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POSSIBILITY OF USING POLYTHENE LINED PONDS FOR MARICULTURE IN SANDY BEACHES*

Introduction

Vast stretches of sandy seashores are at present lying unutilised. These sandy areas are not suited for agricultural operation. Neither are they considered suitable for aquaculture due to the porous nature of the soil and resultant seepage of water. However, if this seepage of water could be prevented by some means these areas could be utilised for aquaculture purposes. Experiments have been conducted at the Calicut Research Centre of Central Marine Fisheries Research Institute in this direction. These experiments have proved that the seepage of water through the soil could be prevented by suitably lining the ponds with black polythene film. Although the use of polythene film is quite prevalent in agriculture for various purposes, it has not so far been of much use in aquaculture. The conversion of these sandy shores into productive aquaculture ponds by providing polythene lining for them has shown bright possibilities of utilising extensive areas for aquaculture and a report on this method is presented here.

Construction of ponds

The sandy sea shore of about 0.5 ha area in front of the Research Centre at Calicut was utilised for making the fish farm. The thorny bushes were removed and ponds of various areas-0.01 ha, 0.025 ha and 0.1 ha were excavated with a slope of 60° and a depth of 1.5 m. Care was taken that no sharp edged hard materials like glass pieces or stones are left on the sides and

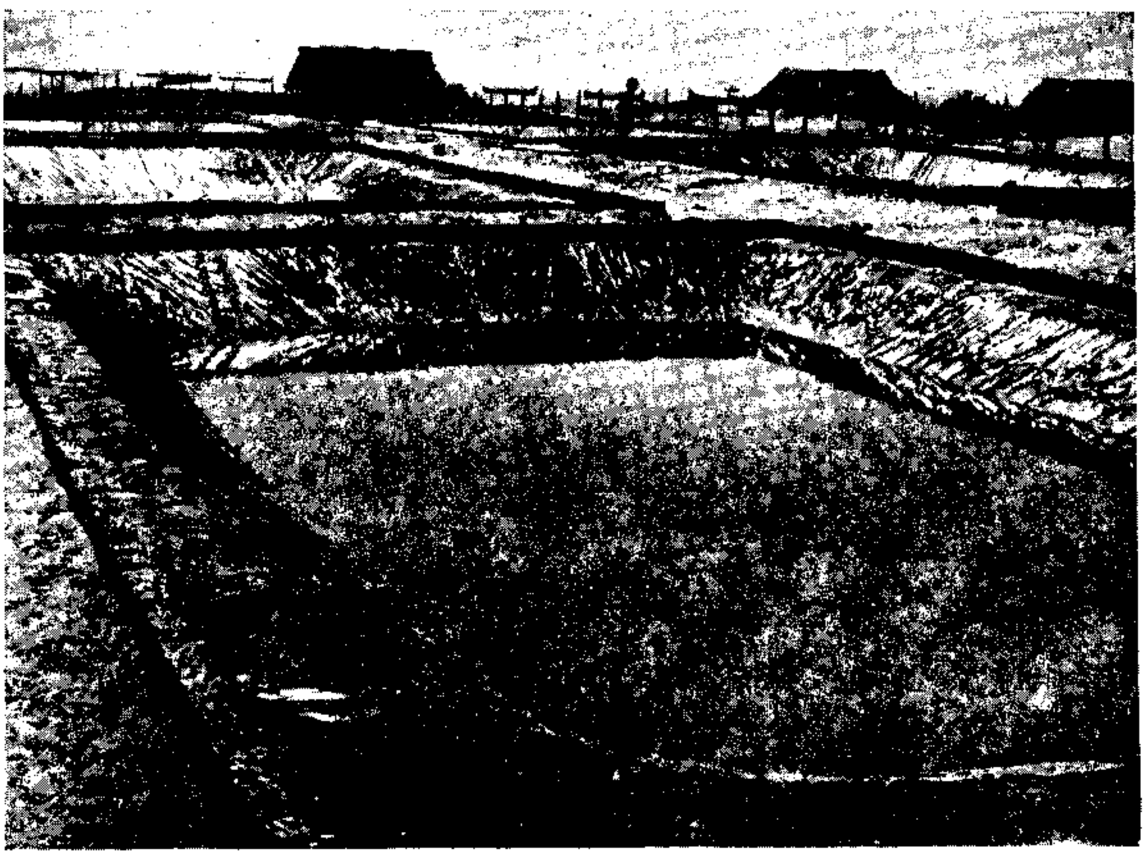

Fig. 1 A view of the polythene lined ponds.

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bottom of the excavated pond. After levelling properly, the pond is provided with the polythene lining.

