

Seafood handling

INFORMATION SHEETS

Fish is an essential part of the diet in the Pacific Islands. Much of the fish that is eaten has been caught and traded by someone other than the consumer. To assure that fresh and healthy fish is accessible through these distribution chains, the handling of fish must be hygienic and appropriate.

This folder contains five information sheets about ways to keep fish fresh, healthy and safe for human consumption for as long as possible. One information sheet each has been put together for:

- fishers,
- fish vendors, and
- customers

The information sheets contain information about how to handle and care for fish as a fisher, fish vendor or customer, to make sure that fish stays fresh, healthy and safe for human consumption. They are structured according to four rules: care, cool, clean, and quick. The information sheet for customers also includes a guide for how to choose the freshest fish.

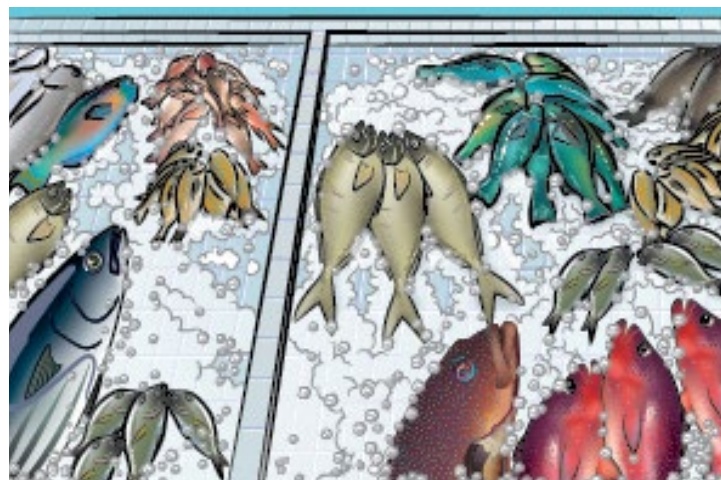
The two additional sheets included in this folder are about:

- the 'cold chain', and
- freezing fish

The 'cold chain' sheet describes why it is important to keep fish cold throughout all the steps that fish go through between being caught and being sold, and how to do so.

The sheet about freezing fish describes how to freeze fish properly to ensure fish can be kept in good condition, and safe for human consumption for long periods. There are also tips on how to prepare fish for freezing so that their eating quality (i.e. flesh texture and flavour) is maintained.

Each sheet can be used on its own, without the information from the other sheets. Individual sheets can be photocopied and used for different activities.



Handling seafood

in the Pacific Islands

INFORMATION SHEETS

for fishers,
vendors
and
consumers



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Preface

The content of these information sheets is based on the Seafood Handling manual by Tony Chamberlain and Gabriel Titili, with contributions from Lyn Lambeth, which was published, as part of the Community Fisheries Training Series, by the USP Marine Studies Programme and the Pacific Community (SPC) in 2001.

The information sheets are intended to help fishers, fish vendors and consumers with hygienic and appropriate handling of fish.

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INFORMATION SHEETS

for fishers, vendors
and consumers

#1 FOR FISHERS



WHY

This card contains information on how to preserve the freshness of fish for as long as possible so that:

- They hold their value as long as possible
- Your fish taste better and are healthier for you and your customers



CARE

Be gentle with your fish.

Fish spoil quickly if they are bruised, if the skin is broken, or if the guts are burst.

To make fish easier to store, and to stop them from bruising, kill them quickly with a hit on the head.



