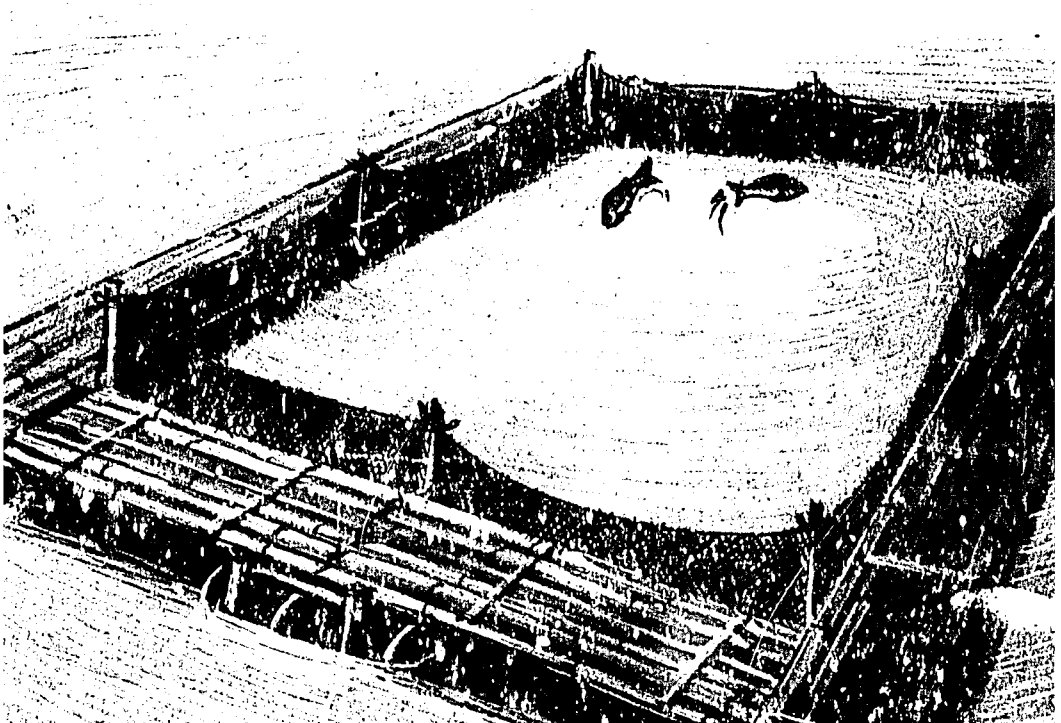


This material is provided by the International Center for Living Aquatic Resources Management (ICLARM), an independent, nonprofit research center working on fisheries and aquaculture in tropical third-world countries.

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Culture of Common Carp in Floating Net Cages



Culture of common carp in floating net cages

**B.A. Costa-Pierce
Rusydi
A. Safari
G.W. Atmadja**

1989

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Culture of Common Carp in Floating Net Cages

by

**Barry A. Costa-Pierce
Rusydi
Apih Safari
Gelar Wira Atmadja**

1989

**Illustrated by: Trya Yudhantara
Ovidio F. Espiritu, Jr.**

The techniques described in this book were developed for culture of common carp in the Saguling and Cirata Reservoirs in Bandung, Indonesia. They can easily be adapted to other locations.

Produced by:
The Aquaculture and Fisheries Development Project
for the Resettlement of Communities
from the Saguling and Cirata Dam Regions

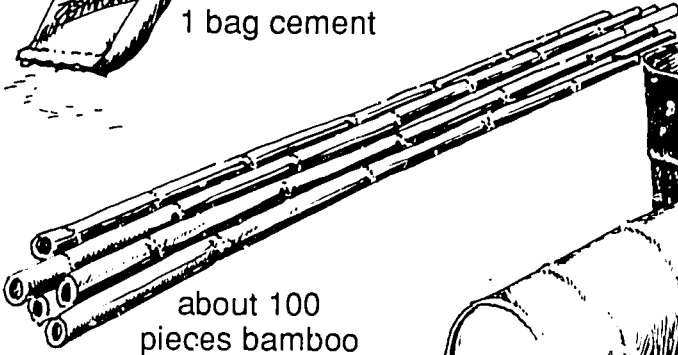
A cooperation between the Institute of Ecology, Indonesian State Electric Company (IOE UNPAD-PLN), Bandung, Indonesia; and the International Center for Living Aquatic Resources Management (ICLARM), Manila Philippines, with funding from the International Bank for Reconstruction and Development.

This book is also available in Sundanese (West Java, Indonesia).

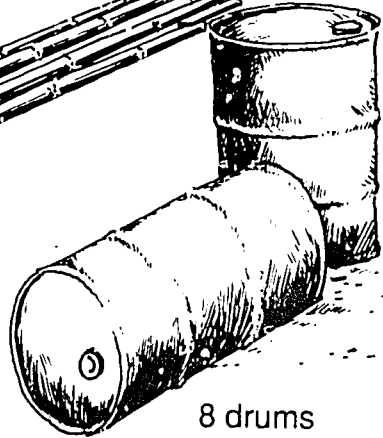
Materials needed to construct a floating net cage



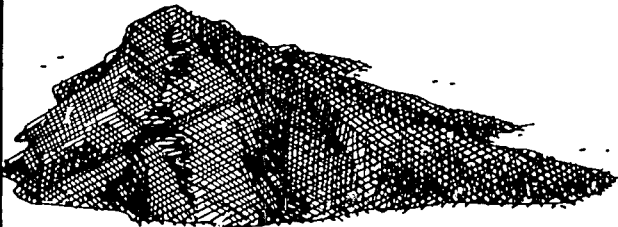
1 bag cement



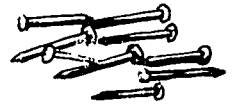
about 100
pieces bamboo



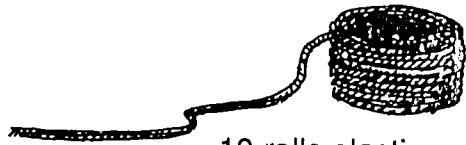
8 drums



10 kg net



5 kg nails



10 rolls plastic rope

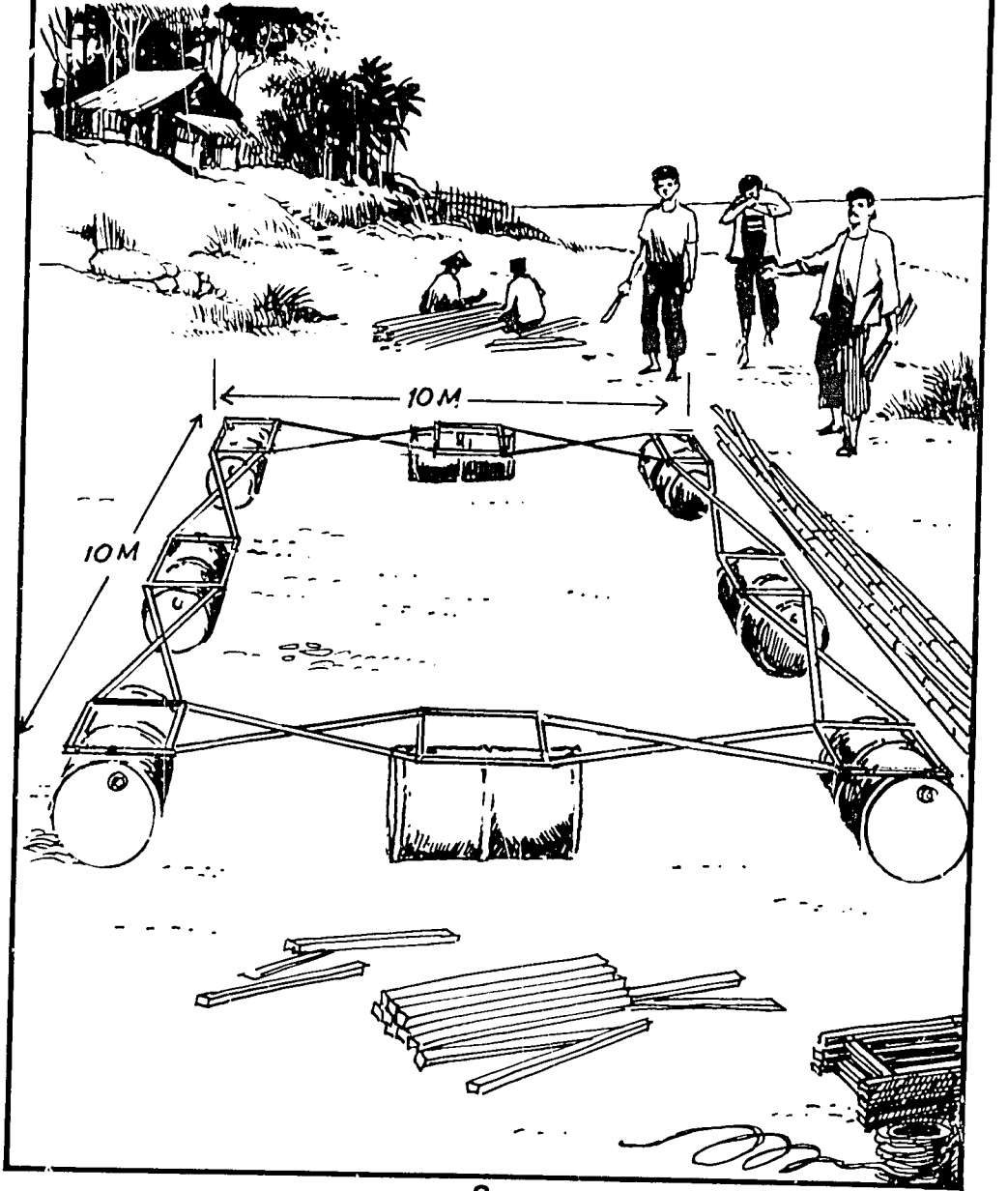


60 pieces hard wood
size 5 x 7 cm x 5 m

How to construct a floating net cage

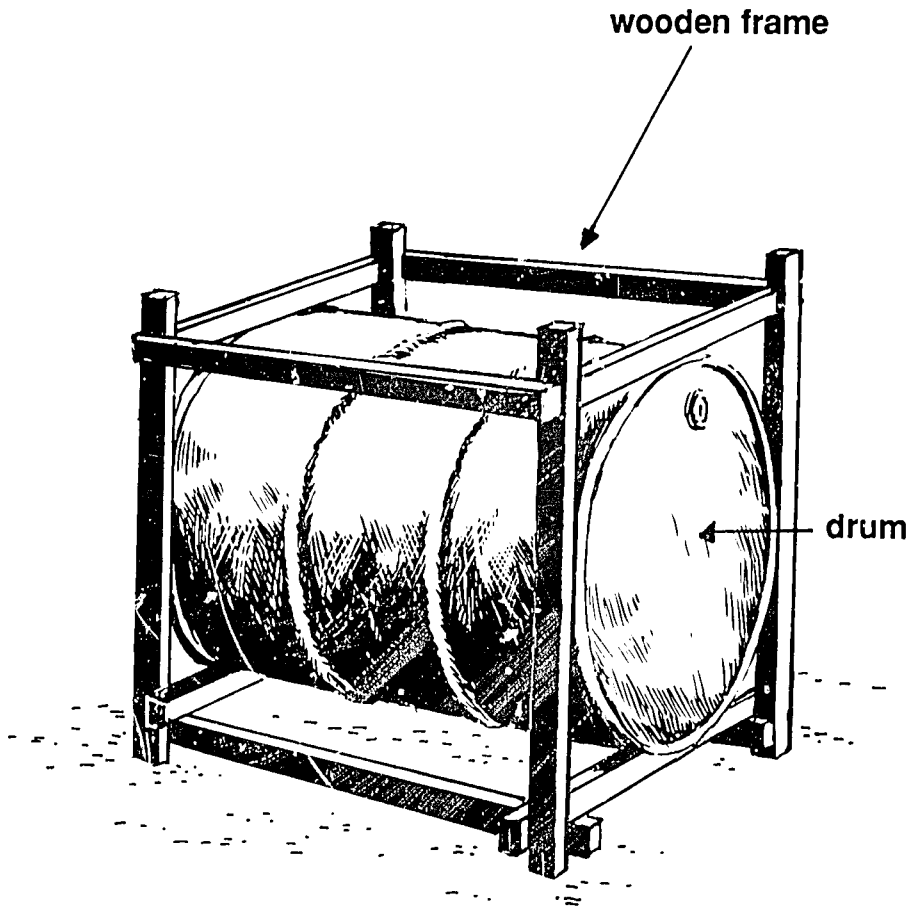


Arrange bamboo pieces to form a square raft. Use drums to float the raft.



