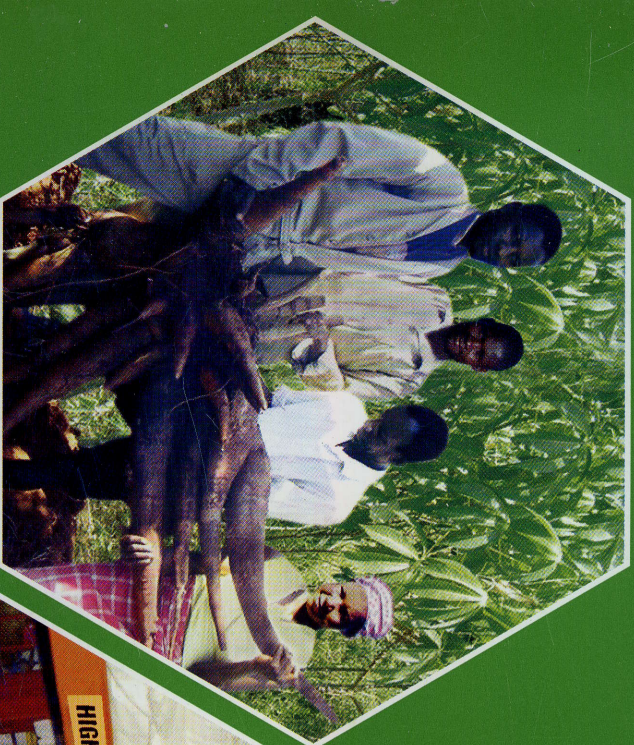


IITA

Research to Nourish Africa

How to make High Quality Cassava Flour (HQCF)

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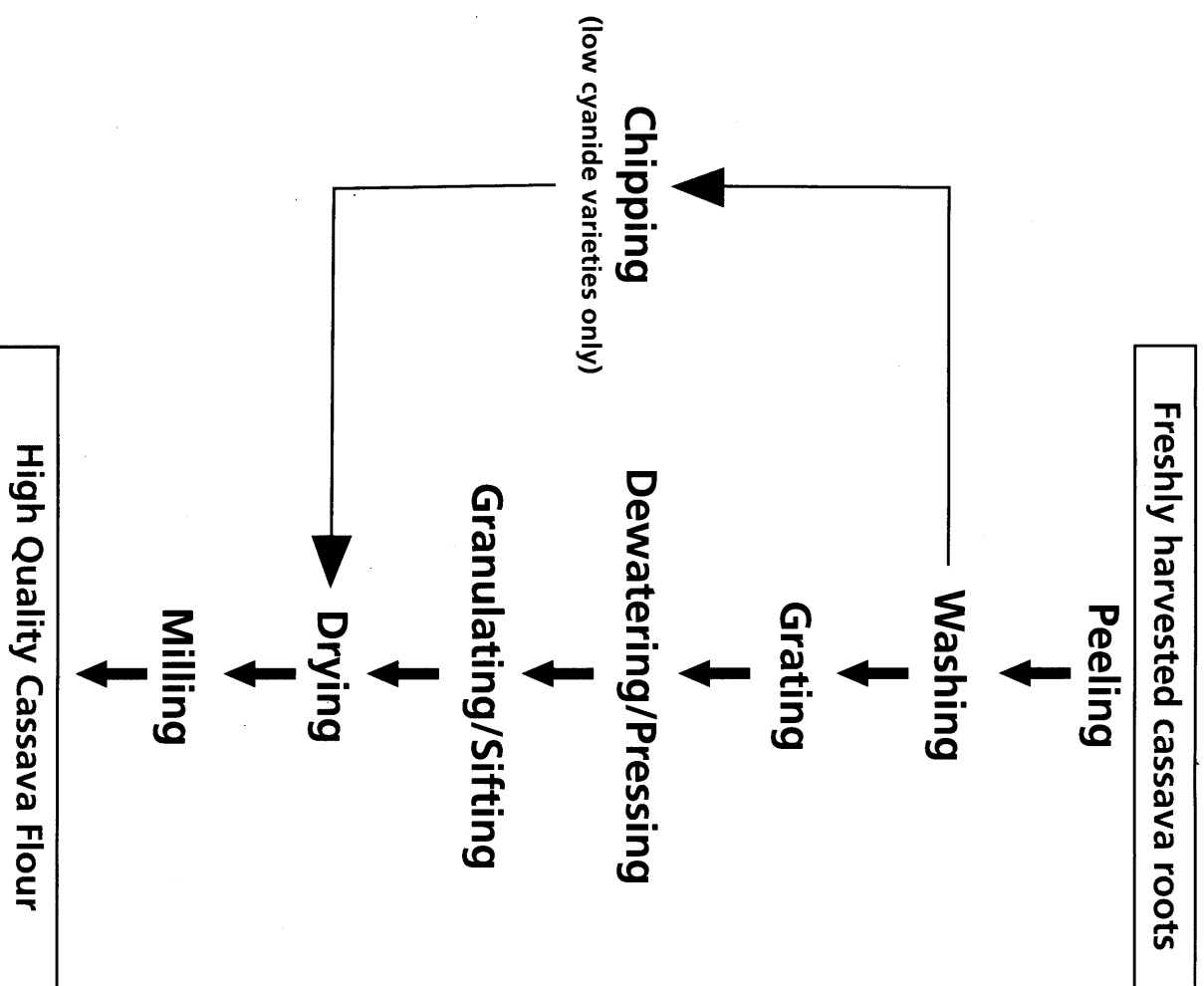
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Introduction

Improving the traditional, small-scale farming system into a market-oriented system is a process that requires different approaches. Processing crops for integration into new growth market has shown to be an effective way to reduce postharvest losses of perishable crops, such as cassava, create demand for the crops, and increase the income of small-scale farmers who are growing the crops. It is important to develop innovative methods that can help these farmers and other processors to gain skills in adopting new techniques to convert perishable crops to products that meet the requirements of local and export markets in terms of price, quality, quantity, and regularity of supply.

