

Geographic Information Systems (GIS) as a Decision Support Tool for Land Suitability Assessment for Rice Production in Ghana

E. Boateng

CSIR-Soil Research Institute, P.O. Box M.32, Accra, Ghana

E-mail: soilri@ncs.com.gh

Abstract

A land suitability analysis based on the Food and Agriculture Organization/International Institute for Applied Systems Analysis/Agro-Ecological Zone (FAO/IIASA/AEZ) methodology was adopted and modified to suit the environmental conditions of Ghana for the purpose of rice production. The methodology utilizes a Geographical Information System (GIS) approach for establishing a spatial inventory of land resource database to assess potential areas suitable for sustainable rice production. A spatial representation of the results of the thematic suitability assessment for the three cultivars of rice show that the percent of land area very suitable for rice production doubles from medium matured variety to early matured variety, and from early matured variety to very early matured variety. For suitable areas, and for the same sequence as just described, the percent of land area increases by 50%. However, for moderately suitable areas, the percent of land suitable for the crops ranges from 18~23% with very early matured rice variety having the highest percent of area. Areas potentially suitable for cultivation of rice in Ghana range from 26~48% of the total land mass (approx. 5~11 million ha) depending on the type of rice cultivars. Whilst the early matured variety can be grown in ecological zones where the LGP is greater than 150 days, the medium matured variety should be concentrated in ecological zones with LGP greater than 210 days. Emphasis on rice production should be to target a higher yield per hectare. Farmers should, therefore, be introduced to high yielding and disease resistant varieties to improve upon their yield.

Introduction

Rice production in Ghana is limited to inland valleys which form about 12% of the total land area (Otoo *et al.*, 1995). However, in other countries in the sub-region such as Ivory Coast, rice cultivation is on both lowlands and upland areas, provided the rainfall in the upland areas is adequate to support its growth.

Rice is now an important staple food for many Ghanaians. Its consumption increased from 11.5~26.7 kg/person/year between 1980 and 1995 (FAO, 2000). Areas under rice cultivation also increased steadily from 30.5 ha in 1966 to about 79 ha in 1975 (PPMED, 1976). From 1997 to 2000 about 100,000 ha of land out of which only 0.2%

was under irrigation were put under rice cultivation each year (PPMED, 2001). Between 1966 and 1975 the average yield was about 1 metric ton per hectare. This has doubled to 2 metric tons/ha after 1975. However, on irrigated plots yields are between 3 and 4.8 metric tons/ha.

It is important that policy makers, researchers and agro investors are aware of areas which have potential to support rice cultivation in the country so as to form the basis for any decision on rice policy. The objective of this study were 1. to use the FAO/IIASA/AEZ methodology in a computer assisted programme (Arc Info GIS) to establish areas which have potentials to support rice cultivation in Ghana under