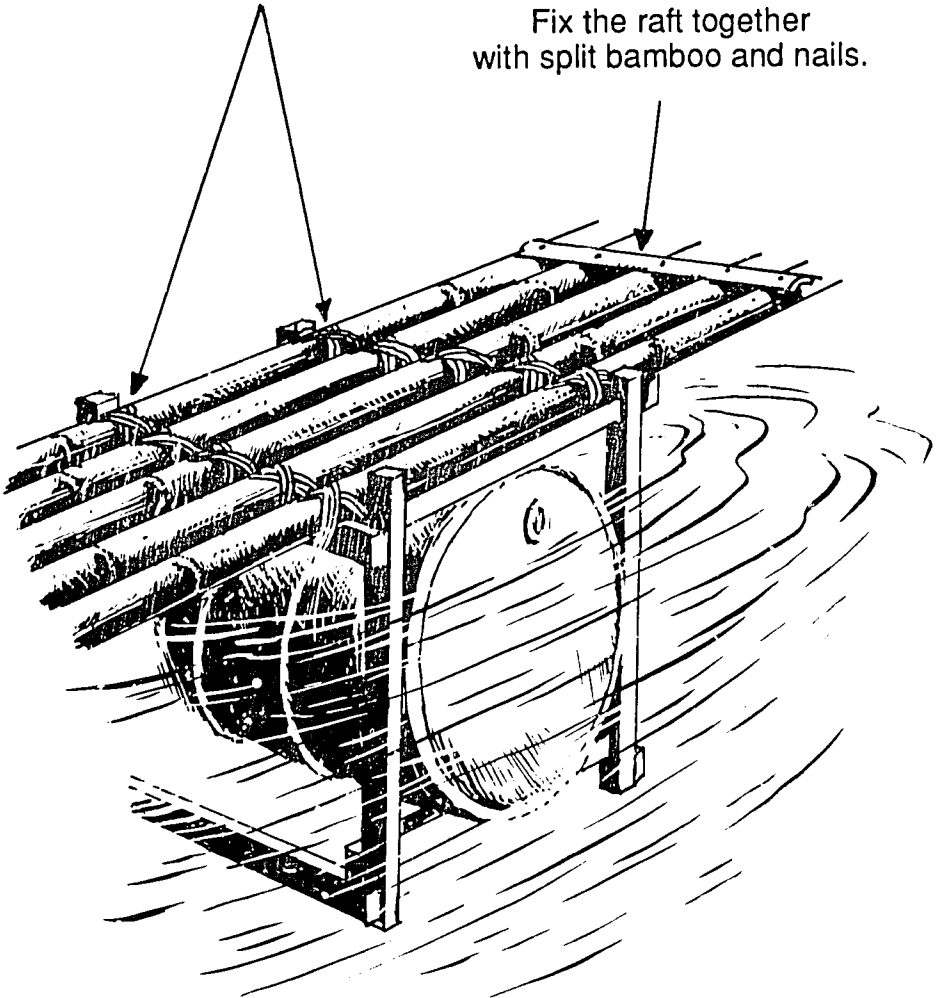
How to fix the drums to the raft

Make a wooden frame for the drum.

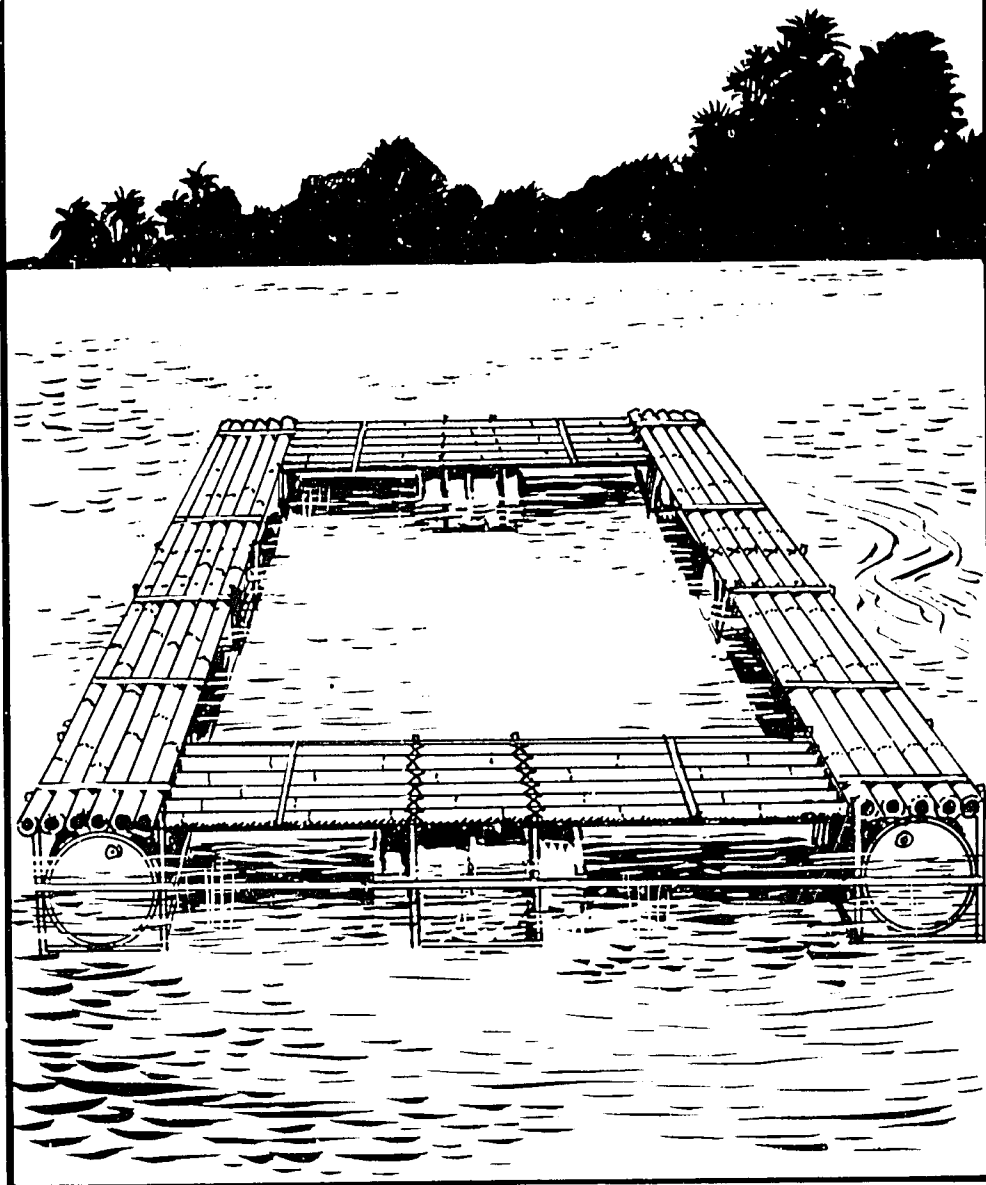


Tie the raft to the wooden frame with plastic rope.

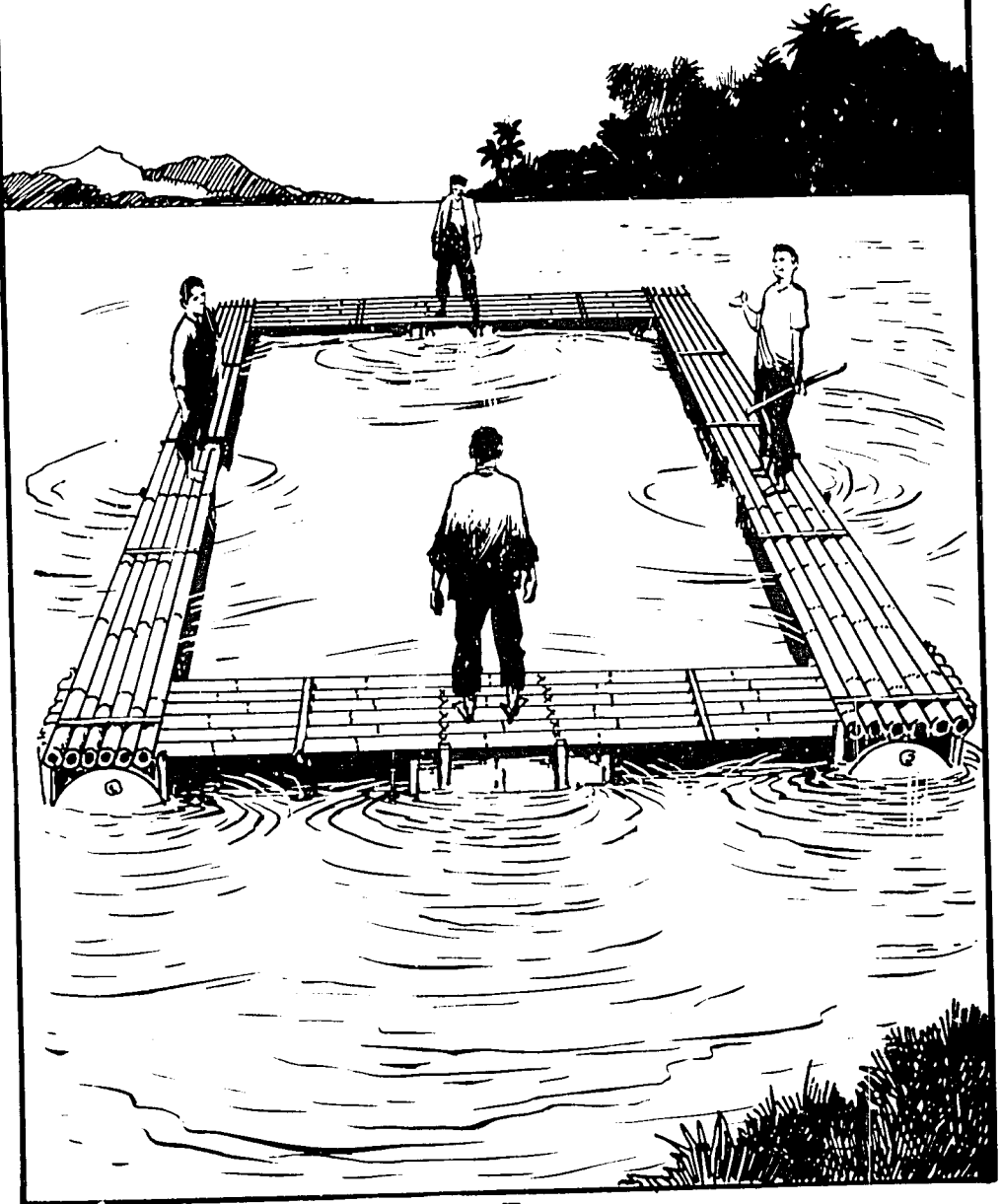
Fix the raft together with split bamboo and nails.



