

THE USE OF ICE IN FISHERY

The importance of keeping fish fresh, as long as possible before consumption, has been a challenge for many cultures for thousands of years. Both the ancient Chinese and the ancient Romans used natural ice and natural ice mixed with seaweed respectively to preserve their catch. It wasn't until the mid-19th Century when mechanical refrigeration was invented and later perfected by the Frenchman Ferdinand Carre that ice readily became available to use of fish preservation.

Preservation of fish is of great importance to the coastal poor. Preserved fish products provide adequate protein during low fishing periods. Ice preserves fish and extends shelf life by lowering the temperature. If the temperature is decreased, the metabolic activity in the fish can be reduced or stopped.

Some of the issues faced by the artisanal fishers are as follows:

- Ice is not available at the FLS to allow fishers to take ice to sea with them
- Fishing boats are not equipped with containers, such as insulated boxes, to carry ice if it was available;
- Catch is generally only kept for a few hours on board and is then sold immediately, giving the impression that the need for ice is less important.
- Catch is not handled well on board the boats and is often exposed to hot sun.
- Some consumers indicate an aversion for fish preserved in ice.
- Ice represents additional operating costs for the fishers and so reduces their profits.

As a result, SmartFish, as part of their value-chain enhancement activities to help reduce post-harvest losses and improve quality of fish for trade, has intervened to assist fishers and fish sellers in both coastal and inland fisheries to improve the quality of their fish through the use of ice. Coastal areas include Tamarin FLS (Mauritius) and Vanga and Shimoni FLS (Kenya). For inland fisheries Malembo (Malawi) and Gisenyi (Rwanda) are examples.

WHY USE ICE

An effective method of preserving the freshness of fish is to distribute the ice uniformly around the fish. Ice is a safe cooling method, which keeps fish moist and suitable for transport. It has become widely used since the development of mechanical refrigeration, which makes ice easy and cheap to produce and it is produced in various shapes; crushed, flakes, plates, tubes and blocks.

The use of ice and the amount of ice needed varies with a number of factors, including; type of fish, type of fishing and weather conditions which is the main issue facing fishers and buyers. Generally in hotter regions, a rule of thumb often used is for every 1.0Kg of fish 1.0Kg of ice should be used. Other factors to be taken into consideration are the requirement of ice on the boat before fishing; the availability of ice at the landing site when the fish is unloaded, and availability of ice for the buyers who are transporting the fish to the next step in the distribution chain. If appropriate infrastructure is available at the FLS (such as covered areas for unloading and sorting fish, or the availability of refrigerated transportation) then the amount of ice required may vary.

These conditions therefore dictate the amount of ice that is required and supports calculations for specifying ice equipment to

be provided for landing sites. The system used is to estimate as accurately as possible the amount of fish that would, on average, be landed at a landing site throughout the year and then using a multiplier such as 1:1 or 2:1 (Kg ice: Kg fish) calculate the amount of ice required. In addition, there may be a requirement to understand peak fishing periods at certain times of the year and so increase the requirement of ice accordingly. In addition to ice machinery, there is usually some space for ice storage at the sites. Ice storage space is most commonly specified to be equal to 3-times the capacity of the ice making equipment.

EXAMPLES



Tamarin fishermen using the cool boxes © SmartFish database

Tamarin – Mauritius

The “Mauritius Fishermen’s Cooperative Federation (MFCF) Limited” is located in Tamarin on the south west coast of Mauritius, it is an old fishing village and produces about 4 Mt of fish per month (high season from March to October) and about 1.5 Mt per month during low season. The fish is mainly caught with nets and includes red mullet, dame berri, tuna and capitaine. It is brought to the landing sites and then transported to the cooperative building located close-by. It is then processed and distributed or sold directly to customers from the cooperative building. Ice is therefore crucial to keep the fish as fresh and as cool as possible from the moment it is caught out at sea to the time it is sold to the final consumer.

