RICE HARVEST AND POST HARVEST HANDLING

Handling harvest and post-harvest food crops is a very strategic effort in order to support national food security. Direct postharvest handling has a role in suppressing yield losses (losses), maintaining yield quality and increasing added value, competitiveness and farmers' income.

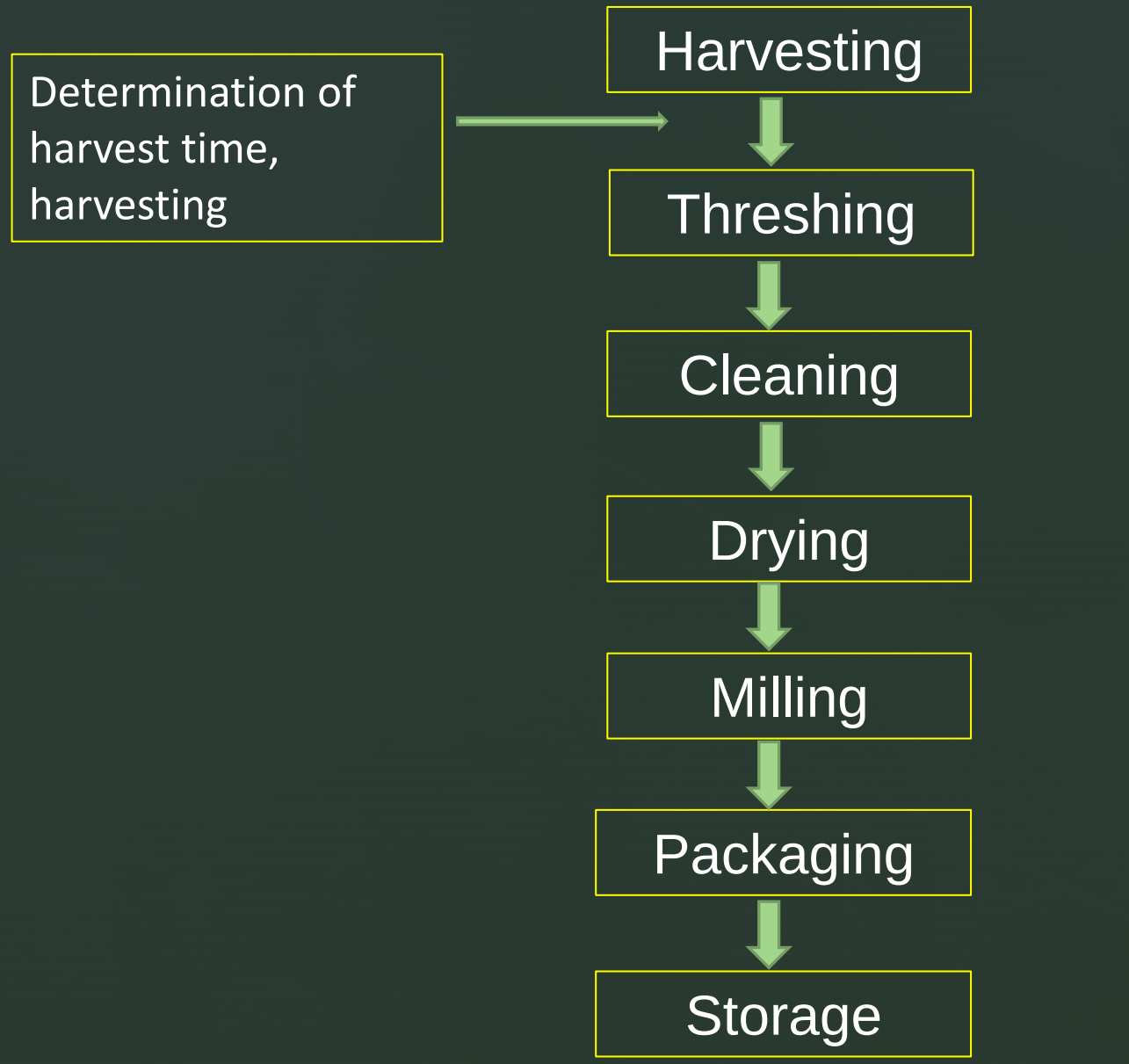
Abundant rice production during harvest season requires serious post-harvest handling. Improper postharvest handling can cause losses, especially shrinkage or loss of both quality and physical

Harvesting is the process of collecting the mature rice crop from the field. The goal of good harvesting is to maximize grain yield, and to minimize grain losses and quality deterioration.

