Sustainable Indian Fisheries. T. J. Pandian (ed.). National Academy of Agricultural Science, ICAR and Ministry of Agriculture, New Delhi. 2001. 327 pp. Price not mentioned.

It was indeed a pleasure to review such a well-edited volume, which is very readable and largely free from mistakes. I am sure it will fulfil the purpose for which it is intended. The volume begins with a foreword from the eminent and highly-respected agricultural scientist, M. S. Swaminathan, one of the architects of the 'Green Revolution' in India. In his foreword, he emphasizes the importance of fisheries and particularly aquaculture, in promoting sustainable nutrition and livelihood security for the country. This is followed by two more forewords from the very well-known agricultural scientists, R. S. Paroda and V. L. Chopra. Both these forewords indicate fish as one of the cheapest sources of animal protein and stress the need for strengthening the weak points regarding fisheries and aquaculture.

In his preface, T. J. Pandian gives the framework of fisheries policy enunciated in 1898 which has changed very little in the past, and the few acts pronounced by the Central and State Governments that have largely become outdated. Therefore, there is an urgent need for revision of the earlier policy to make it in line with the present-day development of fisheries.

The volume contains eighteen articles, including introductory remarks by N. Balakrishnan Nair, an eminent marine biologist and fishery expert. He was the Chairman of the National Seminar on 'Sustainable Fisheries and Aquaculture for National Security' held in Chennai from 29 November to 2 December 2000. In his introductory remarks, the Chairman reviewed the present state of fisheries in India, in both freshwater and marine sectors. He also summarized the various techniques followed by the aquaculture industry and the methods for enhancing both capture and culture fisheries. All the eighteen papers have been grouped under five sections or sub-themes. The next paper under the section 'Introduction' by M. Sakthival describes the constraints which the aquaculture industry in India is facing today. He is optimistic about the future of Indian aquaculture, provided the various hurdles are removed.

There are three papers in the next section on 'Capture fisheries'. The first paper outlines the limitations on increasing fish production from coastal areas which presently contributes to about 50% of the total production. The author summarizes the major issues which defy sustainability of fisheries and these demand immediate attention. The next paper reflects capture and culture fisheries of inland waters. The authors are hopeful about the future growth of reservoir fisheries and culture-based fisheries of the wetlands despite the fact that rivers, estuaries and lagoons are undergoing progressive degradation. Some of the important sectors, such as deep-sea and oceanic waters, according to V. S. Somvanshi, the author of the next paper, are grossly under-exploited. In these waters, tunas, cephalopods, myctophids, dep-sea shrimps and Antarctic krill form major resources.

There are seven papers in the third section on 'Aquaculture'. The first gives an account on freshwater aquaculture and enumerates the difficulties which limit its sustainability. Brackishwater aquaculture, according to the authors of the next paper, holds the greatest promise in the future. The available technologies which have been under criticism because of their adverse impact on the adjoining land are indicated and strategies for sustainable development have been suggested. There has been vast expansion of areas under aquaculture, but these are largely used for shrimp culture because of its profitability and export potential. As a result of this, the culture of other species has decreased.

Another essential prerequisite in sustainable aquaculture is providing inexpensive, well-balanced synthetic food. The composition of some of the earlier feeds produced in India has been indicated by the authors of the third paper, who also give some important recommendations to meet vastly growing requirements of the aquaculture-feed-industry. Shrimp culture suffers huge losses because of diseases caused by viruses, bacteria, fungi and parasites, and the authors of the fourth paper have suggested that the prevention and control of diseases should be implemented by both government and private agencies.

Diversification of aquaculture, given in the fifth paper, has increased the world production enormously. Of the 297 farmed species, 71 are from freshwater and the rest are salt-tolerant of various degrees. Unlike the other countries, only 15 species are being used in commercial aquaculture in India. Therefore, by diversification, India can increase its aquaculture production several-fold. There is an urgent need for protecting fish germ plasm resources of the country, and further research and policy initiatives for genetic measurements of wild stocks, conservation of endangered species, development of aquatic sanctuaries, etc. are required. These have been stated in the sixth paper. According to M. Sakthivel, sustainable aquaculture requires a proper legal framework which should be implemented taking into consideration the provisions made in the Integrated Coastal Zone Management (ICZM) and the Coastal Regulation Zone (CZR).

There are three papers in the fourth section on 'Post-harvest'. In the first paper, handling and transport of fish have been dealt with adequately by the authors. Fish being a highly perishable commodity requires special precautions in handling and transport, if proper hygienic conditions are to be maintained. Fish processing is the foremost technology for utilizing the fish and shellfish as a commodity for domestic and foreign trade. Various methods in use, including irradiation have been discussed in the second paper. Value-added production such as fish oils provides a good source of nutrients and vitamins which are not found in adequate quantities in cereal-based diet of developing countries. Therefore, 'their use will significantly contribute to the improvement of health status of our population', according to Ghaffoounissa in the third paper.