Secure the drums to the raft with wood.

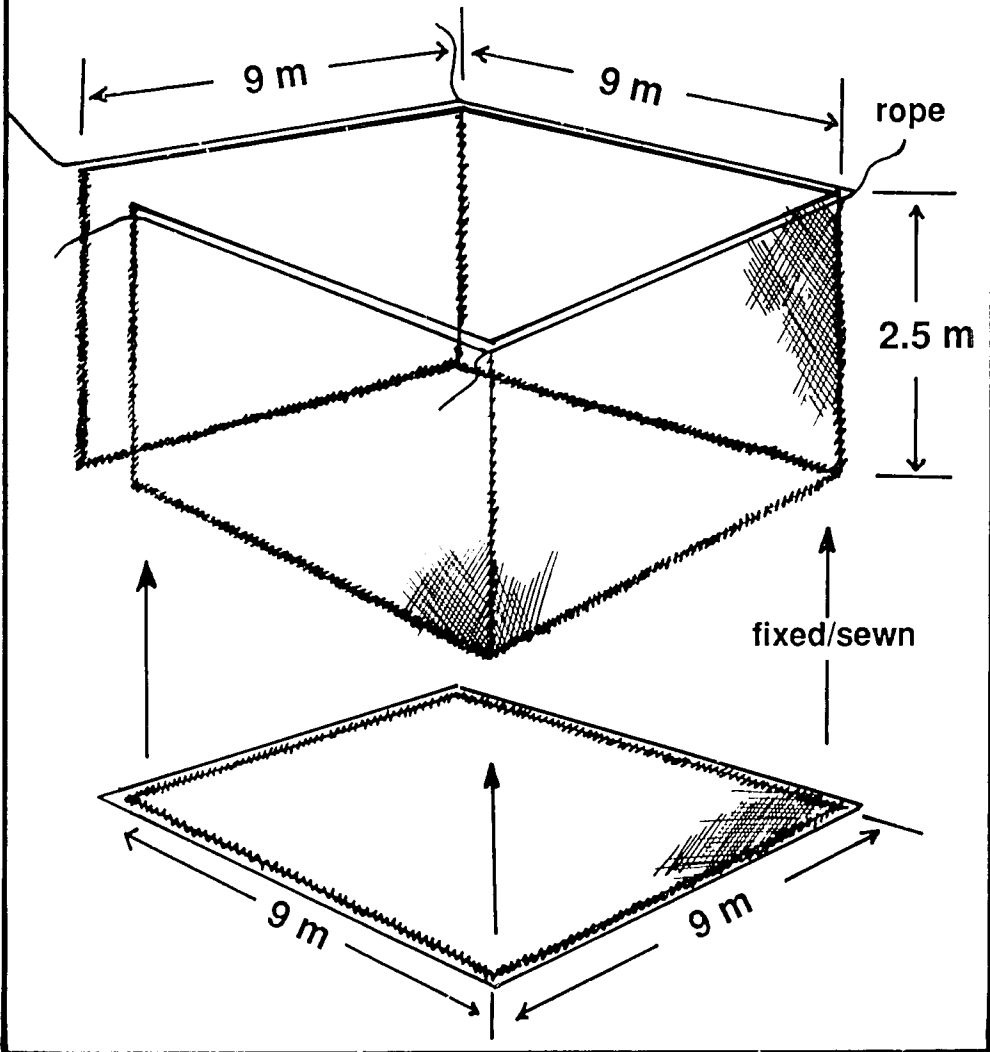


Construct the raft to hold the weight of at least four persons, as well as the weight of the other parts.



How to sew the net

1. Measure the length, width and height of the net.
2. Cut the net to form a square then fix and sew the ends together with plastic rope.
3. Measure the base of the net and sew the edges to form a square.

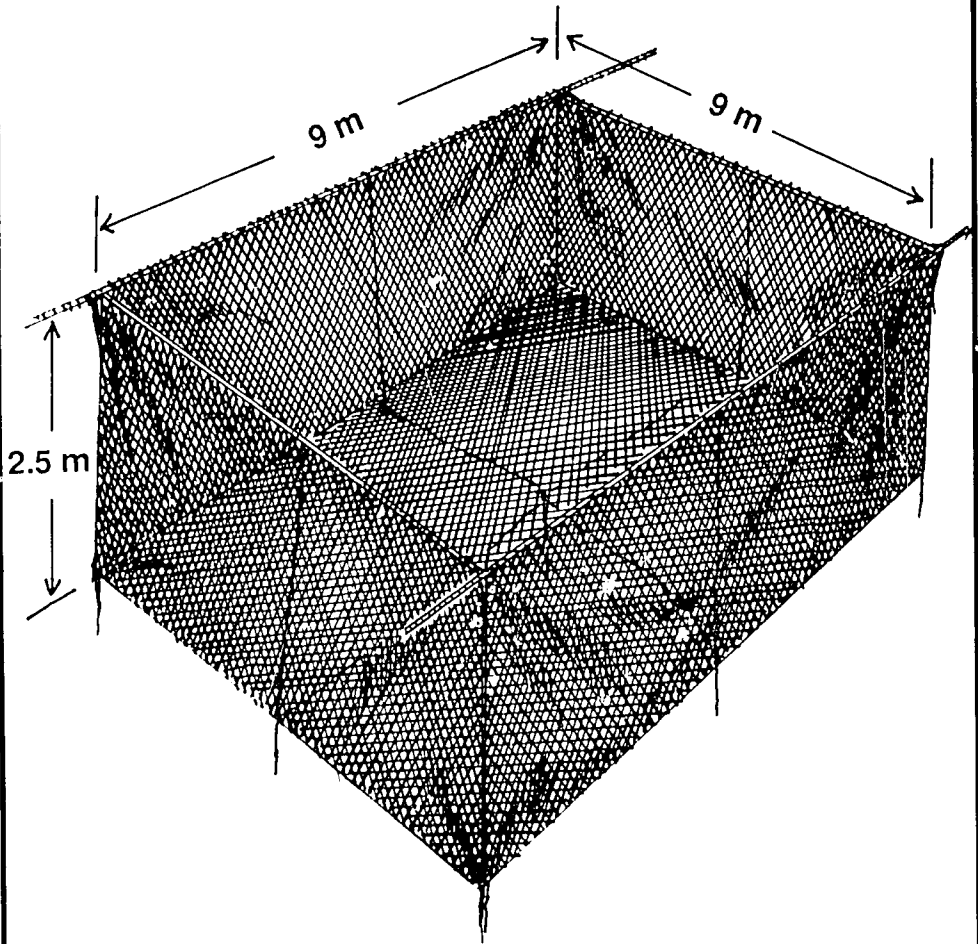


The net should be square.

