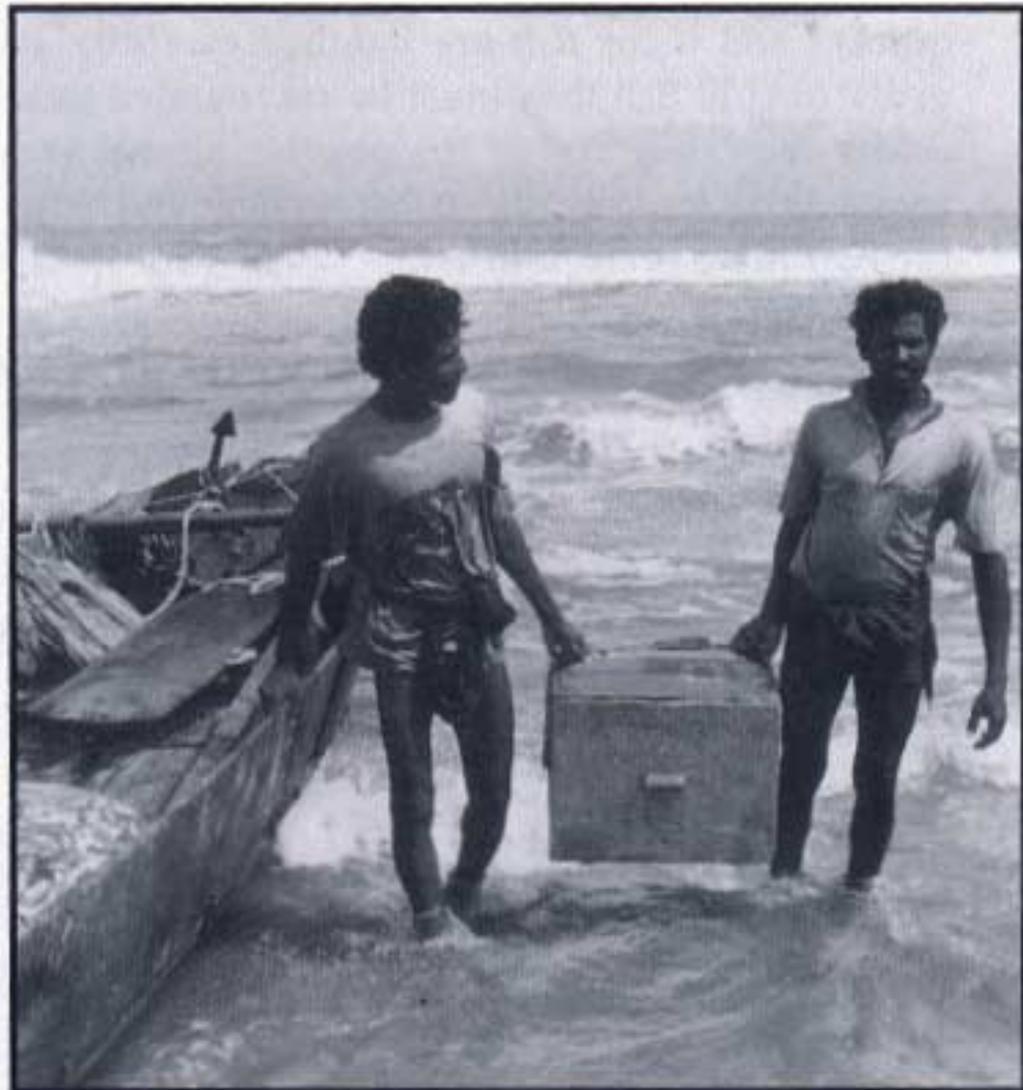


USE OF ICE IN ARTISANAL FISHERIES



**DEPARTMENT FOR
INTERNATIONAL DEVELOPMENT**

**POST-HARVEST
FISHERIES
PROJECT**

INTRODUCTION

WHY USE ICE?

Fish spoilage is a one-way process; fish will lose quality after death and eventually become unfit for consumption. Failure to keep fish cool immediately after harvesting will accentuate spoilage at a later stage in its distribution.

