



The potential of fish export from West Bengal: An analysis

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ABSTRACT

In the present study, an attempt has been made to study the potential of fish export from West Bengal over the years and to find the appropriate model to characterize the dynamics of export trend in West Bengal. The appropriate trend equation has been identified and it has been evaluated by the model accuracy parameters like AIC. The importance of such studies remains from the fact that the policy makers need the specialized scientific information in the form of advisory services in respect of the dynamics of fish export of the state for making strategic plan/policy.

1. Introduction

Fisheries sector has been playing a strategic role in food security, international trade and employment generation. Fish is one of the major sources of protein for most of the Indian population. India is the second largest fish producing country in the world with the contribution of 5.43% of total global fish (FAO, 2010) production and West Bengal ranked second position after Andhra Pradesh. West Bengal has a long coastline and covers mainly the districts of South and North 24 Parganas and Purba Medinipur (Pathak SC 1990). Fish is an important part of the regular diet and is a cheap source of protein for the people of West Bengal. In West Bengal about 78% of total fish catch is consumed in fresh condition, 6% is used as dry fish and rest is used as frozen fish. West Bengal ranks as the fifth highest contributor to India's Gross Domestic Product (GDP) after Maharashtra, Andhra Pradesh, Tamil Nadu, and Uttar Pradesh. The State has a long coastline (over 150 km) and innumerable water bodies, reflecting the huge potential for inland fishing and fish cultivation. It is the largest fish producing State and accounts for about 18.5% of the total fish production in India as of December 2014. West Bengal also accounts for a significant amount of fresh water fish, carp seed; and the largest producer of shrimps. Shrimp farming is on the rise, especially in the district of

Purbo Midnapore (Milwain *et al.* 2002). Fish production in West Bengal is anticipated to cross the 2,000 metric tons mark by 2015 from about 1,580 metric tons in 2013-14. The State exported close to 1.7 lakh tonnes of fish to others states and overseas in 2017-18. Of this, export of shrimp accounted for nearly 70,000 tonnes, estimated at around Rs-8,000/- crore. This is for the first time that the fisheries department has taken up such an initiative that will not only create a market for Bengal's fishes in the foreign countries but also help to uplift the financial condition of the state's fishermen. To meet the ongoing demands of fishes in the international market, the department is setting up processing units with modern facilities. A report revealed that the fisheries sector is considered to be the "Sunrise sector" in terms of export of fishes not only in the domestic markets of various states but also to abroad countries like Dubai, Japan, China. The department has also chalked out plans on how to engage more unemployed rural youth and women in pisciculture through the formation of various self-help groups in the villages. The state fisheries department has already been distributing fingerlings to people at free of cost. In the present study, an attempt has been made to quantify and characterize the export potential in fisheries over the years from West Bengal to determine the dynamics or trend pattern (Pal, 2015) identifying the appropriate trend equation which will act as a guide for the future management plan in this area.

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2. Materials and methods

In the present study, an attempt has been made to explore the pattern of fish export of West Bengal from 2000-01 to 2015-16. The patterns of export in the time period ascertain to forecast the future pattern of the region enabling the better prospect in the fisheries sector to maintain better economic profit and growth. The data collected from the Director/Commissioner of Fisheries of West Bengal from 2000-01 to 2015-16. A non-parametric Mann-Kendall trend test has initially been employed to confirm the presence of statistically significant trend by applying the Gilbert (1987) procedure. Then the data set were fitted through polynomial regression. Polynomial regression models are usually fit using the method of least squares. In general, the expected value of y can be modeled as n^{th} degree polynomial, yielding the general polynomial regression model:

$$Y = a_0 + a_1x + a_2x^2 + a_3x^3 + \dots + a_nx^n + e$$

Conveniently, these models are all linear from the point of view of estimation, since the regression function is linear in terms of the unknown parameters i.e. a_0, a_1, \dots . Some standard statistical measures were under taken to evaluate the performance of the fitted model. The accuracy parameters are R^2 and AIC criteria. The data was analyzed by SAS 9.3 (2012) for appropriate trend equation.

3. Results and discussion

The data of fish export over the years has been plotted graphically to find a simple trend/pattern over the years and further tested by Mann-Kendall trend test which revealed that there is a statistically significant increasing trend in the export data sets of West Bengal (p (no trend) < 0.001).

After that the data series were fitted through different models. But the best fitted trend equation was Polynomial regression (Quadratic) model. The superiority of the model was based on the parameter of the model found with their model accuracy parameter- Aikake Information Criteria (AIC) which are given in the Table 1. The AIC values which are presented in the Table 1 indubitably confirm the superiority of the representative power (in terms of higher precision or less AIC values).

1. Conclusion

The polynomial regression (Quadratic model) model is capable to produce exact dynamics at any time point most precisely so as to provide accurate advisory services to fisheries sector, an advance knowledge of which is of utmost

help to make the necessary futuristic planning for better management of the sector. However, in anticipation of emerging demands for food-fish, quality fish seed, environmental preservation and perhaps food safety standards, the sustainable growth of the industry is very much needed through different strategic and managerial measures to promote sustainable development in the sector.

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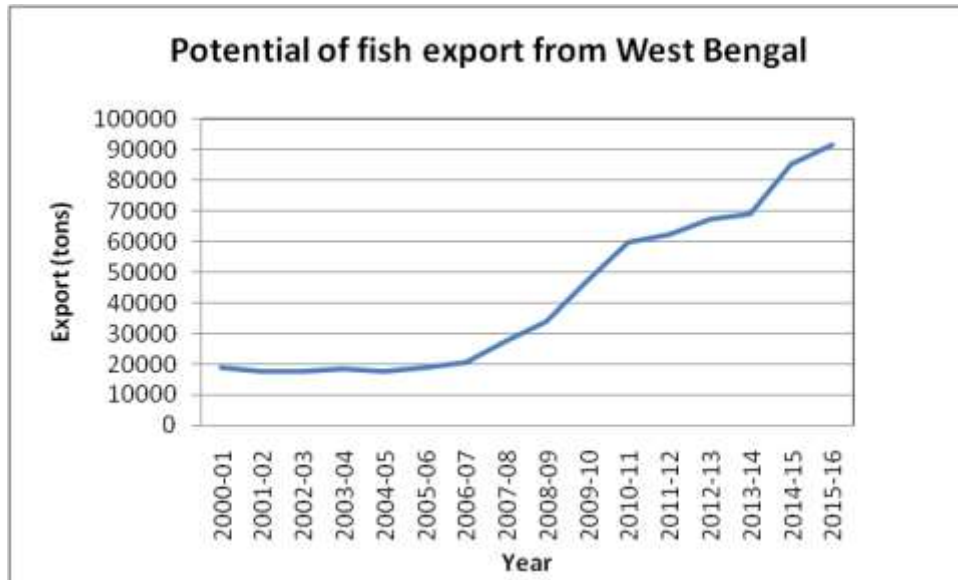


Fig 1: Graphical representation of potential of fish export from West Bengal

Table 1: Parameter estimates of the fitted model (Polynomial regression)

Model	Equation	AIC
Linear	$y = -2710.4 + 5251.1x$	1.17E+09
Quadratic	$y = 390.57x^2 - 1388.6x + 17209$	2.96E+08
Exponential	$y = 12861e^{0.12667x} - 2591.3$	4.23E+08