Role of CICEF, Bangalore in the Development of Fishery Harbours, Fish Landing Centres and Brackishwater Shrimp Farms

K.Omprakash*

Joint reconnaissance survey of new sites for identifying the suitability of development as FH/ FLC and updating the Master Plan Report for each Maritime State is a continuous process ...

The Institute was established in January 1968 as Pre-investment Survey of Fishing Harbours by the Ministry of Agriculture, Government of India in collaboration with Food and Agriculture Organisation of the United Nations (FAO/UN). The primary objective of establishing this Institute was to carry out engineering and economic investigations and prepare techno-economic feasibility reports for the development of fishery harbours at suitable sites along the Indian coast and to provide fishery harbour facilities to mechanised fishing vessels (MFVs). After the cessation of the FAO/UN assistance, the Institute received technical assistance in the form of equipment and expert consultancy services from Swedish International Development Agency (SIDA) for a period of 2 years from January 1974. In August 1983, it was renamed as Central Institute of Coastal Engineering for Fishery. Expertise has been further developed in the subsequent years and from August 1983, the Institute is also catering to the requirements of Aquaculture Engineering for development of Brackishwater Shrimp Farms along the Indian Coast. The Institute received UNDP/FAO assistance in the form of equipment and consultants from 1986 to 1991 for the development of coastal aquaculture shrimp farms. During the period, four pilot brackishwater shrimp farms Viz., Asangaon in Maharashtra, Poyya in Kerala, Polekkuru

Director, Central Institute of Coastal Engineering for Fishery, Bangalore

in Andhra Pradesh and Alampur in West Bengal and one shrimp seed hatchery at Benaulim in Goa were developed.

As a Nodal Agency, the Institute implemented the World Bank assisted Shrimp Culture Projects in the States of West Bengal, Orissa and Andhra Pradesh between 1992 and 2000.

Under the World Bank assisted Shrimp Culture Project, the Institute carried out survey and sub-soil Investigations at 13 sites Viz., Bhairavapalem, P.T.Palem, C.G.Palem, Ipuru and Veemuldevi in Andhra Pradesh, Jagatjore / Banapada, Narendrapur and Bedeipur in Orissa and Digha, Dadanpatrabar, Canning, Dighirpar and Meendwip in West Bengal covering a total area of 9640 ha. Techno-economic feasibility reports have been prepared in respect of 10 sites Viz., Bhairavapalem and P.T.Palem in Andhra Pradesh, Jagatjore / Banapada, Narendrapur and Bedeipur in Orissa and Digha, Dadanpatrabar, Canning, Dighirpar and Meendwip in West Bengal covering a total productive pond area of 3826 ha. Trial culture operations were carried out at Digha, Canning and Dighirpar in West Bengal and Bhairavapalem in Andhra Pradesh.

The Institute, till the end of July 2007 had carried out fishery harbour investigations at 79 sites and prepared project reports for 73 sites. The Institute monitors the progress of construction of ongoing fishery harbours sanctioned under Centrally Sponsored Scheme by the Ministry of Agriculture and renders technical guidance to the Maritime States/Union Territories in the implementation of the projects. The fishery harbours developed, under construction and sites proposed for development may be seen in the attached Map of India.

1.0 Organisation

The Director heads the Institute and the total sanctioned strength is 49 comprising technical and administrative personnel. The break-up of the sanctioned posts is as follows:

Group	Non-Plan	
	Technical	Non-Technical
A	10	-
B (Gazetted)	03	01
B (Non-Gazetted)	05	-
C	12	13
D	01	04
Total	**31**	**18**

An inter-disciplinary team comprising of Engineers and Economists who have specialised knowledge and vast experience on field, in conducting necessary pre-investment studies to identify sites for development of Fishery Harbours and Brackishwater Shrimp Farms, preparation of techno-economic feasibility reports, detailed construction plans for the projects and other supporting facilities are on the roll of this Institute.

2.0 Mandate

The objectives of this Institute in respect of development of fishery harbours and brackishwater shrimp farms are as follows:

2.1 Fishery Harbours

- To carry out reconnaissance surveys/pre-feasibility studies to identify priority sites for development of fishery harbours and follow it up by detailed engineering and economic investigations and prepare techno-economic feasibility reports.
- To prepare preliminary construction plans and supporting facilities, etc for fishery harbours.
- To give technical advice on engineering and economic aspects wherever required for the development of fishery harbours and fish landing centres.
- To monitor the progress of construction of ongoing fishery harbours sanctioned under the Centrally Sponsored Scheme in association with the Ministry of Agriculture.

2.2 Brackishwater Shrimp Farms

To conduct economic and engineering investigations, prepare suitable engineering designs for farms and prepare techno-economic feasibility reports.

3.0 Master Plan for development of Fishery Harbours and Fish Landing Centres

The Institute has taken up the task of updating the Master Plan for development of fishery harbours and fish landing centres in the Coastal States / Union Territories during the Ninth & Tenth Five Year Plans and beyond. It has so far identified 62 fishery harbour sites and 184 fish landing centre sites suitable for development and inclusion in the Master Plan. Of the 62 sites found suitable for development of fishery harbours, the Institute has conducted engineering and economic investigations at 23 sites in the Coastal States of Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa and in the UTs of Diu & Daman and Pondicherry.

4.0 Achievements during Tenth Five-Year Plan (2002-2003 to 2006-2007)

During the Tenth Five Year Plan, the Institute conducted engineering and economic investigations at 8 sites in the Coastal States of Gujarat, Maharashtra, Goa, Karnataka, Andhra Pradesh, Orissa and in the U.T. of Pondicherry. Beside conducted additional Economic investigations at 12 sites. The Institute prepared and issued Techno-economic feasibility Reports for 8 sites.

5.0 Expertise available

The Institute is functioning in the new building since August 2003. The Institute has acquired expertise from FAO/UNDP and SIDA experts in identification of suitable sites, conducting engineering and economic investigations, preparation of Techno-Economic Feasibility Reports and detailed construction drawings for the development of fishery harbours and fish landing centres in the country. Besides, the Institute has acquired expertise in identification of suitable sites, conducting Engineering and Economic investigations and preparation of Techno-Economic Feasibility Reports for Brackishwater Shrimp Farms.

The infrastructure in the form of Fishery Harbours and Fish Landing Centres developed so far caters to about 30% of the Mechanised Fishing Vessels (MFVs) operating in the country. There is need, therefore, to create facilities for 70 % of MFVs operating in the country which amounts to Planning, Designing and construction of adequate number of Fishery Harbours (FHs). The Fish Landing Centres (FLCs) presently available for traditional craft are grossly inadequate. There is a need for development of more number of Fish Landing Centres for the ever-growing need of the traditional craft. The Institute will play a pivotal role in the development of Fishery Harbours / Fish Landing Centres in the country.

Most of the FHs and FLCs that are operational have far exceeded the designed capacity due to increase in the number of MFVs and traditional craft. Besides, some of the facilities created have not been put to use due to poor maintenance. Therefore, there is a need to conduct Post Evaluation Studies at the existing FHs and FLCs to evaluate the utility of the facilities already created and to assess the requirements of additional facilities. Some of the FHs would need further expansion and some FLCs would need upgradation to FHs. Keeping the expertise available, the Institute can undertake the task of Post Evaluation Studies.

Joint reconnaissance survey of new sites for identifying the suitability of development as FH/FLC and updating the Master Plan Report for each Maritime State is a continuous process and the Institute will be actively involved in the above activity.

Human Resource Development in Fisheries Sector

D.D.Nambudiri*

With the long coastline of 8118 kms India has a tremendous potential for capture fisheries in the Indian exclusive economic zone and for culture fisheries. The country is blessed with rich and varied marine and inland fishery resources. We have a rich bio-diversity and a strong sub-sector for agricultural diversification. The fishery sector in India employs several million people. Aquaculture in India is growing at a pace comparable to the world's growth in aquaculture. The average annual growth of aquaculture in India is 7% in the last one decade during which period aquaculture production has increased by two folds. The share of inland fisheries sector in aquaculture is more than 50%. India has, however, to go much ahead to untap the resource base of deep-sea fisheries and also in aquaculture. Much developments need to be carried out in making fishing vessels best suited in the Indian waters. Adequate infrastructural facilities right from landing site to the marketing of products have to be established. The demand for fishery products in the domestic market is rapidly growing. Similar is the case with worldwide demand for fish products. There is ample scope for product and market diversification for export. The Indian exporter mainly remains as a raw material exporter with very little innovation introduced in value addition of products.

...stress should be given in professionalising the government owned development sector and also the industry.

With the increase in the input in capture fisheries and with the advent of aquaculture and fish processing, it has become inevitable to have technical manpower to professionally manage the sector. That is the genesis of fisheries education in the country. The first Fisheries College

Professor & Dean, College of Fisheries, Panangad, Kerala.

under ICAR system was started in the year 1969 under the University of Agricultural Sciences at Mangalore and the second fisheries college at Tuticorin. The College of Fisheries, Panangad was established in the year 1979. The first maritime University to start postgraduate degree programme in fisheries was Cochin University of Science and Technology in the year 1976. At present, there are 40 State Agricultural Universities in the country and 14 Fisheries Colleges. There are 7 Veterinary, Animal and Fisheries Sciences Universities under ICAR. Fisheries Colleges in such States are affiliated to these universities.

Agricultural Education in the country is regulated by ICAR, similar is the case with Veterinary Science and Fisheries Science education. The Council has been addressing most of the issues related to Fisheries education through several mechanisms. One of such mechanisms is the constitution of the Deans Committee for the revision of course curriculum. The graduates passing out today do not fully match the requirements of emerging market. Globalization and demand led market necessitate a relook at the content and delivery regularly. Objective of the process is that the graduates coming out of such institutions not only meet the expectations of different stake holders but also be propeller of growth of the fisheries sector. This also makes graduates to remain in the forefront of developing new technologies and disseminating them to the farming community.

Fisheries education in the country quite differs from that of agricultural science or veterinary science. Different academic programmes is Fisheries have been started by various colleges coming under the UGC. The courses offered in these colleges differ in content and duration. While the graduate programme under the State Agricultural Universities are for a duration of 4 years after pre-degree, many UG programmes offered under the colleges affiliated to UGC are for a period of three years. This makes a lot of difficulties for employers in the sector in choosing such varied group of students for professional efficiency in placement.

Accreditation is the best method for ensuring quality of education. For bettering fisheries programme under State Agricultural Universities accreditation boards have been established and accreditation procedure institutionalized. Such procedures involve preparation of self-study report by the institution, validation of self-study report by a peer-team and finally decision by the accreditation board on accreditation of the institution.

For improving norms and standards of fisheries education in the country there is need for implementing uniform academic regulations, examination and evaluation system. With the aim of enhancing practical content in fisheries education, ICAR has advised all the SAUs offering fisheries courses to introduce hands on training to the students for one full semester. Rural Agricultural Work Experience Programmes being offered by SAUs strengthens interaction between fisheries graduates and the farming community.