Chilling is an effective way of reducing spoilage in fish if it is done quickly and if the fish are handled carefully and hygienically. In order to chill fish they must be surrounded by a medium which is colder than they are: of the possible alternatives, ice has much to commend it. Ice slows down fish spoilage and helps the fish command the best price in the market.

INSULATED FISH BOXES

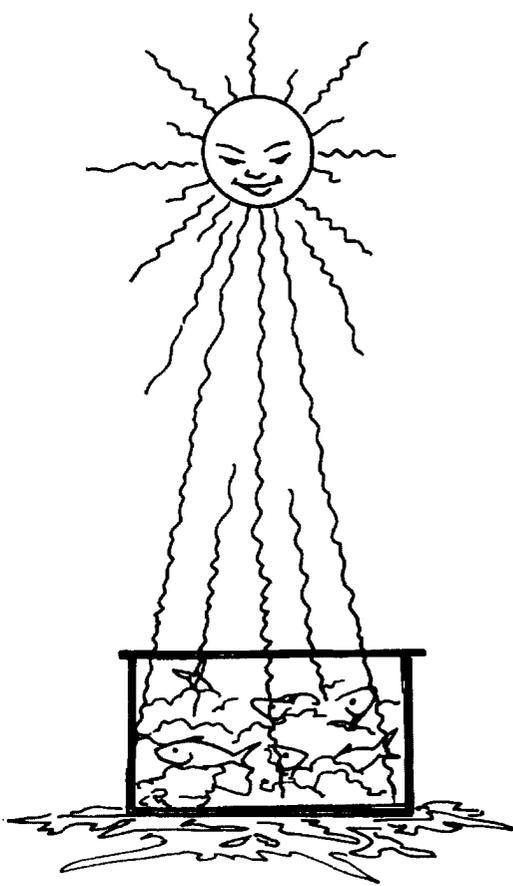
There are various methods of carrying and storing fish both on the fishing craft at sea and on shore. Many of these methods utilise some form of container. Containers help to reduce damage to the fish during handling and allow more efficient marketing. Typical examples of containers are bamboo and palmvrah baskets, wooden crates, pots and buckets.



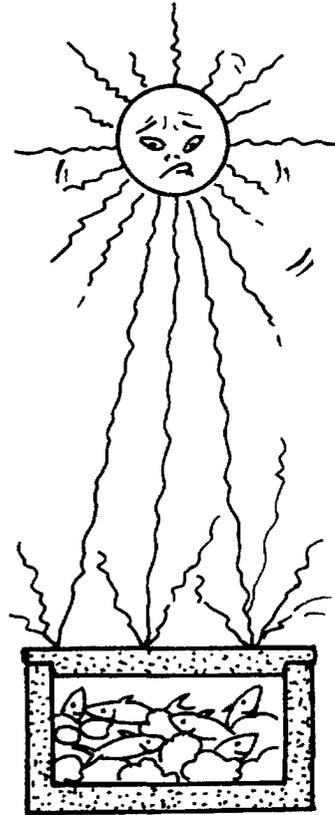
Ice can be used most effectively in combination with an insulated box. Insulated boxes offer the following advantages over un-insulated containers:

- * **Less ice required to chill** fish
- * **Less ice required to keep fish cold.**

This is because warmth from the outside cannot penetrate the insulation and wastefully melt the ice, as happens in an ordinary container.



