METHOD OF PADDY LOSSES MEASUREMENT FOR POSTHARVEST IN MADAGASCAR
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EPPENDIX:

FINAL REPORT, ON PROJECT FOR PRODUCTIVITY IMPROVEMENT IN CENTRAL HIGHLAND IN THE REPUBLIC OF MADAGASCAR
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INTRODUCTION

The island of Madagascar is home to nearly 20 million people (2006), 80% of which live in rural areas. A total of 1.7 million farmers are involved in the production of rice in Madagascar. In addition, there are about 30,000 downstream operators, who perform multiple functions (collection, processing, wholesale, importers, retailers). Since the vast majority of them represent family businesses, there exist approximately 1.750,000 households that are involved in the production, processing and handling of rice.

Rice is the staple food of the Madagascar. The importance of rice production in Madagascar. National demand amounts to 2.2 million tons per year, and domestic production of about 2 million tons is insufficient even in years with normal rainfall regime. About 200,000 tons is annually imported, and more than 47 % of the national territory arable lands are allocated for rice production. Efforts to increase rice production not only in terms of pre-harvest aspects (culture), but also aspects of post-harvest (yield losses pressing business / losses and increase redemen paddy rice).

Postharvest losses affecting rice production and food security in Madagascar. No data and methods of measuring losses of rice in Madagascar. Farmers do not feel any loss of postharvest, because not knowing the factors that cause losses of rice, as well as research on losses of rice in Madagascar have not been developed.

Purpose of making technical manual is a reference to getting accurate scale shrinkage / scattered / losses (yield loss) during the rice harvesting (cutting, gathering and threshing delay / temporary), transport (paddy / rice), threshing, drying, milling and storage.

II. DEFINITION AND SCOPE OF ACTIVITIES

2.1. Definition

1. Post-harvest technology is the post-harvest grain handling measures include harvesting, threshing, drying, milling, storage and transportation of the harvest.

2. Losses of rice post-harvest is loss the part of the harvest in the form of grains or rice that can not be used by farmers as the owner of the harvest (in percentage of weight).

3. Harvesting is the process of harvesting the rice crop and it is ripe optimum done by cutting the stems of rice plants using a scythe (sickle) or a machine harvester.

4. Stacking while harvesting is the process of accumulation of the results of cutting rice (hay along with panicle and paddy) on the ground waiting for the cutting process.

5. Threshing is the process of releasing grains of rice panicle were done by hand (slam / gebot) or mechanical (pedal or power threshers).
6. Drying is the process of losing most of the moisture content of grain to the safe limit for further processing (milling or storage of grain).

7. Milling is the process of releasing shuck (rice husk) and aleurone grain milled to produce white rice, consists of two processes, namely stripping and polishing.

8. Storage is the storage of grain or rice in a variety of packaging and bulking for a period of time.

9. Transportation is the process of transporting grain or rice from the fields to the farmhouse, place of drying, milling or market.

10. Moisture content is the water content contained in grains and rice are expressed in percent, both percent wet weight (wet basis) and dry weight (dry basis).

11. The respondent is the person who represents the object actors interviewed activity.

2.2. Scope of Activities

The scope of activity is the measurement and calculation results of post-harvest grain losses are limited to the handling of harvesting, threshing, transportation, drying, milling and storage of commonly performed by rice farmers, and conducted interviews using questionnaires. The process of post-harvest handling of rice, such as Figure 1.
III. MEASUREMENT METHODS OF RICE POSTHARVEST LOSSES

3.1. Losses of Harvesting

Harvest Losses (HL) starting from the time of harvest / cutting rice to temporary buildup.

- Prepare equipment tile (elbow, meter, 9 boards, 5 fruit growers sickle, hanging scales max. 10kg, weights max. 100kg, moisture tester, plastic bag 10 pieces, plastic bags uk. 5 kg (1 pack), marker maker, uk base plastic sheeting. 8 mx 8 m, rope and pedestal farmers.
- Select the fields ready to harvest (no pain, no fall and sunny weather)
- Harvest the mornings over at 9:00 to 10:00
- Tiles field size of 5 mx 5 m, and place the board nine randomly
- Select 3-5 farmers to harvest the way farmers, each given a plastic bag to put the rice yield has been cut.
- Take all boards 9, calculate the amount of grain that fell on board 9 and the conversion of heavy cuts losses on conversion table (B)
- Collect paddy cutting results along with its base to the threshing. Take rice for dirontok and weigh weight (A), were left on base weighed weight (C).

