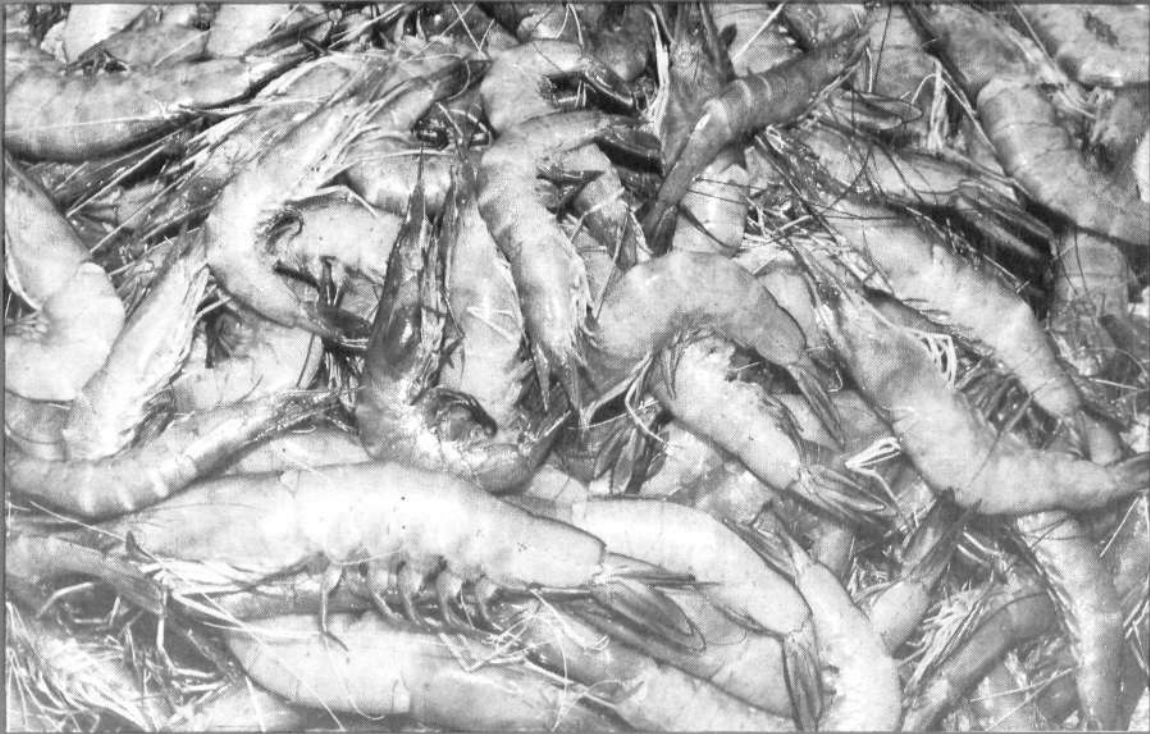




# समुद्री मात्स्यकी सूचना सेवा MARINE FISHERIES INFORMATION SERVICE

No. 165 :

July, August, September 2000



तकनीकी एवं विस्तार अंकावली TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यकी अनुसंधान संस्थान कोचिन, भारत CENTRAL MARINE FISHERIES RESEARCH INSTITUTE COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद्  
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Title : **Management of Fresh water Fisheries**  
Author : **Jacques Arrignon**  
Publisher : **Oxford and IBH publishing Co. Pvt. Ltd., New Delhi**  
ISBN : **81 - 204 - 1324 - 5**  
Year of Publication : **1999**  
No. of pages : **582 + illustrations and B/W photographs**  
Size : **160 x 245 mm**  
Binding : **Hardbound**

Ever increasing human interventions in the natural ecosystems have caused habitat alterations/degradations and over-harvest of resources, often exceeded the carrying capacity/replenishing capacity, by an ever growing human population with the backing of a sophisticated, fine tuned technology in the harvest and post — harvest sector. These global phenomena have stressed more the easily assessable

natural habitats and easily vulnerable species of developed and developing nations, warranting stringent controls, formulation and implementation of appropriate mitigative measures and management strategies suitable to each situation and region without alienating the beneficiary society, prevailing socio/economic/ethnic situations in the implementing regions concerned. With the awareness of the above ob-