Traditional box - the sun melts the ice

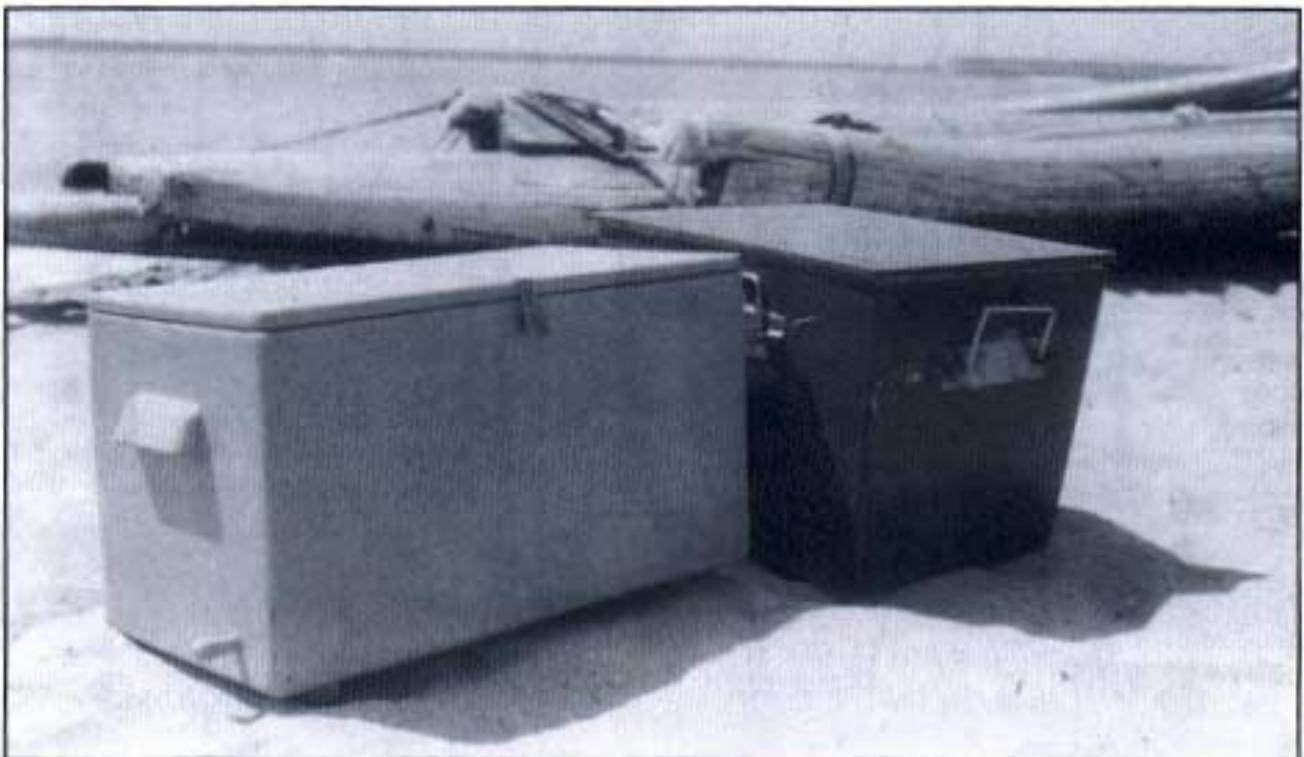
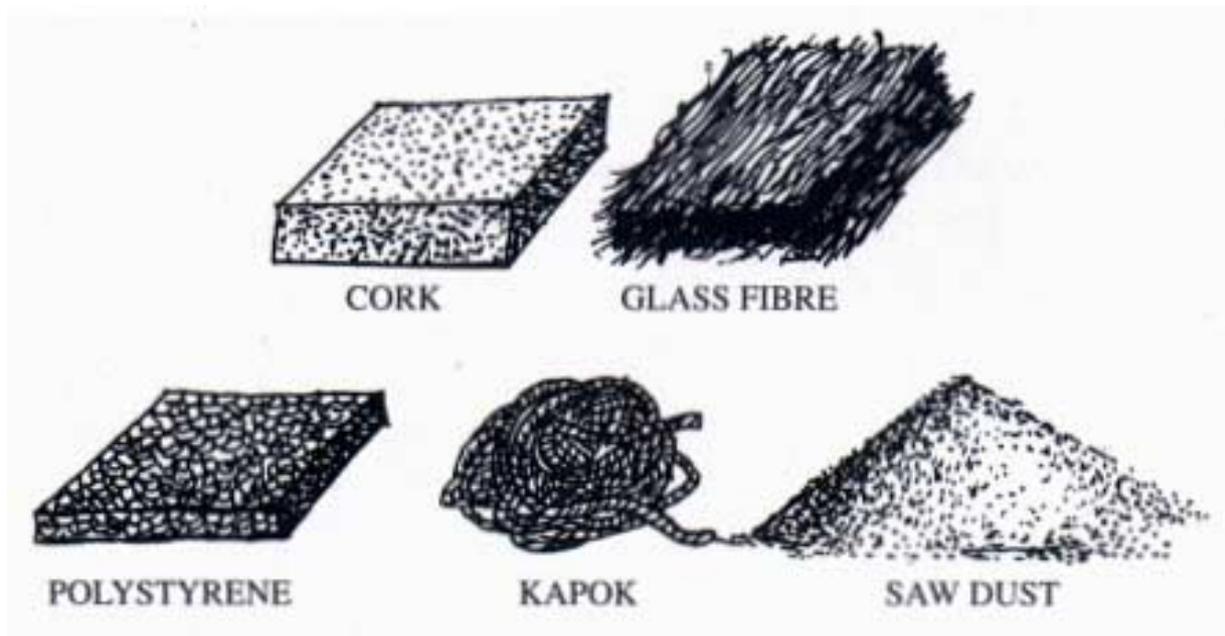