This manual was prepared to point out in a simple and direct manner the do's and don'ts of High Quality Cassava Flour (HQCF) production technology. By following the simple descriptions of the technology and taking the necessary precautions, small-scale processors and farmers alike will be able to produce HQCF of consistent quality at minimal cost. The manual will also be valuable to extension agents in helping farmers and small-scale processors to develop the necessary skills for processing cassava to HQCF and supplying the product to the new, emerging markets.

HQCF production Flow diagram



Harvesting Cassava

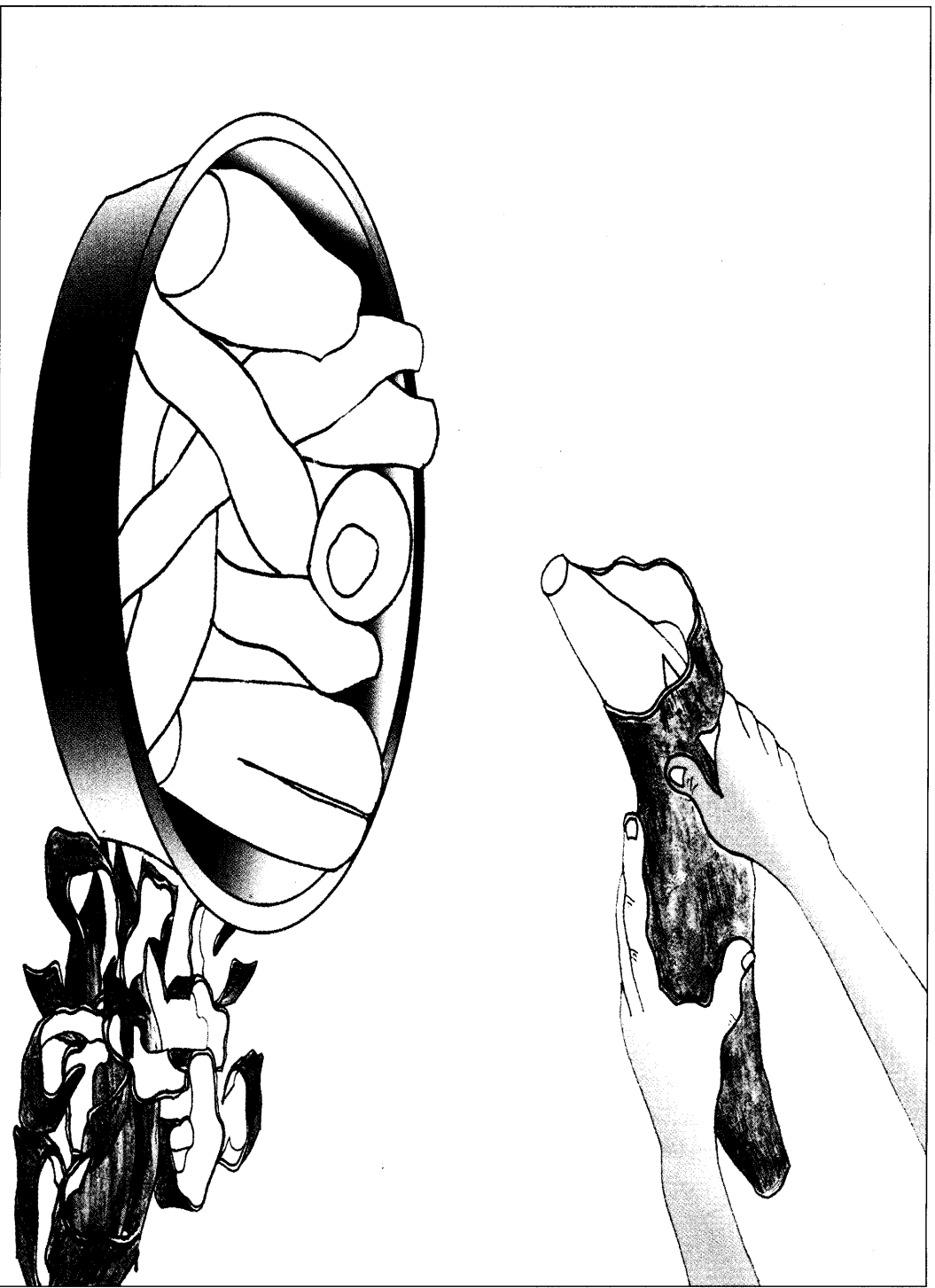


- Select mature plants
- Harvest cassava roots
- Transport quickly to the processing site

- ♦ Select cassava varieties with high starch and dry matter contents.
- ♦ Avoid over-aged or immature plants.
- ♦ Avoid any plant previously affected by bush burning.
- ♦ Avoid damage to the roots when harvesting and packing them into vehicles for transportation to the processing plant.
- ♦ Do not keep harvested cassava roots for more than 12 hours before processing them to HQCF.
- ♦ Do not keep harvested roots under direct sunlight or in the heat.