In the sector of fisheries education, much efforts have been made for capacity building for human resource development. In this area, ICAR is providing development grant for modernization of classrooms, library strengthening, establishment of students laboratories at college level, students counseling and placement cell. ICAR has also supported construction of international students hostels, girls' hostels and modernization of UG and PG practical and research laboratories.

Improvement of faculty competence is very essential for strengthening fisheries education. At present, in the country, fisheries education is provided by national institutes coming under ICAR, Government of India Institutions, colleges coming under UGC and State Agricultural Universities coming under ICAR. ICAR provides adequate support to State Agricultural Universities for improving faculty competence. Large number of training programmes are organized through Centers of Advance Studies for the faculty in these colleges. Besides, summer and winter schools are organized. Scientists are sent for training in the best of the institutions overseas, sabbatical leave rules as well

as visiting scientists schemes operationalized. Supports are also being provided for the faculty for participating in seminars, symposia both national and international. ICAR has also introduced best teacher awards at university and national level.

Inbreeding is a factor, which reduces the quality of education in universities. Steps have to be taken to reduce such practice. ICAR conducts All India Competitive examinations each year to fill 50% UG and 25% PG seats in all State Agricultural Universities. Through this examination each year about 1500 students at UG level and 1000 at PG level are sent from one institution to another. This has changed the cultural life on campuses, brought healthy competition, promoted national integration leading to improvement in instruction.

The fisheries professional must have expertise in diverse areas such as biology, oceanography, conservation, genetics, nutrition, limnology and human dimensions. As our management of the world's resources and human populations becomes more intermixed, the ability to manage whole eco-systems, as sustainable entities will be an important professional skill. Several new disciplines are emerging, one such discipline is that of environmental consultant/planner. This discipline requires expertise on resource management planning, habitat enhancement, recreation management and public relations. Such jobs are becoming important as one learns more about the relationships between fisheries resources, their habitat and people.

There is great need for carrying out manpower need assessment in specialized areas in Indian fisheries sector. Newer opportunities are emerging in the area of deep-sea fishing. The changing global economy and food style has created enormous opportunities. So far fish processing has been focussing on process of fish from capture fisheries sector. With adequate fish not available for developing various products not much progress has been made in value addition in this sector. With aquaculture emerging as the rapidly growing sector product development and proper distribution mechanism need consideration. This can create good employment for fisheries graduates. Shrimp hatchery sector in India though at present is confronted with various problems, can overcome these difficulties with the stabilization of the industry and giving focusing on sustainability. The sector has enormous untapped potential to create employment opportunities and help the country in boosting export.

In any consideration of HRD needs of fisheries sector in the country stress should be given in professionalising the government owned development sector and also the industry. Even with several professional fisheries programmes being operationalized in the country, the government sector remains less professional. This is being reflected in the slow pace of development being carried out in the sector. It is the private sector in the country, which draws fisheries professionals in their fold. The country has to go much ahead in ensuring that the development of the fisheries sector takes place with the active involvement of professional fisheries personnel.

l

"Give a man a fish and you will feed him for a day.
Teach him how to fish and he can feed his family forever ....."

-Chinese Proverb

Fishing Capacity Management

M.R. Boopendranath*

Excess fishing capacity has been identified as one of the most pernicious problems affecting long-term sustainability and biodiversity of fishery resources and economic viability of fishing operations.

A wide array of fishing gears and practices ranging from small-scale artisanal to advanced mechanized systems are used for fish capture. Over the years, traditional fishing gears have been upgraded and newer more efficient fishing systems have been introduced. Most important among these fish harvesting systems are trawls, seines, lines, gillnets and entangling nets and traps. Among the most significant developments which affected the historical evolution of fishing gear and practices are (i) developments in craft technology and mechanization of propulsion, gear and catch handling (ii) introduction of synthetic gear materials (iii) developments in acoustic fish detection and satellite-based remote sensing techniques (iv) advances in electronic navigation and position fixing equipment (v) awareness of the need for responsible fishing to ensure sustainability of the resources, protection of the biodiversity and environmental safety and energy efficiency.

The erstwhile Indo-Norwegian Project which was formed as a result of a tripartite technical co-operation agreement signed in 1952, between India, the USA and the United Nations for fisheries development, has made important contributions in traditional craft motorisation and mechanisation. Central Institute of Fisheries Technology (formerly Central Fisheries Technological Research Station) was established in Cochin in 1957, with the objectives of development of fishing industry in India. The programme for mechanisation of the existing traditional crafts began with the posting of FAO naval Architects to the Research Station. In 1955, experimental shrimp trawling was conducted with 6.6 m LOA, 10 hp open motor boat, off Malabar coast using

*Principal Scientist, Central Institute of Fisheries Technology, Kochi.

a Gulf of Mexico type flat trawl of 9.6 m head line and consistently impressive catches of shrimp was obtained from the shallow coastal waters of 4-18 m depth (Kristjonsson, 1967). This finding gave a major fillip in commercial shrimp trawling in India and increasing demand for shrimps for the processing industry caused rapid development of the otter trawling in Indian waters. This was soon followed by various technological developments including offshore expansion in the area of operation. At present the focus is to expand the fisheries into even deeper waters and diversification of fishing to areas such as tuna longlining. Major technological changes that have taken place in the capture fisheries of India are:

- Introduction and popularization of synthetic fishing gear materials.
- Introduction of mechanised trawling and purse seining in mid-1950s.
- Expansion in mechanized fleet in terms of numbers, size, installed hp and capacities and introduction of multi-day fishing.
- Improvement in efficiency and diversification of trawls, purse seines, gillnets and lines, for mechanized sector.
- Expansion of fishing grounds for harvesting deep sea fishing for deeps sea prawns, lobsters and cephalopods.
- Adoption of modern technologies such as echo sounder and GPS.
- Chartering and joint venture schemes.
- Motorization of traditional fishing crafts and expansion in fishing grounds.
- Improvement of traditional fishing units, in terms of craft modernization, gear materials, gear efficiency and dimensions.
- Introduction of ring seines in mid-1980s along south-west coast and rapid expansion of ring seine units in terms of size of crafts, horsepower of OBM, craft materials, increase in and overall dimensions of the ring seines and mechanized purse line hauling.

Growing concern is being expressed world-wide about the impact of excess fishing capacity on the sustainability of fishery resources and on the economic viability of fishing operations. The problem of excess capacity has received international and national focus in recent years. Fitzpatrick (1995) has estimated a 270% increase in the average fishing technology coefficient between 1965 and 1995 which indicates large scale increase in technological efficiency and precision in fishing practices. Garcia and Newton estimated that, in 1989, there was a global overcapacity of 25 to 53% with respect to maximum economic yield (MEY), meaning that important economic gains could have been achieved by an appropriate reduction in fleet capacity. A recent study by WWF has indicated that the world fleet was two and a half times in excess of what the world stocks could sustain, which indicates the need for optimizing the fishing capacity. Cunningham and Gréboval (2001) define capacity management as the implementation of a range of policies and technical measures in order to attain a desired balance between fixed fishing inputs and capture fish production, which could be through direct controls, such as limited entry schemes or indirect controls through developing appropriate incentive systems for self regulation.

2.0 Indian capture fisheries

India has a long coastline of 8118 km, an Exclusive Economic Zone of 2.02 million km^2 and continental shelf area of 0.506×10^6 km^2. The inland water resources of India consist of 1.97×10^5 kilometers of rivers and canals, 3.15×10^6 million hectares of minor and major reservoirs, 2.35×10^6 hectares of ponds and tanks and about 1.3×10^6 hectares of oxbow lakes and derelict water bodies, 1.24×10^6 hectares of brackish-waters. Inland capture fishery production of India increased from 0.19×10^6 t in 1950 to 0.81×10^6 t in 2004 and marine capture fish production of India increased from 0.5×10^6 t to 2.8×10^6 t, during the same period (FAO-FIGIS, 2007) (Fig. 1). About 2400 species of finfish have been recorded in India, out of which about 69% are found in marine waters and the rest in inland waters.

Marine fishing fleet in India consists of (i) non-mechanized (artisanal) sector using country craft and traditional gears, (ii) motorised sector using traditional craft with outboard motor(s) (OBMs)

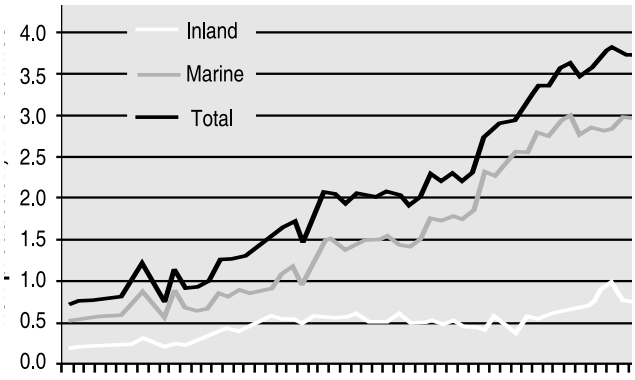


Fig.1 Capture fish production in India (source: FAO-FIGIS)

(9.9-120 hp) and, more recently, inboard engines (IBM) (89-156 hp); (iii) mechanized sector (8.5-16.7 m LOA; 89-156 hp; and (iv) deep sea fishing sector (>16.7m LOA; 156 hp and above). There have been significant structural changes in the fishing fleet over the last few decades. Contribution of the mechanised boats to the total marine fishing fleet increased from 14 to 25% and motorised craft from 4 to 32 %, over the years from 1985 to 2005, while that of non-motorised craft decreased from 83 to 44% (Fig. 2 in ensuing).

Marine fishery potential of the Indian Exclusive Economic Zone (EEZ) is estimated at about $3.93x10^6$ t. About 58 % of the resources is available at a depth of 0-50 m, 35 % at 50-200 m and 7 % from beyond 200 m depth. The present catch of $2.8x10^6$ t forms about 72 % of the estimated fishery

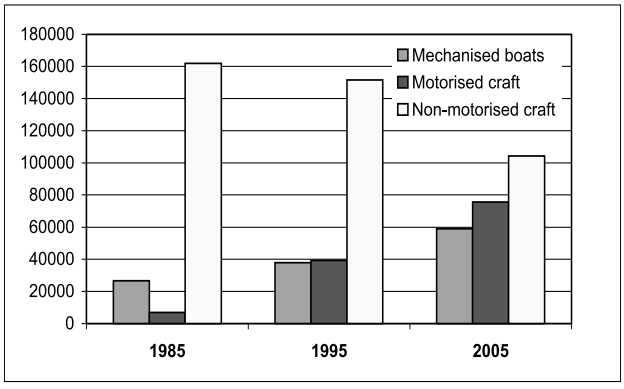


Fig. 2 Structural changes in marine fishing fleet in India, during 1985-2005 (source: CMFRI, 1998; 2006)

potential and is largely derived from the intensively fished shelf waters. About 2,38,772 fishing crafts of various sizes and classes are under operation in marine fisheries, consisting of 58,911 mechanised boats, 75,991 motorised crafts, 104,270 non-mechanised crafts (CMFRI, 2006).

