

## RESPONSE SURFACE APPROACH TO DERIVE ECONOMICALLY OPTIMAL FERTILIZER DOSES FOR WHEAT PRODUCTION ON TWO SOIL FAMILIES

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### ABSTRACT

Response surface methodology was employed to study the nitrogen and phosphorus requirements of winter wheat on Hafizabad and Rasulpur soil series. Economic optimums were calculated using the quadratic responses. The study led to the conclusion that economic fertilizer dose differed for both the soil series. If the marginal rate of return (MRR) of 1 is considered as farmer's choice, then economically optimum fertilizer recommendations for Hafizabad soil series are 142 Kg N and 37 Kg P (85 Kg P<sub>2</sub>O<sub>5</sub>) per hectare. On the otherhand, for Rasulpur soil series, 160 Kg N and 16 Kg P (37 Kg P<sub>2</sub>O<sub>5</sub>) per hectare was found to be the economically optimum fertilizer dose. Therefore, for efficient and judicious use of fertilizers, recommendations need to be formulated on the basis of soil series.

### INTRODUCTION

Chemical fertilizers are costly but considered strategic input and play an important role in increasing wheat production. Therefore, their judicious, efficient and economic use is highly essential for enhancing crop productivity by obtaining wider grain nutrient and cost benefit ratios. This objective can be realized by deriving production functions based on soil series, crops and agroecological regions with an indication of marginal coefficients which in turn may provide a basis for attaining maximum crop output from the limited fertilizer use.

In the past, agronomic and fertilizer management technologies were not developed on the basis of soil variations, therefore, often had limited applications in local areas and failed to produce the desired results when applied to other areas having different soils. However, research studies by Baird and Mason (1959) in North Carolina, Rennie and Clayton (1960) in Canada, and Pesek and Heady (1967) in Iowa have proved that