global forum for rural advisory services
forum mondial pour le conseil rural
foro global para los servicios de asesoría rural

IPM: Integrated Pest Management

WORKBOOK

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Contents

Module 1: Integrated Pest Management

Pre-assessment

After reading through the preface and introduction, the students must complete the following pre-assessment to determine how comfortable they are with the topic by rating their knowledge on the topics on a scale of 1 to 5, circling the corresponding number.

	Question	**Self-assessment**				
		Low				**High**
1	How well can you explain what IPM and its components?	1	2	3	4	5
2	Do you know the benefits of IPM?	1	2	3	4	5
3	Are you able to explain what prevention of pest attack is and give examples of preventative action?	1	2	3	4	5
4	How well can you explain Responsible Pesticide Use and how this reduces risk?	1	2	3	4	5
5	Can you explain what is Personal Protective Equipment used in pesticide application?	1	2	3	4	5
6	What is your understanding of resistance to pesticides and how to manage this?	1	2	3	4	5
7	Can you describe what are counterfeit and illegal pesticides and their impact on IPM?	1	2	3	4	5
8	Are you able to describe the role that genetically-engineered plants can play in IPM?	1	2	3	4	5
9	Can you give examples of IPM in action?	1	2	3	4	5

Study Unit 1: Introduction to IPM

Session 1.1 What is IPM?

1. Answer the following questions by indicating whether the statement is true or false. Give the reason for your answer if false. (4)

1.1 The goal of IPM is to reduce the use of chemical pesticides

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1.2 The application of ecological science to the management of a farming system, that also takes into account socioeconomics and culture, is called agroecology

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2. Answer the following in your own words. (4)

2.1 What are the three underlying principles of IPM?

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2.2 By adopting IPM, you will satisfy the requirements of Organic Agriculture certification. True or False?

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Summative assessment: Unit 1

1. Fill in the missing words from the table below. (5)

integration	*agroecosystems*	*pest control techniques*	*economically justified*	*pesticides*

Integrated Pest Management (IPM) means the careful consideration of all available _____ and subsequent _____ of appropriate measures that discourage the development of pest populations and keep _____ and other interventions to levels that discourage the development of pest populations and keep pesticides and other interventions to levels that are _____ and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to _____ and encourages natural pest control mechanisms

2. What are the benefits of IPM? (7)

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3. What sustainable development goals does IPM contribute directly to? (5)

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Total: 17 marks

Study Unit 2: Implementation of IPM

Session 2.1: Prevention

1 Fill in the missing words from the box below. (4)

Pest infestation	resistant	healthy	Pest damage	Attractive

Prevention is all about growing a _____ crop that is robust but does not provide either a source of _____ or becomes more _____ to infestation. A healthy crop is also more _____ to, and able to recover from, _____

2. Mark the prevention elements with an X in the table below (9)

Crop Location	
Seed/Variety Selection	
Strategic Planting and Crop Rotation	
Land Preparation	
Assessing Numbers of Pests Present	
Release of Natural Control Agents	
Sanitation	
Application of Herbicide before Planting	
Optimising Plant Nutrition	
Water Management	
Preserving and Enhancing Biodiversity	
Seed Treatment	

3. How does strategic planting help prevent pest infestation? (5)

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4. What role does optimising plant nutrition play? (4)

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Session 2.2: Monitoring

1. In your own words explain why monitoring of the crop is important and what is monitored.

(5)

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2. What methods of monitoring can be used? (5)