Capture fisheries in India has been progressing in a haphazard way. Three phases could be recognized in the development of fisheries in coastal areas of India, viz., (i) pre-development phase (1947-1962), without any effective management, (ii) growth phase (1963-1988) and full expansion phase (1989-1997) with insufficient management and control, which has been leading to rapid transition to overexploitation (Devaraj and Vivekanandan, 1999). The substantial increase in fishing effort since the 1970s has resulted in the decrease in per capita area per active fishermen and per boat in the inshore fishing grounds and also in the CPUE. Growth overfishing and economic overfishing, at several centres, and inter-sectoral conflicts in the coastal belt have highlighted the need for caution and urgent remedial action.

The time series data of marine capture fisheries illustrates that the catch have increased gradually in 1950s with the rate increase accelerating since 1980s and early 1980s. The increase in catch is limited to mechanized and motorized sector, which were able to expand their fishing ground further offshore. Catches of the non-motorized sector has been decreasing since 1970s (Srinath 2003). Existing intra and inter-fleet competition is the outcome of fisheries overexploitation and Malthusian overfishing (Pauly 1994) in Indian waters. The proliferation of mechanized and motorized fleet increased the catch but had a negative impact leading to growth overfishing, economic overfishing and ecosystem overfishing. A recent analysis of time series data of marine landings by Bhathal (2005) has shown that 'the fishing down marine food webs' effect is visible in Indian fisheries from 1964 onwards with a decline of 3.25 MT L at the rate of 0.0058 per year. There is an immediate need to curb existing overcapacity, redistribute remaining effort across the trophic levels (Pauly et al., 1998; 2002) and adopt responsible fishing techniques and practices.

The Comprehensive Marine Fishing Policy announced by the Government of India in 2004, seeks for the first time, to bring the traditional and coastal fishermen in to the focus together with stakeholders in the deep sea sector so as to achieve harmonized development of marine fisheries in the Indian EEZ (Government of India, 2004). The policy

aims to (i) augment marine fish production of the country up to the sustainable level in a responsible manner so as to boost export of seafood from the country and also to increase per capita fish protein intake of the masses, (ii) to ensure socio-economic security of the artisanal fishermen whose livelihood solely depends on this vocation, and (iii) ensure sustainable development of marine fisheries with due concern for ecological integrity and biodiversity.

3.0 Excess fishing capacity

Fishing capacity is the ability of a stock of inputs (capital) used in fisheries to produce output, measured as either effort (or indicators of effort) or catch, over a period of time (FAO, 1998; 1999a; 2000; 2001). Overcapacity (or excess capacity) may be defined as capacity in excess of the (desired) stock of inputs that will produce a desired level of outputs (e.g., a set of target fishing mortality rates for the species being harvested) and will best achieve the objectives of a fishery management plan. Excessive fishing capacity leads to overfishing and affects long term sustainability of resources, biodiversity and environment and economic viability of fishing as a method of food production.

The FAO Code of Conduct for Responsible Fisheries (FAO, 1995) recognizes that excessive fishing capacity threatens the world's fishery resources and thus their ability to provide sustainable catches and benefits to fishers and consumers. It recommended that "States should prevent overfishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization" (Article 6.3).

The International Plan of Action for the Management of Fishing Capacity (IPOA) was elaborated within the framework of the Code of Conduct with the objective of attaining an efficient, equitable and transparent management of fishing capacity for fisheries conservation and sustainable management.It advocates that the States and regional fishery organizations (i) should strive to achieve worldwide, an efficient, equitable and transparent management of fishing capacity, within a scheduled time-frame, in the framework of their respective competencies and consistent with international law; (ii) should endeavour to limit initially at existing level and progressively reduce the fishing capacity applied to affected fisheries, when confronted with an overcapacity problem; and (iii) recognize the need to exercise caution to avoid growth in capacity undermining long-term sustainability objectives. The actions in this direction include assessment and monitoring of fishing capacity, the preparation and implementation of national, regional and international plans of action (FAO, 1999b).

The excess fishing capacity stems essentially from the widespread tendency for overcapitalization and overfishing under free and open-access conditions. Excess harvesting capacity may take the form of any combination of people, fishing gear, fishing vessels and variations in their capacities and efficiencies.

Excess fishing capacity is estimated by a variety of techniques of differing sophistication and data requirements such as (i) bioeconomic analysis, (ii) schocastic production frontier analysis, (iii) fishing power analysis, (iii) data envelopment analysis and (v) peak to peak analysis (FAO, 1998; 1999a; 2000; 2001). Excess capacity is assessed by comparing the existing capacity to an optimal or desired level, using various reference points such as maximum economic yield (MEY) and maximum sustainable yield (MSY).

4.0 Excess fishing capacity in Indian fisheries

A few attempts have been made to estimate optimum fleet size for harvesting of marine fishery resources, in Indian waters (Kalawar, 1985; CMFRI, 1998; MoA, 2000; Kurup and Devaraj, 2000)(Table 1). Estimate of optimum fleet size by Kalawar (1985) was limited to the territorial waters of Kerala.

CMFRI (1998) has estimated the optimum fleet size for marine fishing as 67984 consisting of 20928 mechanised boats, 15998 motorised craft and 31058 non-motorised craft for Indian waters. Estimates of optimum fleet size by Devaraj and Kurup (2000) for Indian shelf waters (excluding islands) were 62748 consisting of 10998 mechanized trawlers, 784 mechanized purse seiners, 3694 mechanized gillnetters, 2014 mechanised bag-netters (dol-netters), 1558 other mechanised boats, 14862 motorized crafts and 28837 non-motorized crafts and was more conservative than CMFRI

Table 1: Estimates of optimum fleet size for Indian waters			
	CMFRI (1998)	**MoA (2000)**	**Kurup and Devaraj (2000)**
Mechanised boats	20928	47683	19048
Mechanised trawler	12245		10998
Mechanised purse seiner	835		784
Mechanised gill netter	3972		3694
Mechanised bag netter	2193		2014
Other mechanised boats	1683		1558
Motorised craft	15998	51726	14862
OBM boat seiner	326		304
OBM gill netter	10746		10018
OBM ring seiner	1302		1219
OBM dol netter	159		147
Other OBM boats	3465		3174
Non-motorised craft	31058	159481	28837
Total fleet size	67984	258890	62748

(1998) estimates. According to these estimates, the existing number (CMFRI, 2006) of mechanised trawlers were in excess by a factor of 2.7, mechanised purse seiners 1.3, mechanised gillnetters 3.8, mechanised bag-netters 4.4, other mechanised boats 3.6, motorized vessels 5.1 and non-motorized vessels 3.6 (Fig. 3). National Level Review Committee appointed by Ministry of Agriculture to assess the area-wise requirements of different categories of fishing vessels below 20 m LOA determined the optimum fleet size for India as 258890 consisting of 47683 mechanized crafts, 75591 motorized crafts and 159481 non-motorized crafts, where the focus in apportioning of capacity tended towards mechanised and motorised sectors. According to these estimates, the existing fleet size (CMFRI, 2006) of mechanized vessels is in excess by 35% and motorized crafts by 46%, while non-motorized crafts were 24% less.

These studies indicate that there are significant levels of excess capacity in motorized and mechanized fleet of India. A significant percentage of the mechanized and motorized fleet operates fishing gears which have poor selectivity and high ecological impact such as bottom trawls and small-meshed gillnets, which negatively impact on sustainability of resources. However, the number of non-motorized crafts in the fleet has been diminishing, due to competition from motorized and mechanized segments and depletion of coastal resources within their reach.

The Ministry of Agriculture has recently taken action to induct 110 Tuna Longliners, 18 Purse Seiners, 10 Trap/ Hook & Line vessels, 15 Squid Jiggers, 72 Pelagic/Mid-water Trawlers and 500 Pole & Line vessels for deep sea fishing in the Indian EEZ, as follow up action of implementation of the Comprehensive Marine Fishing Policy – 2004 and on the recommendations of Empowered Committee on Marine Fisheries.

The effective control of fishing capacity needs regular stock assessments and an understanding of fleet dynamics, based on a monitoring of the fleet size and its use and an understanding of its links with related issues, such as the impact of subsidies, fleet mobility and access to fish stocks.

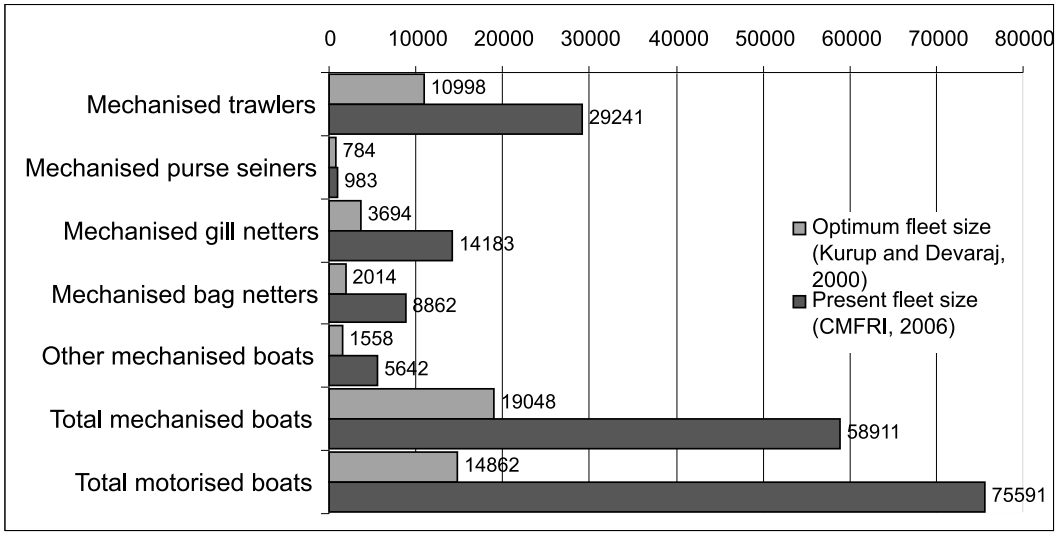


Fig. 3 Present (CMFRI, 2006) and estimated optimum fleet size (Kurup and Devaraj, 2000) for marine fisheries of India

5.0 Approaches to fishing capacity management

The growth of fishing capacity is controlled either by limiting the use of 'inputs' (limited entry schemes) or by placing a limit on 'output' such as an upper limit on the volume of landings.

