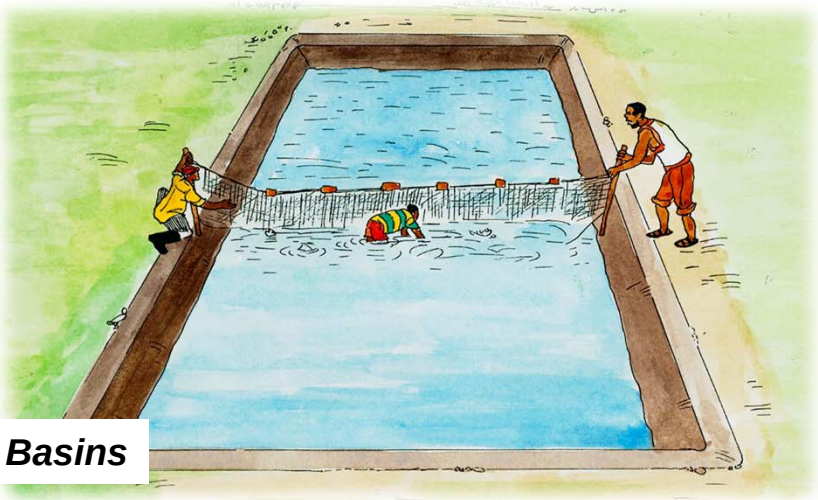
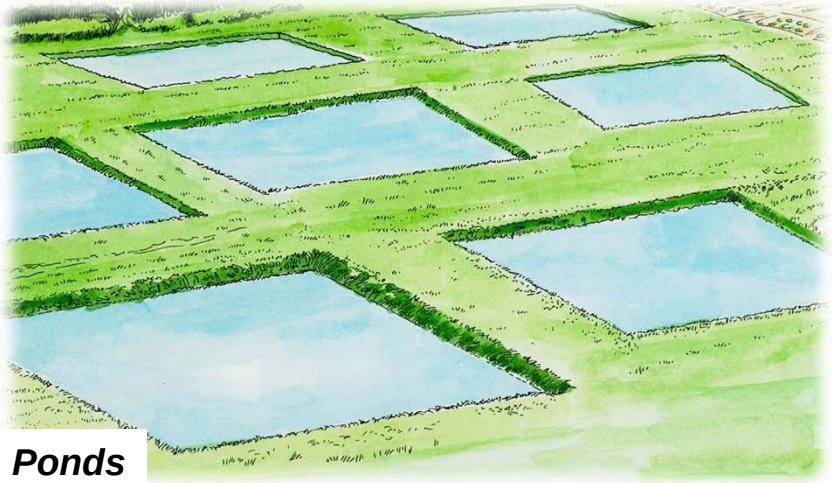
Fish production systems in Africa

Cages



Basins

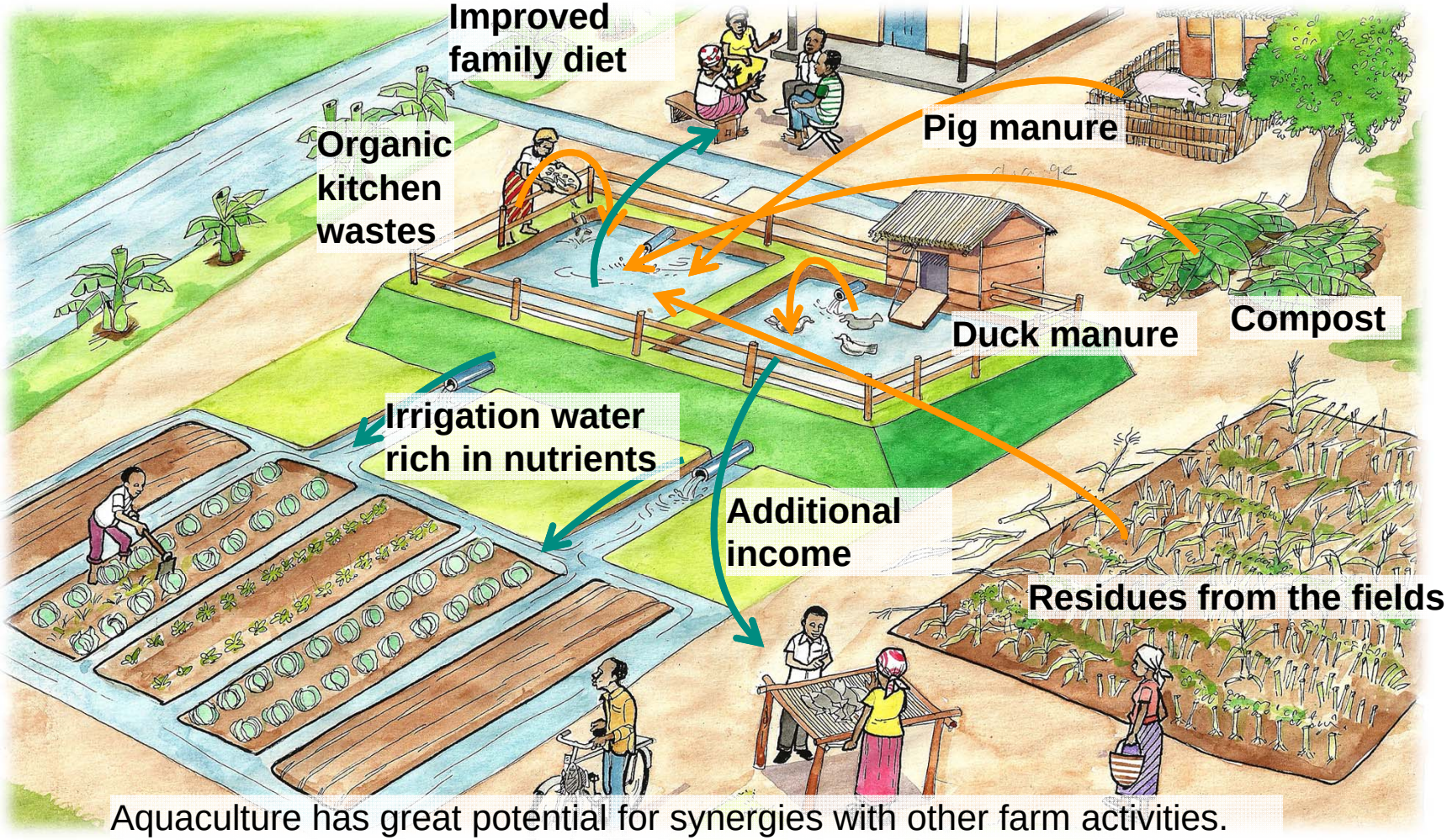


Ponds

Fish farming:

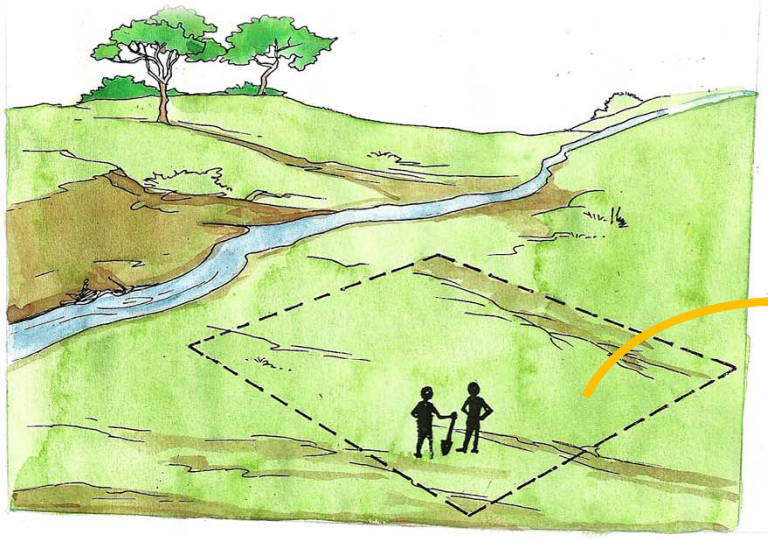
- is suitable for smallholder farmers.
- is complementary to other farm enterprises.
- requires moderate effort and provides a healthy food source.

