

# *les dossiers* d'**AGROPOLIS** INTERNATIONAL

*Expertise of the scientific community  
in the Languedoc-Roussillon region (France)*



## Family farming





▲ A traditional lowland cropping area on the brink of saturation.

▼ Agroecological upland rice cropping promoted by research.

## Ecosystem functions of service plants— a case study of upland rice crops in highland areas of Madagascar

Biodiversity is pivotal to the ecological intensification concept, to ensure optimal natural resource management and serve as a guarantor of the resilience of family farming production systems. These systems are increasingly hampered by natural and socioeconomic turbulence.

In Madagascar, in the CIRAD priority research platform ‘Highland production systems and sustainability’, UPR AIDA conducts research and development activities on different scales—plot to *terroir*—with the aim of enhancing the sustainability of upland rice cropping in highland regions, while providing food security and generating new income to overcome the problem of land saturation in irrigated areas.

An iterative participatory approach, involving analysis, monitoring of reference farms and controlled experiments under real field conditions, enables innovation in a step-by-step production system design process, combining local know-how and external scientific and technical knowledge to meet current and future needs.



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In the short term, the main challenge is integrated management of upland rice pests. This crop is hampered by many constraints due to fungal diseases, white grub infestations and parasitism (*Striga asiatica*). The genetic diversity of upland rice (selection and breeding) associated with the introduction of service plants in the crop sequence and crop diversification are being studied on a cropping system scale. Innovation adaptation, adoption and dissemination will follow this learning phase.

In the medium and long term, biodiversity generated by the introduction of service plants will provide fodder opportunities for dairy farmers and generate, via soil-livestock plant resource sharing, synergies between these two main constituents of production systems.

The genetic biodiversity and multifunctional service plants introduced in upland rice cropping systems are gradually being appropriated in the highland and middle western regions of Madagascar. This has given rise to agrobiological models that could be applicable in other settings.

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