COOL

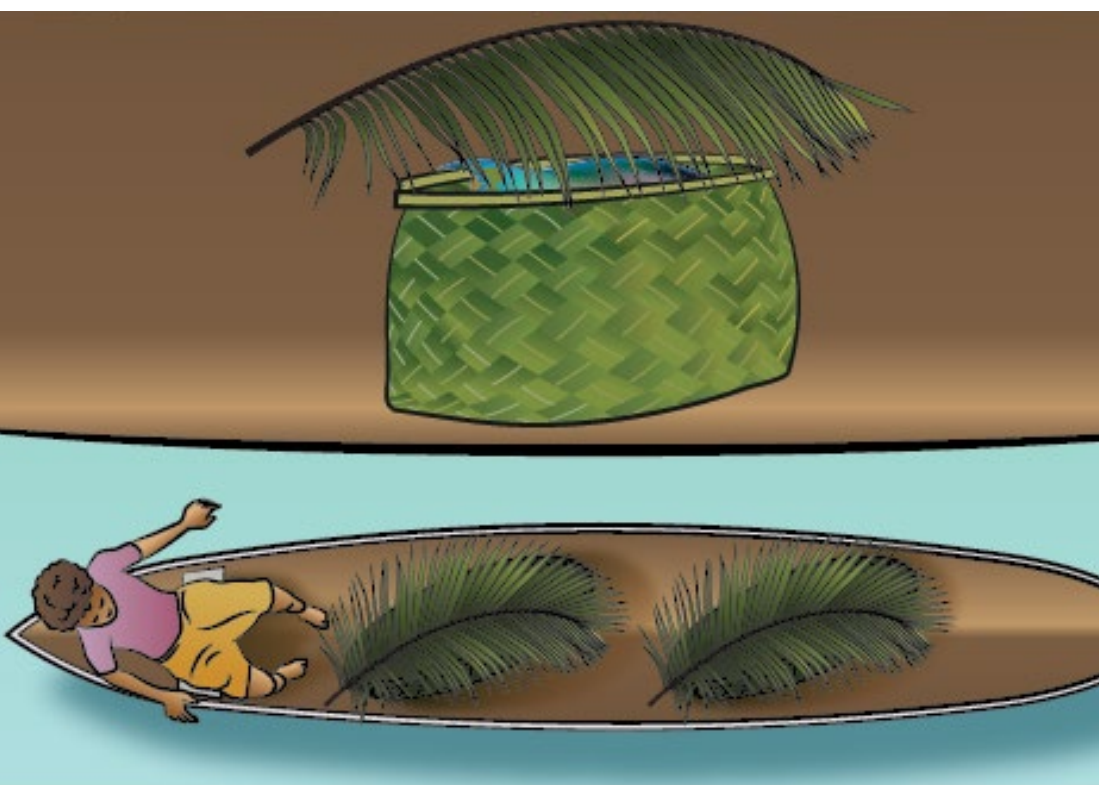
The bacteria and enzymes that cause fish to spoil are more active when the temperature is high.

Keep the fish as cool as possible, and cool them down as soon as they are gilled, gutted and cleaned.

Fish can be kept cool by:

- Keeping the fish wet and shaded
- Packing the fish in crushed ice (belly up if they have not been gutted)
- Submerging the fish in chilled seawater
- Freezing the fish

It is important to keep fish cool the entire time, from the moment the fish is caught to the moment it is sold.





CLEAN

Fish can be contaminated by bacteria and dirt.

Bacteria and dirt can be found:

- On the fish, and in their gut
- In the surrounding area
- On equipment
- On people

Any place used to clean and store fish should be kept as clean as possible, and be washed immediately after the fish have been moved.



Fish should never be placed directly on the ground.

To prevent bacteria and dirt from spoiling fish and making them unsafe to eat:

- Use clean water to wash the fish
- Whenever available, use clean ice to cool the fish
- Use clean containers to store the fish
- Keep the fish as cool as possible
- Keep the fish covered as much as possible

- Do not allow raw fish to come into contact with cooked fish
- Keep the work area, including cutting and cleaning surfaces, clean
- Keep yourself clean
- Wash your hands thoroughly and regularly
- Do not handle fish if you are unwell
- Keep animals and insects away



QUICK

Kill, gill, gut, clean and cool your fish as quickly as possible.

