

ARISE Plus Thailand

Organic Rice Production Techniques

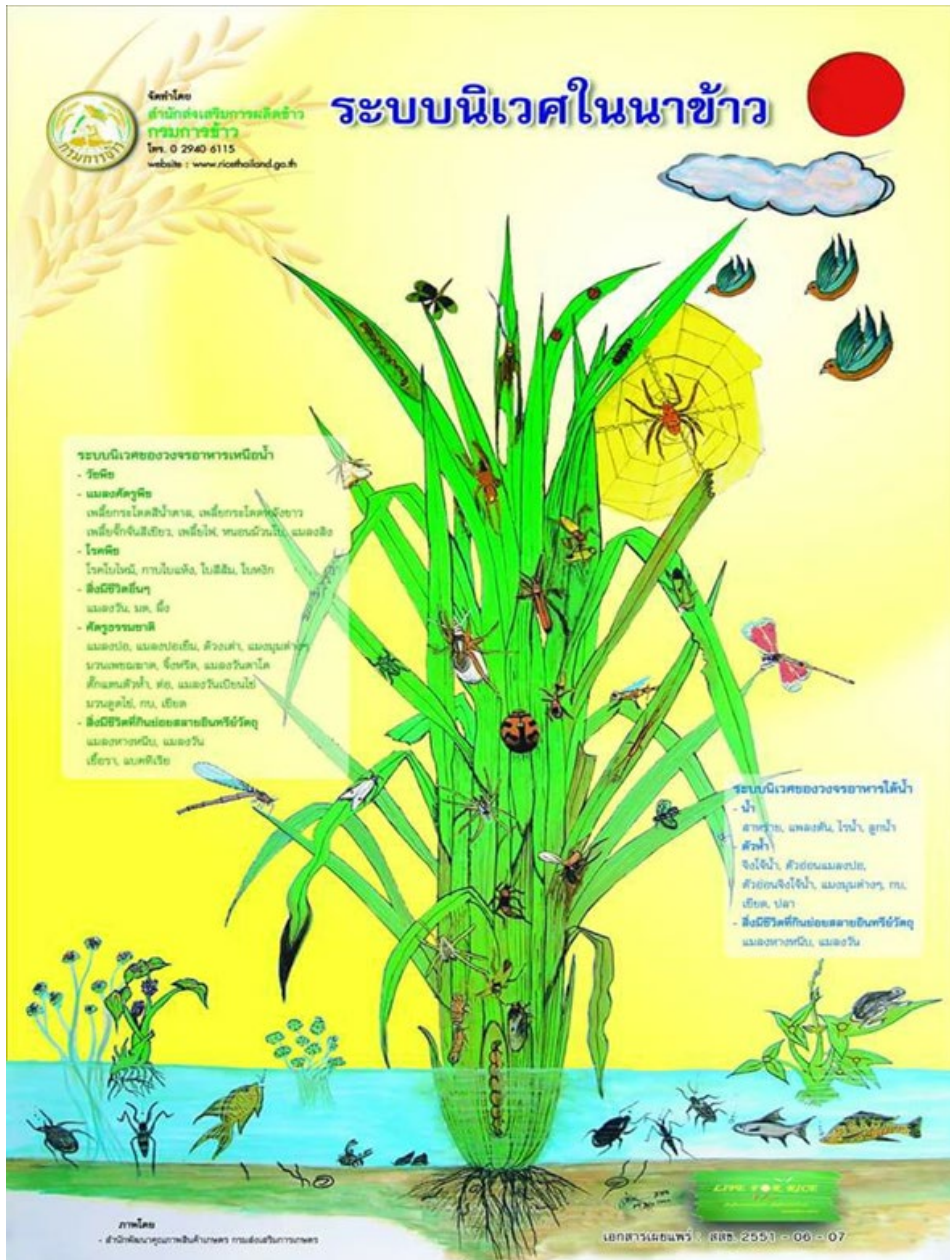


By :

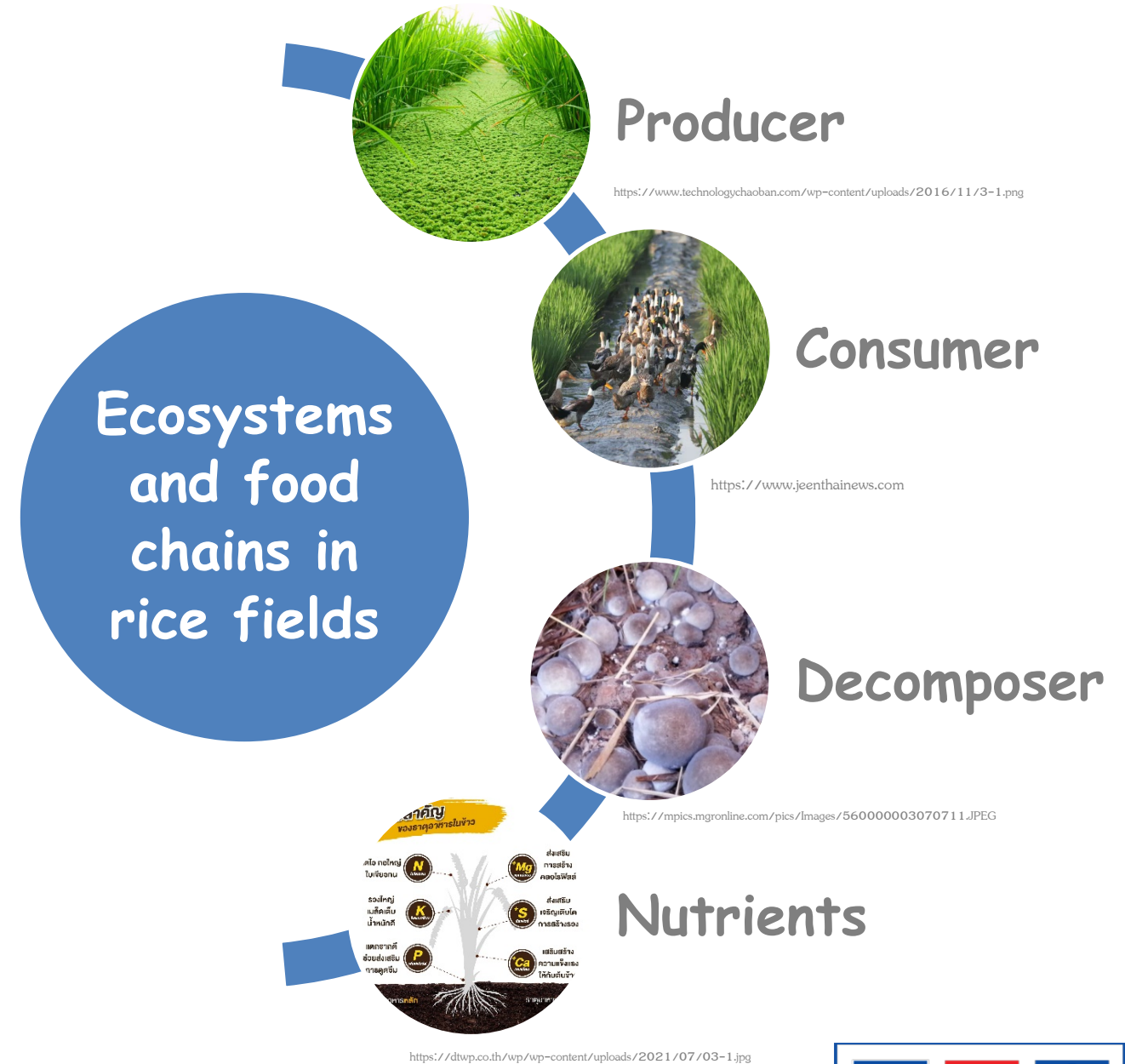


Maejo University International College





ที่มา: สำนักส่งเสริมการผลิตข้าว กรมการข้าว, 2551



food chain example



Rice



Mantis



Frog



Falcon

<https://yuinongluk.files.wordpress.com/2013/07/e0b8a3e0b8b9e0b89be0b8a0e0b8b2e0b89e11.jpg>

A complete ecosystem is a balance between all living things in the food chain. If there is too much or too little of any one type, the ecosystem will become out of balance and will affect other organisms.



