How does Thailand’s economic growth and crisis influence land use decisions of upland and highland farmers, and what are the environmental and economic policy implications?

Things to concentrate on

Focus & efficiency  This is a small project with limited resources and a short time horizon. We need to ensure that the research addresses a manageable number of goals and activities.

Relevance and replicability  Careful review of secondary data and appropriate literature is important to help ensure that project outputs will be seen as relevant. In addition it is highly desirable that the findings are demonstrably applicable beyond the study site itself.

Product differentiation  There is a lot of ongoing work in N. Thailand on resource management, upland agricultural development, and other related areas. The project needs to be designed so as to take advantage of existing work and add significant value to it.

A proposed research strategy

Initially at least, the project should maintain a very tight focus on the economic analysis of determinants of land use patterns by upland and highland farmers, as set out in the proposal document. Although the potential impact of the research ultimately depends on informed policy and environmental implications, these can only be obtained by careful attention to the analysis of causes. One clear way to maintain focus, ensure relevance and facilitate product differentiation is to focus on the issue of overall Thai economic development and policy as an influence on upland and highland agricultural resource allocation.

Our preliminary analysis of regional data (Coxhead and Jiraporn 1997) identified wage growth and associated out-migration from agriculture as a dominant influence on aggregate agricultural land area and agricultural technology. We found that wage growth in agriculture was in turn caused by growth of labor demand in non-agricultural sectors, particularly as the result of the investment boom that followed a series of trade policy and capital account reforms beginning in the late 1980s. Our analysis also raised questions about the environmental impacts of crop diversification, especially into field crops such as corn and soybean, that has been driven in large part by trade policy and related initiatives of the Thai government. However, an inspection of province-level data revealed considerable variation in the pace, timing and even direction
of aggregate land are change since the late 1980s. Linear multiple regression analysis revealed that this could be explained in part by provincial variations in infrastructure, land quality and supply-side labor market variables such as education. However, the analysis was not based on any microeconomic theory of resource allocation, and other sources of variation and more complex relationships cannot be ruled out. In particular, there is a large body of evidence identifying cultural and institutional constraints to land use decisions by farmers in Northern Thailand. A closer exploration of changes in the agricultural resource base and of land use in particular requires farm-level and community-level data underpinned by explicit models of economic behavior.

On the basis of the above findings, we may consider focusing our research on a test of the following hypothesis:

*That subject to the constraint of access to product and labor markets, structural changes in the Thai economy as a whole, and in particular the growth of non-agricultural employment and the reform of trade and macroeconomic policies, are dominant influences on the land use decisions of farmers in upland and highland areas.*

A test of this hypothesis requires the collection and analysis of data on the determinants of land use decisions in a sample of farms spanning a range of market access conditions (these may be governed by distance, travel time and cost, information flows, and supply-side conditions in labor markets as well as by a variety of other factors). It further requires an evaluation of the causal linkages between economic growth and policies and the generation of market and price signals received by farmers. The latter can be accomplished by further analysis of secondary data, linked to the farm-level data through product and factor market models.

The implications of our work for environmental management and economic policy can then be expressed as corollaries to this hypothesis.

*Corollary 1: Given the importance of individual land use decisions for key environmental outcomes such as soil erosion and deforestation, ex ante evaluations of the welfare impacts of national-level economic growth strategies and policy decisions must explicitly take account of their predicted impacts on resource allocation decisions in upland and highland agricultural sectors.*
Corollary 2: Since land use decisions in response to market signals are constrained by local agronomic, cultural and institutional conditions, there is scope for initiatives by communities, local governments and NGO groups to influence farmers’ resource allocation in ways that reduce the risk of environmental degradation.

In asking about the effects of economic growth (and crisis) on upland and highland land use, we can adopt a primary focus on the role of markets for labor and agricultural products, with other economic phenomena and infrastructural, biophysical, cultural and community-level variables as constraints. As a starting point we need to characterize the economic development context of individual decisions. Subsequently we need to obtain an understanding of the ways in which farm-level and community level constraints and opportunities condition land use decisions, and of the implications of relaxing these. Finally, we have a unique opportunity to address the economic and environmental implications of the current Thai economic crisis.

Pursuing these topics implies addressing the following questions:

1. How has long-term economic growth and structural change influenced the economic choice set of upland and highland agricultural sectors? What changes in this set are indicated by the current economic crisis?
2. What land use responses do economy-wide changes elicit from farmers under a range of infrastructural, cultural, market access and biophysical conditions?
3. How are land use choices conditioned by community, local government and NGO resources and interventions?

The first stage of the research should adhere closely to the above structure and research questions. Once it is firmly established that they can be addressed in a meaningful way with the time and resources at hand, we might consider options to expand the scope, or to build links to other research projects (e.g., for the purpose of assessing environmental outcomes in a more direct manner).

**Issues in sample design and selection**
In choosing a sample for the collection of farm-level and community-level data we must take care to ensure adequate coverage, but also be cognizant of constraints imposed by time and financial resources.

From a statistical point of view it is vital to choose a sample exhibiting substantial variation in market access. This should be defined by a “true”
measure of distance, i.e. one taking account not only of geographical distance but of other factors such as travel time and transport cost to a central point (or to several central points having comparable economic characteristics). We should construct an index of distance characteristics using the common unit of effective travel cost.

It is also essential that our sample exhibit variation in land use (or rather, in the propensity for changes in land use) and in local agronomic and institutional conditions that indicate potential environmental stress and the capacity of communities to analyze and act upon it. For this purpose it is appropriate to stratify the sample by agro-ecological zones (altitude, prevailing slope and broad soil types are candidates for this). To obtain a more broadly representative sample we should replicate the strata in several different areas, e.g. provinces.

Once provinces are selected, sample selection by village can be guided by a survey of key characteristics in the NRC village-level data set. This data set contains information from which a “true” distance measure can be constructed, and also provides data on broad agro-ecological conditions. We can use these data to draw a sample of villages in each province. Variation in “true” distance can be embedded by drawing villages along a continuum of the “true” distance measure. Within each village so chosen, a sample of farmers can be drawn at random from household data to be supplied by village leaders. Care must be exercised to ensure that the sampling within each stratum is broadly representative of the wider Northern Thailand agricultural population.

Assuming we were to choose three provinces and to stratify by three broad agro-ecological zones (e.g. upland, mid-altitude and highland), we would need a minimum sample size of about 75 farmers in each stratum (25 per stratum per province, a total of 225 respondents). A good sampling strategy might be to choose 10 farmers from each of 2 villages in each agro-ecozone and province, a total of 10x2x3x3=180. If it takes a maximum of one day to interview each farmer plus a maximum ‘fixed cost’ of five days (average) per village, the maximum time required for the survey will be 180 + (5*18) = 270 days. With two interviewers the total time required for the survey will thus be 135 days, or about 4 months.