



Research Article

Coffee production modelling in India using nonlinear statistical growth models

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SUMMARY : Efforts have been made in this paper, to develop appropriate nonlinear statistical models with a view to provide analytical approach to describe the coffee production trends in India. To this end, attempts were made to apply six nonlinear statistical growth models. The parameters of each model were estimated using Levenberg-Marquardt (LM) iterative method. The main assumptions of 'independence' and 'normality' of error terms were examined by using respectively, the 'Run-test' and 'Shapiro-Wilk test'. The best model was selected based on the performance of several model goodness of fit criteria viz., R^2 , MAE, MSE, RMSE, MAPE, AIC and BIC. MMF and Logistic models were found to be quite successful for describing the pattern of coffee production. Forecast values were also computed using two best fitted models. A comparative study indicated that both selected models were performed similarly for forecasting coffee production for the years 2015 and 2020.

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BACKGROUND AND OBJECTIVES

Coffee is the most preferred beverage in the world by virtue of its special flavour and taste. Another feature of coffee is that the crop is more sensitive to climatic and soil requirements, hence, it is confined mostly to the tropical situations in South India. India ranks sixth in world coffee production after Brazil, Vietnam, Columbia, Indonesia and Ethiopia. Coffee production is mainly confined to the Southern States of India viz., Karnataka, Kerala, and Tamil Nadu, which form the traditional coffee tracts. For the past five to six years, the productivity of coffee in India has been around 800 kg/ha. The India's coffee production was only 1.80 lakh tonnes in 1991-1992, thereby continued to add to the production by accounting an all time highest production of 3.02 lakh tonnes in 2010-2011. According to post blossom estimate, it will continue to add India's coffee production by 3.22 lakh tonnes for the year 2011-2012. The share of India's coffee production compared to world production was 3.18 per cent

during 1992-1993, which was peaked to 4.46 per cent during 2001-2002 and again production fell down to around 3.78 per cent in 2010-2011. India is the largest coffee exporter in Asia. Coffee is predominantly an export oriented commodity in India with 70 to 75 per cent of the production being exported. Total quantity of 2.19 lakh tonnes of coffee was exported from India in 2011. The share of India's export to global trade was accounted around 4.14 per cent in 2009-2011 (Anonymous, 2011). Although there has been an increasing trend in the production of coffee from the country, there also are apparent wide fluctuations from year to year.

Growth rate analyses are widely employed to describing the long-term trends in variables over time in various agricultural crops. Growth models are generally 'mechanistic' and the parameters have meaningful biological interpretation. Some isolated attempts have been made in the past to investigate quantitatively the growth pattern of coffee production in the country. Chengappa

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