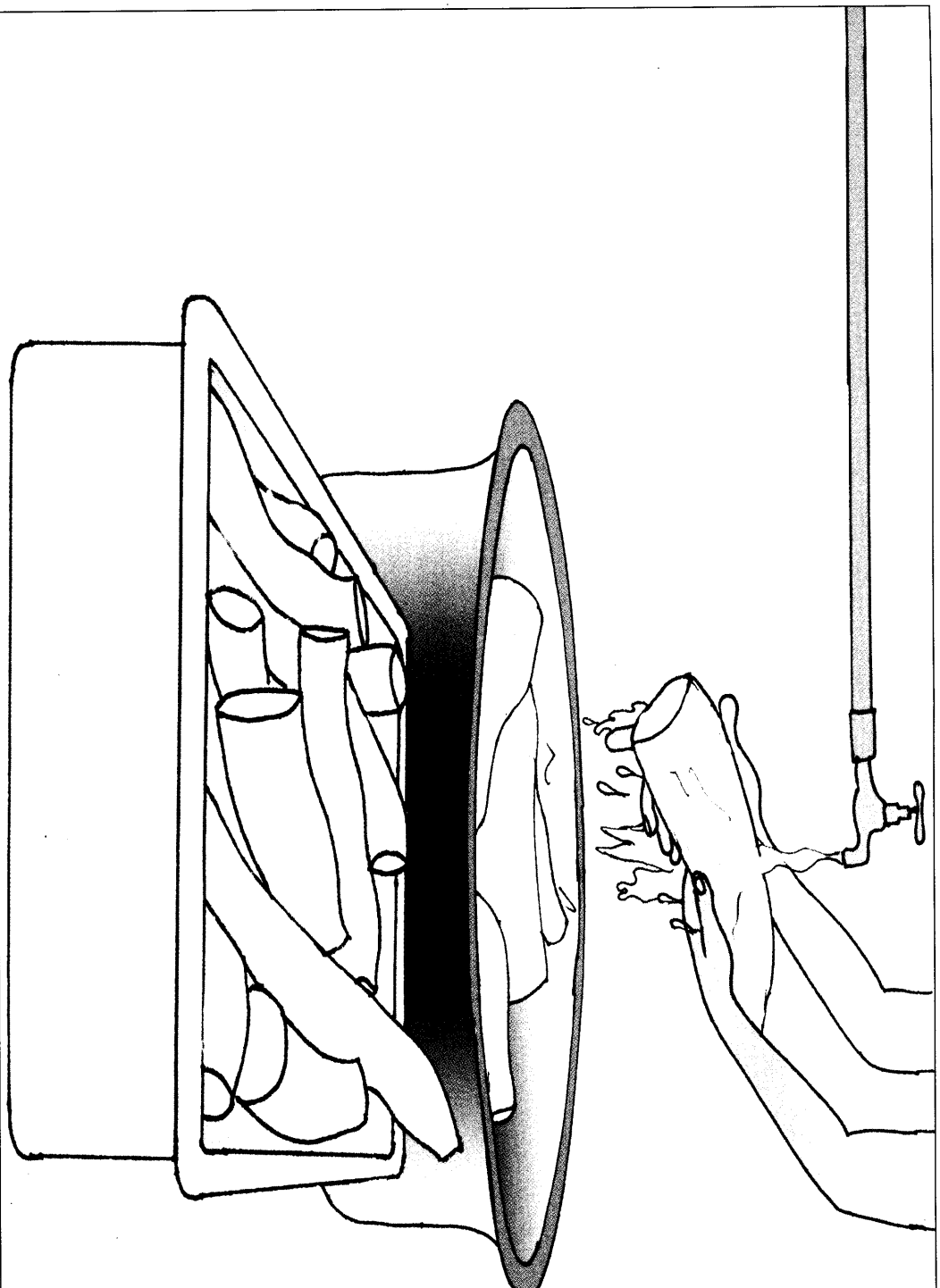
Peeling

- ♦ Avoid removing useful parts of the cassava roots with the peels.
- ♦ Peeling loss can range from 10 to 22%, depending on wholesomeness, size, or age of roots, and the carefulness of the people involved in peeling.
- ♦ Careless peeling, use of tiny, woody, or spoilt roots will lead to a low yield of HQCF.
- ♦ Peeled roots may be left inside water while awaiting washing.



- Remove woody parts stuck on the roots
- Remove the peels and all spoilt portions

Washing



- Wash peeled roots thoroughly with clean water
- Remove all dirt, sand, sticky mud, and smelly parts
- Wash several times in clean water until the roots are completely clean

- ♦ Wash immediately after peeling to avoid a change in colour.
- ♦ Use clean water from a reliable source.