Insulated fish box - sun's heat cannot penetrate the insulation.

The net result is that the cost of keeping the fish fresh is much less.

HOW TO MAKE INSULATED FISH BOXES

There are different insulation materials, such as cork, glass fibre, polystyrene, kapok and saw dust. But styrofoam and polyurethane foam are the materials most widely used. To make insulated boxes, an insulating material is best packed between two layers of strong, waterproof, non-absorbent board, such as fibre-glass (Fibre Reinforced Plastic, FRP, also known as GRP) or High Density Polyethylene (HDPE). At a more local level, Galvanised Iron (GI) or wood also gets to be used.

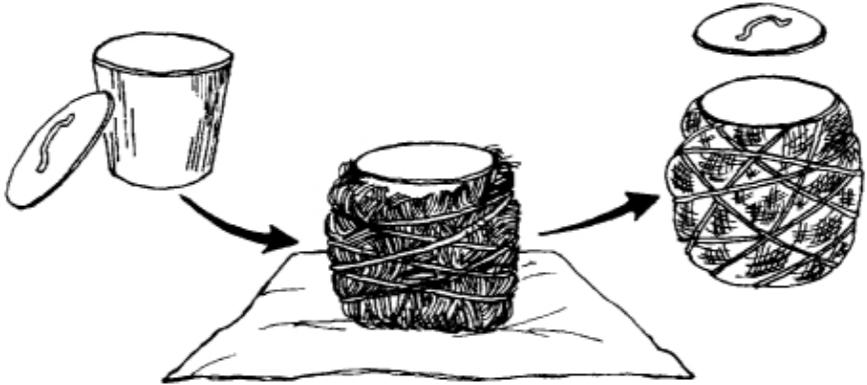


Plywood (left) and FRP ice boxes on the beach

MAKING THE MOST OF WHAT YOU HAVE AT HAND

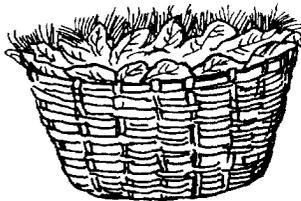
1. **Simple insulated containers and boxes** can be made by wrapping gunny or any lightweight, low-cost material around a water-tight container, such as an aluminium bucket or fish container, and keeping this dry with a plastic hag tied around the outside. The container should have a tight-fitting lid to stop warm air from melting the ice too quickly.

Tests show that ice stored in this type of container will last twice as long as ice in an uninsulated container.

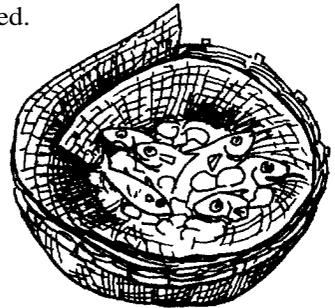


2. A **simple bamboo or palmyrah root basket** can be used by lining it with leaves, plastic, coconut fibre or palmyrah leaf matting:

These baskets will need to be covered with lids made of wood, tin or gunny. These should be thick and light. The leaves, coconut fibre, and matting must be replaced every time the basket is used.



Palmyrah matting



Leaves & coconut fibre

REMEMBER: *The insulation material should be kept as dry and as thick as possible.*

PROBLEMS WITH INDIGENOUS ICE BOXES

Indigenously produced ice boxes, made using GI or wood, are manufactured to meet a specific need of a specific fishing craft. They serve a useful purpose. However, problems faced by fishermen using these boxes are:

- * *short life span*
- * *insufficient insulation, requiring more ice to be carried than is required*
- * *heavy to handle*
- * *often enable growth of micro-organisms.*



The indigenous ice box — heavy to handle.

