



Research Paper

Utilizing weather parameters in modelling and predicting yield production - An empirical study

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ABSTRACT : Often there is a time lag between awareness of an impending event and occurrence of that event. This lead time is the main reason for planning and forecasting. The bio-system is comprised of a complex interaction among the soil, the atmosphere and the plants that live in it. A chance alteration of one element may yield desirable or undesirable consequences. The yield prediction becomes an important issue in agricultural statistics. Multi – variable polynomial regression (MPR) provides an effective way to describe complex non-linear input output relationships so that an outcome variable can be predicted from the other/others. In this paper, forecast modelling and rice prediction using weather parameters are considered in detail by using polynomial regression. The results of the proposed methodology were compared to the results produced by multiple linear regression model (MLR), which indicated that the prediction model based on MPR has higher accuracy than MLR.

KEY WORDS : Polynomial regression, Rice forecasting, Statistical forecasting, Multiple linear regressions

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INTRODUCTION

In recent years there has been a growing concern that changes in climate will lead to significant damage to both market and non-market sectors. The climate change will have a negative effect in many states. But farmer's adaptation to climate change through changes in farming practices, cropping patterns, and use of new technologies will help to ease the impact. The application of crop models to study the potential impact of climate change and climate variability provides a direct link between models, agrometeorology and the concerns of society. A model can calculate probabilities of grain yield levels for a given soil type based on rainfall. The occurrence of prolonged dry period or heavy rain at the critical stages of the crop growth and development may lead to significant reduce crop yield. Accurate and timely forecasting is a major challenge for the scientific community. Rice prediction modeling involves a combination of computer models, observation and knowledge of trends and patterns. Using these methods, reasonable accurate forecasts can be made up.

Regression is a statistical empirical technique and is widely used in business, social, behavioral and agriculture sciences, climate prediction and many other areas. Sen (2003) has presented long-range summer monsoon rainfall forecast model based on power regression technique. Nkrintra *et al.* (2005) described the development of a statistical forecasting method using MLR and local polynomial based non-parametric approaches. Sohen *et al.* (2005) has developed a prediction model using multiple linear and logistics regression.

The following section presents our approach to the development of rice forecasting system. Firstly second order polynomial regression is discussed, next how to forecast rice production with the use of MPR is described.

Second order polynomial regression:

Regression is a technique that utilizes the relation between two or more quantitative variables on observational data base so that an outcome variable can be predicted from the others. Polynomial regression produces a polynomial describing the relationship between any set of inputs and corresponding