

Collaborative Research Program: “Sustainable Land Use and Rural Development in Mountainous Regions in Southeast Asia”

DFG-Sonderforschungsbereich 564

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Research Concept

High population growth, reinforced by resettlement programmes and migration, has increased the pressure on already marginal and fragile natural resources in many mountainous regions of South-East Asia, thus threatening their sustainability.

In these regions, we observe vicious circles with shortened fallow periods, increasing erosion and loss of land fertility leading, often with accelerating speed, to decreasing agricultural productivity and degradation of natural resources. Rising rural poverty, under-employment and food insecurity are the consequences.

The objective of the Special Research Programme (SFB) is to contribute to preserving natural resources and improving the living conditions of the rural population in the mountainous regions of South-East Asia. Therefore, two important, closely inter-related areas need to be investigated scientifically.

Sustainable land use ↔ sustainable rural development

The concept is based on the hypothesis that the development of sustainable land use systems in situations of increasing population pressure cannot be successful without the simultaneous creation of off-farm income-generating opportunities and an appropriate institutional and infrastructural framework in rural areas. The agricultural sector, with its limited resource potential in mountainous regions, cannot absorb the growing population. Rural development, with the creation of additional possibilities for earning in upstream and downstream areas of agriculture is therefore an indispensable prerequisite for sustainable land use.

In terms of methodological aspects, scientific methods for carrying out research into ecological systems and their dynamics will be developed and the conditions for applying them in complex ecological systems with ethnic diversity and a heterogeneous institutional framework will be analysed.

Initial situation and problems addressed

Mountainous regions in South-East Asia

The dynamic economic growth in South-East Asia, with a yearly GDP growth rate of around 8% in Thailand and Vietnam from the 1980s until the mid-1990s, was concentrated in the commercial and industrial sectors and trade in the urban centres. It was linked with exploitation of natural resources and isolation of rural areas in terms of overall economic development. In Vietnam, an economic boom was experienced in the early 1990s after the introduction of a wide-ranging transformation process from a centrally planned economy to a more market-oriented one, and a similar development is now evident.

Until now, the mountainous regions of South-East Asia were isolated to a large extent, not only from the rapid economic development in areas surrounding urban centres (like Bangkok, Chiang Mai and Hanoi), but also from the “green revolution” in the traditional rice-growing regions (central provinces of Thailand, Red River and Mekong deltas of Vietnam). Nevertheless, the inhabitants of these regions face profound changes: increased purchasing power in the urban centres and developed regions leads to changes in consumption levels and in the consumption structure. Contrary to traditional foodstuffs, the demand for high-value foodstuffs, above all demand for fruits, vegetables and livestock products is increasing. Simultaneously, the desire for a higher living standard and thus for monetary incomes is growing in rural areas.

The mountainous regions of South-East Asia are mainly inhabited by ethnic minorities, some of whom migrated to these regions centuries ago, and the groups living in the lower and middle levels of the mountainous regions especially, the so-called “foothills” (under 800m), cultivate and practise irrigated agriculture, for example, the Karen in northern Thailand and the Thai in northern Vietnam. But by far the majority of the so-called “mountain population” in Thailand and Vietnam migrated to these regions in the twentieth century and settled mainly on the higher levels (above 800m). Important representatives of these population groups, which traditionally practise an extensive form of “slash and burn” agriculture, are the Hmong, Akha, Lisu and Lahu in northern Thailand, and the Hmong, Mien and Dao in northern Vietnam. In both countries, the natural population growth in mountainous regions is over 3%, higher than the national average. Especially in Thailand, the inflow of immigrants from the neighbouring countries of Myanmar (formerly Burma) and Laos continues to add to population growth. The pressure on the mountainous regions, and especially on the erosion-damaged hills, is in addition intensified in both countries by increasing immigration from the population-dense valley areas and by resettlement resulting from large hydro dam construction projects. With this development, the population in Chiang Mai province in northern Thailand increased by 12% per year in the early 1990s. In Son La province in north-western Vietnam, the population more than tripled between 1960 and 1995.

Worldwide importance of mountainous regions

Mountainous regions are of basic importance for the global ecological system. They are important stores of fresh water and energy, and offer living space for plants and animals that are often found only in these regions. The mountainous regions are distinguished from other regions by complex ecological interaction and high vulnerability. The heterogeneity of climate, edaphic, hydrological, economic and socio-structural conditions brings about a high variability of land use and production processes. Around 10% of the world’s population depends directly on the resources of these regions. Many more people are affected by the impact of inappropriate use of mountainous regions.

