POND DESIGN AND CONSTRUCTION

by

Ricardo Esguerra

Selection of pond site: The soil must be either clayey or loamy clay, as these types can retain water and support good growth of filamentous algae and microbenthic organism. The soil pH should be 6.5 to 7.5. Soil with pH lower than 6.5 needs heavy liming while higher than 7.5 needs acidic fertilization. Water supply must be clean and adequate throughout the year. It may come from sea or tidal streams. Topography of the site must be level. The elevation should be punch that it is under water during ordinary low tide but could be drained by gravity when desired. Draining is necessary in growing feed of fishes, harvesting and eradication of undesirable fishes. The site should be free from flood away from swelling rivers and adjacent to mountainous region. Bangos fry should be available in sufficient quantity and the bangos harvest must have a ready market.

General layout of bangos fishpond: It is more economical to construct and convenient to manage fishoond if the layout is a square. No other geometrical figure can have the shortest perimeter with a maximum area enclosed than a square. However, the fishpond layout may be of any shape a rectangle, a trapezoid. The shape of the pond is governed by the condition of the available site.

A complete bangos fishpond system has three main ponds, namely the nursery, transition or stunting and the rearing ponds. An auxiliary pond may serve as a combination of catching pond and supply canal or head pond.

The nursery pond constitute 1 per cent of the whole area. It is divided into series of ponds ranging from 1,000 - 5,000 sq. m. each. Bangos fry are stocked in the nursery pond at the rate of 50-100 to a sq. m., until they reached fingerlings size.

The transition or stunting pond constitute 9 per cent of the whole area. This pond is divided into series of ponds, each ranging from 1-2 hectares. Bangos fingerlings are stocked in one stunting pond at the rate of 1-15 fingerlings per sq. m. to retard the growth of the fish until the rearing ponds are ready for the next stocking crop season.

The rearing pond constitute 90 per cent of the whole milkfish pond area. This pond is divided into ponds with an area ranging from 5-10 hectares. It is where milkfish fingerlings are stocked at the rate of 1-3 fingerlings per sq. m. or 1,000 to 3,000 fingerlings per hectare until they reached marketable size.

Tools and facilities used in the fishpond construction

The digging blades generally used are the Luzon and Visayas types. The former is a flat steel about 50 cm, long and 15 cm. wide at the point and taper to 5 cm. toward the wooden dumb-bell

shape handle. This is used for making and block for dikes construction and for excavation, preferably used during low tide. The latter type is the same as that of Luzon type except the handle which is a long bamboo pole that can be used during high tide.

The dug-out banca or flat boat is used for transporting and block from the place of excavation to the place of dike construction (details PI. VI).

A piece of wooden sliding board usually 1" x 12" x 14' is a set in inclined position to facilitate the movement of mud block from the place of excavation to the place of dike construction when the distance of source of mud block is near.

The above tools and facilities are used manually in group labor in contractual work. In a group there is a division of labor, that is one group do the digging or mud block making, the second group do the transporting of the mud blocks and the third group do the piling of the mud blocks to form the dikes.

Machineries used in fishpond construction. In newly opened fishpond sites a mechanical puller is used. It is a native invention a manually operated devise consisting of pulley and gear mounted on a flat boat used in pulling or uprooting live mangrove tree or stumps. A crane with clan bucker mounted on a barge is used economically in dike construction in tidal flats or coves. A bull-dozer can be used in swamplands where the soil can support its weight (details-Cabangbang, Bartolome).

Dikes and their construction. The main dike is the largest dike in the fishpond system and it encloses the whole area. Usually the base of the main dike is 5-10 m. wide, the height 1.5-2 m., at least 0.5 higher than the prevailing highest tide to be constructed and if the site is a swampland, the path of the dike has to be cleared of all trees, stumps, debris, etc. If the soil is hard, puddle trench of 30 cm. wide and 50 cm. deep is dug along the middle of the path of the dike to minimize the seepage underneath. The trench (metcha) is filled with new soil preferably clayey loam and free debris. The dike is raised by piling and block layer. It is necessary to allow each layer to slump before layer is piled.

In a tidal flat if the soil is soft, the outer limits (toe and heel) of the base of the proposed dike are first staked preferably with bamboo poles one meter apart. Bamboo mattings or worn out lumber are set inside, against the poles. The soil will press the matting against the poles thus preventing the washing off of the soil by the wave action.

The secondary dike is smaller than the main dike. It is constructed when the whole area is already enclosed by the main dike. The purpose of this dike is to divide the fishpond into rearing ponds, catching or head pond and supply canal. The base of this dike is 2- 4 m. wide, height is 1-15 m. and the crown is 0.8-1 m. It is constructed in the same manner as the main dike.

