PADDY HARVEST AND POSTHARVEST MANAGEMENT

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SPECIFIC LEARNING OBJECTIVE

Basic Competencies

After learning : participants able to handle the harvest and postharvest paddy.

Success Indicators

Explaining the Characteristics of The Harvesting Criteria and How to Harvest, Threshing, Transportation, Drying, Milling and Storage.





INTRODUCTION

Postharvest agricultural products:
A stage of activity that begins from the collection of results until they are ready to be marketed.

Postharvest handling :
Actions are prepared/carried out at the postharvest stage so that agricultural products are ready and safe for use by consumers and or further processed.

INTRODUCTION

- As the main food
- The growth of paddy demand (3.0%) was higher than the increase in production (1.6%).
- Paddy yield loss during postharvest handling is high, the national average is 20.5%.
- Loss on harvesting-threshing 14.5-18.9%.
- The quality of grain and rice is low

Application of Harvest and Post-harvest Handling Technology

- Decrease in yield losses,
- Improving the quality and competitiveness of results,
- Increased income and welfare of farmers.

Yield Loss Data Due to Improper Crop and Postharvest Handling

No.	Stage	Losses
1.	Harvesting	9,52%
2.	Trashing	4,78%
3.	Transport	0,19%
4.	Drying	2,13%
5.	Milling	2,19%
6.	Storage	1,61%
	Total	20,51%

Sumber : BPS

The data loss of these products if converted in rupiah will cost farmers per year around 18 trillion rupiah.

HARVEST

Definition

Harvesting – usually refers to all activities carried out in the field, including:

- ✓ ***Stem cutting - reaping***
- ✓ ***Stacking of paddy stalks***
- ✓ ***Collection/binding***
- ✓ ***Temporary storage***

Harvesting Criteria, determined in 2 ways:

Visual observations :

- ❑ The appearance of paddy on the paddy field.
- ❑ The optimal harvest age of paddy is achieved after 90 to 95% of the grains in the paddy panicle are yellow or golden yellow
- ❑ Has a grain loss of about 16–30 % (How to measure it by squeezing the panicle with hands).

Harvesting Criteria, determined in 2 ways:

Theoretical observations

- by plant age (on average 135–140 DAP).
- grain moisture content (22–23% in the dry season, and 24–26% in the rainy season (Darmadjati, 1981; Darmadjati et al, 1989).

How to Harvest

1. Manual cutting

a. Cutting

- "Ani-ani"
- Sickle – 10-15 person-day/ha

Losses

- Approx : 5% from production

ANI ANI

Materials from bamboo and steel knife 1.5-3 mm thick.

Used for cutting short cut hay (top) .

JAGGED SICKLE

The blade is made of steel on the one hand, the number of eyes serrations of 12-16 pieces per-inch.

ANI ANI

JAGGED SICKLE

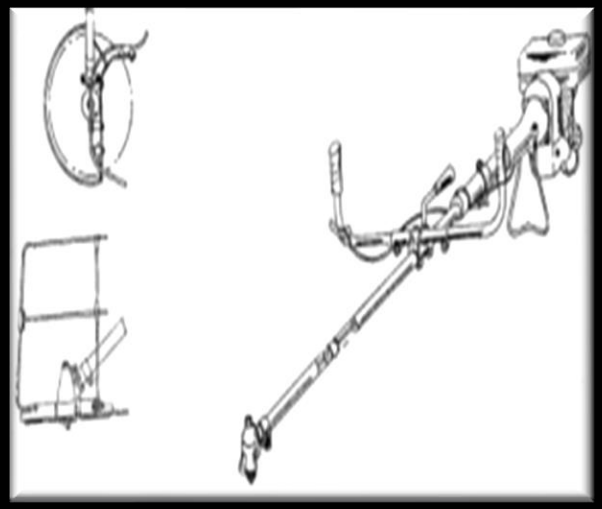
2. Mechanical Cutting

a. Reaper cutting-bar system

- Sliding action
- Low power requirements
- Complicated to make it
- Expensive maintenance costs

- Field Capacity : 2 ha/day
- Power requirement: 1 operator
- 7-8 org/ha of collecting power
- Weight shrinkage: <1–2%

b. Rotary disc cutter reaper



Pressure & shear combination

Greater power requirements

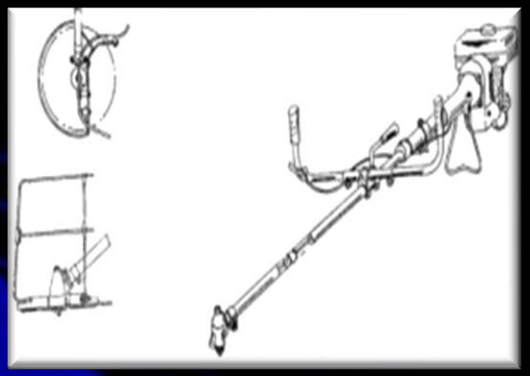
It's easier to make it

Low maintenance costs

1) Field Capacity 2 ha/day
2) Weight shrinkage: 1–2%

C. Mecanical Cutting

Brush-type harvester made by Philrice



- **Can cut paddy, clean paddy fields from straw and leaves**
- **Capacity 0.4-0.6 ha/day, weight shrinkage <1%**
- **2 hp 2-stroke engine**