Polythene film

After making trials with polythene film of different gauges of 75 to 150 microns thickness, it was found that 150 micron thick film was suitable. White and transparent polythene film was proved to be unsuitable as it could not withstand the heat of the sand during summer and started developing cracks. As the ponds were more than 20 m wide and the film of maximum width of 6 m only were available, the films, have to be joined in order to line the entire pond. This was done by fusing the free ends of the films by a hot iron. The free ends of the polythene film are kept in position with about 10 cm overlap. A cellophane paper is kept over the edges and the films are fused. Heat is applied till the overlapping portions of the polythene films get fused well. The cellophane paper can be removed after some time. Care should be taken that no sand particles are left in the area of fusion as it is likely to damage the film. The film should be dry and without any salt deposits while it is being fused

Paving the film

The lining of the ponds by the film is done by anchoring the free ends of the film around the pond by making a trench of 30 cm deep and 40 cm wide. The free ends of the film is anchored inside the trench and sand is placed over it. The lining should not be tight. After the completion of the lining the ponds can be bordered with laterite stones so as to prevent the sand being blown into the ponds (Figs 1 & 2). The bottom of the pond can be spread with sand of about 10 cm thickness so as to provide the culture animals with substrata. This will also help to prevent the heat being absorbed by the black polythene lining causing rise in the water temperature.

Sea water supply

Sea water is pumped into the ponds by a 5 h. p. diesel pump with 3″ suction and 2½″ delivery pipes. Alcathene pipe of standard quality is used (Apex brand). A foot valve is attached to a float anchored at a distance of 50 m from the surf. A polythene coated drum of 250 l capacity is used as a float. It is attached to a 5-toothed anchor weighing 75 kg with

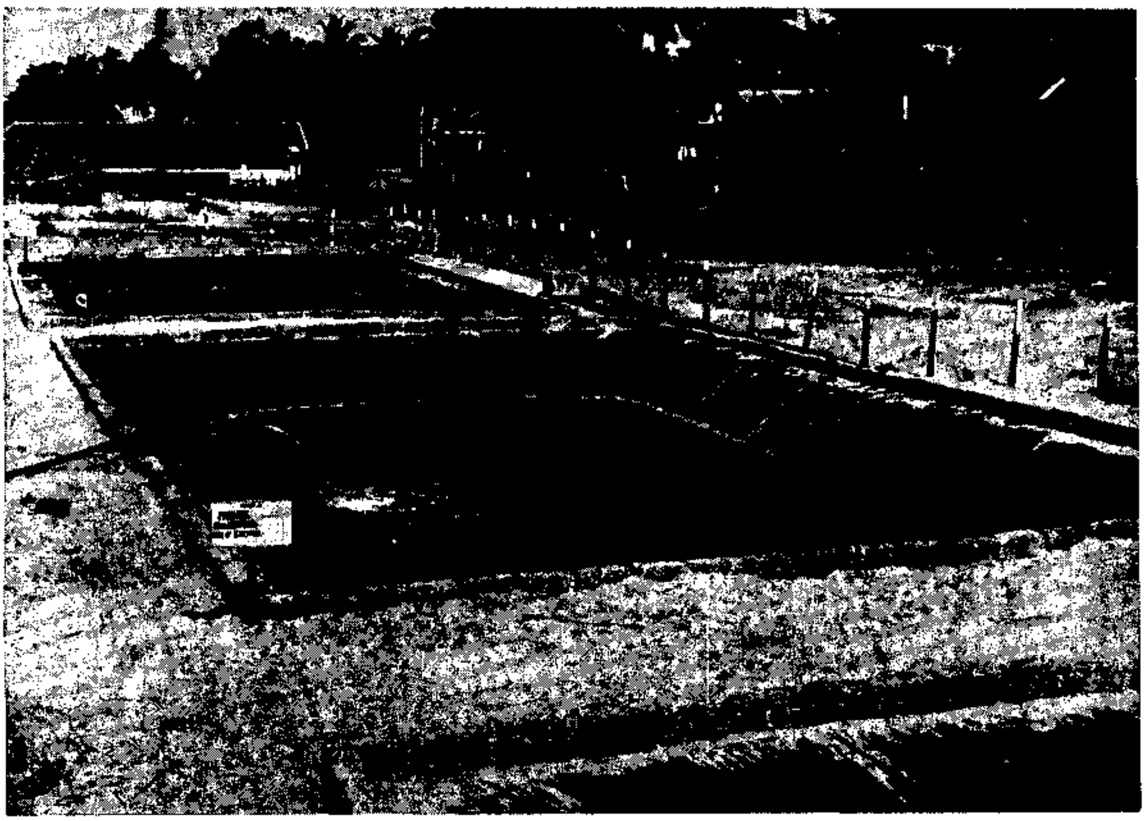

Fig. 2 A view of the polythene lined ponds.

the aid of an iron chain. Nylon mosquito netting is tied to the distal ends of the suction and delivery tubes so as to prevent the fishes and other particles gaining entry into the pond. The water may be again filtered by a velon screen net at the outlet of the delivery tube. About 1.5 m depth of water is maintained inside the pond. Now the pond is ready for stocking.