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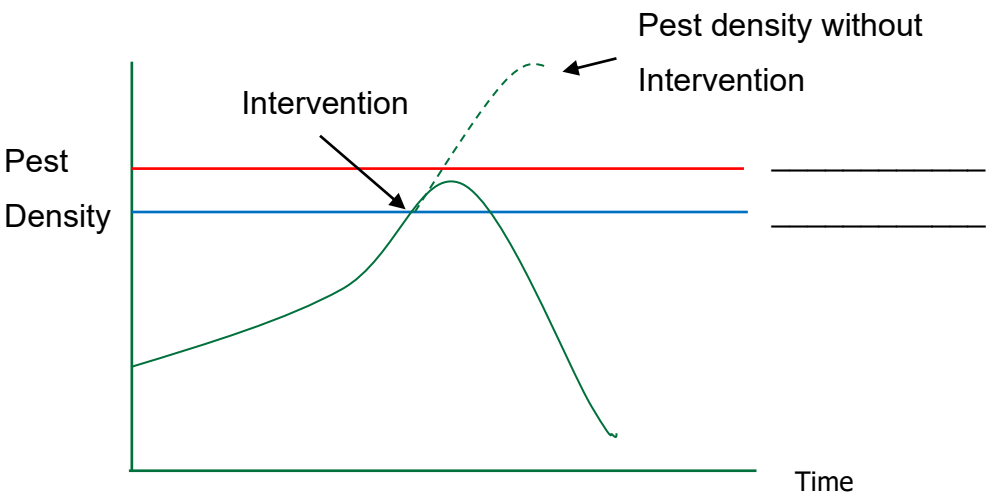
3. Fill in the missing words on the graph. (4)



Session 2.3 What is intervention?

1. Biological Control includes the use of products from living organisms, True or False. (2)

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2. Describe three disadvantages of Cultural/Mechanical Control (6)

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3. Fill in the spaces using the words in the table below: (4)

Death	biochemical	pest biology	Disrupts

Pesticide Mode/Site of Action can be defined as the _____ process by which a pesticide _____ normal _____ usually resulting in the _____ of the pest.

Summative assessment: Unit 2

1. Describe the three components of IPM (12)

2. What factors influences the decision to carry out pest control interventions? (10)

3. Describe the types of Intervention that can be made. (12)

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Total: 32 Marks

Study Unit 3: Responsible Use of Pesticides

Session 3.1: Pesticide poisoning

1. What are the three principle methods that a pesticide can enter the body? (3)

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2. Risk = Hazard + Exposure. True or False? (2)

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3. Mark with an X the principles that should be followed when choosing a chemical pesticide? (5)

Right type for the pest	
Cheapest available	
Works in a way that optimises control	
Less hazardous	
Formulation that is safer to handle	
Broad spectrum to kill more pest types	
Safer packaging	

Session 3.2: Read and understand the pesticide label

1. Which of the following is **not** normally on a typical pesticide label? (2)

Product Name, Active Ingredient, Dose Rates, Price, Safety Precautions

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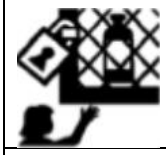
2. Place the colour of the colour bands in order of hazard/toxicity (1 = most toxic, 4 = least toxic. (4)

3 What do the following pictograms mean? (6)

4. What is the pre-harvest interval (PHI)? (4)

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Session 3.3: Application Equipment

1. What single nozzle is suitable for Herbicides, Insecticides and Fungicides? (4)

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2. In your own words, how do you determine the Volume Rate for application? (6)

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3. Mark with an X the correct statement. (4)

Spray during the middle of the day when it is less windy	
Do not spray when raining	
Walk upwind when spraying so the spray blows away from you	
Point the spray lance in front so that you can see what is being sprayed	

Session 3.4: Personal Protective Equipment (PPE)

1. Fill in the missing words from the table below. (5)

last line	risk	application technique	handling	first line

PPE is essential to reduce the _____ of contamination from pesticides. While important, it is the _____ of defence, good _____, proper sprayer maintenance and proper _____ are the _____ of defence.

2. Which of these statements is False? (4)

a. Gloves should be worn over shirt sleeves.

b. Boots should be worn over trousers.

