# INTEGRATED PEST MANAGEMENT

# Instructions for use

Understands the concept of Integrated Pest management



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# How did we ussualy control the paddy pest and disease?

# Pest and Disease Control

Expensive up to 25% of total Production

Synthetic Chemical Pesticides

Pollute the Environment

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# INTEGRATED PEST MANAGEMENT

# Integrated Pest Manegement

IPM system is an effort population control or pest attack rate by using one or more of various control techniques developed in a single unit, to prevent economic losses and environmental damage. In this system the use of pesticides is the last alternative.

IPM is "DYNAMIC", meaning that the IPM system is not applied in the form of a technology package, which applies uniformly to all conditions, places and ecosystem conditions, but must be in a flexible, dynamic and location-specific form or typical of local ecosystems.

IPM components are various pest control techniques that we know, including chemical control with chemical pesticides. IPM components consist of:

1. Physical Control
2. Mechanical Control
3. Control How to cultivate crops or technical culture
4. Control of resistant varieties
5. Biological Control
6. Control by Regulation/Regulation/Quarantine
7. Chemical Control

## Physical Control

Physical control is our effort to use or change physical environmental factors in such a way that it can cause death and reduce pest populations. Some of the treatments or actions included in physical control include:

| | |
|---|---|
| a. Warming up<br>b. Burning<br>c. Heating with radio-frequency energy<br>d. Cooling<br>e. Wetting | f. Drying<br>g. Trap light<br>h. Infrared radiation<br>i. Sound wave<br>j. barrier |

## Mechanical Control

Mechanical control aims to kill or move pests directly either by hand or with the help of other tools and materials

There are several mechanical control techniques that are often used in pest control practices:

a. Hand picking, collected is the life phase of pests that are easy to find and collect such as eggs and larvae.
b. Gropyokan, usually carried out for controlling rat pests, is by killing rats both in the burrow and those outside the nest.

c. Installing Traps, Insect pests are trapped with various types of traps that are made according to the type of pest and the phase of the pest to be caught.

d. Expulsion, The target of the expulsion technique is to repel pests that are in the plantation or those that are heading to the plantation

e. Other techniques here include rocking the tree, brushing, washing, removing affected plant parts, hitting, etc.

# Cultivation Techniques

Most of the control techniques in farming are grouped into 4 target groups, namely:

a. Reduce ecosystem suitability.

b. Disrupt the continuity of providing the necessities of life for pests.

c. Divert pest populations away from plants.

d. Reduces the impact of crop damage.

a. Ecosystem Suitability Reduction

1. Sanitation
2. Destruction or modification of replacement host or habitat
3. Earthwork
4. Water Management

b. Disruption of Continuity of Provision of Living Necessities Pest

1. Crop rotation
2. Land acquisition
3. Simultaneous planting
4. Determination of spacing
5. Plant location
6. Disconnecting crops and pests
7. Blocking the laying of eggs