MAKING A MORE EFFICIENT ICE BOX

A good ice box has the following properties:

- * *retains ice for an optimum period*
- * *serves the purposes adequately and is economical*
- * *lasts long, with minimum maintenance*
- * *is easily, and locally, repairable*



A good ice box.

CONSIDERATIONS IN SELECTING A SUITABLE ICE BOX FOR USE ONBOARD

For using onboard the fishing craft, a good ice box should have the following properties:

- can hold all sizes of different varieties of fish caught by the fishing craft;
- can fit into the craft, without impeding the crew in their regular work;
- can withstand rough sea conditions, is rustproof and does not get easily damaged due to pitching and rolling while onboard and while handling on shore; metal clamps and buckles avoided to the extent possible.
- can retain the ice (and fish) long enough to land the catch in prime condition;
- is light in weight and can be easily handled by the crew onboard as well as on shore;
- can be cleaned easily;
- is fitted with a drainhole (with a plug).



Ice box on traditional Nava

REMEMBER: The method and duration of fishing done, varieties of fish targeted, their disposal patterns, availability of ice/ice plants in the area, and economics of operation are some of the factors which determine an ideal ice box for a particular fishery.

EXAMPLES OF ICE BOXES DEMONSTRATED BY THE DFID POST-HARVEST FISHERIES PROJECT

Some of the boxes developed/promoted by the DFID Post-Harvest Fisheries Project are:

1. 200 Kg FRP Box

Insulation : 70 mm polyurethane sheets, or PUF injected

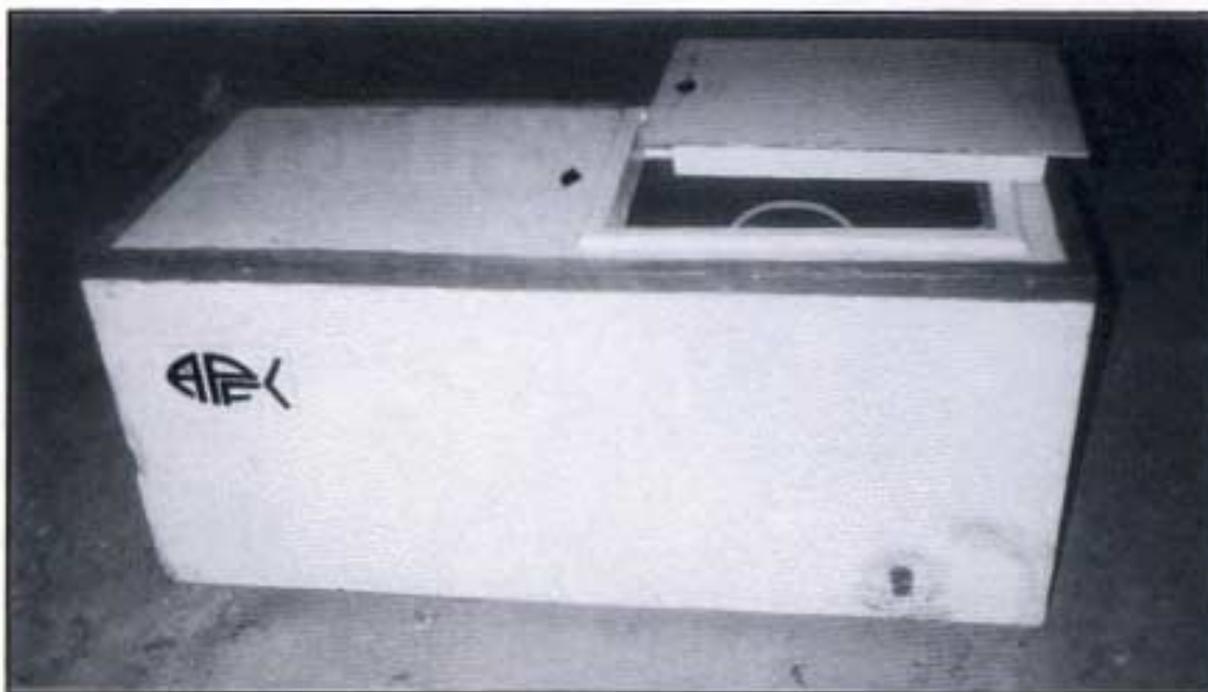
For use on : Fishing craft > 30' operating large/medium mesh gill nets.