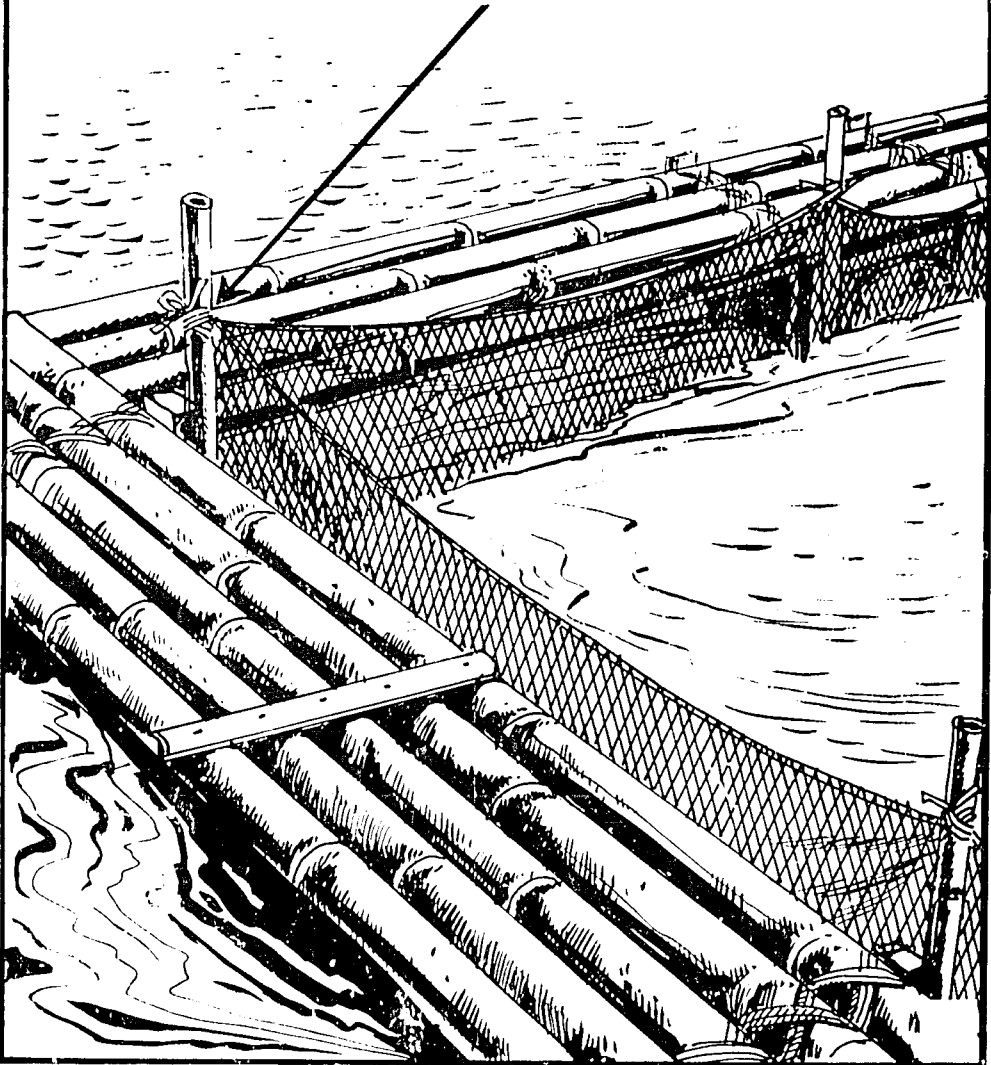
length = 9 m

width = 9 m

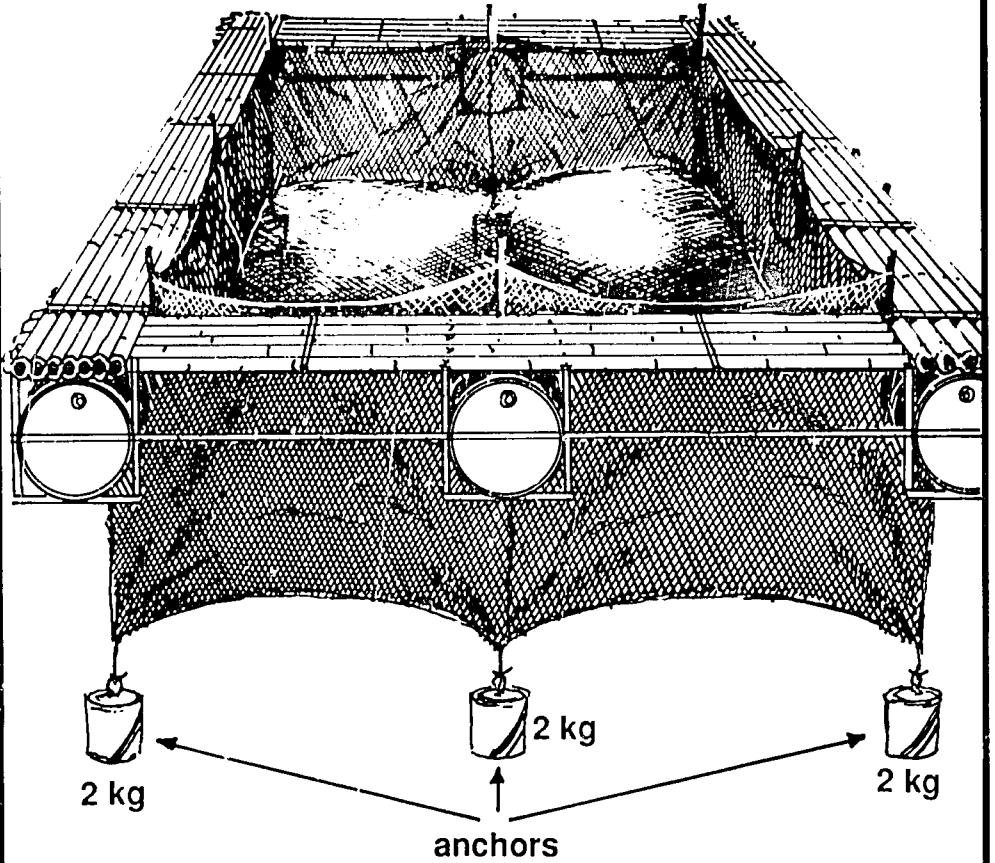
height = 2.5 m



Attach the net to the floating raft by binding the net to a bamboo pole fixed to the raft.

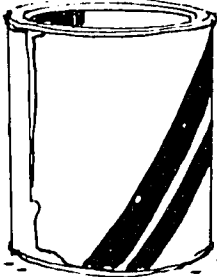


To stretch the net into a rectangle, hang nine anchors around the bottom of the net (on sides and middle of net). Each anchor should weigh 2 kg.

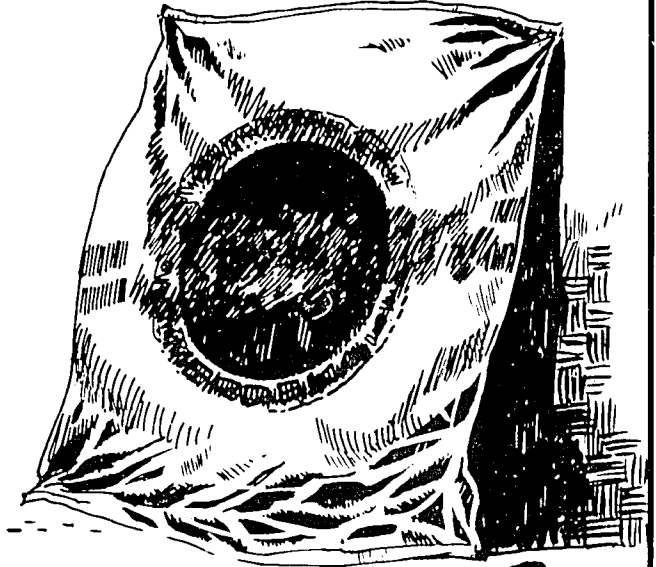


How to make the anchors

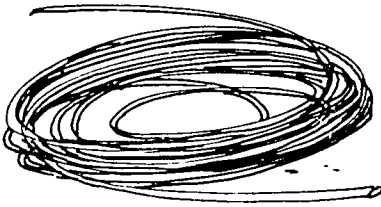
Materials needed:



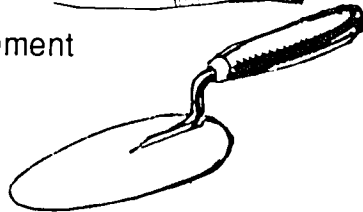
9 medium size,
empty paint tins



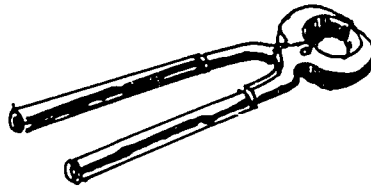
cement



strong wire



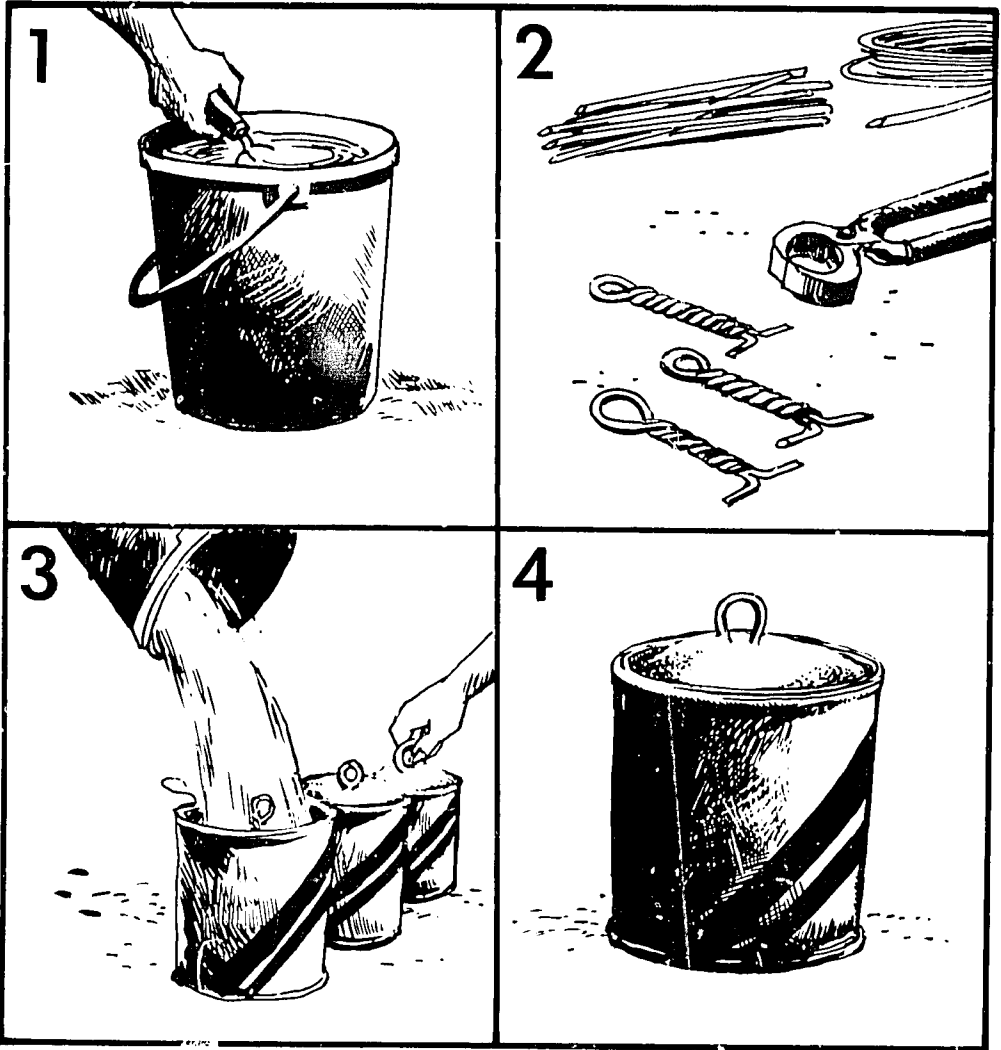
brick-laying trowel



wire cutter

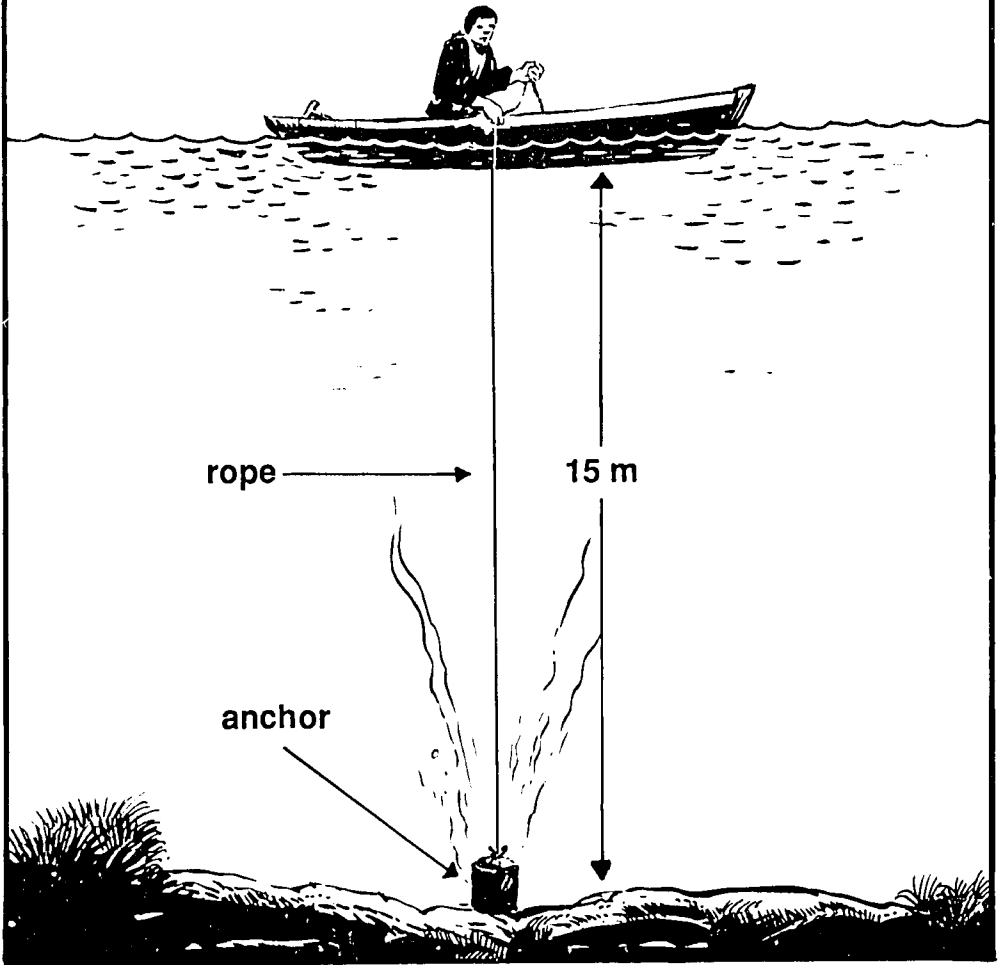
Method

1. Stir the cement until sticky.
2. Form the wire into hangers.
3. Insert a wire hanger into the center of each paint tin while pouring cement.
4. When the cement dries, the anchor is ready to use.