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3. Which of the following is not normally needed to be worn for application of pesticides? (4)

Apron, Boots, Gloves

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Summative assessment: Unit 3

1. Fill in the missing words from the table below. (4)

acceptable level	benefits	IPM	Risks

The Responsible Use of pesticides is an important part of _____, which helps to manage risk and keep it at an _____ where the _____ of pesticide use far outweigh the _____.

2. List the nine easy steps of the Responsible Use of Pesticides (18)

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3. What are the eight steps of (backpack) sprayer maintenance? (8)

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Total: 30 marks

Study Unit 4: Pesticide Resistance Management

Session 4.1: What is Pesticide Resistance and How does it Develop?

1. Resistance in insects, mites or rodents can occur because the pest changes behaviour. True or False? (4)

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2. In your own words explain pesticide resistance. (8)

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3. Which of the following practices promote resistance? Mark with an X. (4)

Continual and frequent use of the same pesticide on a pest population.	
Use of selective pesticides.	
The use of application rates which are below those recommended on the label	
Poor coverage of the area being treated.	
Use of genuine products	
Areas where there is little or no immigration of susceptible individuals from outside.	

Session 4.2: Resistance Management Strategies

1. Following herbicide application, removing surviving weeds by hand and prior to seeding can be described as a Double-hit strategy. True or False? (2)

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2. In your own words describe Mode/Site of Action (MoA) rotation. (4)

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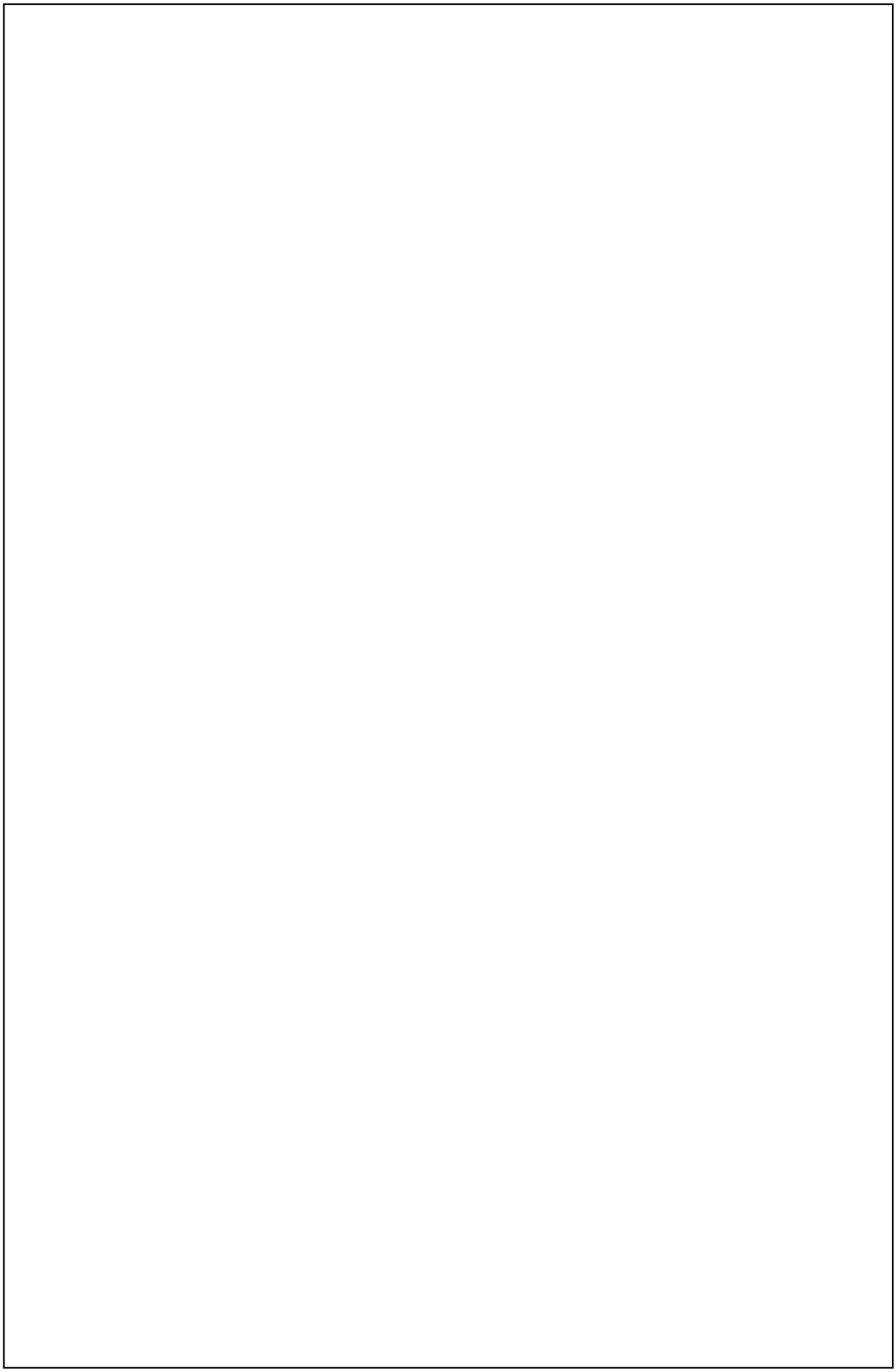
3. How to manage resistance in a Bt crop? Fill in the missing words from the table below. (4)