jective, many nations have rose to the occasion to face the challenging problems in the natural resource exploitation and evolved appropriate management options, programmes, policies and wherever required legal mechinaries for a sustainable growth in this sector. The fresh water productive medium that traverses the terrestrial environment in the form of streams, rivers, ponds, lakes or back waters, which sustain life, has been severely trampled and stressed the world over by many natural causes on the one side and human interventions to the physical, hydrological and biological medium on the other side. In this back drop, a clear knowledge and understanding of the prevailing interactions and status of fresh water ecosystems, resources and the socio-economics has become an absolute necessity to assess the levels of consumption, both industrial and human, for the protection and management of the inland fresh water bodies. A structured multidisciplinary curriculum on fresh water fisheries is imperative to create necessary awareness and to produce a strong cadre of resourceful manpower who can rationally manage the inland fishery of the future.

The book under review '**Management of Fresh Water Fisheries**' by Jacques Arrignon is a very valuable compendium of knowledge on fresh water fisheries presented in three parts, such as ecological fundamentals, fish breeding and management of aquatic media. The appendices given in part four deals with formulae and programmes on the knowledge of aquatic medium, on the fish populations, about water and other harmful effects; the glossary, references and index spread over in sixty pages. This book is the English translation of the original French work '*Aminagement piscicole des eaux dauces*', updated by the author for the English edition. In order to befit the title the author has carefully structured all relevant subjects in fresh water fisheries and expressed them in appropriate terms and in a more useful and effective manner than a scientific discussion. To widen the scope of this work, the author took special attention to stress the ecological context so as to help clarify and justify

the reasons for the suggested practical solutions. The richness of ideas pervade throughout the chapters dealt in this book, whether it is ecology, fish breeding or management.

In part one of this book on the ecological fundamental a wide range of subjects like aquatic ecosystems, nature and dynamics of the components of a medium, fish and investigations in the medium are briefly explained in 190 pages, spread under four chapters with appropriate subtitles to highlight the thrust topics relevant to each chapter. Aquatic ecosystem connected zoning, typology, fluvial and limnology of hydrosystems / lakes are explained in chapter one with suitable diagrams and in clear understandable terms. The dynamics of fresh-water medium is covered in chapter two under four sub headings such as terrestrial environment, water movement, water and biotic components. The subject matter narrations are substantiated with data, figures, diagrams, dendrograms, histograms etc. wherever necessary. Fish morphology, anatomy, classification and elements of physiology, biology and ethology are incorporated in chapter three of part one. The contents of this chapter especially the scientific terminologies, definitions and the sharp illustrations given at many places, are highly informative to students and researchers in freshwater fisheries. This chapter would have been richer and justified the sub title if age and growth was also incorporated at its end. In the chapter on investigations in the medium the author has incorporated the classification of the freshwater medium, sampling and tagging. The methodology for stomach content, scale and skeletal part examination, radio tracking, echo sounding are dealt with in this chapter with ample illustrations. Fish productivity estimation by different approaches and models, hydroecological studies etc. is also explained here in clear and understandable terms with the support of formulae and figures.

The part two of this book under review with nine chapters cover all possible and relevant themes of fish breeding which would serve as a text for post graduates and researchers in fresh-

water fisheries. The subject is carefully moduled under nine sub heads with suitable descriptions, data, diagrams and photographs spread over 170 pages. The chapter on improvement of natural spawning conditions consists of sections such as access to spawning areas, protection and improvement of spawning areas and artificial spawning beds. The latter section describes different methods like planting aquatic plants on the substratum fixed, floating — gravel beds; spawning channels to improve spawning beds, with diagrams and photographs. The need for *insitu* hatcheries, when media are not suitable for carrying out improvements, for the production of eggs/eyed embryos is vital for restocking the media. The second chapter is devoted to explain the different types of incubation boxes like vibert boxes and corchus box; incubator cradles such as spawning basket, artificial spawning bed and floating incubator for the *insitu* production of eggs/embryos, being liberally supported by sketches and photographs. The third chapter, growth in a natural medium, explains the hardiness of species, breeding media and improved extensive breeding. The author has taken care to incorporate all information on the reproduction/breeding of a range of fresh water fishes in the fourth chapter, titled induced breeding. The practice of making improvements that induce fishes such as cyprinids (gudgeon carp and asian carp), percomorphs (perch, pike perch, black bass), salmonids (arctic char, danube salmon and, common grayling coregonids) to reproduce is the main theme of this chapter, supported effectively with figures and photographs. In chapter five of part two, the various aspects of intensive fish culture is explained under six subheads such as, reproduction of trout, salmon, fertilization and incubation, hatching and rearing of fry, raising of summerlings, growth and mortality and introduction of salmon in natural medium. The various methods and technologies used to control the parameters of the breeding medium and the biocycle of the fish being raised are elaborated with the help of suitable diagrams in this chapter so as to produce the maximum number in a

