

The sustainability of land use and problems of the soil environment as a result of rice cultivation in the Red River Delta

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Abstract

This research was carried out on fluvisols in the Red River Delta of Vietnam. The main purpose of the research was to evaluate the sustainability of paddy rice production in the Red River Delta based on analysis of land use systems, crop yields and changes in soil qualities over time. The main factors affecting the sustainable land use are also defined. The results show that rice cultivation is changing from traditional to modern techniques of production. The combination of traditional experiences and new technologies has been essential for sustainable development of agriculture in the past few decades. Consequently, rice yields have increased gradually from 2.94 t ha⁻¹ in 1985 to 3.42 t ha⁻¹ in 1990, 4.44 t ha⁻¹ in 1995 and 5.43 t ha⁻¹ in 1999.

In terms of land use systems, the area of specific use is changing very quickly with a decrease of annual crops and paddy rice. On the other hand, 'special use' and residential areas have increased. The area under annual crops and paddy rice is expected to decline to approximately 718,764 ha and 565,843 ha by the year 2010, respectively as compared to 621,793 ha and 575,869 ha in the year 2000.

At present the production of rice and the use of fertilizers do not pollute paddy soils. Residues of pesticides are generally found in soils but only at trace levels. However, it is suggested that soil contamination is observed in some areas surrounding industrial and urban areas or traditional 'handicraft' production villages. In addition, rice cultivation systems have affected many properties of the soil environment. Primarily, soil humus, nitrogen and phosphorus levels have increased. However, both total and available potassium, and soil pH have decreased. Soil acidification and decreasing potassium and cultivation areas are identified as the main causes affecting sustainable development of rice production systems in the Red River delta in the future.

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