Directly limiting fishing inputs may facilitate the tendency to expand capacity by improving the elements of fishing effort that have not been restricted. Hence technical developments that effectively increase fishing effort must be compensated by appropriate adjustments made to the restrictions imposed on the fishery.

A consensus is emerging in favour of using individual transferable quotas (ITQs) management to control fishing capacity, particularly in developed countries. This system of capacity regulation generally limits the number of fishing units and allocates a share of the total allowable catch (TAC) to each unit and allows the sale or lease of the right to quotas. This system shifts the incentive structure away from racing to catch fish before others do so, and towards harvesting the fish provided under quota, in the most efficient manner. Making these rights transferable increases the possibility of efficient use of fisheries inputs, reducing fishing capacity to a level that accords with the quantity of fish available for harvesting. However, not all fisheries are amenable to quota management, either for social and cultural reasons or because of the multi-species nature of the fishery, for which complex schemes are usually needed to offset the increased incentive to discard bycatch.

A rights based regulated access system under a co-management regime based on a strong inclusive cooperative movement of stakeholders with built-in transferable quota system and buy-back or rotational right of entry schemes seems to hold potential for capacity management in the shelf fisheries of Indian states, which need to be implemented in collaboration with the Union Government and the neighboring states with confluent ecosystems and shared fishing grounds. A key advantage of the use of rights based approaches for managing fishing capacity is that they provide a mechanism through which stakeholders can more easily and actively participate in the management process.

Major focus need to be given for the sustainability shelf resources, as more than 95% of the landings are derived from this zone of maximum productivity. Restoration and enhancement of fishery resources need to be ensured in shelf waters by all possible resource conservation and enhancement strategies such as area closures, seasonal closures (fishing holidays), mesh regulation, minimum landing size, ban on destructive fishing practices, restructuring and diversification of fishing effort to underexploited areas and resources, ranching and restoration of non-productive fishing grounds, in additional to the removal of excess capacity from the fishing fleet, rights based access control and responsible fishing

practices. Vessel Monitoring Systems (VMS) need to be made mandatory for large vessels (>20 m LOA) and newly inducted resource-specific deep sea fleets, to forestall tendency for zonal transgressions. Comprehensive and effective monitoring, control and surveillance (MCS) is essential for managing fishing capacity and to prevent illegal, unregulated and unreported (IUU) fishing in the Indian EEZ.

Since a large number of people depend on fisheries, implementation of any of the measures demands thorough evaluation of social as well as economic factors and incorporation of possible trade-offs among social, economic and ecological objectives of management. Conventional top-down approaches for reducing excess fishing capacity may not be well suited for Indian fisheries, which is predominantly small-scale and is inextricably linked with livelihood issues of large sections of coastal population. The solution may lie in an integrated approach based on co-management, with stake-holder integration in an inclusive cooperative framework with allocation of property rights over different resource segments. Co-management is an approach to management in which responsibility for management of the resource is shared between the resource users and the government.

Fishing effort management is not possible in isolation, as the fishing grounds and accessible fishery resources extends far beyond the jurisdiction of the maritime states (12 nautical mile from the coast line) and hence need to region based and harmonized among the maritime states sharing the same resources, in collaboration with the Union Government who holds responsibility for waters beyond territorial limits of the maritime states.

Capacity management in some form or another is undertaken and integrated into the general fisheries management policies by most fishing nations, including India. The measures adopted include area restrictions, temporal restrictions, gear restrictions, fish size restrictions, access related restrictions, catch restrictions, rights-based approaches and financial incentives, taxes and royalties, etc. (Pascoe and Gréboval, 2005).

Excess fishing capacity has been identified as one of the most pernicious problems affecting long-term sustainability and biodiversity of fishery resources and economic viability of fishing operations. Significant economic gains could be achieved by eliminating excess capacity, in addition to attaining objectives of resource sustainability.

References

Bhathal, B. (2005) Historical reconstruction of Indian fisheries catches, 1950-2000, as basis for testing the 'Marine Trophic Index", The Fisheries Centre, University of British Columbia 2259 Lower Mall, Vancouver B.C., Canada, V6T 1Z4, Fisheries Research Centre Reports 13(5): 122 p.

CMFRI (1998) Annual Report, Central Marine Fisheries Research Institute, Cochin: 151 p.

CMFRI (2006) Marine Fisheries Census 2005 Part-1, Central Marine Fisheries Research Institute, Cochin: 97 p.

Cunningham, S. and Gréboval, D. (2001) Managing fishing capacity: A review of policy and technical issues, FAO Fisheries Technical PaperNo. 409,FAO, Rome

Devaraj, M. and Vivekanandan, E. (1999) Marine capture fisheries of India: Challenges and opportunities, Current Science 76(3): 314-332.

FAO (1998) Report of the FAO Technical working Group on management of fishing capacity, 15-18 April 1998, La Jolla, USA, FAO Fisheries Report No. 586, FAO, Rome.

FAO (1999a) Managing fishing capacity: selected papers on underlying concepts and issues, FAO fisheries Technical Paper No. 386, FAO, Rome.

FAO (1999b) International Plan of Action for the management of fishing capacity, FAO, Rome

FAO (2000) Report of the technical consultation in the measurement of fishing capacity, 29 Novemner-3 December 1999, Mexico, FAO Fisheries Report No, 615, FAO, Rome.

FAO (2001) Managing fishing capacity: a review of policy and technical issues, FAO technical Paper 409, FAO, Rome: 63 p.

Fitzpatrick, J. (1996) Technology and Fisheries Legislation, In Precautionary approach to fisheries, Part 2: Scientific papers, FAO Fisheries Technical Paper 350/2. Rome, FAO. pp. 191-199.

Garcia S.M. and Newton, C. (1997)Current situation, trends and prospects in world capture fisheries, In: Global Trends: Fisheries Management (Pikitch, E.K., Huppert, E.D. and Sissenwine, M.P., Eds), American Fisheries Society Symposium 20. Bethesda, Maryland, USA.

Gréboval, D. and Munro, G. (1999) Overcapitalization and excess capacity in world fisheries: underlying economics and methods of control. In: Managing fishing capacity: selected papers on underlying concepts and issues (Gréboval D., Ed.), FAO Fisheries Technical Paper. No. 386. FAO, Rome.

Kalawar, A.G., M.Devara j and A.K. Parulekar (1985) Report of the Expert Committee on Marine Fishery Management in Kerala, CIFE Bombay, India: 432 p.

Kristjonsson, H., 1967. Technique of finding and catching shrimp in commercial fishing. Proc. FAO World Scientific Conference on the Biology and Culture of Shrimps and Prawns. 12-24. June 1967, Cuidad de Mexico, 69p.

Kurup K N and Devaraj N (2000) Estimates of optimum fleet size for the exploited Indian shelf fisheries, Mar. Fish. Inf. ser. T&E No. 165, July-Aug-Sept 2000, CMFRI, Cochin: 2-11

MoA (2000) Report of the National level Review Committee to assess the area-wise requirements of different categories of fishing vessels below 20 m OAL, July 2000, submitted to Government of India, Ministry of Agriculture, Department of animal Husbandary & Dairying, Ministry of Agriculture, Fisheries division: 14 p.

Pascoe, S. and Gréboval, D. (2005) Capacity management and sustainable fisheries: international experiences In: Overcoming factors of unsustainability and overexploitation in fisheries: selected papers on issues and approaches. International Workshop on the Implementation of the International Fisheries Instruments and Factors of Unsustainability and Overexploitation in Fisheries (Swan, J; Gréboval, D., eds.) Siem Reap, Cambodia, 13–16 September 2004, FAO Fisheries Report No. 782, FAO, Rome: 352p.

Pauly, D. (1994) On Malthusian overfishing, In: On the sex of fish and gender of scientists: Collected essays in fisheries science (Pitcher, T., ed), Chapman & Hall, London: 90-103

Pauly, D. Christensen, V., Dalsgaard, J., Froese, R. and Torres, J.F. (1998) Fishing down marine food webs, Science 279:860-863

Pauly, D., Christensen, V., Guenette, S., Piteher, T.J., Sumaila, U.R., Walters, C.J., Watson, R. and Zeller, D. (2002) Towards sustainability in world fisheries, Nature 418:689-695

Porter, G. (1998) Estimating overcapacity in the global fishing fleet, World Wildlife Fund, USA

1

"Ten percent of the fishermen catch ninety percent of the fish."

– Fisherman's Saying

Go Green ! the Exciting Market for Organic Spices!

O.T.S.Nambiar*

World is becoming greener and greener, thanks to the increasing concern of the consumer to protect environment by preferring organic products to conventional products, which would lead to ecological balance, environmental protection and protect the mother earth from being attacked by overdose poisonous chemicals!

The increasingly health conscious consumer will prefer certified organic products for which he is ready to pay a premium price, as he does not want to consume a 'cocktail' of poisonous pesticide residues, when non-organic products are bought!

The green or organic products are more than a market segment; more than a niche market it is a movement, a commitment, a philosophy, a passion!

Organic agriculture can be defined as:

"A production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manure, legumes, green manure, off-farm organic wastes, mechanical cultivation, mineral bearing rocks and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests."

According to Mr Kasturi Das [Reference - "Organic - to combat pesticide residue"] "Organic agriculture is a holistic production management system, which enhances the health of the agroecosystem, including biodiversity, biological cycles, and soil biological activity, thereby increasing the fertility of

India will soon emerge as a major player in the organic spices space and gain market leadership.

Director (Marketing) Spices Board, Kochi

the soil and making the agricultural system sustainable in the longer run. Moreover, as organic farming refrains from using chemical inputs, the health hazards and other side effects posed by those inputs are also prevented.

In the modern sense, 'organic' is a labeling term that denotes products that have been produced in accordance with certain legally defined standards and norms (which are codified in a number of formal standards) and certified by a duly constituted certification authority. It is the market for this kind of 'certified organic' food, which has now turned out to be the most rapidly growing food sector of the developed countries (especially, the USA, the EU and Japan), where it fetches a handsome premium as it is perceived to be safer, healthier, environment-friendly and socially responsible".

With an annual growth rate of 20 – 30%, organic food market is poised to grow to an astounding figure of 100 Billion US $ within the next 5 years, with USA, EU and Japan emerging in the major market of organic food products from the present level of 35 billion US$.

With increase in supply, the premium fetched may come down, but still the future is promising, as the increasingly health conscious, discerning global consumer is opting for organic products. With increasing global demand for organic products, the future is exciting and bright.

India is emerging as a major supplier of organic products. Spices Board has taken major initiatives in supporting organic production. Spices Board is assisting organic certification also.

The overuse of chemicals, fertilizers and pesticides has ruined the mother earth, polluting food, drinking water and air. Organic mode of production is the only way to save ecology, environment and produce hazard-free foods for the people, conserving natural resources.