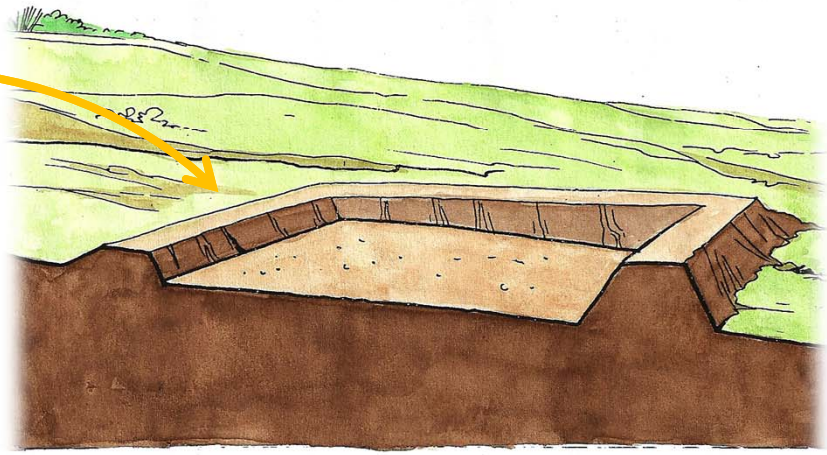
Potential benefits of integrating aquaculture



Aquaculture has great potential for synergies with other farm activities.

Choosing the right site for the pond





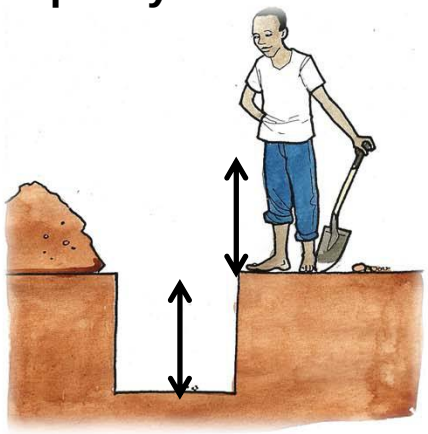
A slight slope saves a lot of work for digging the pond.

Ideal conditions:

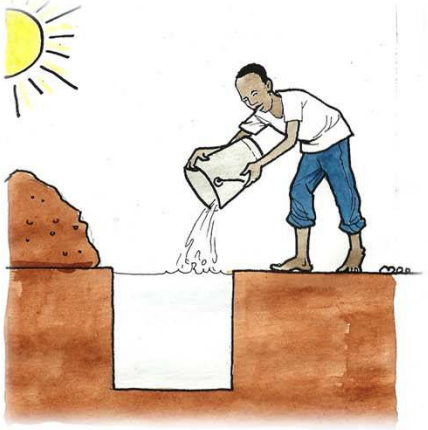
- **Easily accessible and secure**
- **Near a water source**
- **Soil with high content of clay**
- **Impermeable to water and stable**

Will the soil hold the water?

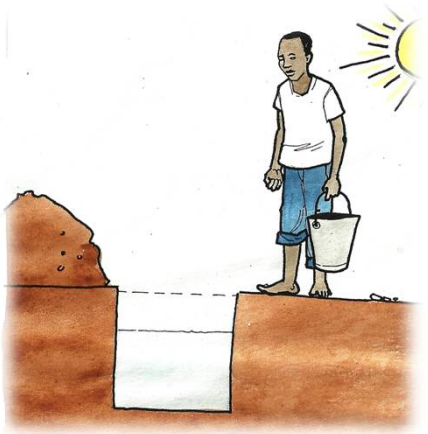
1. Dig a hole as deep as your waist



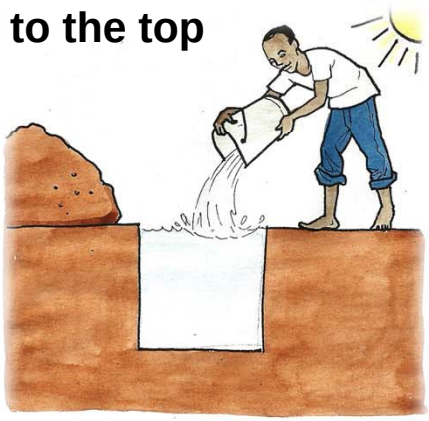
2. Early next morning fill the hole with water to the top



3. In the evening some water will have trickled away

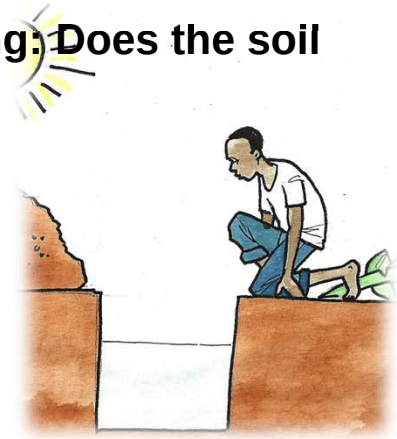


4. Fill the hole again to the top



5. Cover the hole

6. Check next morning: Does the soil hold the water?



Will the soil be stable when wet?

Stability test

1. Take some soil and moisten it

2. Squeeze the soil by closing the fingers firmly

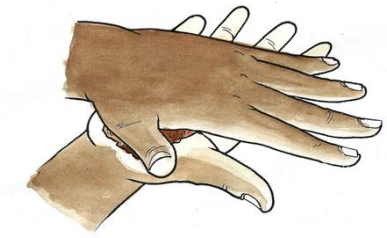
3. Open your hand again

If the soil holds the shape, it will be stable when wet.

If the soil falls apart, it won't be stable.

Clay or silt?

1. Rub some soil between your hands



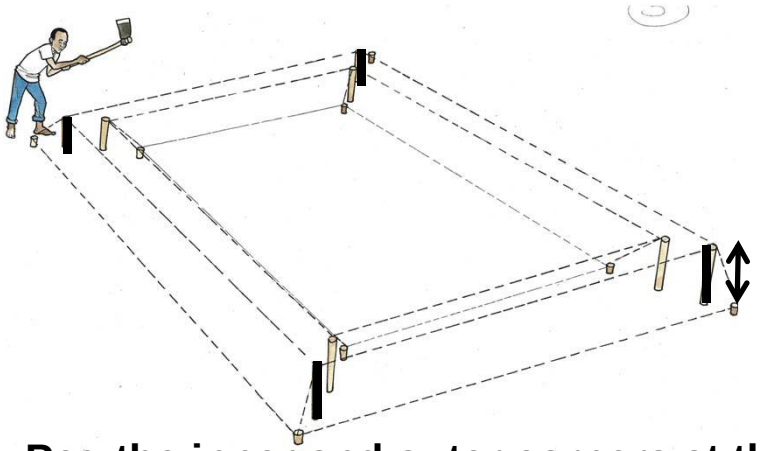
2. After rubbing:
Is there some soil in the folds of your hand?

No:
The soil consists of clay.

Yes:
The soil consists of silt.