c. Diversion of Pest Populations Away from Crops

1. Planting trap crops
2. Gradual harvest

d. Pest Damage Reduction

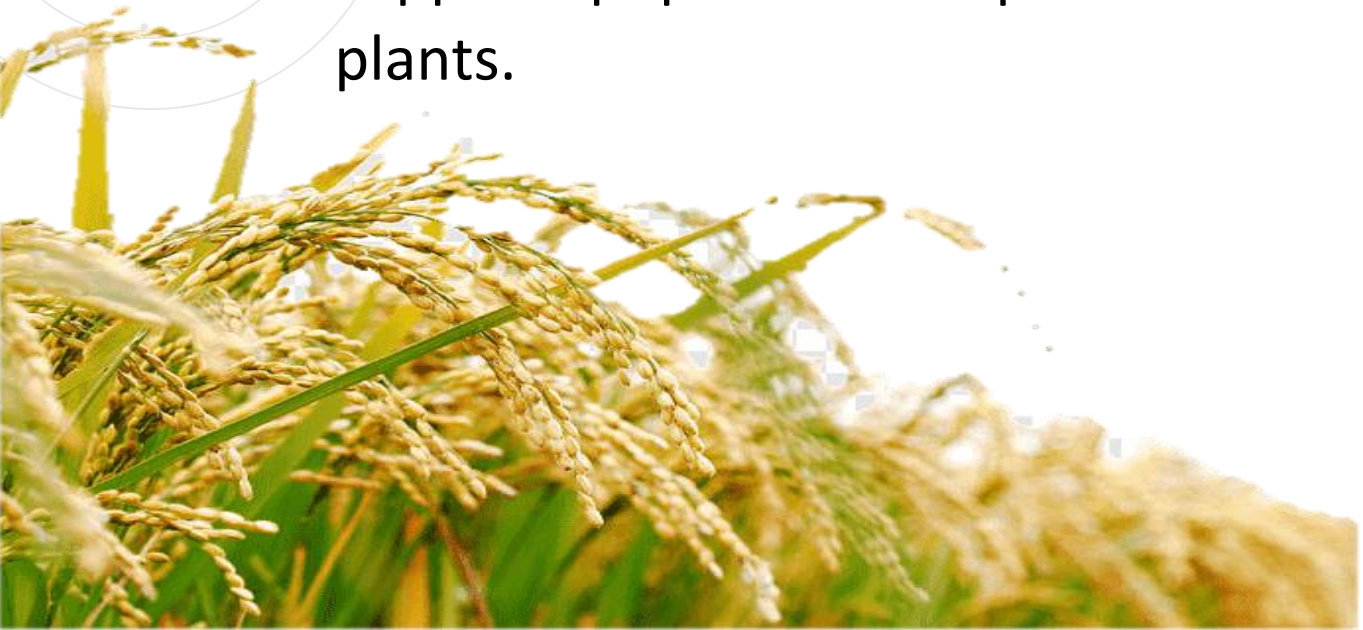
1. Changing host tolerance
2. Changing the harvest schedule

The Indonesian government also runs an integrated pest management school for extension workers and farmers, as a medium for training officers and rice farmers in implementing and developing IPM

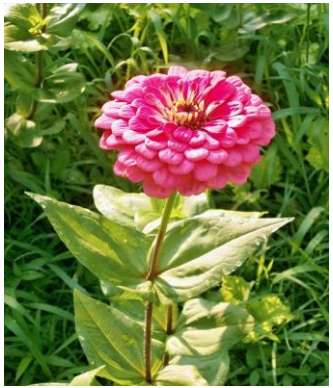
The IPM principles developed by the officers and farmers themselves in integrated pest management  school are:

1. Healthy Plant Cultivation
2. Preservation and Utilization of Natural Enemies
3. Weekly Observations
4. Farmers as IPM “Experts”

Conservation of natural enemies of pests in biological control of pests that attack rice plants including integrated pest control (IPM) which aims to increase the population of natural enemies of pests in rice fields and suppress populations of pests that can damage rice plants.

