

EFFECTS OF ORGANIC AMENDMENTS, DRAINAGE AND  
MULCHING ON THE RECLAMATION OF  
SALT-AFFECTED SOIL IN  
NORTHEAST THAILAND

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## ABSTRACT

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February 1982. Effects of Organic Amendments, Drainage and  
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A field experiment to determine the effects of organic amendments, of drainage and of mulching on the yield of rice and sorghum and on some chemical properties of a salt-affected soil was conducted in Kalasin province, Thailand from September 11, 1980 to July 16, 1981.

The results show that among the four kinds of organic amendments tested, rice hull and buffalo manure at the rate of 25 tons/ha each gave significantly the highest grain yield of the rice RD7 variety. In the first crop, the grain yield in the rice hull treatment was 2.331 tons/ha while the buffalo manure was 2.120 tons/ha. In the second crop, testing the residual effect of the soil amendments, the buffalo manure gave a yield of 2.732 tons/ha and rice hull, 2.420 tons/ha.

Rice RD7 variety is a medium salt tolerant variety and was able to grow on 6.70 mmhos/cm of EC.

The sesbania straw treatment gave significantly higher nitrogen and potassium in rice straw, than the buffalo manure, rice straw and rice hull treatments.

Submergence significantly increased the pH and available phosphorus in the soil.

The irrigation water was classified as C<sub>3</sub>-S<sub>1</sub> or C<sub>4</sub>-S<sub>1</sub>, which simply means it is high in salinity hazards and low in sodium hazard.

The intermittent drainage treatment before the application of 5 tons of rice straw mulch per hectare increased the grain yield, head dry weight, total dry matter production and harvest index of the sorghum over the control. The sorghum grain yield was highly correlated with head dry weight, 100-grain weight and harvest index, but not to plant height, panicle length, grain-stover ratio and total dry matter production in the intermittent drainage plot. In the no drainage plot, the sorghum grain yield was highly correlated with the head dry weight and total dry matter production, but not to plant height, panicle length, 100-grain weight, grain-stover ratio and harvest index.

Organic amendments increased the pH and available phosphorus in the soil but did not affect the electrical conductivity, organic matter and osmotic pressure.

The intermittent drainage three cycles, decreased the EC to 1.68 mmhos/cm at 25°C and increased soil pH to 5.4.

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## INTRODUCTION

Among the factors limiting agricultural production in many countries are soil salinity and alkalinity. There are various estimates of the total area affected or likely to be affected by such adverse soil conditions. Szabolcs (1980) estimated that the total area of such soil is 952 million hectares. Although a large portion of that area is not agriculturally important, an increase in population and the pressure on land make amelioration and utilization of such soils important. In South and Southeast Asia, where population pressure is high and arable land is scarce, about 54 million hectares of land are climatically, physiographically and hydrologically suited for rice; lie uncultivated largely because of salinity (Ponnamperuma and Bandyopadhyaya, 1979; Akbar and Ponnamperuma, 1980). Sankaram (1977) estimates that of the total land area of the world, about 11 percent is under cultivation, of which 40 percent lies in the arid and semi-arid regions. Nearly a quarter of this 40 percent would be suitable for cultivation if water is made available.

Soil salinity is a condition that arises from the accumulation of soluble salts in soils to a degree that adversely affect crop growth. Salinity in a soil may gradually develop under conditions of poor drainage and excessive use of poor irrigation water. These