Preliminary experiments of prawn and fish culture

A few preliminary experiments of culturing of the prawn *Penaeus indicus* in such ponds have given encouraging results. In a pond of 0.1 ha area 18,500 juveniles of 42 mm average size were stocked on 15-5-1980 at a stocking rate of 1,85,000 per ha. These prawns were initially raised in a nursery pond up-to this stocking size, from seeds transported from the Prawn Culture Laboratory of CMFRI at Narakkal, Cochin. On 4-9-1980 when the pond was harvested 8,950 specimens of average size of 97 mm were obtained with a total weight of 50 kg (fig. 3). The count size of the harvested prawns was 179 per kg. The production rate works out to 500 kg per ha for 112 days, with a survival rate of 48%. The harvesting was done by cast netting after reducing the level of water in the pond by removing the polythene film from one side and allowing the water to get seeped off to a certain level. Artificially compounded feed of ground wheat preparation was given to the prawns.

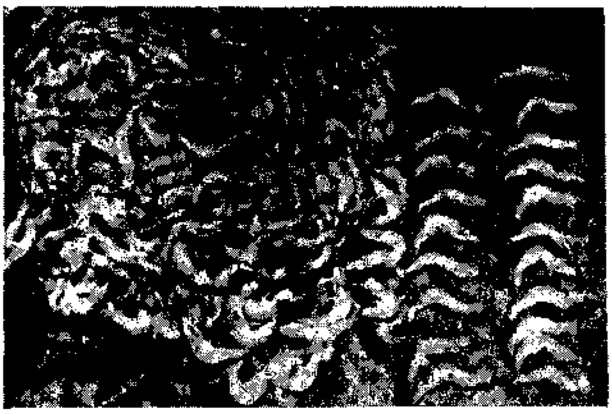

Fig. 3 Part of the prawn harvest

In another experiment in a pond of 0.01 ha area 1,900 juveniles of *P. indicus* of 42 mm average size were stocked on 17-5-1980 at a stocking rate of 1,90,000 per ha and on 4-9-1980 when harvested 1,856 specimens were obtained. They grew to an average size of 109 mm with a count size of 116 per kg. The total weight of prawns harvested amounted to 16 kg, giving a production rate of 1,600 kg per ha for 110 days at a very high survival rate of 98%. In another experiment of

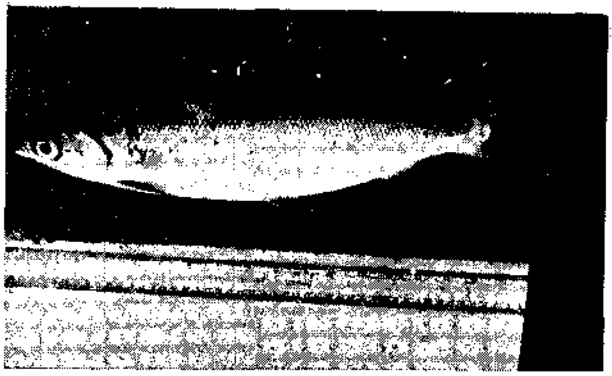

Fig. 4 *Chanos chanos* cultured in the fish pond.

stocking the fingerlings of the milk fish *Chanos chanos* in a pond of 0.01 ha it was possible to grow the fish to a size of 422 mm in 526 days (Fig. 4).

Prospects

Some of these results would indicate that there is immense possibility of converting these derelict sandy shores to productive fish ponds by this method of providing a polythene lining. But constant monitoring of the temperature, salinity and dissolved oxygen of the water in the ponds is very essential. Though the water temperature was usually varying between 25 and 32°C, at times it shot up as high as 46°C at the bottom of the pond, resulting in mortality of the prawns. Such rise in temperature at the bottom was observed when there was rain followed by bright sunshine. This is probably caused by the less dense fresh water remaining at the surface and the denser saline water at the bottom preventing proper circulation of water and equal distribution of heat in the water mass, thus raising the temperature at the bottom. Immediate preventive measures like dragging a coir net along the bottom of the pond to make the temperature uniform will have to be taken.

Depletion of dissolved oxygen especially during the early hours of the day between 4 and 6 A.M. is another factor which has to be constantly watched. This may probably be brought about by high plankton productivity or the presence of organic debris. Constant monitoring of dissolved oxygen would indicate such depletion and when detected corrective measures have to be taken immediately by providing aeration of the water. Besides monitoring the environmental factors, suitable artificial feed at the required quantity is to be given for the stocked prawns to grow. With all these input of efforts the cost economics of the entire operations have to be properly worked out in order to decide the economic feasibility of undertaking large scale aquaculture in such ponds and this is in progress.