D. Reaper Made Philpaddy-JICA

- *Model Morallo*

- *Model Lakas Kuliglig*

- **Capacity 2 ha/day, Shrinkage falls out 1-2%**
- **Gasolin engine 6 hp;**
- **Need 2 operators**

Transportation and Collecting

- 5 people -hr/ha
- Small pile for good aeration & for minimum heating
- Fall out immediately & dry

Weight shrinkage

- Approx – 2% dr production

POST HARVEST

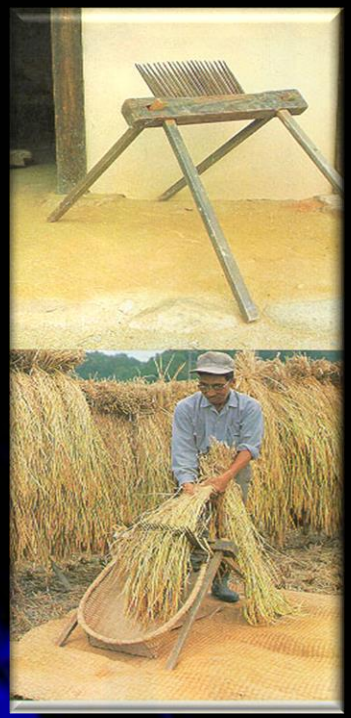
- Post-harvest is an activity from the beginning of the harvesting process to the process of producing semi-finished products (intermediate products).

- **Post-Harvest Activities Include:**
- Panicle cutting
- Collection
- Threshing and grain cleaning
- Drying
- Storage
- Milling or bending
- Packaging and transportation.

B. THRESHING
Yield loss when threshing

No	Activities	Yield Loss Rate
1	Iles/trampling	3,99 %
2	Hit	4,54 %
3	Slam/slam without curtains	6,4 – 12,3 %
4	Slam/slam with curtains	4,45 – 5,06 %
5	Pedal Tresher	-
6	Power Tresher	0,84 %
	TH-6-quick 1	1,54 %
	TH-6-quick 2	0,34 %
	Modifications TH-6-Aceh 1	0,64 %
	Modifications TH-6-Aceh 2	

1. Manual Threshing



a. Trampling

- Rubbing/iles
- Stepped on the feet of humans/animals

b. Slam

- Slam action – impact
- 400-500 kg/day – 2 persons
- Shrinkage 2 – 4%

c. Comb

- Comb effect

2. Mechanical Threshing

a. Pedal thresher

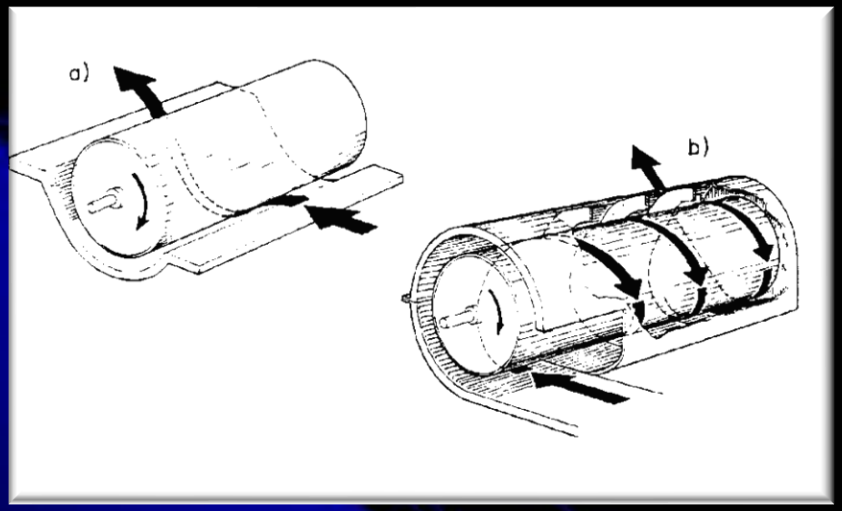
- Manual: 50-75 kg/h, 1-2 people
- Motor/engine : 500 kg/h, 2-3 people

b. Thresher tipe McCormick

- “Tilladora”
- Threshing unit with combine
- PTO-driven, 2/4 wheel tractor
- 2 – 4 t/h, 8-10 people
- Shrinkage 6-11%

c. Axial flow thresher

- 500 kg/h – 2 t/h, 2-8 people
- Throw-in; engine 5 – 16 hp
- Drums with serrations; 600-1000 rpm
- Weight shrinkage 0.1-2.0%



a) Tangential; b) Axial flow

C. . TRANSPORTATION OF GRAIN

- **Transportation:**
- **That is the transfer of grain from the paddy field to the processing place or to the house. carried out by means of being carried by manpower, by carts, trucks or trailers.**
- **In this transport there is often also loss.**

