

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

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



## Family farming



## Ecological intensification of rubber plantations in marginal areas

Many smallholders in Southeast Asia are currently developing rubber plantations (*Hevea brasiliensis* Muell. Arg.) in regions that are relatively unsuitable for growing this tree due to the soil-climate conditions. This leads to substantial delays before the trees become productive and increased soil erosion risks. The introduction of perennial cover crops between three rows could be an option to minimize these hazards. In northeastern Thailand, two cover crops were studied by UMR Eco&Sols: *Hevea/Pueraria phaseolides*, a legume, and *Hevea/Vetiveria zizanoides*, a grass. Cover crops were planted in the inter-rows in a young rubber plantation (3 years old). They were cut every 3 months and the biomass was spread on the soil surface as mulch.



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▲ *Hevea/Pueraria* and *Hevea/Vetiveria* associations.

After 4 years, 74% of the nitrogen incorporated in rubber leaves was derived from biological fixation by the legume crop. In deep soil, *Pueraria* also enhanced the water status of the trees via its effect on their root distribution. The growth rate of rubber trees associated with *Pueraria* was twofold higher than that of trees grown without a cover crop in the inter-rows. The introduction of *Vetiveria* did not have significant effects on rubber trees in deep soil. However, in shallow soil, the two cover crops had negative impacts on rubber tree survival in the dry season due to competition for water resources.

These results show that, in shallow soil, farmers have very little leeway for reducing the time before rubber trees begin producing. However, in deeper soils in these regions, the introduction of *Pueraria* helps preserve the soils and improve young rubber tree growth. Direct seeding of food crops under *Pueraria* cover could be considered in order to make better use of the high quantities of nitrogen released by the legume crop in the inter-rows in rubber plantations, thus enabling smallholders to earn additional income.

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## Drip irrigation systems of family farmers in Morocco

As water becomes increasingly scarce, Morocco has an international reputation regarding localized irrigation, with farmers and private companies at the forefront of technology. This is supported by an ambitious policy to reduce pressure on water resources by favouring the conversion of surface irrigation into localized systems (especially drip irrigation). According to the national irrigation water-saving plan, 550 000 ha will be converted by 2020 through a highly subsidized investment scheme. In the field, however, another major but less publicized phenomenon is under way—the dissemination of alternative inexpensive drip irrigation systems that are well adapted to Moroccan family farming conditions thanks to the involvement of many often informal intermediaries. This gives family farmers access to technology whereby plants are watered directly at the foot, so it is in line with these farmers' physical, economic and social situations.

In collaboration with its partners (IAV<sup>\*</sup> Hassan II, ENA<sup>\*\*</sup> Meknès, University of Wageningen), UMR G-EAU studied localized irrigation system innovation processes and their impacts on water resources. Farmers have developed a broad range of different drip irrigation systems to meet their specific agro-economic (improve their agricultural production, reduce labour requirements, etc.) and socioprofessional (enhance their social status, gain knowledge to integrate new drip irrigation services) needs. It is only the State that explicitly associates this phenomenon with the water-saving dimension.

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▲ A drip irrigation system with above-ground gated pipes at Saiss (Morocco).

The study findings revealed that the introduction of drip irrigation on a farm does not always mean that water is saved on the field (irrigation practices not water-efficient) or farm (production intensification) scale, and it may even increase pressure on water resources, particularly groundwater. It is essential to gain greater insight into farmers' reasons for using drip irrigation so that water savings will be an important issue in discussions between the State and irrigators. Farmers' rationales underlie their choice of irrigation practices and thus the performance of their drip irrigation systems.

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