

**Production of Rotation Crops in Rice-based Cropping Systems
as Affected by Tillage Practices and Methods of
Fertilizer Application on 2nd Rice Crop**

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ABSTRACT

To increase the yield of upland crops in rice-based cropping system, experiments on improving tillage practices and methods of fertilizer application for 2nd rice crop was carried out in Pingtung area in 1985 and 1986.

Results showed that the conventional tillage practice, plowing and puddling under flooded condition, usually resulted in soil compaction which is a barrier for root development. The compaction of soil was reduced if soil was plowing before flooding. Yield of rice was increased 2.4 to 6.1% when using this tillage method and applying fertilizer on the surface soil, but was decreased 0 to 5.9% when using this tillage method and applying fertilizer in the deep layer (8 cm from soil surface). The main reason for the yeild decrease of rice was due to the increase of nutrients leaching when fertilizer was placed in deep soil layer. The nutrients leached could be re-utilized by long-stem upland crops such as corn and sorghum planted after 2nd rice crop and led to a yield increase 0.9 to 2.4%. The yield of short-stem upland crops such as adzuki bean and soybean was not affected, because root system is so short not longer enough to absorb nutrients leached into deep soil layer.

Soil physical properties was significantly improved when soil was plowing before flooding. For instance, soil bulk density decreased from 1.34 to 1.24, and soil water content decreased from 35.1% to 31.5% after 2nd rice crop was harvested. The effect of improved soil properties made dramatically increase on the yield of fall adzuki bean (a 23% increase), but there was not effect on the yield of spring sorghum crop. Subsoil compaction might be the reason for the difference since available tillage depth only reached to 15 cm which is shallow for the root development of long-stem sorghum crop, but is suitable for short-stem adzuki bean.

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