- Calculation : (in hectar)

\[
\text{Losses of harvesting} = \frac{B + C}{A + B + C} \times 100\%
\]

![Diagram of tile plot of board method (IRRI Method)](image)

X = rice plant
1,2,3,...,9 = observation board
Table 1. Conversion of paddy losses with Tile method

<table>
<thead>
<tr>
<th>Sum of paddy (Butir)</th>
<th>Losse$ \text{s (Kg/ha)}$</th>
<th>Sum of paddy (Butir)</th>
<th>Losse$ \text{s (Kg/ha)}$</th>
<th>Sum of paddy (Butir)</th>
<th>Losse$ \text{s (Kg/ha)}$</th>
<th>Sum of paddy (Butir)</th>
<th>Losse$ \text{s (Kg/ha)}$</th>
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<td>52.5</td>
<td>150</td>
<td>78.4</td>
<td>200</td>
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Sample calculation: Losses harvesting (SP)

1. The number of grains pithy board attached to the 9 = 200 points
2. Weight of tile results 5m x 5m = 15 kg (Au), per ha = (15 x 10,000 / 25) = 6,000 kg
3. The number of grains of rice on the bottom of the stack while pithy = 800 grains (Bt)

Calculation:
1. Based on the amount of grain on the measuring board (200 butir0, the conversion data obtained from Table large losses at harvest = 104.1 kg / ha (BSK)
2. Heavy grains were scattered on the stack while (Bgt):
   \[ Bgt = Bt \times G \times (1000/Au) = (800 \times 0.022 \text{ g grain / grain}) \times (10.000m^2/25m^2) = 7040 \text{ g / ha} = 7.04 \text{ kg / ha}. \]
3. So harvest Losses (HL)

\[
\frac{B + C}{A + B + C} \times 100\% = \frac{7.04 + 104.01}{104.1 + 7.04 + 6.000} \times 100\% = 1.82\%
\]
3. Losses of Transportation

- Losses occurred due to the reduction in the transport of grain / rice during the transport process. The cause for the packaging and transport of conveyance unfavorable resulting in grain / rice scattered during the trip.
- Calculation of shrinkage transporting grain / rice is measured by measuring the weight of grain / rice before and after transport.

Calculation:
\[
\text{Losses transport (TL)} = \frac{A - B}{A} \times 100\%
\]

3.2. Losses of Threshing (TL)

Two kind of the paddy threshing are used pedal thresher or power thresher system.

- Preparation (threshing site should be flat, dry land, dirontok immediately after rice is cut, the material used freshly harvested rice / not delayed).
- The tool is placed alongside a pedestal thresher used. The exit of the grain must follow the direction of the wind.
- Prepare rice harvest 50-100 kg (manual) or 400 kg (power threshers)
- Degree of plastic pedestal control (8 mx 8 m) above base of farmers.
- Threshing done for reasons of farmers, taking into account the wind direction.
- The net grain threshing weighted (A), straw (B) and feces (C).
- Measure the moisture content of grain cleaner with a Moisture Tester (5 replicates)
- Collect and weigh grain farmers thrown out base (A1)
- Separate and weigh grains that are still attached to the straw (A2). Calculating (A2) grab samples of 1 kg of straw after threshing, then remove grain that is still attached to the panicle rice, collect and weigh weight (X).
- Separate and weigh pithy grains that carried over into kororan (A3). Calculating (A3), take kotoran 1 kg, pithy separate grains that carried over into dirty, separate and weigh weight (Y).
4. Losses of Drying

Drying shrinkage is the physical loss of grain due to scattered or eaten by birds, not a decrease in water content.

Terms drying:
- Drying is done by sun drying or drying machine.
- Drying can be done sun drying with cement floors, plastic terpal drying or drying machine.
- Material to be dried grain Events uniform moisture content and does not contain a lot of dirt and grain hollow.

Implementation of measurement:
- Weigh initial grain before drying of 500 kg GKP (for drying) and 1000-2000 kg (for the dryer) (X), measuring water content before drying (m1)
- Weigh grain after drying (Y) and measuring water content after drying (m2)
- Calculation of drying shrinkage was measured by measuring the rice grain before and after drying, the dry weight of the same conditions (based on dry basis).
Calculation:

\[
A = \frac{100 - m_1}{100} \times X \\
B = \frac{100 - m_2}{100} \times Y
\]

5. Losses of Milling

- Losses milling merupakan difference between the yield of milling and grinding control field.
- The yield of rice milling is a ratio / scale used to express the weight percentage of rice milling yield to the weight of the milled grain.
- The yield is the amount of rice field were obtained in the process of milling in the field (RL)
- Yield control is the amount earned in rice milling process that all processes can be controlled / controlled (RK).
- For uniform shrinkage calculations performed on the degree of milling rice polished 100% (100% DS) is all aleurone layer / bran are all washed away.
- The degree of polished (DS) is the percentage release aleurone layer / bran on rice during the penyosohan (in 80%, 90% and 100%).

Calculation:

\[
\text{The recovery of rice} = \frac{B}{A} \times 100\%
\]

A = Weight paddy
B = Weight milled Rice

Losses od milling = recovery of control – recovery of field
6. Losses of grain and rice storage

- Losses occur during storage of storage. Retention period set (4-6 months).
- Losses storage of grain / rice measured by the weight of grain / rice before (A) and after storage (B). Water levels measured early and late storage.

Calculation:

\[
\text{Losses of storage} = \frac{A - B}{A} \times 100\%
\]

REFERENCE:

