

Project Title : Predictive Modeling in Marine Fisheries of South West Coast of India

Scientists : M. Srinath, T.V. Sathianandan, Somy Kuriakose and Mini, K.G

Centre : Cochin

Funding Agency : Dept. of Ocean Development, Govt. of India.

Objectives :

The project focuses on development of suitable univariate and multivariate predictive models for the marine fishery resources of southwest coast of India and estimate the inter relationship between the exploited stocks, the climatic and oceanographic parameters based on a cross correlation analysis.



Major findings of the project

- **Univariate Time Series models were fitted for the South West coast of India based on estimated annual and quarterly landings for the period 1960 to 2003. Seasonal ARIMA models were identified for the total landings and major 14 exploited species. For each species 5 models were selected based on the R2 values.**

Seasonal ARIMA models for the South West Coast

No	Species	ARIMA Model (Annual)	ARIMA Model (Quarterly)
1	Elasmobranchs	(0,0,1), (1,1,0), (2,0,0), (0,1,1), (2,1,1)	(1,1,3), (2,0,3), (3,1,1), (4,1,1), (1,0,4)
2	Catfish	(0,0,1), (2,1,0), (1,2,0), (1,1,1), (3,1,0)	(4,1,0), (2,1,4), (1,0,4), (0,1,4), (1,1,4)
3	Oil Sardines	(4,1,0), (3,2,0)	(3,1,4), (2,1,5), (4,1,4), (5,0,4)
4	Whitebait	(0,1,1), (1,0,1), (3,1,0), (2,1,2)	(4,1,0), (5,0,0), (3,0,4), (2,1,4), (0,0,4)
5	Perches	(1,1,0), (0,0,2), (0,1,2)	(4,1,0)
6	Croakers	(0,1,1)	(3,0,4), (3,0,4), (4,0,0)
7	Ribbonfish	(0,0,1), (2,1,0), (4,0,1)	(3,1,1)
8	Carangids	(0,0,1), (1,1,0), (2,0,0), (1,1,2), (2,0,2)	(2,0,3), (4,0,1), (3,1,1)
9	Mackerel	(1,0,1), (0,1,1), (2,0,0), (1,1,0), (1,1,1)	(4,0,0), (3,1,0), (3,0,4)
10	Seer fish	(0,0,1), (1,1,0), (2,0,0), (2,0,1)	(2,1,2), (4,0,1), (3,1,1), (5,0,0)
11	Tuna	(1,0,0), (0,1,0), (0,0,1), (0,1,1)	(4,0,0), (3,1,0), (2,1,4), (3,0,4), (0,0,5)
12	Soles	(1,0,0), (0,1,0), (0,0,1), (0,1,1), (1,0,1),	(1,1,3), (4,0,1), (3,1,1)
13	Penaeid Prawn	(1,0,0), (0,1,0), (0,0,1), (0,1,1), (1,0,1)	(3,0,4), (2,0,4), (3,0,4)
14	Cephalopods	(2,2,0), (3,1,0), (4,1,0), (3,2,0),	(4,0,2), (5,0,0), (4,1,0),
15	Total Catch	(0,0,1), (1,1,0), (2,0,0), (2,0,2)	(3,1,4), (2,1,5)

Project Title : Predictive Modeling in Marine Fisheries of South West Coast of India

- Studied the Impact of introduction of crafts with outboard engines on marine fish production in Kerala and Karnataka using intervention analysis. This was examined by adopting seasonal ARIMA and regression models with ARMA type errors. The effect of intervention was calculated from the estimated regression coefficient corresponding to auxiliary variables and an increase of about 56,463 tonnes in quarter wise marine fish landings was observed in Kerala due to introduction of outboard engines. In case of Karnataka, it was found that on an average there is an increase of about 88 thousand tonnes in the annual total marine fish landings due to the intervention.



Project Title : Predictive Modeling in Marine Fisheries of South West Coast of India

- A four state Markov chain model is applied to study the changes in the landings and long term projection of the Marine Fish Landings a of South-west coast of India. Time series of marine fish landings in South-west coast of India during 1961 to 2003 was examined by Markov chain model after transition probability matrices were derived from the data series. Using these matrices, the estimated steady state value of exploited marine fish landings along south west coast of India is 6.57 lakh tonnes. The projection indicates that there will be decline in the landings in the long run, if the present mode of exploitation is continued.



- The dynamics of the pelagic resource assemblage along the Karnataka Coast is analysed with reference to the change in resource composition and relative dominance using Markov chain. The transition probabilities of the species dominance with respect to four dominant groups namely oil sardine, mackerel, carangids and whitebaits along the Karnataka coast have been estimated. The analysis indicated that in the long run the pelagic fish assemblage of Karnataka coast is more likely to be dominated by oil sardine rather than mackerel.