In order to assist this process SmartFish has provided the MFCF with 40 fish containers, an ice-making machine, 150 polystyrene boxes for transporting the fish and ice and a vacuum package machine for packaging the final product. The fishermen at the Cooperative have also been trained in fish handling and processing to better handle their product and the ice machine which can produce up to 800 kg (it is specified as a 1 Mt machine) of ice a day provides the fishermen with fresh flake ice in order to store the catch instantly from the moment it is caught right up to the moment it is sold to the consumer.

Since SmartFish’s intervention the MFCF has managed to obtain a grant from the Mauritian Government to upgrade its facilities, it has also increased its catch and has managed to reduce post-harvest losses.

Vanga/Shimoni – Kenya

Vanga and Shimoni are located in Kwale County just south of Mombasa. The county has roughly over 3,800 fishers and produces almost 2.5 Mt of fish, which is almost 30% of the national marine production (Kenya Fisheries Bulletin 2010). Some assistance

The importance of ice in the value-chain



MFCF Refrigerated truck © SmartFish database

has been given to these two landing sites by the Government of Kenya and other donors; an ice plant and cold store at Vanga, fish grading and processing areas at both locations, as well as Beach Management Unit (BMU) offices.

SmartFish is now working at these sites; the goal for SmartFish is to improve fish quality as a key step to improving the marketability of the products and increased prices. The ability for these fishers to deliver good quality fish to the market is a ticket to economic reward for the entire community.

After an initial visit by SmartFish, a baseline assessment was completed and a training workshop for 100 fishers and members was held at a BMU. SmartFish procured two chest freezers for Shimoni landing site together with insulated boxes to be used on shipping vessels. The boxes will be tailored to fit to the different sized boats. Additional training for the maintenance and operation of ice machines is envisaged for Vanga and Shimoni, increasing awareness about fish handling and quality at the sites; support for product marketing in Mombasa as well as other regional markets; and monitoring visits.



Ice machine © SmartFish database

Malembo – Malawi

Malembo is the largest landing site on Lake Malawi and of great importance to trade development; it requires a good quality infrastructure for improving the quality of fish for local consumption and for export. The Fisheries Department in Malawi has available a 5 Mt ice plant and cold storage equipment already present from a previous project, but which had not been installed due to problems with a previous contractor.

To ensure that this vital equipment is put to the good use it was intended for, SmartFish is supporting its installation and commissioning. This will allow for better management of fish quality by providing ice to fishers during fishing, for landing and processing operations and to ensure availability of ice for transporting fish from the site to national and regional markets in Zambia and South Africa. The cold storage facility will allow for a buffer storage area when fish landings are high and allow for control over market prices so that the best value for the fish can be attained.

Gisenyi – Rwanda

Gisenyi is a small town of about 100,000 people situated on Lake Kivu in the Western Province of Rwanda, it is regarded as a very



The use of ice © SmartFish database

important border market point for fish entering DRC. The majority of the fish (mainly small pelagic, tilapia and catfish) arrives from Uganda in ice filled trucks and is sold to hundreds of Congolese women who cross the border every day to buy the fish and resell in their own towns. The problem is keeping the fish fresh as long as possible during their journey back home. The women are equipped with their own containers in most cases made of plastic, some utilise the (dirty) ice from the trucks and fill their containers with the fish just bought. The containers are not covered and are subject to further contamination and exposed to dirt and pollution.

To assist these women a SmartFish project will provide insulated boxes for fish traders in 5 Districts along Lake Kivu. Each one of the 5 cooperative unions (1 in each district) will be supplied with insulated boxes suitable for hand-carrying the fish; The Cooperative Union Committee will ensure that the boxes are well-handled and maintained and distributed to the women. As part of the process a refresher training on fish hygiene and handling will be arranged. The training will be coordinated by the SmartFish National Focal Point and will utilise the beneficiaries (trainers) from the Training of Trainers' Fish Quality & Hygiene undertaken previously in Rwanda by SmartFish.

The insulated cool boxes will ensure a better handling of fish, better quality of fish for trade and easier carrying system.

A FINAL WORD

By using ice the quality of fish is maintained as fresh as possible. The primary objective is to prevent spoilage and therefore ensure food safety. Clearly the better quality fish that reaches the final market, the better the price achieved.

Better quality – More money!



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