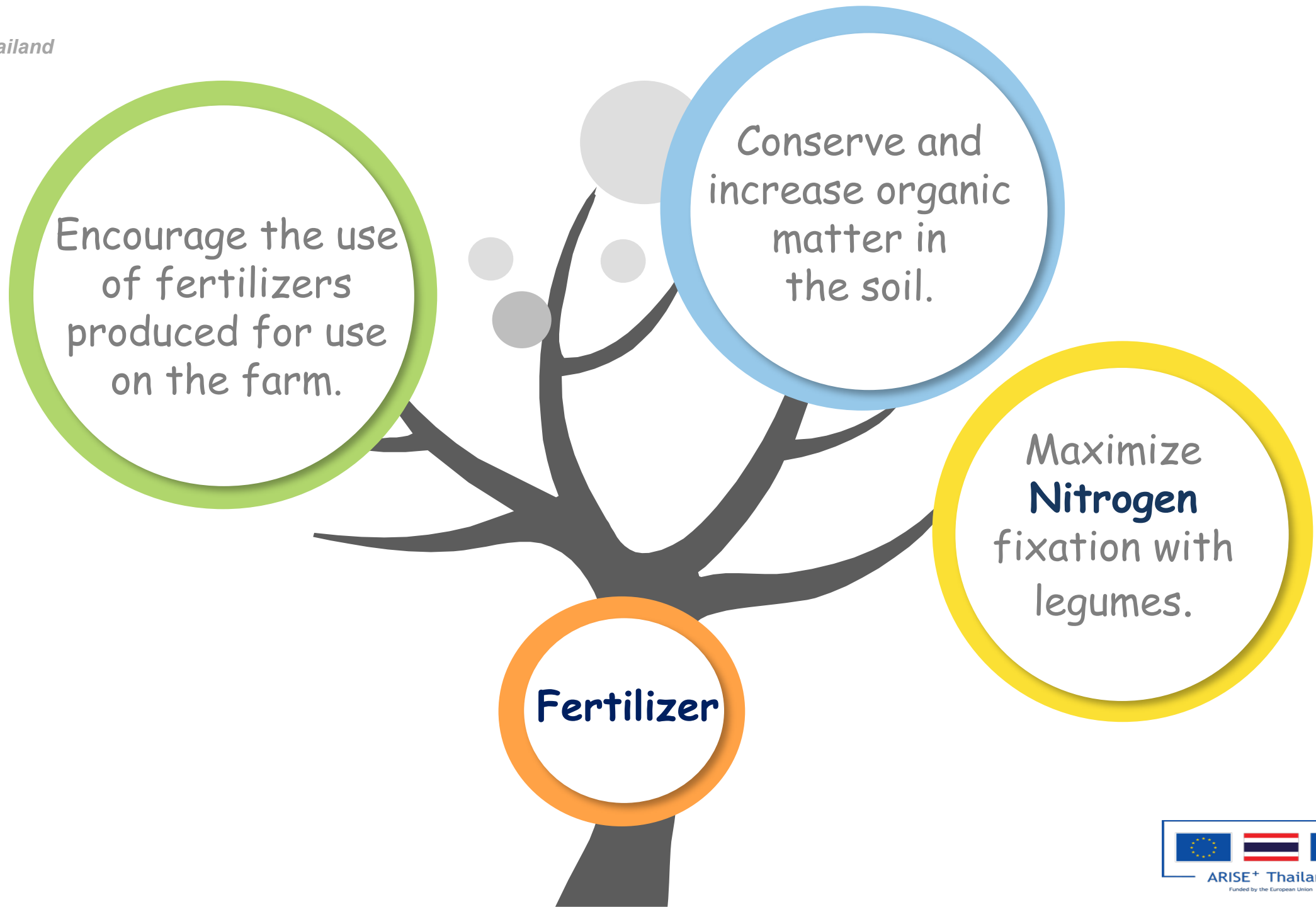
10 Rules

- 01 Do not use any synthetic chemical fertilizers.
- 02 Do not use chemical pesticides.
- 03 High diversity and no burning
- 04 Use organic seeds
- 05 Prevent contamination



10 Rules

- 06 Prohibit parallel production (organic vs conventional)
- 07 Must go through conversion period
- 08 Separate produce and label it.
- 09 Record and store documents.
- 10 Understanding and cooperation



Use of manure

- Use on plants that are not at risk.
 - Use more than **3** months before the first harvest: No fermentation required.
 - Not more than **3** months: **It must be completely fermented**
- Use on plants that are at risk, plant that its yield touches the soil.
 - Use more than **4** months before the first harvest : No fermentation required.
 - Not more than **4** months: **Must be completely fermented and must be able to display the composting record as well as the temperature record of the manure pile over a period of 15 days.**



<https://www.thaikbf.com/images/content/product/v2/pic-powder.png>



- Manure **must not** come from industrial farms.
 - Focusing on the fermentation process completely
- For a list of permitted substances, see Appendix A, Table A.1.

1. Fertilizer



- Manure **must not** come from industrial farms.
- Use manure not more than 170 kg N/ha per year or cow manure 2,176 - 2,720 kg/rai/year.

For a list of authorized substances, see Implementing Regulation (EU) 2021/1165 ANNEX II Article 24(1) of Regulation (EU) 2018/848.



- Focusing on the fermentation process completely
- For a list of permitted substances, see <https://www.omri.org/omri-search>

Examples of fertilizer application guidelines in rice fields to increase production efficiency according to soil fertility

Organic fertilizers are applied during soil preparation by plowing into the soil before planting rice

Green manure, such as legumes, African Sesbania, Sun Hemp are plowed before preparing the soil for rice planting.

Compost is used during soil preparation/plot preparation by applying bio-compost on the plot 2-3 handfuls/square meter before tilling the soil for the second round or before plowing.

Take a sample of the soil after harvest for analysis and send it to the government for inspection.

Examples of fertilizer application guidelines in rice fields to increase production efficiency according to soil fertility

Time to fertilize

Photoperiod sensitive rice Should be applied 2 times, the first time during the transplanting period/in the sowing field 15-20 days after the rice germinates and the time when the rice is inflorescence

Rice is not sensitive to photoperiod Should be applied 3 times, the first period during seeding/in the sowing field 15-20 days after rice germination, during the period of maximum tillering and the period when rice is inflorescence.

Fertilizing methods such as sowing fertilizer and raking before planting, or sowing when rice begins to grow, when rice matures and when the ear is soft.

Cultivation methods such as sowing dry rice, sowing sludge, transplanting paddy field

1. Fertilizer

Caution

External inputs, including the use of green manure and cover crops, need to be approved by the certification body and documented in order to comply with organic production rules.



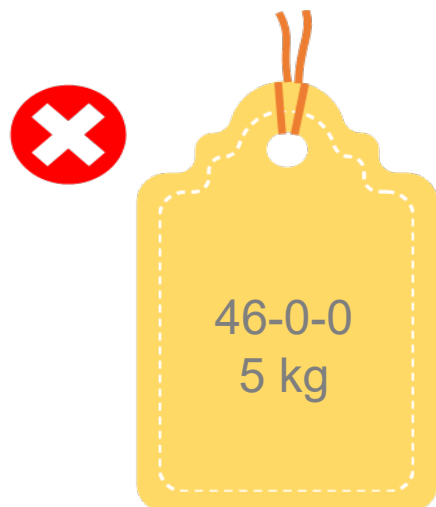
<https://www.thailandplus.tv/wp-content/uploads/2022/04/514921-e1650345331182.jpg>



https://www.mitrpholmodernfarm.com/public/images/uploads/87d2c0e7_4de648aed94e7a4086747258d6558e10.jpg

1. Fertilizer

Frequently encountered problems



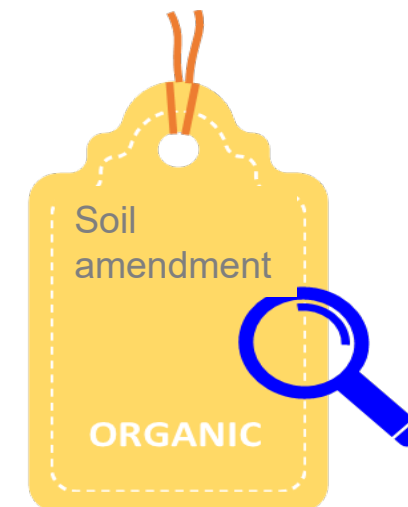
still use chemical fertilizers
(Always say just a little use)
in the part that doesn't sell to
the group / for self-consumption



"I'm afraid that I won't
get the product."
"I'm still not confident.
Let me use it a bit."



government sector or
a project to distribute
organic fertilizers to use



Believe the merchant or
neighbor that it is organic
fertilizer. Misunderstanding
that it can be used



**It must be checked from the authorization list of the standard
and must always seek approval before use**



2. Pest and weed control

Do not use any chemical pesticides such as herbicides, insecticides and disease-causing agents.

Use natural enemies

Use a machine tool

If it is necessary to use pesticides, it **must be used organic pesticides.**

2. Pest and weed control

The use of microbes

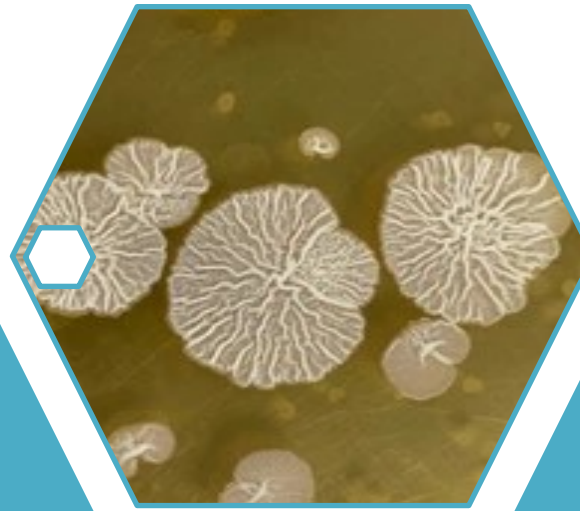


<https://biologicvine.co.za/wp-content/uploads/2018/05/>

Bacteria destroy insect pests and plant pathogens.

Bacillus thuringiensis

Bacillus subtilis



<https://www.shutterstock.com/>

The virus destroys insect pests.

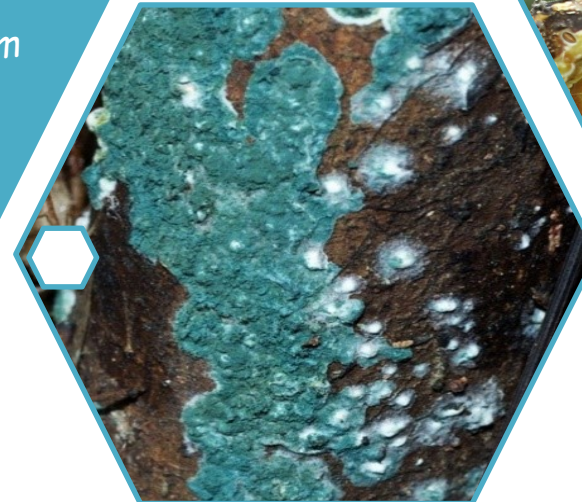
Nucleopolyhedro Virus



https://www.business.qld.gov.au/_data/assets/image/00411/267989/NPV-infection.JPG

The fungus destroys plant pathogens.

Trichoderma asperellum



<https://www.allkaset.com/>

The fungus destroys insect pests.