How to choose a site

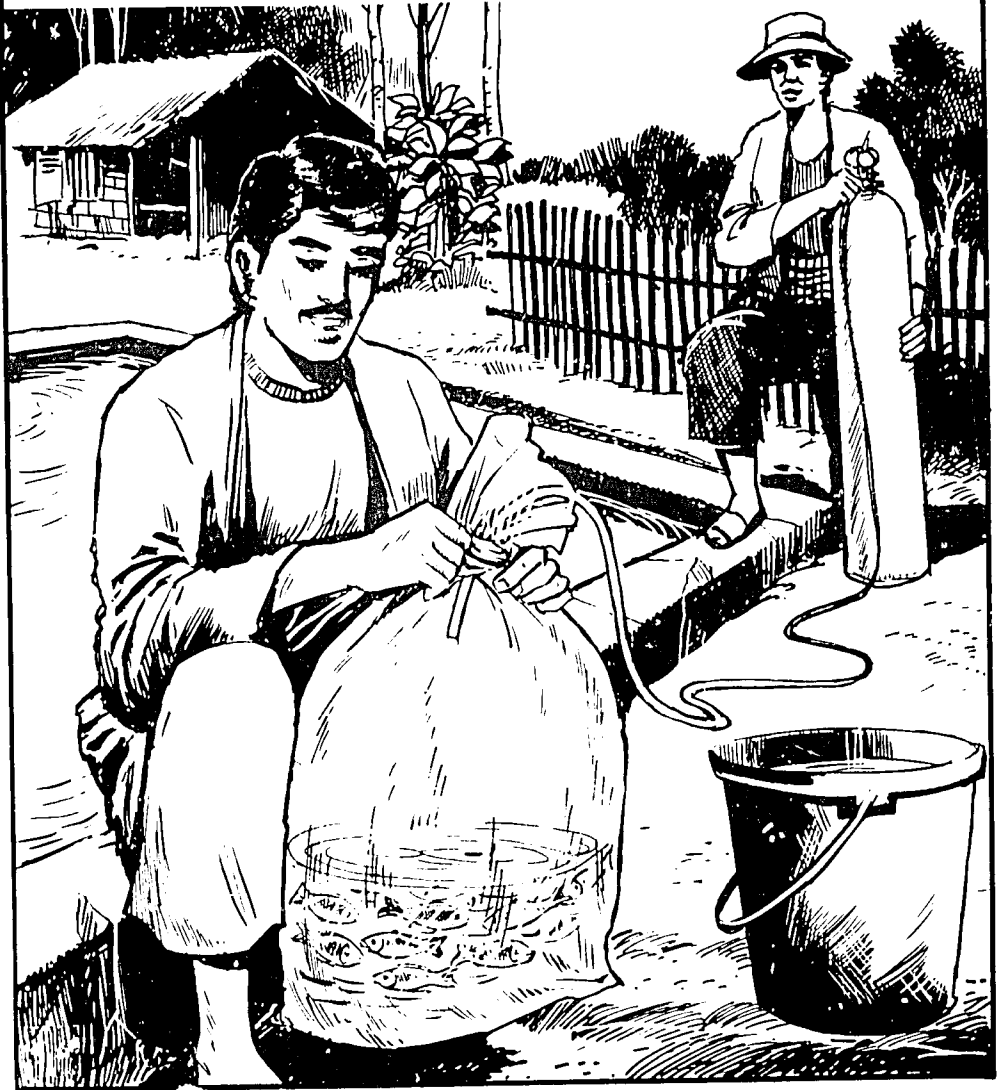
- The water should be at least 15 m deep (use an anchor tied with plastic rope to measure the water depth)
- The site should be free from remains of trees and other debris.
- The water current should flow sufficiently.
- Winds should not be strong.



How to select quality fish seed

Look for the following characteristics:

- healthy-looking, grey-colored
- 60-100-g size (about 10-16 fish per kg)

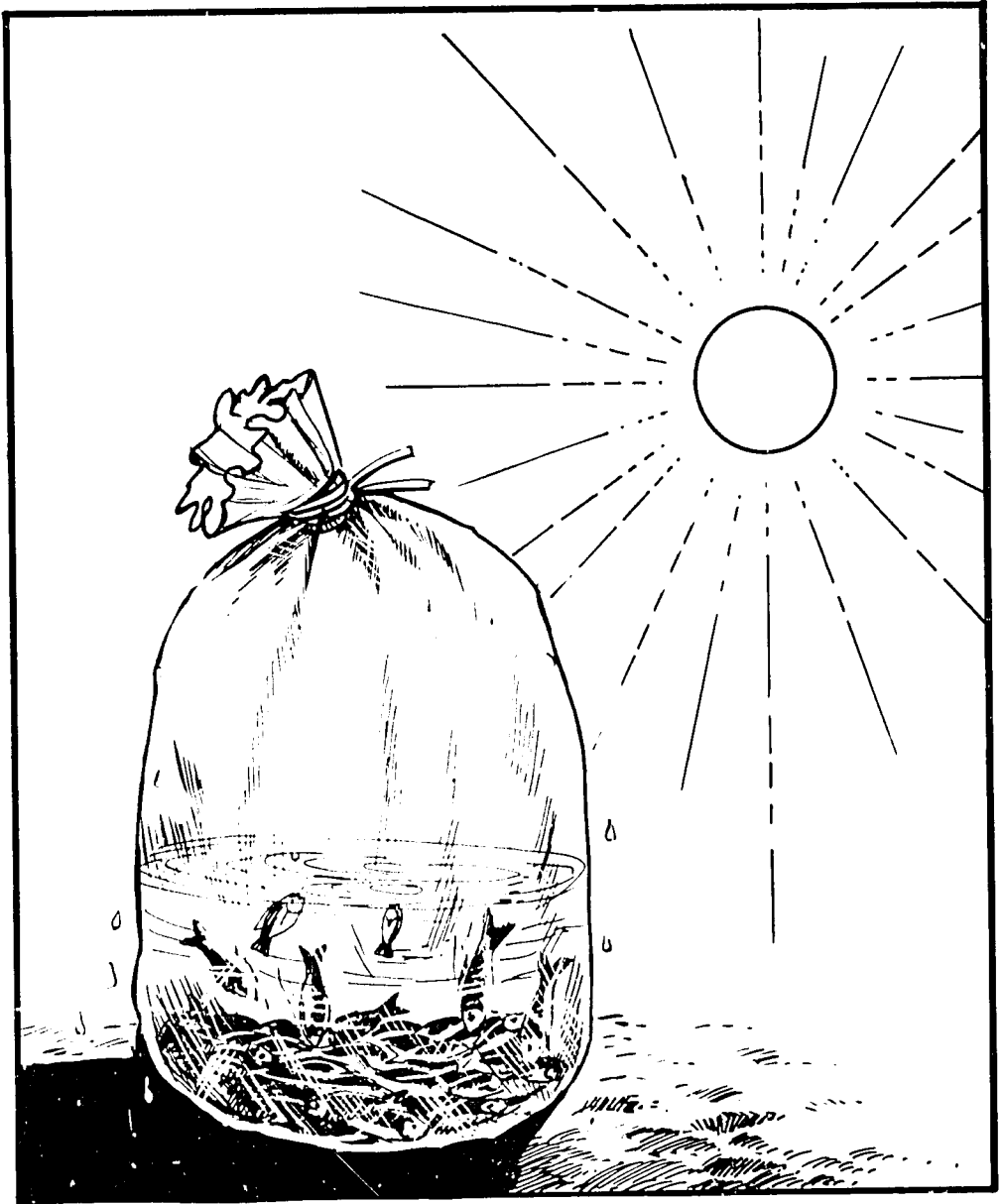


How to transport fish seed

1. Fill 3 liter plastic bags 1/3 with clean, clear water.
2. Put into the bag no more than 8 kg of 60-100 g fish.
3. Fill the bag with pure oxygen until it is about 2/3 full with oxygen and 1/3 with water.
4. Bend the top of the bag and tie it securely with 2-3 rubber bands.
5. Transport fish in the early morning or at night when it is cool.
6. Use the quickest possible means of transportation. Fish will only survive a 4-5 hour journey in the plastic bags.



Transport fish seed early in the morning or late in the afternoon. The midday heat may cause fish to die.



How to stock the fish seed

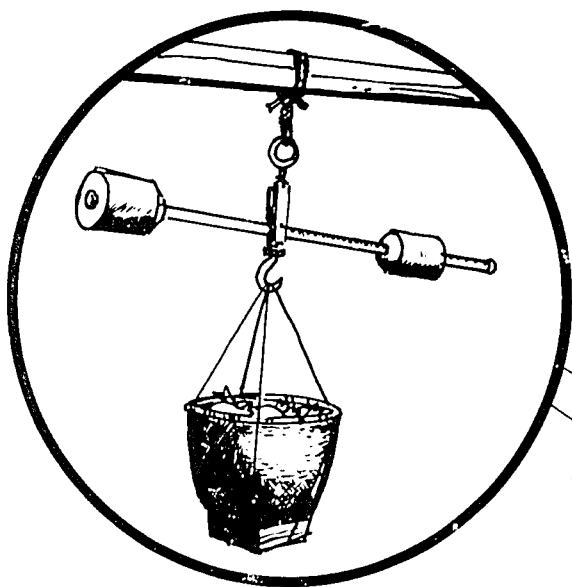
1. As soon as the fish seed arrive at the cage site, immediately float the plastic bag into the water for 15-20 minutes.
2. Splash water onto the sides of the bag above the water surface.



