

SCOPE FOR PRAWN FARMING ALONG SINDH COAST

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It was more than two years back when my sons told me of their interest in prawn farming and asked me my opinion and permission to get into that venture. They wanted some advice from on this subject. I told them to pick me a few books on prawn farming from my library. After glancing through the literature then readily available, I found the task was gigantic. Then prawn farming on subsistence level is possible, if cheap labour and land were available and prawn juveniles were allowed to get into the field and feed on natural feed as phytoplankton and zooplankton but in this case yields will be very low and the income will be comparable to that form farming of ordinary crops. In order to make money out of prawn farming, advanced technological know-how is required. Hitherto this has been maintained as secret by specialists, consultants and professionals who would part with it only at exorbitant prices. My first reaction was to collect as much literature as possible from various sources I knew of. This process kept me busy for next six months. The more I went into the details, the more complicated the situation became. Some of the difficult problems to be solved for successful prawn farming were:-

1. Prawn does not mate in captivity.
2. Even when this is achieved technically, after spawning, the female has the tendency to eat away her own eggs. This is more so if spawning takes place in captivity.
3. After eggs hatch, the larvae are too weak and immobile to take food for survival, unless the latter is brought in contact with them.
4. Mating would take place in water of comparatively low salinities at desired temperatures but after hatching, the larvae move to water of higher salinities.
5. The larva passes through a number of stages before it finally reaches the juvenile stage in about six weeks. During this period, food and water salinity requirements vary and they need to be controlled.
6. For commercial farming 100 to 300 thousand juveniles are required per crop.
7. Mortality rate of juveniles in transport is pretty high as they resort to cannibalism.
8. The growth rate of the animals is in proportion to the quantity and quality of feed and it is possible to have an average of 2.25 crops of prawn from each acre of land per year along the Sindh Coast if optimum conditions for quick growth were met.
9. The cost of land lay-out and capital costs for commercial farming are very high and are justifiable only with high yields.

10. The income per acre would be higher than from any agriculture crops but so will the inputs on food and maintenance be.
11. The annual running expenses may be as high as 40% of the gross sale. A failure of the crop therefore means ruination of grower.
12. Anybody thinking of prawn farming should not believe that he will be visiting his bankers with a smile because of large number of factors that control the yields and without adequate know-how or guidance, failures are certain.
13. The food that is to be provided to the animals would have moisture contents of less than 15%. On this a food to growth rate of 1:0.9 is possible but prawn meat contains 70% water i.e. ratio is 1:0.27. Considering moisture in feed, the real growth rate would be 0.85: 0.27 i.e. 1 : 0.317 a factor little understood by laymen. For laymen growth rate of 9.2" inches in a year or 6" inches after 4 months is more intelligible.
14. Prawns consume lot of oxygen in their metabolic activity and growth. The rate of consumption of oxygen is so high that water has to be changed at least twice a day to maintain proper percentage of dissolved oxygen in water. By changing water twice daily, yields have been doubled.
15. This special requirement of change of water would need proper supply of water and drainage for every individual prawn grow out pond and would need special techniques and structures to achieve it.
16. Lay out of the land has to be such that after harvest of each intensive crop in four to five months, pond is to be drained, dried, disinfected and re-filled with water, along with necessary chemicals or materials to encourage growth of phytoplankton and zooplankton.
17. It is impracticable to capture and bring large number of juveniles from open sea to the grow out ponds if commercial farming is aimed at.
18. Even if it was possible to bring large number of juveniles to each pond from open sea, there would be juveniles of different species, mixed up. The different species will have different rates of growth, feed requirements and some would be economical to raise while the others not.
19. Segregation of uneconomical species from economic ones, even if done in rearing nurseries in the field would be an impracticable task

With these difficulties in mind, I thought it fit to hand over the whole question to a group of specialists and started my own office for a detailed study of this and allied subjects. The study undertaken during the past two years has included the following:-

1. Biological factors concerning shrimp species tolerance to grow out facilities, their availability and productivity.

2. Physical factors involving:
 - a) Hydrological studies.
 - b) Climatic factors (temperature, wind velocity and direction, rainfall, air temperature, tides, high & low and variation conditions in the area during the whole year.
 - c) Salinity of water and its detailed analysis for various elements including trace elements, dissolved organic compounds, toxic compounds, turbidity, PH and etc.
 - d) Tides, water currents, wave action, silt burden and water shade characteristics of area.
 - e) Topographic cover.
 - f) Evaporation rates.
 - g) Ground water patterns and seepage.
 - h) Soils, their acidity, alkalinity, top of soil layers, permeability, chemical and mechanical composition and accessibility etc. this means a large number of visits to the site and collection of data from various sources. Since prawns are not able to stand high saline sea water and prefer salinities of 24,000 to 30,000. Sindh Coast is ideal for such environment.

