

Impact of technologies and market access on natural resources and farming systems Southern Xayaburi province, Lao PDR

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Landscape unit on the south of Sayaboury

Context

Traditional farming systems have drastically changed over the last fifteen years in southern Xayaburi province through considerable agricultural development based on rainfed cash crops production such as maize, rice-bean (*Vigna umbellata*), peanut, Job's tears (*Coix lacryma*), black cowpea (*Vigna unguiculata*) and sesame. This development depends mainly on local market accessibility, transfer of technologies from Thailand and financial capacities of local traders (inputs, heavy mechanization and technical skills from Thailand).

Degradation of natural resources, destruction of roads and paddy fields on the lowland

As a result of this development, associated with land allocation and increasing population density, fallow periods are disappearing and agricultural systems are not conserving soils and nutrients. Even arable land with very good soils and high potential for agricultural development can be rapidly degraded, in which case negative social and economic impacts follow.



Land and paddy fields degradation

Towards a marked differentiation according to production area



Rice-bean direct seeded on maize residus and pasture land of *B. ruziziensis* (background)

In areas with high soil fertility, maize cropping is the main cash income source of most households. Despite high yields (mean value of 5.0 t/ha), labour productivity is relatively low (mean US\$ 2.25/ha) because of the high production costs (mean US\$ 175/ha) incurred by ploughing, seed purchase, and chemical weeding.

In the most degraded areas a combination of multicropping, animal husbandry and off-farm activities is observed, allowing for a balanced distribution of farming activities over time and space. These strategies aim to reduce climatic and economic risks in a fragile ecosystem.

Challenges to convert this 'resource-mining' production

In order to convert this 'resource-mining' production to a stabilising plant-soil system, an iterative approach has been implemented to analyse the technical and socio-economic viabilities of direct seeding mulch-based cropping (DMC) systems. Positive results from DMC are evident; however, obtaining all the biophysical and economic advantages of these systems involves a long process:

- Economic incentives have to be promoted. One of the major limiting factors to adoption may be that the practice promoted was first perceived as being closely associated with a need to use cash income for equipment and inputs.
- Labour force is one of the main limiting factors, and specific tools have to be promote in order to reduce drudgery and labour inputs.
- Rules must be defined at the community level for management of residues and cover crops during the dry season.
- Land allocation must be flexible, taking into account the diversity of livelihoods in the uplands.

