TANI TANGGUH

MONITORING BOOK: FIRST PLANTING SEASON

INTRODUCTION

Successful farming does not come solely from the application of expensive pesticide, abundant fertilizers or high-quality seeds. It strongly depends on regular monitoring and observation. This book provides assistance in presenting the form for self-help observation report that can be utilized by an individual farmer or farmers' group. The book also tries to fulfil farmers' need on how often they should monitor the farm land and how to conduct farm observation properly.

On monitoring the farms, the more frequent it is carried out, will result in better farming application. However, when performed everyday, it will eventually require time and energy. Thus, it is advisable to do monitoring at least once a week.

Farm monitoring should be conducted properly where farmers have to be really present in the farms to check the plants and examine any potential pests and plant diseases on the rice plant clumps.

Plant observation should be examined from the top (tip of the plant) to the bottom (base of the plant) in order to prevent any pest or plant disease from spreading to other clumps, but instead they will descend to the base of the plant. Once the farmers have examined the clumps, they should write down the findings on the condition of the plant and on any pest and or plant disease found, as the basis for necessary controlling actions.

When the farmers found any sign of pests attacks, particular plant disease, abnormal plant growth or any obstruction to plant growth, then farmer should immediately take prevention measures and consult with the farming extensions officers or farming assistants.

Hopefully, this book helps the farmers in managing and monitoring the fields, from the preparation, implementation, and until they can harvest the crops.

Author

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USER MANUAL

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I. Preparation Phase

1. Determining the location of the farm

When deciding on the farm being used, both for individual farmer or farmers' group, they should consider the position, inclination and water supply. Farm being cultivated by farmers' group should be agreed by group's members with clear distribution of roles and responsibility in cultivating the land.

2. Technical training on farming

Technical training should be adjusted to the need of the farmers which will provide them with knowledge and skills for cultivating the land. The training includes procedures to make organic fertilizers and bio-pesticides, as well as land management..

3. Provision of seeds

Seeds selection depends on the location of the land. Farmers are encouraged to consult with the farming extension officers or farming assistants in selecting seeds with optimum use value and market value. Farmers are also required to know the types of seed labels.

II. Implementation Phase

1. Land cultivation

Land cultivation includes land clearing, plowing, initial application of fertilizers, and making dikes around around the land.

2. Planting

Farmers should follow the planting technique with seed row spacing and whether it applies *tumpang sari* (poly-culture) or mono-culture agriculture. The rice variety on dry land requires special planting technique using small holes for planting the seeds.

3. Plant nursery

Plant nursery includes watering, applying fertilizers, weeding and replacing the dead plants.

4. Harvesting

III. Monitoring & Evaluation

Important!

Monitoring of the rice field can be performed independently by the farmers or together with the farming extension officers or farmers' assistants. It may be conducted once a week to observe the plant growth. It is also necessary to have regular meeting with the farmers group to discuss and evaluate the progress of the farming program while at the same time learning from each other.

Evaluation should also be performed regularly to observe the progress of the farming exercise being applied by individual farmers or farmers group.

FARM MONITORING FORMAT

FORMAT

Observer's Name	Day, Date	Location	Commodity	Observation Results	Problems	Solutions
				Plant age: Plant condition:		
				Plant age: Plant condition:		
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ORGANIC FERTILIZER

FERTILIZER

benefits of organic fertilizer

Organic fertilizer is basically fertilizer from organic materials or waste, such as animal excrement, agricultural waste (plants, hay, bagasse and sawdust) and waste from human activities (waste from the market and household waste).

In order to improve the quality of the materials (for fodder), they need to be fermented first. The technology to produce this fertilizer is easy to apply with the availability of basic materials in the farming environment. The organic substances such as animal excrement and waste are suitable for propagating microbes.

The use of organic fertilizer or compost help soil propagation, repairing the physical, chemical and biological properties of the soil. This fertilizer evidently improves the soil fertility and support the growth of natural enemies of plant pests and diseases. By applying the organic fertilizer in farm land will significantly reduce the environment pollution and improve the quality of the soil in sustainable manner. In the end, it will increase the land productivity and crops harvest, as well as preventing land degradation.

Materials:

- Animal excrement from cows, goats, chicken (70% from total materials)
- Organic materials, such as different kind of leaves and other organic wastes (20%)
- Sawdust and bran (7%)
- Dolomite/aglime (3% at most)
- Molasses
- Bio-activator (EM4)
- Water as necessary

Tools:

- Sickle to chop the organic materials
- Spade, hoe or pitchfork to mix the materials
- Bucket to mix the liquid substances
- Watering can to pour the liquid substances onto the dry materials.
- Tarpaulin, plastic sheet or gunny sack to cover the materials.

