



Tropentag, October 6-8, 2009, Hamburg

“Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources”

**Effects of Local Resources and Nitrogen on Soil Water pH and
Yield of Lowland Rice in Nepal**

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Abstract

Rice is the most preferred staple food crop of Nepal fulfilling more than 50% of the calorie requirement contributing 25% of the agricultural gross domestic product and 50.4% of the total food grain production in the country. Lowland rice is principal source of rice production, however, productivity of lowland rice in Nepal is very low as compared to many developed and developing countries. Out of the multitude of limiting factors, nutrient management especially nitrogen comes to forefront. Nitrogen fertiliser applied in the lowland rice paddy is subjected into several fates of which loss of nitrogen through NH_3 volatilisation is important and is the function of floodwater temperature and pH. The rapid loss of N through NH_3 volatilisation under high pH is related to the growth of algae in the floodwater. As a result of depletion of CO_2 in the water by algal growth, the pH rises as high as 9 by mid-afternoon leading to loss of Nitrogen.

An experiment aiming at finding the effects of conjoint use of local mulch materials with inorganic nitrogen on floodwater pH and yield of rice was conducted under sub-tropical condition of Nepal. Ten treatments were tested with two levels of nitrogen (50 and 100 t ha⁻¹) with different mulch materials (wheat straw, *Ipomoea cernua* and *Cassia tora*) under randomised completely block design. Floodwater pH was measured at an interval of 4 days at 12 noon. The mean maximum and minimum pH was recorded under nitrogen-omitted treatment (7.28) and 100 kg N plus 3 t ha⁻¹ of wheat straw mulch (6.87) respectively. The grain and straw yields were higher under the latter treatment which discernibly shows that less nitrogen have been lost through volatilisation. There was significant negative relationship between pH and grains per panicle ($r=-0.789^{**}$), pH and grain yield ($r=-0.754^{**}$), and pH and straw yield ($r=-0.727^*$). As NH_3 volatilisation is the pH driven phenomena, straw mulch applied in rice field is considered a good source to decrease the pH of floodwater concomitantly improving the nitrogen use efficiency in rice, save the water bodies; soil and aerial environment vis-à-vis provide better production at lower cost.

Keywords: *Cassia tora*, floodwater, *Ipomoea cernua*, mulching materials