

Pond Construction: Design and Layout of Ponds

Any pond can be used to grow fish, but a pond that is dug specially for fish culture usually has a regular shape, a flat bottom with a slight slope along its length.

When deciding where to locate a new pond, you should consider the **landscape** (find a moderate elevation, gentle 2% or less slope, well drained and not prone to flooding), **land use** (remember - all sources of water contributing to the pond should be free of sediment, pesticides and other forms of pollution), **soil texture** (15% clay is best for pond construction and water holding), **water supply** (consider quality, quantity and seasonality), **security** (from theft) and **convenience** (maybe close to your house).



A nursery pond

Fish culture ponds differ in size and depth depending on their functions:

Types of ponds for fish culture

- The smallest and shallowest of ponds for fish culture is a **nursery pond**. This is about 0.02-0.05 ha. The water is about 1 m deep.
- A **rearing pond** is larger than a nursery pond. It is 0.08-0.2 ha. The water is about 1.5-2.0 m deep. **Nursery** and **rearing ponds** can be seasonal.
- A **stocking pond** is much larger, often 0.2-2.0 ha. It should be 2.0-3.5 m deep. This pond might be perennial or seasonal.
- A **marketing pond**, which is small but quite deep, is used to keep fish caught from a stocking pond for sale at short notice when the demand and price are high. These ponds can be 0.05-0.10 ha in size with a water level of 3-4 m in summer.
- **Broodstock ponds** (0.2-0.4 ha) are perennial and have a water depth of 2 m in the summer.
- Fish brought in from outside are first placed in a small (0.02 ha) but perennial (1.5 m deep) **quarantine pond** for a time to verify that they are not infected. You can also use this pond to treat diseased fish from other ponds. The one in the picture is concrete lined.



A rearing pond



A stocking pond



A marketing pond



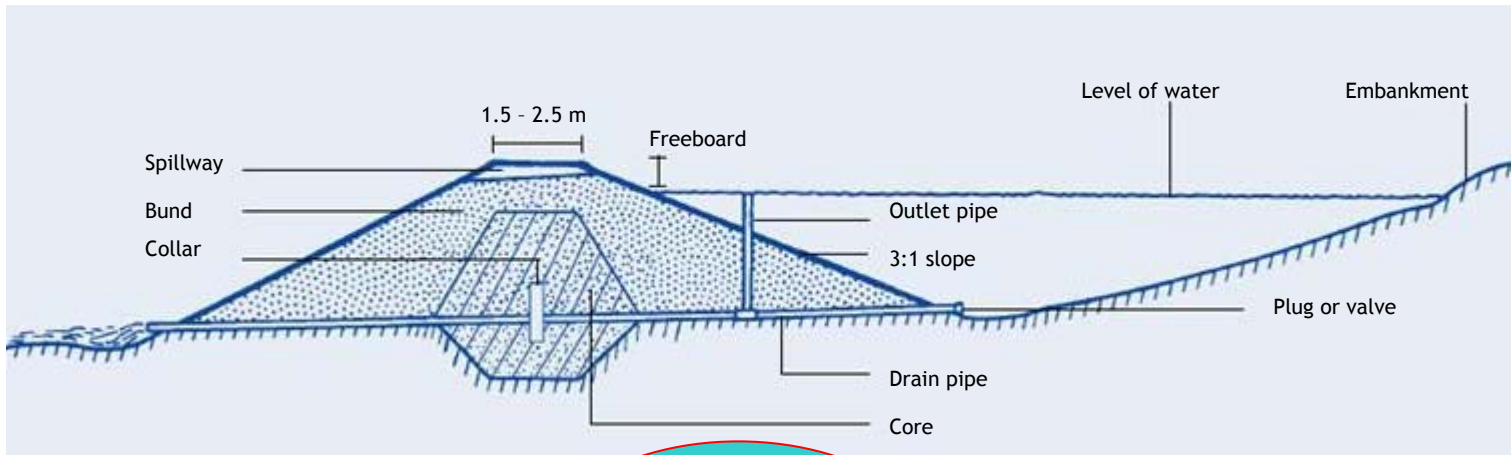
A broodstock pond



A quarantine pond

Design of ponds

Ponds are dug in the ground or formed behind bunds on one, two, three or four sides, which can be made of earth or building materials such as concrete. The diagram below shows an earth bund and a pond as if it has been cut open to show how it is designed.



The top width of the dam should be at least 1.5 m in the case of nursery and rearing ponds, but not less than 2.5 m for stocking ponds.

The part of the earth bund where waves strike should be well strengthened.

Make the side slopes of earth bunds stable enough to keep the earth fill in place and stop them from collapsing. A slope of 3 lengths along the ground (horizontal) to 1 length upwards (vertical) (3:1) on both the upstream and downstream faces of the dam will be good.

