

An Asian Journal of Soil Science

Volume 8 | Issue 1 | June, 2013 | 98-102



Research Article

Non-linear statistical modeling for area, production and productivity of rice crop in Chhattisgarh

SHAISTA KHAN, R.K. BHARDWAJ, R.R. SAXENA, R. K. BHAGAT AND G.K. JATAV

Received : 20.02.2013; Revised : 21.03.2013; Accepted : 22.04.2013

MEMBERS OF RESEARCH FORUM :

Corresponding author : G.K. JATAV, Department of Soil Science and Agricultural Science, Institute of Agricultural Sciences, Banaras Hindu University, VARANASI (U.P.) INDIA Email: gouravjatav143@gmail.com

Co-authors : SHAISTA KHAN, R.K. BHARDWAJ AND R.R. SAXENA,

Department of Agricultural Statistics, Institute of Agricultural Sciences, Banaras Hindu University, VARANASI (U.P.) INDIA

R.K. BHAGAT, Department of Soil Science and Agricultural Science, Indira Gandhi Agricultural University, RAIPUR (C.G.) INDIA Summary An attempt was made to develop nonlinear statistical models for studying area, production and productivity of rice for three agro-climatic zones as well as whole Chhattisgarh State level. To this end, five nonlinear statistical models viz., monomolecular, logistic, Gompertz, Richards and MMF were considered. Parameters of these models were estimated by using nonlinear regression option of SPSS PC version 15.0. An important aspect of this estimation procedure was that we must provide initial parameter estimates. Appropriateness of a model was judged by the magnitude and sign of the parameter estimates, various goodness of fit statistics *viz.*, R², RMSE, MAE, MSE, r (Y, $\overline{\mathbf{Y}}$) and PCFE. Run test and Shapiro-Wilk test were employed to test, respectively, the assumptions of randomness and normality of residuals, respectively. As an illustration, for modeling production of rice, logistic, Gompertz and Monomolecular models came to be the most appropriate for the Northern hills and whole Chhattisgarh State Gompertz and logistic models for Bastar plateau. For modeling productivity of rice logistic and Gompertz models were found to be the most suitable for the Northern hill, logistic for whole Chhattisgarh. Monomolecular and logistic models were found to be the best model for describing the area data of Chhattisgarh State. We found that, for all state monomolecular and logistic model came out to be the best model among the five models considered for describing zone-wise rice area data. In a large number of situations, no single model is emerging as the best model. However, on the basis of various goodness of fit criterion; we were able to restrict our search for best model in a particular situation to two or three models. As an illustration, for studying zone wise rice production, choice of the best model was restricted to logistic, Gompertz and monomolecular models for agro climatic zones viz., Northern hills and Bastar plateau and also at the whole Chhattisgarh State level. It may also be noted that logistic model considered satisfactory for overall Chhattisgarh State to describe the rice yield data. With a view to making a final choice about the best model, there is need to study some additional features of these models viz. monomolecular, logistic, Gompertz, Richards and MMF only when this is done, we shall be able to make a final decision about the best model.

Key words : Non-linear models, Rice, Agro-climatic zones

How to cite this article : Khan, Shaista, Bhardwaj, R.K., Sexena, R.R., Bhagat, R.K. and Jatav, G.K. (2013). Non-linear statistical modeling for area, production and productivity of rice crop in Chhattisgarh. *Asian J. Soil Sci.*, **8**(1): 98-102.