

Improving the Quality of Ghanaian Parboiled Rice

Training Manual



The Role of Farmers

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Session 2

The role of farmers

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| Objective: |
| The objective of this session is to investigate the role farmers play in producing good quality paddy. We will look at current practices and explore ways in which they can be improved. |

Parboiled rice is a manufactured product. This means that raw materials undergo certain processes to produce the final product.

The quality of any manufactured product is only as good as the quality of the raw materials and the controls exercised during processing.

The quality of parboiled rice produced in Ghana is very variable, even though the same raw materials and processes are used throughout the three northern regions of Ghana.

WHAT DOES QUALITY MEAN TO FARMERS?

We have already looked at the factors that affect rice quality, you probably gave your views from a consumer's point of view but does "good quality" mean the same thing to everyone?

If you asked a farmer to say which characteristics were most important to him, he would probably suggest the following:

- Yield
- Price

He would be aware of many of the quality issues but as far as he is concerned how much crop he grows and the price he gets are his primary concerns.

Unlike many other paddy producing countries. Ghanaian paddy is not graded and sold at different prices for each grade. If this was the case farmers would be far more quality aware. As it is, they have no financial incentive to produce the best possible quality paddy. This project plans to establish “sites of best practice” where farmers, parboilers and millers will work together to produce good quality parboiled rice.

WHAT IMPACT COULD A FARMER HAVE ON PADDY QUALITY?

What will influence paddy quality **at point of harvest?**

- Intrinsic qualities
- Weather
- Agricultural practices

The farmer has no control over two out of three of these influencing factors, but if we look at some of the quality issues we can see that by following **Good Agricultural Practices** the farmer does have some control over quality attributes and can do much to ensure that the paddy he harvests is of good quality.

| Quality attribute | Intrinsic quality | Influenced by weather | Influenced by agricultural practices |
|-----------------------|-------------------|-----------------------|--------------------------------------|
| Density | 4 | | |
| Size | 4 | 4 | 4 |
| Shape | 4 | | |
| Composition | 4 | 4 | |
| Colour | 4 | | |
| Aroma | 4 | | |
| Foreign matter | | | 4 |
| Mixed varieties | | 4 | 4 |
| Maturity | | 4 | 4 |
| Infestation/infection | | 4 | 4 |
| Cracked grain | | 4 | 4 |
| Sprouted grain | | 4 | 4 |
| Moisture content | | 4 | 4 |

However, this workshop will focus mainly on post production practices.

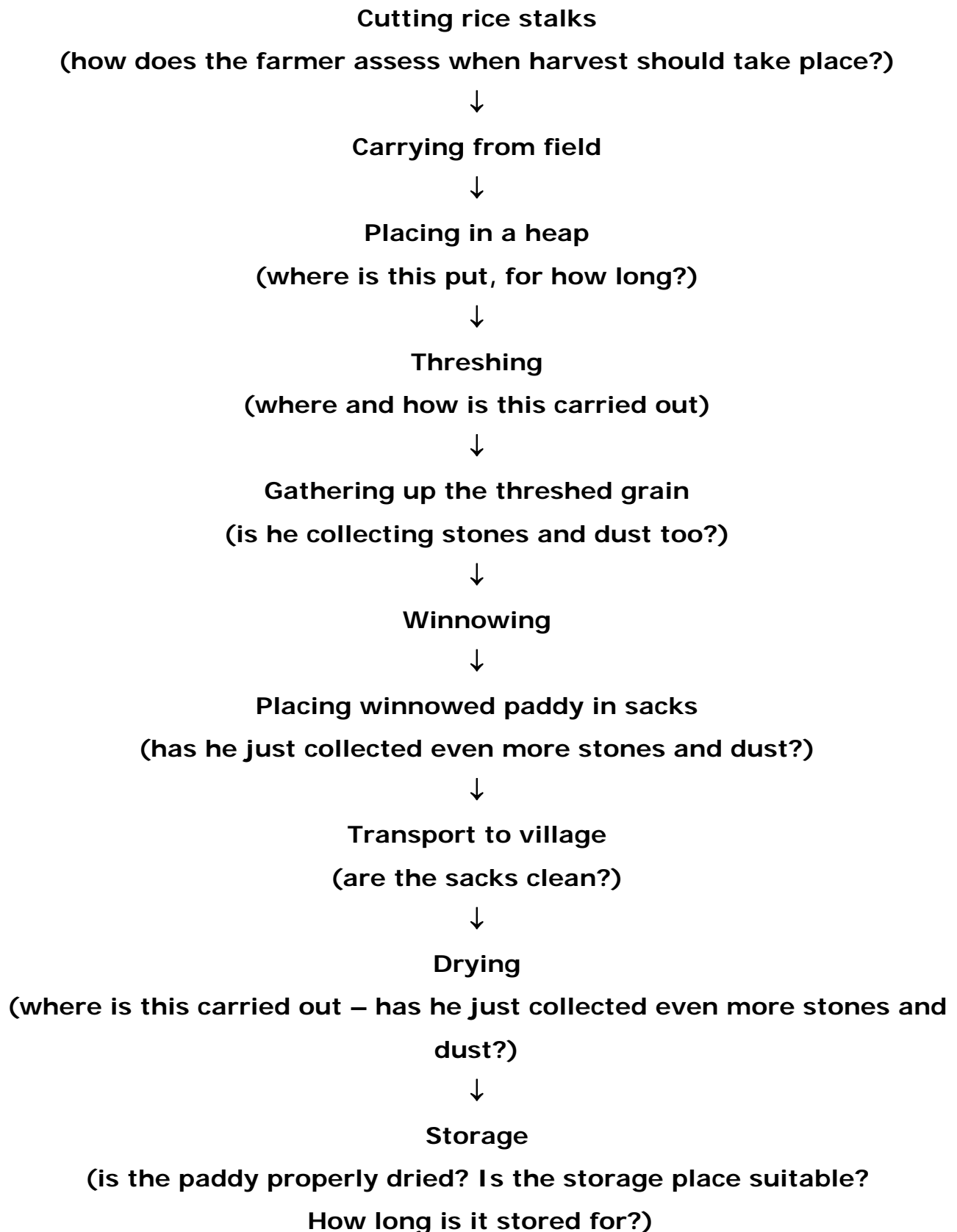
Practical session 3

From your experience, draw a flow chart of what happens to paddy from the moment it is cut in the field until it is sold. Try to be very specific and include as much detail as possible.