Also, as portable ice boxes for use on shore by women's groups.

Other sizes available : Other boxes in FRP include, 100 kg, 65 kg and 35 kg boxes, used onboard different fishing craft in different areas. The 35 kg ice box was specifically developed for the log catamarans of Andhra Pradesh and Orissa.

FRP ice boxes designed for mounting on bicycles for cycle-traders are in use in Sri Lanka.

Guide price Rs.50/- per kg.



NOTE: FRP is a versatile material, which can be used to construct boxes of any required size indigenously by any competent FRP unit. Repairing the FRP boxes is also easy where facilities are available.

2. 100 Lt HDPE (“Sintex” type) Box

Insulation 40 mm polyurethane foam injected

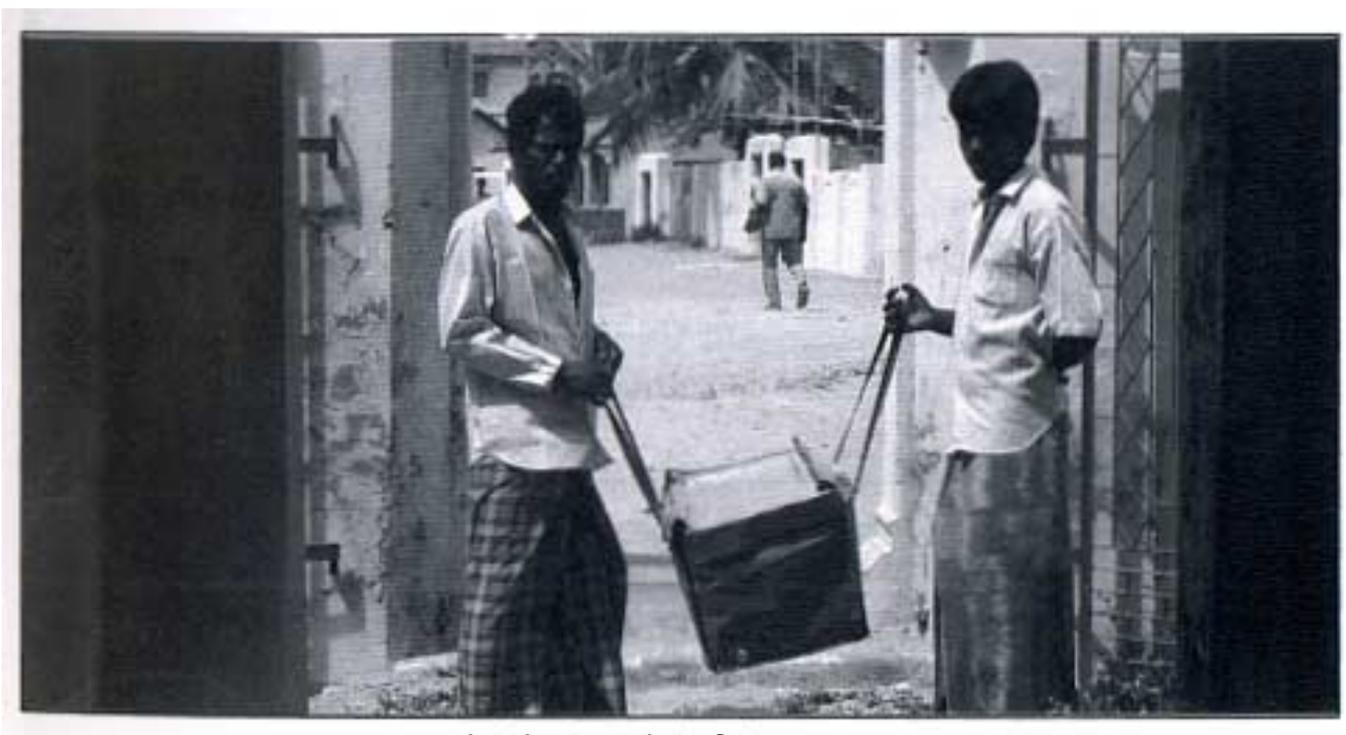
Other sizes available Various kinds of fishing craft, depending on the capacity, and also as portable ice boxes for onshore usage.