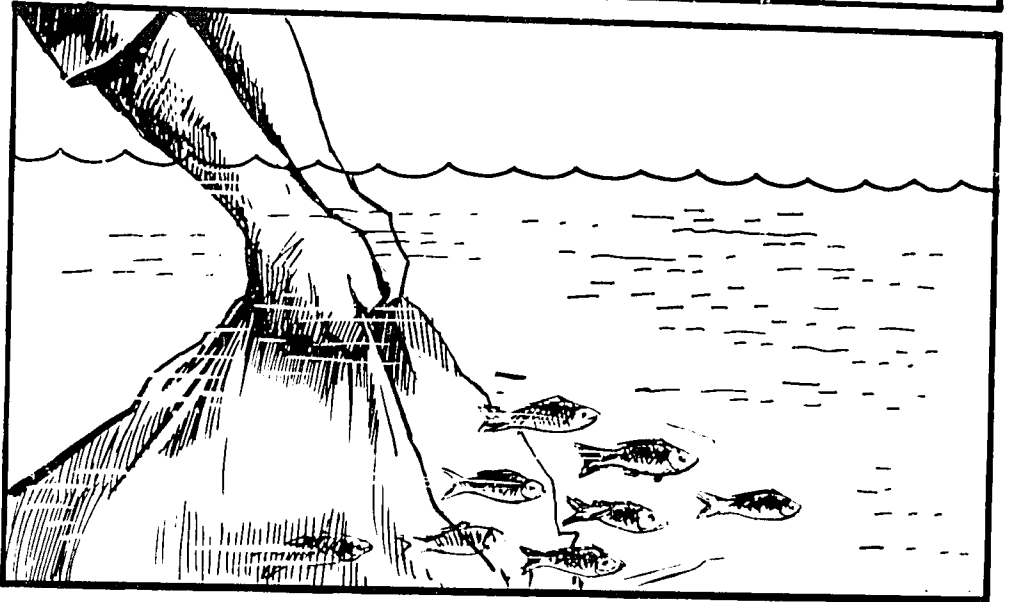
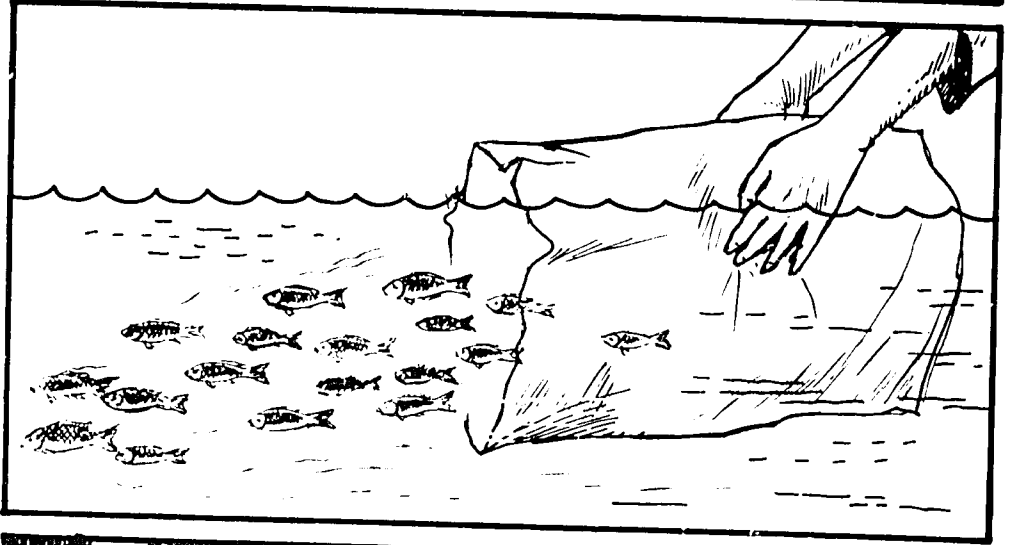
3. Open the plastic bag and slowly splash small amounts of water into the bag over 15-20 minutes so that the temperature of the water in the bag becomes the same as the water in the cage.



4. At stocking, weigh and count the fish.



5. Sink or slant the bag into the water, allowing the fish to swim out by themselves.



After stocking, remove any dead fish from the floating cage. Count and weigh all the dead fish.



Record the following:

Stocking date (e.g., date 1-1-90)

The day after (e.g., date 2-1-90)

Number of fish

date 1-1-90 = 1000

date 2-1-90 = 20 dead
980 live

Weight of fish

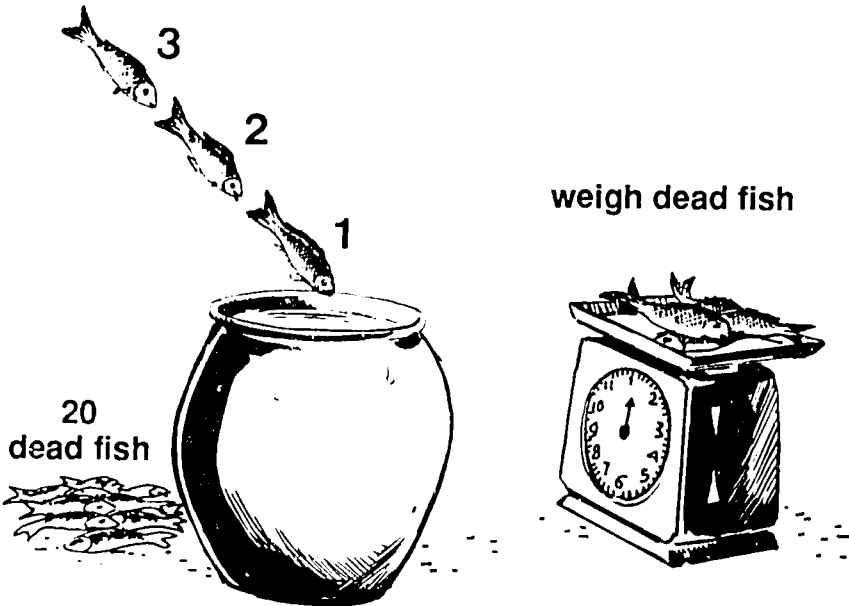
date 1-1-90 fish weight = 100 kg

date 2-1-90 dead = 2 kg

weight of live fish = 98 kg

Average weight when stocked = 100 g/fish

Weight the day after = 100 g/fish



Keep daily records of your cages.

Make a table as follows:

date	number of live fish	number of dead fish	weight (kg fish/ 1 cage)	average fish weight (g/fish)	remarks
1-1-1990	1,000	0	100	100	stocking date
2-1-1990	980	20	98	100	dead fish from stocking



Feed the fish three times daily

- morning
- midday
- late afternoon



Feeding times are the best times to closely observe your fish. If the fish do not act normal, they may be ill. If the fish stop feeding, cancel feeding until the next day.



Determine how much weight the fish have gained by sampling fish weight every 2 weeks.

For example:

sample number	number of fish/sample	weight (kg)
1	20	2.05
2	20	2.00
3	20	2.01
4	20	2.10
5	20	2.07
Total =		10.23 kg
average fish weight	=	$\frac{10.23 \text{ kg}}{5 \text{ samples}} = 2.046 \text{ kg}$
	=	$\frac{2.046 \text{ kg}}{1 \text{ sample}} \times \frac{1 \text{ sample}}{20 \text{ fish}} = 102.3 \text{ g/fish}$



To determine the total weight of fish in the cage, multiply the average fish weight from the sampling by the number of live fish. Observe the cage every day for dead fish and subtract this from the number of live fish.

date	number of live fish	number of dead fish	average fish weight (g) from sampling	total weight of fish in cage (kg)	remarks
1-1-90	1,000	0	100	100	new stock
2-1-90	980	20	100	98	fish dead after 1 day
15-1-90	979	1	102.3	100.1	first sampling
29-1-90	975	4	145.5	141.9	second sampling

Example:
 15-1-90 979 live fish x 102.3 g/fish = 100.1 kg/cage total weight

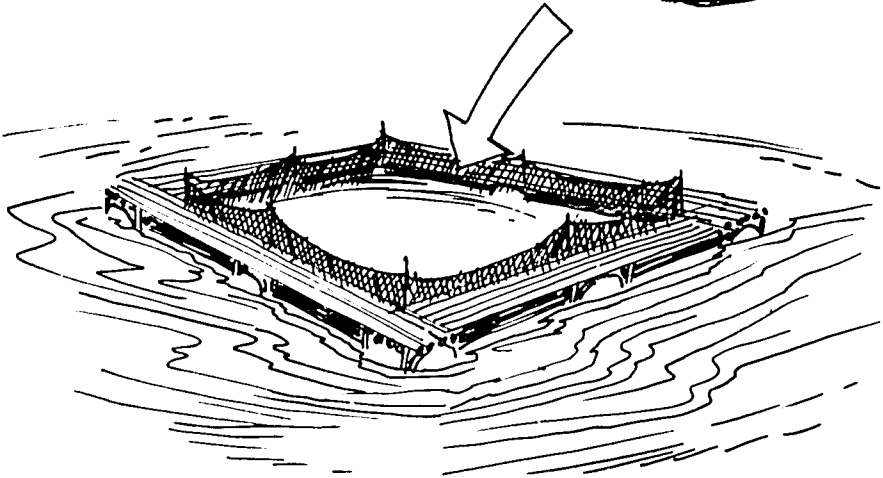


As the fish gain weight, increase the feeding rate by 3% per day.

date	kg/cage	X 3%/day	feed/day
15-1-90	100.1	X.03	3.0 kg
29-1-90	141.9	X.03	4.2 kg



x 3% =



Feed fish by hand (p. 25-26) or by putting the feed in a plastic bucket tied at the water surface with small holes in the bottom of it so that food will slowly leak out.