Bacteria grow quickly, so making sure your fish are cleaned and cooled as quickly as possible will help keep your catch fresh, tasty and safe to eat for longer.

Fish should also be taken to market as soon as possible.

#2

FOR FISH VENDORS

INFORMATION SHEETS

for fishers, vendors
and consumers



WHY

This card contains information on how to preserve the freshness of fish for as long as possible so that:

- They hold their value
- Your fish taste better and are healthier for your customers to eat



CARE

Be gentle with your fish. Fish spoil quickly if they are bruised, if the skin is broken, or if the guts are burst.

- Handle your fish as little as possible.
- Use sharp knives when gutting, gilling and cleaning your fish.
- Make sure your fish are not crushed in your display, or while they are being stored.



COOL

The bacteria and enzymes that cause fish to spoil are more active when the temperature is high.

Keep the fish as cool as possible, and do it as soon as the fish are gilled, gutted and cleaned.

Fish can be kept cool by:

- Keeping them wet and shaded
- Packing them in crushed ice if available (belly up if they have not been gutted)
- Submerging them in chilled seawater
- Freezing them

It is important to keep fish cool, during the entire time they are at the market.





CLEAN

Fish can be contaminated by bacteria and dirt.

- Bacteria and dirt can be found:
- On the fish, and in their gut
 - In the surrounding area
 - On equipment
 - On people

Any place used to clean and store fish should be kept as clean as possible, and be washed immediately after the fish have been moved.

Fish should never be placed directly on the ground.

To prevent bacteria and dirt from spoiling fish and making them unsafe to eat:

- Use clean water to wash the fish
- Whenever available, use clean ice to cool the fish
- Use clean containers to store the fish
- Keep the fish as cool as possible
- Keep the fish covered as much as possible
- Do not allow raw fish to come into contact with cooked fish
- Keep the work area and surfaces clean
- Keep yourself clean
- Wash your hands thoroughly and regularly
- Do not handle fish if you are unwell
- Keep animals and insects away
- Keep any garbage well away from the fish



QUICK

Gill, gut, clean and cool your fish as quickly as possible.

Bacteria grow quickly, so making sure your fish are cleaned and cooled as quickly as possible will help keep them fresh, tasty and safe to eat for longer.

You should also make sure that no fish are left at your stall long enough to spoil. 'First in, first out.' The first fish put out should be the first ones sold. If the first fish put out are slow to sell, return them to the ice box.



#3 FOR CUSTOMERS

INFORMATION SHEETS

for fishers, vendors
and consumers



WHY

This card contains information on how to choose the freshest fish possible and maintain its freshness at home so that you and your family and friends can enjoy a safe, tasty and healthy meal.



COOL

The bacteria and enzymes that cause fish to spoil are more active when the temperature is high.

Choose fish that have been kept cool during their entire time on the boat, and at the market.

Fish can be kept cool by doing the following:

- Keeping them wet and shaded



- Packing them in crushed ice if possible
- Submerging them in chilled seawater
- Freezing them



CARE

Choose fish that have been treated with care.

Fish spoil quickly if they are bruised, if the skin is broken, or if the guts are burst. Do not choose fish that have:

- Split skin
- Dull colours
- Soft, bruised flesh
- Exposed guts



It is also important that you try and keep your fish cool on your way home, or try to get home as quickly as possible so that they don't become warm.

Handling seafood in the Pacific Islands

INFORMATION SHEETS for fishers, vendors and consumers

#3 FOR CUSTOMERS



CLEAN

Fish can be contaminated by bacteria and dirt.

Bacteria and dirt can be found:

- On the fish, and in their gut
- In the surrounding area
- On equipment
- On people

Buy fish from stalls that are kept clean.

