SUMMARY

In South-East Asia the accelerating transition from traditional to modern agricultural practices modifies agrobiodiversity, changes landscape sceneries, and affects lifestyles and human well-being. Efficiency-oriented land use strategies are increasingly replacing sustainable and sufficient land use practices. The study assesses current drivers and impacts of change affecting environment and biodiversity, land management, and socio-cultures of traditional rice landscapes exemplarily for current agrarian transformation processes in rural areas of South-East Asia. Based on a qualitative data collection in the mountainous provinces Ifugao (Northern Philippines), and Sapa (North Vietnam), the effects of recent transformation processes on farmer’s livelihoods, their environmental perceptions and future aspirations are investigated. The most important opportunities for a sustainable development in these particular social-ecological systems are discussed with a focus on local strengths and potentials to create adequate livelihoods under avoidance of further environmental degradation. This research was conducted in the context of a large-scale consortia research project (LEGATO, 2011-2016). The results of this study support the identification and formulation of appropriate management recommendations for the investigated socio-ecological systems.

Keywords: socioeconomic transformation, rural landscapes, land use, poverty, perspectives, South-East Asia

ZUSAMMENFASSUNG

In vielen Regionen Süd-Ost-Asiens werden historisch gewachsene Landschaften mit traditionellen Subsistenzsystemen und nachhaltigen Landnutzungspraktiken zunehmend durch monokulturelle Landwirtschaftsmodelle verdrängt. Dennoch erhöhen sich Armutsdisparitäten und führen zu Abwanderungsprozessen aus ländlichen Räumen. Die vorliegende

Schlüsselworte: sozioökonomischer Wandel, marginale Regionen, Landnutzung, Armut, Perspektiven, Süd-Ost-Asien

1 INTRODUCTION

In South-East Asia the tradition of rice cultivation is not only closely linked with impressing landscapes, and the development of distinct socio-cultural values and social structures, but it also reflects a successful strategy to manage poor soils in marginal areas. Increasingly, the pressing demand for food reinforces the intensification of agricultural production also in areas which have not yet been categorized as lucrative. The accelerating transition from traditional to modern agricultural practices strongly modifies (agrobiodiversity, leads to changes in the landscape sceneries, and affects lifestyles and human well-being. Efficiency-oriented management practices are increasingly replacing sustainable and sufficient land management strategies. However, the motivation of this turning away from traditional ways to manage land is based on the success of agricultural intensification in other regions in South-East Asia. Those serve as best practice examples to end poverty and hunger in rural areas, to safeguard food security, to give younger farmer generations a perspective, but also to include rural areas in the country’s economic development (Kozel 2014; Fortier and Tran 2014; Republic of the Philippines 1997).

In particular in Vietnam the transformation from a centrally managed, planned economy towards a market-oriented but still state-controlled economy causes changes at the socio-cultural and at the socioeconomic level, respectively. The current governmental strategy to lessen poverty and hunger of ethnic minorities in the mountainous and poor regions in the north and central highlands focuses the increase of rice production as a panacea to “boost income […]” and to “improve food security” (Yu et al. 2012). However, findings such as of Nguyen et al. (2006) illustrate that, next to other drivers that increase the probability of currently non-poor ethnic minority households to actually move into poverty, the expenses
for insecticides became an indicator for impoverishment. Thus, this is one example that one-fits-all solutions for solving the problem of steadily increasing global food demand by agricultural commercialization, modernization and expansion can cause more harm than good. Further, the impacts of overexploitation in Vietnam’s north-western mountainous region have been leading to a severe nutrient depletion, a persistent decline in biomass productivity, and have transformed the region into a “degradation hotspot” (Vu et al. 2014).

In the Philippines, despite recent economic progress and growth, an increasing inequality between regions and social groups in terms of income and wealth distribution can be observed (Reyes et al. 2012). The food and headcount poverty rate among rice farmers is high, albeit lower than in other agricultural subsectors (Reyes et al. 2012). In general, poverty incidence is fundamentally linked with the level of dependency on agriculture (Reyes et al. 2012). The upcoming farmer generation needs strong motivations and governmental support to continue with agricultural production (Republic of the Philippines 1997).

Both countries emphasize an increase of agricultural productivity and higher efficiency in the production of agricultural commodities. However, there are more than just economic aspects that play a vital role for peasant agriculture; well-being and food sovereignty are equally important (Nguyen et al. 2006; Pachón-Ariza 2013). Local ecosystems, managed and cultivated by peasant farmers, have unique ecological structures at different levels which are maintained by locally adequate agro-ecological practices, e.g. food webs that “improve and sustain productive capacity” (van der Ploeg 2014).

In many developing countries food security depends to a large extent on subsistence and small-scale “multi-cropping-systems” (Altieri 1999). Many of these systems inherit a species richness that is comparable to the organization of natural ecosystems; they are genetically diverse and can contribute to a stable production at low levels of risk (Chapin III et al. 2000). Traditional farming systems inherit a large potential to support the conservation of agrobiodiversity and thus to function as role models for the conceptual redesign of sustainable agricultural systems under global change (Altieri 2004). The increasing intensification of land use and the spreading of modern techniques can compromise biodiversity and genetic variety, and cause a decrease of food diversity and food sovereignty in rural areas which are still imprinted by smallholders and subsistence farmers.