Main countries which are opting for organic foods are USA, EU and Japan. As developing countries are the main producing countries, organic food products which is fast growing niche market offers a good export opportunity for developing countries.

By eliminating harmful use of pesticides and fungicides, we are protecting the environment and enhancing the quality of life, which has taken a severe beating, due to heavy use of harmful chemicals, which has spoilt the fertility of the soil and caused imbalance in the system with disastrous consequences.

Organic production is a commercially viable option for farmers, as organic foods/products fetch a premium price, at less cost of production, as it avoids costly chemical fertilizers and pesticides.

The Main organic spices/spice products exported from India are:

BLACK PEPPER	THYME
WHITE PEPPER	OREGANO
VANILLA	PARSLEY
GINGER	GARCINIA
TURMERIC	NUTMEG & MACE
ROSEMARY	CLOVE
VANILLA EXTRACTS	

Why Organic?

1. Indiscriminate use of fertilizer and pesticides pollute the environment.
2. It affects nutrient and water – holding capacity of the soil.
3. It 'promotes' soil erosion. Sediment from erosion pollutes surface water and transmits agro chemicals which are injurious to human health.
4. It tampers biodiversity.
5. The excessive use of synthetic chemicals damage the system and make conventional agriculture unsustainable in the long run.
6. In health point of view, green products are contaminant-free and therefore 'healthy'.

Global Scenario:

The supply – demand dynamics of organic spices are detailed below:-

- World Trade in organic foods: 30 billion USD Projected to grow to 100 billion USD in 5 years
- Premium is around 10 – 50%, but will decline, when supply is expanding but still organic production is a profitable proposition, as reduced premium will expand the market

· Total area under organic production in India - 25,08,826 hectares

ORGANIC MARKET: High Growth:

US:	1992	1.5	Billion US Dollars
	1995	2.8	" "
	1997	4.2	" "
	2000	6.4	" "

EU is the largest market for Organic Product

5.6 Billion US Dollars

In EU, Germany is the biggest market [2.41 billion US$] [more than 50% of the EU market 10% growth]

Total Area under cultivation of organic spices is 24 Million Hectares

Top three producers are listed below:

Australia	: 10 Million Hectares
Argentina	: 3 Million Hectares
Italy	: 1.2 Million Hectares

Barriers to be Contained to promote organic spices production:

- Non availability – Lack of inputs, Loss in production, Doubt on viability
- High Price
- Doubt in genuineness and hence no justification for the high price
- Lack of domestic market
- High cost of certification
- Fractured , small holdings – making organic conversion difficult
- Oversupply reduces premium, making organic cultivation not attractive
- Long conversion time
- Varying standards from country to country

Spices Board's support:

Spices Board has supported organic production of spices through the following programmes:

- Formulated guidelines for production of important Spices
- Provides assistance for acquiring Organic Certification
- Regular training programme on organic farming to farmers, NGOs and officers to promote organic farming
- Provides assistance to establish vermicompost units to spice farmers
- Separate schemes in North Eastern States on Large Cardamom, Black Pepper, Ginger, Turmeric and Herbal Spices Development
- Assistance given to farmers for production of organic chilli, kokam and seed spices.
- Provides Awards to farmers for excellence in Organic Farming.

Spices Board also assists exporters of organic products to participate in Bio-Fach Fair, which is the most popular convergence of organic buyers and sellers

Positive factors that supports Organic Movement:

Organic spices have a very bright future as the following factors will induce growth in production and marketing of organic spice products.

1. An increasingly health conscious consumer, choosy, assertive and knowledgeable
2. Increasing social responsibility, ecological concerns, environmental protection and hazard-free food for all
3. Profitable in the long run, even when premium will decline.
4. Premium price, low cost of production
5. Active involvement of Govt and promotional agencies to support organic production and its exports/domestic market
6. Active role of good NGOs promoting organic cultivation/marketing.
7. Increasing Demand for natural and healthy foods plus growing consumer concerns about food safety are positive factors, that will trigger expansion of organic market.
8. Premium: Organic spices fetch a premium of 10 to 50% over conventional products.

India will soon emerge as a major player in the organic spices space and gain market leadership.

l

Distant Market-oriented Pond Fishery Development in Andhra Pradesh

J.V.H. Dixitulu*

Andhra Pradesh now occupies an unique position among the various States of India in respect of distant market-oriented freshwater pond fishery development. This orientation that has been achieved has two facets. One of this is related to quality fish seed production and utilising the seed produced for optimal stocking in ponds, while conforming to the sustainability standards laid down for the development of pond fisheries and for harvesting the produce thereof. The other facet concerns marketing of harvested fish within the State on one hand and exporting them on the other to such of the States where there is demand. So far as domestic marketing in rural and adjacent urban areas within the State or exporting the product to a metropolis like Kolkata as has been taken place traditionally is concerned, this can be deemed as a normal business activity, but the present State of development reflects as upgraded marketing system.

.... an active intervention of the Integrated Fisheries Project by way of taking up pilot studies on the subject in the identified States that are lagging behind in the integrated pond fishery development

A conspicuously superior and upgraded marketing system, compared to the traditional integration of pond fish farming with disposal of the harvested fish as explained in the preceding paragraph, has now come into being, specially in the central coastal districts of the State of Andhra Pradesh. This system is one of organising supplies of farmed freshwater fish (mostly of major carps) in a big way to several States of the country distant from Andhra Pradesh and where a good demand for freshwater fish (mostly major carps) exists. This system of farmed fish supplies has been achieved by the

Chief Editor & Publisher , Fishing Chimes, Visakhapatanam

freshwater fish farming entrepreneurship of the central coastal zone of the State. This achievement is indeed an exceptionally outstanding one that has stood the test of time. It has come to be established firmly, proving that what had happened was not just a routine kind of development of farmed fish production and its integration with the prevailing marketing system within the State, but as we now know, the system is one of an extraordinary dimension as never witnessed in the country before in the fisheries sector.

Fig. 1 Final phase of Harvesting in a Pond

The principal belt of distant market-oriented fish farming in Andhra Pradesh, as already explained, is in the central coastal districts of State. It burgeoned in these districts in the peripheral zones of Kolleru Lake. The farm ponds of the peripheral zones of the lake came up within the precincts of West Godavari and Krishna districts of the State. Imperceptibly, it took a period of over thirty years for the development of the aforesaid distant market-oriented farmed fish production system that brought the fish so produced into the orbit of the marketing system, in stages. The system has now reached not only to a stage of stability but had also spread to the neighbouring East Godavari district on the north and upto Nellore district in the south. The hub of development of aforesaid kind of integrated farming however continues to be in West Godavari and Krishna districts, with over 2,00,000 ha of pond area brought under fish production. Of this, over 12,000 ha are situated in the peripheral zone of Kolleru lake, which were the first to have been brought under the distant market-oriented farming activity in a big way. The main centres that share this activity in the zone are: Eluru, Bhimavaram, Narayanapuram, Ganapavaram, Peddapadu, Bhimadolu, Dendulooru, Ungatooru, Nidamarru and Akivedu in West Godavari district and Kaikaluru, Gudivada and Handavalli in Krishna district. The pulsations from this hub have eventually spread out not only to the other confined water areas in these districts but also to the other districts of the State too, mainly to East Godavari and Nellore districts located along the coast line of the State, as already stated.

Fig. 2 Harvested catch being sorted out prior to packing

A large number of fish hatcheries have sprung up in Andhra Pradesh, particularly along the coastal belt. Production of seed at the hatcheries and supplying of the seed so produced to farmers has become a well established practice in the State, in the same way as it had taken roots in other States too. A point to be mentioned here is that, anomalously, despite adequate availability of hatchery – produced major carp seed within the State, some of the farmers of the central coastal zone continue to import major carp seed from West Bengal. The main reason for this is stated to be the higher cost of seed produced in Andhra Pradesh.

In comparison, seed (early fry) imported from West Bengal is stated to be far less expensive. These are grown in nurseries to an advanced size and used for stocking. Another aspect to be mentioned here is the conspicuous difference in the quality of seed raised by some of the seed producers in the West Godavari and Krishna districts of the State. This category of seed producers concentrate on raising yearlings only which they supply at a good price to a class of farmers who specialise in stocking their ponds at 5000 nos or even more of these yearlings per ha in around July and manage the production in a manner that the resultant crop will be over 10 t/ha, harvested by May/June next. In this practice both the producer of yearlings and the fish farmers are benefited. Irrespective of the seed stocking practices adopted by the farmers (related to advanced fry or fingerlings or yearlings), the outstanding achievement of the leadership of the fish farmers of A.P, particularly of its central coastal belt is one of sustainably optimal fish production (quantitatively and qualitatively impressive) with an effective linkage to fish exports to several States in the country, especially to the States, whose populations are traditional fish consumers.

Fig.3 Weighment in Progress

The fish exports from A.P to places within the country began initially by rail over 30 years back to West Bengal, with the Howrah wholesale market as the focal destination. The fish exports used to be mostly of major carps (as is the continuing practice now) packed in ice in baskets made out of bamboo reepers, and of live climbing perch (Koi) and magur placed in cylindrical G.I containers with the needed moisture. As the coverage of exports eventually extended to the other north – eastern States (Assam, Meghalaya, Tripura, Manipur, Mizoram, Nagaland, Arunachal Pradesh), it happened alongside the packing and transport systems have also been improved simultaneously. One development in this context was a switch over to packing of fishes in insulated vans/plain open trucks of 10 t capacity with layers of crushed ice placed in between. Around 8 t of fish used to be exported in each vehicle mostly to Howrah market. This practice, although mostly obsolete now, happens to be revived now and then whenever the need arises. However, as time went by, this system largely gave way to packing of fish in plastic crates in ice, transported by trucks/vans. With the passage of time demand for major carp supplies increased mostly from the north-east. Efforts were therefore mounted at increasing major carp production too to meet the demand. Packing in plastic crates eventually gave way in recent years partly to packing of fish in thermocole boxes in ice. While this system continues to be the preferred one, export in plastic crates also continues to be prevalent.

It is estimated that over seven lakh tonnes of fish, mainly major carps are exported annually to the other States, mostly from the coastal districts of A.P, mainly from West Godavari, Krishna, Nellore and East Godavari districts. This quantity represents a major share of production from an estimated extent of around 2.00 lakh ha of pond area, the average production therefrom being 5 t/ha. An average of 400 vehicles (150 to 300 vehicles in normal days but going upto 1000 nos in a day during festive or other important occasions) carry the fish, mostly packed in thermocole boxes, plastic crates and occasionally in packed layers of ice in trucks, to the various States from Orissa to Arunachal Pradesh

on the north and north – east and also to States such as Chhattisgarh, Bihar, parts of Maharashtra, Uttar Pradesh and also to Delhi. It is stated that Delhi has emerged as a centre for radiating Andhra fish supplies to Chandigarh, certain parts of U.P and Haryana. Fish are also probably exported from Andhra Pradesh to States other than those mentioned above. There was a report some time back that freshwater fish from coastal A.P made their entry into Jammu market too.