(Source: ATSAF, GTZ, BMZ (1996): International agricultural research, Bonn).

In the mountainous regions of Thailand and Vietnam, opium production has, up to now, been a main source of income.¹ In the past, the national governments of these countries made every effort to substitute poppy cultivation by introducing alternative crops. However, up to now,

¹ Cultivation of the opium poppy (*papaver somniferum*) is only possible here at altitudes of over 800m above sea level.

there has been a lack of feasible alternatives with long-term concepts for sustainable land use and rural development, geared towards reducing the increasing erosion as well as towards combating rural poverty. Moreover, agriculture in the mountainous regions of both countries is in conflict with other policy objectives such as large-scale afforestation of deforested regions, designation of wildlife reserves and water protection zones, as well as the construction of dams for securing energy provision. To some extent, these developments and policy measures damage sustainable land use, as is shown by the Hoa Binh dam in northern Vietnam, which was established in 1979. The resettlement of the rural population in neighbouring mountainous regions led to such extensive deforestation and erosion damage that the estimated life expectation of the dam was reduced from its original 300 years to the present estimate of 70 - 80 years.

Adaptation processes and problem areas

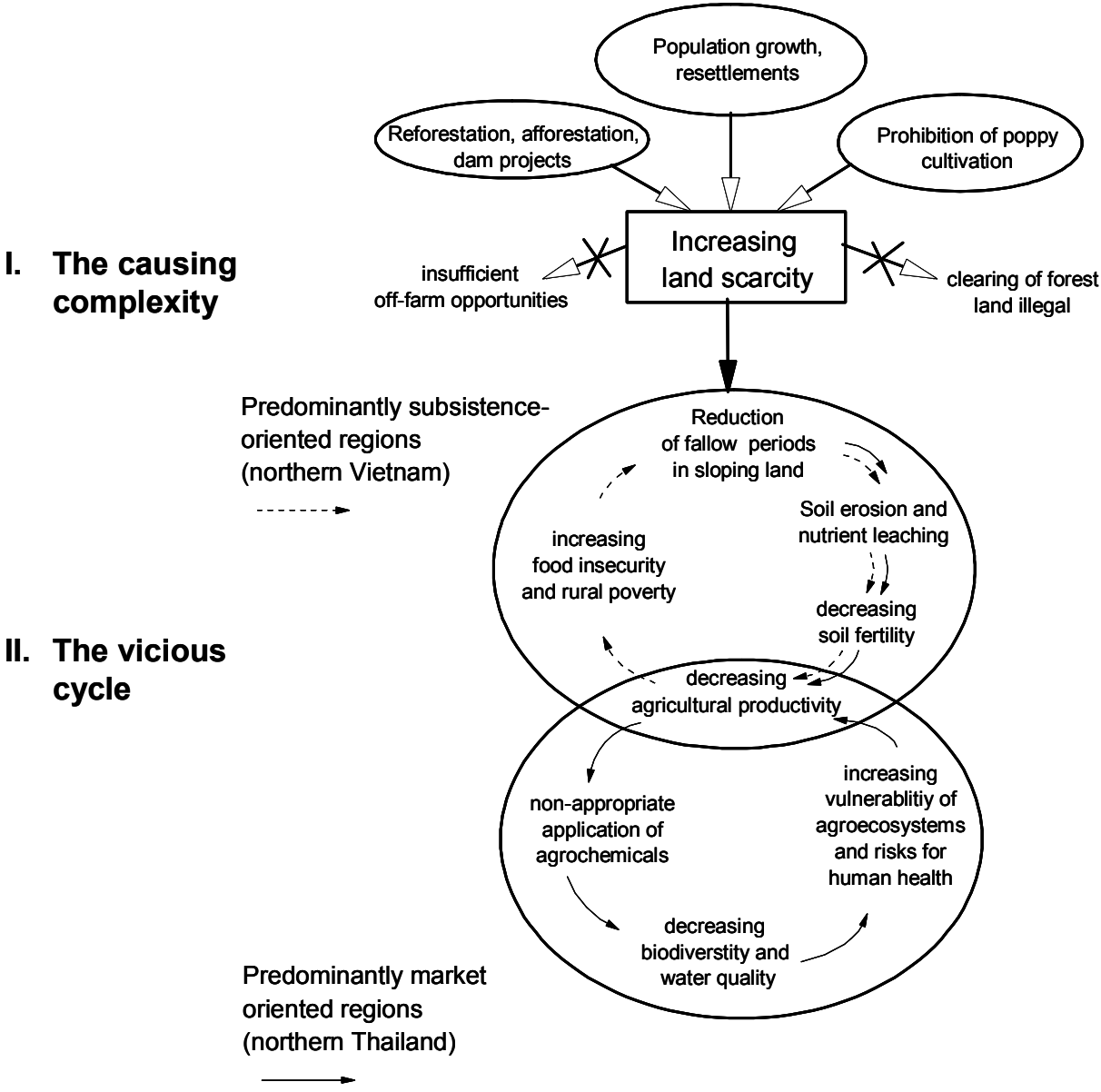
The pressure of cultivating on ever-smaller areas and the rapid change from shifting cultivation and fallow practice to permanent agriculture has led to overuse and long-term damage of natural resources in many regions of northern Thailand and northern Vietnam (see Figure 1). Whereas problems still exist in extensive subsistence-oriented regions of northern Vietnam, above all erosion and fertility loss and increasing impoverishment of the rural population, the application of agricultural chemicals in more market-oriented regions of northern Thailand, coupled with land degradation, has also led to considerable losses in biodiversity of plant and animal genetic resources and to contamination of groundwater with pesticide and fertiliser residues.