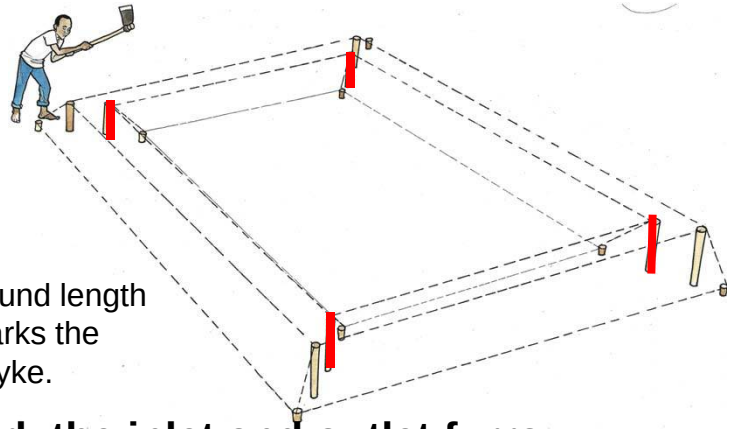
How to peg a pond

1. Peg the outer edges of the dyke crest

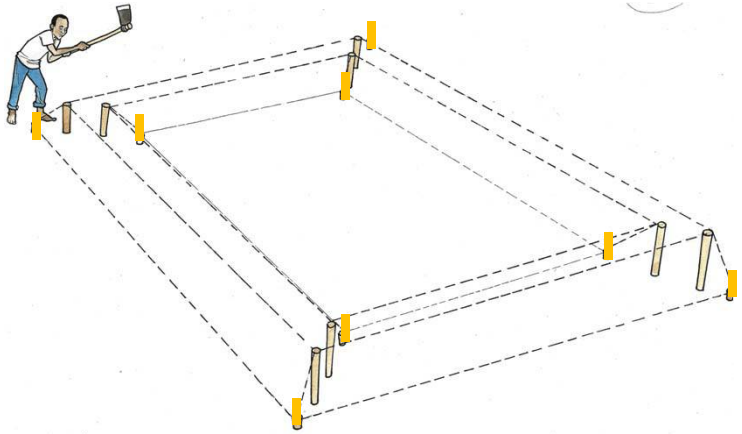


The above ground length of the pegs marks the height of the dyke.

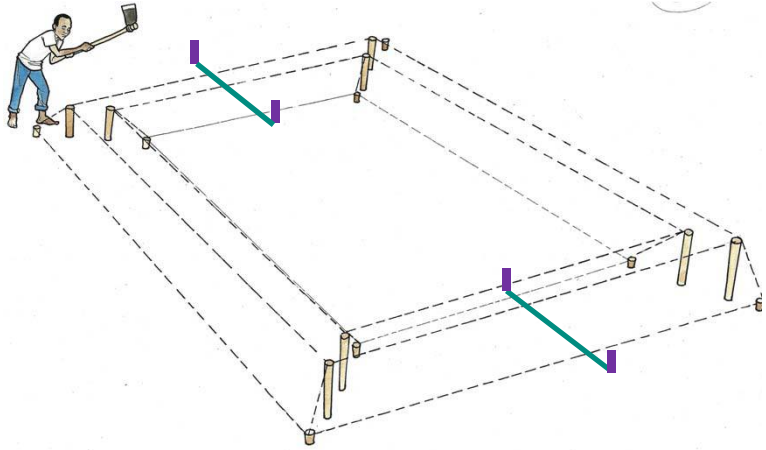
2. Peg the inner edges of the dyke crest



3. Peg the inner and outer corners at the bottom of the slope

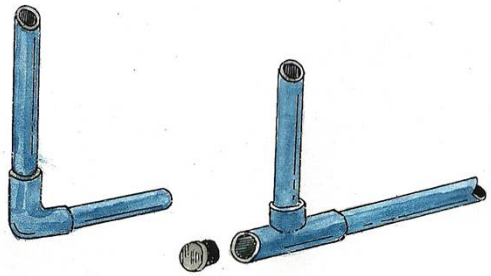


4. Mark the inlet and outlet furrow

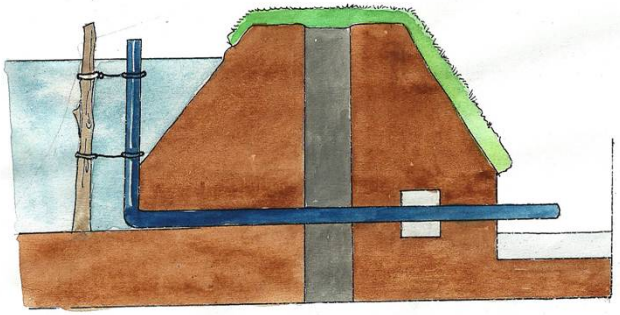


Construction of outlets

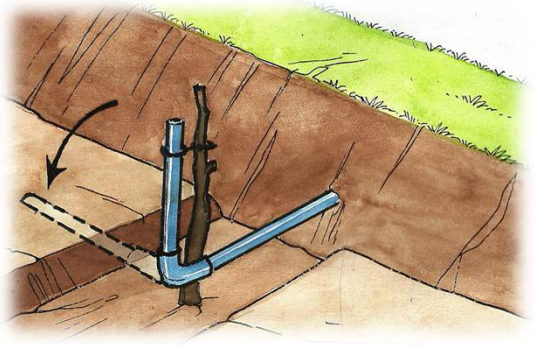
A) Simple elbow-pipe for small ponds



Easy to make from tubes

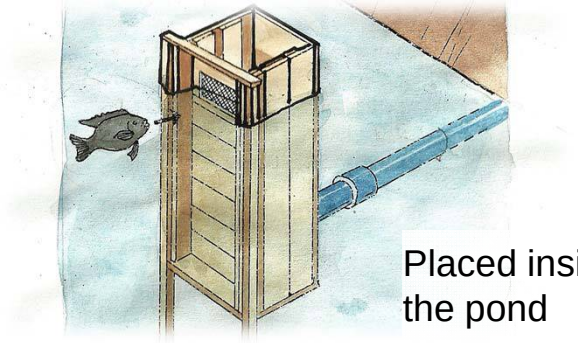


Elbow inside the pond

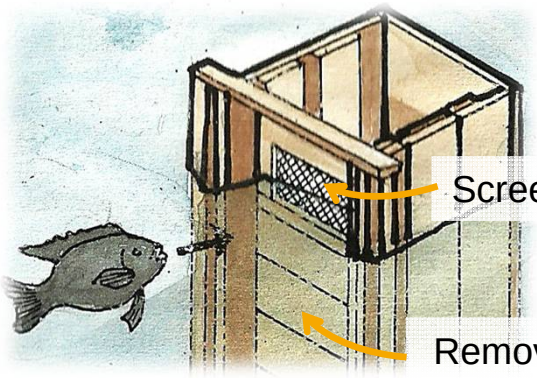


Elbow outside the pond

B) More sophisticated monk for large ponds

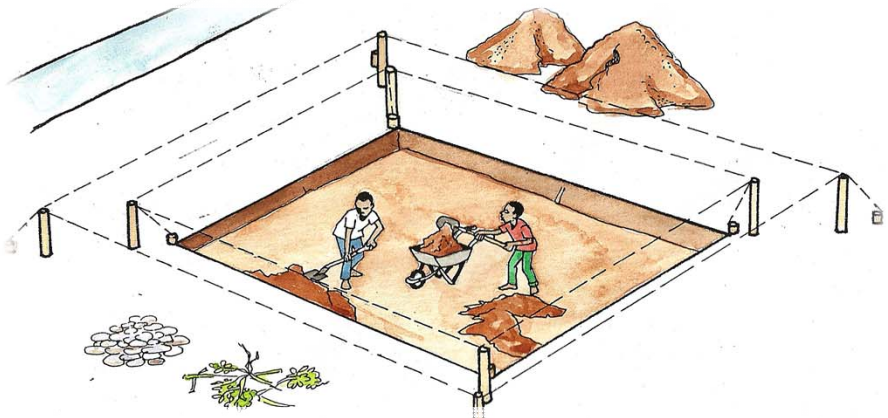


Placed inside the pond

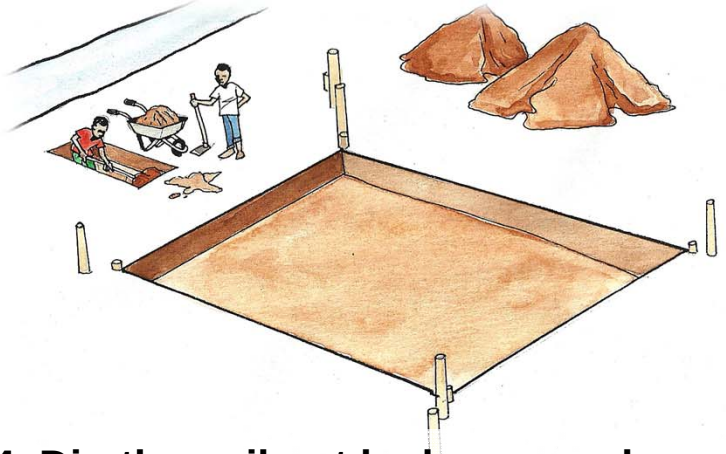


How to build a pond in successive steps (1)