Beauveria fungus

Metarhizium fungus

2. Pest and weed control

Using natural enemies of rice pests



Lynx spider

https://upload.wikimedia.org/wikipedia/commons/thumb/1/17/Oxyopes_javanus-Kadavoor-2016-06-17-002.jpg/1200px-Oxyopes_javanus-Kadavoor-2016-06-17-002.jpg



Damselfly

<https://images.pexels.com/photos/73800/azure-damselfly-damselfly-insect-blue-73800.jpeg?auto=compress&cs=tinysrgb&w=1260&h=750&dpr=1>

Parasite

Insects feed on the host insects, just like parasites or worms

- [Elenchus yasumatsui](#)
- [Parasitists and planthopper predators](#)
- [Anagrus flaveolus planthopper.](#)
- [Oligosita yasumatsui](#)
- [Gonatocerus sp.](#)
- [Telenomus rowani](#)
- [Temelucha stangi](#)
- [Psix sp.](#)
- [Snellenius sp](#)
- [Argyrophylax nigrotibialis](#)
- [Rice gall midge egg parasitist](#)
- [Rice gall midge pupa parasitist](#)
- [Rice leaffolder pupa parasitist](#)
- [Parasitiod - Rice leaffolder](#)

Predator

Insect-eating insects

- [Mirid Bugs.](#)
- [Chinese black mirid](#)
- [Ochthera brevitibialis](#)
- [Predatory Cricket](#)
- [Rove beetle](#)
- [Ophionea ishii ishii](#)
- [Lady beetles](#)
- [Long- horned Grasshopper](#)
- [Long-jawed Spider](#)
- [Lynx Spider](#)
- [Wolf Spider](#)
- [Argiope catenulata](#)
- [Damselfly](#)
- [Dragonfly](#)

2. Pest and weed control

Animal enemy of rice



<https://scontent.fcnx3-1.fna.fbcdn.net>

Pest of rice rats

- Big voles - Small voles
- Big field rat - Small field rat
- House mouse
- Long-tailed Rat
- Short-tailed rat



<https://s.isanook.com/ns/>

Destructive manner

- Damaged since the beginning of planting to eat the germinated rice grains.
- The rice germinated until the tillering stage.
- The grain breaks off the stalks or necks and eats the seeds from the ears.
- Collecting ears of rice in the nest for food after the harvest season.



<https://cdn.esan108.com/main/wp-content>

Rice pest control

- Trapping using different types of traps
- Digging rats for rice plantations with enough labor and time.
- Rat siege after harvest
- Making a fence or enclosing a fence in conjunction with the use of stealth or cage traps
- The use of natural enemies such as snakes, barnacles and owls helps to get rid of rats.



<https://cdn.chiangmainews.co.th/wp-content/uploads/2017/12/07090442/B8-4.jpg>

Channeled snails

- Adults 3 months old can breed and lay eggs.
- The eggs are pink, clinging together in groups of 388 - 3,000 eggs per group.
- Eggs are laid in a dry place above the water level, the eggs hatch in 7 - 12 days.



<https://fishingthai.com/wp-content/uploads/2021/07/golden-apple-snail-21.jpg>

Destructive manner

- Likes to eat the young rice plants from the germinated rice or from before the transplant to the tillering rice.



<https://encrypted-tbn0.gstatic.com/images>

Prevention

- Choose the method of transplanting using seedlings aged 25-30 days.
- Make artificial channels around the plot to lure the snails to gather and destroy them.
- Every time water is pumped into the field, a cast is used to block the scum and large clams first and then block the other layer with a mesh net.
- Remove shellfish and egg clusters from previous seasons.
- Plant bamboo along the sides of the rice fields to lure snails to lay eggs and collect them to destroy them.
- Collect mollusks and egg clusters at least once a week.
- Release ducks to chase the field down to eat shellfish.



https://birdsofthai.kku.ac.th/wp-content/uploads/2021/09/DSC_7170.jpg

Rice Pest Bird

- Kratied pied lark
- White-rumped Kratied
- House sparrow
- Tan sparrow
- Great sparrow
- Common sparrow
- Golden Warbler
- Javanese Bird
- Dove Dove
- Wild Pigeon



<https://mpics.mgonline.com/pics/Images/563000010740601.JPEG>

Destructive manner

- The birds will destroy the rice from the beginning of the new sap until the pre-harvest stage.



<https://www.tipsza.com/wp-content/uploads/2015/08/Stop-Bird1.jpg>

Prevention of rice pest birds

- The use of repellents
- Using sounds to scare birds away, such as using firecrackers.
- Use vision, such as using objects that move when the wind blows. or objects that can reflect light
- Preventing birds from entering, e.g. using netting



<https://itp1.itopfile.com/ImageServer/bd5a53dd6a0a1f84/0/0/iTopPlus446521372064.webp>

Weed

- Narrow-leaved weeds, grass genera, are more of a problem than broad-leaved and aquatic weeds.
- Weeds in paddy fields may refer to paddy rice, paddy rice, paddy field vegetables, paddy legs, sand sedges, etc. that grow in paddy fields.
- It could be other rice varieties such as leer rice and weed rice.



https://image.tnews.co.th/newscenter/images/userfiles/images/tnews_1505180420_823.jpg

Methods for controlling weeds in the field

- Choose a rice variety that can compete with weeds.
- Crop rotation plowing before the weeds bloom.
- Use about 10 - 20 kg of seed per rai.
- Determine the rice planting period.
- Weeding by manual weeding twice at 15 and 30 days after germination.

2. Pest and weed control



For a list of permitted substances, see [Appendix A, Table A.3.](#)



For a list of permitted substances, see [Implementing Regulation \(EU\) 2021/1165](#)
ANNEX II Article 24(1) of Regulation (EU) 2018/848



For a list of permitted substances, see <https://www.omri.org/omri-search>

3. Sustainable and environmentally friendly production

✓

Do not burn stubble, rice straw and organic waste in the rice fields.

✓

Stubble, straw and organic waste should not be removed from the fields.

✓

The soil should be analyzed annually and the pH of the soil should be corrected to suit the growth of the rice plants.



<https://static.thairath.co.th/media/4DQpJutzLUwmJZZSBzwRxrPytoPu5EW7qvrUTidjmev.jpg>

3. Sustainable and environmentally friendly production

✓ There are a variety of plants and animals in the rice fields according to their utilization, for example:

- Diversity of natural enemies of insect pests such as dragonflies, spiders, snail-eating birds, etc.
- Planting grass or lemongrass on the rice fields is a buffer line.
- Raising animals such as shrimp and fish in the fields



<https://coachnong.com/wp->

[content/uploads/2018/02/%E0%B8%81%E0%B8%B8%E0%B9%89%E0%B8%87%E0%B8%9D%E0%B8%AD%E0%B8%A2.jpg](https://coachnong.com/wp-content/uploads/2018/02/%E0%B8%81%E0%B8%B8%E0%B9%89%E0%B8%87%E0%B8%9D%E0%B8%AD%E0%B8%A2.jpg)



<https://www.bansuanporpeang.com/files/images/user6602/P1550685.JPG>

3. Sustainable and environmentally friendly production



Crop rotation is where different crops are planted on the same area in rotation without leaving the soil empty.

- Selection of crops for use in the crop rotation system.
 - Crop rotation, alternating deep roots with shallow roots.
 - Rotate legumes with plants that need more nitrogen.
 - Plant plants that can suppress weeds.
- Cultivate plants that are resistant to different diseases and pests.
- Grow plants suitable for soil and climate conditions.
- Cultivate balanced forage and money crops.



https://www.ricethailand.go.th/rkb3/weed_m003-2s.jpg

4. Seed

Rice seeds and other crops planted in the area.

Recommendations and precautions

Rice seeds and other crops planted in the area.

Do not mix with chemicals

Do not use genetically modified seeds.

Use seeds from organic sources that are certified according to the organic standards for which you are applying for certification. If you can't find it, you must have evidence.



For EU standards

Approval is required before use.

If used without applying for permission before planting 3 times, certification will be canceled.

Common problems

Propagation comes with nursery soil.

No evidence is provided in case the source of organic seedlings cannot be found.

Missing record / purchase document / source cannot be found.

Self-grown, grow little, grown by workers, but the farm owner did not follow-up.

It was given freely, from friends and neighbor.

Permission was not ask before use.

Mix the seeds with drugs.

Recommendations and precautions

Should be bought in groups, or produced together within the group.

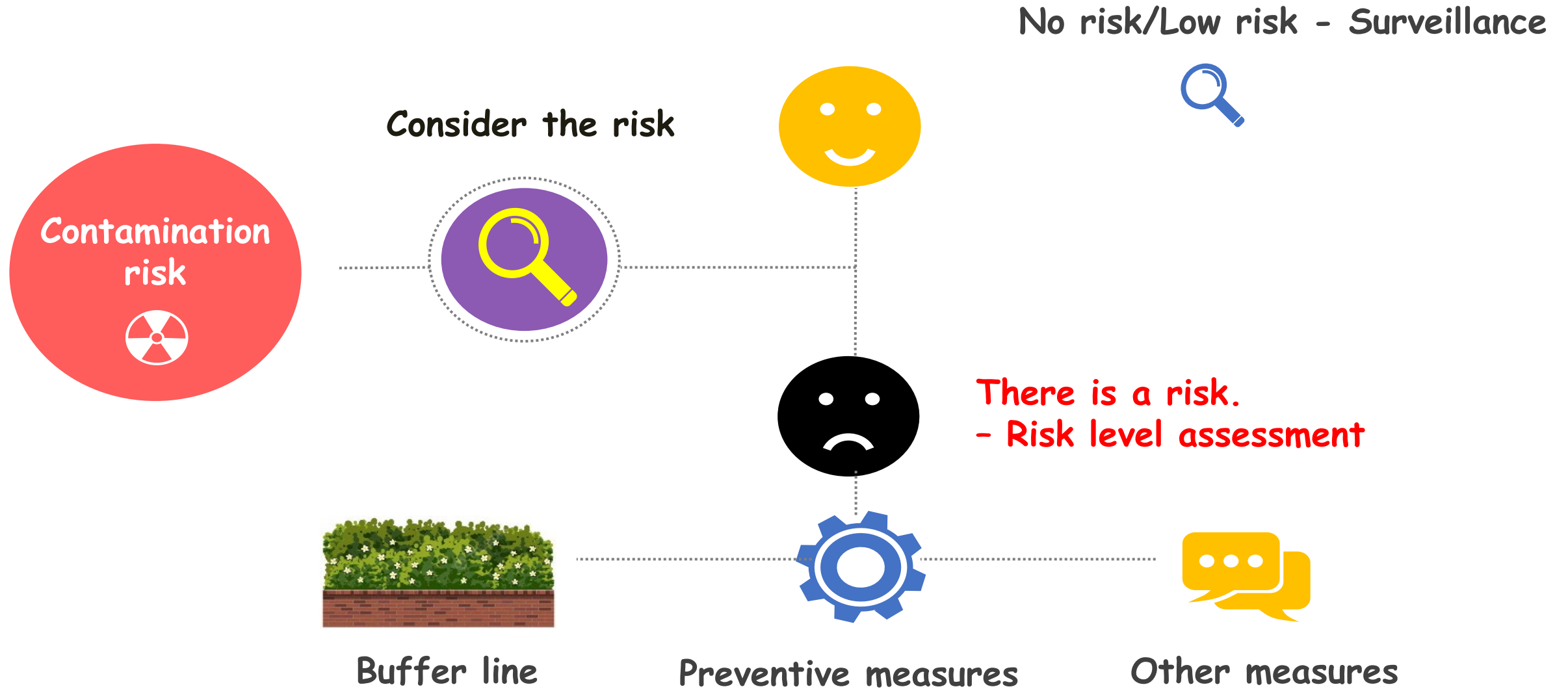
The regulations must be strictly followed even if the plants are grown for personal consumption.