Guide Price: Rs. 40/- per Litre.



NOTE: HDPE is cheaper than FRP Also, being factory made, HDPE boxes are more sleek, and provide a range of choices for the fisherfolk

Besides, the DFID Post-Harvest Fisheries Project has also demonstrated an ice box made of canvas, for use on catamarans in Tamil Nadu.



Ice box made of canvas

GOOD MANAGEMENT PRACTICES FOR USE OF ICE BOXES ONBOARD

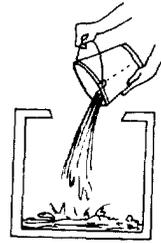
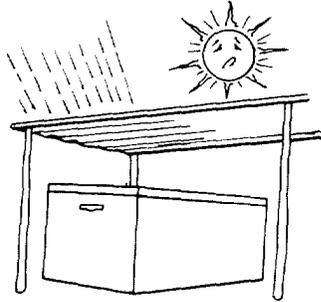
REMEMBER: A good quality, expensive ice box needs as much care and attention as an indigenous, less expensive ice box.

For ensuring efficiency and long life, certain precautions have to be taken.

DON'Ts

- × Do not expose the box to direct sunlight. Exposure to heat causes bulging and disfigurement.
- × Carrying block ice and crushing it in the box damages both the box and the fish.
- × Do not open the lid frequently. Do not allow air to enter inside through gaps etc.
- × Do not allow water to enter inside the walls.
- × Do not use the box when water is observed between the walls.
- × Do not reuse the remaining ice from the previous trip.

- × Avoid longer fishing hauls, and delays in putting the catches in the box. Spoilage is an irreversible process.
- × The boxes, if not cleaned periodically, could harbour organisms responsible for spoilage.
- × Melt water in the box could bleach and discolor gills, reducing value.
- × Rough handling causes cracks and other damages, reducing efficiency and longevity of the box.
- × Drain holes are often installed by piercing through the walls *after* the box has been constructed; improper sealing causes water to seep in and damage the box.



DOs

- ✓ Keep the box under covers during day time. When bulging is observed, stop using the box until it is repaired.
- ✓ Carry only crushed ice in the box.
- ✓ Open the lid only when keeping the fish in the box. Ensure that the lid closes properly, sealing air passages.
- ✓ Inspect the box periodically to see if water is seeping in.
- ✓ Get the box repaired immediately to remove water between walls.
- ✓ Carry fresh ice for every fishing trip. Reusing ice can actually hasten spoilage.
- ✓ Shorter fishing hauls and quick chilling on hoard ensure best quality.
- ✓ Clean the box after every use.
- ✓ Allow melt water to flow out through the drain hole.
- ✓ Handle the box with care. Ensure that it is not kept under stress. and that cracks do not develop.
- ✓ Ensure that the entry and exit points are properly sealed, and remain so throughout the life of the box.

CHECKLIST FOR OBTAINING A SUITABLE ICE BOX

Before you buy or make a box, check the following:

- ☞ Is size of box suitable for the size and quantity of the varieties of fish you normally capture?*
- ☞ Is the box light enough to lift when full, so that it can be carried easily?*
- ☞ Is the box easy to clean?*
- ☞ Is there a drain hole at the bottom?*
- ☞ Is the insulation thick enough and well protected from getting wet?*
- ☞ Is there a tight fitting lid with seal?*
- ☞ Can the box be repaired locally?*



Checking the ice box

CAUTION:

When using an ice box, keep observing for symptoms such as these:

- * bulging lid, walls or bottom;**
- * water in between walls; this is observable as dark patches on the walls and also by increase in weight of the box;**
- * rusty or broken hinges and clamps; they will lead to air and water penetration and decreased efficiency of the box.**
- * if such problems are encountered, make sure to get them repaired before using the box again.**



Ice box with broken hinges

ICE BOXES ON SHORE

WHY ICE BOXES ON SHORE?