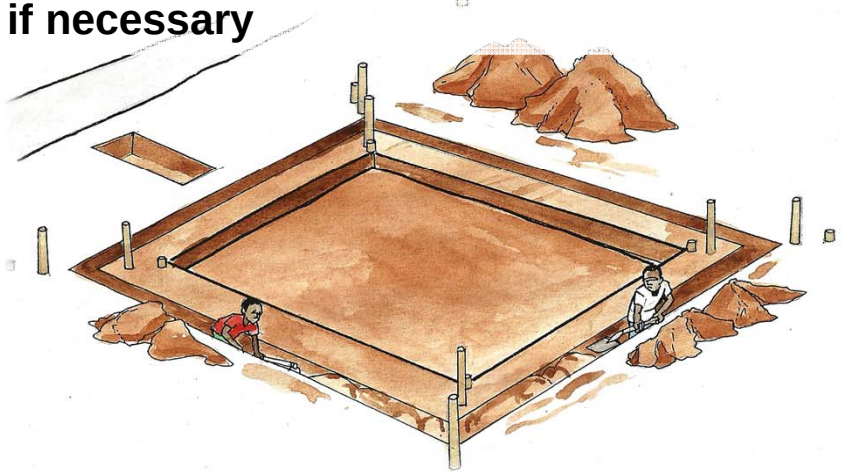
1. Clear the ground and remove the topsoil



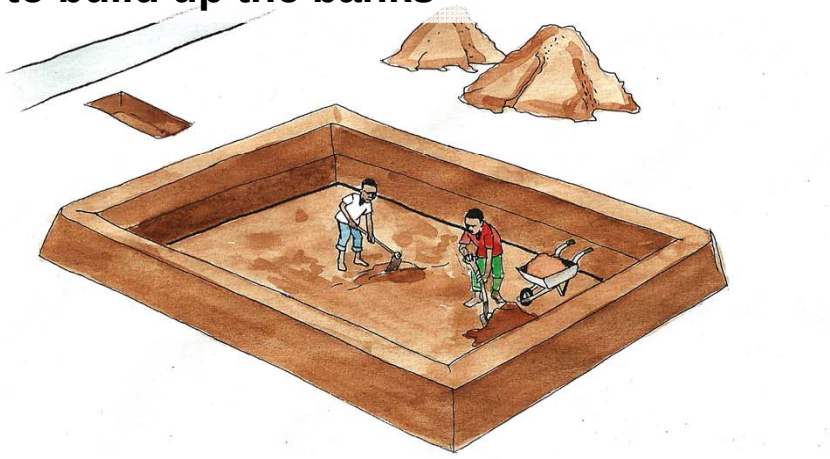
2. Dig the inlet ditch



3. Dig a core trench and fill it with clay, if necessary

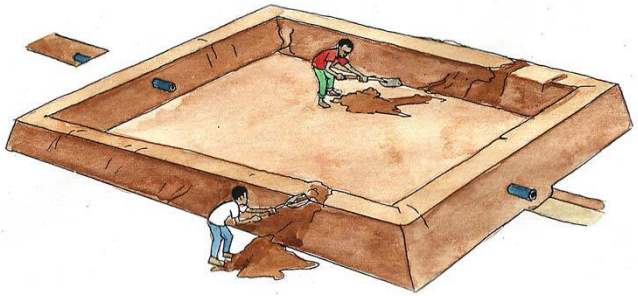


4. Dig the soil out by layers and use it to build up the banks

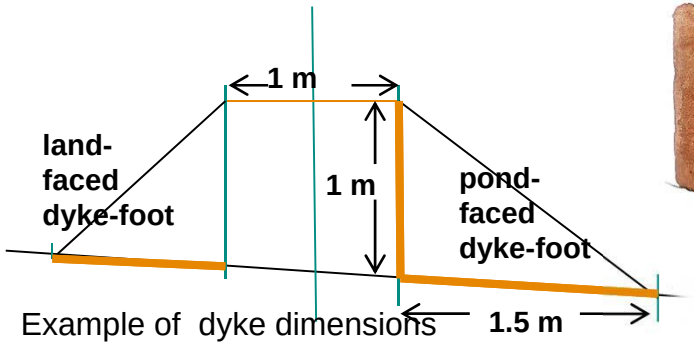


How to build a pond in successive steps (2)

