B-63: Residual effect of acidulated mica, a local S-Mg-K fertilizer, on rice cultivation

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A field experiment was conducted with a less refined fertilizer based on locally available mica containing K-Mg-S and trace elements. Application rates of 1,500 kg/ha containing equivalent K to recommended MOP (33 kg/ha) and 150 kg/ha acidulated mica were compared with the highly concentrated K(MOP) fertilizer control. Treatment with K(MOP) combined with 625 kg/ha dolomite containing equivalent Mg to 1,500 kg/ha acidulated mica and a KO control were also established. NP fertilizer was added to all treatments. The residual effect of all K and Mg fertilizers were checked during the following season by eliminating K, Mg basal application.

The differences in yield between K(MOP) and KO controls were 10% and zero in the 2 consecutive seasons indicating absence of a residual K effect from the highly refined and soluble MOP-K source. The differences in yield between the 1,500 kg/ha acidulated mica treatment in the 2 seasons over the KO control were 21% and 10% respectively. Thus, the acidulated mica treatment maintained a yield increase of above 10% over th K(MOP) control in the 2nd season without fertilizer replenishment. While the treatment with dolomite + K(MOP) showed no yield effect in the 1st season, a marked 9% yield increase was obtained in the 2nd season over the K(MOP) control suggesting a response to Mg fertilizer input.

Treatment with a high Mg input had changed the soil exchangeable K/Mg ratio significantly from 0.51 (KO control) to 0.63 (acidulated mica) and shoot K/Mg from 18.5 to 13.7 resulting in a higher yield. A correlation coefficient of 0.9395 between exchangeable K/Mg after the 1st harvest and yield was obtained. The soil K/Mg ratio averaged 0.53 for all treatments in the 2nd season in agreement with the narrower yield margin (10%) between the KO control and the highest yielding treatment (1,500 kg/ha acidulated mica). The exchangeable K and Mg pools had

reduced by half after the residual trial. These experiments appear to point towards a hidden hunger for Mg even in paddy soils since cultivation of high yielding rice varieties has intensified the need for NPK fertilizers thereby accelerating the depletion of other soil nutrients such as Mg.