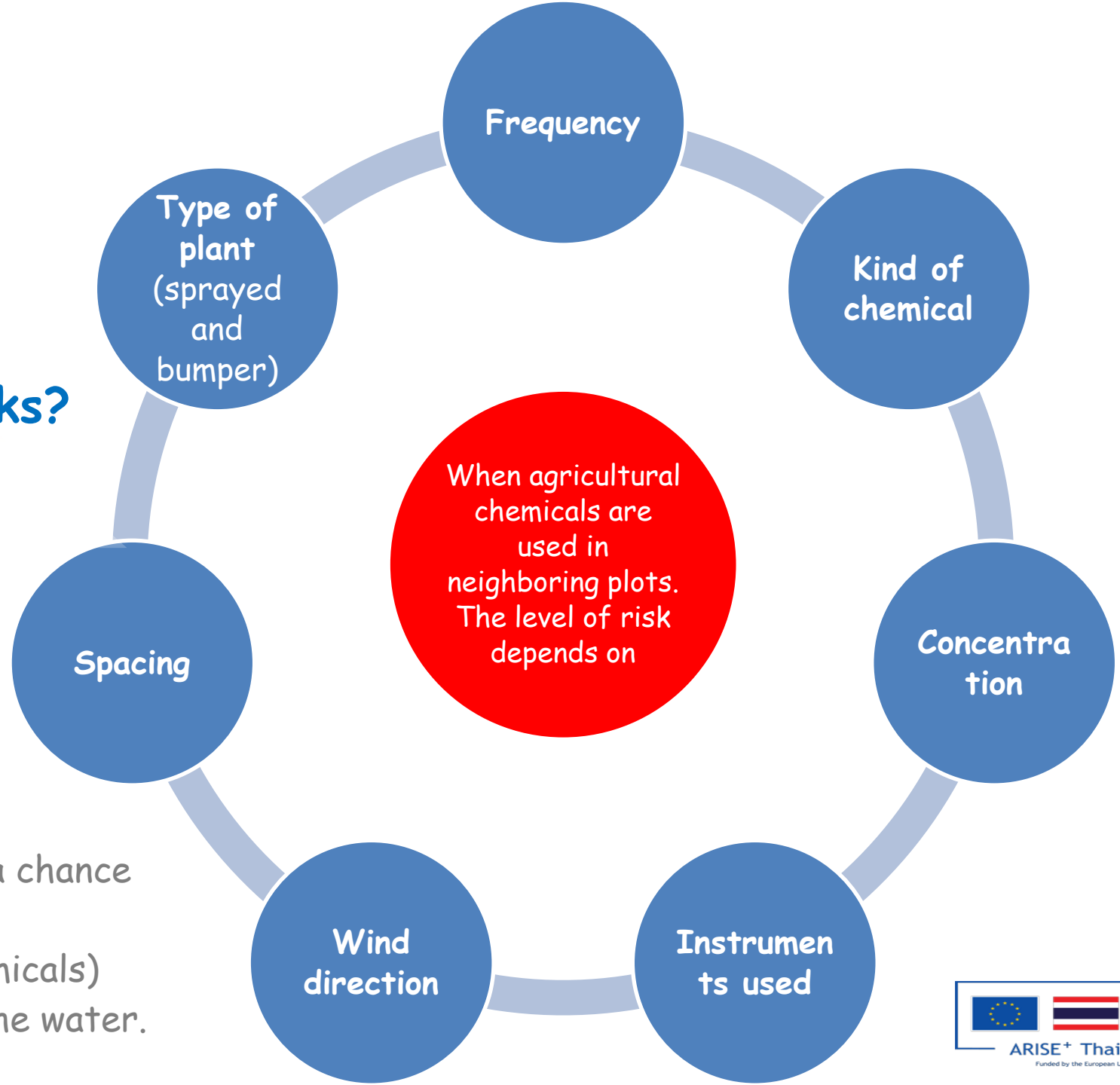
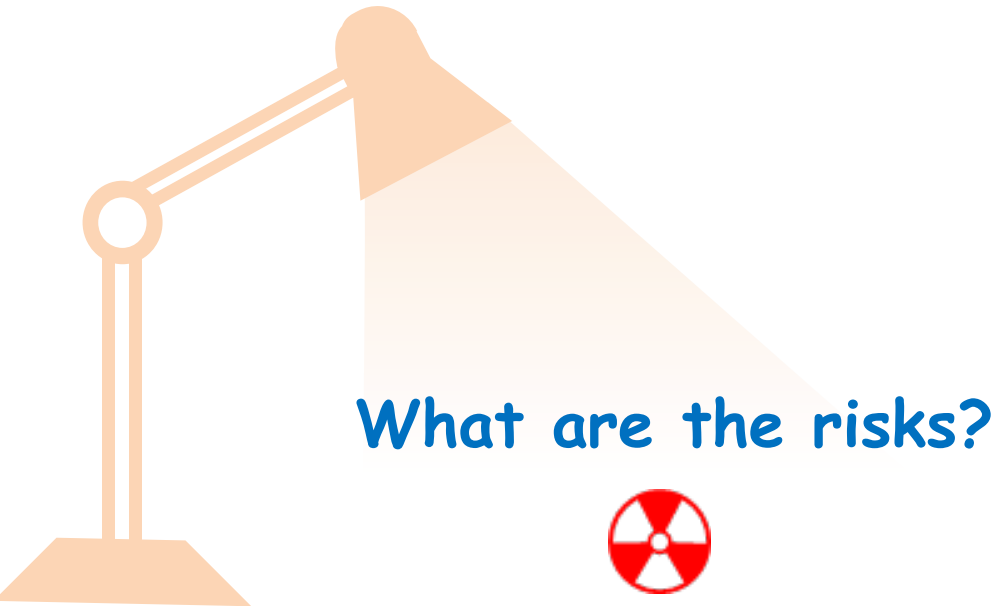
The source of origin of all plants must be recorded.

If you are not sure whether the seeds used meet the certification standards, ask the inspection unit first, or keep some seeds for the inspector to review during visit.

Rice seed should be soaked in neem water for 2 days to get rid of gall midge and other insects from the seeds.

5. Avoid contamination





In sloping areas, there may be a chance that the chemicals used (chemical fertilizers and chemicals) from the upper plot flow down the water.



<https://scontent.fcnx3-1.fna.fbcdn.net/>



Planting crops as a buffer line,
such as grazing grass, fast growing shrub.

Roads or ridges that are farther away
from neighboring plots of at least 1 meter

What can be a buffer line?

Cash crops or agricultural crops
that are not certified

Rice planted as a buffer line, must be
a different breed with noticeable difference.

(Be careful! produce must be
clearly separated, labeled, and recorded.)





Measures to avoid contamination of water used in rice fields

- Water sources should conserve water used in rice fields. The water used for planting must be obtained from a source that does not have an environment that contributes to hazardous material contamination.
- There should be a water reservoir, water filtering plants should be planted.



Other measures

- Discuss to neighboring farmers to jointly find solution.
- Signing a joint agreements
- Community regulation, etc.

6. Parallel production

Farmers with multiple plots of land with organic rice production plots alongside other plots that have not yet been certified have 2 cases.

Plots of organic rice with other plots growing other crops chemically.

Organic rice plots with other plots that grow non-organic rice.

Plots of organic rice with other plots growing other **conventional crops**.



It will be permitted with
the following conditions

Different harvesting, transportation
and packaging containers
must be arranged.



Tools and equipment
must not mix.

Keep the production input
factor separate and clearly
label them.



Separate related
documents.

6. Parallel production



Organic rice plots with other plots that grow **conversion periods** or **conventional production** rice.

- **Permitted** the same applies to the case when other plots are conventional productions with other crops and additional conditions like...
- Store organic produce separately from products from conversion period and products from conventional production by
 - Separate storage area
 - Put a label indicating the organic status (organic, conversion or conventional) of the produce on the containers.

6. Parallel production

Organic rice plots with other plots that grow **conversion period** or **conventional production** rice.



- **Not permitted** In case of other conversions to conventional rice
- **Permitted** In case the other plots are rice during the **conversion period** and there is a good post-harvest sorting system.