5. Form the inside and outside slopes of the banks

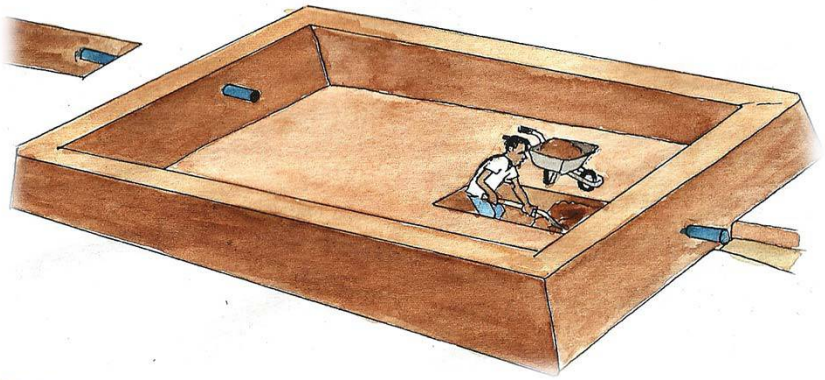


6. Cover the top and the outside slopes of the banks with topsoil

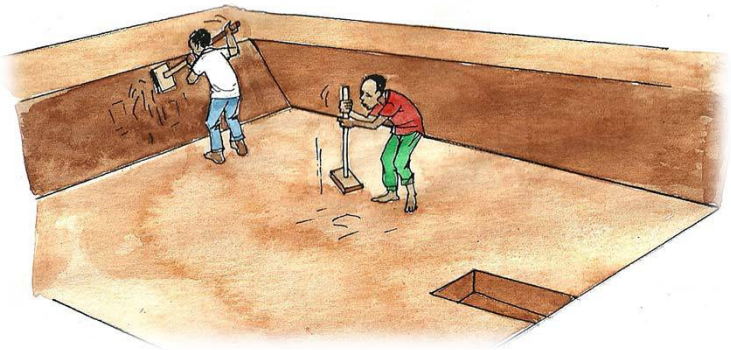


Example of dyke dimensions in the case of pure clay material

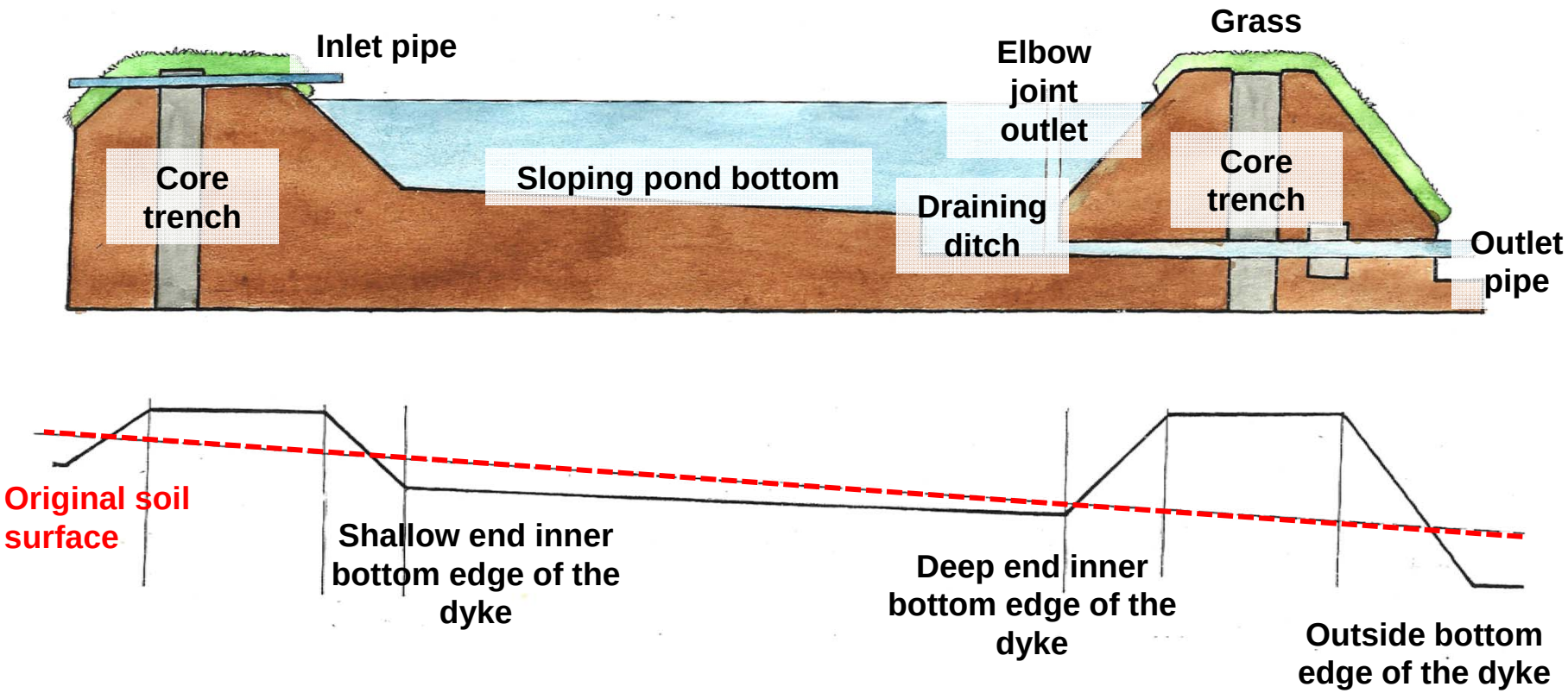
7. Dig a draining ditch inside the pond



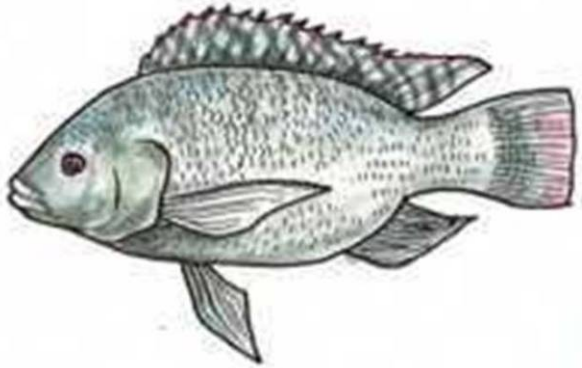
8. Stamp the bottom of the pond and the slopes of the banks



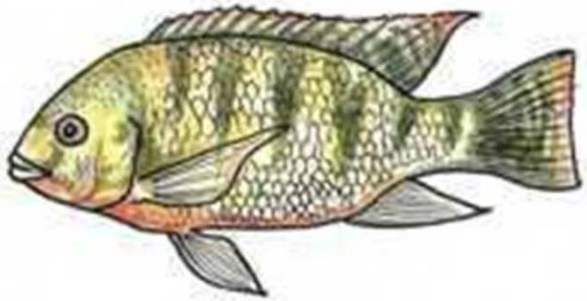
How a completed pond should look like



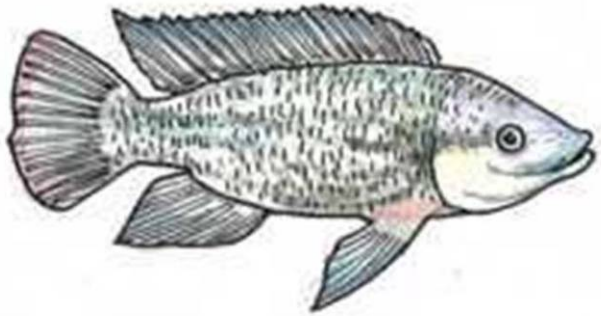
Most common Tilapia species in Africa



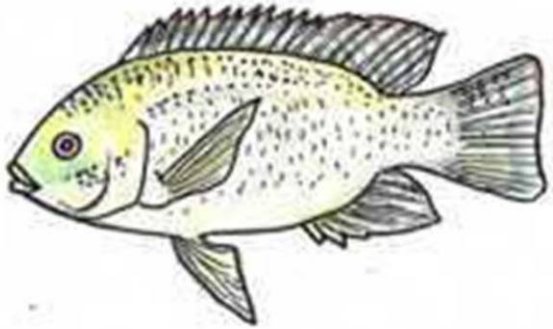
Blue tilapia
(Oreochromis aureus)



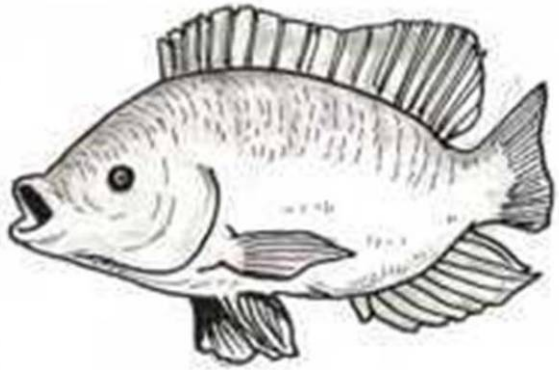
Red breast tilapia
(Tilapia rendalli)



Mozambique tilapia
(Oreochromis mossambicus)

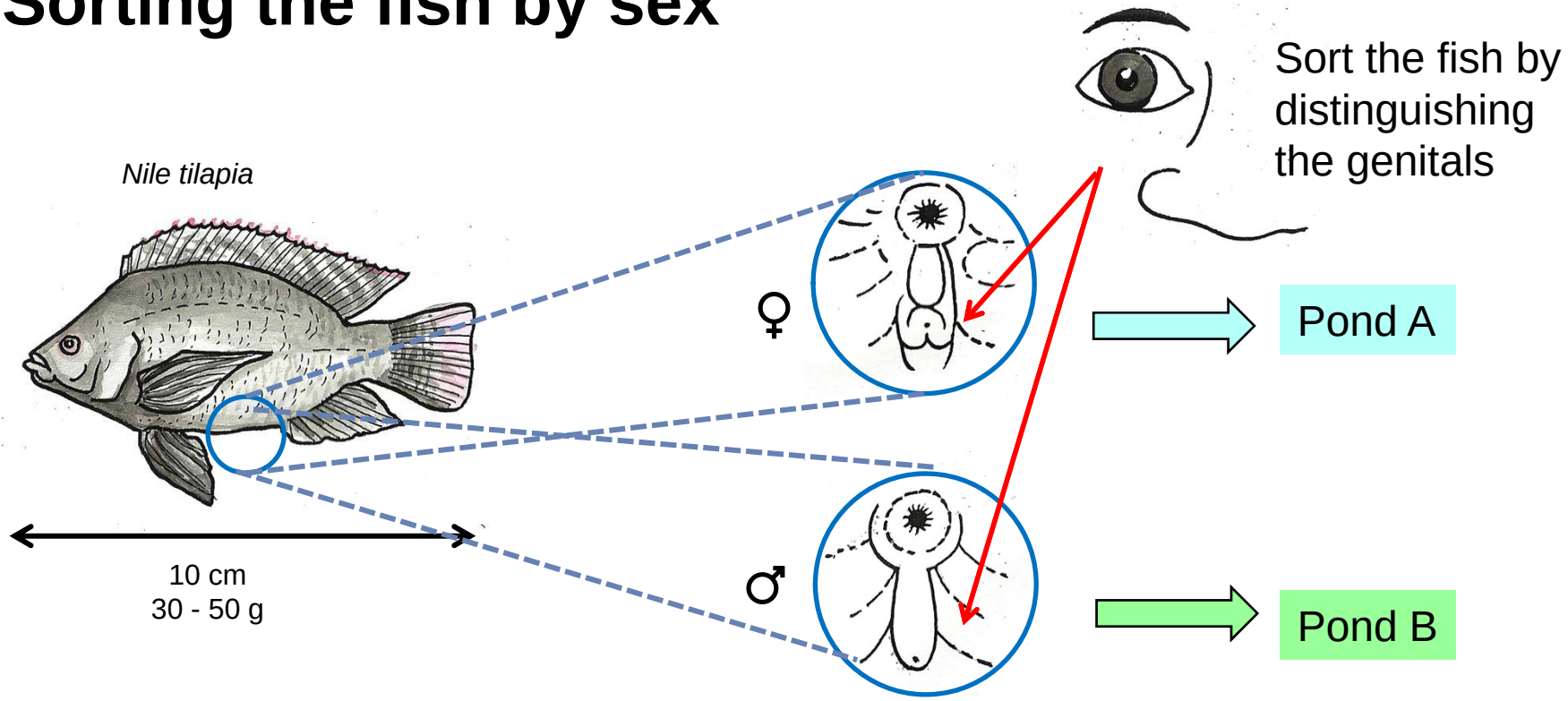


Green headed perch
(Oreochromis machrochir)