A good vendor will:

- Use clean water to wash the fish
- Whenever available, use clean ice to cool the fish
- Use clean containers to store the fish
- Keep the fish as cool as possible
- Keep the fish covered as much as possible
- Not allow raw fish to come into contact with cooked fish
- Keep the work area and surfaces clean
- Keep themselves clean
- Wash their hands and equipment thoroughly and regularly
- Not handle fish if they are unwell
- Keep animals and insects away
- Keep any garbage well away from the fish
- Never place the fish directly on the ground



QUICK

Bacteria grow quickly, so making sure you keep your fish cool, and getting home as quickly as possible will help keep your fish fresh, tasty and safe to eat for longer.

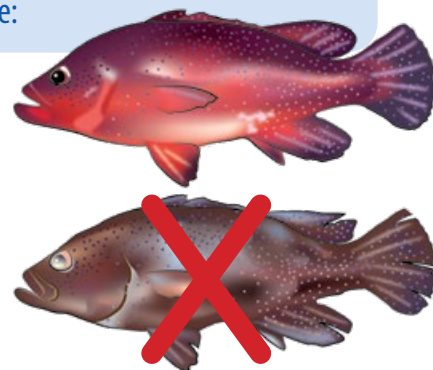
Make sure to prepare and eat your fish before they spoil at home.



CHECKLIST

The freshest fish will have:

- Bright red gills
- No fishy smell
- Bright, shiny colours
- Firm, springy flesh
- Bright, clear eyes that are not sunken



Here is a table to help you choose the freshest, healthiest fish:

	Very good	Good	Moderate	Not good	Spoiled
Gills	Bright red	Red	Pink	Brown	Dark brown
Smell	Like the sea	None	Fishy	Stale	Rotten
Looks	Shiny colours	Dull colours	Grey	Dark	Bruised, very dark
Flesh firmness	Firm, springy	Firm, springy	Leaves dent	Soft	Very soft
Eyes	Clear	Clear with a little blood	Cloudy with a little blood	Cloudy and sunken	Very cloudy and sunken
Colour	Very bright	Bright	Faded	Dull	Brown spots



#4

ABOUT THE COLD CHAIN

INFORMATION SHEETS

for fishers, vendors
and consumers



WHY

Keeping fish cold reduces the activity of the enzymes and bacteria that cause fish to spoil.

Making sure that all steps of the cold chain are followed will allow you to maintain the quality and freshness of your fish for longer, and, probably, sell your fish at a higher price.

This information sheet will give you some information about what the cold chain is, and how to maintain it easily.



WHAT

The cold chain is a list of steps that should be taken to keep a fish cold from the time it is caught, to the time it is sold

Keeping the fish cold (close to 0°C for fresh fish, and -18°C for frozen fish) during each of these steps is called 'maintaining the cold chain'. Not doing so increases the risk of your fish spoiling and the potential for your customers to suffer food poisoning. These steps, during which fish must be kept cold, include:

- Live fish on deck
- Fish iced down on board
- Fish unloaded at the wharf
- Fish transported to the vendor
- Fish displayed at the market
- Fish sold to the customer



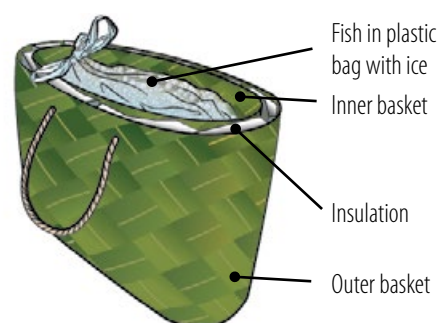
HOW

Fish can be kept cool by:

- Packing them in crushed or chipped ice (ideally the same volume of ice as there will be fish)
- Submerging them in chilled seawater (a mixture of ice and seawater)
- Freezing them
- Keeping them wet and shaded

If an onboard refrigerator is not available, an ice box containing ice or chilled seawater will also work to keep your fish cool.

If you cannot afford an ice box, a double coconut basket can be used instead.



At every step of the cold chain, **one person** should be made responsible for making sure the cold chain is maintained (i.e. that fresh fish are kept at close to 0°C, and frozen fish at -18°C).