- * Ice is not generally available in many fishing villages. Getting it from distant ice plants is expensive and time-consuming.
- * Fish landings do not take place on time, and traders may not be always present to take away the landed catch on time.
- * Fish landed in the afternoon can often be marketed only the next morning.
- * Regular availability of ice in the village itself has often worked as a lever to get good prices for the fishermen from traders.
- * Availability of ice in the village is beneficial to traders too, in that they get good-quality fish.



CHECKLIST FOR CONSTRUCTION OF A PERMANENT ICE BOX (PIB)

When installing a permanent ice box, a number of problems, not necessarily technical, come to the fore, and these have to be resolved before the PIB can be constructed. Being community-operated, questions of responsibility for management and maintenance become very important, as also the fact of vested interests taking the advantage of the PIB. The following questions will need to be satisfactorily answered before the construction of a PIB can commence:



- ❑ Who will manage and maintain the PIB: Who will invest the working capital?
- ❑ Where is the nearest ice plant, and is sufficient quantity of ice available regularly?
- ❑ How can an individual fisherman get to use the PIB? If more than one fisherman makes use of it, how do they share the available space amicably?
- ❑ Is the land provided for the purpose problem-free?
- ❑ What will be the approximate quantity of fish that needs to be kept in the box daily?
- ❑ Will it be more useful to have a number of smaller boxes, to be used individually or by smaller groups, than one big ice box? Should the box be permanently constructed, or would movable ice boxes be a better option?

NOTE It might be useful to try out a few smaller, movable insulated containers for the purpose initially, and once the feasibility and economics of operation have been worked out satisfactorily, then to go for a more permanent structure

SUGGESTED MANUFACTURERS

A. FOR FRP ICE BOXES

1. Ayyappa Boat Builders
15-6-2. Jagannaickpur
Kakinada - 533 002
Andhra Pradesh
2. M/s. Orissa Marine Builders Ltd
Chakrathirtha Road
Pen thakota
Pun 752 002
Uris sa
3. S & S Aqua Needs
17-14-11/1 Jayendra Nagar
Near SBI Officers' Colony
Kakinada 533 004
Andhra Pradesh
4. Ratnam Fibre Industries
Mulapeta Road,
Uppada 533 448
U Kothapalli Mandal
East Godavari District
Andhra Pradesh
5. M/s. Baba Marine Works
Chandrahaga
Konark. Pun District
Uris sa
6. Essar Fibre Industries
Kothapalli Road
Uppada, U Kothapalli Mandal
East Godavari District
Andhra Pradesh
7. Intech Enterprises
Factory : #34. Industrial Estate
Perungudi. Chennai - 600 096
Ph : 044-4961265
8. South Indian Federation
of Fishermen Societies
TC-20/8 16- 1. Karamana
Melaranoor Road. Karamana Post
Trivandrum 695 002
Ph : 0471-343711, 343178
Fax : 0471-342053

B. FOR HDPE ICE BOXES

Factory:

Sintex Industries Ltd
Plastics Division
KaloI 382 721
(N Gujarat)

Sintex Industries Ltd
#301 Swapnalok Complex
Sarojini Devi Road
Secunderahad 500 003
Tel: 040-812360
Fax: 040-8 1263 |

KMS Traders
(Authorised Dealer for Sintex)
3, Iyya Mudali Street
Chintadripet. Chennai - 600 002
Ph : 044-8549018
Fax : 044-8549018

Keep your fish fresh in ice and get a better price!



Use insulated boxes

The advantages of insulated containers and boxes in a nutshell:

LESS ICE NEEDED

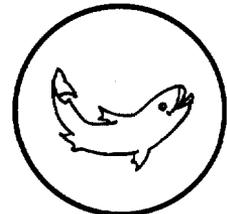
ICE LASTS LONGER

FISH STAYS FRESH FOR LONG TIME

FRESH FISH GETS BETTER PRICE

FISHERMEN AND TRADERS EARN MORE

GOOD FISH



GOOD FORTUNE

For further information contact:

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Chennai - 600 018. India. Phone :4936294, 4936096, 4936188, Fax :044-4936839.

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Kakinada - 533004. Phone :0884-64003, 64851, Fax: 0884-64851.