World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

Pathways for Agroforestry Development in North-West Vietnam

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BACKGROUND

Deforestation and land degradation in connection with shifting cultivation and mono-cropping is a major issue in the northwestern uplands of Vietnam. Fallow cycling in shifting cultivation has been reduced or is non-existent, exacerbated by an increasing population, greater land allocation and strong market liberation and demand. Mono-cropping of maize, upland rice, cassava, teak and currently also rubber is expanding (Photo 1), mainly for economic purposes. On forest land, farmers cut down trees and either plant food crops or sell the timber. As a consequence, during 1990–1995, forest cover was reduced to around 10% and was highly fragmented with a significant loss of biodiversity. Soil erosion owing to unsustainable sloping cultivation is alarming (68 t/ha/year under maize in Yen Son district, Upland program 2010).

Research ideas for bringing trees back to the landscape for more sustainable farming are under development by the World Agroforestry Centre Vietnam and its national partners as a part of the Australian Centre for International Agricultural Research (ACIAR) program in the area. The role of trees in increasing income to local farmers, either directly or indirectly through livestock, and at the same time improving soil and water quality, is a focus of the program.

A scoping study has been being carried out by the Centre's interdisciplinary team that includes international and national experts . Begining in May 2010, we have worked in three provinces, with a focus on Son La province (Map 1). The methods used are reviews, interviews, field visits and workshops with local stakeholders including local government, research institutes, universities and farmers (Photo 2).

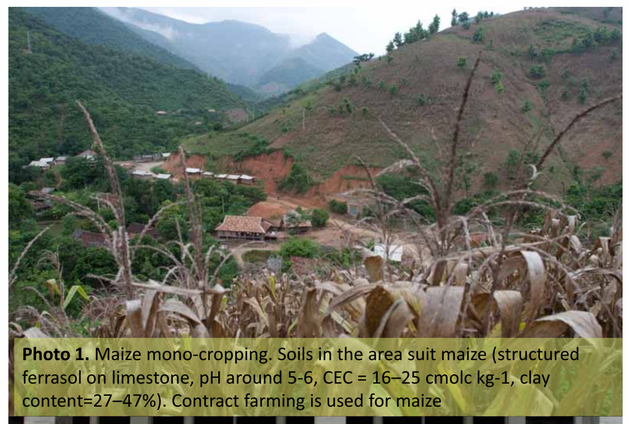

Photo 1. Maize mono-cropping. Soils in the area suit maize (structured ferrasol on limestone, pH around 5-6, CEC = 16–25 cmolc kg-1, clay content=27–47%). Contract farming is used for maize

Photo 2. Stakeholders' workshop. Integrated agroforestry systems are highly recommended as links between economic growth and environmental protection

RESEARCH FRAMEWORK

Assumption

Trees in farming landscapes in northwestern Vietnam will make the agricultural system more profitable, environmentally sustainable and resilient.

Research questions

1. What species, what agroforestry systems and management principles are most suitable in different agro-ecological zones?
2. What are the costs, benefits, risks and trade-offs between the economic, environmental and cultural benefits of the agroforestry options?
3. Which markets and agroforestry products provide significant opportunities for farmers and how can access to these markets be improved?
4. What are the most appropriate models for supplying tree germplasm to farmers?
5. What are appropriate policies and institutions required for adoption and optimal management of the different agroforestry options?

PRINCIPLES FOR DESIGNING AGROFORESTRY SYSTEMS

The systems should contain trees, crops and animals that

a) are of high priority for socio-economic development in the region;
b) are most suitable for the climate and soil conditions; and
c) have good markets for products that will provide income to local farmers.

The successful agroforestry systems should

a) fully incorporate local knowledge and other research findings for designing experiments and assessing their impacts;
b) use on-farm experiments to maximise the involvement of local farmers; and
c) have clear quantitative and qualitative assessments (Figure 1).

The geographical areas of research should be 'hotspots' for mono-cropping threat as well as have a strong willingness to participate from local people. Experiments should be located close to research stations in the region in order to maximize cost-efficiency of staff, data availability and superior seed and seedling supply.

Our proposed research framework with activities is illustrated in Figure 1 below.

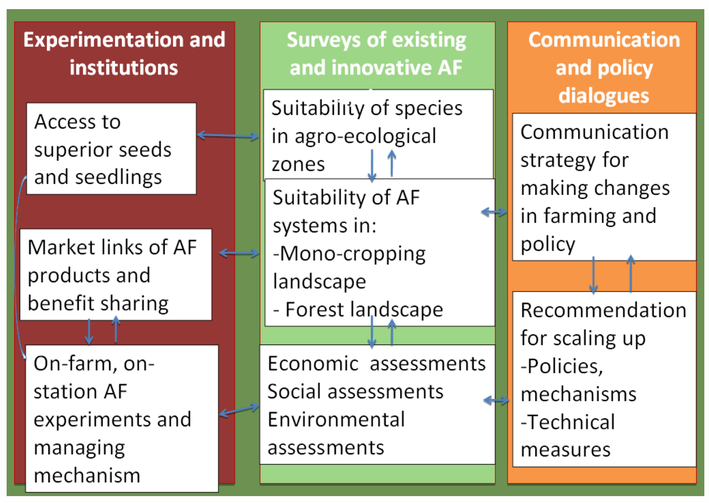

Figure 1. Research framework for the development of agroforestry systems in northwestern Vietnam

PROMISING AGROFORESTRY SYSTEMS

Following the principles mentioned above, 20 species have been found to be suitable for different spatial and temporal arrangements in the mono-cropping landscape (elevation below 800 m and slope less than 30 degrees) (Photos 3, 4, 5).

