TANI TANGGUH
MONITORING BOOK: FIRST PLANTING SEASON

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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 fulfill 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

YAKKUM EMERGENCY UNIT
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

Monitoring of the intervention can be performed regularly using the indicators together with the training providerofficials and farmers’ accounts. It may be conducted once a week to observe the plant growth. It is also necessary to have regular meetings 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 methods being applied by individual farmers or farmers’ groups.

[Image description: Farmers tending to crops]
FARM MONITORING GUIDEBOOK

FARM MONITORING FORMAT

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FARM MONITORING GUIDEBOOK

ORGANIC 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.
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.
FARM MONITORING GUIDEBOOK

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*. 

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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.
- 1 pack (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 antagonistic 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: *Helminthosporium 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.
FARM MONITORING GUIDEBOOK

ALTERNATIVE FODDER
BENEFITS OF ALTERNATIVE LIVESTOCK FODDER

- Reduced dependency on crop residues for animal feed, ensuring a more balanced diet for livestock.
- Improved soil health through increased organic matter and nutrient content.
- Reduced costs associated with traditional feed sources, allowing for more efficient use of resources.
- Enhanced animal productivity and health, leading to increased meat and milk production.
- Reduced environmental impact due to lower reliance on feedlot systems and associated waste.
- Increased food security at the local level by promoting diversified food production systems.
HOW TO MAKE UTEMU (UREA, MOLASSES & RICE STRAW)

Materials
- 1 lb of dry rice straw
- 6 kg urea
- A container (pail or drum)
- 2 kg rice straw

Tools
- Spade
- Sifter
- Gloves to avoid the urea
- Separating in big plastic sheets to cover the urea

How to make:
1. Mix all the materials according to the proportions.
2. Sift the dry straw and pour the dry urea with a mixture of 1:30 ratio.
3. Mix the materials and take into the big drums and let it rest.
4. Spread the mixture along the drums and put another layer of straw with the same proportions. Repeat until all drums have been used and cover with plastic or cloth sheet.
5. Leave the drums for 15-20 days. Check about two days before they may reach the fermentation process.
6. A common practice is to mix the straw and the fermented mixture to be used as inoculant shelf of fermented materials, with a capacity to absorb and serve a decade of fertility.
FERMENTATION
is the result of an anaerobic metabolic process of certain microorganisms, such as bacteria, yeast, and fungi.

MAJOR MATERIALS
- Dry kava (rata root), kava
- Syzygium aromaticum (Black pepper)
- Equisetum arvense (Horsetail)
- Ficus carica (Common fig)
- Coriandrum sativum (Coriander)

ADDITIVE MATERIALS
- 20 kg rice
- 10 kg rice bran
- 10 kg water
- 10 kg yeast extract
- 5 lbs of molasses
- 1 piece of vanilla
taste: sweet, fruity

TOOLS
- Scissors
- Trowel
- Shovel
- Sponge
- Water
- Measuring cup
- Bottle or liquid yoga
- Spoon
- Water
- Scissors
- Bottle
- Sponge
- Measuring cup
- Water
HOW TO MAKE ALTERNATIVE FODDER

1. Add all the other materials into the mixer at 30% to 50% dry weight.
2. Mix the flake, plant material, and organic material to each other evenly.
3. Add the dry material (flakes and organic material) to the wet rice mixture and mix it around to ensure the material is wet.
4. Add some additional water to make sure the mixture is wet.
5. Pour the mixture into plastic bags or airtight containers to ensure the mixture does not spoil.
6. Put the mixture in the plastic bags or use airtight containers to ensure the mixture does not spoil.
7. If the mixture is concentrated due to the moisture content, make sure the mixture is not too wet. This may take time for some materials (like cow peels).

A good mixture of rice, flake, and organic material makes a good alternative fodder for animals. These materials are easy to find and mix.
thank you

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