Post-harvest handling of rice is an activity from the time the rice is harvested until it is in the form of intermediate products that are ready to be marketed. Post-harvest handling activities include several stages of activities, namely: harvesting, stockpiling and gathering, threshing, cleaning, transporting, drying, packaging and storage and milling.

How did you decide the harvesting time?

How did you harvest the rice?



Rice Harvest and post-harvest activities

➢ Determination of harvest time

Determining the time of harvest is the initial stage of handling harvest and post-harvest activities for rice. Inaccuracy in determining the time of harvest can result in high yield loss which and makes the quality of grain/rice low

1) **Visual Observation**

Visual observation is done by looking at the appearance of rice on paddy field. Based on the visual appearance, the optimal harvest age of rice is achieved when 90 to 95% of grain grains in rice panicles are yellow or golden yellow. Rice harvested under these conditions will produce good quality grain

2) **Theoretical Observations**

Theoretical observations were made based on the description of rice varieties and measuring the moisture content with a moisture tester. Based on the description of rice varieties, the appropriate harvesting age of rice is 30 to 35 days after flowering uniformly or between 135 to 145 days after transplanting. Based on the water content, the optimum harvest age is achieved after the grain moisture content reaches 22–23% in the dry season, and between 24–26% in the rainy season

A. Harvesting

1) Rice Harvest Age

Harvesting of rice must be done at the harvest age that meets the requirements as follows:

following :

(a) 90–95% of the grain from the panicle appears yellow.

(b) Panicles aged 30-35 days after flowering.

(c) The moisture content of grain is 22–26% as measured by a moisture tester.

2) Rice Harvesting Machines and Tools

Harvesting rice must use tools and machines that meet technical, health, economical and ergonomic requirements.

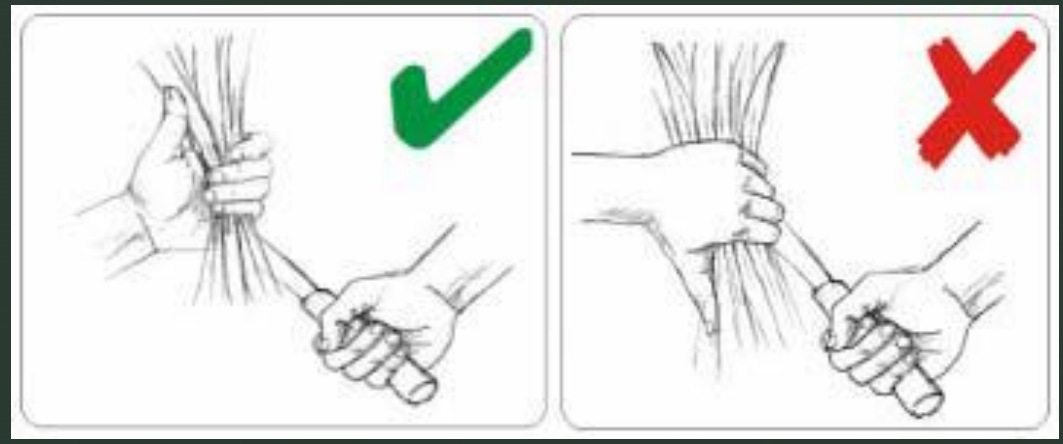
The tools and machines used to harvest rice must be in accordance with the type of rice variety to be harvested. At this time, tools and machines for harvesting rice have developed following the development of new varieties produced.

The rice harvesting tool has evolved from an ani-ani to an ordinary sickle then to a serrated sickle with very sharp steel material and finally the reaper, stripper and combine harvester have been introduced.

a. Harvest Rice using Ani-ani.
b. Harvest Rice using Sickle
c. Harvest Rice using Reaper
d. Harvest Rice using Combine Harvester

Health and Safety Precautions during Harvesting in manual harvesting

When cutting crop with a sickle, always hold the stems with thumb pointing upwards, away from the sickle.



3) Harvest System

The harvesting system must be made based on a plan that meets the following requirements:

a. Harvesting is carried out in a team/group system.
b. Harvesting and threshing are carried out by the harvester group.
c. The number of harvesters is between 5-7 people equipped with 1 unit of pedal thresher or 15-20 people equipped with 1 unit of power thresher.