Fig. 4 Fish being packed in ice in thermocole boxes

These are observations that availability of low-lying areas in the coastal districts of A.P, not well suited for economically viable agrifarming has served as an incentive for their conversion into fish ponds. So much so, the pond area estimated at 1.60 lakh ha in 1990s, is now estimated to have gone up to over 2 lakh ha. This increase has led to a remarkable spurt in fish production. This was possible because of adoption of environmentally compatible and technologically superior farming practices with orientation towards optimally sustainable fish production adopted in most of the area.

The steady supply of the fish so produced to various other States from Andhra Pradesh in an enduring manner has aroused curiosity, particularly among the fisheries departments and among enterprising farmers in the States concerned. This has prompted the authorities in those States that receive supplies to have an evaluation of the remarkable upgradation of the distant market-oriented fish farming system in Andhra Pradesh. There have been thus visits by groups of fisheries technologists/farmers from the various States concerned to study the ground realities first hand and have an evaluation of the progress with a view to adopting the same in a form as can be applied in their respective States.

Fig. 5 A truck with packed fish boxes ready for transport

Quite a few fish transporting vehicle supplying agencies sprung up in the coastal belt of A.P, particularly in West Godavari and Krishna districts. These agencies have become a vital facilitating link between fish pond owners in A.P and the fish wholesalers in the various receiving States. The mechanism of the export operation is simple. The pond owners in A.P decide on the harvesting programme (phased or total) from their units and inform the vehicle supplying agency concerned about the date, time of harvesting and other details in respect of their ponds. The agencies concerned then send such number of vehicles as needed to the pond site, with a stock of needed number of plastic crates/ thermocole boxes and also the quantity of crushed ice needed for packing fish in the boxes. There are now over 400 ice factories in Krishna, West Godavari, East Godavari and Nellore

districts, half of which are engaged in supplying ice for fish packing. As the harvesting concludes, the fishes caught are sorted out and packed in boxes and loaded into the vehicles.

Harvesting is normally done in early morning hours. The reason for this is stated to be the relative emptiness of the guts at that time of the day, according to the observations of farmers. As the day progresses, the fishes start feeding and this fills the guts. Such fishes with guts having food cause problem of pollution in the containers because of faecal matter, leading to mortality, it is stated.

The supply of fish to the destinations in the various States is based on prior indents as settled after exchange of needed information on anticipated catch composition, weight range, price structure etc. The buying wholesalers are given the needed details such as plate numbers of the vehicles concerned, the quantity loaded, times of departure of vehicles etc., to enable the wholesale merchants at the destination to organise the distribution of the fish among their set of retail merchants.

The initiatives taken by the entrepreneurship in Andhra Pradesh are largely oriented towards exporting of a substantial part of the production mainly to the traditionally freshwater fish consuming States of Orissa, West Bengal, Assam, Meghalaya, Tripura, Manipur etc. They are also directed at exports to Chhattisgarh, Bihar, and Uttar Pradesh etc.

The sustainable development in the fish farming sector of the State of A.P has bestowed a measure of prosperity among a large number of fish farmers and fish workers and transport agencies within the State, besides creating considerable employment opportunities in the States that receive fish supplies. The wholesale merchants in the recipient States also are considerably benefited. Above all, fish supplies from A.P have been contributing to the nutritional needs of the people of the States receiving fish supplies. While all the States mentioned above have been stepping up efforts to augment fish production, there can be constraints in the way and these may relate to suitability of water resources and adequacy of water resources for undertaking farming, development of a farming class etc. A focal approach to identify the constraints and to get over them is no doubt already under adoption in the States concerned but the need is to provide a special fillip to intensify efforts in that direction. So far as Andhra Pradesh is concerned, the present situation demands initiation of focal measures to develop a foreign export market for Indian major carps in a big way for the benefit of the farmers whose earnings have not gone up in tune with their efforts. This would be possible only under the leadership of MPEDA. Further, as the main purpose of the Integrated Fisheries Project which functions under the Union Department of Animal Husbandry, Dairying and Fisheries is to bring about effective integration, the activities of fish production, processing and marketing. In this context, more than the marine sector, inland fresh fish sector needs an active intervention of the Integrated Fisheries Project by way of taking up pilot studies on the subject in the identified States that are lagging behind in the integrated pond fishery development, particularly in respect of fish marketing linkages, within State or otherwise. The results of such studies will empower the Fish Farmers Development Agencies to bring about an efficient intensification of the efforts of farmers in the development of integrated pond fish farming, with the needed market-orientation.

l

CIFRI in the Service of Nation

K. K. Vass and Pradeep K. Katiha*

Indian Inland fisheries has a long history spanning over several centuries. It has evolved as a livelihood activity for the people living along riverbanks, reservoirs, lakes, estuaries, wetlands and small aquaculture waters. These vast and varied inland waters constitute an important fishery and aquaculture resource of India. In recent years, fish production from open waters, especially river systems has declined in comparison to confined aquaculture waters. Notwithstanding marked achievements in aquaculture, the traditional fishers operating in open-waters have gained marginally in stature and income, but concerns about the economic condition of such fishers persist, that further assumes significance in the context of negative impacts from globalization, environmental degradation and drastic reduction in quantity of water in our open-waters, especially in downstream. Since, open-water fishery apart from being constrained by ecosystem health, is a multi-stake holder activity, its conservation and enhancement do require policy support to ensure proper implementation of interventions to achieve sustainable fishery within available water. Central Inland Fisheries Research Institute (CIFRI), Barrackpore is the oldest and most important institution addressing these issues under its research portfolio since independence.

appropriate and holistic management of open-water fishery would be essential in future to protect the livelihood support of this section of the society.

CIFRI had a modest beginning on March 17, 1947 as a Research Centre at Calcutta under the administrative control of the Ministry of Food and Agriculture, Government of India. In the year 1959, it was elevated to the status of Central Inland Fisheries Research Institute (CIFRI) and started functioning from its own buildings at Barrackpore, District

*Central Inland Fisheries Research Institute, Barrackpore, Kolkata

24-Paraganas (N) in the state of West Bengal and came under Indian Council of Agricultural Research (ICAR) in 1967. Initially, the Institute developed the technologies of induced breeding and composite fish culture, which revolutionized the aquaculture sector and contributed to blue revolution in the country. Considering the importance and growth potential of inland fisheries and brackish water aquaculture, two institutes, namely, Central Institute of Fresh water Aquaculture, Bhubaneswar and Central Institute of Brackishwater Aquaculture were carved out of CIFRI in 1987. Further, National Research Centre for Cold water Fisheries at Bhimtal and National Bureau of Fish Genetic Resources, Lucknow were created to conduct area specific research on cold water fisheries and the issues related to genetics and fish bio-diversity. With revised research agenda, CIFRI functions from its headquarters at Barrackpore (Kolkata) and four regional centres at Allahabad, Bangalore, Guwahati and Vadodara. In addition to that, there are temporary need- based field level facilities/ laboratories. The headquarters has ancillary sections to provide necessary support to the research activities.

Since 1987, the Institute is mainly conducting research on fisheries management in inland open waters in the country. Over the years, the Institute has established itself as a premier research organization in the field of inland fisheries and aquatic ecology contributing to development of technologies including practices for sustainable fishery in open-waters. Apart from developing practices / technologies which have significantly demonstrated their effectiveness in fishery enhancement from site specific ecosystems in different regions of the country, the Institute has generated a massive and useful database on fishery limnology/ ecology, fish population dynamics, and pollution status of our river systems, reservoirs, wetlands, and estuaries spread across the country. These initiatives of CIFRI helped in understanding our open-water ecosystems, which are key elements in developing improved resource management strategy aimed to achieve the goal of responsible fisheries.

Keeping in view the needs of the changing scenario and Vision 2025 of inland fishery sector, Institute has shifted its research focus from production optimization to sustainable productivity and achieving ecosystem health and benefits. Accordingly, its mission is "*Knowledge based management for enhanced fishery, conservation of biodiversity, integrity of ecological services, and to derive social benefits from inland open-waters" and the vision is "Eco-friendly enhanced fish production and productivity from inland open-waters for livelihoods and societal benefits"*. This vision required modified mandate, which is:

- To undertake basic, strategic and applied research in inland open-water fisheries viz. rivers, reservoirs, lakes, estuaries and associated waters
- To develop ecosystem-based technology and strategies for productivity enhancement in mandated waters
- To monitor environmental changes, their impacts on fisheries and developing mitigation action plans in collaboration with other organizations, and
- To create awareness, provide training and consultancy in inland open-water fishery management

Resource Related Salient Achievements

Rivers

The time scale data on the ecology, biodiversity and fisheries of various river systems in the country including the Ganga river system generated by CIFRI formed the basis for formulating the Ganga Action Plan by the NRCD (MOEF) Government of India

Suitable nets and methodologies were standardized to collect fish seed from potential rivers, suiting different hydrological conditions with five times more efficient than the conventional ones.

Detailed biological database on important fishes was generated, which resulted in better understanding of the breeding behaviour of economically important fish species, forming the

basis for developing strategies for conservation of fish stocks in rivers.

The quantum of data generated on ecology and fisheries of river Narmada has proved a benchmark to predict the likely changes in ecology and fisheries of the river due to construction of dams, which has been utilized by the Narmada Control Authority while planning strategies for conserving the fish stocks.

Valuable data has been generated on the Biology of commercially important riverine fish species and status of exotic fish species in major river systems of India are being utilized for drawing action plan to protect the endemic fish species.

Reservoirs

CIFRI is a repository of information on ecology, fisheries and biodiversity of selected Indian reservoirs situated in different regions.

Based on the database generated fisheries management protocol for fish stock manipulation were developed for large and medium reservoirs. It helped in increasing the production and productivity of many reservoirs, such as Nagarjunasagar, Gobindsagar, Getalsud, Hirakud, Pong, etc.

Fisheries enhancement technology for increasing fish production from small reservoirs was also developed. The technology was verified in several small reservoirs across the country (Gulariya, Baghla, Bachhara (Uttar Pradesh); Meenakara (Kerala); Markonahalli (Karnataka), Aliyar, Thirumoorthi (Tamil Nadu). etc increased fish yield from. Gulariya, Baghla, Bachhara (Uttar Pradesh); Meenakara (Kerala); Markonahalli (Karnataka), Aliyar, Thirumoorthi (Tamil Nadu); etc). All the case studies recorded more than three times increase in fish yield with scientific management.

Cage and Pen-culture Technologies for raising table fish as well as stocking materials were tested and standardized in reservoirs. It is expected to solve the major constraint of non-availability of quality fish seed in time and space.

