Food and Agriculture Organization of the United Nations

The FAO-Thiaroye processing technique How to construct it and assemble its components

Source	FAO-Thiaroye
Keywords	Fisheries, Burundi, post-harvest losses, raised racks, drying, fish processing techniques, post-harvest fisheries technological platform
Country of first practice	Côte d'Ivoire
ID and publishing year	8304 and 2015
Sustainbale Development Goals	No poverty, zero hunger and decent work and economic growth

Summary

The FTT-Thiaroye is a technique drawn from the collaborative efforts between the FAO and the National Training Center for Fisheries and Aquaculture Technicians (CNFTPA) training institute in Senegal. Its development addresses the need to improve small-scale fish drying and smoking operations. The key to its adoption rests upon its benefits. Globally, the main condition required for the FAO-Thiaroye technique to be successfully applied is the know-how of its construction, use and maintenance.

Description

1. Overview of the comparative advantages of the FTT-Thiaroye

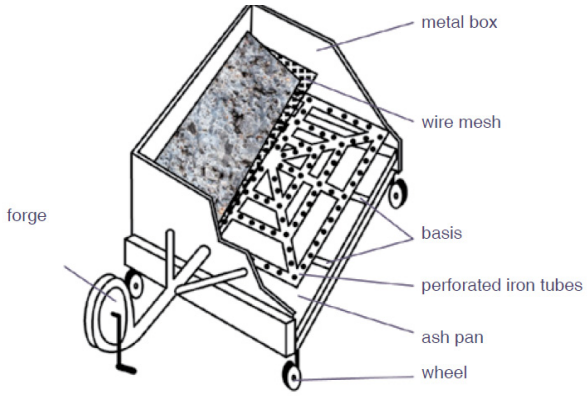
The FTT-Thiaroye is an innovative and polyvalent technique with important advantages for each actor of the fisheries supply chain. First, the FTT allows dried and smoked products that better meet food safety requirements. This results in a positive endorsement by the competent authority in charge of certifying products placed on the market, be it at the national, regional or international levels. Consumer confidence is also enhanced with superior quality products that better meet their expectations.

Second, the FTT allows drying and smoking operations regardless of weather conditions. Consequently, post-harvest losses, which may exceed 50 percent during the rainy season or cloudy days are better controlled. But the FTT-Thiaroye also provides opportunities for additional revenue for fish operators, with the possibility to process by-products. Fat gathered through the fat collection tray allows, for example, the manufacturing of soap, or can be used as cooking or frying oil.

Finally, we can say that the FTT-Thiaroye practice reduces the wood or coal to fish ratio, and it is also adaptable to other fuels such as coconut husks and shells, stems or corncobs, sugar cane bagasse, etc. Overall, the use of the FTT presupposes less deforestation, better protection of mangroves, thus resulting in positive conservation of natural resources. Talking specifically about gender concerns, the use of the FTT-Thiaroye practice reduces female fish processors drudgery, including a lower exposure to smoke and heat. At the same time, women spend less time on fish processing, allowing them to

TECA
TECHNOLOGIES and PRACTICES for SMALL AGRICULTURAL PRODUCERS

Figure 1: Ember Furnace



© FAO/TECA

engage in household chores simultaneously.

Up to now, prototypes of the FAO-Thiaroye technique have been provided through technical cooperation programmes implemented by FAO in some African countries. Many of them are used within post-harvest fish technology platforms constructed to address challenges and key issues in small-scale fisheries; others were offered to institutions whose first calling is to export smoked fish to European Union countries.

The FAO-Thiaroye is a technology built on the strengths of existing improved ovens (kiln) that are adopted all over Africa, such as the Chorkor, Banda, or Altona while correcting their shortcomings to come up with accessories available locally and suitable for small-scale processing operations.

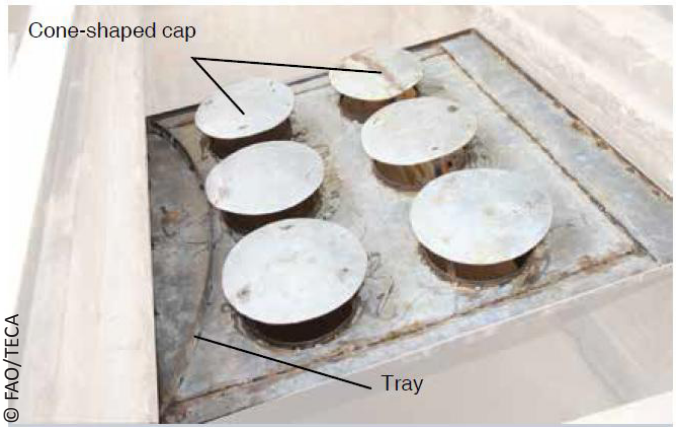
These kilns become FTT when some specific components are added to them, and these are: (1) the ember furnace, (2) the fat–collection tray, (3) the indirect smoke generator system, and (4) the hot–air distributor.