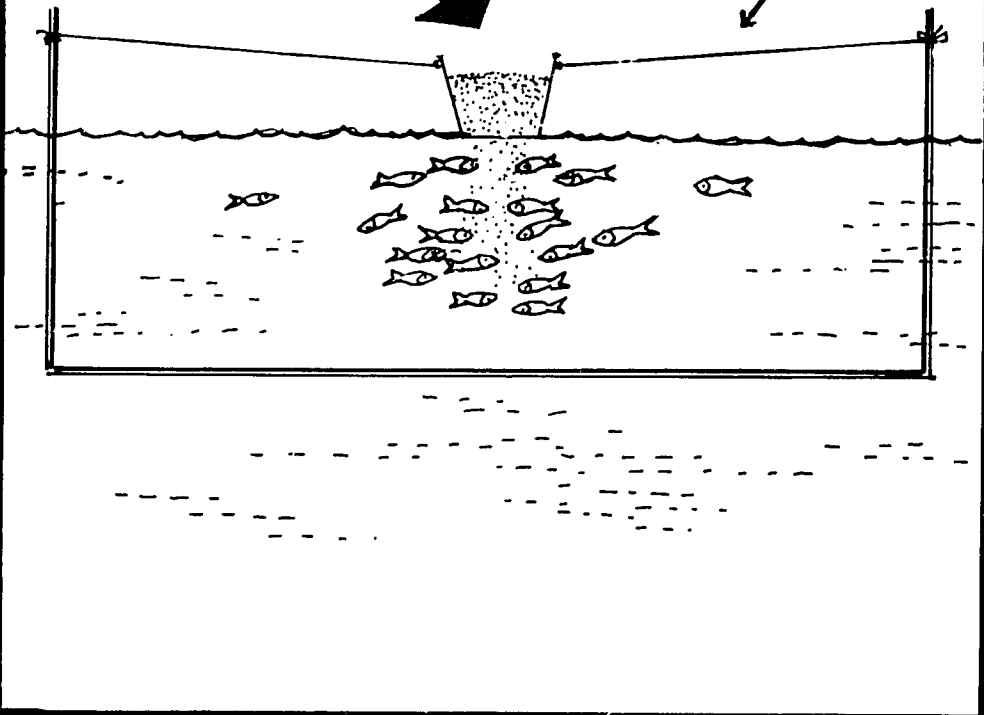
fish feed



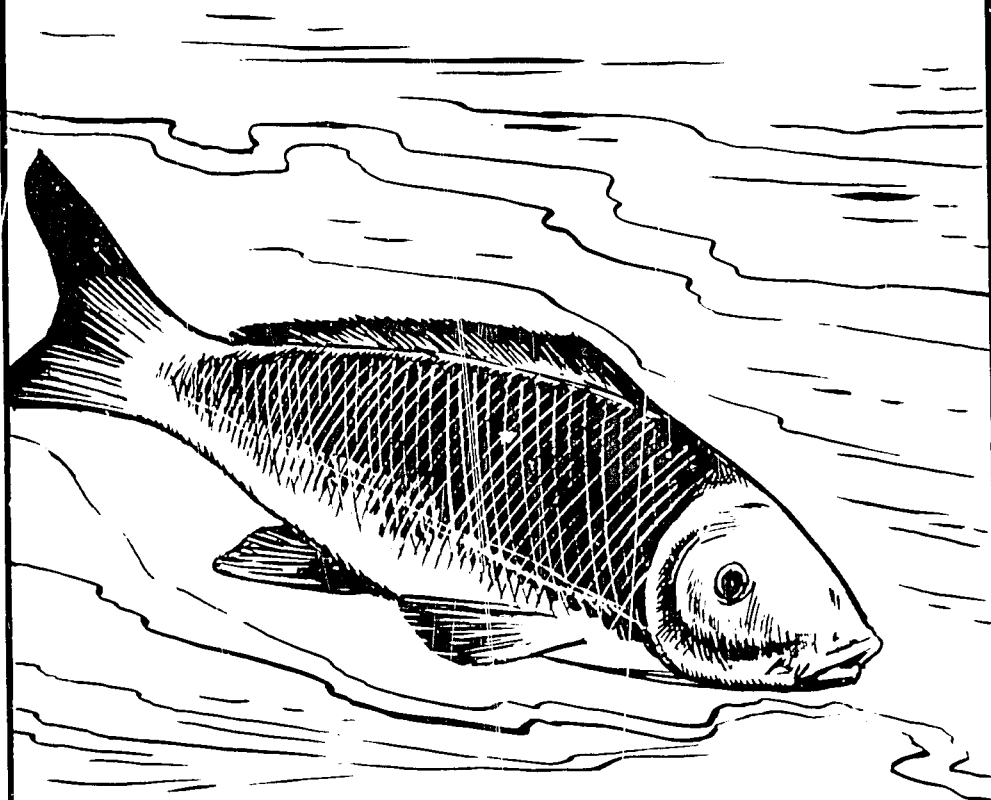
3 kg a day per 100 kg fish
total weight in the cage



rope



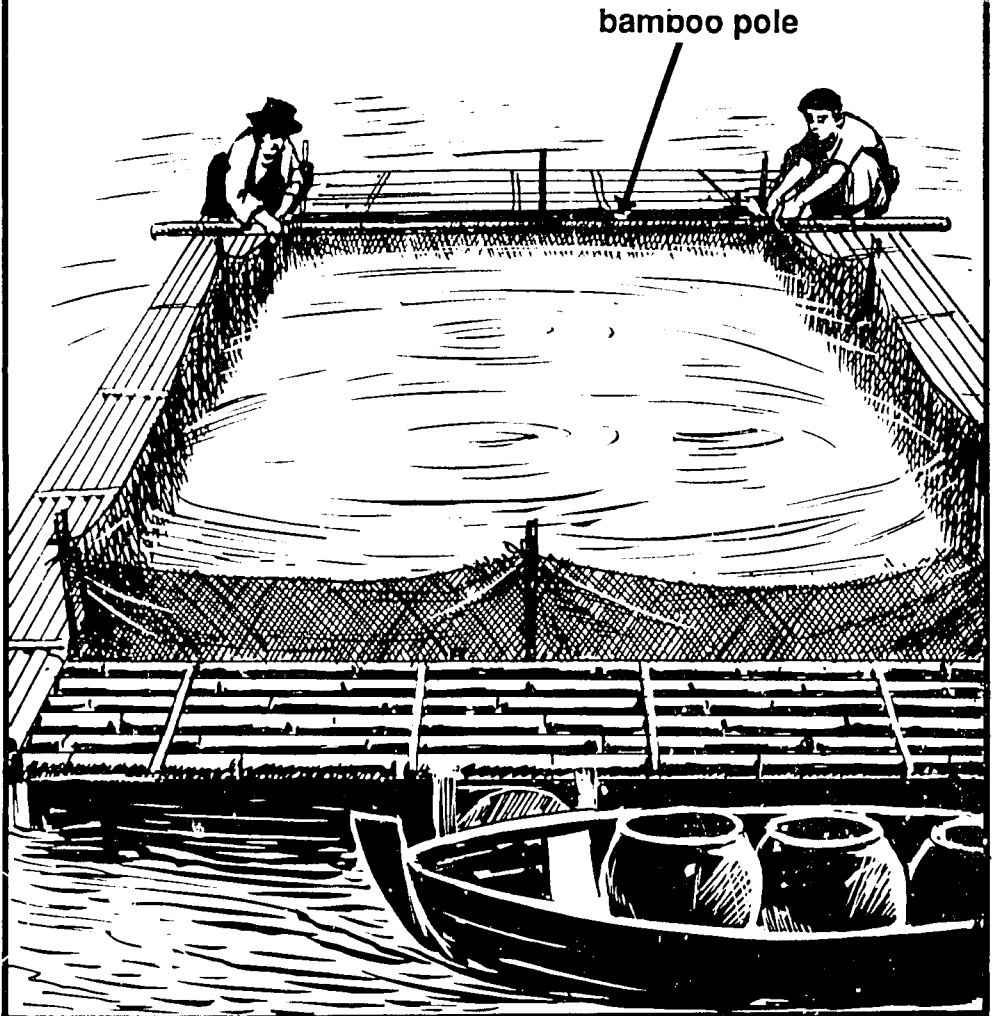
Consider the size of fish to be sold. Usually, fish are grown for 3-4 months until they weigh about 0.5 kg.



0.5 kg
3-4 months

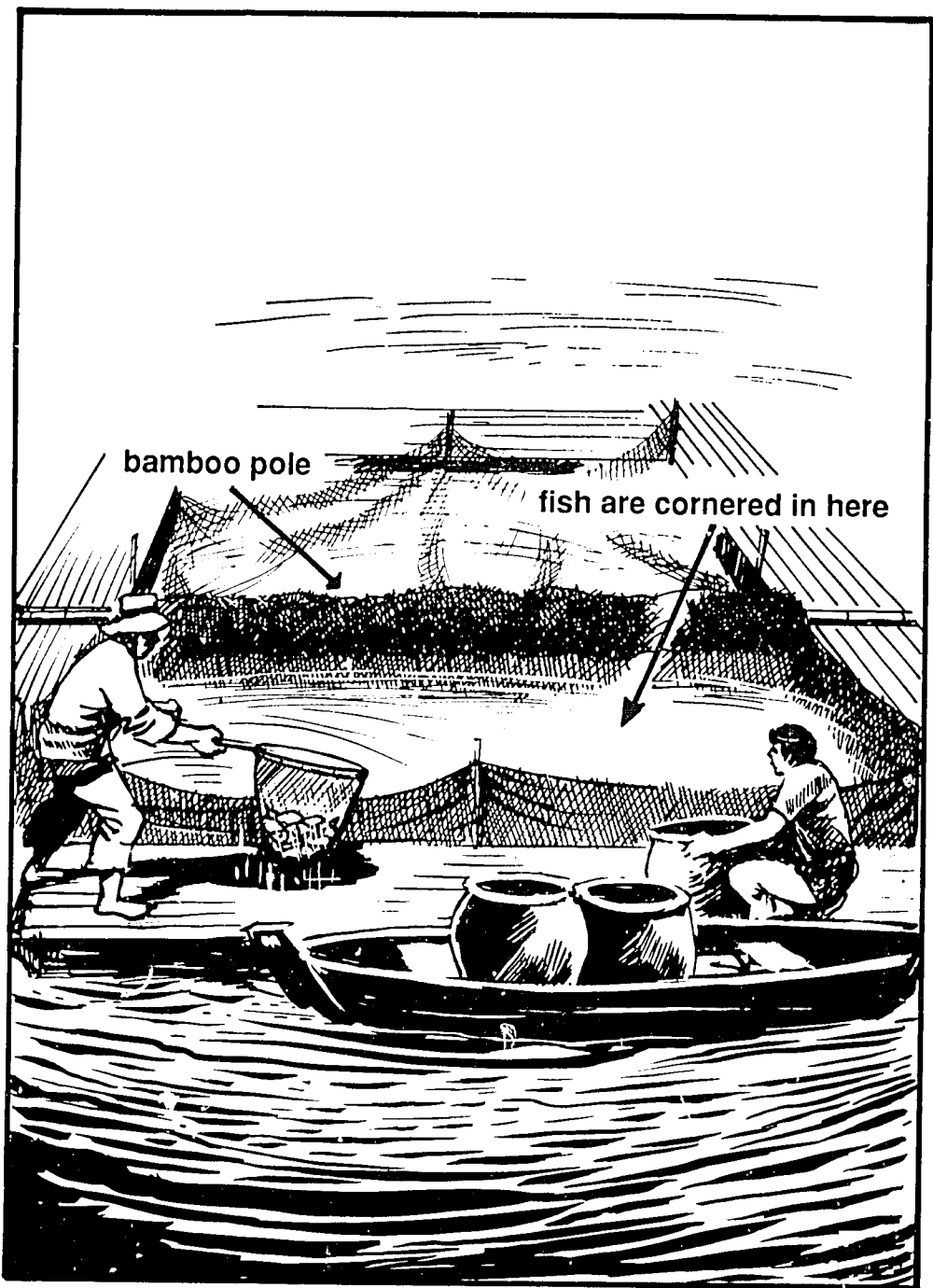
How to harvest the fish

1. Untie the bindings at the corners and sides of the net.
2. Retie these but much looser.
3. Insert a bamboo pole as shown.



