

# **KADALEKUM KANIVUKAL**

**(Bounties of the Sea)**

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# POTENTIAL FISHING ZONES IN THE MARINE ENVIRONMENT

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As in the case of terrestrial animals, the marine fauna including fish also respond, in varying degrees, to changes in the environmental conditions. The physical parameters such as sea water temperature, density, hydrostatic pressure, horizontal and vertical movements of water masses, the intensity of solar radiation and chemical parameters including the saltness of seawater, dissolved gases and biological factors such as the availability of food and occurrence of predators decide the occurrence, distribution, abundance, reproduction and mortality of individual species in space and time. Perhaps the ultimate objective would be to predict, to a satisfying extent, meaningful relations between:

- 1) Fishable fish concentrations and one or more of the easily observable environmental parameters.
- 2) Changes occurring in the availability of fish and the respective environmental changes.
- 3) Effect of these changes on the reproductive success and fluctuations in the number of recruits.

Japan was one of the countries which recognised early the importance of synoptic information on oceanographic and marine meteorological conditions and also their application for the improvement of fishing efficiency.

In due course the need for similar services has been accepted by several other nations such as Australia, France, the Republic of South Africa, the U.S.A., the U.S.S.R. and the U.K. These services which are established for the benefit of the respective national fisheries provide oceanographic analyses and stress the need to establish intelligent collaboration between services, research scientists and the end users in such a manner that all of them could considerably profit from such a collaboration.

Besides the direct assistance given to fisheries by visual air spotting of fish schools, remote sensors are used successfully onboard aircrafts. Satellites are also employed to assess environmental conditions and to monitor fish distribution. Techniques have been developed to measure the sea surface temperature with high accuracy and space resolution, the heat flux thermal fronts, the upwelling intensity and variability, the ocean colour (chlorophyll and plankton) and bioluminescence of plankton. At present, remote sensors from space craft observations are available for surface temperature measurements, temperature gradients and anomalies showing upwelling areas and current boundaries (infra red and micro wave radio meters), measurement of circulation patterns and eddies of water masses through colour and multi spectral cameras.

A country such as India, with about 8041 km of sea coast and large extent of fishable areas on the shelf and beyond, requires a permanent set up to monitor various parameters connected with fish resources, environmental data governing the distribution of these resources and such other parameters which influence the fluctuations in stock sizes. To clarify such situations and to make fairly accurate fishery forecasts, continued surveys and data monitoring are needed.

In view of the following limitations in the rational exploitation of the resources the reduction of searching time in fishing assumes great importance in our country.

- number and location of operating bases
- the cruising range for different types of fishing crafts
- the weather conditions
- availability of suitable fishing gear
- width of continental shelf and bathymetry for trawling purposes
- storage and processing facilities both onboard and inshore
- infrastructure for loading of fuel, water and ice
- infrastructure for unloading of catches and marketing facilities
- increasing fuel cost.

This is especially the case with the small mechanised and non-mechanised boats whose operating ranges are comparatively smaller. Perhaps the first step towards organising such an information service would be to set up a facility for collection of a synoptic oceanographic and marine meteorological data, the analysis and interpretation of this data and to predict, within reasonable limits, the availability of fishable concentrations in specific areas. The synoptic data can be collected with the co-operation of fishing vessels and this will, to a large extent, depend on how best one can convince the boat operator about the usefulness of the processed information to the fishing industry.

The dissemination of processed information as well as the predictions should be conveyed in an easily understandable manner to the end user. Different types of audio-visual media such as radio broadcasts, radio telephone, wireless and telegraphic messages, movie films, notices and newsletters can be used for speedy transfer of information based on the requirement. Short-term forecasts and analyses are found most effective. Mid-term or long-term forecasts can be considered in the second stage.

A short-term forecast service, known as the Potential Fishing Zone (PFZ) advisories, has been set up mainly for the benefit of small mechanised sector and artisanal fishermen by the Department of Space in collaboration with Fishery Survey of India, Mumbai, National Institute of Oceanography, Goa, Central Marine Fisheries Research Institute, Cochin, Space Application Centre, Ahmedabad, Remote Sensing Application Centre, Bhubaneswar and Institute for Ocean Management, Chennai.

The sea surface temperature and chlorophyll data generated by the American satellite NOAA and IRS series of Indian satellites through infra-red/microwave cameras and colour scanners form the basis for generating PFZ advisories. The PFZ forecasts which provide the location of potential fishing zones are transmitted through FAX to the collaborating agencies all over the country and in turn disseminated to active groups of fishermen through a network of survey and extension workers and also through the mass media. The forecasts which are brought out twice a week during the cloud free months of November - May have

validity of only two or three days because of the changing hydrographic conditions. These short term forecasts have proven useful mainly for the small mechanised sector and artisanal fishermen who are engaged in pelagic fishing for catching surface shoaling fishes such as oil sardine, mackerel and tuna. This service has gained better acceptance among Kerala fishermen, possibly due to their comparatively higher literacy levels.