Floodplain wetlands

The research conducted by the Institute on the production functions of floodplain wetlands in Bihar, West Bengal and Assam has provided inputs to formulate their management action plan for fishery development.

Package of practices developed by the Institute, based on its continued improvement, for fish yield enhancement in floodplain wetlands have indicated wider acceptability registering manifold increase in fish production in the states of Assam, West Bengal and Bihar from such resources.

Pen-culture technology developed by the Institute has paved the way for diversification in fish rearing activities, contributing additional fish biomass in floodplain wetlands of Assam, Bihar and West Bengal. In recent years, the technology has gained adequate popularity among the fishers and financial institutions.

Cage-culture technology, especially for raising stocking materials, to pursue rational stocking in floodplain wetlands and reservoirs, has proved quite handy and economical to raise on-site quality seed. The activity is particularly popular in Assam, which has the largest area under floodplain wetlands.

Inventory and biology of ornamental fish species inhabiting floodplain wetlands of Assam, West Bengal and Bihar were prepared. It provided the opportunities for culture and sale of ornamental fish.

Investigations on qualitative and quantitative dynamics of biotic communities like plankton, benthos and aquatic macrophytes helped in fisheries management in these wetlands

Estuaries and associated waters

The time series data on the ecology and fisheries generated by the Institute, on major estuarine ecosystems such as Hooghly-Matlah has helped in developing management protocols for responsible fishery.

The knowledge generated on the life history and fishery of Hilsa during pre and post Farakka barrage, has helped in creating awareness among the fishers to operate nets of bigger mesh size so as to prevent the catch of smaller size fishes to support natural recruitment.

Impact Assessment of Farakka barrage on ecology and fisheries of *Hooghly-Matlah* estuary including Hilsa fishery dynamics in Ganga river system paved the way for studies on impact of dam/ barrage construction on up/down stream fisheries.

Interactive CD on Algal Diversity of *Hooghly-Matlah* estuarine System is a manual for identification and documentation of algal diversity. This is very important with regard to biodiversity documentation.

Generation of baseline data on the fisheries management in sewage-fed estuarine impoundments and database on plankton and benthos from saline wetlands led to develop management protocols for the scientific management of sewage-fed saline waters helped in increasing the fish production on sustainable basis.

The recommendations of the Institute, based on its investigations during the last five decades on Chilka Lake, formed the basis for ecological restoration of the lake and improvement in fish yield in recent times.

Fish Health and Environment

The rapid as well as long-term Environment Impact Assessment protocols on inland open-waters developed by the Institute have received good recognition. A number of consultancy projects awarded to the Institute are the testimony to this.

The inventory of fish parasites prevalent in aquatic ecosystems and mitigation action plan, developed by the Institute, has become very useful tools in the hands of fish farmers and fishery managers.

Detailed data-sets on the status of pollution in various river systems in relation to effluents, heavy metals and pesticides and their impact on biotic communities including fish and fisheries formed the base for restoration and conservation of fisheries in natural waters, especially the rivers.

Inventory and characterization of fish pathogens together with Control measures for various types of fish diseases helped in control and monitor the fish disease outbreak in the open-waters.

The RAPD and UPGMA dendrogram clusters analysis used to delineate six different populations from rivers flowing into the Bay of Bengal and from rivers flowing into Arabian Sea and two distinct population of *Tenualosa ilisha* in Ganga, Yamuna, Hooghly, Narmada & Tapti and Hooghly-Matlah estuary.

A protocol for normal/stressed levels of blood and tissue parameters developed in indicator fish species, which can serve as a guideline for fish/ aquatic ecosystem health assessment.

Community level bio-indicators for fish population viz., HAI, IBI and growth indices were standardized for environment impact assessment.

Resource Assessment

The Institute has standardized methodology for collection of data on inland fisheries resources and fish production to develop reliable database for the country. The methodology helped the State Governments to generate reliable database.

Information generated on population dynamics of many commercially important fish species of estuarine and riverine origin helped to suggest fishing regulations and formulation of code of conduct for responsible fisheries.

Resource mapping conducted by the Institute, using remote sensing imaginaries of inland open-waters (>10 ha) in the states of Rajasthan, West Bengal, Assam and Bihar helped in generating reliable database on inland fishery resource for resource owners, planners, researchers and policy makers.

Socio-economic issues in inland fisheries

The socio-economic status of riparian fishers is very poor, especially in case of rivers, due to decline in catch both in quantity and quality. It has led to irrational methods of fishing and occupational shift away from fisheries both in terms of annual effort and time devoted per day.

Immense scope exists for employment and income generation from fisheries activities in wetlands and reservoir, through addressing the institutional and governance issues, like multiple use,

ownership, leasing policies, co-operative functioning, inter stakeholder relationships etc.

The fishers from most of the waters are unorganized leading to non-remunerative returns for their catch. The role of market intermediaries is very pronounced in most of the inland open waters and have significant share in consumer rupee. The income for fishers can be increased through improved and organized fish marketing practices.

Future Thrusts

The inland open-water fishery plays a significant role in nutritional security and employment generation in rural sector, both directly and indirectly through ancillary jobs like marketing, retailing, transportation and others. The problem, however, lies in its unorganized, scattered and diffuse nature, which would require adequate attention in future. Accordingly, appropriate and holistic management of open-water fishery would be essential in future to protect the livelihood support of this section of the society.

Considering the emerging research needs of inland fisheries, the major thrust of Research in CIFRI will be on

- ã Water requirement for fishery and management protocols
- ã Environmental flows and Ranching in rivers
- ã Environmental Impact Assessment, Eutrophication, Bioremediation and Eco-restoration
- ã River linking impacts, Conservation and Fish pass designing
- ã Monitoring Estuarine & riverine catches , Hilsa population dynamics & Mangrove ecology
- ã Fishery Resource evaluation on GIS format
- ã Reservoir investigations, productivity enhancement and Cage culture
- ã Wetland/lakes investigation, productivity enhancement, Pen and cage culture
- ã Aquatic microbiology and Environmental biotechnology
- ã Valuation of inland fisheries resources and development of protocols for Fishery policy and governance
- ã Socio-economics of the fishers.

Expected Outputs

The research programmes with aforementioned thrust areas are expected to generate following outputs:

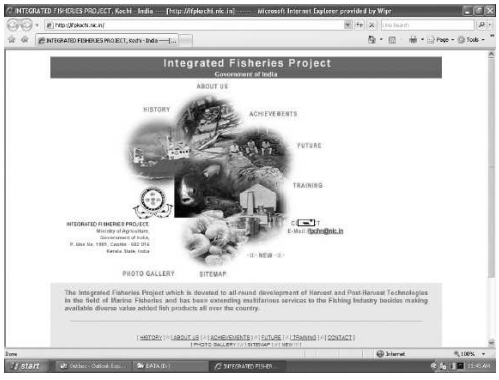
- ã Reliable estimates of open-water fishery resources with their ecological status on GIS format will be available for better planning and management decisions
- ã Water requirements for fisheries and aquatic food-chain will be known for taking decisions by the water authorities to make available the required quantity of water for sustenance of fishery stocks in river systems
- ã Fishery enhancement tools (both biomass and species) for small reservoirs and wetlands under different agro-climatic conditions
- ã Time-scale database on fisheries and ecology of open-water resources to develop a forecasting model for scenario building
- ã Policy papers/guidelines on ecosystem based approach in fishery management of open-waters
- ã The information on technology evaluation / refinement / development
- ã Revised mechanisms for inland fishery regulation norms for implementation at state or central levels.

l

E-Governance Initiatives by National Informatics Centre, Kochi for IFP

K.S.Raman*

National Informatics Centre (NIC), under Ministry of Communication and Information Technology, Govt. of India has been closely associated for their E-Governance application development and Implementation process.



- NIC is implementing the following Web based application packages for IFP which are being used by various sections of IFP. All operations and features are based on individual logins to the system. Main areas of computerisation are:
  - Budget Monitoring System
  - Valuable Register Automation
  - Overtime Register Automation
  - T A Calculation
  - Bills Tracking System
- NIC have also designed and hosted a Web site for IFP, the Home page of which is given below. The necessary updations are being carried out by IFP.
- NIC plan to computerise the Marketing Information System, Application packages for Establishment and Administration sections, as Web based applications in the next phase.

The applications developed and implemented are very useful for their day-to-day monitoring of major activities like monitoring and tracking of bills, payments, expenditures, cash flows and so on.

Director in-charge, National IT Promotion Unit, NIC, Kochi

स्वतंत्र भारत साठ सालों के बाद..

पी .आर .आनंदवल्ली*

15 अगस्त,1947 को स्वतंत्र भारत का जन्म हुआ था साथ ही राष्ट्र की सर्वांगीण प्रगति के प्रति हमारी उम्मीदें, अभिलाषाएँ बुलंदियों पर थी। स्वतंत्रता प्राप्त करने पर राष्ष्ट्र के कुल विकास के लिए एक एजेंडा की रूपकल्पना की गई थी। । अंग्रोजों के कब्जे से भारत को मुक्त करने के पश्चात हमारे राष्ट्र निर्माताओं ने सिर्फ देश में एक जबरदस्त लोकतंत्र स्थापित करने के लिए ही नहीं बल्कि सामाजिक असमानता, गरीबी, भुखमरी, पिछडेपन, अंधविश्वास आदि के उन्मूलन के लिए भी योजनाएं बनायी थी

इस साल भारत ने अपनी स्वतंत्रता की साठवीं सालगिरह मनाया है। इस अवसर पर राष्ट्रीय एवं अंतर्राष्ट्रीय दृष्टिकोण से देखें तो इस तथ्य का ज्ञात होगा कि भारत ने हर क्षेत्र में अपनी क्षमता का लोहा जरूर मनवाया है, हर तरफ चमकता सितारा बनकर उभर रही है। 60 सालों की अवधि में भारत की विश्व शक्ति के रूप में प्रगति वाकई शानदार है । भारत अपने पडोसी देशों से सौहार्दपूर्ण बरताव भी करती आ रही है फिर भी इस चमकीले मुलम्मे के पीछे एक अलग भारत की तसवीर छिपि हुई है जिससे हमारे देश का एक फीका सा प्रतिबिंब परिलक्षित होता है।

भारत अपने पडोसी देशों से सौहार्दपूर्ण बरताव भी करती आ रही है फिर भी इस चमकीले मुलम्मे के पीछे एक अलग भारत की तसवीर छिपि हुई है जिससे हमारे देश का एक फीका सा प्रतिबिंब परिलक्षित होता है।