1.1 The ember furnace

The ember furnace is meant to hold the fuel used to cook the fish. Loading it in the fireplace concentrates the heat on the product.

The furnace should fit the dimensions of the kiln's gate, and it mainly consists of a metal box that is 26 cm high and 1 m wide. As such, the furnace is 98 cm long, and

Figure 2: Fat-collection tray



© FAO/TECA

Figure 3: Smoke generator system



88 cm wide, with a mesh of 5 mm netting, 97 cm long, and 87 cm wide.

The materials used for the construction of the furnace are:

- one galvanized steel sheet with a thickness of 1.5 mm;
- one piece of cornière (length: 5.80 m; width: 30 mm);
- one piece of flat iron (25 mm);
- one piece of forge;
- four pieces of metal wheels; and
- two pieces of the handle.

The furnace can be improved by equipping it with a detachable pull-tab that fits on with a pipe placed on the front of the furnace.

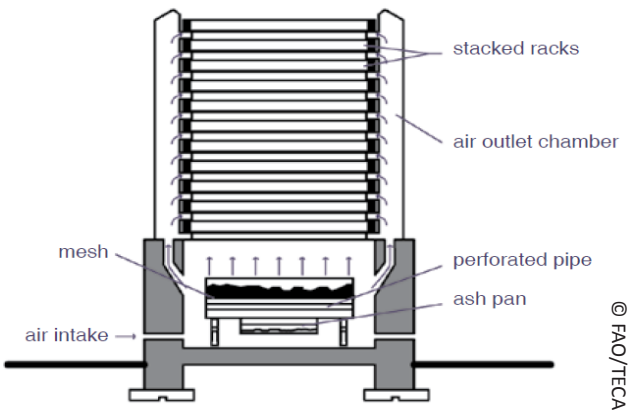
1.2 The flat-collection tray

The fat-collection tray is used for collecting fat while cooking the fish. It includes a set of holes allowing the heat from the stove to reach the fish on the rack, and each hole is topped with a cone-shaped cap allowing the fat and exudate to drip on the tray that will be slightly tilted so that the oil can drip towards the edge. The oil will be collected in a container placed outside the furnace through the pipes welded at the end edges of the tray. The size of the fat-collection tray may vary but must fit the kiln in which it will be placed.

To manufacture the fat-collection tray, the following are usually need:

- one galvanized steel sheet of 2 m long,

Figure 4: Hot-air distributor



1 m wide and 1.5 mm thick;
- two bars of 30 mm flat iron; and
- one bar of 6 mm iron rod.

A more convenient model would have an opening made in the kiln. It is fitted out with parallel runners allowing the fat-collection tray to slide and be removed more easily without touching the rack as it is now equipped with two handles.

1.3 The indirect smoke generator system

The indirect smoke generator system consists of a metal barrel welded to a metal tube that is about 1.5 m long and 30 cm in diameter. The metal tube can be shaped into a spiral or circular tube depending on the available space. It also includes a metal casing in which the filter is inserted. All of these are then inserted into a metal housing.

1.4 The hot-air distributor

The hot-air distributor (Figure 4) is composed of two metal boxes. Inside each of these, horizontal fins match the number of drying racks and perfectly fit them. The drying racks are stacked and arranged vertically. A metal pipe connects the furnace to the air distribution box to facilitate the air flow.

The hot air can thus circulate on the racks using the furnace's forge. The hot-air distributor or ''air blower'' has the same height as all the racks stacked together and the same width as the wall of the compartments (between 30 and 40 cm). It is made up internally of fins like those of aero-evaporators, enabling the hot air to circulate over each rack. As for the aerated rack's frame, its height is increased from 7 cm to 10 cm, and a longitudinal opening is made at a level of 3 cm to allow the warm air through during drying.

As for the fuel sources, wood is generally used, especially for smoking fish products. Agricultural biomass such as bagasse (plant material derived from sugar cane), corn cobs, millet or rice stalks and coconut husks or shells can also be used as fuel. However, the use of fuels other than wood and plant material for smoking food is to be prohibited.

Fuels such as diesel, rubber (including tires) or waste oil should never be used even as a partial component, as they can significantly increase the level of polycyclic aromatic hydrocarbons (PAHs).

The FTT has been tested and validated firstly in Senegal. Then fish processors in other African countries have also experienced the Thiaroye system, like in Togo, Cote d'Ivoire, Tanzania, and recently in Ghana. The primary user groups of the FTT-Thiaroye are obviously fish processors, the majority of which, in Africa, are women. A training video and a methodological guide (English and French) have been released in that respect.

2. Further reading

Ndiaye, O., Sodoke Komivi, B. and Diei-Ouadi, Y. 2014. Guide for developing and using the FAO-Thiaroye processing technique (FTT-Thiaroye). Rome, FAO. 67 pp. Available at: http://www.fao.org/3/a-i4174e.pdf

3. Agri-ecological zone

- Tropics, warm
- Subtropics, warm/mod cool

TECA
TECHNOLOGIES and PRACTICES for SMALL AGRICULTURAL PRODUCERS