

**EFFECT OF LONG TERM PHOSPHORUS
FERTILIZER APPLICATION ON PHOSPHORUS
AVAILABILITY AND CADMIUM ACCUMULATION
IN RICE SOILS (*Oryza sativa* L.)**

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture of
Uva Wellassa University
in partial fulfillment of the requirements for the award of the degree of
Bachelor of Science in Export Agriculture

By
INDULSOORIYA GEDARA CHAMARA RUWAN DASANAYAKA

**Faculty of Animal Science and Export Agriculture
Uva Wellassa University**

2013

ABSTRACT

Plant nutrients are essential for quantity and quality of crop production but plant nutrient should be managed efficiently to produce healthy foods at low cost for the increasing population in Sri Lanka. Phosphorus is one of the most important and limiting nutrient in rice cultivation in Sri Lanka. Therefore, application P fertilizer in the form of TSP has been recommended for island wide paddy cultivation from 1960's. Unwise application of TSP fertilizer to paddy fields not only enhances accumulation of soil P but also increases the heavy metal contents such as Cd. Therefore, this research was conducted at the Rice Research and Development Institute, Batalagoda to study the effect of P fertilizer application on crop production, soil P and Cd contents.

Soil samples, Plant samples and crop yields were collected from long term field experiment established in 2007 at the RRDI and situated in the low country intermediate zone. The experiment comprised three P treatments namely: No P fertilizer (T1); Seasonal P fertilizer application according to recommendation of DOA (T2); Alternative seasonal P application according to recommendation of DOA (T3). Treatments were arranged in Randomized Complete Block Design with four replicates. Soil samples were analyzed for available P and total P while plant samples were analyzed for P contents. To study the Cd accumulation in soil and plant, soil and plant samples were analyzed for Cd concentration. Yield and yield components and dry matter yield were recorded at the harvesting.

According to the results there was a positive relationship between plant biomass and application of P fertilizer but no significant difference between seasonal P application and alternate season P application. In the P applied plots, soil P content as well as rice biomass was increased. As a result of higher biomass production, there was a reduction in Cd accumulation in soil as well as in grain and straw.

According to these results it can be suggested that application of P fertilizer is necessary to increase rice production but application of TSP at the present rates does not increase soil or grain Cd contents.

KEYWORDS: Total Phosphorus, Available Phosphorus, Cadmium, Rice yield