D. DRYING

- Most used
- Cheapest method
- Stack thickness 2-4 cm
- Reversing every 30 min for uniform drying and avoid overheating
- Depending on the weather

2. Drying with Hot Air

a. **Tub type dryer**

- Not moving, batch type
- Forced convection – axial fan
- 2-10 t/batch
- Depth 30-35 cm
- The difference in water contain can be 2%
- Time 4-10 h
- Air temperature 40-50°C
- Fuel : kerosene, diesel or husk

Problems in Post-Harvest Handling

The transition of local paddy cultivation to new high-yielding varieties, resulted in:

1. Changed the way of harvesting from cut panicles to cut stems
2. From ani-ani to sickle
3. From mash to weighted and ground

Grain Treatment of The Harvest

- Drying by utilizing sunlight
- Drying by using a drying machine
- Wet grain treatment with the use of table salt (1-2%)

Rice Milling

- Grain moisture content should be 14%
- Skin stripping process
- Highlighting process
- Packaging

SORTASI

- **Sorting on rice will identify whole rice, broken rice, whitewashing rice, groat rice, yellowed rice and foreign objects.**

- **The sorting process is carried out to separate rice that is still safe for consumption from rice that is not safe for consumption by first checking in a certified laboratory,**

Rice quality standards based on SNI No. 01-6128-1999

No	Quality criteria	Persentage	Quality I	Quality II	Quality Ill	Quality IV	Quality V
1.	Derajat sosoh (min) polish degree	(%)	100	100	95	95	95
2.	Moisture content (max)	(%)	14	14	14	14	15
3.	Beras kepala (min) Rice head (min)	(%)	100	95	84	84	60
4.	Butir utuh (min) Whole grain (min)	(%)	95	89	78	73	60
5.	Butir patah (maks) Broken grain (max)	(%)	0	5	15	25	53
6.	Butir menir (maks) Grain groats (max)	(%)	0	0	1	2	3
7.	Butir merah (maks) Butir merah (maks)	(%)	0	0	1	3	3
8.	Butir kuning (maks) Yellow grains (max	(%)	0	0	1	3	5
9.	Benda mengapur (maks) Whitewashing objects (max	(%)	0	0	1	3	5
10.	Benda sing (maks) foreign objects	(%)	0	0	0.02	0.05	0.2
11.	Butir Gabah (maks) grains of grain	(%)	0	0	1	2	3
12.	Campuran varietas lain (maks) A mixture of other varieties (max)	(%)	5	5	5	10	10