In both countries, overstretching of resources leads, in the long term, to productivity reduction, rural poverty and inadequate food security and therefore fosters migration to less developed or still undeveloped regions.

In the meantime, the off-site effects of inappropriate land use systems in the mountainous regions of northern Thailand and northern Vietnam have another, alarming aspect. Floods, landslides and sedimentation will occur very frequently. During the past 10 years, these phenomena alternate increasingly, even in continuous dry periods.

The situations presented in simple form in Fig. 1 may be understood as adaptation processes and problem areas along an economic development gradient from subsistence-oriented to more market-oriented land use systems. The remote mountainous regions of northern Vietnam form the beginning, and the market-accessed "uplands" in Thailand are at the end of this basic conceptual gradient, which is fundamentally shaped by the infrastructural link to markets and political-institutional areas.

Figure 1: The vicious cycle of land scarcity, environment damage and rural poverty in mountainous regions of Thailand and Vietnam



The similarities and differences between northern Thailand and northern Vietnam regarding the problems of land use and the dynamics of rural development will be dealt with in more detail in the following sections. Methodologically, the research is based on a two-country approach with important possibilities for comparison and synergy effects, with further development of methods under different institutional frameworks. On the one hand, Vietnam benefits from this programme particularly in natural science fields and in the testing of participatory research methods. On the other hand, the investigations, e.g. of land and forestry allocation policy, show that Thailand can draw useful lessons from the experiences of Vietnam.

Foundations for developing the concepts of the 2nd phase of SFB

The first phase showed that the approaches formulated in the initial proposal have proved themselves. In detail, these are:

1. A 2-country study
2. An approach whereby basic research simultaneously contributes to arriving at a solution for practical problems
3. Concentration on concepts for small-farm agriculture and stronger emphasis on high-value agricultural products
4. Spatial proximity of sub-projects and concentration on the fewest possible locations.
5. A participatory research approach

These approaches are to be continued in the 2nd phase.

Research concept of the SFB

The research concept was formulated in the initial application as the long-term concept for all other phases of the SFB; its basis remains the same for the 2nd phase.

Objectives of the SFB

Primary and long-term objectives of SFB are the creation of scientific foundations for:

- (1) Developing and testing of a sustainable land use system, production and processing processes in the ecologically sensitive and economically disadvantaged mountainous regions of South-East Asia.
- (2) Elaborating a development concept for rural institutions, enabling them to contribute sustainably to solving the problems of rural poverty and malnutrition in the mountainous regions of South-East Asia and improve the adaptability of rural households to the dynamic economic environment of South-East Asia, and
- (3) Advancing methods for carrying out research of ecological systems and their dynamics, giving special consideration to the complex interactions between ecological issues, ethnic diversity and the heterogeneous institutional frameworks.

These objectives are closely interconnected. In the regions with high population growth and limited agricultural resources, two parallel approaches are important for sustainable development: first, to increase sustainably the productivity of existing resources, and second, to reduce the pressure on natural resources by expanding non-farm employment. Thus, it is of fundamental importance to link research on sustainable land-use with the analysis of rural development processes. On this point, the SFB has already shown an important catalytic

effect in the first phase. In Vietnam, development of the mountainous regions in the north of the country was in cooperation with the SFB included in the national priority programme for rural development.