4. With the bamboo pole, push the net along to harvest the fish.



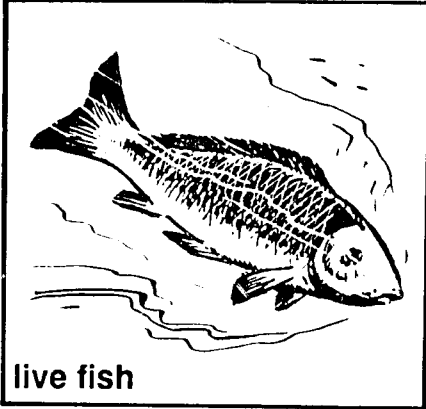


bamboo pole

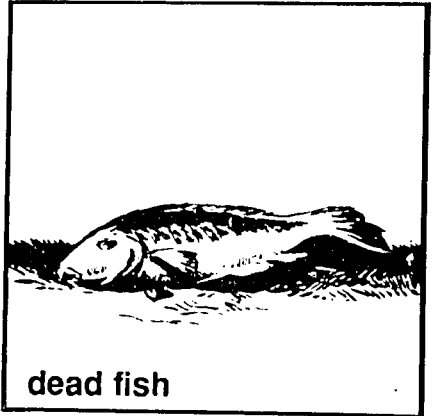
fish are cornered in here

Marketing the fish

Live fish fetch a higher price than dead fish. Try to sell live fish from your site.



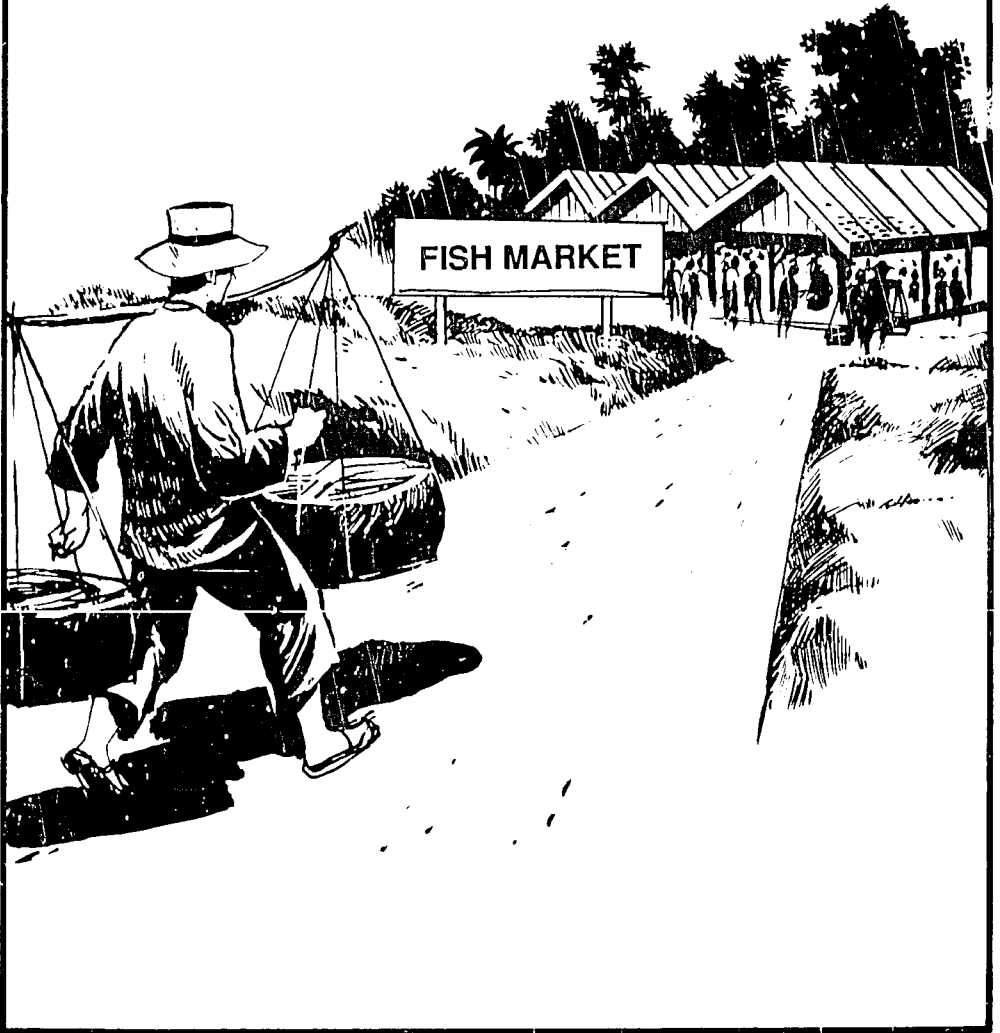
live fish



dead fish

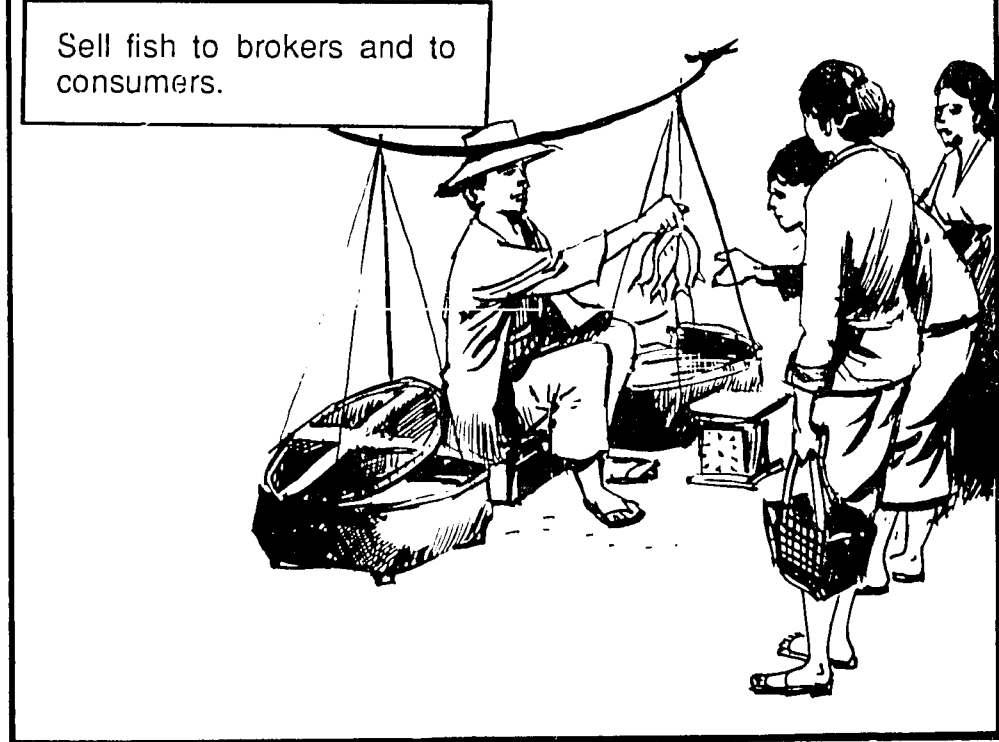


To sell fish wholesale, take samples to the market, bargain for the best price, size, quantity, etc.





Sell fish to brokers and to consumers.



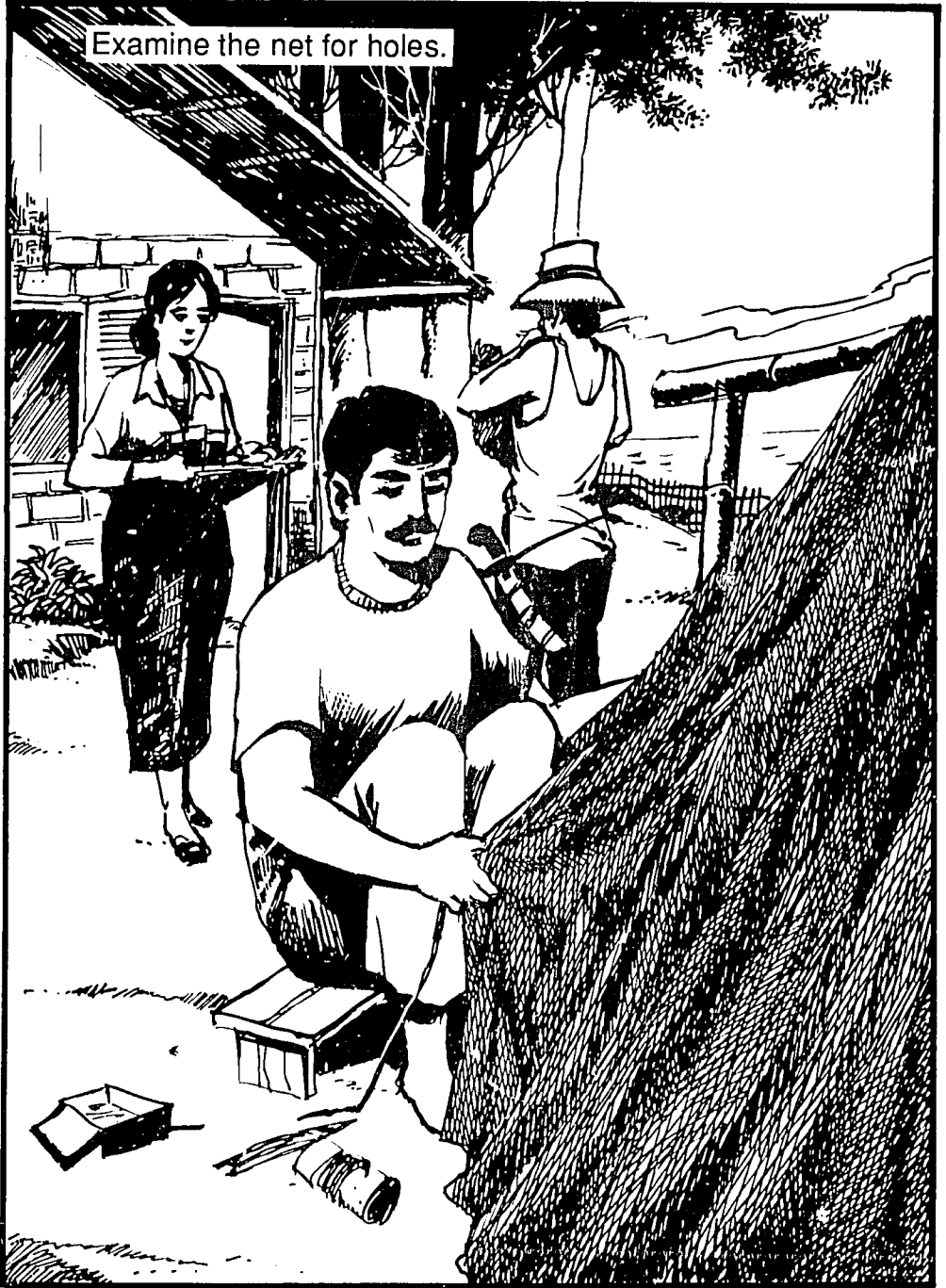
It is a good safety precaution to have a guardhouse at the site with provisions for sleeping overnight.



Take care of your net. After harvest, pull out the net and clean it.



Examine the net for holes.



Fish culture has many benefits. The family is healthy, happy, and active.





Units of measure

kg = kilogram

g = gram

m = meter

cm = centimeter

l = liter

ml = milliliter