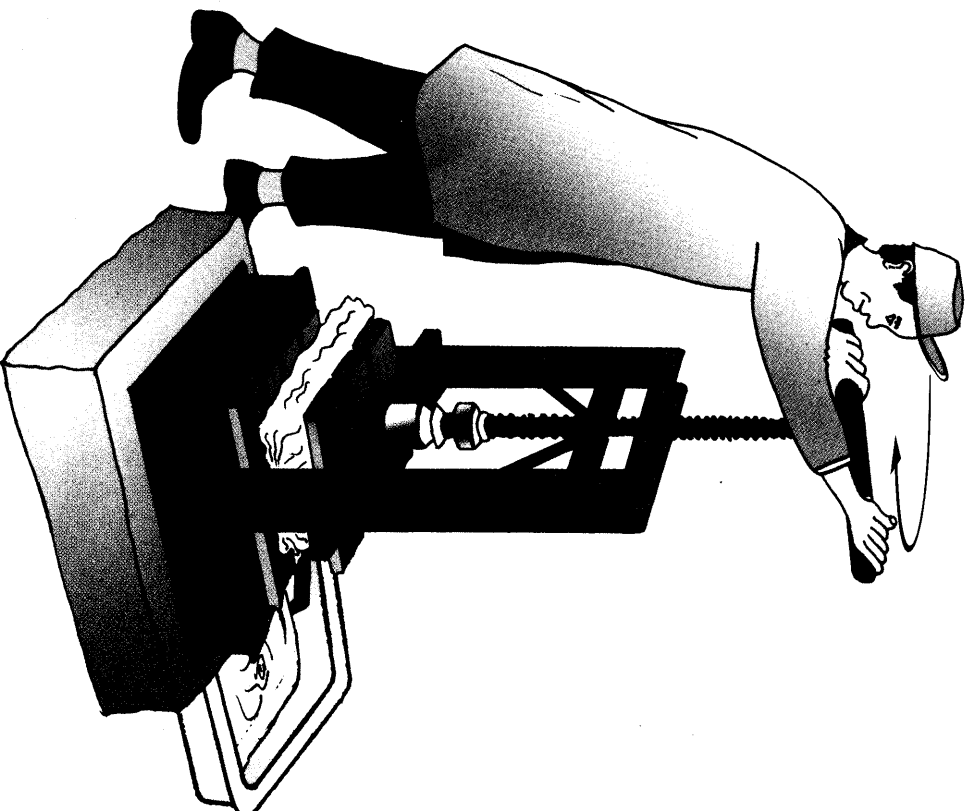
Grating

- ◆ Never allow the sacks containing the cassava mash to touch dirty surfaces (floors, etc.)
- ◆ Wash the grater thoroughly before and after grating.
- ◆ The grating area must be well drained.



- Grate the cassava roots immediately after washing to maintain the white colour
- Collect the grated cassava mash in clean containers
- Pack the mash into clean polypropylene sacks with a fine mesh for dewatering
- Tie the sacks

Dewatering



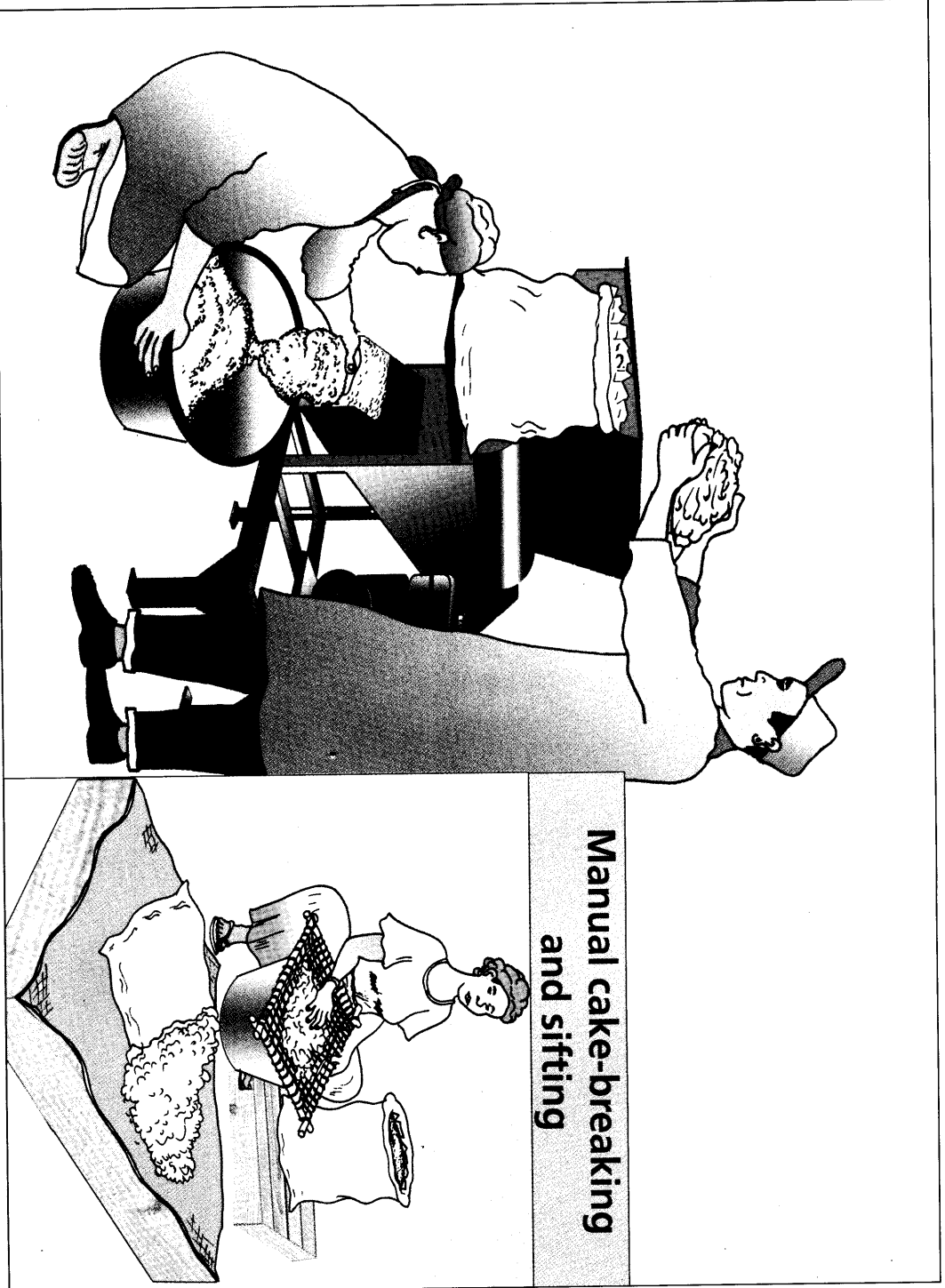
- Ensure that the sack containing the cassava mash is thoroughly tied before being placed on the platform of the pressing machine
- Apply pressure by turning the screw bar clockwise on to the sack until tight
- Allow the liquor to drain out for 3-10 minutes
- Turn the screw bar again until the mash is well dewatered to form a cake that crumbles easily

♦ Most industrial users do not want fermented HQCF. Hence, dewatering should be done as quickly as possible to prevent the mash from fermenting.

♦ Cassava mash may be allowed to ferment for 1 to 2 days if the end-users prefer aromatic and sour flour (e.g., for home cooking). In this case, dewatering does not have to be done rapidly. This batch of flour must be labelled "Fermented Cassava Flour".