Furthermore, research studies to date have confirmed that complex ecological, socio-cultural and institutional frameworks demand a variety of methods and careful selection of appropriate methods for each situation.

The closely interconnected nature of these objectives makes interdisciplinary cooperation in the research inevitable. The promotion of interdisciplinary papers and the utilisation of their synergetic effects among the participating universities as well as between Thai and Vietnamese partners remain another important objective of the SFB. Over and above this, the SFB strives to steer the attention of research in Thailand and Vietnam more towards mountainous regions and poverty-oriented development. A clear increase in the integration of mountainous regions into course subjects taught at the participating universities was already recorded during the first phase. In the second phase, the SFB will also give another important impulse in this direction.

Another objective of SFB is to integrate the research programme into other national and international interconnected projects in the regions studied. In Vietnam, closer research exchange has been established with the SAM (Mountainous Farming Systems) research project initiated by CIRAD and IRD, and the Red River Programme of GRET. In Thailand, cooperation with ICRAF (or, since 2001, World Agroforestry Center) within the framework of common colloquia and seminars has been institutionalised. Thus, subject areas that do not fall directly into the framework of SFB can also be addressed.

With the continuing exchange of information and research results with development projects, non-governmental organisations and consultancy institutions actively engaged in the mountainous regions, the fastest possible transfer of scientific knowledge to practice should be ensured. Close contacts have been established with GTZ projects, the World Bank, the EU and other organisations. With an increase in the scientific results obtained, these contacts will be strengthened and expanded in the 2nd phase.

Interdisciplinarity

Interdisciplinarity is strongly advised for all special research programmes (SFBs) funded by DFG. The interdisciplinarity in SFB 564 covers different disciplines within the agricultural sciences, food technology and economic and social sciences. Interdisciplinary research studies are coordinated, verified and optimised (see also the box about the workshop in Bad Boll). The experience gained under the SFB 564 is valuable also for other related projects in intercultural contexts.

Workshop on interdisciplinary collaboration

In July 2002, a workshop for all members of the SFB was held in Bad Boll, at which interdisciplinary collaboration was analysed and an action plan elaborated.

An SFB with three locations (Hohenheim, Thailand, Vietnam) results in considerable challenges for coordination and communication. Coordinated communication requires on the one hand that important project information should reach the appropriate recipients while on the other avoiding providing too much information. Improving electronic mailing lists can make a contribution to this issue.

The intensive exchange of scientific studies (papers, posters, presentations....) undertaken in the framework of SFB is important. In addition, information is disseminated via the Newsletter of SFB; individual sub-project leaders distribute information relating to their sub-project. Once a month, an "SFB midday round table" takes place, providing an opportunity for informal information exchange among SFB's members.

The SFB bodies responsible for allocation of duties and decision-making are regulated by a set of rules. Their actual implementation demands good cooperation by all participants.

Integral examination of the product chain, with different use levels from production via processing to marketing in the area of "optimisation of fruit production" in Thailand, as well as from livestock breeding via keeping to marketing in the area of "optimisation of livestock production" in Vietnam, is one of the main features of interdisciplinary cooperation in the SFB 564. Implementing such approaches in a consistent manner remains a challenge in international agricultural research.

The implementation of interdisciplinary study projects intended to prepare the research plan, identify priority research topics and train junior scientists represents another innovation in international agricultural research. Alongside three study projects that were carried out in the preparatory phase, a fourth study project with the title "Local knowledge and innovation process in Vietnam" was carried out during the first phase. The project was supported by the Eiselen Foundation, Ulm, and DAAD, and professionally supervised by Prof. Ruediger Korff (sociology, sub-project F3).

International Symposia and Workshops organised in the framework of the SFB 564 by the University of Hohenheim and its partners, were purposely held in an interdisciplinary manner. This applied especially to the International Workshop "Participatory technology development and local knowledge for sustainable land use in South-East Asia" (July 6-7, 2001 in Chiang Mai) and the International Symposium "Sustaining food security and managing natural resources in South-East Asia – Challenges for the 21st century" (January 8-11, 2002 in Chiang Mai), which was initiated and financially supported by the Eiselen Foundation, Ulm. Both events brought together more than 300 participants from different professional disciplines from 25 countries.

