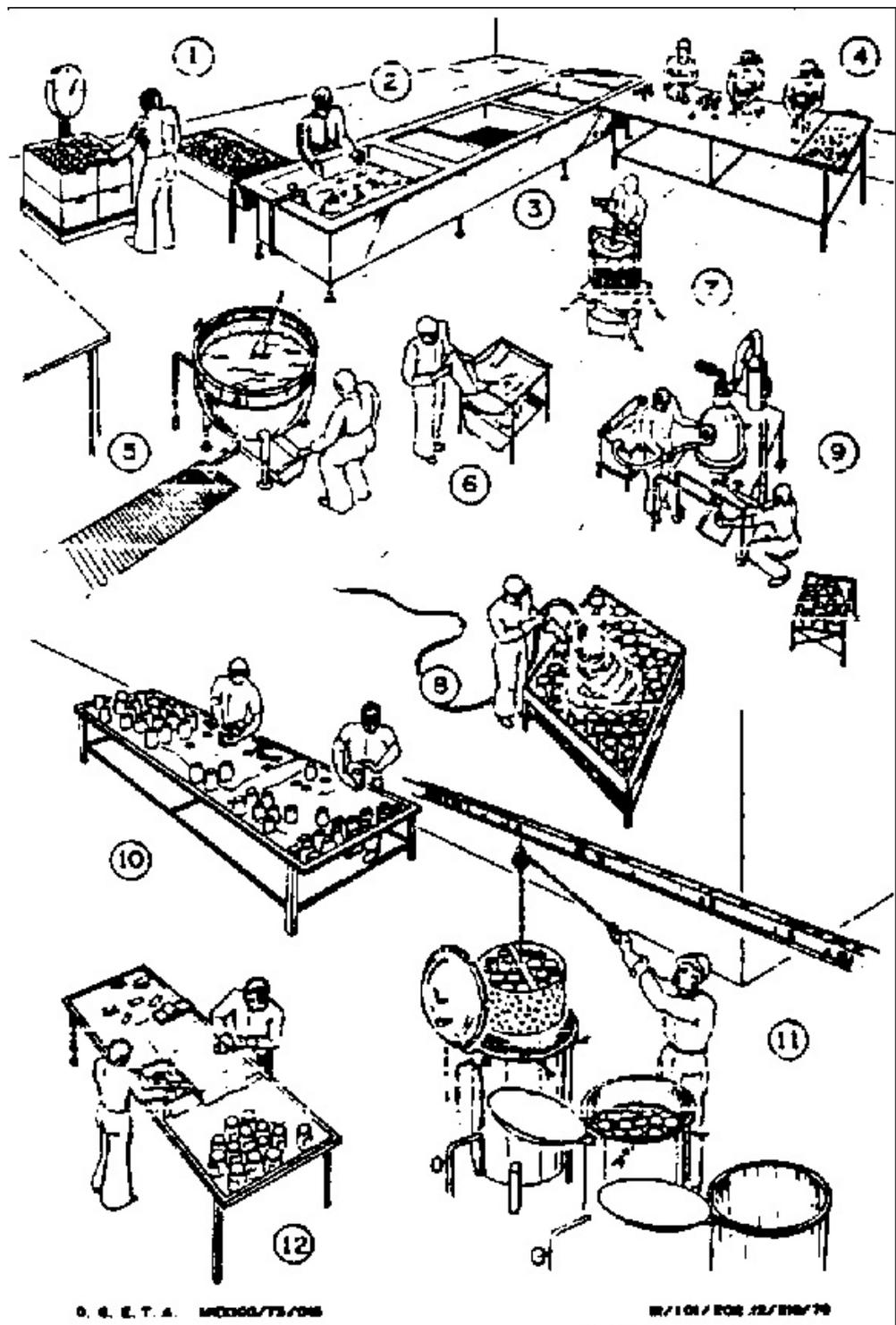


INFRASTRUCTURE





Fruit processing toolkit



INFRASTRUCTURE

1.- Physical Layout

Infrastructure and processing site layout

When setting up a new processing site, one of the first issues to consider is the layout and infrastructure of the site. It is important to keep in mind the costs and the essential infrastructure needed to carry out the required work. It is essential to remember that the food is being processed for human consumption, therefore particular concern should be given to the hygiene and safety of the site.

Physical layout

Because the volumes of production are relatively low and the technology fairly simple, the physical layout of the plant can be simple. However, it must take into account basic health, hygiene and safety. Several different activities take place at the processing site, from the reception of incoming raw materials through the processing to the storage of finished products.