About 10 local species were selected as the most suitable for multi-strata and multi-purpose agroforestry systems in the forest landscape (elevation above 800 m and slope less than 30 degrees) (Photo 6). Products of local species are well known mainly in the local market but also in Hanoi (Photo 7).

Agroforestry systems in a mono-cropping landscape are familiar to the region. Therefore, there is a high possibility of expanding the systems' scale (Figure 2). However, multi-strata and multi-purpose agroforestry systems are new to the region. These systems face more challenges than the familiar systems (Figure 3).

Figure 2. SWOT analysis of agroforestry systems suggested for mono-cropping landscapes

Strengths: Meet the needs of NW region in enhancing livelihoods and environmental protection.
Tree components make intensified crops (maize etc) be more sustainable on sloping land
Different species arrangements (temporal and spatial) fit with different landscape units

Weaknesses: Competition for light, nutrients and water between trees and crops if arrangement is not good
Compete land with mono-cropping

Opportunities: Stable farming. Extensive knowledge among local farmers and local decision makers about these systems. The systems are promoted for large areas that currently are under shifting cultivation and mono-cropping

Threats: Farmers do not want to lose land for trees. Intercropping differs from traditional shifting cultivation. Therefore it is difficult to change. Steep slopes prone to erosion. Difficult to access in the field due to complex landscape. Knowledge and farming skills lacking in local farmers. Lack of funds and professionals to guide farmers. Policies are overlapping and also incomplete

Figure 3. SWOT analysis of multi-strata and multi-purpose agroforestry systems in forest landscapes

Strengths: Can improve livelihoods and protect forests at the same time
Creates new jobs for local farmers
Diversifies products; suitable for 'one village one product' strategy

Weaknesses: Difficult to define 'objective' species
Complex management techniques
Difficult to create large market
Complex mechanisms (access to trees, tree products; managing trees and benefit sharing)

Opportunities: Suitable for the large areas of natural protected forest under community management
Many mechanism and *policies* of this land use (661, 35, Payments for ES), supportive of AF development
Market for products is available and can be promoted

Threats: Natural disasters (droughts, floods, epidemics, forest fire)
Slow return
New system, therefore lack of knowledge and experience in implementing
Lack of funds

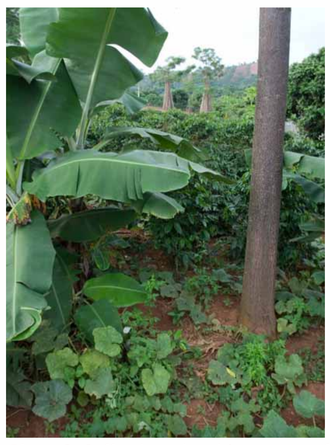

Photo 3. Coffee-based multi-strata agroforestry system. Local coffee species (*Robusta* spp) in Son La are well known throughout Vietnam

Photo 4. Banana-based multi-strata agroforestry system. Banana has a good local market, sold and consumed both fresh and dried

Photo 5. Teak-based agroforestry systems. Teak intercropped with maize, in greenbanks, rows or parkland trees. Teak is sold for furniture timber whenever farmers need money

Photo 6a. Tree garden in a forest landscape

Photo 6b. 'Tao Meo' species, the favorite local species in forest gardens in Son La at elevations of more than 800 m

Photo 7. Some products from local species

IMPLEMENTATION STRATEGY

The World Agroforestry Centre is the coordinator and national partners are in charge of different components (Figure 4). Research and development partners collaborate closely over the whole research process. Participatory design is applied, where researchers lead surveys, but farmers lead experiments and monitoring at farm level. Local and science knowledge is combined in order to optimize ecologica agroforestry arrangements at landscape level

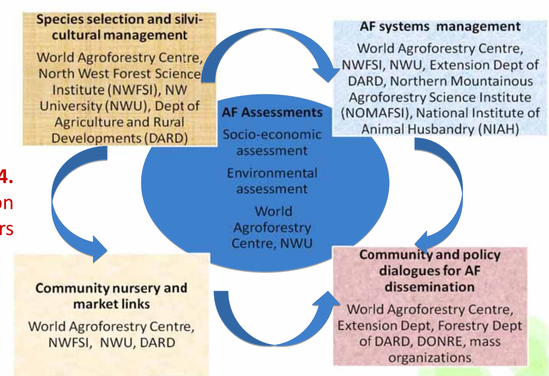

Figure 4. Implementation and actors

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