All these factors promise great capabilities of sustaining prawn farming in the Sindh Coast, provided correct steps are taken to counter the difficulties enumerated above.

SOURCE OF SEED STOCK

Before significant commercial investment in shrimp mariculture is realized, a reliable source of seed stock must be obtained. For shrimp mariculture to be commercially feasible, it will be necessary to maintain and spawn brood stock on a scale sufficient for commercial production purposes. If the farmer succeeds in it, then it means tht he has overcome one of the major incoming difficulties.

PRAWN FEED.

Man domesticated cattle some 10,000 years ago. He used his intelligence to take the animals to the best grazing land and watering points and in return animals surrendered their freedom. Around 7000 – 8000 years back man started agriculture and there was adequate, no longer utilized by the man directly as his food. These were oilseeds, cakes, cotton seed cakes, rice bran, wheat bran and nut residues of different kinds. On feeding these to the animals, the man found that they were better than green fodders and grasses in respect of nutrition values. Since then he has fed these agricultural waste products, to the cattle with beneficial results. Later on he gained similar experience with birds like chicken, turkey and others which he domesticated before 4000 B.C. With this experience in the early Civilization Zones namely: Egypt,

Mesopotamia, Indus, Yang He and Mesoamerica, he gain confidence that these ingredients, though no good for human beings were good for animals. Fish farming too is centuries old occupation, though limited to farming was thought of only at the end of last century and it owes its economic impact only to the 20th century technology. The farming community in the ancient civilization areas invariably used some feed for fish as they had been using for cattle. But it seemed to work. No scientific research was done to find out why it worked. In the Sub-continent there is special emphasis that this subject has now been studied in detail by us and with reference to prawns we find that though they can eat anything including rotting wood if hungry, but they do not take the total quantity of rice bran, bread and oilseed cakes fed to them. Once in water these items disintegrate very fast and interesting part of the whole story is that all these agricultural wastes contain large quantities of protein i.e. Nitrogen. In the process of their disintegration proteins which are amino-acids break into nitrates, which act as fertilizer. Nitrogen so made available helps in the growth of phytoplankton and zooplankton. Some farmers have used farm yard manure with equally good success, because farm yard manure serves the same purpose as fertilizer, and with good results, One has to, therefore, work out the economics of various methods and find out the cheapest way to accelerate growth of planktons. The natural fish food produced in this manner is not adequate for raising prawns commercially but it would be better than subsistence farming. The exact feed formulae are trade secrets known only to the feed manufacturers and some consultants. This information is too difficult to obtain. Usually such information is not published. Published research material on the subject however good it may be, lacks proper give the feed which is properly balanced in carbohydrates, proteins, fats, minerals, vitamins and trace elements. Feed has to be so processed that it does not disintegrate in water quickly. Prawns are night eaters and the ideal situation would be that they are given feed at night time in more than once installment. Feed has to be of the type that it does not float in water, to be carried away by water currents

Our chickens in large poultry farms mature in about 10 weeks and sodo they in Europe but the latter are bigger in size and weight. The main reason for this is balanced diet or feed given to the chickens. Our chicken feed lacks certain ingredients and is in excess in others. The net result is that the animals are able to consume only small quantities and rest passes out as excreta. The same would be true about feed for prawns. Unless the feed is properly balanced we should not expect adequate results. Extensive farming by conventional methods and natural feed would give an average of 150 to 250 Kg per acre. This is based on the figures available from tropical zones through out the world. Yields of 1500 Kg. to 3000 Kg from one crop can be anticipated if scientific methods and proper feed are use.

LAY OUT OF LAND

The land lay out is purely an engineering problem. Land has to have certain slopes to help drainage. Embankments are to have certain grades to be able to withstand action of water as well as waves produced by high wind velocity prevalent along the Sindh coast. After harvest, land has to be drained leaving no water behind. This part of technology though new to the country yet could be handled by the engineers.

The above article is an outcome of more than 2 years work by specialists in various fields. The task is not un-surmountable but it is definitely not easy. We started the work with the intention of helping ourselves but we felt that it would be in the national interest if we help other

prawn growers also so that they do not face difficulties at various stages. Further information on this subject can be made available free of cost to any party interested.

And know that your possessions and your children are
a test, and that with Allah is immense reward.
-----*The Holy Quran (VIII-28)*

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