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ON STATISTICAL METHODS FOR FINDING OPTIMUM LEVELS OF INPUTS

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ABSTRACT

Response surface methods are often known to be useful in the industrial experiments. The application of these methods to the agriculture experiments usually conducted in Pakistan is investigated. The method of finding optimum levels of inputs is discussed with an example.

INTRODUCTION

Most of the designs of experiments are understood to be used for comparison of treatments/varieties. In most cases we prepare a table for analysis of variance or analysis of covariance and compare treatments by F test or make further individual comparisons.

In case the observation is related to the treatments by some statistical function, say $y = f(x)$, then the experimenter may be interested in the estimation of this relationship or in the levels of inputs which give optimum output. Such designs are usually refered to as response surface designs and all the statistical methods involved are often called Response Surface Methodology (RSM). RSM originated from British chemical industry and the first major contributions to the field are [2] and [1].

The observation above, usually refered to as response, may be yield, output, flavour, softness of cake etc. The inputs which are usually called factors may be different levels of temprature, pressure, nutrients etc.

Here we show how these methods can be used in agriculture experiments usually conducted in Pakistan. For example in fertilizer trials we can find the optimum doses of different fertilizers, in sowing date experiments the optimum sowing dates can be found and in animal diet experiments one can find optimum combination of nutrients to constitute best animal diet etc. This is also shown that even if the experiment is not originally designed