SUMMARY

1. A surge in the shrimp culture was observed recently due to increased market demand and inadequate capture fisheries. The prospects of shrimp in export market and opportunity for earning foreign exchange attracted the support of Governments of developing countries and thus led the private industrialists to develop the places where brackishwater was available for culture.

2. The biology of shrimps, information on their life cycle, reproduction, larval biology and the nature of habitation in each stage were reviewed to analyse the concepts involved in the hatchery design.

3. The pre-requisites for hatchery design were determined. The suitability of the site was assessed by formulating a questionnaire relating technical, financial, biological and other details.

4. A thorough survey made during 1992-95 on the shrimp hatcheries throughout the coastal belts of India revealed 206 hatcheries. Their technological variations and design concepts were analysed and discussed in detail. The various factors that involved in the success and failure of hatcheries establishment were also thoroughly analysed and described in depth.
5. Technological concepts which determined production on par with various hatchery technologies were investigated. The major technologies, viz., the Japanese and the Galveston-Hawaii (American) and the combination of the above comprising Taiwan, Philippines, German, French and Indian technologies were comparatively analysed. It has been found that the Hawaii technology edged over other technologies in producing shrimp seeds with consistency by utilising less space and volume at high stocking density, maximum water exchange and aeration.

6. The engineering details comprising civil, mechanical and electrical designs were investigated in detail. In the Hawaii technology, the civil design was found to be simple and efficient in operation than the designs formulated by other technologies. In the light of mechanical and electrical details, the designs were based on site specific condition and no standard specifications was found possible to be implemented.

7. The remedial measures for engineering details were implemented systematically and judiciously in most of the large scale hatcheries. However, in the small scale hatcheries, the technical flaws were unnoticed and the remedial measures were not implemented.

8. The various hatchery operation techniques were described in detail. Though variation in designs and technologies were noted, the basic plan of operation schedule and techniques have been found similar in most of the hatchery sections. Variation were observed in individual and
group spawning process in which the former was found to produce maximum results than the later.

9. In the present study, the role of induced breeding techniques in the hatcheries have been discussed. Modern techniques in reproduction, viz., artificial insemination and *invitro* fertilisation are carried out in many hatcheries. However these techniques are yet to attain perfection in the commercial production of shrimp seeds.

10. The various diseases that affect shrimp seed production and their remedial measures were studied in detail. The Hawaii technology aims at preventing diseases through drugs. However, the Philippines/Japanese/Taiwan technologies aim at producing shrimp seeds only when environmental conditions are found favourable. The utility of indigenous drugs used in some hatcheries was also discussed.

11. In the present study, the natural calamities that affected production in various hatcheries and remedial measures for these calamities were also discussed. It was found that natural calamities, viz., salinity and temperature fluctuations can be controlled in small scale hatcheries than large scale hatcheries owing to the enormous requirement of volume of water in the later.

12. Studies revealed that many hatcheries in India failed to produce results due to various managerial problems. The various tools used to rectify such problems have been described in detail. However, the
implementation of such tools are yet to be perfected, since managerial
problems were found to be specific in each hatchery.

13. The exploitation through capture and culture practices have been found
to deplete breeders and seeds of commercially important species of
shrimps. The remedial measures to prevent exploitation of shrimps have
been described in detail.

14. The present investigation on 206 hatcheries revealed that they adopt
seven basic hatchery technologies. Within these seven basic technologies,
a few minor variations have been observed. When these minor
technological variations are taken into consideration, about 18 types of
hatchery technologies have been observed. Further, a careful scrutiny
revealed variation within these 18 types of hatchery technologies among
146 hatcheries in India. It has been observed that the Hawaii technology
edged over other technologies in consistent production and achieving
remarkable profits.

15. The role of vaasthu shastra was also reviewed in the present study. In
general, the vaasthu shastra produced remarkable achievements.
However, due to the over importance given to vaasthu shastra or
neglecting the design and technology some hatcheries were succumbed
to production failure.

16. The growth of hatcheries in different states of India were described.
Andhra Pradesh has been found to be leading among all other states in
establishing more number of hatcheries due to conducive environmental factors. Although there are social constraints, the enterprising qualities of the natives are masking these sociological and political problems enabling them to go ahead by constructing more and more number of hatcheries.

17. The role of blue revolution and the research and development that took place in the recent past were also studied in detail and incorporated.