The construction of the building must be sufficient to meet the required production capacity, have the ability to adapt to different products if necessary and be durable and weather proof. The materials used should be light-weight and easy to move and re-adapt if necessary. They should be easy to wash and disinfect. The building should be constructed with smooth walls.

The joint between the wall and floor should be rounded for easy cleaning. The building lines should be simple and square, without crevices and small places that can attract dust and may become birds nests. Windows should be covered with mosquito mesh to prevent the entry of flies and other insects. The ceiling and walls must be made from washable and easily dried materials. They must not be absorbent or porous. The lighting should be natural if possible. If artificial lights are used they must not get in the way of the processing. The bulbs should be protected to prevent glass falling into the products if the lights are broken. It is important to ensure that the processing room is well-ventilated to eliminate odours.

The floors should be made of a solid material, never earth or plant covering. The floor material should be washable and easily dried. It must be gently sloping to allow for drainage and prevent the formation of pools in the processing area. Care must be taken to ensure that the floor is not slippery.

2.- Infrastructure

2.1.-Basic Services

Three basic services are required for a basic food processing operation:

Electrical power

Small home-processing plants can manage without electricity, but for medium and large scale applications, it is preferable to have access to power. This will improve the efficiency and output of the business. It will also enable lighting to be used which increases the hours during which the business can function.

Drinking water

Drinking water should be available in sufficient quantities to allow for the safe, hygienic processing of food. Water must be protected from all possible sources of contamination. The storage tank must be covered. Clean water is often a scarce commodity and therefore efforts should be made to conserve it. Clean water must be available at all times. It is recommended that an elevated storage tank is used that is not reliant on the use of electricity. The use of a storage tank allows the water to be treated with a disinfectant.

It is recommended that chlorine is added to water as a disinfectant. The recommended dosage is 2 ppm of free chlorine, which is equivalent to 100ml sodium hypochlorite solution per 2000 litres of water. At this level, the chlorine disinfects, but does not affect the taste of the water.

Disposal of waste water and material

Provision should be made for the disposal of waste water and waste material

2.2.-Basic facilities

A small to medium scale fruit and vegetable processing unit must have the following basic facilities:

Reception of raw material

The plant must have a special area for the reception and storage of raw material until it is required. This area may simply be a shed or an appropriately designed room. The area should be clean, away from direct sunlight and with control over the temperature and humidity according to the type of material being stored. Raw materials (especially fresh fruit and vegetables) deteriorate rapidly if they are stored in poor conditions. The temperature of the store room must be as low as possible. If refrigeration is not available, the material should be collected early in the day when it is cool. The humidity of the store room should be relatively high to prevent the material dehydrating and losing its quality. The temperature should be no higher than 30 degrees C and the humidity lower than 70%. The raw material storage area should not be used for the storage of other products that could contaminate it such as cleaning materials and pesticides. The quality of the finished product is directly dependent on the quality of the raw material. Thus the conditions of the storage area are of great importance. The storage area should have basic equipment such as weighing scales for the reception of raw material.

Processing room

The processing room is the main place of activity. The different materials used during processing and the various pieces of equipment are kept here. Ideally, the room should be large enough to house all the equipment needed for the various stages, to allow the process to be continuous and improve the efficiency of processing. The processing room should be divided into areas where different functions are carried out. In general this would be a dirty area for cleaning and peeling the raw material, plus areas for juice extraction, heating, filling, packing

etc. The dirty area must be kept apart from processing areas to avoid cross contamination of processed fruits with peels and waste material.

Quality control

Quality control operations should be carried out in a separate room. The room should be equipped with basic equipment such as a sink, running water and a bench or table where the tests can be carried out. The equipment for testing should be kept in this room.

Storeroom for finished products

The storeroom should be clean and airy, free from damp and away from direct sunlight. The temperature of the room should be kept as low as possible to maintain the quality of the stored products. The storeroom should be fitted with shelves to allow neat and tidy storage of the processed foods. Processors should regularly test the quality of the stored products and make sure they rotate the stock, selling the oldest stock first.

3.- Equipment

Checklist of basic requirements for a small rural agro-enterprise

- Building specifications

Processing area (5-10 x 10m approx) equipped with ceiling fan, mosquito net windows, separate room for storage of additives, packing material and finished products. Ample natural and artificial light. Sanitary facilities outside the processing area. Electrical power supply. More than one socket; sockets high up the wall away from the damp floor. Drinking water available. Double dishwasher, preferably enamelled or stainless steel, with running drinking water. Two double gas stoves or electrical, paraffin or solid fuel heaters. Two enamelled or wood tables (180x120x80cm) with a galvanised steel or stainless steel covering.