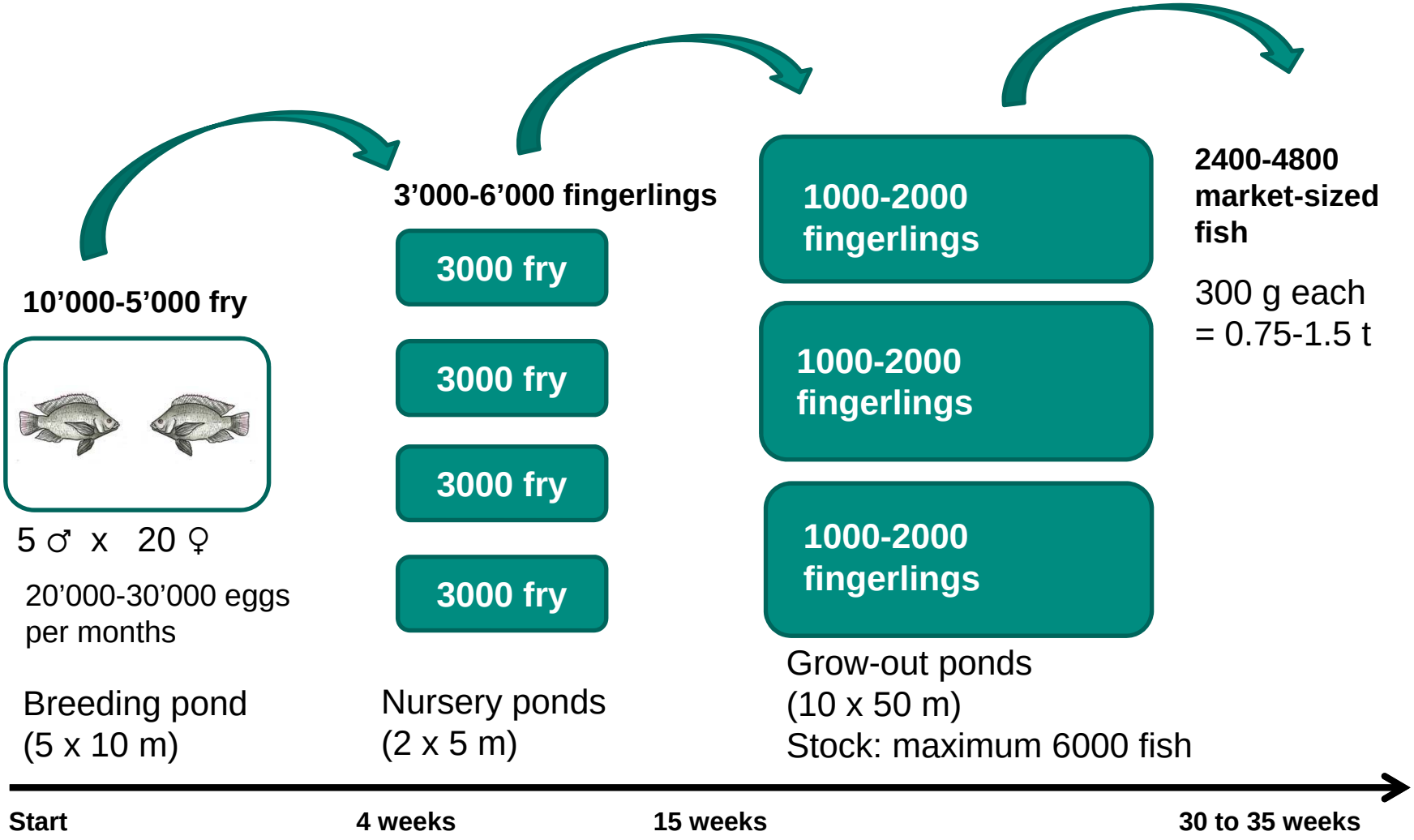
Nile tilapia
(Oreochromis niloticus)

Sorting the fish by sex



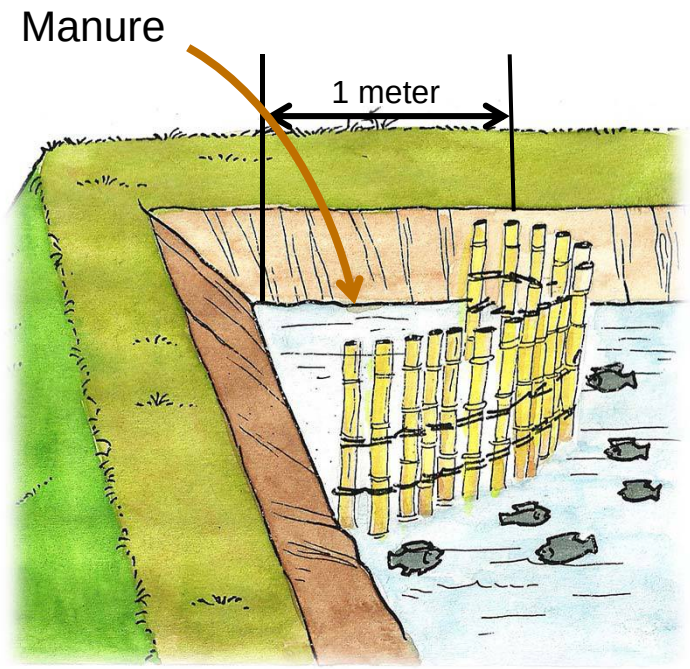
Hormonal treatment to produce female fish only is not allowed in organic agriculture!

The production cycle of fish

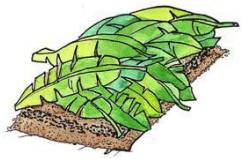


How to fertilize the pond

1. Build a crib from bamboo or wood at the shallow side of the pond to hold the fertilizer

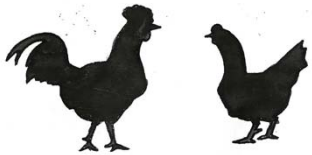


2. Apply the recommended rates per 100 m² of pond area and week



10 kg of ripe compost

or

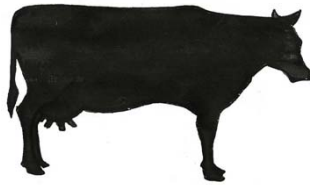


2 to 3 kg of chicken manure

or

8 to 10 kg of pig manure

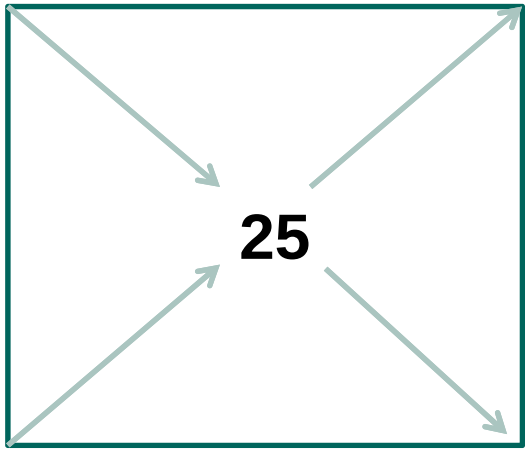
or



10 to 15 kg of cow manure

Calculating feed ingredients: The square method

Ingredient 1 (50 %)



