

Entry No. IRRC-0187

Category	: International Rice Research Conference
Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Farm diversification
Keyword 2	: Sustainable management practices
Keyword 3	: Ecological approaches
Title of Entry	: The potential of agroforestry to sustain rice production in Africa
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Trees are not commonly integrated with rice production in a deliberate manner, in particular not in Africa. Experiences with other crops, suggest that agroforestry could offer a pathway to sustainable intensification and diversification of rice production systems. To assess what evidence is available on impacts of trees on rice production and the benefits and challenges associated with integrating trees in rice production systems, a systematic review of scientific literature was conducted. The review, mainly of Asian studies, revealed existence of six distinct, but partly overlapping, practices: 1. long-term tree - rice rotations (Rotation), 2.

hedgerow intercropping (Hedgerow), 3. green manuring biomass transfer systems (Biomass), 4. classical long-term rice – tree intercropping (Intercrop), 5. traditional agroforestry practices (Tradition), and 6. forest and fallow management (Forest). The literature covered reports on 87 different tree or perennial shrub species. Rice yields were the most commonly reported parameter in these studies, enabling analyses of rice productivity across practices and tree species. The most positive impacts were found with Hedgerow and Biomass practices. High-potential tree species for further testing and scaling, with respect to Africa are 1. *Senna siamea*, 2. *Sesbania rostrata*, 3. *Acacia auriculiformis*, 4. *Gliricidia sepium*, 5. *Acacia nilotica* and 6. *Leuceana leucocephala*. These tree species combine (rice) yield-enhancing effects or other products and services, with environmental adaptability and a wide distribution. Scaling of rice agroforestry practices and tree species requires systematic research to match them to ecological, agronomic, and socio-economic contexts and to ensure they contribute to the maintenance of tree diversity at landscape scales. An iterative research-in-development approach is proposed involving four key stages: 1. the selection of high-potential species and practices for target scaling domains (including screening of native species in the context of local knowledge), 2. participatory testing of promising options across environmental and socio-economic contexts within scaling domains, 3. development of tools and models for matching practices and species based on multi-criteria and multi-stakeholder analyses of their performance 4. development of recommendations for scaling practices and species to new geographies based on understanding of how contextual factors condition adoptability of practices and species and on rice-tree model simulations.

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