➢ Stacking and Collecting

Stacking and collection are post-harvest handling stages after rice is harvested. Inaccuracy in the accumulation and collection of rice can result in high yield losses.

To avoid or reduce the occurrence of yield loss, it is better to use pads when stacking and transporting rice.

The use of pedestals and containers during stacking and transportation can reduce yield losses between 0.94–2.36%.

B. Threshing

Manual threshing/Gebot

Pedal Thresher

Combine harvester

C. Grain Cleaning

Grain cleaning after harvest is important as it removes unwanted materials from the grain. Clean grain has a higher value than grain that is contaminated with straws, chaff, weed seeds, soil, rubbish, and other non-grain materials. Grain cleaning will improve the storability of grain, reduce dockage at time of milling, and improve milling output and quality. Seed cleaning will reduce damage by disease, and improve yields.

Winnowing: Lighter materials such as unfilled grains, chaff, weed seeds, and straw can be removed from the grain by using a blower, air fan, or by wind. Winnowing recovers only the heavier grains.

Screening/Sifting: Smaller materials such as weed seeds, soil particles and stones can be removed by sieving the grain through a smaller sized screen (1.4mm or less sieve opening).

Seed cleaning: Malformed, discolored, germinated, broken or moldy grains in seed lots can severely impact seed quality, viability and vigor. Visually inspect the seed prior to storage and consider removing these grains from the seed lot.

Seed grading: For commercial seed processing, seed grains should have uniform size and weight. A variety of commercial equipment can be used to achieve uniformity in seed size and shape. These include gravity tables, rotary screens, indented cylinders, and length graders.

Seed purity: Maintain seed purity by preventing mixing with other varieties and contamination with other species.

D. Drying

Drying is the process of decreasing the moisture content of the grain until it reaches a certain value so that it is ready to be processed/milled or safe to be stored for a long time. Yield loss due to inaccuracy in the drying process can reach 2.13%. At this time the method of drying rice has developed from sun drying method to dryer machine. Usually it takes 3-4 times to dry the rice, but if the sun is so bright it takes two days only to dry the grain.

Drying floor

Dryer

Notes:

Harvested Dry Grain, it has a water content greater than 18% but less than or equal to 25%, content of empty seeds or impurities maximum 10%.

Stored Dry Grain is grain that contains water content greater than 14% but less than or equal to 18%, other characteristics, it has dirt/void grain greater than 3% but less than or equal to 6%,

Milled Dry Grain is grain that has a maximum moisture content of 14% because if it is more it will break during the next process, it has a maximum 3% dirt/void grain

D. Milling

Milling is a process to convert grain into rice. In general, the machines used in the rice milling service industry RMU (Rice milling unit) and RMP (Rice milling plant) can be grouped as follows:

1. Machines that break the husk/husk or peeler/husk of dry milled grain (huller or husker)
2. Machines that separate grain and brown rice (brown rice separator)
3. Grinding machine or whitening machine (polisher)
4. Sifting machine (sifter)
5. Packaging machine or equipment (weighing and sewing sack)

RMU

RMP

D. Packaging

Packaging can help prevent/reduce damage, protecting the ingredients inside. Plastic packaging has a passive function to protect the packaged product against damage caused by external factors related to handling, dropping and micro- and macro-organisms attack (such as insects). Unopened white rice should be consumed within 2 years. Signs of rotten rice or poor quality can be seen from the appearance of rice lice.

F. Storage

The shelf life of rice is influenced by various factors, such as the type of rice, cooked or not, its packaging, and the way it is stored.

Storing rice should be done well. Packaged rice must be placed regularly in the warehouse to facilitate inspection, pest and disease control and product flow

STORAGE ROOM CONDITION

a. Room temperature and humidity

The ideal conditions for room temperature are 18 oC and 65% humidity. In this condition the life of insects and fungi will be inhibited.

b. Lighting.

Lighting in the warehouse should be sufficient and as much as possible evenly distributed in all corners of the room. Dark places are preferred by insect pests. Lighting with fluorescent lamps in the warehouse is recommended with a standard lighting of 100 watts/m2.

c. Cleanliness.

The warehouse room must be kept clean and free from unpleasant odors.

Processed products made from rice


THANK
YOU