The nursery is the smallest dike in the system. It divided the nursery area into small ponds and constructed the same manner as the secondary dike. It has a base of 1-2 m. wide, height 0.5/-1m. and the crown 0.5-8m. wide.

Water control gates. Gates are installed to control the letting in and out of water in the fishpond system. Each pond should at least have one gate. It should be situated in such a place that it is independent from other pond in letting in and out of water. With such condition, it is possible for one pond to be dry while other ponds under water. It should be constructed at the lowest portion of the pond to effect total drainage when desired.

The main gate controls the letting in and out of water direct to the sea or tidal stream and situated along the main dike. In some cases, this is made of wood. To make this effective, durable and stable,it should be made of reinforced concrete.

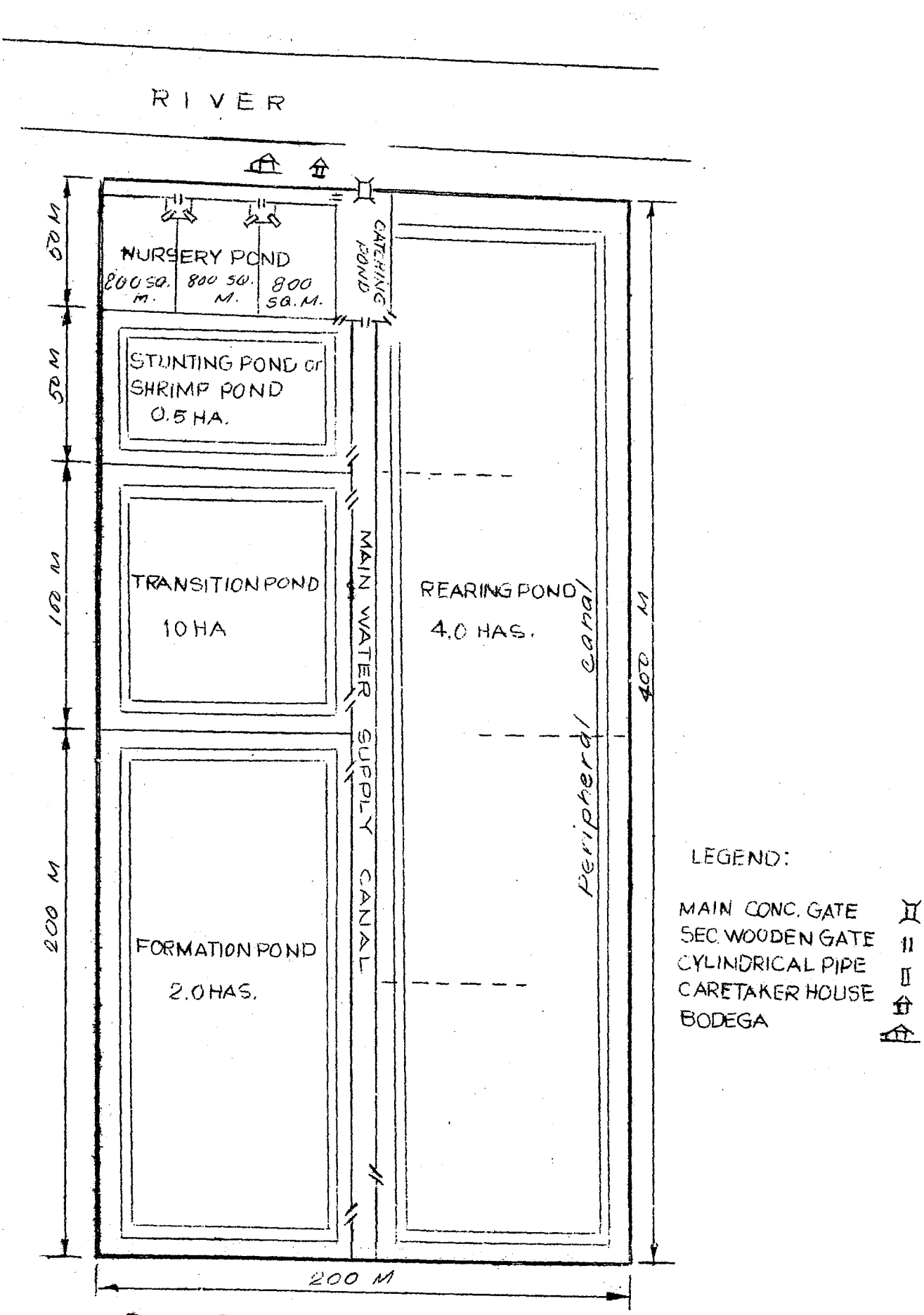
Muddy or sandy foundation should be improved by bamboo piles to insure stability of the gate. The opening of the gate should be at least 1 m. wide for every 10 ha. fishpond area.