Then look at what effect each of these steps could have on quality.

*You may like to try this exercise in the field with farmers. You will then learn **exactly** what they do and together you can look at the quality implications.*

Your flow chart will probably look something like this:



Every step of this process can have an impact on paddy quality and therefore on the ultimate quality of the parboiled rice.

The two major post-harvest quality factors which farmers have influence over are:

- **Foreign matter**
- **Fungal damage**

In countries where paddy and milled rice are subject to inspection and grading for quality standards, the quality inspections are carried out throughout the production chain but particularly:

1. **At harvest**
2. When the milled rice is marketed
3. By the consumer

The farmer is therefore the most important link in the production chain. If the paddy (raw material) he produces is of poor quality this will affect the final quality of the parboiled rice. No matter how well controlled the processing stages are they will not be able to produce a good product if the basic raw material is of poor quality.

HOW CAN WE ASSESS IF PADDY IS OF GOOD QUALITY?

When grading standards are enforced the determination of paddy quality is assessed by visual examination. The categories which are examined are:

- Broken grain
- Organic matter (straw, weed seeds etc)
- Inorganic matter (stones)
- Fungal damage
- Infestation
- Type admixture (mixed varieties)
- Immature grains
- Discoloured (yellow) grains

How current practices in Ghana affect quality

| Quality defect | Current practices |
|--|---|
| <ul style="list-style-type: none"> Broken grain | This is a major problem when combine harvesters are used. |
| <ul style="list-style-type: none"> Organic matter (straw, weed seeds etc) | Combine harvested grain usually contains a very high proportion of weed seeds and other foreign matter. Traditional winnowing processes do seem to be quite effective. |
| <ul style="list-style-type: none"> Inorganic matter (stones) | Traditionally threshed grain often contains unacceptable levels of inorganic matter, particularly stones. This is seen to be major quality defect by consumers. Threshing is the major source of contamination with soil and stones. Once small stones are mixed with paddy it is almost impossible to remove them. Dirty grain is a problem if lodging occurs. Dirt and stones can also be introduced when the paddy is spread to dry. |
| <ul style="list-style-type: none"> Fungal damage * | This is most likely to occur if harvested panicles/stalks are heaped and left on the field for an extended period of time. It will also occur if grain is inappropriately stored. |
| <ul style="list-style-type: none"> Insect Infestation | Most likely to occur during storage, but is not usually a major problem in northern Ghana where paddy is stored in bags. Paddy stored on unthreshed panicles is most susceptible to infestation. |
| <ul style="list-style-type: none"> Type admixture (mixed varieties) | The common practice of saving seed contributes to this problem. Shattering also leads to a mixture of varieties. Mixing of varieties can also occur at threshing and drying if the floor is not thoroughly cleaned between batches. |
| <ul style="list-style-type: none"> Immature grains * | Immature grains are introduced if harvesting is carried out too early. It may also occur if harvesting is carried out too late and shattering occurs, allowing volunteer plants to grow. |
| <ul style="list-style-type: none"> Discoloured (yellow) grains * | Yellowing occurs if the grain is overheated. This can also occur if grain is inappropriately stored. |

*You will need to dehusk the paddy to see fungal damage, yellow and immature grain.

Practical session 4

Examine the sample of paddy provided and look at all the quality defects to make sure you can recognise them, then look back at your flow chart and identify at which stage each defect is most likely to be introduced.

Now think of ways in which the introduction of these quality defects can be prevented or substantially reduced.

*You may like to try this exercise in the field with farmers. You will then learn **exactly** what they do and together you can look at the quality implications.*

IMPROVING THE QUALITY OF PARBOILED RICE – WHAT CAN FARMERS DO?

- **Grow suitable varieties**

Parboilers and consumers know which varieties they prefer – talk to them!

- **Use good quality seed**

Try to make sure that it is of a single variety. Prevent cross contamination in the field by harvesting at the correct time, preventing cross contamination during threshing/winnowing and drying by making sure the surface is clean (much easier with a tarpaulin or threshing box)

- **Never let paddy touch the ground.**

Use a concrete pad, tarpaulin or polypropylene sack for heaping/threshing/winnowing and drying. **The use of tractors for threshing should be discouraged.**

- **Clean the paddy thoroughly**

Make sure winnowing is effective. Try to prevent lodging

- **Make sure the paddy quality is maintained during storage**

Make sure it is dry before storage, be aware of storage pests, store in a suitable place.



☹️ Concrete pads can be used for threshing as long as they are well-maintained and are swept clean of stones



☹️ Do not use roads for threshing - they are a major source of contamination with stones



- ☺️ Tarpaulins or polypropylene sheets are easy to keep clean and free from stones.
- ☺️ Small scale farmers in Tanzania are very quality conscious and always use polypropylene or tarpaulin to keep their paddy stone-free



☺️☺️ Polypropylene sheet used for threshing in Northern Ghana