1993

WHERE DO GREEN MANURES FIT IN ASIAN RICE CROPPING SYSTEMS?*

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ABSTRACT

The mesophytic leguminous species that are suitable as green manures for lowland rice fall into two broad types, as distinguished by their contrasting niches in the cropping system: pre-rice and post-rice green manures. Most prominent in recent research are the pre-rice green manures, due to the recent introduction of waterlogging tolerant, stem-nodulating species such as *Sesbania rostrata*. Post-rice green manures (eg. Astragalus sinica, Indigofera tinctoria) have historically played a much greater role in Asian agriculture, and new forage systems are further expanding the options in these niches. During the 1980s Asian rice farming systems continued to intensify and commercialize. Changing green manure technology is interacting dynamically with cropping systems in rapid flux.

Considerable work has now been done on the soil fertility implications of green manures, but research on the agronomics of green manure systems (plant selection, seed production, crop establishment, and other management factors) has been greatly neglected. It is the agronomic constraints which ultimately determine the feasibility and cost effectiveness of these systems.

This paper reviews the strategies for green manure inclusion in rice farming systems, and develops a qualitative framework for the analysis of the fit of green manures and other soil-improving legumes across the range of ecological niches. Hydrology is the dominant spatial factor controlling green manure adaptation: Waterlogging conditions specifically favor green manures relative to other non-rice species; the comparative productivity of green manures is also strongly favored on sandy soils. Even in intensive irrigated systems there now are several practical pre-rice and post-rice options (eg broadcast relay-cropping). Year-to year performance variability is recognized as a major factor impinging on green manure suitability, particularly in rainfed systems is consistently higher than for inorganic N sources in irrigated systems.

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