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Effect of Organic Amendment on Growth and Quality of Vegetables Grown on Tsunami Affected Soil in Aceh Besar, Indonesia

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Abstract

The tsunami of 25.12.2004 degraded many coastal soils in Aceh/Indonesia by sedimentation of mud and deposition of rubble as well as contamination with salt and harmful chemicals. Upon drying, hardsetting of the soil surface layer hampers tillage and root growth. Contaminants like heavy metals can be toxic to crops or pose a threat to human health upon consumption. Rice straw compost is a local available source of organic amendments that can be used to rehabilitate the tsunami affected soils.

The objectives were to determine if rice straw compost can alleviate tsunami borne soil degradation, as assessed by growth and yield of vegetables as well as to monitor the heavy metal threat in the produce.

The effect of rice straw compost (20 t ha^{-1}) amendment to long bean (*Vigna unguiculata* ssp. *sesquipedalis*) and water spinach (*Ipomoea aquatica*) was tested in field plots (2-factorial randomised complete block design) located on tsunami and non-tsunami affected soils from September 2007 to January 2008, in Aceh Besar district.

The results show that plant height and leaf number of water spinach and long bean on tsunami affected soil were lower than on non tsunami affected soil. Harvested biomass of water spinach on tsunami soil (1.5 t ha^{-1}) was lower than on non-tsunami affected soil (3.5 t ha^{-1}). Biomass of long bean pods on soil with organic amendment (4.16 t ha^{-1}) was higher than on soil without organic amendment (3.10 t ha^{-1}). In both tsunami affected and non affected soil, concentrations of Cd and Pb were lower than 0.1 mg kg^{-1} wet weight of plants. The residual limit of Cd in food product is about 0.05–0.2 mg kg^{-1} wet weight (WHO/FAO standard). The use of organic amendment improved the production of long bean and water spinach on tsunami affected soil but yield levels are still lower than on non-affected soil. There was no harmful contamination of heavy metal in long bean and water spinach that can be dangerous to human health.

Keywords: Long bean, organic amendment, rice straw, tsunami soil, water spinach

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