Chlorophyll based assessment of Indian Marine Fishery Resources

CMFRI's research initiative

Indian marine fisheries have all along remained buoyant to vagaries of fishing effort and other factors with the past decades recording consistently increasing trends despite the disaggregated analyses throw up new scenarios. The most imposing challenge before the planners and hence in the realms of research feeding to policy designing is the real time assessment of harvestable potential and possible mechanism to forecast the near future availability. CMFRI with its internationally acclaimed sampling design has been providing timely estimates of marine fishery resources landed in the peninsular region of the country which has been used by various agencies like GoI and FAO. Many previous attempts to revalidate the marine resource potential were also dependent on these time series of landings. But given an opportunity, a chance to base the entire resource measurement mechanism on a complete coverage platform while assessing the potential would always improve the figures.

Primary productivity, best indicated by chlorophyll concentration at various parts of the EEZ, are the single most dependable factors of resource wealth as they are the first link in the process of existence and proliferation of marine fishery resources apart from being a rapid indicator of their concentration. Organic production based assessment of Indian marine resources was first attempted by CMFRI in the late fifties and early sixties. With the methodologies in vogue those days viz. Oxygen and C14 methods using limited resources available attempts were made by CMFRI scientists to estimate the carbon production and thus the fishery resource potential, after applying globally accepted and locally pertinent conversion factors. Those efforts put the production possibilities of the Indian ocean region at 39- 40 million tonnes with 40%

attributable to Indian territory which as per the level of exploitation prevailed elsewhere at that point of time could be taken as 11 million tonnes of harvestable potential. Such pioneering works introduced a very different perspective to the assessment of resource potential but was severely constrained by the assessment coverage of the organic productivity. But the advent of remote sensing tools and the algorithms to convert the optical data into relevant parameters has changed the entire scenario recently. The chlorophyll concentration has been very successfully measured simultaneously across the vast expanse of seas using the satellite propelled OCM sensors. Such measures and derived fishery potential assessments have long been standardized by Space Applications Centre (SAC), Ahmedabad.

Taking cue from the recent technological advances and dwelling deeply on the seminal research carried in the past, CMFRI has rededicated itself to forge the best of remotely sensed information and its physical infrastructure existing at various centres across the Indian coast towards construction of a paradigm aimed at assessing and forecasting marine fishery resources and harvestable potential. The green data supplied through the OCM sensed information and the brown data based on the benthic studies involving detritus along side the derived data on secondary producers and higher level animals are planned to be modeled on a spatio-seasonal basis over a period of five years with a sound sea-truthing rigour planned at various regions of the EEZ. Such a mammoth exercise would always require collaboration of like mandated organizations and CMFRI has initiated joint research exercises along with SAC and FSI towards achieving better results. The initiative is likely to herald the finalization of a hybrid modeling

modules by the end of the first phase in three years starting from 2012-'13. After revalidating the output of these models, bieconomic subsidiary models based on the market scenarios existing for different resources at different parts of the country would be developed alongside the fleet capacity availability on a dynamic basis, which would result in the realistic prediction of harvested catches for different seasons of the year.

Kicking off the project a two-day brainstorming workshop on Chlorophyll based Remote Sensing assisted Indian Fisheries Forecasting System (ChloRIFFS) was conducted on 17-18th October 2012 at CMFRI, Cochin wherein experts from FSI as well as SAC participated. The overall work plan and temporal framework were deliberated at length during the sessions. The focus was more on the strengths of the constituent institutions and the approach to be followed towards achievement of synergy in the future endeavours. During the course of deliberations the existing algorithms adopted to decipher remotely sensed data and facilities available for *in situ* evaluation and the areas needing immediate focus vis-à-vis validation and sea truthing were assessed at length. These initiatives have drawn the attention of a couple of foreign research institutions who have evinced keen interest to take part in the model development.

With a road map in place and mutual prerogatives thrashed out, this CMFRI led concerted efforts towards predicting and forecasting marine fisheries resources through the most tangible causal factor namely chlorophyllis bound to add strength to the Indian marine fishery management.

(Reported by J. Jayasankar, Senior Scientist, FRAD)