- Equipment

- Weighing scale (from 50-100kg)
- Weighing scale (from 3-5kg)
- Weighing scale (from 100-500g)
- Refractometer (0-90 degrees Brix)
- Refractometer (0-30 degrees Brix)
- Stainless steel thermometer (0-150 degrees C)
- 2 cast aluminum pots with lid (capacity of 50 litres)
- 2 cast aluminum pots with lid (capacity of 10 litres)
- 2 cast aluminum pots with lid (capacity of 5 litres)
- 10 wooden chopping boards
- 5 stainless steel knives with thick blade (15-20cm x 2cm)
- 5 stainless steel knives with thick blade (10cm x 1cm)

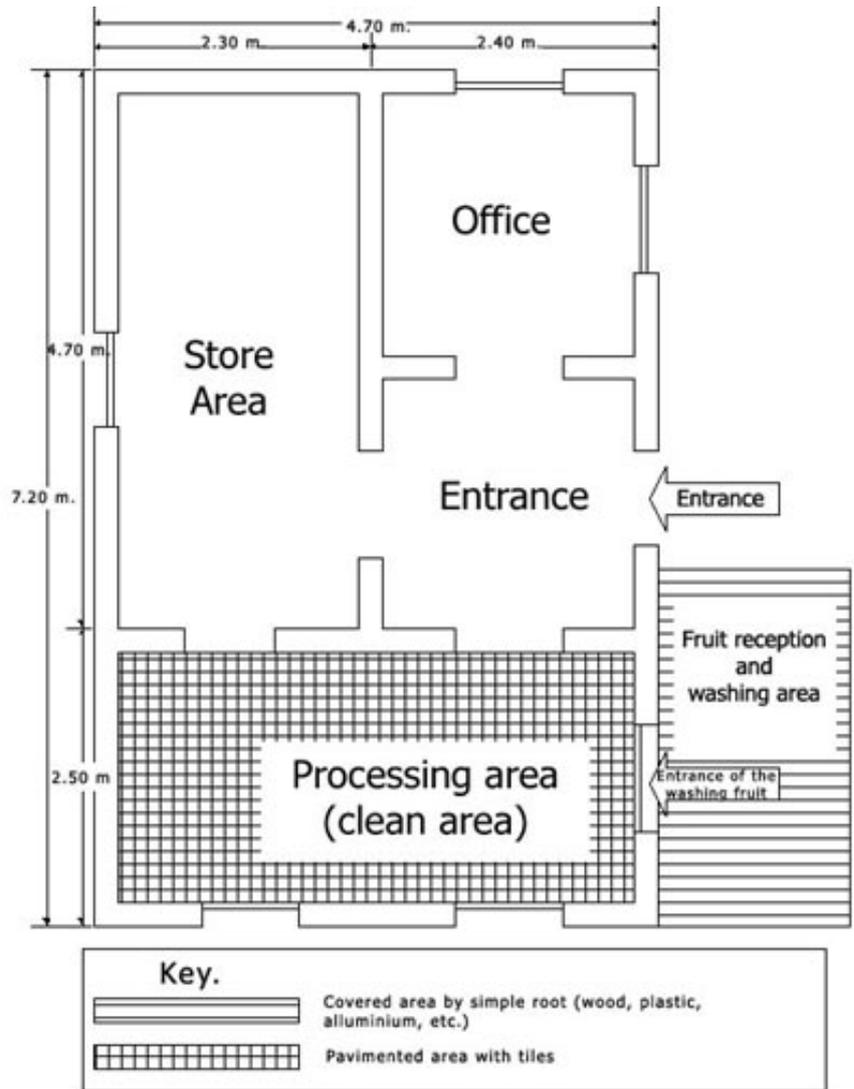
- 5 colanders (20-25cm diameter) with aluminum mesh
- 5 plastic trays (40x60x5cm)
- 10 plastic buckets (20 litres)
- 10 plastic buckets (10 litres)
- 2 plastic or aluminum funnels (20cm diameter)
- 2 plastic or aluminum funnels (15cm diameter)
- 3 stainless steel spoons of different sizes
- 3 large plastic spoons
- 3 medium wooden spoons
- 3 large wooden spoons
- 2 manual pulp extractors
- 2 manual cappers for crown cork
- 5 perforated plastic cases for fruit (18-20kg)

Additional equipment for a medium-large scale enterprise:

- Small boiler, generating about 250 kg steam per hour
- Vertical autoclave with a capacity for 200-500 jars
- Pulper, either manual or electrical
- Hand operated hydraulic press
- Two double-wall kettles
- Dryer

PROCESSING UNIT

SMALL SCALE



MEDIUM SCALE

