AQUACULTURE I

9. WEEK

IN BRACKISH-WATER PONDS

WEEKLY TOPICS

WEEK	TOPICS
1. WEEK	WHAT IS AQUACULTURE?
2. WEEK	IMPORTANCE OF AQUACULTURE
3. WEEK	AQUACULTURE: ANIMAL PROTEIN
4. WEEK	HISTORY OF AQUACULTURE
5. WEEK	ORGANISATION OF AQUACULTURE
6. WEEK	CHARACTERISTICS OF AQUACULTURE
7. WEEK	POND CULTURE
8. WEEK	IN STATIC FRESHWATER PONDS
9. WEEK	IN BRACKISH-WATER PONDS
10. WEEK	RUNNING WATER CULTURE
11. WEEK	CULTURE IN RE-CIRCULATORY SYSTEMS (RAS)
12. WEEK	AQUACULTURE IN RACEWAYS, CAGES, AND ENCLOSURES
13. WEEK	MONOCULTURE AND POLYCULTURE
14. WEEK	RECENT ADVANCES IN AQUACULTURE

- **Brackishwater ponds**
- Not only are the species different from those cultured in freshwater ponds but the principle of operation of brackishwater ponds is different from those of freshwater ponds. Here the pond or the farm is essentially located on a tidal creek or stream and there is a system of sluices to control the ingress and egress of water into and from the ponds. Examples are: Milkfish farms in Philippines, Taiwan, Indonesia etc. Brackish water fish farming is a fast growing science. Here also there is competition with other land use agencies, especially forestry, but the extent of competition with agriculture is relatively less because coastal land is generally not suitable for agriculture. The ARAC farm at Buguma is tidally fed and the salinity range is 5 – 21 ppt.

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- Brackishwater fish culture is still in the early stages of development in Africa. The present practices are based on the availability of natural fry and often several species are either purposely stocked or they gain entry with the tidal water, in spite of preventive measures. The more common species in brackishwater ponds are mullets, tilapia and catfish. The combination of species is only incidental and not actually based on their compatibility in terms of the use of food available or other habits. In so far as tilapia are concerned, the problem of prolific breeding, over-population and stunted growth occurs at least when all available species gain entry. Mullet fry are generally available in required numbers, but the growth and production achieved so far are not high. This is largely due to the nature of the soil on which brackishwater ponds are built. Coastal swamps and mangrove areas used for pond construction generally have peaty acid soils. Besides the difficulties of building water-tight dikes with peaty soils, serious problems of maintaining favourable pH of water and soil for the growth of benthic as well as planktonic fish food organisms, are faced during the first few years of pond operation. Till the toxic salts are leached out from the soil and its texture improved by the deposition of silt brought in by high tides, which may take as much as two or three years, the growth of adequate quantities of natural food cannot be relied upon for high density culture of mullets or Other fish.

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- Different species of tilapia are cultivated in brackish water in several areas. Initial culture experiments with the catfish, (Chrysichthys) have given very encouraging results when fed with artificial food. It would appear that a high production cannot be expected with only natural food.
- The economic viability of brackishwater pond culture, as freshwater pond culture, has yet to be convincingly demonstrated, and future work has necessarily to be focussed on this requirement.
- In view of the above factors, the task force recommends that initial studies should concentrate on monoculture of three species, viz., Tilapia melanopleura, T. nilotica and Chrysichthys nigrodigitatus.
- The problems of culturing tilapia in brackishwater ponds are essentially the same as in freshwater ponds. It is known that salinity would affect the breeding of T. nilotica, but the effect of different salinities on breeding has not yet been experimentally verified. If separate breeding and fry production facilities with supplies of fresh water are developed, this will not become a major constraint. Whether salinity will affect growth' rates of these species also has yet to be determined.

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- Although the culture of Chrysichthys has been attempted in a number of places in West Africa, very little scientific research has been done on this. C. nigrodigitatus, which is the more desirable species for culture, is a brackishwater species, which migrates up-river to freshwater areas for breeding during the rainy season (generally from July to September). This species seems to have only one restricted breeding season, unlike the other two slow-growing species of the genus (C. walkeri and C. auratus) which breed throughout the year. Even though the fish would attain up to the fourth stage of maturity in ponds they have not been observed to breed naturally in such water or in brackish water. Preliminary experiments show fast growth and the possibility of high production, when fed with artificial feeds such as oil cakes.

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- The main constraint to the farming of this species appears to be the scarcity of fry in adequate numbers. It is difficult to find enough fry in natural habitats. Induced breeding and larval rearing techniques have yet to be developed. Similarly nutritionally and economically suitable feeds have to be developed for larvae, fry and adults. Though the fish grows relatively fast, the growth and production that can be obtained in high density culture in short growing periods, have yet to be determined. In fact the whole farming system remains to be developed. The need for demonstrating economic viability applies to Chrysichthys culture also, even though it is a high-priced fish and there appears to be no major difficulties in growing them to a uniform marketable size with artificial feeding.
- In addition to the problems related to the species cultured, there is also the inherent problem of design and management of brackishwater ponds built on mangrove soil. Methods of controlling the acidity and leaching out of toxic salts from the soil have not yet been adequately developed.

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- Research needs
- The research needs for tilapia culture in brackish water are essentially the same as for their culture in fresh water and has already been described on page 3. In addition to these it will be necessary to determine the effect of salinity on the breeding of the two species selected and whether freshwater hatcheries will be needed for the production of fry for brackishwater culture.
- Other factors that may need some special attention are the entry of extraneous species into the ponds and the maintenance of optimum salinity.

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- As regards tilapia culture in brackish water, besides the research described under freshwater pond culture, the effect of salinity has to be studied. This can be tested in the laboratory and based on the results obtained, breeding, larval rearing and production experiments should be carried out, using different salinity ranges as a major variable.

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- Mariculture:
- Mariculture is aquaculture in the saltwater of the sea. It may be in seas, bays, bayes, sounds etc. e.g. traditional mariculture in inshore and offshore waters by a large number of countries notably, U.S.A, France, Spain, Japan etc. Mariculture of finfish in cages is relatively recent. Though a new development, it has assumed considerable importance and has great potential e.g. mariculture of several species of salmonids; Salmo salar, Oncorhynchus spp; of yellowtail, Seriola quinaueradiata; of red seabream (Pagrus major) etc.

http://www.fao.org/docrep/field/003/ac169e/ac169e00.htm#ch5.1.1

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