

Nutritional Status of Some Calcareous Soil of Saudi Arabia as Influenced by Intensive Fertilization of Wheat Grown under Pivot Irrigation System

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Abstract. Wheat growers in the Kingdom of Saudi Arabia usually overdose the amount of fertilizers applied. Such intensive applications of fertilizers led us to appraise the nutritional status of soil. To achieve this goal eleven farms growing wheat under central pivot system were selected. These farms represented a comparatively short period of cultivation (less than ten years) and long one (more than 10 years). Soil samples representing three depths namely: 0-15, 15-30, 30-45 cm were taken from inside the central pivots and from its outer uncultivated zone. The long period of cultivation elevated the available N and P throughout the soil depths. Only a significant increase was recorded for the N of the first soil layer and P in the upper two consecutive layers. In comparison, the short cultivation period significantly accentuated the available N and P in the first soil layer. Available Mn, Zn, and Cu were significantly increased due to intensive fertilization of wheat cultivated for either short or long period. However, Fe showed nonsignificant increase. Comparing total nutrient contents of the cultivated and non cultivated soils, the results indicated that total P increased significantly in the first layer while a decline trend occurred in the case of K, probably due to lack of K application. Conclusions as to the more important measures to be taken towards achieving more efficiency in fertilizer use are drawn.

Introduction

Most farmers in the Kingdom of Saudi Arabia tend to apply more fertilizer than would be needed by the crop in most seasons. This could result in a general build up in the various nutrient status of many agricultural soils. While this accumulation may be generally desirable to boost production, yet it might not be cost effective because excessive application of fertilizers often leads to large losses of nutrients from the agricultural system and may cause nutrients imbalance in soil. With only about half of the applied fertilizers getting into the crop [1], there is a potential for marked economic losses and for negative environmental impacts.