FERTILIZER

how to make organic fertilizer

- Finely chop the leaves.
- Mix the materials; animal manure, leaves, sawdust and dolomite.
- In the bucket, mix bio-activator (EM4) solution, molasses, and water with a ratio 1 : 1 : 10.
- Wet the bran with the mixed solution until it's moist, put aside some solution for watering the other material compound.
- Spread the material compound with 30 cm - 40 cm thickness on the floor or other flat surface away from the direct sunlight.
- Spread the bran on top of the material compound, mix it, and evenly wet it with the remaining solution.
- Repeat the process, pile up the materials until 1 metre or 1,5 metres, then cover it with tarpaulin, plastic sheet or gunny sack.
- Leave it for 21-30 days.
- Check the temperature every 12 hours; if it is too hot, uncover to release the heat and then cover again to continue the process.
- Constantly re-pile the materials, once a week, to maintain the high temperature and supply of oxygen.
- On the 21st or 30th day, the organic fertilizer is ready to be applied in farm.

Organic fertilizers which are ready to be applied in the farm land should be as follow:

- Dark brown in colour.
- Crumbly texture.
- Smells almost similar to friable soil.
- The mass shrink to around 1/3 of the initial volume.

The fertilizers are applied or spread on top of the soil during cultivation. The amount being used in 1 hectare of land is around 3,5 tons to 5 tons.

BIO-PESTICIDES

what are bio-pesticides?

Bio-pesticides are every organism in the form of species, sub-species, variety, insects, nematode, protozoa, fungi, bacteria, virus, micro-plasma, and other organisms that can be used to control the plant pests and diseases. They are categorized as predators, parasitoid, insect pathogen and antagonist agents.

By controlling pests and diseases biologically, farmers may obtain benefits as follow:

- high selectivity of organisms without creating new pests or diseases
- optimized the already existing organisms to combat pests and diseases
- the useful organisms will actively seek and require a host (plant pests)
- natural predators are able to breed and spread by themselves
- pests do not become resistant, and if they do, it will take longer time
- pests and diseases control occurs autonomously
- safe for the environment and human
- easily degradable

The guidebook will explain how to make bio-pesticides: ***Beauveria Bassiana*** and ***Paenibacillus Polymyxa***.

beauveria bassiana

Beauveria bassiana is a type of fungus that can be propagated with the following materials and tools:

- fungal isolates or fungi spores
- rice
- thick plastic bag 0,5 kg
- rice cooker pot
- big rice spoon
- adhesive tape or rubber band
- stapler
- tray to cool the rice
- Fan to help cooling the rice

Inoculation or propagation process by putting the fungi spores into the rice as the medium for growth, requires a sterile environment. Wash your hands with soap or alcohol solution before putting in beauveria bassiana spores.

beauveria bassiana

How to propagate beauveria bassiana?

- Wash the rice until it is clean.
- Cook in the rice cooker pot until it is half-cooked (approx. 10 minutes), stir once in a while to cook evenly.
- Spread the rice on the tray to cool the rice.
- Once it is cool, weigh it every 100 gr into the plastic bags.
- Squeeze the rice in the plastic bag to release the air and fold the bags by rolling them, and bind them with adhesive tape or rubber band to avoid the rolls do not loose.
- Put them back into the rice cooker pot to be cooked for the second time to be sterilized for around 1(one) hour.
- Take the rice rolls out of the cooking pot and fan them again to let cool.
- Once it is cool, put it in the sterile location.
- Put the beauveria bassiana fungi substrate inside the plastic bag.
- Fold the plastic opening, but make sure there is space for oxygen needed for the growth of the fungal isolate.
- Store the inoculated substrate for 3-4 weeks in a room without direct sunlight exposure.

beauveria bassiana

How to apply beauveria bassiana?

- Wash the sprayer tank to make sure that all chemical substances have been rid before applying the beauveria bassiana.
- Put beauveria bassiana isolate into the bucket filled with water and stir it.
- Put in 3 spoonful of white sugar as a binder.
- Pour the solution into the sprayer tank by filtering it with a thin cloth.
- 1pack (plastic bag) of beauveria bassiana isolate can be used for 2-3 sprayer tanks.
- Spraying should be carried out just before the sunset to avoid the heat from the sunlight which might kill the beauveria bassiana fungi.

paenibacillus polymyxa

Paenibacillus Polymyxa is an antagonist bacteria that can be obtained naturally and isolated between rice leaves infected by Hawar Daun Bakteri (locally known as kresek) or rice bacterial leaf blight in English. It has been tested effectively in the laboratory and in the field application.

Paenibacillus polymyxa can be propagated using a liquid medium, namely PDA (Potato Dextrose Agar).