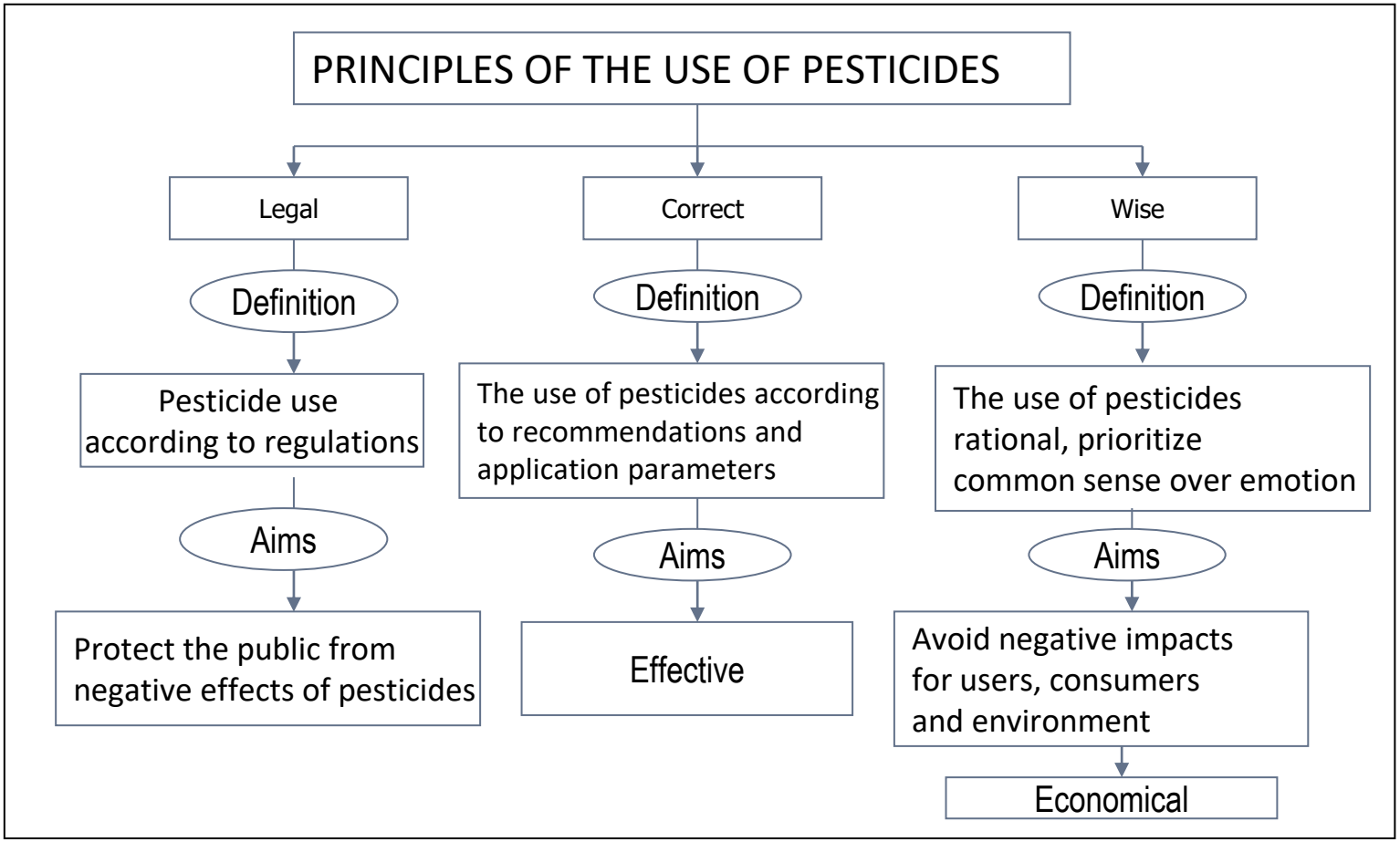


Refugia plants can be used as insect attractants which are natural enemies of pests as a source of nectar and pollen for natural enemies of rice pests such as predators and parasitoids. An example of a refugia plant that can be used for pest control is paper flower (Zinnia ellegans). sunflower (*Heliantus annuus* L.), and Kenikir flower (Cosmos caudatus).



Some examples of natural enemies of pests that can be found in rice fields are the Koksinelid beetle / *Synharmonia octomaculata*, praying mantis, bees, and needle dragonflies. These natural enemies can act as predators for pests that attack rice plants.