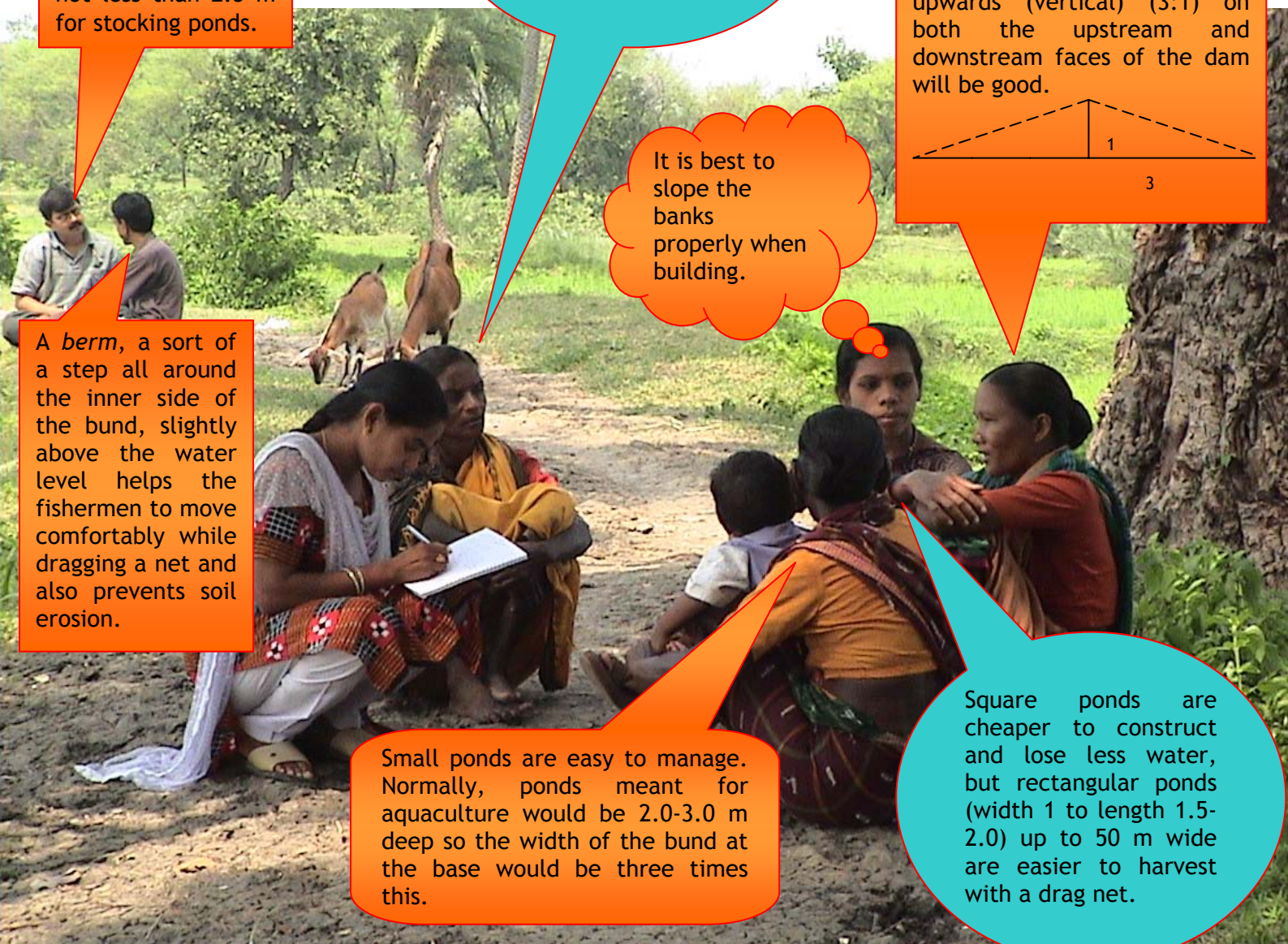


It is best to slope the banks properly when building.

A *berm*, a sort of a step all around the inner side of the bund, slightly above the water level helps the fishermen to move comfortably while dragging a net and also prevents soil erosion.

Small ponds are easy to manage. Normally, ponds meant for aquaculture would be 2.0-3.0 m deep so the width of the bund at the base would be three times this.

Square ponds are cheaper to construct and lose less water, but rectangular ponds (width 1 to length 1.5-2.0) up to 50 m wide are easier to harvest with a drag net.



If the top of the dam is 2 m, the depth 3 m plus 0.5 m freeboard (3.5 m), the bottom of the dam will be 3 times the depth = about 10 m.

$$A = \frac{1}{2} (b_1 + b_2) h$$

{A=area, b1=top, b2=bottom, h=depth}

That means the area will be 23 m².

So the earth needed in m³ will be the length of dam x 21.

The first step is to clean away all trees, bushes, rocks and boulders. There should be no trace of the roots of trees or any vegetation where the dam will be.

So every 10 meters of dam needs 230 m³ of earth.

20 cm of surface soil is scraped away before building and kept aside and spread over the pond bottom when digging is complete. In case of heavy seepage, the bottom of the pond should be treated either with a heavy dose of wet cattle dung or biogas slurry.

To create the bund, you need to add earth in 20-30 cm layers, sprinkle on some water and ram the earth down to make it strong. Finally, put turf on the dam to protect it from the rain.

Choosing the place to dig ponds depends on the type of pond, the slope and water supply, drainage system and roads.

Yes, nursery ponds should be near the home and all valuable fish should be guarded.

Fish ponds need to be tended and kept secure too.



Design of the outlet

I am building a MONK - that's an outlet so I can slowly reduce the height of water.

These are wooden boards - with clay to make them water tight.

This U-shaped part is made of concrete.

This is where the water goes.

Out-flow

Useful Contacts

Other Better-Practice Guidelines

There are many more Better-Practice Guidelines in this series.

You can get more copies of this and other Better-Practice Guidelines from your local One-stop Aqua Shop, STREAM India Communications Hub, from the STREAM Regional Office or from the STREAM Website.

www.streaminitiative.org

We would like your feedback about these Better-Practice Guidelines. You can let us know by phoning, emailing or writing to the Communications Hub Manager at your STREAM Country Office.

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