- 1 litre of paenibacillus polymyxa isolate
- 2 kg of potatoes
- 200-400 gr of sugar
- 10-15 litre of boiled water

If you want to make more, you can refer to the ratio above.

You can use jerry can or plastic tank if it is possible to make an aerator set.

Paenibacillus polymyxa bacteria is efficient in combating these plant diseases:

- **On rice: Hawar Daun Bakteri or Bacterial Leaf Blight, BRS (Bacterial Red Stripes), Blast and Cercospora.**
- **On corn: Helminthopsporium dan Cercospora.**

paenibacillus polymyxa

How to propagate paenibacillus polymyxa?

- Choose fresh potatoes, then peel and wash them clean.
- Dice them.
- Put them into a pan filled with water and cook until they are soft and stir once in a while.
- Strain the boiled potatoes and take the extract water.
- Dissolve the sugar in the potato extract water.
- Cool the solution and put it into a container (a jerry can or plastic tank).
- Put paenibacillus polymyxa isolate into it.
- Propagate using the incubation method by giving more oxygen, or shake it manually once a day.
- It takes 14 days for paenibacillus polymyxa to propagate.

paenibacillus polymyxa

How to apply paenibacillus polymyxa?

- Wash the sprayer tank to make sure that all chemical substances have been rid before applying the paenibacillus polymyxa.
- The dosage is 250 ml of paenibacillus polymyxa for each sprayer tank.
- Put paenibacillus polymyxa isolate into the bucket filled with water and stir it.
- Put in 3 spoonful of white sugar as a binder.
- Pour the solution into the sprayer tank by filtering it with a thin cloth.
- Spraying should be carried out just before the sunset to avoid the heat from the sunlight which might kill the beauveria bassiana fungi.

ALTERNATIVE FODDER

BENEFITS OF ALTERNATIVE LIVESTOCK FODDER

HOW TO MAKE UTEMI (UREA, MOLASSES & RICE STRAW)

Materials:

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Tools:

- [illegible]
- [illegible]
- [illegible]
- [illegible]

Process to make it:

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]
7. [illegible]

[illegible]

HOW TO MAKE FERMENTATION

FERMENTATION

is the result of an anaerobic metabolism process of several microorganisms, such as bacteria, molds and yeasts.

MAIN MATERIALS

- dry forage (dried stalk, [illegible] grass or Pennisetum purpureum, etc.), [illegible]
- banana trunk, papaya trunk
- corn husks, corn cob, or peanut shells

*[illegible]

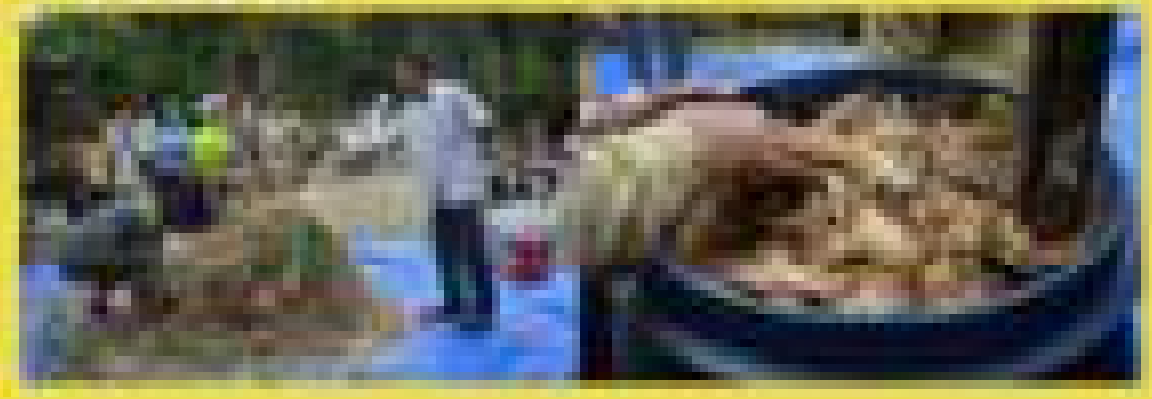
ADDITIVE MATERIALS

- 10 kg rice bran
- 10 kg tofu waste
- 10 kg cassava powder
- 2 liters of molasses
- [illegible]
- 1 litre of starter (such as EM4, [illegible] or Liquid Organic [illegible])
- water as necessary

TOOLS

- sickle for chopping
- crushing machine (if available)
- shovel
- bucket for mixing the additive materials
- drum or big plastic bag for storing the fermentation

HOW TO MAKE ALTERNATIVE Fodder:



thank you

AGRICULTURE EXTENSION AGENCY IN PURWOSARI
AGRICULTURE EXTENSION AGENCY IN PANGGANG
FARMERS' GROUPS IN PURWOSARI AND PANGGANG

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