India's Exclusive Economic Zone – Resources, Exploitation Management. S. Z. Qasim and G. S. Roonwal (eds). Omega Scientific Publishers, B-7, Lajpatnagar, New Delhi. 1996. Price: Rs 600. 248pp.

Under the UNCLOS-III, the coastal states have jurisdiction of the sea up to 200 nautical miles from the coast line, termed the Exclusive Economic Zone (EEZ). The resources within the EEZ of about 2.0149 million km^2 which is nearly 61 per cent of the Indian area, therefore, belong to us.

As India prepares to explore and utilize the living and non-living ocean resources, tap the energy potential and use the coastal zone for harbours, industrial activity and tourism, as a new frontier for food and wealth, it is essential that we understand and assess the different aspects of this important marine ecosystem. This would enable us to utilize the resources in a rational way without causing damage, so as to maintain a sustainable relationship between exploitation and ecobalance.

To be able to manage this zone, we must know the long-term and short-term environmental problems faced by the various sectors of the zone and the consequences associated with the exploitation of its resources. To discuss this problem, a National Seminar on Management and Policies for India's EEZ was organized by the Planning Commission and the University of Delhi with the support of the British Council at the NIO, Goa. This volume presents a selection of papers presented at the seminar.

Qasim in his introductory essay explains what lies ahead and suggests that management of the resources would require an understanding of the types of features and the resources they contain, the establishment of proper infrastructure, trained manpower and use of environment-friendly technologies. The coastal belt up to 100 m depth at present being extensively exploited for a variety of purposes, demands rational management schemes to control possible harmful effects of the activities.

There is an imperative need for (1) the conservation and protection of the biological diversity, (2) the management of endangered ecosystems such as the mangroves, coral reefs and declaring them as biosphere reserves, (3) an understanding of the nature and influence of the coastal upwelling leading to high fertility in certain areas which are the sites of our major fisheries, and (4) examining the possibilities of mariculture, consequences and control of anthropogenic disturbances such as dredging and reclamation. There is also the need for further legislation, review and monitoring of the sources of pollution and control of coastal erosion.

Ocean resources must be used for the benefit of mankind but they must be used responsibly and sustainably so that future generations do not pay for our misuse. Antony S. Laughton warns that fresh consideration be given to using the ocean for properly engineered waste disposal and storage, with safeguards against unacceptable environmental degradation. Oceanic processes must be understood sufficiently to allow reliable models to be adopted to predict the state of the ocean and its reaction to perturbations. Laughton, therefore, recommends a continuous observing system to monitor the health of the oceans.

Considering India's industrial and economic development, there will be increasing demand for metals, such as copper, nickel, cobalt and silver as well as gold and platinum. Marine mineral resources and their sustainable exploitation are discussed in three papers by Roonwal, Chandra *et al.* and Victor Rajamanikom. The mineral potential of India's EEZ includes well-known monazite–ilminite rutile placers on the west and east coasts, calcareous aggregates and sands in the shallow waters, phosphate mud and sediments. Similarly, the cobalt-rich manganese crusts in several locations, and the hydrothermal sulphide mineralization in the Andamans seem promising. Further, the sea water components and the hydrocarbon deposits in the off-shore areas are also important. A good beginning has been made in respect of the exploitation of beach and offshore placers, heavy mineral sands comprising ilminite rutile, zircon, monazite, sillimanite and garnet; lime-mud deposits, calcareous sediments, phosphate nodules, phosphatized rocks, ferro-manganese nodules and possibly diamond and gold. The utilization of remote sensing application would be beneficial for evaluating placers and to monitor the changes which might take place in the configuration of the beaches.

The biological resources are by far the most important from the point of view of protein food for the Indian people. Five papers deal with biological resources.

Benthos form the basis for energy flow to many species in the benthic system, the meiofauna serve as an important food source for higher trophic levels. The macrofauna contribute to the benthic energetics of estuaries which is reflected in the demersal fishery. For the interpretation of the ecology of tropical demersal fisheries, an estimation of the benthic organic carbon is the basic prerequisite. According to Ansari *et al.*, the dimersal fisheries of the continental shelf have been assessed as 1.2 million tonnes as against the present level of exploitation of about 0.45 million tonnes per year. The nonavailability of base-line data on the benthos of the EEZ has been a serious constraint while assessing potential fishery resources. Wide variations exist in the distribution and faunal abundance, coastal waters and estuaries harbours high density. The average annual production range from 0.176 to 11.8 g cm^{-2} year. Benthic production is directly related to primary production.

Along the south-west coast, the overall productivity increases sharply during the SW monsoon on account of nutrient enrichment. High biomass of zooplankton in the region leads to large catches of fishes. The sardine and mackerel take advantage of the conditions that develop during the season. Their migration from south to north coincides with the south-north progression of the upwelling triggered by a shift in the availability of the food maxima.

The zooplankton is the chief index of utilization of the aquatic biotype at the secondary trophic level. The shelf areas sustain higher zooplankton production according to Goswamy, as compared to oceanic waters. Biomass values are higher over the shelf region during SW monsoon and in the oceanic realm during the pre-monsoon. Diel variability is reflected in the biomass – night values being higher than day values. On the basis of these the potential fish yield has been worked out as 9.01 and 2.25 million tonnes per year respectively for Arabian Sea, Bay of Bengal, Lakshadweep and Andaman Nicobar Seas.

Estimates of fishery potential based on the data of primary, secondary and benthic production for a period of over 20 years by Bhargava amount to 4.72×10^6 tonnes per annum. Since the annual production is just over 2 million tonnes it can be inferred that the production can be doubled.

