrated Pest & Disease Management (IPDM) Masterclass

- **Duration:** 5 Days (approximately 35-40 instructional hours)
- **Course Goal:** To equip participants with advanced knowledge, diagnostic skills, practical techniques, and strategic thinking abilities to design, implement, and manage comprehensive Integrated Pest and Disease Management (IPDM) programs that are effective, economically viable, environmentally sound, and socially acceptable for diverse cropping systems.
- **Core Focus:** Moving beyond conventional pest control to a holistic, ecosystem-based approach that prioritizes prevention and plant health.

Learning Objectives:

Upon successful completion of this masterclass, participants will be able to:

- **Apply** the core principles of IPDM and agroecosystem analysis to any cropping system.
- **Accurately identify** major pests, diseases, nutrient deficiencies, and their natural enemies relevant to key local crops.
- **Design and implement** effective scouting and monitoring programs using modern and traditional tools.
- **Utilize** economic and action thresholds to make data-driven management decisions.
- **Develop** and implement preventative IPDM strategies focusing on cultural, physical, and host-plant resistance tactics.
- **Effectively integrate** biological control agents and bio-rational pesticides into a management plan.
- **Select and apply** chemical controls judiciously, safely, and in a manner that minimizes non-target impacts and resistance development.
- **Create** a comprehensive, season-long IPDM plan for a specific crop.
- **Adapt** IPDM strategies to account for the impacts of climate change.

Target Audience:

- Agricultural Extension Officers and Agronomists.
- Crop Protection Specialists, Plant Pathologists, and Entomologists (for a practical application focus).
- Lead Farmers and Managers of commercial farms or cooperatives.
- NGO staff and Development Practitioners working in sustainable agriculture.
- Agribusiness professionals in the input and advisory sectors.

Prerequisites:

- A solid understanding of basic agronomy and crop production principles.
- Practical experience with common pests and diseases in the field.

Teaching Methodology:

This is a highly interactive and field-oriented (where possible) workshop. The methodology includes:

- **Interactive Lectures & Case Studies:** Introducing scientific principles using real-world IPDM program examples.
- **Practical Field/Lab Sessions:** The core of the course. This includes scouting exercises, pest/disease diagnosis, and observing control methods.
- **Hands-on Demonstrations:** Preparing botanical sprays, setting up traps, using diagnostic tools.
- **Problem-Solving Workshops:** Participants work in groups to solve complex pest and disease management challenges.
- **Guest Speakers (optional):** Inviting a researcher, a biological control supplier, or a farmer with a successful IPDM program.
- **Action Planning:** Developing practical IPDM plans that can be implemented immediately.

Materials Provided:

- Comprehensive digital or printed workbook with IPDM principles, diagnostic guides, control method details, and planning tools.
- Field guides (pocket-sized) for identification of key local pests, diseases, and beneficial organisms.
- Hand lenses, sample collection kits, and materials for practical sessions.
- Templates for an IPDM plan, scouting forms, and monitoring records.
- Access to selected online resources, pest forecasting models, and research databases.
- Certificate of Completion.

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Detailed Day-by-Day Curriculum

Day 1: The IPDM Mindset – Ecology & Diagnosis

- **Module 1: The Philosophy & Principles of IPDM (Approx. 2 hours)**
  - Welcome, introductions, and course objectives.
  - The evolution from scheduled spraying to integrated management.
  - The IPDM Pyramid: A framework for intervention (Prevention -> Cultural/Sanitation -> Physical/Mechanical -> Biological -> Chemical).
  - The economic, environmental, and social benefits of IPDM.
  - **Activity:** "Deconstructing a Pest Problem" – Analyzing a past pest/disease issue to see where IPDM could have changed the outcome.
- **Module 2: The Agroecosystem: Your Farm's Immune System (Approx. 2.5 hours)**
  - The farm as an ecosystem: Understanding interactions between crops, pests, beneficials, soil, and climate.
  - The Pest/Disease Triangle: Host - Pathogen/Pest - Environment.
  - The role of biodiversity in natural pest regulation.
  - **Workshop:** "Agroecosystem Analysis (AESA)" – Participants create a simple AESA map for a case study farm, identifying key components and interactions.
- **Module 3: Masterclass in Diagnosis: Pests, Diseases & Their Look-Alikes (Approx. 3 hours)**
  - Accurate identification as the cornerstone of IPDM.
  - Key characteristics of major insect pest groups and their damage.
  - Key symptoms of fungal, bacterial, and viral diseases.
  - **Crucially:** Differentiating pest/disease damage from nutrient deficiencies and abiotic disorders (e.g., water stress, herbicide damage).
  - **Hands-on Lab/Field Session:** Using hand lenses, field guides, and high-quality samples/images to practice diagnosing a range of plant health problems.
  - **End of Day 1 Recap & Q&A.**