minimum amount of water, space and time at a minimum cost through intensive culture. Techniques of breeding the fresh water cat fish, sturgeon, eel, tropical tilapia, catfish, rice/pig/fish/duck/hen in integrated farming are briefly dealt in chapter six. The health problems in the medium, fauna and those associated with culture are elaborated in chapter seven under subheads like investigation of causes, therapy and prevention. The classification of the medium, situation and development are presented in the eighth chapter on suitability of media. The last chapter of part two of the book presents in detail all adverse effects to the medium and fish breeding. Here the author has narrated the adverse effect caused through historical changes, effects on the catchment area, effects on aquatic medium and pollution. Estimation of water quality using different evaluations on the medium as well as on the inhabitants etc. are explained with the support of data, illustrations and photographs.

The part three on management of aquatic media is presented vividly through three chapters such as physical management, intervention in the biological medium and economy of aquatic resources, each one being supported by diagrams and photographs. The maintenance of surroundings, clearing, removal of weeds and measures against muskrat are the subjects covered in the first module with maintenance of the aquatic media under chapter one. The ponds are classified in the second module according to origin, feed, arrangement and purpose. All aspects connected to creation of artificial medium are explained in the third module and the subjects are liberally illustrated with drawings. The other modules under this chapter include correction of water courses and management of water course for migratory fishes; the former explains correction works to prevent natural physical processes that might degrade streams, torrents, confluences and estuaries, while the latter narrates aspects of crossing obstacles by migrants, devices for their crossing and devices for sampling. The second chapter on intervention in the biological me-

dium gives the improvements required to ameliorate the culture ponds, means to create artificial equilibrium and fish production criteria such as selection of species, quantitative estimation, introduction of new load of fish and exploitation. The annual schedule of interventions in the culture ponds to appropriate pH by liming/calcite, pond fertility by phosphoric, potassic and nitrogenous mineral/organic fertilizers are emphasised in this chapter. The last chapter of part three of this book highlights the economy of aquatic resources through four subsections such as strategies of fish stocks, animal resources, suitability of medium and management of fishery resources. The author conceptualises the apt fish stocks management strategy as the one that aim for maximum production without compromising the productive future and distribution of species, and more economical and better respects to the law of nature. The concept of MSY and the pitfalls in strategy based on MSY are also explained here in detail along with the economic importance, and development needs in animal resources use. The suitability value of aquatic medium for recreational fishing and its development trends, preferably in the French context is also explained in this chapter. The last part of this chapter provides the administrative organization of fisheries management.

The last part of this book is appendices dealing with formulae and programmes on aquatic medium, fish populations, about water and harmful effects. This part is highly useful as it explains the minute details of methodology/formulae and calculations of various indices, and also provides proformae for samplings, models and computer softwares to derive equations etc. often required to guide and help students in the subject. The glossary gives suitable meaning/explanation/definition/inter-

pretation of more than 300 words/technical terms. About 210 upto date literature on all aspects covered in the text are cited under references; although many pertain to temperate waters and French works. This chapter ends with a seventeen page index list.

In order to evolve viable, economical and socio-politically acceptable and easily implementable strategies for the management of fresh water fisheries relevant to each geographical/ecological region with characteristic and unique socio-cultural conditions require a thorough knowledge, on the physical, chemical and biological condition of the media, the veracity of stress caused to the medium by both natural and anthropogenic effects, together with a clear understanding on the interventions and mitigative measures required to correct the medium and the ways and means to enhance the productivity through fish breeding and culture in tune with the laws of nature socially acceptable and adaptable.

The contents of the book are a collection of appropriate and authentic record of information which heavily deal with many fundamentals, general topics, methodology, breeding and culture practices, management of medium, which are relevant, applicable and replicable to many universal situations. As such this book fulfils most of the curriculum requirements of fresh water fisheries students of India. An intensive review made during the present exercise revealed that the book is not only useful to post graduate and research students but also to the faculty to supplement plan and align their fresh water fisheries teaching schedule. This book is a worthy addition to libraries and is recommended as a reference text for postgraduates/research students.

Dr. N.G. MENON