Frequently encountered problems

The case of **organic** parallels with **conventional**

- Information is not disclosed / Concealed
- Misunderstood / Miss out
- Sell them together

The case of **organic** parallels with **conversion**

- Harvest simultaneously
- Harvested together / No specified label
- Sell them together

7. Conversion period



An conversion period of rice	12 month before harvest	24 month before Planting	36 month before harvest
Beginning of the conversion period	Date of application for certification with the inspection agency	The date the contract is signed or the date of the first internal inspection.	Last day to use banned substances

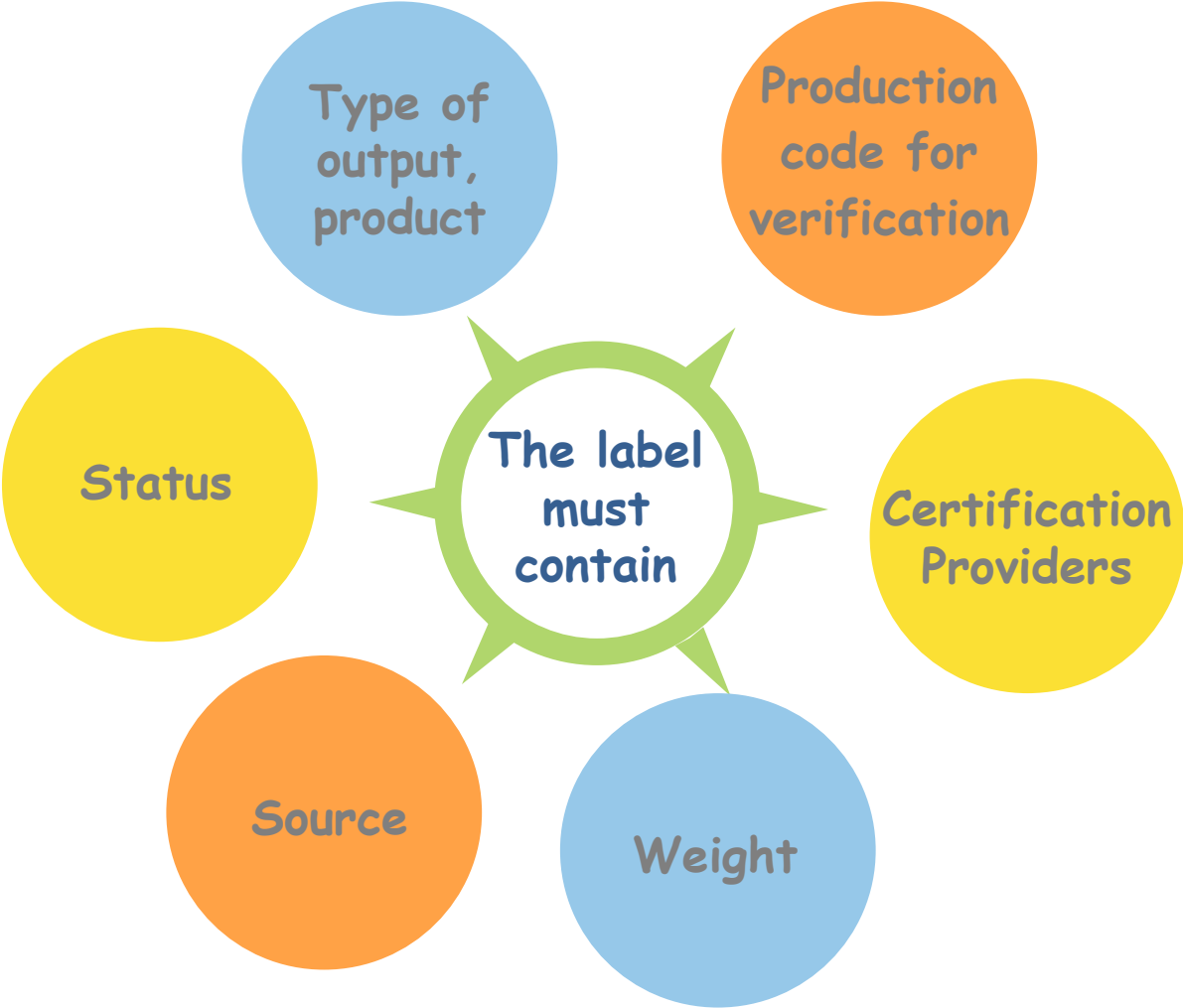
In case there is evidence of not using prohibited substances in the previous period, the duration of the conversion period can be reduced.

8. Separation of output and labeling

- Organic produce must be displayed separately from other production at all stages, from harvesting and storage, it must be labeled to see the organic product symbol during storage and transportation every time.
- In cases where the product is stored in separate bins, a label symbol must be made, and the symbol must indicate the source (e.g. name, farmer ID, plot ID). Status (e.g. organic or conversion) and certification providers.

8. Separation of output and labeling

- Use only new packaging and display labels to store organic produce.
- Do not use old fertilizer bags or bags that are not used for food containers.
- Separate them during the production of "conversion" and "organic" produce.



The label

Product	Organic rice
Source Production ID	Phayakkhaphumphisai District Organic Rice Producers Club Mrs. Yindee Sukjai 3-2-78-11 T2
Status	Yield from second-year conversion (T2)
Certification provider	CERES GmbH TH-BIO-140

9. Prepare records and related documents

- These records can be in a simple form that suits the farmer.
- But it is necessary to keep the record current and regularly.
- At the time they should be kept for internal and external inspections.

9. Prepare records and related documents

The standard requires the farmers to keep records of their farms and production

- Farm records
- Farm Location Map
- Record of yields and distribution
- Purchase and sales receipts

Farm Records

- Activities in Each Farm
- Activities in sub-plots
- Activities of Each Plant
- Daily Activities
- Others

Pictures

Production Factor

- Seeds
- Compost/Fermented water
- Soil amendments
- Biological substance
- Others

Receipt

Harvest / Sales

- Each crop must have it
- Specify the plot and day
- Sent for packaging/processing
- Sales record
- Others

Sales Document

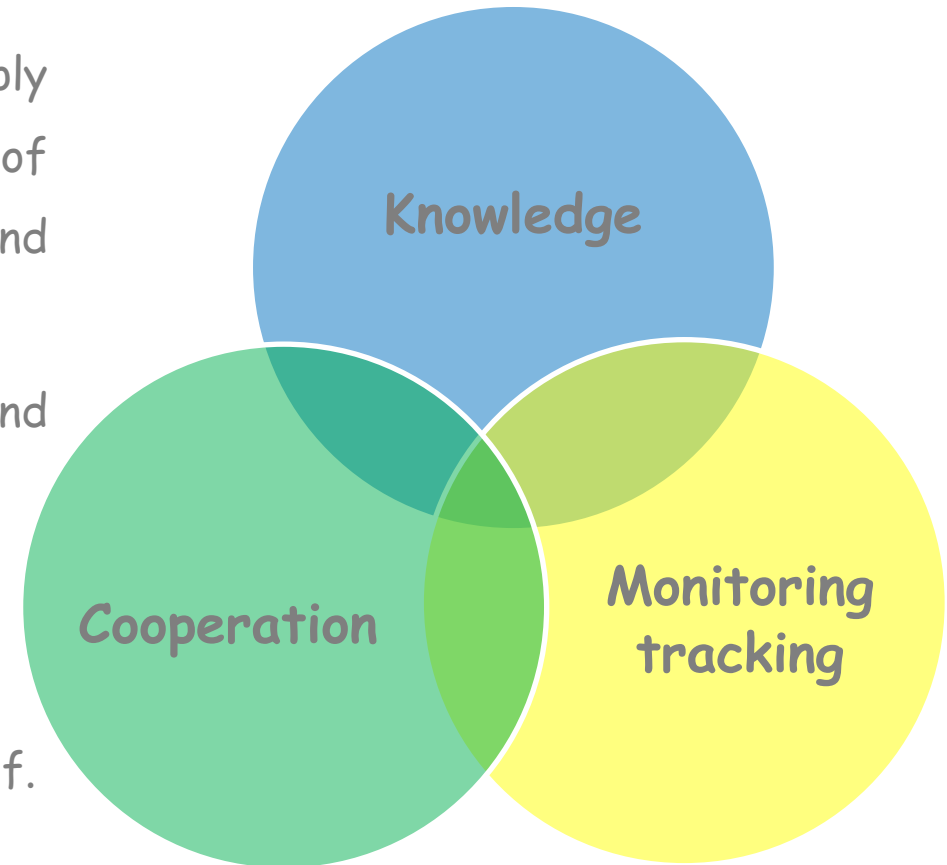
Post Harvest (If any)

- Washing
- Packaging
- Storage
- Delivery
- Others

Record/Form

10. Cooperate in internal and external inspections.

- ❖ There must be standard documents that farmers can apply for certification or documents on the requirements of groups that farmers are members of and study and understand.
- ❖ Must have sufficient knowledge of both regulations and techniques of organic farming.
- ❖ Daily operations
- ❖ Job tracking record
- ❖ Internal inspection of groups that farmers are members of.
- ❖ External inspection of certification body inspectors





10 Rules

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- 02 Do not use chemical pesticides.
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10 Rules