The secondary gate controls the letting in and out of the water of a pond to either catchings or head pond or supply canal and is situated down the initial construction cost of fishpond project.

A wooden gate does not need foundation improvement with bamboo pile. But if the tidal fluctuation in the location is great, it should have wooden flooring to prevent the scouring of the bottom. At least 1 m. opening secondary gate is necessary for every 10 hectare pond.

The nursery gate is the smallest gate in the pond system. It controls the letting in and out of water of the nursery pond to either catching pond or supply canal. It is situated along the nursery dike. This gate is usually constructed with wooden slabs in the same manner as the secondary wooden gate.

In some places this gate is replaced by pipes. The pipes may be either quadrangular or circular. Quadrangular pipes are usually made of 4 pieces of lumber while circular are made out of palm trunk. Lately concrete or asbestos circular are being used.

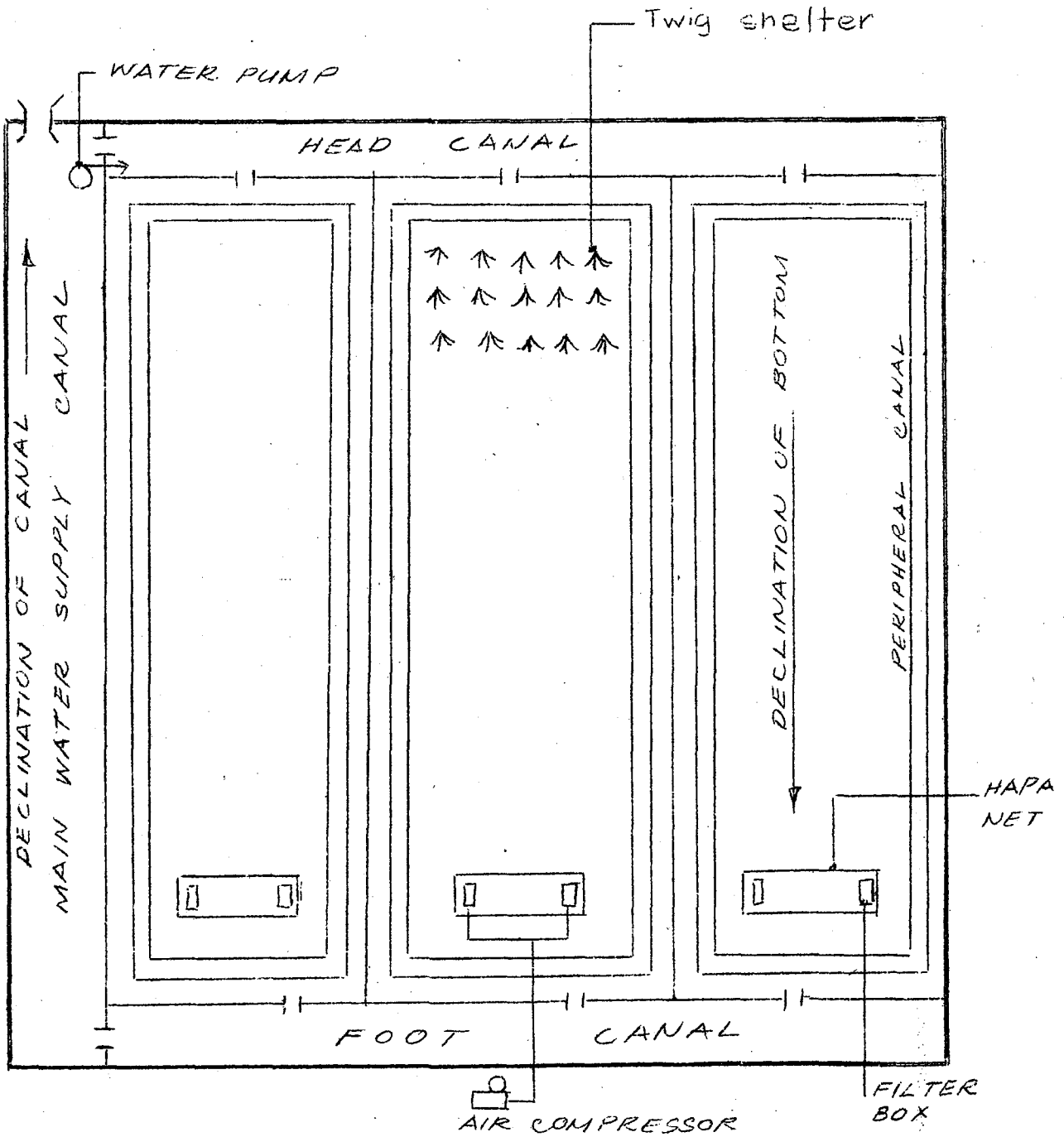


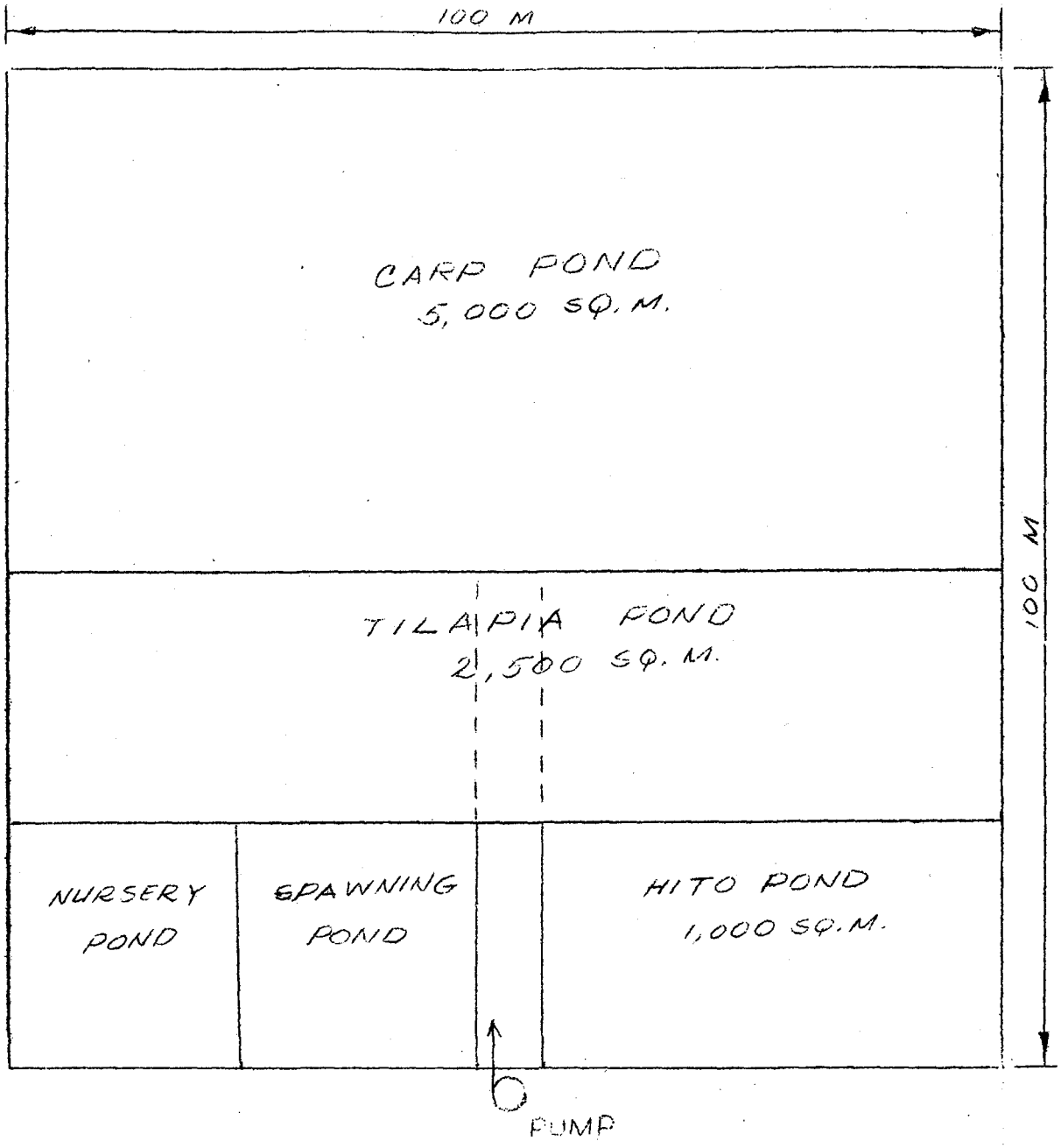
LAYOUT PLAN FOR AN 8 HAS. BANGUS FISHPOND

MAIN DIKE = 5m. b, 1.5m. h, 2m. c

SEC. DIKE = 3m. b, 1m. h, 1m. c

PROPOSED LAYOUT OF A ONE HECTARE SUGPO POND
(IMPROVED METHOD)





LAYOUT OF A ONE HECTARE FRESH WATER FISH FARM