Day 2: The Proactive Approach – Monitoring & Prevention

- **Module 4: Systematic Scouting & Monitoring Techniques (Approx. 3 hours)**
  - The principles of effective scouting: "Look high, look low, look all around."
  - Developing a systematic scouting plan (sampling patterns like 'W' or 'Z').
  - Using monitoring tools: Pheromone traps, sticky traps, sweep nets.
  - Recording and mapping pest/disease data for decision-making.
  - **Field Practical:** Participants design and conduct a simulated scouting exercise in a field or using a detailed virtual farm map.
- **Module 5: Decision Making: Economic & Action Thresholds (Approx. 2 hours)**
  - Understanding Economic Injury Level (EIL) and Economic Threshold (ET).
  - Moving beyond economic thresholds to Action Thresholds that include environmental and social factors.
  - How to use scouting data to make a "spray" or "no-spray" decision.
- **Module 6: Preventative Strategies: Cultural & Physical Controls (Approx. 2.5 hours)**
  - **Cultural Controls:** Crop rotation, sanitation, managing planting dates, intercropping, trap cropping, water management.
  - **Host Plant Resistance:** Using resistant and tolerant varieties as a first line of defense.
  - **Physical & Mechanical Controls:** Barriers (nets), traps, tillage, mulching, hand removal.
  - **Workshop:** Designing a comprehensive preventative control strategy for a key crop in the case study.
  - **End of Day 2 Recap & Q&A.**

Day 3: Working with Nature – Biological & Bio-rational Controls

- **Module 7: Conservation & Augmentation of Biological Control Agents (Approx. 3 hours)**
  - Identifying key local natural enemies (predators like ladybugs, parasitoids like tiny wasps).
  - **Conservation Biocontrol:** Creating habitats (e.g., flower strips) and using selective pesticides to protect beneficials.
  - **Augmentative Biocontrol:** Releasing commercially produced beneficials (e.g., predatory mites, Trichogramma wasps) – when and how.
  - **Activity:** "Beneficial Insect ID" and creating a plan to attract them.
- **Module 8: Bio-pesticides & Bio-rational Products (Approx. 2.5 hours)**
  - Understanding different types of bio-pesticides (microbial, botanical, biochemical).
  - Their modes of action and best use practices (e.g., many are preventative or need good coverage).
  - The role of products like Neem, *Bacillus thuringiensis* (Bt), and beneficial fungi (e.g., Trichoderma).
  - Compatibility with beneficial insects.
- **Module 9: Practical Application & Preparation (Approx. 2 hours)**
  - **Hands-on Demonstration:** Preparing a simple botanical spray (e.g., a neem or garlic-chili extract).

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- Discussing proper application techniques, timing, and safety for bio-rational products.
- **End of Day 3 Recap & Q&A.**

Day 4: Judicious Chemical Use & Building the IPDM Plan

- **Module 10: The Role of Chemical Control in IPDM (Approx. 2.5 hours)**
  - Pesticides as a last resort: Using thresholds to justify application.
  - Understanding pesticide labels, modes of action, and classifications.
  - The importance of **selectivity**: Choosing chemicals that have minimal impact on non-target organisms.
  - Application technology: Nozzle selection, calibration basics, and drift reduction.
- **Module 11: Pesticide Resistance Management & Safety (Approx. 2.5 hours)**
  - How pesticide resistance develops.
  - Strategies to delay resistance: Rotating modes of action, using mixtures correctly, respecting refuges.
  - **Safety Deep Dive:** Personal Protective Equipment (PPE), safe storage, handling, disposal, and understanding re-entry intervals.
- **Module 12: Capstone Workshop: Developing a Full IPDM Plan (Approx. 2.5 hours)**
  - **Intensive Workshop:** Participants work in groups on a specific crop from the case study.
  - Using a provided template, they will create a season-long IPDM plan that includes:
    1. Key pests and diseases to monitor.
    2. A detailed scouting and monitoring schedule.
    3. Action thresholds.
    4. A list of preventative (cultural, biological) tactics.
    5. A justified, last-resort list of selective chemical options with resistance management notes.
  - **End of Day 4 Recap & Q&A.**

Day 5: Implementation, Future Trends & Action Planning

- **Module 13: IPDM in the Context of Climate Change (Approx. 2 hours)**
  - How changing climate affects pest/disease pressure and distribution.
  - Adapting IPDM strategies for increased climate resilience.
  - The role of IPDM in reducing the carbon footprint of agriculture.
- **Module 14: Farmer Adoption & Extension of IPDM (Approx. 2.5 hours)**
  - Understanding the barriers to IPDM adoption.
  - Strategies for effective communication and training (e.g., Farmer Field Schools).
  - Demonstrating the economic benefits of IPDM.
  - The role of community-level and area-wide IPDM programs.
- **Module 15: The Future of IPDM: Technology & Innovation (Approx. 2 hours)**
  - Emerging technologies:
    - Drones for scouting and targeted spraying.
    - Mobile apps for diagnosis and decision support.
    - Sensors and predictive modeling for forecasting outbreaks.
- **Module 16: Your IPDM Action Plan & Course Wrap-up (Approx. 1.5 hours)**
  - **Action Planning:** Participants create a personal action plan to implement or improve IPDM practices in their own work context.
  - Review of the key principles and the IPDM decision-making process.
  - Open forum for final questions and sharing key insights.
  - Course evaluation and closing.

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