Refuge	part of	surrounding	Express

Planting of _____ the crop area or _____ area, with plants that do not _____ the Bt toxin. This is known as a _____.

Summative assessment: Unit 4

1. Using weeds as an example draw a diagram to illustrate how resistance develops. (20)



2. What are the main resistance management strategies with pesticides? (8)

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Total: 28 marks

Study Unit 5: IPM in Action

Session 5.1 Threats and Outcomes

1. The acceptable daily intake (ADI) of a pesticide is the maximum quantity which can be consumed in a year without harm. True or False? (4)

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2. What are benefits to IPM of accurate record keeping? Mark with an X. (4)

Used to determine whether the action threshold has been reached	
Demonstrate the impact of IPM on crop yields	
Demonstrate the cost of IPM implementation	
Required for income tax returns	
Facilitates auditing for sustainability schemes, such as GlobalGap	
Needed to recommend pest control actions to neighbouring farmers	

3. What does triple rinsing of an empty pesticide bottle do? (4)

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4. What practices help to avoid counterfeit/illegal pesticides? (4)

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5. Fill in the missing words from the table below. (4)

principles	capacity building	behaviour	Understand

Farmer _____ is essential for IPM to be adopted – farmers need to _____ the _____ and benefits of IPM and how it is implemented. Ultimately this requires training that results in _____ change.

Session 5.2: Examples of IPM in the field

1. What specific action is undertaken in all the field examples shown? (5)

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2. What do you understand by mass-trapping? (5)

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3. List four benefits of using a Spray Service Provider. (8)

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Summative assessment: Unit 5

Practical Assessment

1. Using your own experience describe a pest problem in a defined crop and how you might address it through an IPM strategy along with the benefits of successful implementation.

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Total: 50 Marks

Post-assessment

The students must complete the following post-assessment to determine how much they have learnt of the topic.

	Question	Self-assessment				
		Low				High
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2	Do you know the benefits of IPM?	1	2	3	4	5
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6	What is your understanding of resistance to pesticides and how to manage this?	1	2	3	4	5
7	Can you describe what are counterfeit and illegal pesticides and their impact on IPM?					
8	Are you able to describe the role that genetically-engineered plants can play in IPM?					
9	Can you give examples of IPM in action?					

Global Forum for Rural Advisory Services (GFRAS) is about enhancing the performance of advisory services so that they can better serve farm families and rural producers, thus contributing to improved livelihoods in rural areas and the sustainable reduction of hunger and poverty. Rural advisory services help to empower farmers and better integrate them in systems of agricultural innovations.