In the fifth and last section on 'Education and publication', there are three papers. The first enumerates the changing needs of fisheries education in India. It summarizes the early education on fish and fisheries imparted by the Indian universities till the Central Institute of Fisheries Education (CIFE) was established in 1961 in Mumbai. Today, fisheries education is also being undertaken in agriculture universities. The second paper quantifies fish and aquaculture research in India. About 460 papers (5.5% of the world output) are published from India every year.

The third and last paper under this section summarizes the present status of fisheries and concludes that fisheries and aquaculture constitute highly pro-

ductive sectors. These contribute significantly to the generation of food, employment and national income. The paper finally recommends that the fisheries policy which was enunciated in 1898 has not changed significantly in more than hundred years, although the fisheries technology has drastically improved from the country-crafts to highly mechanized boats and powered fishing. It is, therefore, necessary to formulate a new policy which takes into consideration the interests of all the fisheries sectors. The export earnings of seafood have increased from Rs 25 million in the 1950s to Rs 52,000 million in 2000. Therefore, there is enough justification to increase financial support to the fisheries sector. For marine fisheries, maximum sustainable yield has to be indicated. Aquaculture, being the fastest growing sector, requires greater incentive. Fisheries education needs further refinements and the quality of publications in our journals needs a lot of improvement to reach international standard.

The volume undoubtedly provides valuable addition to our knowledge about Indian fisheries with all its complexities. It is well-edited, for which T. J. Pandian deserves our compliments. The only weakpoint in the book is that it gives little reflection on the degradation of coastal and estuarine areas of the country. Rapid growth in human population and increased human settlement around the coast and estuaries have modified the natural habitats, including mangroves, salt marshes, coral reefs and mudflats to a considerable degree. Lack of waste-disposal facilities and dependence of the settled population on resources of the environment such as timber, corals and their associated animals (wherever they occur), and overexploitation of fish, crustaceans and molluscs, impose considerable stress on the environment. Mumbai alone, with a human population density of 25000 km^2, generates 2.2×10^6 m^3/day of domestic waste, which enters the bays and creeks in treated, partially-treated and untreated forms, and creates serious problems because these areas form important fishing grounds. Environmental degradation is found from severe to less severe forms in practically all the estuaries of India. We have not yet decided about the allowed level of environmental degradation and extent of deforestation of mangroves. Therefore, the cumulative economic gains by preserving a natural ecosystem are just as important as the technological advancement in the form of industrial complexes along the coast, which may spell out destruction of the environment.

Unlike agriculture farming, dairy production and poultry farming which have become sustainable, the fisheries sector has been fluctuating from year to year and has suffered stagnation for several years in the past. Therefore, attempts made in the present volume to make the Indian fishery sustainable are indeed valuable and praiseworthy. The book will form an important addition to all libraries and must be used intensively by research workers and policy makers, as it gives constructive information on different fisheries sectors to be implemented in the future.

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Assisted Reproductive Technologies: Current Methods and Future Directions. Indira Hinduja, Kusum Zaveri and Chander Puri (eds). Oxford University Press, YMCA Library Building, Jai Singh Road, New Delhi 110 001. 2001. 254 pp. Price: Rs 1500.

The birth of the world's first and second test-tube babies born in the UK and Calcutta, respectively just a few months apart in 1978, created sensational news. Scientific disbelief, and moral and ethical criticisms highlighted these early events. Today, with over a million babies reportedly born throughout the world by medically-assisted reproductive techniques (MART), *in vitro* fertilization and embryo transfer is considered a benign, therapeutic option for millions of infertile couples. MART has become an intrinsic part of modern therapeutic modalities that aim to alleviate human suffering.

It is against this background that the book under review generates considerable interest, as it promises to tell all about current methods and future directions of assisted reproductive technologies. However, a careful reading of the miscellaneous collection of eighteen chapters is very disappointing; no new information is presented nor any future directions suggested. Much more relevant and recent information is freely available on the World Wide Web.

The editing appears to have received perfunctory attention. Literature citation is misleading. For example, the foreword written by the Director General of the Indian Council of Medical Research reads, 'Collectively, this book represents the insight gathered by more than *500 years* of clinical scientific and research experience'. Surely one cannot expect the Director General to commit such a faux pas on a subject that is less than 50 years old!

Chapter 1 states 'the cost factor is unfortunately *inhibitive*'. Possibly the authors mean 'prohibitive', as the word 'inhibitive' does not exist in the *Oxford Dictionary*.

Chapter 2 cites two separate publications of Lass *et al.* Both the articles were published in the same journal in 1997. In such cases, it is relevant to differentiate the citation by referring to the article as 1997a and 1997b, so the reader can check the appropriate article. In Chapter 9, only the author's name is given in the citation without the year of publication.

Line drawings in Chapter 3 are amateurish. They could have been presented better with the help of a professional artist. These line drawings are not original, but have been culled out of reproductive physiology textbooks. The sources of these illustrations should have been indicated, otherwise these drawings could be construed as having been plagiarized.

Reproduction of photographic illustrations leaves much to be desired. One is amazed to see such poor-quality illustration from Oxford University Press in this day and age of digital illustration. Such illustrations have further devalued the quality of information being conveyed by the various chapters.

The book is certainly not worth its price.

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