Sumber : www.bsn.go.id

PACKING

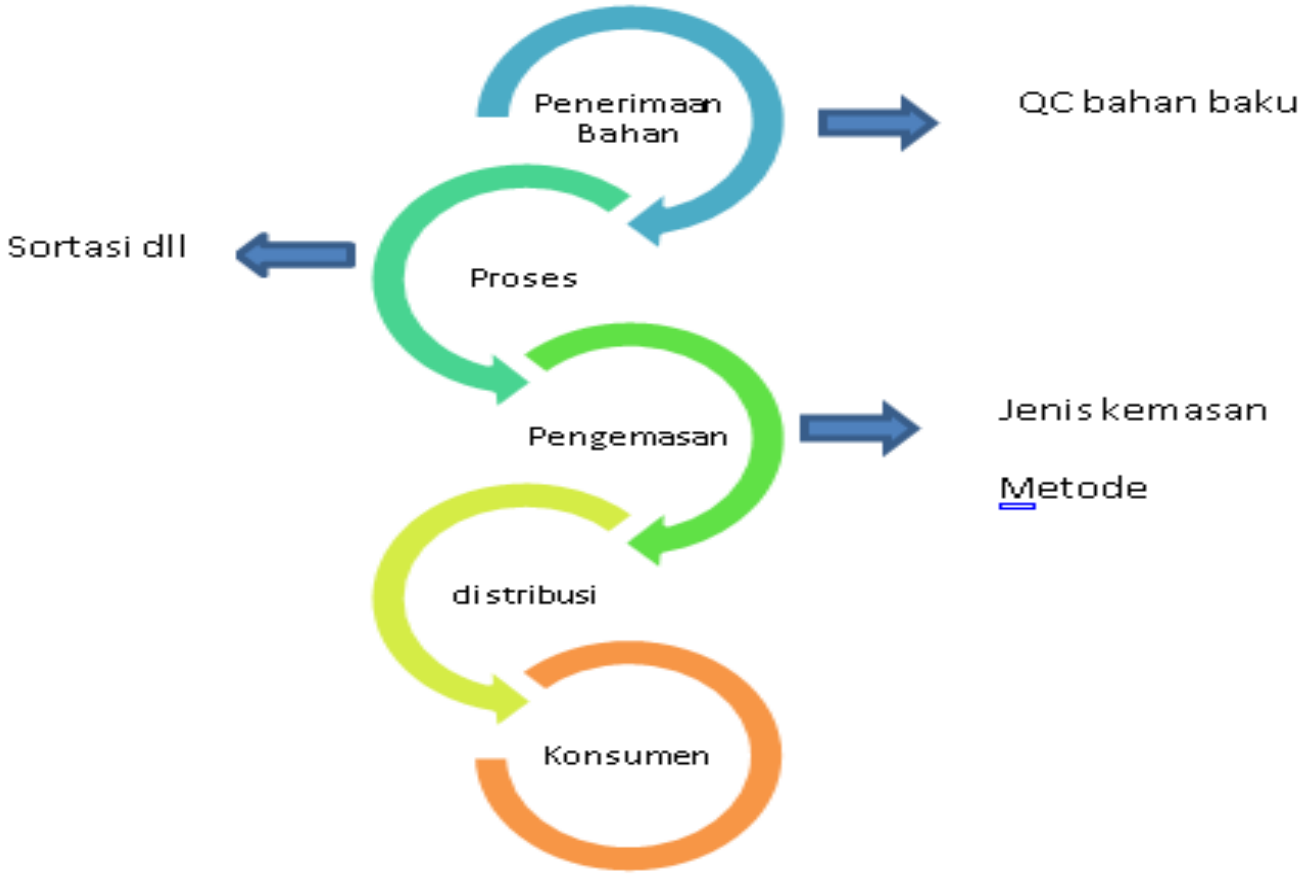
PACKING

- Packaging means a coordinated system of preparing goods for transportation, warehousing, logistics, sales, and end use. Simply put, packaging is a process of giving a container or wrapper to a product
- This vacuum method can be used manually or automatically such as inserting the product into a vacuum plastic bag, removing air from the plastic and sealing plastic.

Packing house

- Cleanliness of the premises
- Tool facilities
- scales
- vacuum device
- packing sealer
- sack sewing machine
- -> process flow setting > work efficiency

Production process flow



Things to note in packaging

- Types of packaging
- Packaging dimensions -> demand/ market segment
- Packaging Design
- Label inclusion ->product description and product traceability

Labeling rules

- Regulation of the minister of agriculture 53 2018 year chapter 11.
  - Regulation of the minister of marketing 53 2019 year chapter 4.
  - For the inclusion of organic labels carried out by the Organic Certification.
  - Rice packaging label: brand, type of rice, rice variety mixture, net weight/contents, packaging date, name and address of the rice packer or rice importer.

Rice Storage

- Bulk rice without packing in wooden boxes or silos
- Packed in sacks

RICE STORAGE REQUIREMENTS

1. Clean storage space and sanitize with fungicides and insecticides

2. Storage space no potholes for walking rats, birds, lighting and ventilation are sufficient and easy to clean.

3. Prepare wooden blocks and boards to hold paddy sacks.

4. Rice in a dry state, moisture content (14%).

5. Rice in packaged form

6. Rice is stacked in the form of blocks, so it is easy to clean,

Causes of Rice Damage

Internal factors : From the rice itself

- **Chemical damage – processes of hydrolysis and oxidation.**

External factors :

- **Microbiological damage due to fungal attacks, for example, dull-black paddy**
- **Biological damage, due to insect attacks, for example, paddy with holes and odors.**
- **Other damage by rodents, birds and chickens – weight is reduced**

Efforts to Reduce Rice Damage

- Stored rice must be dry
- Highlighting must be perfect
- How to pack
- The storage room must be clean and not damp, not hollow, have good ventilation and good enough lighting.

YIELD LOSS AND RICE QUALITY ARE STRONGLY INFLUENCED BY:

- **Types of paddy varieties**
- **Grain moisture content at harvest**
- **Tools and how to harvest**
- **Harvesting system**

RICE BY-PRODUCTS

By-product 20-23 % husk, 8-18 % bran and 3-5 % Groats

1) Husk, as a fuel both in the raw / fresh state and in the form of bulk charcoal or briquettes.

2) Bran, the process of utilizing bran using the method of roasting on a cauldron and producing durable bran and bran products.

3) Groats, the utilization of groats into flour can be done through the bending process both through wet methods and dry methods.

Terimakasih