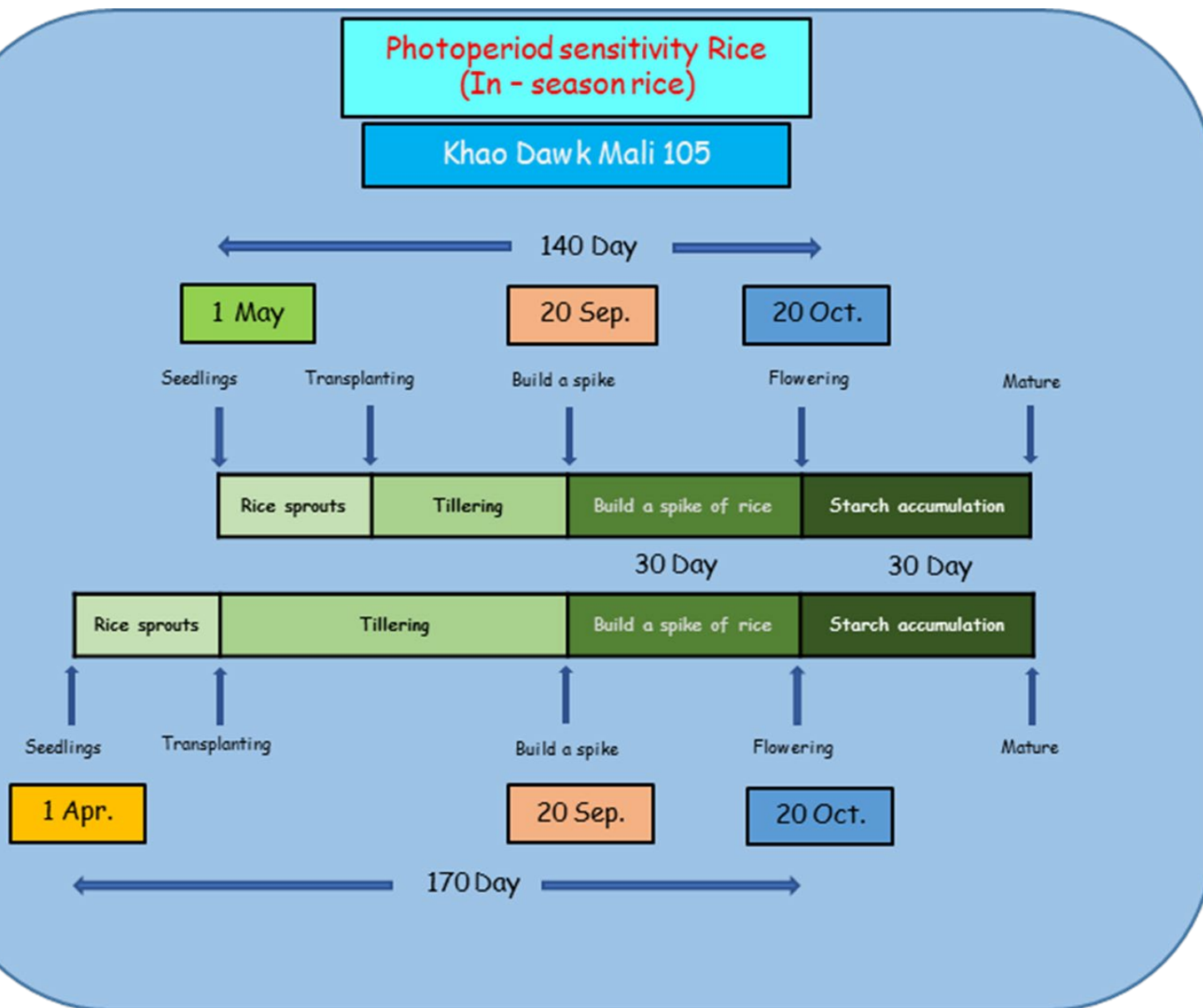
- 06 Prohibit parallel production (organic vs conventional)
- 07 Must go through conversion period
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The production of organic rice to achieve good yields and meet standards requires careful care.

It is divided into 4 steps as follows:

- 1.The process of planning the production of organic rice.
- 2.The process of growing organic rice.
- 3.The process of managing organic rice during the tillering, gestation and budding stages.
- 4.Post-harvest handling procedures

1. The process of planning the production of organic rice



Should understand "rice production season cycle"

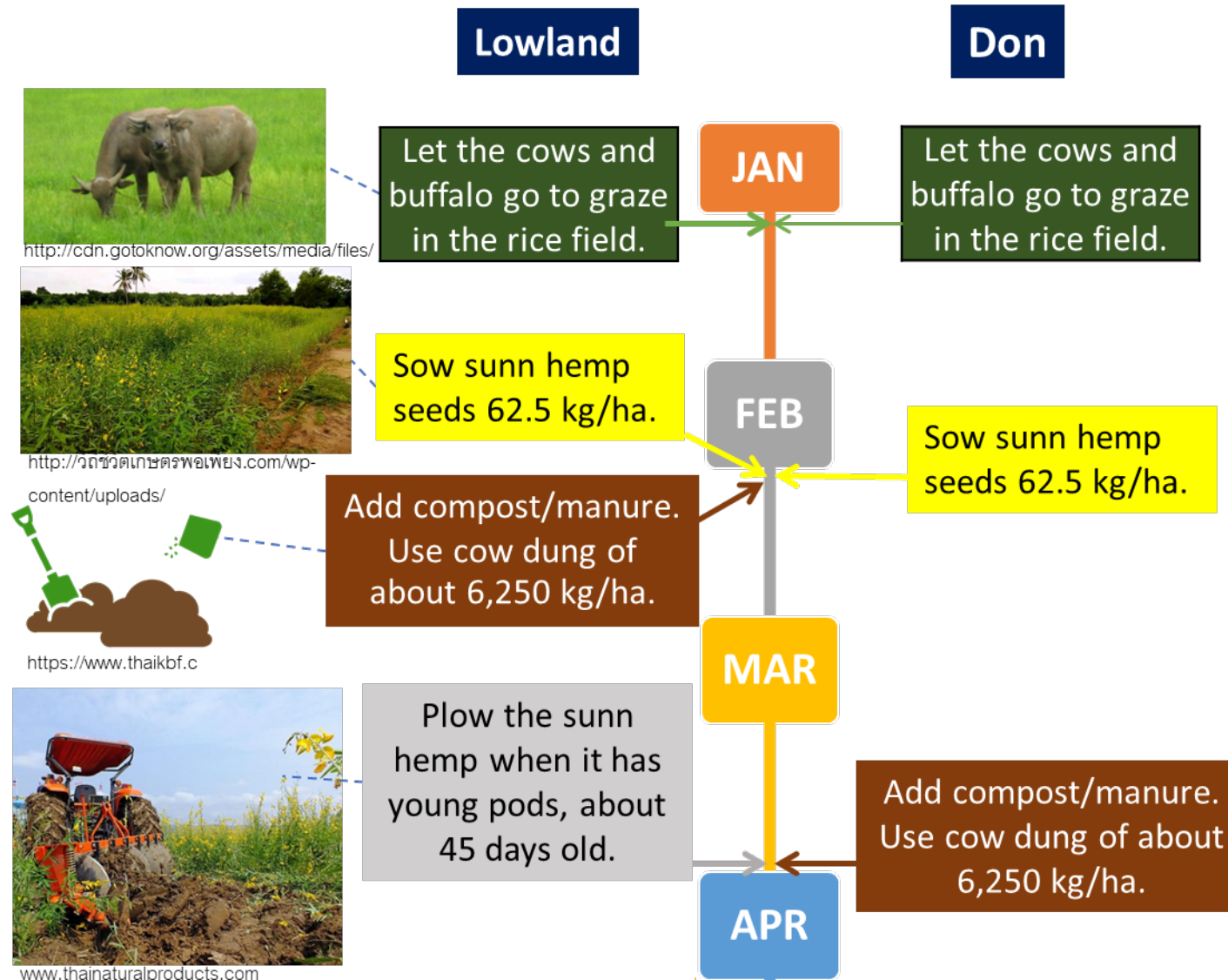
What are the rice varieties selected for planting in that area?

Divided according to the characteristics of flowering that can be classified into 2 types:

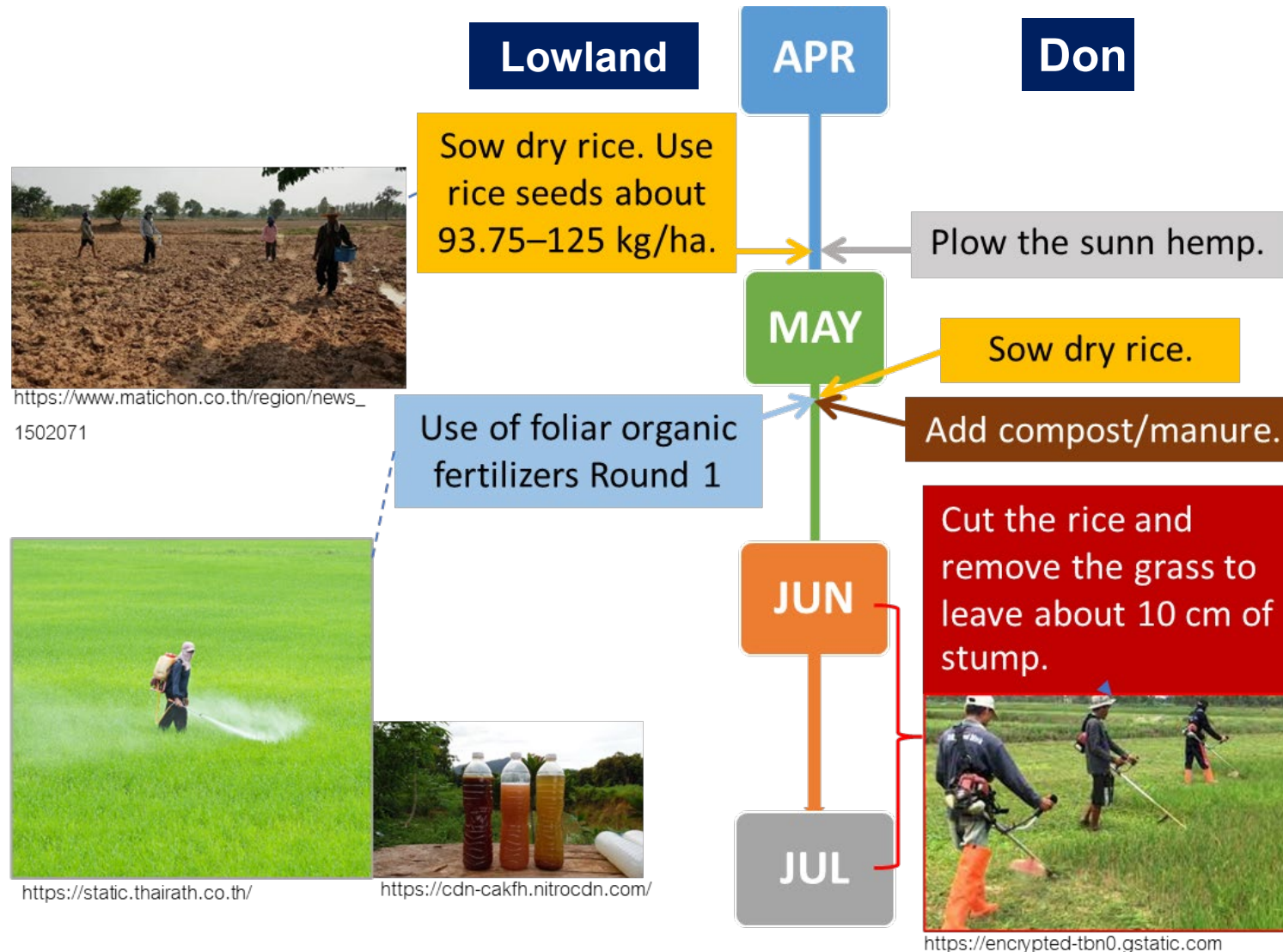
- Photoperiod Sensitive Rice (National Rice)
- Rice is not sensitive to photoperiod (Can be grown all year round)

Showing the production cycle of Khao Dawk Mali 105 rice, which is a rice that is sensitive to photoperiod, it can be seen that it has been planted since April, starting to flower in October.