Ingredient 2 (8 %)

Difference: 42

17

Shows portion needed of ingredient 1

Shows portion needed of ingredient 2

25

Sum: 42

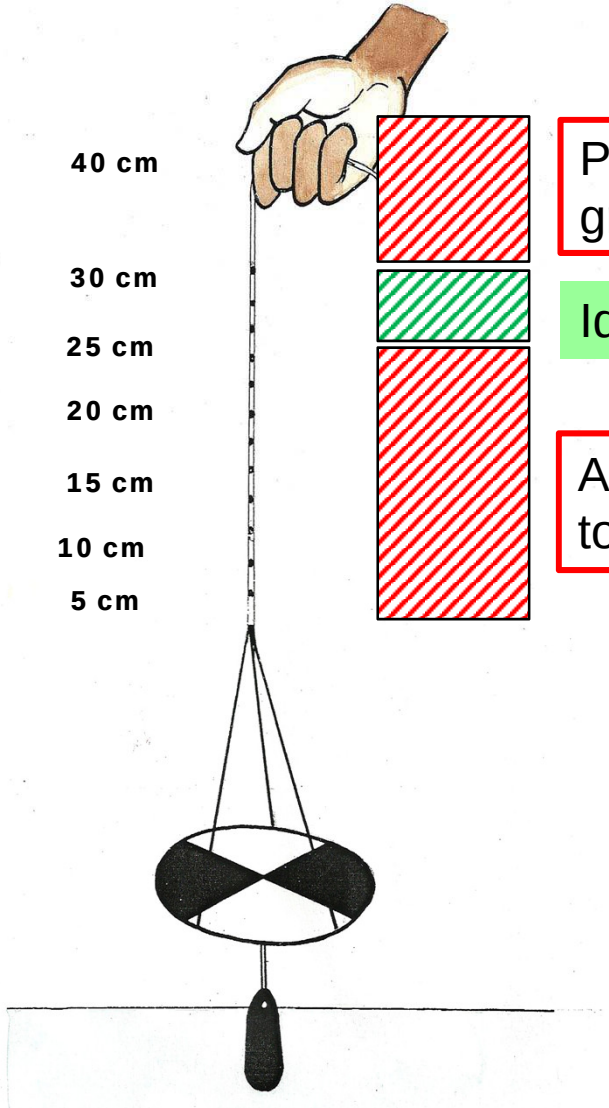
Shows total parts needed

1. **Note the desired protein level in the center.**
2. **Place the two ingredients with their protein levels at each corner on the left.**
3. **Note the differences between the number in the center and each feed ingredient on the right side in the diagonally opposite corner.**

The portions of both ingredients can be expressed as:
ingredient 1 : ingredient 2 = 17:25
or as percentage: 17/42 x 100 = 40.5 % and 25/42 x 100 = 59.5 %

How to use the Secchi disc

1. **Immerse the disk slowly into the water**
2. **Measure the depth at which the disk disappears**

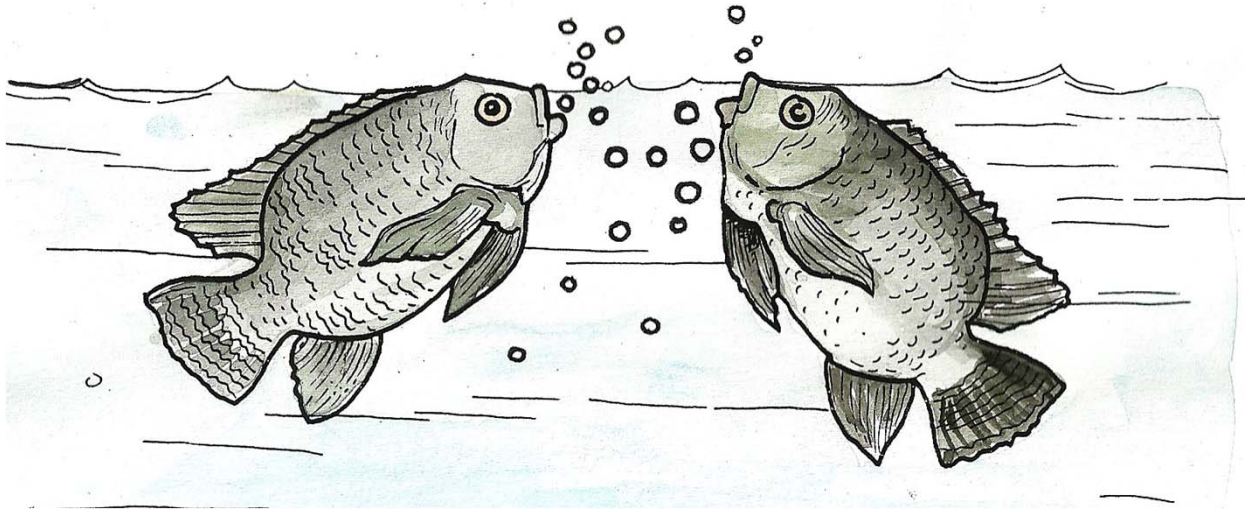


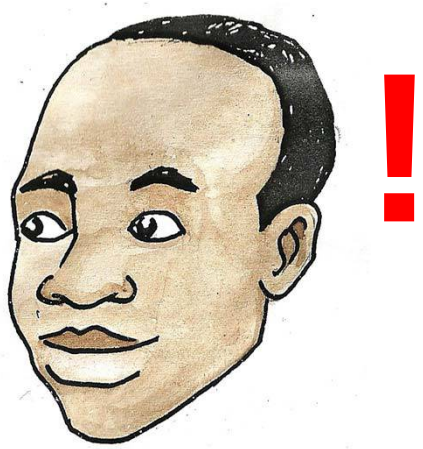
Poor algae growth → Add manure!

Ideal fertilization ✓

Algae growth too strong → Stop fertilization!

