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“Development on the margin”

Water Saving and Organic Fertilisers Based Technology to Remediate the Health of Paddy Soils and to Increase Rice Productivity in Indonesia

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Abstract

The rice production in Indonesia is dominated by permanent flooding or inundation system. Intensification of permanent flooding of paddy soils not only reduces the soil biological power significantly, but also restricts the roots growth. Virtually water to produce one kilogram of rice in continuously irrigated fields needs approximately 3,000 L of water, while the theoretical minimum at the crop scale is as low as 600 L. Under anaerobic condition, soil organisms cannot growth optimally and estimated only about 25 % rice roots can growth normally. Intensive use of inorganic fertilisers, particularly N fertilisers such as urea accelerates the mineralisation of soil organic matter. Consequently, soil organic content decreases rapidly. Various field studies indicated mostly of paddy soils in Indonesia has a low organic content ($\ll 2\%$). Under these conditions, the increasing of inorganic fertilisers dosage application may give a non significant effect on rice production and paddy soils can be categorised as a sick paddy soils. Remediation the paddy soil health can be achieved by managing the irrigation system and organic fertilisers application. The field results using several rice varieties in Indonesia revealed that the water saving technology combined with organic fertilisers (straw compost) can produce grain yield about 8 — 12 t/ha (average of an increasing about 50 — 150 % compared to anaerobic rice cultivation) and the water irrigation was reduced by at least 50 % and as well as inorganic fertilisers was reduced by 25 % This high rice yield is highly correlated with the increasing of roots zone about 4 — 10 times, number of productive tillers about 60 — 80 tillers, number of panicles, length of panicles and number of grain/panicle, and as well as due to the increase of soil biodiversity.

Keywords: Paddy soils, organic fertilizers, soil health, straw compost, water saving