An example of a standard organic rice planting plan for rainwater fields in lowland and on the don of the Northeast will have the following rice production cycles



An example of a standard organic rice planting plan for rainwater fields in lowland and on the don of the Northeast will have the following rice production cycles





<https://www.chaipat.or.th/site-content/item/6420-9-2557.html>



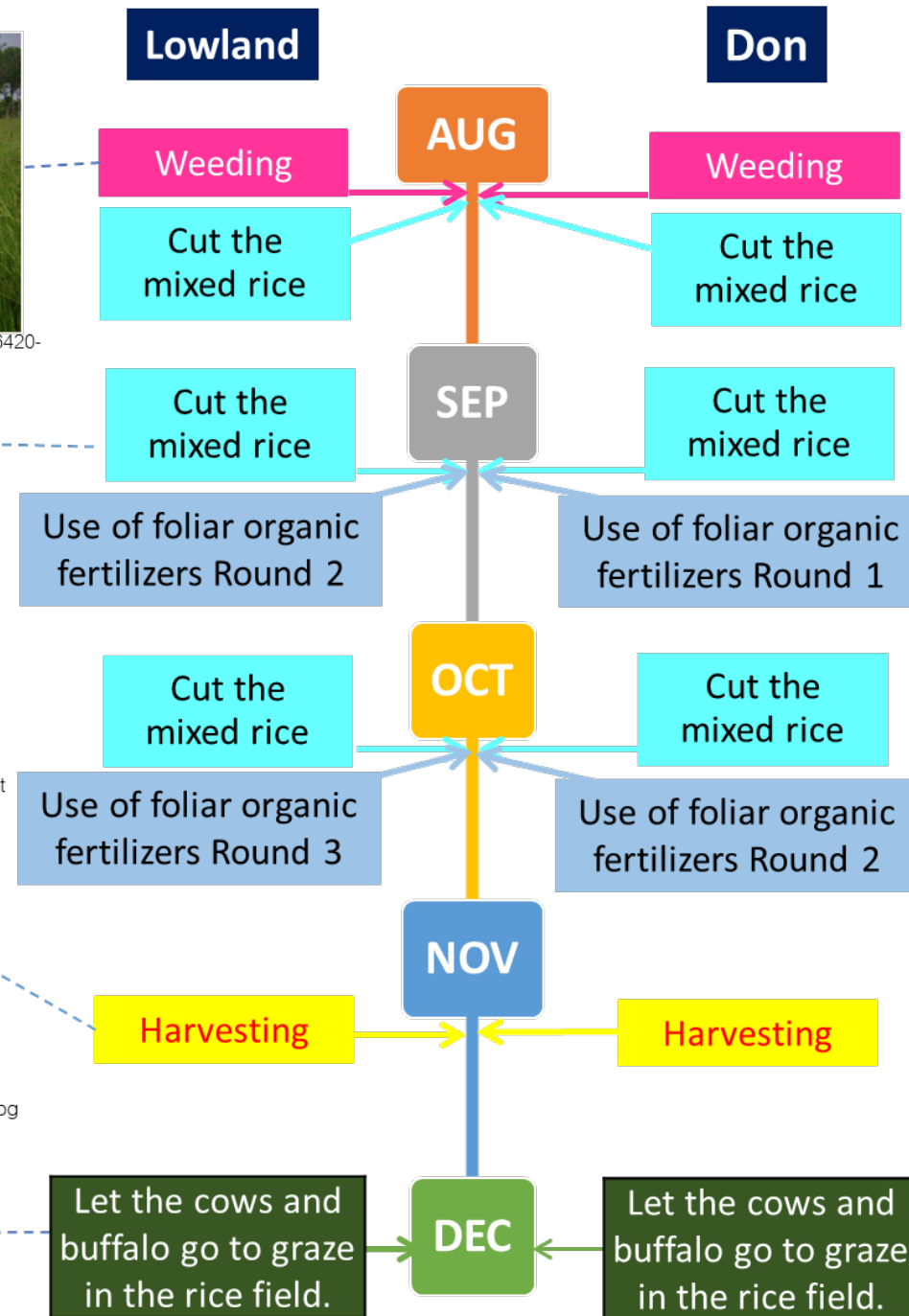
https://rsdb.hrdi.or.th/Uploads/10/document/25630806_113910.pdf



https://farmkaset.org/upload_files/kaopon.jpg



<http://cdn.gotoknow.org/assets/media/files/>



1. The process of planning the production of organic rice

Organic rice cultivation on the don compared to lowland area

Problems encountered:
less water, a lot of weeds.

Problem solving planning

Choose drought tolerant varieties that grow fast.

Sowing dry rice to wait for rain

On the don rice is planted later than to Lowland area rice in order to stay in the rainy season and have more water in the uplands.

In upland fields, rice and grass grow together about 1 month after sowing.

Cut the rice and grass at the same time, leaving about 10 cm of stubble.

2. The process of growing organic rice.

There are several ways to grow rice, for example:



Transplanting of Rice Seedlings

Single line transplanting of rice seedlings.

Sowing dry rice seeds

Sowing of germinated rice or Flooded rice field

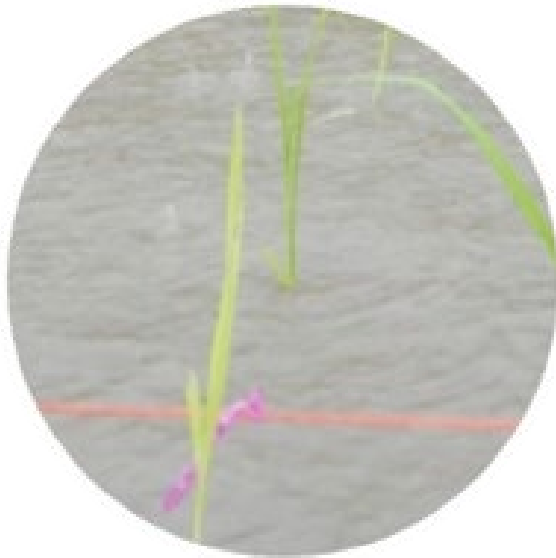


Transplanting of Rice Seedlings

- It is most suitable for organic rice production.
- Seedlings used for transplanting should be about 30 days old.
- Use a frequent planting spacing more than the general recommended planting spacing for rice cultivation.
- The number of seedlings should be 3 - 5 plants per hole. However, if the fertility of the field soil is low, it is recommended to use a narrower distance.

Single line transplanting of rice seedlings.

It is a method of rice cultivation that has become more popular in modern times with the following principles:



<https://www.hrdi.or.th/Articles/Detail/17>

01

Do a single line transplanting of the rice seedlings when the rice are not more than 14 days old.

02

Plant the rice in a way that the roots are parallel to the ground. Reduce the spacing, such as 30 x 30 centimeters.

03

Improve soil fertility with organic matter.

04

Reduce and control irrigation such as, alternating between wet and dry irrigation. But there's often a problem of labour shortage, which delays the planting

Sowing dry rice seeds

This method is commonly done in rainwater fields

Dry grain is sown in dry soil conditions because it has not rained yet.

After the last plowing, the grain is sown without rake.

The seeds will fall between the surface of the soil.
The rice will begin to grow

In some area after sowing dry rice, it is raked or ploughed.

In addition, they sown after plowing. By sowing in a rainy conditions

The water begins to trap in the rice field. Once plowed, the grain is sown and raked over immediately.

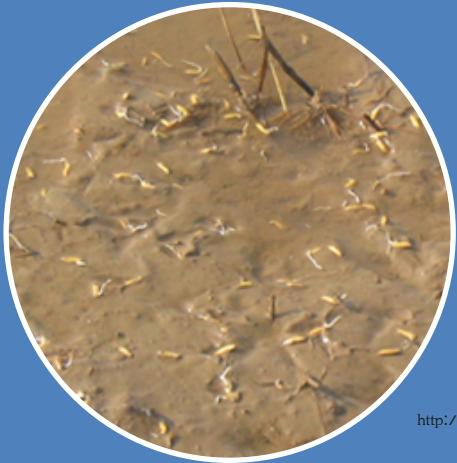


<https://www.youtube.com/watch?app=desktop&v=SCZagsYQVnE>

Sowing of germinated rice or Flooded rice field

Taking the seeds that have been cultivated to germinate (with roots germinating about 1-2 mm) to sow into the field.