# Pesticide Use Principle Chart



# *Common Pest in Paddy Field*

## 1. Stem Borer

This pest can damage plants at all stages of growth, both at the time of the nursery, going phase, and flowering phase. If the attack occurs in the nursery until the tiller stage, this pest is called sundep/dead heart and if it occurs during flowering, it is called beluk/white head. Control measures must be taken immediately if >10% of clumps show symptoms of sundep. Insecticides that are effective against stem borers are available, especially those with active ingredients: karbofuran, benzene, carbosulfan, dimenhipo, amitraz, and fipronil

SUNDEP

BELUK

## 2. Brown planthopper (BPH)

This is a consequence of the application of a rice intensification system. The use of pesticides that violate the principles of integrated pest control (right type, right dose, and timely application) also triggers the brown planthopper explosion. In addition, BPH is also a vector of grass dwarf and empty dwarf virus diseases.

# 3. Green leafhopper (GLH)

The role of green leafhoppers (GLH) in the rice cropping system is a crucial concern because GLH is a vector of tungro disease. GLH causes the rice leaves to turn yellow to orange yellow, decrease the number of tillers, and stunted plant growth (shortened). Fertilization of high nitrogen elements greatly triggers the development of GLH.

# 5. Rice stink bug/ Walang sangit

*Leptocorisa oratorius* (Fabricius) Rice bug, is a common pest that damages rice grains during the ripening phase. The mechanism of damage is sucking grain grains that are filling. When disturbed, insects will defend themselves by emitting a stink smell. The damage it causes causes the rice to change color and calcify, and the grain becomes empty.

## 6. Rat

Rats damage rice plants at all stages of growth from seedling to harvest, even storage. Severe damage occurs if mice attack rice in the generative phase, because the plants are no longer able to form new tillers. In heavy attack, rats damage rice plants starting from the center of the plot, extending towards the edge, leaving 1-2 rows of rice at the edge of the plot.

# *Common Disease in Paddy Field*

1. Bacterial Leaf Blight – (BLB)

   *Xanthomonas campestris* pv. Oryzae. Bacterial leaf blight (HDB) is a widespread bacterial disease and reduces yields by up to 36%. The disease occurs in the rainy season or wet dry season, especially in paddy fields that are always flooded and fertilized with high N. BLB disease is effectively controlled with resistant varieties; complete fertilization; and water regulation

# 2. Blas (blast)

The disease which can reduce the yield very large is caused by the pathogenic fungus *Pyricularia grisae*. Leaf blast is a blackish brown spot, rhombic in shape, with a white center spot. This disease is controlled by alternately planting resistant varieties and proper NPK fertilization; planting at the right time and seed treatment. If necessary, use a fungicide with the active ingredient methyl thiocyanate, fosdifen, or kasugamycin.

# 3. Sheath blight

Sheath blight is a fungal disease caused by *Rhizoctonia solani*. Infected leaves senesce or dry out and die more rapidly, Seath blight is an important disease in rice plants. This disease destroys the midrib, so to find and recognize the disease, it is necessary to open the planting canopy. Disease causes plants to fall easily, the earlier it falls, the greater the loss it causes.

# 4. Narrow brown leaf spot

*Cercospora oryzae*. Cercospora spots are caused by the fungus Cercospora oryzae. Disease causes serious damage to crops on less fertile land. The disease produces straight narrow brown symptoms on the flag leaf blade, in the ripening growth phase. Symptoms can also occur on the midrib/leaf sheath and husk of the grain.

## 5. Tungro

Tungro is one of the important diseases in rice which is very destructive and widespread caused by Rice Tungro Bacilliform Virus from green leafhopper. The prominent symptoms of tungro attack are leaf discoloration and stunted growth of plants. Leaf color of diseased plants varies from slightly yellow to orange. This characteristic symptom is determined by the level of resistance of the variety, environmental conditions, and the growing phase when the plants are infected.

## 6. Ragged stunt

Ragged stunt or Hollow and dwarf is caused by a virus transmitted by the brown planthopper. This disease produces several symptoms of leaf malformations such as ragged and twisting leaves. The leaves of the sick plant are dark green. Panicles from diseased plants only partially come out and the resulting grain is empty. Disease is controlled through the control of brown planthoppers, among others, by planting resistant varieties.

# THANK YOU