Acknowledging the heterogeneity of natural economic and cultural conditions in mountainous regions of South-East Asia, it would be unrealistic to cover all the problems of the region in an SFB. The SFB 564 thus provides an open system that is intended to create a closer network in the longer term with other related national and international projects in the region. In doing so, interdisciplinary research was carried out by the Institute of Ethnology of the University of Hamburg. In addition, students from other German universities (Berlin, Bayreuth, Bonn) were offered an opportunity to undertake their diploma or master theses within the framework of SFB 564 with financial support from the Eiselen Foundation, Ulm.

Interaction between project areas and sub-projects within the SFB

The research concept of SFB is based on the knowledge that the research activities in marginal mountainous regions of South-East Asia can only bring sustainable improvements to the existing situation if the land users, and all groups directly and indirectly involved in land use, are actively integrated into the research. Furthermore, the natural science and agricultural engineering disciplines, together with those in the human sciences, must find appropriate solutions to the most pressing ecological, economic and social problems. For this reason, a broad **project area A entitled “Participatory research approaches in intercultural contexts”** was developed. This project area supports the cross-sectional tasks of “participation” and “intercultural communication” in a single sub-project, but is also intended to investigate difficulties and limits and provide constitutive contributions to the theoretical basis.

Besides project area A, six other project areas (B-G) fall into two areas which are closely connected to each other:

(1) Sustainable land use ↔ (2) Sustainable rural development

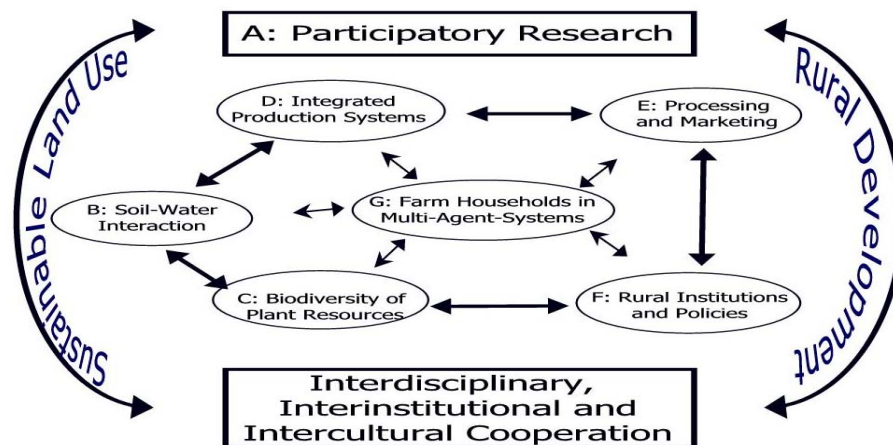
(1) Sustainable land use

Under this focal point, the research activities concentrate on possibilities for stabilising land use systems in mountainous regions. This requires an approach that considers a whole watershed as a system and that can be used in subsequent phases of the research programme to examine the strong external effects for agriculture and the population in the valleys.

The research activities in **project area B, “Resource conservation in soil, water and energy”** concentrate on the possibilities for efficient use of abiotic factors of water and energy and on the impacts of existing and improved land use systems on soil and water quality as well as on the water and soil nutrient balances. In addition, potential stabilisation measures for erosion-damaged hillsides are identified that should also be profitable in the short run for the land users concerned. In the subsequent phases, the potential for using new energy sources in the agricultural sector and in the agricultural pre- and post-harvest areas is to be investigated.

In **project area C, “Biodiversity in agro-economic systems, plant and animal resources”**, the spectrum of anthropologically affected agro-economic systems is analysed. At this point, fruit production in northern Thailand and degraded areas in northern Vietnam are in the limelight. Otherwise, in this project area, innovative approaches are followed for conserving genetic resources from autochthonous animal breeds and legumes and for determining their potential in terms of developing sustainable production systems in mountainous regions.