Marine fishery is an established industry in India. Nearly 9 million people are

involved. India is a leading sea food producer and exporter, the maximum export has always revolved around marine prawns fetching 80 per cent of the revenue. The present production has stabilized around 1.5 lakh tonnes annually. To increase the present production, deep sea prawns have to be located and trapped and aquaculture developed into a major industry. Achuthankutty suggests substantial increase in the present aquaculture production of 35,000 tonnes through expanding the activity and use of advanced technology.

In a power-deficit country such as India, renewable energy such as ocean thermal energy conversion, wave energy and tidal energy look promising and relevant. Ocean energy is pollution free and has minimum health hazards. According to P. M. Koola this resource is most valuable for island communities.

The volume also contains discussions on certain related topics. A set of recommendations are included at the end on developing coherent environment management policies for India's EEZ of which the most important is the formation of a high level committee in which the government, relevant institutions, universities and industry are represented to co-ordinate and monitor the management of the EEZ.

The present series of papers contain authoritative information on the resources by experts and these will draw the attention of researchers, managers and planners to the problems involved in the economic use of India's EEZ. The recommendations would be beneficial for evolving suitable strategies for the sustainable realization and management of the resources.

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Annual Review of Nutrition 1996. Donald B. McCormick (ed.). Annual Reviews Inc., 4139, El Camino Way, P. O. Box 10139, Palo Alto, California, 94303–0139, 557pp. Price: USA $53, elsewhere $ 58.

Annual Review of Nutrition is a valuable series that gives advances in both the basic and the applied aspects of nutrition. It is this blend that makes this publication useful to the research scientists, the teachers, and the practitioners of nutrition. Even science administrators and policy makers may find information that they can use.

The prefatory chapter 'On the making of a clinical nutritionist', is by Bob Olson — a man who has contributed significantly to the basic science and application of nutrition. This autobiographical account is interesting and informative, with an element of nostalgia regarding the events that led to some important discoveries in nutrition and biochemistry.

The overall emphasis of the present volume is on recent advances in nutrient transport mechanisms, regulation of metabolism and diet and disease, particularly cardiovascular disease. Not a single article deals with nutrient deficiencies, which however, continue to plague the developing countries, and about which a lot is being said in other forums. Advances in micronutrients such as vitamins A, E and folic acid are, however, covered in other ways.

A review by Butterworth and Bendich discusses prevention of birth defects (neural tube defects – NTD) by periconception supplementation of women with folic acid. The incidence of NTD is 5 per 1000 births. Though folic acid deficiency is widespread among Indian women, how much of NTD can be prevented by folate supplementation is a moot point since both genetic and environmental factors are responsible for its causation.

Vitamin E deficiency in humans is rare and generally secondary to malabsorption or metabolic abnormalities in lipoprotein metabolism, rather than dietary inadequacy. However, being a powerful antioxidant, vitamin E supplements are being promoted as prophylaxis against degenerative diseases where free-radical-mediated cell and tissue damage is implicated. Do epidemiological studies support this notion? How much vitamin E is enough? Traber and Sies discuss these aspects in the chapter 'Vitamin E in human disease and delivery'.

Besides vitamin E, there are other nutrients and phytochemicals in food (vitamin C, carotenoids, flavonoids, etc.) which have antioxidant properties. Their functions are reviewed in the chapter 'Antioxidants in human health and disease by B. Halliwell'. A lucid explanation of the mechanism of action of reactive oxygen and nitrogen species is also given. Oxidation of low-density lipoproteins (LDL) by cells in the artery wall is believed to initiate the complex chain of atherogenic events, in which other lipid constituents, especially cholesterol also play a role. The role of dietary modifications, with special reference to anti-oxidants and fatty acids in atherogenesis is discussed by Reaven and Witztum.

While polyunsaturated fatty acids (PUFA) have a cholesterol-lowering effect, they tend to increase LDL oxidation. The solution is – a PUFA-rich diet along with anti-oxidant supplements. An interesting recent finding is, mono-unsaturated fatty acids like oleic acid (present in olive oil) is as good or better than PUFA, and that may be the secret of lower incidence of CVD in mediterranean region. The PUFA of fish oil is also very good.

The question of safe limits of dietary cholesterol and ways of achieving it, is still controversial, and covered in the chapter 'Cholesterol policy and the primary prevention of coronary disease' by Naylor and Paterson. New molecular markers will provide better insights into lipid-related atherosclerotic risk.

Obesity is an important predisposing factor in CVD. Frequency of obesity is greater among high-fat than low-fat consumers. Why? For answers, read the chapter 'Control of human appetite: Implications for the intake of dietary fat' by Blundell *et al.* High-fat diets seem to have lower long duration satiety effect, than carbohydrates or proteins, the latter being the best.

Humans and animals have the enzymes for *de novo* lipogenesis. For long this has been regarded to be the method of storing surplus non-fat energy. However, recent studies using stable isotopes question the relevance of this pathway in humans raising several questions. The basis of this dilemma is discussed by Hellerstein in the chapter 'Regulation of hepatic *de novo* lipogenesis in humans'. Use of stable isotopes has greatly increased our understanding of the regulation of carbohydrate and fat metabolism during and after exercise, though questions persist as seen from the update by Halloszy and Kohrt.

The molecular mechanisms involved in transport of nutrients between tissues, their uptake by the cells and in some cases binding to DNA, through receptors, are