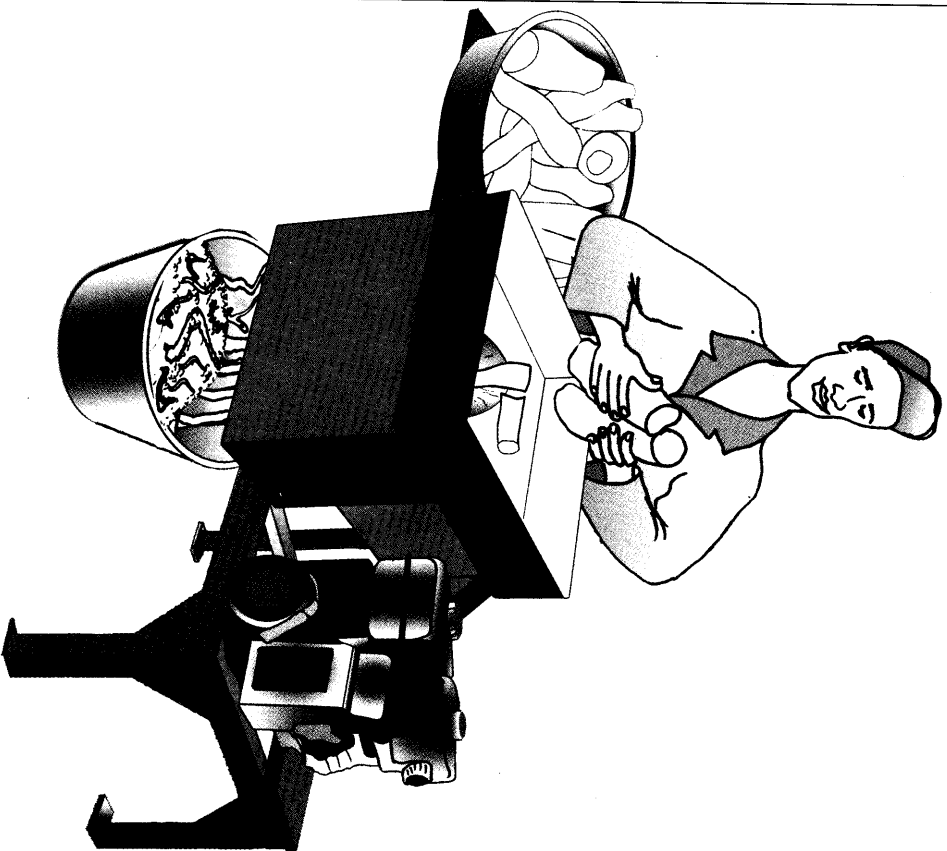
Cake-breaking or Granulating

- ◆ Do not place sacks containing cake or granules on dirty surfaces (e.g. floors).
- ◆ If the cassava grater is not available, a manual sifter may be used to break the cake and sift the granules at the same time.

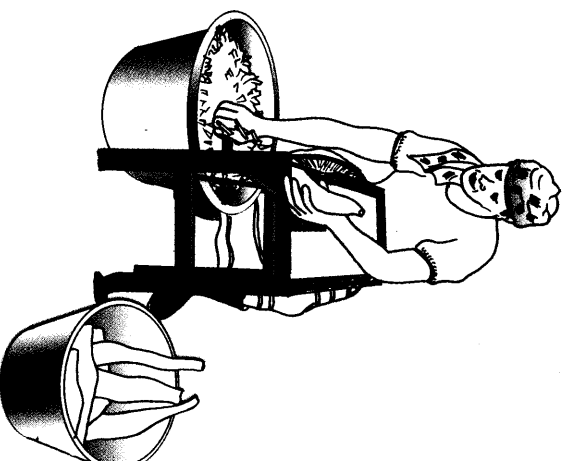


- Empty the cassava cake into clean pans, bowls or sacks
- Feed the cake into a dry cassava grater to break the cake into wet granules
- Sift the resulting wet granules on a sifter to remove lumps
- Use clean containers to hold the wet granules