देश में समाज के दो विपरीत पक्ष विद्यमान है - एक तरफ कल्पना से भी परे रहने वाले संपन्न लोग जो आडंबर जीवन की सभी सुविधाएँ भोग रहे है और दूसरी तरफ पीडित निर्धन श्रेणी जो अपने गुजर बजर के लिए रोजाना अपना पसीना बहाते रहते है। अफसोस की बात यह है कि कई विकासात्मक योजनाओं तथा तेजी से बढ़ती प्रगति के बावजूद भी गरीबी या बेरोजगारी को संपूर्ण रूप से समाज से हटाने में हम नाकामयाब रहते है । सरकार द्वारा बनायी जाने वाली कल्याणकारी योजनाओं का लाभ देश के तमाम लोगों तक पहूँचाने में शासन तंत्र

* *हिन्दी अनुवादक, समाकलित मात्स्यिकी परियोजना*

असफल साबित हुआ है । आज-कल समाज सेवा एक फलतेफूलते व्यवसाय बन कर रही है। ऐसी स्थिति से मुक्ति दिलाने की ओर सर्व प्रथम कदम के रूप में हर भारतवासी को नेकनीयती के रास्ते पर चलना होगा। रोजगार के घटते अवसरों के मद्देनजर सृजनात्मक योजनाएँ बनानी होगी जिससे अधिक से अधिक रोजगार के अवसर सृजित हो सकें।

स्वाधीनता की साठवीं बरसगांठ के इस मौके पर हमें आत्मविश्लेषण करना चाहिए कि कई क्षेत्रों में अन्य देशों की अपेक्षा हम पीछे क्यों रह रहे है ? इसका अनेक कारण होते है। समाज में भ्रष्टाचार ने जितनी गहराई तक अपना जाल पसारा है कि उससे आसानी से निजात पाना नामुमकिन है। जब तक हम उस पर असफल रहेंगे तब तक हमारे देश को विकसित देश के रूप में तब्दील करने का हमारा सपना अधूरा ही रहेगा और विज़न 2020 भी हमेशा के लिए असाध्य होगा। भ्रष्टाचार को समाज से संपूर्ण रूप से मिटाने का काम टेढी खीर जैसा साबित हुआ है। एक भारतीय होने के नाते जब तक हम अपनी कर्तव्यों की अनदेखा करते रहेंगे तब तक के लिए ऐसी हालत का कायम रहने की संभवना है। भ्रष्टाचार के विरूद्ध लडने के लिए हम कृतसंकल्प रहें ताकि हमारा देश की प्रगति सुस्थिर रहें ।

स्वाधीनता के इतने सालों के बाद देश में हुई प्रगति की समीक्षा करें तो इस बात पर दो राय नहीं होगी कि संचार तथा प्रौद्योगिकी के क्षेत्र में हमने काफी हद तक प्रगति हासिल की है , लेकिन लोक जीवन में अनुशासन, मर्यादा आदि में अगाध पतन हुआ साथ ही मानवीय मूल्यों के बिगड जाने की नौबत भी हुई। लोग अपने वैयक्तिक हितों के लिए किसी भी स्तर तक अपने सिर नीचे करने के लिए तत्पर रहने लगे। ऐसे लोग अपने ये रवैए बदलने के लिए तैयार होने पर भी देश की इस क्षेत्र में प्राप्त प्रगति का सकारात्मक प्रभाव सुनिश्चित होगा।

हम सबको खूब ज्ञात है कि हमारा देश कृषि प्रधान देश है । स्वाधीनता के बाद हमारे नेताओं ने इस बात पर जोर दिया कि भारत का विकास ग्रामों से होना चाहिए। सूचना प्रोद्योगिकी जैसे क्षेत्र में चाहे हम ने कितनी भी प्रगति प्राप्त की है कृषि क्षेत्र की अनदेखी करना हमारे देश के विकास के लिए एक बाधा साबित होगी। आजकल भारी ऋण की वजह से कृषकों की आत्महत्या करने का दौर चल रहा है और इसकी रोक थाम के लिए हमारे पास कोई चारा है ही नहीं । इसके अलावा नारियों की ओर अत्याचार बढ़ रहा है साथ ही आतंकवाद भी मोटे तौर पर पनप रहा है और इन समाजिक दुराचारों को काबू में रखने के लिए भी हमारे पास सृजनात्मक उपाय नहीं है। स्वतंत्रता प्राप्ति के साठ सालों के बाद आर्थिक तथा औद्योगिक क्षेत्रों में सराहनीय प्रगति प्राप्त करने पर भी शिक्षा, मूल स्वच्छ सुविधाओं तथा पीने के पानी से वंजित रहने के लोग हमारे देश में बडी तादाद में है।

उदारीकरण प्रक्रियाओं के परिणामस्वरूप भारतीय औद्योगिक क्षेत्र में विवेकपूर्ण परिवर्तन जरूर संभव हुआ है जिसके परिणामस्वरूप सूचना प्रौद्योगिकी की जगत में भारत ने अपनी उपस्थिति दर्ज की है। सूचना प्रौद्योगिकी के क्षेत्र में हुई उल्लेखनीय प्रगति का प्रभाव अन्य क्षेत्रों में भी फैलने के कारण अंतर्राष्ट्रीय स्तर पर भारत को महत्वपूर्ण स्थान प्राप्त हुआ है। इन उपलब्धियों की वाहवाही करने के साथ साथ हमें इस बात पर भी ध्यान रखना चाहिए कि सूचना प्रौद्योगिकी के क्षेत्र में देश द्वारा हासिल अभूतपूर्व प्रगति से आम आदमी लाभान्वित नहीं हुए है , निर्धन निर्धन ही रहने और धनी और अधिक धन कमाने की स्थिति पैदा हुई है। दिन ब दिन धनी - निर्धन, शहरी- ग्रामीण आदि के बीच का अंतर बढ़ता जा रहा है। जनता के कल्याण केलिए रूपकल्पित सुधारात्कम उपाय आम जनता तक नहीं पहूँचा पाए। ऐसी स्थिति में देश के सभी क्षेत्रों में प्रगति सुनिश्चित करना आसान काम तो नहीं है । स्वाधीन भारत के साठ सालों के बाद भी देश का यह हालत वही रहना चिंता की बात है । सालगिरह का जश्न मनाने के साथ हमें इस संकट से निकलने के लिए भी उपाय ढूँढना है ।

देश में ऐसा एक माहौल सृजित करने की अनिवार्यता बढ़ रही है जिससे अमीर-गरीब,शहरी-ग्रामीण की दूरी मिट जाए। शिक्षा पाने की सुविधाएँ सभी अशिक्षितों को उपलब्ध कराने से सभी अपने देश में होने वाली प्रगति तथा अन्य बातों से अवगत रहेंगे। नारी सशक्तीकरण इस समय की आवश्यकता है जिससे नारी अपनी ओर होने वाले अत्याचारों से सतर्क होने तथा एक संपूर्ण रूप से समृद्ध देश के निर्माण की ओर अपनी भूमिका बखूबी निभाने में सक्षम और सफल रहेंगी। इस महत्वपूर्ण अवसर पर एक उत्तरदायी नागरिक की हैसियत में खडे होते हुए हमें यह संकल्प लेना चाहिए कि हम अपने देश को भ्रष्टाचार और आतंकवाद से मुक्त करने के लिए तन मन लगा के प्रयास करेंगे ताकि विश्व में हमारे देश का नाम बुलंदियों पर रहें।

Authors'

Prof. Mohan Joseph Modayil
Director, CMFRI, Kochi

Titile : Challenges for Indian Marine Fisheries

Dr. V. S. Somvanshi
Director General, FSI, Mumbai

Titile : Marine Fishery Resources Potential and Management in the Indian EEZ

G. Mohan Kumar, IAS
Chairman, MPEDA, Kochi

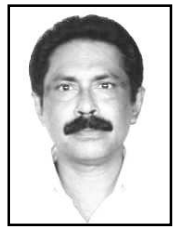
Titile : Sea Food Export from India- Potential and Challenges

M.K.R. Nair
Joint Commissioner, Ministry of Agriculture, Govt. of India
Titile : Fisheries Management in India - Present Status, Challenges and Road ahead

Dr. K. Devadasan
Director, CIFT, Kochi

Titile : Post Harvest Technology of Marine & Fresh water fishes

G. Harikumar, IAS
Director of Fisheries, Kerala



G. Rajendran
Deputy, Director of Fisheries, Kerala

Titile : An overview of Kerala Fisheries with particular Empasis on Aquaculture

K. Prasadachandran Pillai
Additional Director of Fisheries, Kerala

Titile : Free Trade Preparedness for a Developing Fishery Economy

Dr. N.G. K. Pillai
Principal Scientist & HOD, CMFRI, Kochi

Title : Pelagic Fisheries of India

Dr. K.K. Appukuttan
Principal Scientist & HOD (Retd.) CMFRI

Title : The Molluscan Fishery of India and its livelihood ehancement potential

Dr. M.K. Mukundan
Head of Department, CIFT

Title : Solutions for Hazards and Quality Defects in Fish Processing Industry

G.Hassan Manikfan
Director, CIFNET, Kochi

Title : Importance of Human Resource Development for the Fishing Industry

Dr. S. Girija
Director i/c, IFP

Titile : IFP - Upgrading and Updating with Changing Needs and Time

K. Omprakash
Director, CICEF, Bangalore

Title : Role of CICEF in the Development of Fishery Harbours, Fish Landing Centres and Brackish water Shrimp farms

Prof. (Dr.) D.D. Namboodiri
Professor & Dean, Fisheries College, Panangad

Title : Human Resource Development in Fisheries Sector

Dr. M.R. Bhoopendranath
Principal Scientist, CIFT, Kochi

Title : Fishing Capacity Management

O.T.S Nambiar
Jt. Director (Marketing), Spices Board, Kochi

Title : Go Green! The exciting market for organic spices

J. V. H. Dixitulu
Chief Editor & Publisher, Fishing Chimes

Title : Distant Market Oriented Pond Fishery Development in Andhrapradesh

Dr. K.K. Vass
Director, CIFRI, Barackpore, West Bengal

Title : CIFRI in the Service of Nation

Dr. K.S. Raman
Sr. Technical Director, NITPU, NIC, Kochi

Title : E-Governance Initiatives by NIC, Kochi for IFP

पी.आर.आनंदवल्ली अम्मा
आई एफ पि, कोचि

स्वतंत्र भारत साठ सालों के बाद..

Dr. S. Girija

Shri.C. Haridasan

Shri.K.Gopi

Shri.K.Kaladharan

Shri.Varghese John

Shri.M.K. Rajan

Dr.M.K. Venu

Smt. M. Santhakumari

Shri.P.V. Raveendran Nair

Smt. K.K. Radhamma

Smt.Valsamma John

Smt. P.R. Anandavally Amma

Shri.Mohammed Basheer

Shri.M. Rajan

Smt.K.N. Saralabhai

Shri.K. Chandramohanan Nair

Smt.Mini C. Pillai

Shri.Madhu Ramakrishnan

Smt.C. Vasundhara

Smt.K. Geetha

Shri. Jerald Manuel Mascrene

Shri. V. Jayaram

Shri. N.R. Shibu