Figure 2: The conceptual framework: objectives, project areas and points of emphasis in the SFB 564



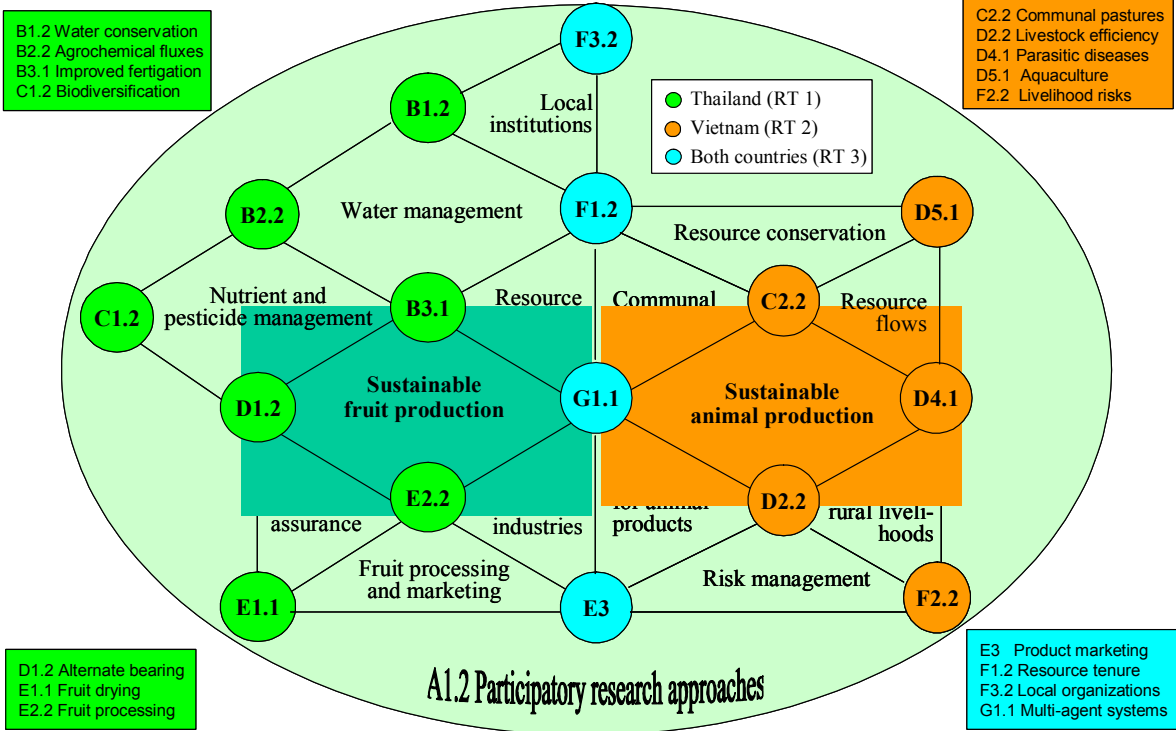
Project area D, “Sustainable and integrated production systems” investigates possibilities for developing economically profitable and ecologically friendly land use systems in mountainous regions. In the more market-oriented study areas in Thailand, the development of perennial crop systems on the basis of fruit trees with undersown crops is focused on. In the regions that are still mainly subsistence-oriented in northern Vietnam, the potential for closer integration between crop cultivation and livestock management, and for improving small-scale livestock farming by means of efficient livestock management and parasitic disease control is to be investigated. Project area D, in particular, is closely related to project areas B and C on the one hand, and project area G on the other. The components examined in these project areas are intended to contribute to the development of sustainable production systems in project area D. Moreover, the environmental impacts of integrated production systems under project area D are to be investigated in project areas B and C.

(2) Sustainable rural development

Under this objective, **project area E, “Processing and marketing of high-value agricultural products”**, technologies appropriate for local or regional processing of agricultural products that have strong market potential in regional, national and international markets, are developed and tested. **Project area F, “Rural institutions and policy measures”** is analysing institutional and political frameworks in disadvantaged regions in order to promote especially those production systems that facilitate sustainable land use, taking into account ethnic diversity and socio-cultural contexts. In **project area G, “Farming systems in dynamic regional context”**, technical and institutional innovations and changes in the political and economic frameworks are modelled and evaluated within rural farming systems with regard to ecological and economic sustainability.

Within this conceptual framework research is carried out by 17 subprojects addressing in an interactive process the research fields indicated in figure 3 (below). Figure 3 also lists the individual subprojects, that form the SFB research program.

Figure 3: Research fields in the second phase of the Uplands Programme



Two particular issues in carrying out international collaborative research programs deserve mentioning. Researchers need to be aware of and sensitive to intercultural differences in approach, attitudes and values of participants coming from different cultural backgrounds and research settings.

A second challenge concerns the relationship between researchers and farmer. The orientation of research towards problem solving at the practical level requires a permanent contact and exchange of information, openness in discussing problems and willingness to share research results with farmers. Appreciating local knowledge and integrating it into the research work as well as the capability of translating research results into a language that farmers can understand are essential ingredients in a productive research-farmer relationship.