Chipping



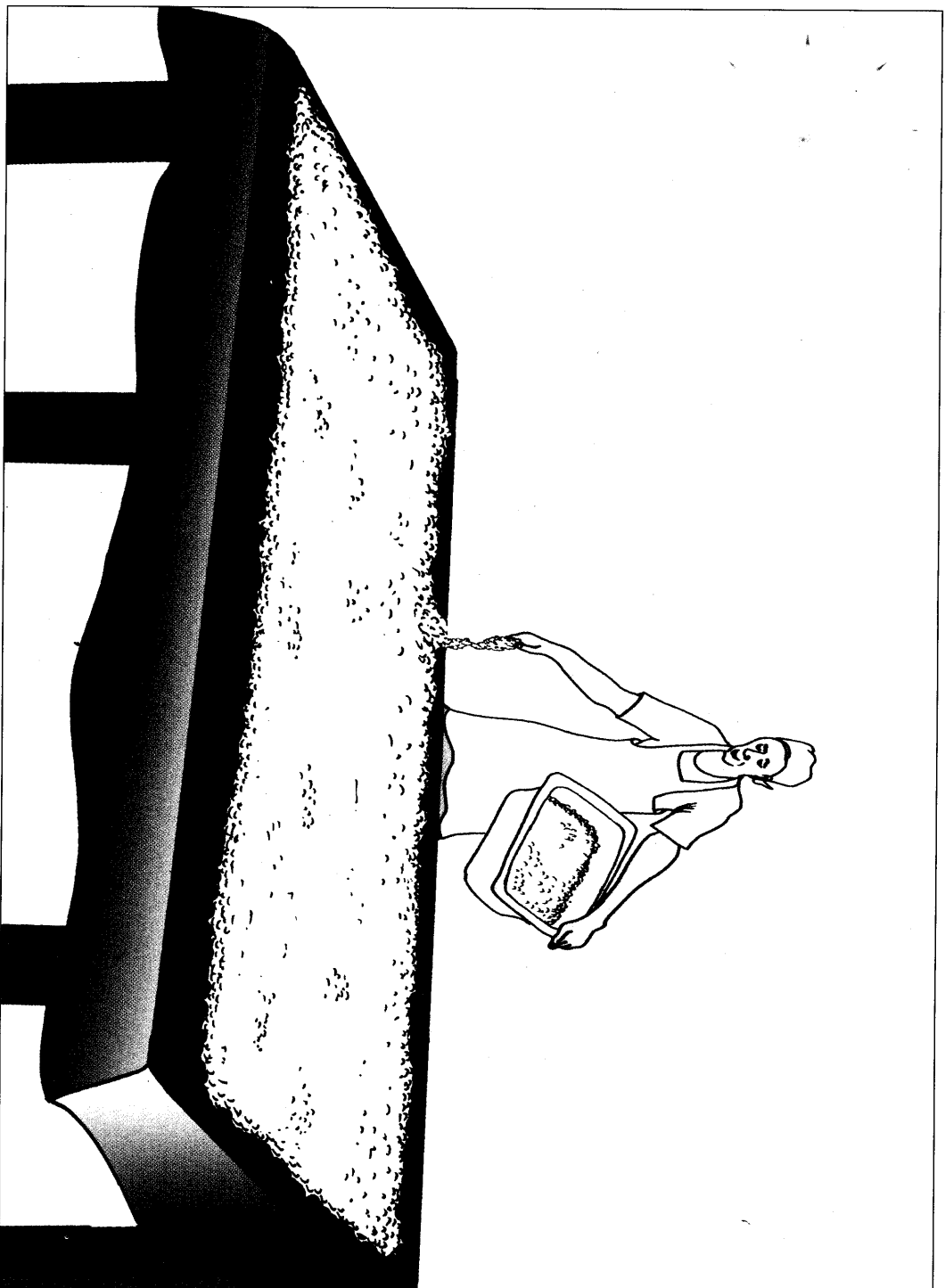
Manual chipping



- ◆ This is an alternative method to grating - dewatering - granulating if a low cyanide cassava is to be processed to HQCF.
- ◆ Never chip high cyanide cassava to produce HQCF meant for human consumption. Grate any cassava variety known to be bitter or contain a high amount of cyanogens.
- ◆ Grate any variety whose level of bitterness or cyanogen content is not known.
- Chip cassava to small and thin chips immediately after washing
- Collect the chips in clean containers for drying

