

## **The Need for Integrated Pest Management Programme**

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Excessive reliance on insecticides to control pests and diseases in agriculture has led to problems that threaten production, sustainability, health and the environment. These include secondary pest outbreaks, development of pesticide resistance and the destruction of natural enemies. As a result, farmers are caught in a vicious pesticide treadmill. In addition, the pesticides find their way into the waterways and eventually into the lake whereby they impact negatively on the water quality and aquatic life. Notably, the farmers' low level of literacy and education in the Kenya increases their overall risk of exposure to pesticides. Successful economical and environmentally friendly control of pests and diseases requires the use of a variety of control methods rather than relying exclusively on a single method of control.

The use of combined pest control methods is referred to as Integrated Pest Management (IPM) strategy. The IPM strategy relies first and foremost on the application of ecological principles and processes. For example, managing pest populations through biological control, use of bio-pesticides and cultural techniques before chemical control can be considered. The IPM strategy is valuable not only as a solution to pesticide-induced problems, but also as a fundamental approach to pest management in general. Human resource development is an essential component of IPM, as it is a knowledge-intensive technology.

### ***Overall objective of the IPM framework***

Overall objective is to enhance integrated pest management within the Kenya so as to reduce risks of pest attacks and associated costs;

### ***Elements of the framework***

The framework should include how :

- a) To assess the pest and disease status
- b) To understand the vulnerability to pest attacks,
- c) To assess the risks of pest attacks and associated economic, environmental, and social costs,
- d) To develop an integrated pest management/control strategy/regime that uses appropriate arrays of complementary methods – natural

- predators and parasites, pest-resistant tree/crop varieties, cultural practices, biological controls and other physical techniques
- e) To assess the capacity to design and implement IPM regimes
  - f) To define clear profile of the institutional or partnerships mandates in the implementation of IPM within the basin
  - g) Enhance understanding on the outstanding researchable areas,
  - h) To provide clear policy recommendations on how to address any risks related to pests that the project may stimulate, and
  - i) Promote monitoring of pests attacks and the effectiveness of management approaches

Among other tasks, the student shall undertake the following:

- a) Review current pest and disease control strategies in the country (including institutional, policy and legal frameworks),
- b) Analyze the vulnerability of the to pest attacks
- c) Review the impact of the current pest control measures
- d) Identify key pests and diseases of the major crops and livestock in the Basin,
- e) Quantify the losses attributed to these pests and diseases
- f) Define/outline outstanding relevant researchable areas,
- g) Propose appropriate Integrated Pest Management strategies for the major pests and diseases in the Basin
- h) Define appropriate implementation strategy for the proposed measures
- i) Develop a comprehensive pests monitoring and evaluation regimes

### **Expected output**

Expected outputs include:

- a) Review of the current status of the country in respect to pest control approaches, pests occurrence and vulnerability levels,
- b) Outline of the impacts of current pest control approaches
- c) Quantify losses associated or caused by pest attacks,
- d) List researchable areas, and
- e) Provide comprehensive Integrated Pest Management and monitoring framework.

### **Methodology**

The student will :

- Carry out a preliminary assessment of available data through desk reviews on existing empirical and relevant situational literature and case studies,
- Produce review report which must be presented in class and be marked as 20/30 of CAT marks

The purpose of the report will be threefold:

- (a) To test the understanding of the on IPM elements
- (b) To state clearly how the IPM methodology as well as the anticipated limitations/constraints, and

The student will use the attached detailed suggested elements of framework :

## **Framework for Integrated Pest Management (IPM) Programs in Kenya**

### 1. Introduction

#### 1.1. Integrated Pest Management (IPM) definition

##### 1.1.1. What is IPM?

##### 1.1.2. What does IPM involve?

- 1.1.2.1. Combination of different methods
- 1.1.2.2. Compatibility of the methods used
- 1.1.2.3. Integrating the methods in the farming
- 1.1.2.4. Integrate the methods in the pest complex
- 1.1.2.5. Economic assessments

##### 1.1.3. History of IPM

- 1.1.3.1. Historical perspectives
- 1.1.3.2. IPM as a concept
- 1.1.3.3. IPM as a philosophy
- 1.1.3.4. IPM in theory and development context
- 1.1.3.5. Management versus control in relation to pest containment

##### 1.1.4. IPM in different contexts

- 1.1.4.1. Low external input user
- 1.1.4.2. Intensive agriculture
- 1.1.4.3. Intensifying agriculture

#### 1.2. Components of IPM

##### 1.2.1. Cultural control

- 1.2.1.1. Spatial and temporal arrangements of crops
  - 1.2.1.1.1. Intercropping
  - 1.2.1.1.2. Companion cropping
  - 1.2.1.1.3. Relay cropping
- 1.2.1.2. Field sanitation
- 1.2.1.3. Water and fertility management