Handling seafood in the Pacific Islands

INFORMATION SHEETS for fishers, vendors and consumers

#4

**ABOUT THE
COLD CHAIN**



CLEAN

Even if fish are kept cold, they can still be contaminated by bacteria and dirt.

Bacteria and dirt can be found:

- On the fish, and in their gut
- In the surrounding area
- On equipment
- On people

During each stage of the cold chain, remember to:

- Use clean water to wash the fish
- Use clean ice to cool the fish
- Use clean containers to store the fish
- Keep the fish covered as much as possible
- Not allow raw fish to come into contact with cooked fish
- Keep the work area and surfaces clean
- Keep yourself clean
- Wash your hands and equipment thoroughly and regularly
- Not handle fish if you are unwell
- Keep animals and insects away
- Keep any garbage well away from the fish
- Never place the fish directly on the ground



QUICK

Bacteria grow quickly, so make sure to move the fish quickly, even when maintaining the cold chain. The less time a fish spends traveling, being stored, or displayed, the better.

Here is a table to help you choose the freshest, healthiest fish:

	Very good	Good	Moderate	Not good	Spoiled
Gills	Bright red	Red	Pink	Brown	Dark brown
Smell	Like the sea	None	Fishy	Stale	Rotten
Looks	Shiny colours	Dull colours	Grey	Dark	Bruised, very dark
Flesh firmness	Firm, springy	Firm, springy	Leaves dent	Soft	Very soft
Eyes	Clear	Clear with a little blood	Cloudy with a little blood	Cloudy and sunken	Very cloudy and sunken
Colour	Very bright	Bright	Faded	Dull	Brown spots



CHECKLIST

If you maintain the cold chain, keep your fish clean, and move quickly, your fish will be fresh and safe to eat.

#5 ABOUT FREEZING FISH

INFORMATION SHEETS

for fishers, vendors
and consumers



WHY

When fish are frozen solid, the activity of the enzymes and bacteria that cause fish to spoil can be partly or entirely stopped.

This means that frozen fish can be stored for longer periods (sometimes many months), and can also be transported long distances more easily without being spoiled.

This information sheet will give you some information about how to prepare your fish for freezing properly, and how to make sure your fish don't spoil when they are frozen.



WHAT

A fish is only considered frozen when all of the liquid water within it has become solid ice.

Properly freezing a fish has three stages:

1. The temperature must fall rapidly to about -1 degree Celsius
2. The temperature will remain constant at -1 degree Celsius for a period while most of the water inside the fish freezes (bacteria can still be active now, so it is important that the temperature drops quickly through this stage)
3. Once most of the water in the fish has frozen, the temperature drops again to freeze the remaining water.



HOW

Once a fish is frozen, it should be stored in a freezer that maintains a temperature of -30 degrees Celsius.

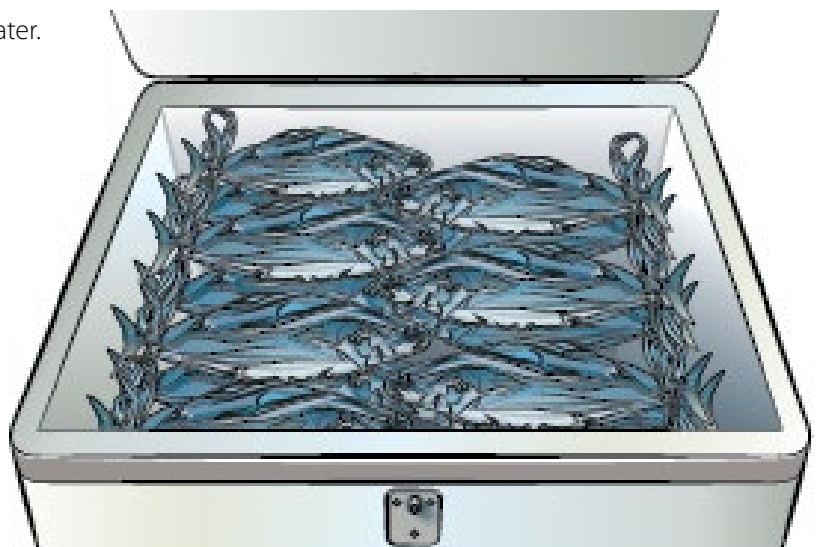
For 12V/24V solar-powered freezers that may not have the capacity to deep freeze, temperature settings need to be adjusted based on the weather, time of day, battery level and freezer content. At higher temperatures the fish will not store for long.