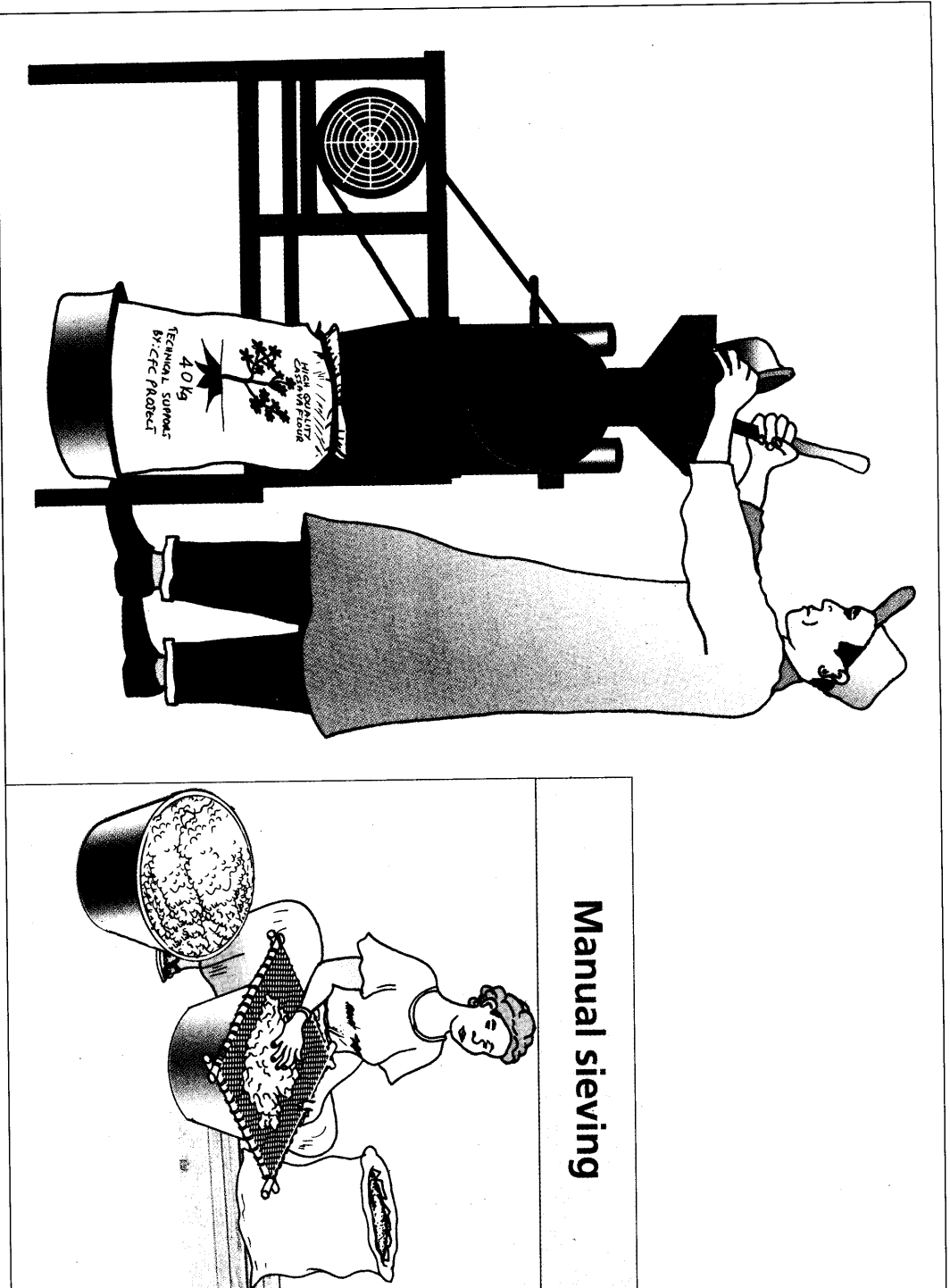
Drying

- ◆ For sun drying, process cassava to HQCF only during dry weather.
- ◆ Begin processing early in the morning and process quickly to begin drying early in the day.
- ◆ Do not load more than 5kg of granules or chips per m² of drying surface.
- ◆ Prevent contamination by dust, animals, pests, including honey bees.
- ◆ It takes 6 to 8 hours to dry granules or chips completely during hot and dry weather.
- ◆ Any insufficiently dried batch of granules should be spread in a ventilated room overnight and continue drying the following day.
- ◆ Maintain clean drying-surfaces and materials.



- Spread the granules or chips thinly on clean black polyethylene sheets or drying mats on raised platforms
- Stir granules or chips regularly for fast drying
- Pack dry granules or chips into clean moisture-proof containers or sacks after cooling
- Label each batch of dried granules

Milling and Sieving



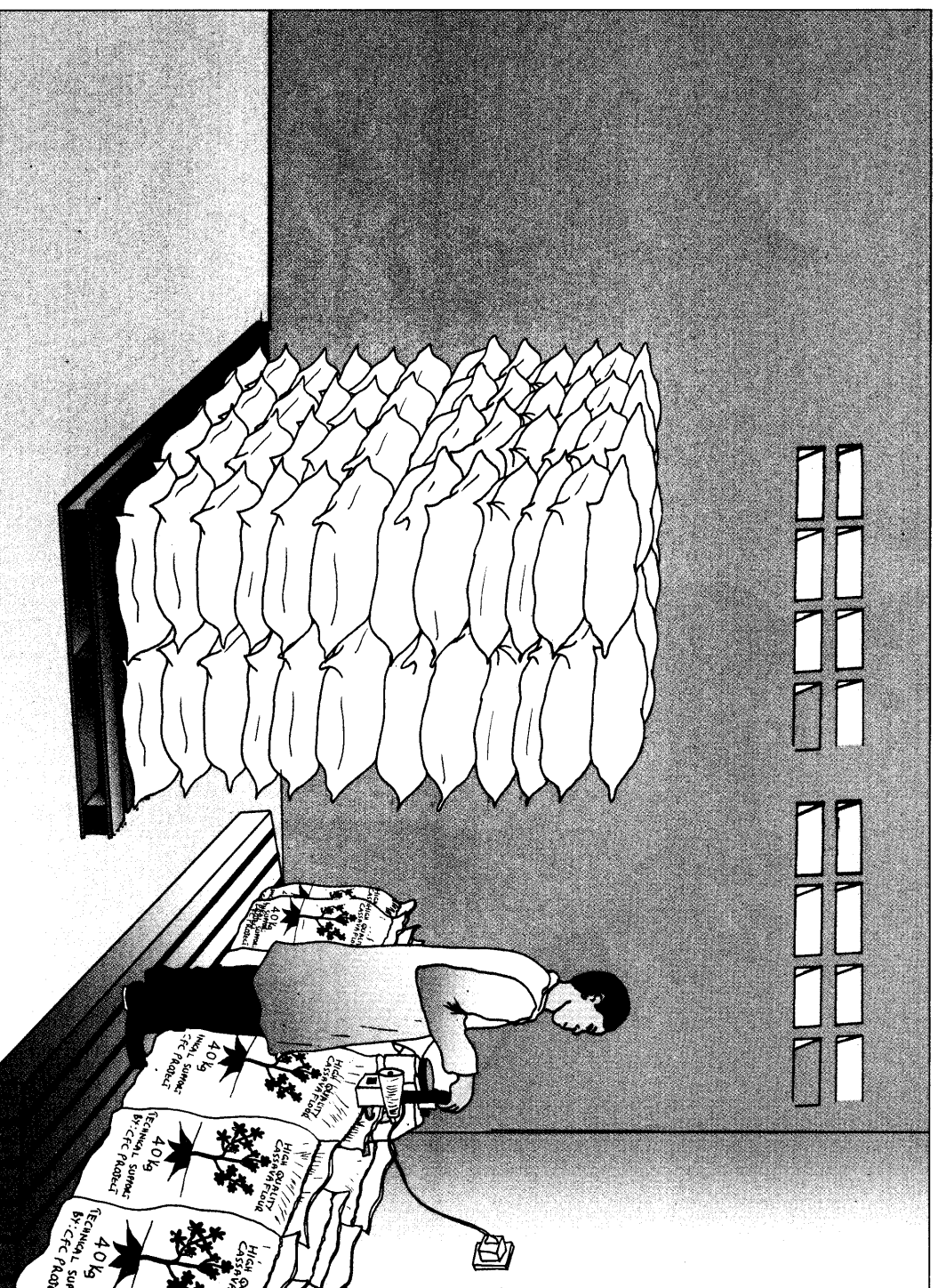
Manual sieving

- ♦ Avoid overloading the mill or sifter.
- ♦ Prevent air pollution (dust and noise).