How to monitor fish behaviour

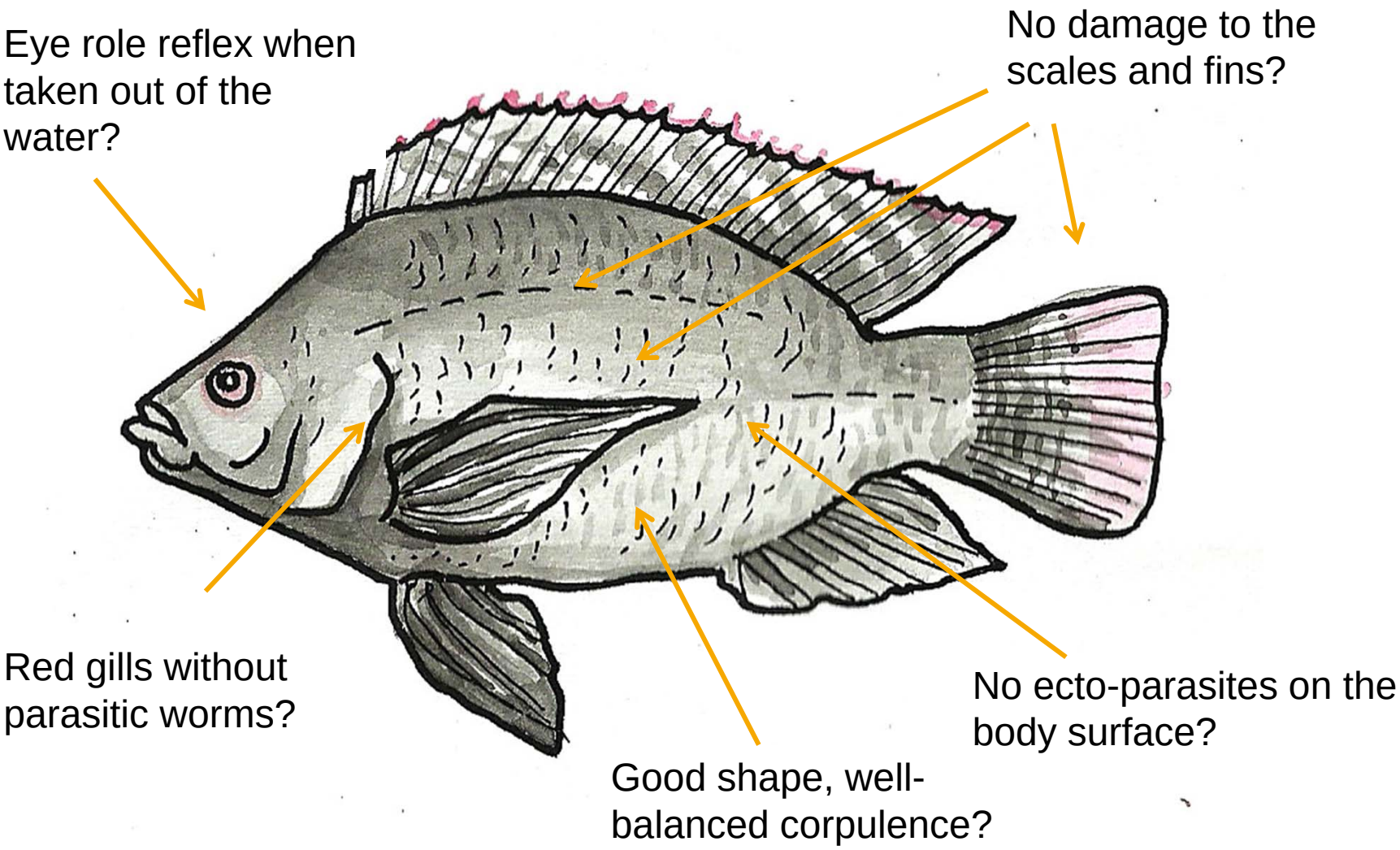




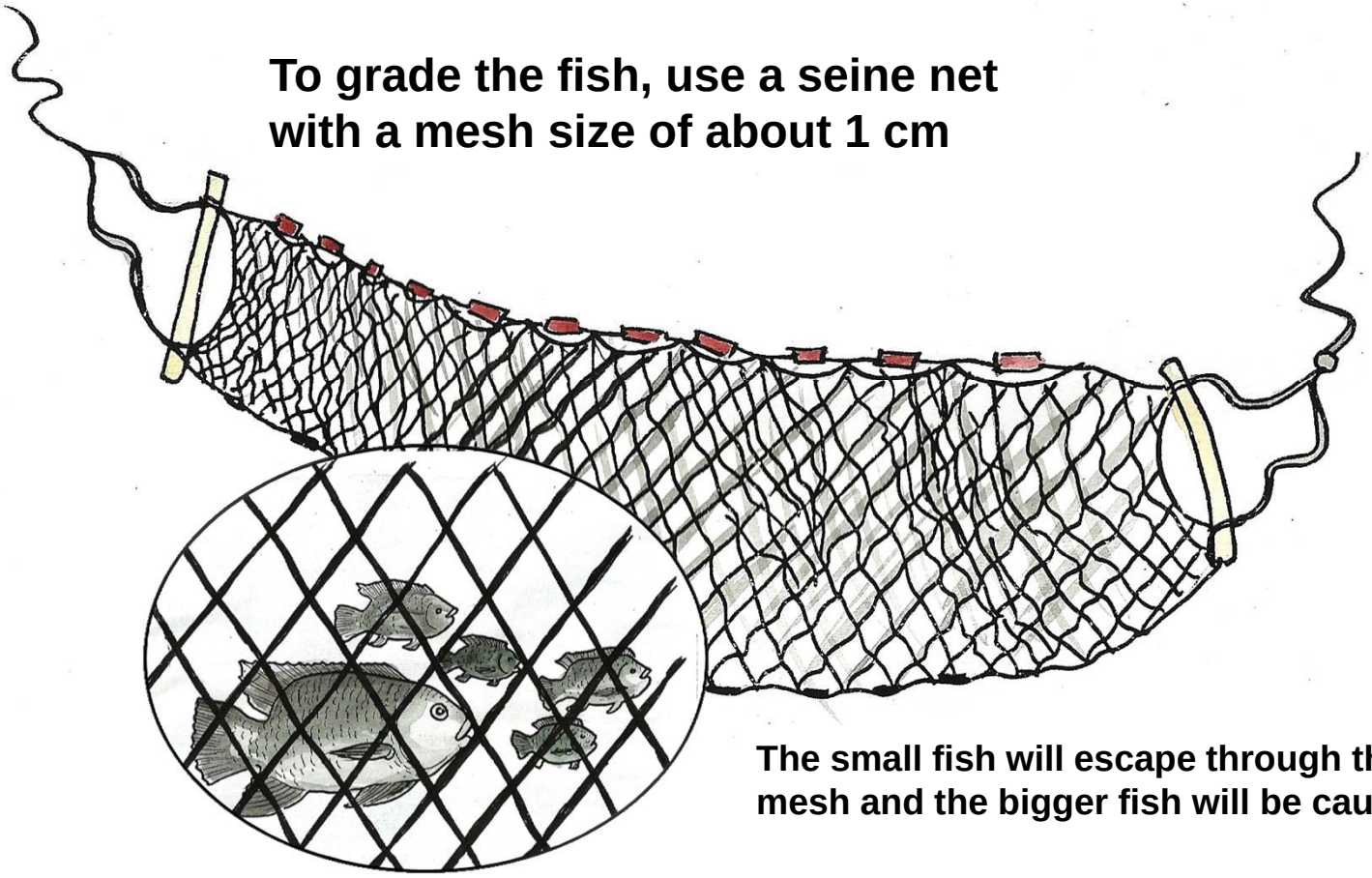
This is an alarming signal!

When fish hover at the surface gasping for air, this means the oxygen content of the water is too low! You must now add oxygen to the water!

How to monitor fish health

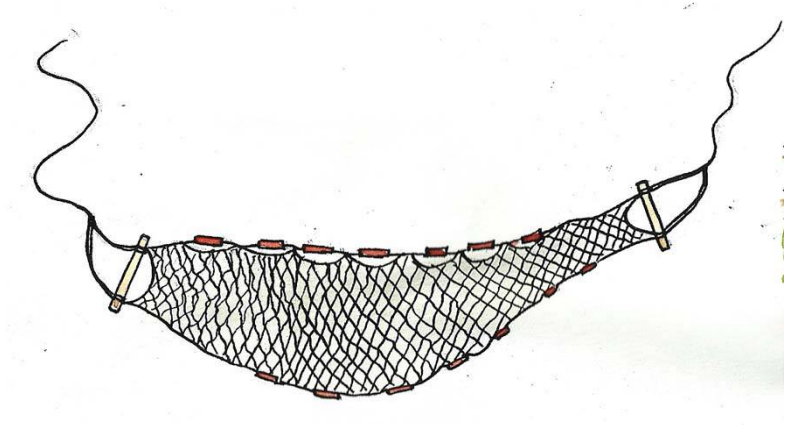


Grading the fish using a seine net

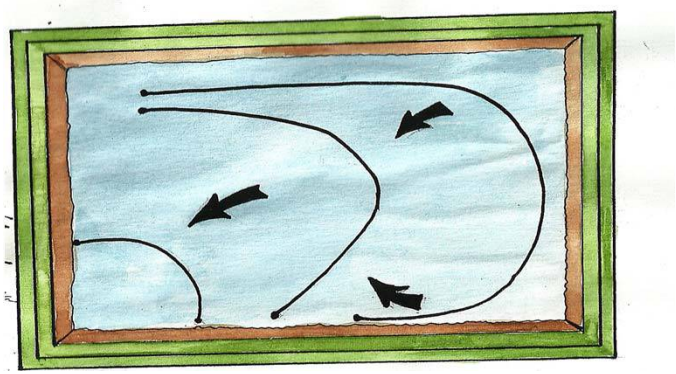


How to harvest the fish using a seine net

1. Use a net with a mesh size of 3 to 3.5 cm



2. Start at the deep end of the pond and move slowly to the shallow end



3. Pull the net along between two or more persons

4. Remove and replace all young fish