Fish that are frozen should be stored in a way that allows cold air to move freely between each fish, and so that they can be rotated easily.

If cold air cannot move freely between each fish, the cold temperature might not be maintained for all your fish, and they might spoil, even if they are in a freezer. You can use pieces of bamboo to ensure there is space between your frozen fish.

Make sure to have a system for tracking how long a fish has been frozen, and sell the fish that have been stored the longest first.

Do not re-freeze your fish if they have become partially or fully defrosted. Doing so can increase the risk of food poisoning.



Handling seafood in the Pacific Islands

INFORMATION SHEETS for fishers, vendors and consumers

#5 ABOUT FREEZING FISH

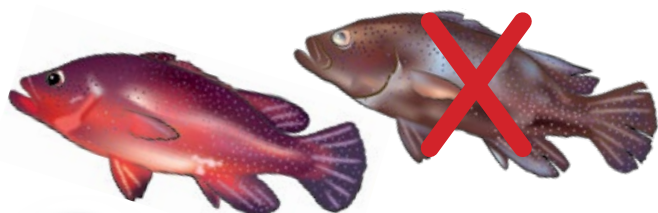


CARE

Be gentle with your fish.

Fish that are bruised, have broken skin, or burst guts will not freeze and store well.

- Handle your fish as little as possible
- Use sharp knives when gutting, gilling and cleaning your fish
- Make sure your fish are not crushed while they are being processed, packaged or stored



CLEAN

Even though freezing can reduce the activity of bacteria, a fish that was contaminated by bacteria or dirt before freezing, will still be unsafe to eat once it is defrosted.

Bacteria and dirt can be found:

- On the fish, and in their gut
- In the surrounding area
- On equipment
- On people

Any place used to clean and store fish should be kept as clean as possible, and be washed immediately after the fish have been moved.

Fish should never be placed on the ground.

To prevent bacteria and dirt from spoiling fish and making them unsafe to eat:

- Use clean water to wash the fish
- Use clean ice to cool the fish
- Use clean containers to store the fish
- Keep the fish as cool as possible
- Keep the fish covered as much as possible
- Do not allow raw fish to come into contact with cooked fish
- Keep the work area and surfaces clean
- Keep yourself clean
- Wash your hands thoroughly and regularly
- Do not handle fish if you are unwell
- Keep animals and insects away
- Keep any garbage well away from the fish



QUICK

Bacteria grow quickly, so make sure any fish you plan to freeze has spent the least possible amount of time out of the water.

The less time a fish spends traveling, being stored, or displayed, the better.

To prevent fish losing their texture, make sure they are frozen quickly. Freezing fish slowly, makes large ice crystals, which ruin the flesh texture.

CONSIDERATIONS

Fish that were spoiled or damaged before freezing, will not improve with freezing. Only freeze fish that have been handled **carefully** and **hygienically**.

Freezing can change the quality of some fish. Some may dry out, lose their texture, or their oils may become rancid.

To prevent fish from **drying out**, use protective packaging, or glaze the fish by dipping them in iced water, giving them a protective coating of ice.

To prevent the **oils in some fish from becoming rancid**, use protective packaging to stop air from reaching the flesh, and also make sure the storage temperature is very low (preferably -30 degrees Celsius). Also, fish with lean, white flesh are less likely to have their oils become rancid.