- Mill dried granules or chips to fine flour (Particle size: 250 to 500µm)
- Leave to cool
- Sieve if necessary
- Put the flour in a clean moisture-proof container

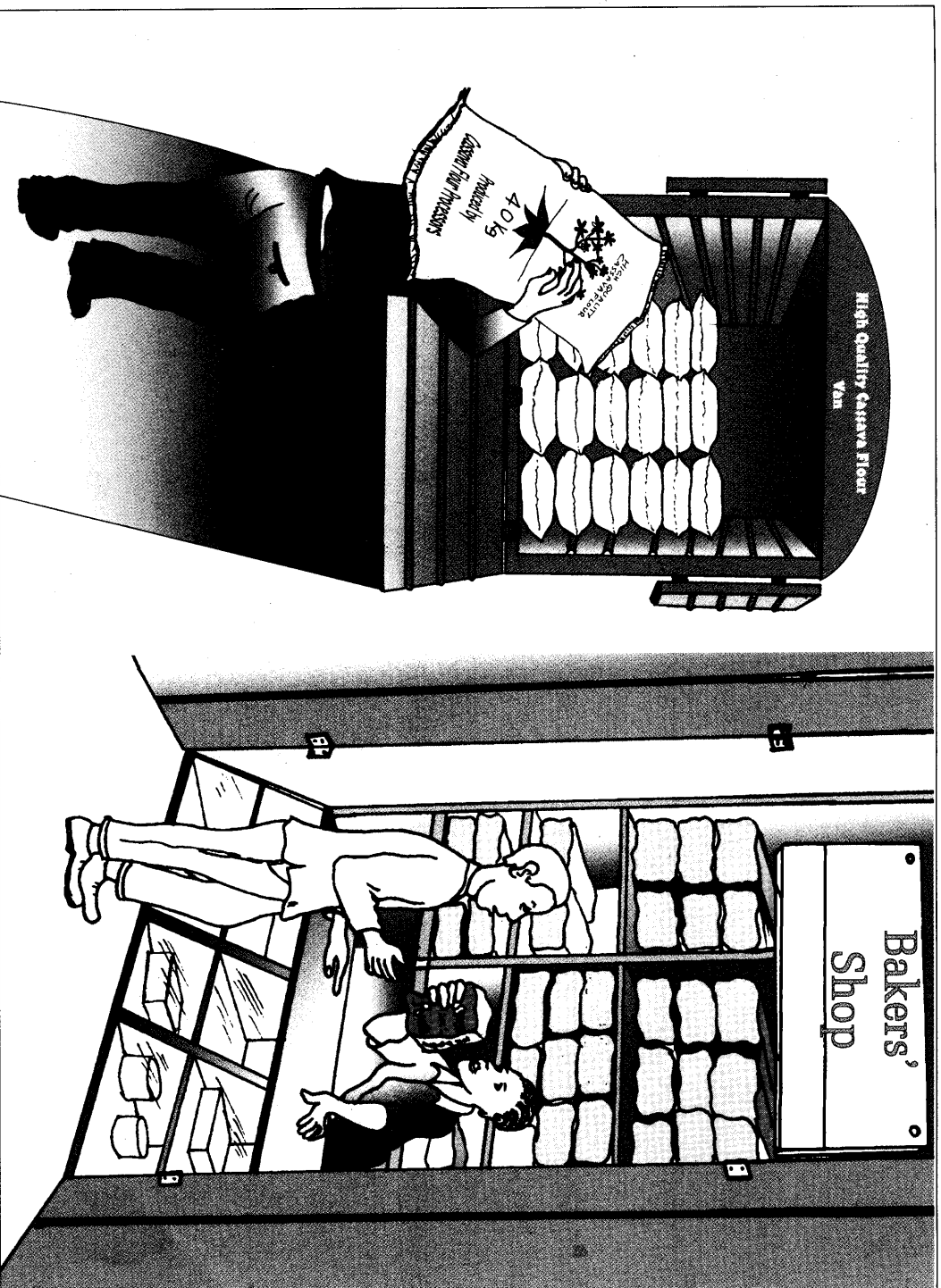
Packaging and Storage

- ♦ Use clean bags that prevent moisture absorption, contamination, and spoilage.
- ♦ Label all bags "High Quality Cassava Flour" and provide necessary product information on the label.



- Weigh and pack the flour in bags of appropriate sizes
- Sew the top securely
- Store bags of flour on pallets in well ventilated storage rooms free from high humidity and pests.

Transportation and Marketing



♦ Avoid contamination through split or leaking sacks.

- Use clean vehicles to transport packaged flour for distribution or storage
- Store properly labelled packaged flour on shelves for marketing

Conclusion

The technology described in this manual has been found to be suitable in rural environments and easily adapted by small-scale processors and farmers' cooperatives.

Although the subject of the manual did not include the profitability of the HQCF enterprises, field results showed that the profitability of HQCF is higher than that of traditional cassava products and HQCF has been found to produce industrial products of high quality. In addition to the use of HQCF for direct home cooking, there are large, unexploited market opportunities for HQCF in the fast food industry and for the manufacture of other high-grade foods, paper, beer, textiles, adhesives, etc.

It is hoped that wide application of the technology and integration of HQCF into industry will widen the market for cassava roots, increase food availability, improve the livelihoods of cassava farmers, and the profitability of user-industries.

About IITA

The International Institute of Tropical Agriculture (IITA, www.iita.org) is an Africa-based International research-for-development organization, established in 1967, and governed by a board of trustees. Our vision is to be Africa's leading research partner in finding solutions to hunger and poverty. We have more than 100 international scientists based in various IITA stations across Africa. This network of scientists is dedicated to the development of technologies that reduce producer and consumer risk, increase local production and generate wealth. We are supported primarily by the Consultative Group for International Agricultural Research (CGIAR, www.cgiar.org).



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