Sowing of flooded rice fields that will yield good results should be done as follows:



<http://www.ricethailand.go.th/rkb3/title-index.php-file=content.php&id=2-8.htm>

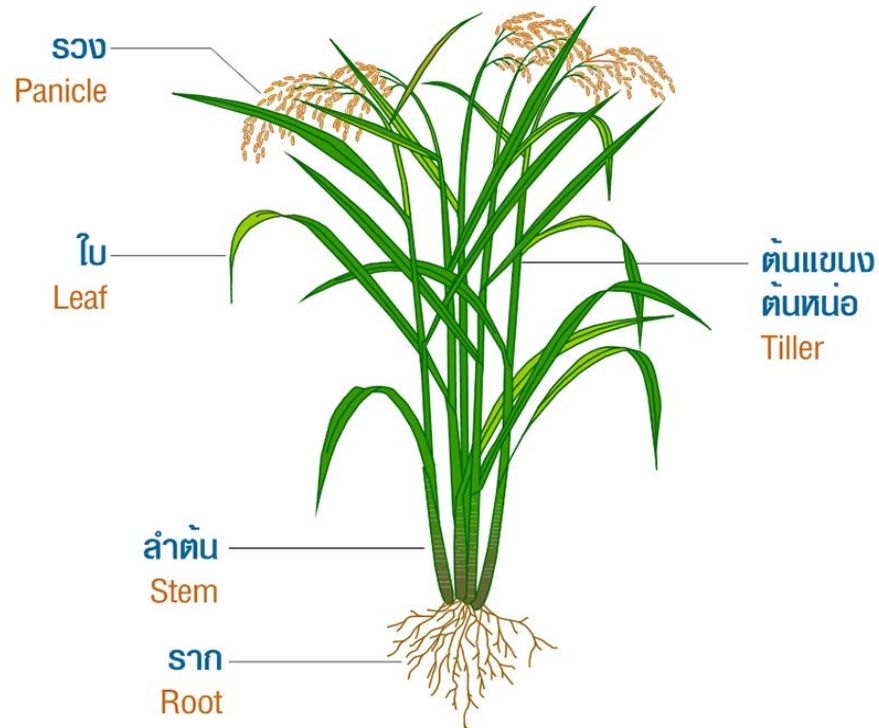
- Uniformize the fields
- Surround the rice field with canals, so can control the water.
- After harvesting the rice, allow the fallen grains in the field to germinate into the rice and then plow.
- Always let enough water in to the rice field to keep the soil moist. This is to allow the weed seeds to grow into destroyed young plants before releasing water into the fields, then plow and rake to destroy the weeds.



<https://www.lazada.co.th/products/-i3491352703.html>

- After the plowing and raking are completed. Keep water in the field for about 3 weeks, to allow water weeds to grow into destroyed young plant, then rake them thoroughly, the weeds will stick to the rice field and can be scooped out.
- When harrowing, drain the water and adjust the slopes evenly. For those who smash rice straw or knead rice straw to sink into the soil instead of plowing, after treading, water should be soaked to allow the straw to rot until the heat is exhausted, at least 3 weeks and then start again

3. The process of managing organic rice during the tillering, gestation and ear budding stages



<https://inwfile.com/s-db/97e5ds.jpg>

Taking care of the growth of rice plants can be divided into 3 stages as follows

- Stage 1 The growth of stem and leaves
- Stage 2 Flowering growth
- State 3 Seed growth



<https://www.ricethailand.go.th/rkb3/rice%20growth%20stage.png>

Stage 1 The growth of stem and leaves

- The seedling stage starts from the rice germinating from the seed until tillering. This phase takes about 20 - 30 days.
- The tillering phase starts from tillering until it starts to produce flowers, and when the rice plant begin to have up to 5 leaves, this period depends on the rice species, such as
 - Jasmine rice 105, which takes 40 - 60 days.

Maintenance at this stage

- Nourish the soil to have good fertility.
- Make sure the water level is not too high and be careful of insect diseases.
- Spraying the fermentation hormone will help the tillering process.



<https://www.saranukromthai.or.th/pictures3/s3-17-1.jpg>

Stage 2 Flowering growth

- Starting from flowering, to pollination
- The period depends on the rice species, such as
 - Jasmine Rice 105, which takes 20 - 30 days.

Maintenance at this stage

- Nourish the soil to have good fertility.
- Make sure the water level is not too high and be careful of insect diseases.
- Spraying water hormones will help the rice grow.



<https://www.saranukromthai.or.th/pictures3/s3-17-1.jpg>

State 3 Seed growth

- ✓ After pollination of the rice flowers
- ✓ The grain starts to become milky and starchy until the grain is fully developed
- ✓ Taking 25-30 day, depends on the rice species.

Maintenance at this stage

- ✓ Mixed varieties of rice should be taken out of the plot, to enable get desired variety of rice.
- ✓ Keep watch on the water level when the grain is about to be fully grown to more aroma to the rice.



<https://www.saranukromthai.or.th/pictures3/s3-17-1.jpg>

Management of Mixed Rice

The separation of mixed rice is by removing rice plants that grew from another variety of rice, and mixed with the rice seed planted on the field.

How to check for removal of mixed rice

- The trench should be set aside for the inspection of the plot because the inspection of the rice plot must be done regularly.
- When other varieties of rice are found to have mixed with the planted rice, they must be uprooted even if the rice has already sprout.
- Mixed Rice should be cut off from the plot for about 4 - 5 times



https://farmkaset.org/upload_files/kaopon.jpg

https://rsdb.hrdi.or.th/Uploads/10/document/25630806_113910.pdf

Management of Mixed Rice

According to the growth stage of rice as follows

- **Seedling stage:** Notice the difference in leaf color height or disease.
- **Tillering stage:** Observe the height difference, the color of the plant, red rice.
- **Flowering stage:** Observe whether flowering occurs before or after, comparing it with the main rice varieties grown.
- **Curved Panicle stage:** Observe the color, tail and characteristics of different seed and panicle.
- **Pre-harvest stage:** Re-check the rice plants with different characteristics before harvesting.



https://rsdb.hrdi.or.th/Uploads/10/document/25630806_113910.pdf

Management of Mixed Rice

A good separation mixed rice will allow the rice seeds to pass the rice seed quality inspection process according to the following rice seed standards:

- ✓ Obtain at least 95% pure rice seeds according to the varieties.
- ✓ Impurities not more than 5%
- ✓ If there is red rice/glutinous rice, it should not be more than 0.2%
- ✓ Rice seeds that have passed germination tests must have a germination rate of at least 85%.
- ✓ Seed moisture must be 14%



<https://www.khaosod.co.th/wpapp/uploads/2022/11/image1-424.jpg>

4. Post-harvest handling procedures



https://ktanachai.files.wordpress.com/2014/01/dsc_47531.jpg

Harvesting



https://www.phtnet.org/article/images/a42_1.png

Threshing and
cleaning



https://www.ricethailand.go.th/rkb3/organic_new_pic13.jpg

Storage



https://ktanachai.files.wordpress.com/2014/01/dsc_47531.jpg

Harvesting

- Rice in plots that have been maintained until flowering will have starch accumulation in the seed until maturity.
- The rice grains will have all the components intact. Harvesting at this stage will yield the best quality rice grains.
- But the moisture content in the seeds was still high, about 28 - 33 percent. It was found that some rice varieties were not fully ripe yet.



https://ktanachai.files.wordpress.com/2014/01/dsc_47531.jpg

Harvesting

- Counting the flowering days of rice is still necessary in every rice ecosystem
 - To harvest rice for high yields and the best quality of seeds, rice in the field must have consistent growth, flowering and maturity.
 - After pollination, the maximum weight was accumulated within 3 weeks or 21 days.
 - The whole ear of rice flowers takes about 7 days to be thoroughly pollinated, depending on the variety.
 - Therefore, the rice takes about 28 - 30 days to be fully ripe and ready for harvesting



https://www.phtnet.org/article/images/a42_1.png

Threshing and cleaning

- Harvesting and cleaning rice is one step after harvesting that causes the grain to fall off and fall apart.
- A good threshing must not cause the kernels to crack or break clean, with little or no impurity or weed seeds.
- Nowadays, it is popular to use combine harvesters, most of which have a cleaning machine built in, making it convenient and fast. It is suitable for farmers who have a lot of farming
- The organic threshing machine must be separate from the general threshing machine.
- If there is no threshing machine dedicated to organic rice and it is necessary to use a general combine harvester, the machine must be washed first and the farmers must separate the rice to be washed for inspection by the organic standard inspector.



https://www.ricethailand.go.th/rkb3/organic_new_pic13.jpg

Storage

- Storage is the final step before being sold, processed or made into planting seeds the following year.
- Good storage prevents quantitative losses and keeps rice quality from decreasing even more.
- If stored in the barn, it must be separate from other rice. The floor should be raised to a moderate height and inside there should be a cradle for supporting the rice sack for good ventilation.



https://www.ricethailand.go.th/rkb3/organic_new_pic13.jpg

Storage

- The main cause of loss during storage consists of:
 - rice to be stored
 - Handling during storage
 - House condition or storage container
 - Storage climate
 - Pests of insects and microorganism

All of these factors affect the quantity and quality of rice stored. In addition, temperature variability in highlands and relative humidity are another factor that determines the storage length of rice.

Link for more knowledge in fertilizer production Fermentation and pest control in organic farming

Production of 3 types of fermented water with 7 types of microorganisms

https://www.youtube.com/watch?v=ok6bvb_TmZY&list=PLHG0U3OvUZUSEZifDdRz6Ugn5SFWMeHca&index=1

Production of white fungus

<https://www.youtube.com/watch?v=sqzxbBe0y5U&list=PLHG0U3OvUZUSEZifDdRz6Ugn5SFWMeHca&index=4>

Pest control by micro-organism (Trichoderma)

<https://www.youtube.com/watch?v=2PGDFwrkgU8&list=PLHG0U3OvUZUSEZifDdRz6Ugn5SFWMeHca&index=7>

Production of organic fertilizer non-reversible pile

<https://www.youtube.com/watch?v=-naw7gH2o64&list=PLHG0U3OvUZUSEZifDdRz6Ugn5SFWMeHca&index=8>

production of non-reversible organic fertilizers, piles in mesh rings

<https://www.youtube.com/watch?v=9RV5jl9GwpY&list=PLHG0U3OvUZUQDPVX278TTT2R0XUTMpKW6&index=4>

Bio-Control Technology

https://www.youtube.com/watch?v=_w89OsreyxQ&list=PLHG0U3OvUZUQDPVX278TTT2R0XUTMpKW6&index=7

For more information



https://www.freepik.com/premium-photo/rice-field-landscape-watercolor_39300461.htm

Trainer's Guide to Organic Rice Production and Processing in Thailand

Chapter 4 Organic Rice Production Techniques



https://www.freepik.com/free-vector/rice-grain-illustration_6203169.htm#query=rice%20drawing&position=3&from_view=keyword&track=ais