##### 1.2.2. Physical control

##### 1.2.3. Mechanical control

##### 1.2.4. Genetic control

##### 1.2.5. Pesticides use

##### 1.2.6. Botanical pesticides

- 1.2.6.1. Plant extracts
- 1.2.6.2. Allelochemicals

##### 1.2.7. Biological control

- 1.2.7.1. Predators
- 1.2.7.2. Parasites

- 1.2.7.3. Pathogens
    - 1.2.8. Plant resistance
    - 1.2.9. Scouting, monitoring, surveillance and forecasting
    - 1.2.10. Pest and crop loss assessment
  - 1.3. Sustainable production
  - 1.4. Ecological/environmental impacts
  - 1.5. Economic impacts
  - 1.6. Human and animal impacts
  - 1.7. Current legal measures for pest management
    - 1.7.1. Agriculture act
    - 1.7.2. Plant protection act
    - 1.7.3. Obnoxious weeds
    - 1.7.4. Environmental management act
    - 1.7.5. Pest control products act
    - 1.7.6. Plant variety act
    - 1.7.7. Livestock act/beekeeping
    - 1.7.8. Education act
    - 1.7.9. Agricultural Research policy
    - 1.7.10. Agricultural extension policy
    - 1.7.11. Agricultural information strategy paper
  - 1.8. Pest management stakeholders
    - 1.8.1. Farmers
      - 1.8.1.1. small scale
      - 1.8.1.2. large scale
    - 1.8.2. Policy makers
    - 1.8.3. Research systems
      - 1.8.3.1. National
      - 1.8.3.2. International
    - 1.8.4. Development partners
      - 1.8.4.1. NGOs and CBOs
      - 1.8.4.2. World Bank
      - 1.8.4.3. UN: UNDP, ENEP, FAO
  - 1.9. Project development approaches and methodologies
    - 1.9.1. Informal and formal surveys
    - 1.9.2. Desktop documentation
- 2. Description of the proposed IPM program
  - 2.1. Goals and objectives
  - 2.2. Project site description
    - 2.2.1. The site: agro ecologies, climatic conditions, demography
    - 2.2.2. Agricultural activities
    - 2.2.3. Other related projects
  - 2.3. Contribution of IPM Program in Vision 2030
    - 2.3.1. Economic pillar
    - 2.3.2. Social pillar
    - 2.3.3. Political pillar

- 2.4. Stakeholder roles and dynamics
  - 2.4.1. Roles of stakeholders
  - 2.4.2. Stakeholder management
  - 2.4.3. Coordination
- 2.5. Participation of Agricultural Sector Ministries
  - 2.5.1. ASCU
  - 2.5.2. NCST
- 3. Situation analyses
  - 3.1. Major pests, diseases and weeds in major crops in Kenya
    - 3.1.1. List of pest, diseases, weeds and current management practices
  - 3.2. Socio-cultural and economic aspects of pest management
    - 3.2.1. Key socio-cultural factors
    - 3.2.2. Key socio-economic factors
    - 3.2.3. Economic losses due to pest
  - 3.3. Farmer knowledge of pests problem and their management
    - 3.3.1. Training needs assessment on pest management
  - 3.4. Potential of IPM options and their application
    - 3.4.1. Current IPM components in use in the target area
    - 3.4.2. Identification and validation of best practices
- 4. Review of country IPM: experiences and lessoned learnt
  - 4.1. Legumes
  - 4.2. Cereals
  - 4.3. Horticultural crops
  - 4.4. Plantation/industrial crops
  - 4.5. Root and tuber crops
  - 4.6. Migratory pests
- 5. Designing an IPM project
  - 5.1. Pest identification
  - 5.2. Identification and utilization of beneficial organisms
  - 5.3. Scouting and monitoring pests and natural enemies
  - 5.4. Economic assessment of pest management
  - 5.5. Pesticides reduction and judicious use
  - 5.6. Application of non chemical means of pest control
- 6. Implementation of IPM project
  - 6.1. Target stakeholder (the one using the method)
    - 6.1.1. Farmers
      - 6.1.1.1. zero input users
      - 6.1.1.2. Low input users
      - 6.1.1.3. High input users
    - 6.1.2. Research institutions
    - 6.1.3. Extension agents
    - 6.1.4. Education institutions

- 6.2. Target crop and key pest
- 6.3. IPM option identification and promotion
- 6.4. Establish demonstration plots/FFSs
- 6.5. IPM sustainability in the target stakeholder
  - 6.5.1. Program ownership by the target stakeholder
    - 6.5.1.1. Development and implementation processes
    - 6.5.1.2. Co-financing
  - 6.5.2. Program management by the target stakeholder
  - 6.5.3. Capacity building
- 7. Monitoring and Evaluation
  - 7.1. Key indicators of IPM success
    - 7.1.1. Target stakeholder characteristics
      - 7.1.1.1. Pre and post IPM project implementation
      - 7.1.1.2. Technical reports
    - 7.1.2. Target area characteristics
      - 7.1.2.1. Environmental improvement
      - 7.1.2.2. Economic improvement
  - 7.2. Updating IPM implementation strategies
    - 7.2.1. Successful areas
    - 7.2.2. Errors made
    - 7.2.3. Records of successive stakeholders
    - 7.2.4.
- 8. Work plan and budget
  - 8.1. Work plan
  - 8.2. Budget

## List of References

## Appendices

- 1. Formal and informal questionnaires
  - 1.1. Training needs assessment
  - 1.2. Socio-cultural information
  - 1.3. Farmer Knowledge base
- 2. IPM planning and evaluation tools
- 3. IPM record card
- 4. IPM monitoring and evaluation form
- 5. Land use maps of the target area