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## Effects of Cropping Intensity on Rice Production in Myanmar

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### Abstract

In the Southeast Asian country of Myanmar population pressure presently leads to a widespread intensification of the irrigated rice production through increased application of mineral nitrogen (N), higher cropping frequencies and the use of modern, high yielding cultivars. To determine the effects of such changes in the production system on the sustainability of rice production, a multi-factorial soil fertility experiment was established in early 2001 at two contrasting field sites. The objectives of this project were **(i)** to identify the yield constraints and N use efficiency in paddy rice, **(ii)** to understand the causes and site-specific variation of these constraints and **(iii)** to develop management strategies to overcome such constraints to increased rice production based on a holistic understanding of the soil-plant continuum. Three cropping sequences were established representing different intensities of rice cultivation: rice double cropping with fallow, rice double cropping with a legume (black gram, *Vigna mungo* L.) in the third season and rice triple cropping. Fertility treatments were 2 t ha<sup>-1</sup> straw or the equivalent in ash combined with 40 to 120 kg N ha<sup>-1</sup> in various split application schemes. Increased application of N led to increased disease incidence, but these effects were site-specific and likely reflected more complex interactions with soil properties. Overall, disease pressure was higher at Hmwabi in southern Myanmar (2300 mm annual rainfall; clayey loam) than at Yezin in the upper part of the country (1310 mm; sandy loam) but fertility treatments increased the pressure only at Yezin. Treatments-induced differences in rice yield varied greatly between sites with immediate yield increases following N addition at the more sandy site of Yezin in central Myanmar. At the Hmwabi site with higher rainfall, however, straw addition seemed to hamper the effects of N at low levels. Overall, there was no difference between straw and ash application nor any interaction of these treatments with N-application during the first four seasons. However, over time straw, split N-application and cropping system effects interacted significantly indicating that cropping system effects on N-use efficiency needed time to built up.

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