In the following, we look at two regions strongly shaped by decades- to century-old terraced rice cultivation: the mountainous regions Ifugao (Luzon Island, Cordilleras, Northern Philippines), and Sapa (province Lào Cai, North Vietnam). Both regions are still characterized by traditional agricultural practices as predominant pattern of subsistence farming, and both regions represent historic cultural landscapes under increasing influence of socioeconomic and sociocultural transformation (UNESCO 2008).
This research is part of a project that follows an agro-ecological approach to outline sustainable land management strategies for rice production and respective ecosystem services in the Philippines and in Vietnam (LEGATO – Land-use Intensity and Ecological Engineering: Assessment Tools for Risks and Opportunities in irrigated rice based production systems1, 2011-2016) (Settele et al. 2013; 2015). The project assesses traditional as well as modern agricultural practices, and their impacts on ecosystem functions, services and for biodiversity conservation (Settele et al. 2013; Tekken and Settele 2014).

Of particular interest for the overall success of the LEGATO project and for the later implementation of management guidelines are insights regarding socio-cultural, environmental and socioeconomic drivers that currently affect land management and biodiversity in these two distinct and historic landscapes. We conducted 36 in-depth semi-structured interviews with local rice farmers and other relevant stakeholders (e.g. guest house owners and local officials) to investigate the effects of recent situational changes of livelihoods on farmers’ perceptions, their aspirations and future perspectives. The results will flow into the formulation of hypotheses on socio-ecological linkages and thus be used as the empirical basis for a refined analysis (stakeholder feedbacks on proposed indicators for local ecosystem services) on the synergetic interactions and interdependencies of local biodiversity and socio-cultural particularities. Further, the project results aim to support the identification and formulation of appropriate management recommendations for the investigated agro-ecosystems.

2 CASE STUDY AREAS

2.1 BACKGROUND INFORMATION ON SAPA, LÀO CAI, NORTH-WESTERN VIETNAM

The Đổi mới (Vietnam’s market reform based on economic liberalisation) in 1986 marks a turning point in Vietnam’s process of profound structural transition from a controlled socialist towards a post-socialist market-based economy (Ravallion and de Walle 2006). Since then, a major goal of the Vietnamese government is the country’s transformation into an industrialized economy (Leung 2010). An important part of this reform was the reorganisation of the agricultural sector in terms of de-collectivization and land reallocation (Ravallion and de Walle 2006). Many farmers in rural areas then decided to rather farm separately, thus formerly collective farms were divided and land use rights were assigned to families (Kerkvliet 2006). Since the late 1980s this pathway of agricultural modernization has contributed

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1 http://www.legato-project.net/
Fig.1: Case study area with interview locations in Sapa district, Lào Cai province in north-western Vietnam.

to “impressive wealth creation” in form of economic growth, poverty reduction and food security (Fortier and Tran 2013; Leung 2010). However, in many regions of Vietnam the agricultural sector has, since then, become dependent on costly technologies, and also the situation for local livelihoods in rural and marginal areas has not significantly improved. There are a variety of reasons for this: the increase of external living costs (household costs, cost for education and health, mobility costs, costs for pesticides and chemical fertilizers, cost for clean drinking water etc.), low degree of social inclusion of ethnic minorities in rural regions, marginal land and soil quality, population growth, and aggravating environmental conditions mainly due to overexploitation.

Sapa is an administrative district of Lào Cai province in the north-western mountainous area of North Vietnam (Fig.1). It belongs to the poorest provinces in the country, with ca. 70% of the population living below the poverty line (Spangenberg et al. 2014). The region is home of several ethnic minorities, whose traditional livelihood is based on rice and shifting cultivation, and on agroforestry (Turner 2012; Truong et al. 2014).

2.2 BACKGROUND INFORMATION ON IFUGAO PROVINCE, LUZON ISLAND, PHILIPPINES

The mountainous rice terraces in the province of Ifugao, Northern Luzon, the Philippines (Fig.2) are characterized by and famous for rice cultivation under most difficult conditions; farmers still practice indigenous farming techniques and maintain their cultural heritage (UNESCO 2008; Settele and Martin 1998). The Ifugao terraces are centuries-old and the Ifugao farmers have created a “visually most impressive” and “intricately patterned landscape” (Conklin 1967), which is listed under the UNESCO World Heritage. The uniqueness of this landscape increasingly attracts tourists, making the Ifugao province the Philippines third most important tourist destination (UNESCO 2008). Such, tourism has become an important source of off-farm income (Spangenberg et al. 2014). But still rice production represents the primary source of livelihoods for most families in the region (UNESCO 2008). Due to internal dynamics (e.g. population growth, changing consumption patterns) and external influences (e.g. steadily increasing living costs, climate change impacts) the socioeconomic situation is subject to a process of change, with consequences for the social structures and as well for the landscape scenery. In particular the preservation of traditional knowledge and its transfer to future generations is at risk. This is problematic as indigenous land-use practices include a portfolio of local-specific solutions to adapt to changing environmental conditions (Camacho et al. 2012; UNESCO 2008). In the recent past the limited opportunities to earn a (good) living in rice agriculture has led to an increasing rate of (mostly younger) people migrating far off, permanently or temporarily, to urbanized areas of the country, or even overseas. This loss of work force in the rice terraces represents
Fig. 2: Case study area with interview locations Ifugao province, Luzon Island, Philippines.

a key reason for their partly abandonment and degradation. But still, the regional subsistence agriculture is crucial for food security, the backbone of a unique culture, a treasure of agricultural biodiversity, and it contributes to the decentralization and diversification of food production. However, the difficult cultivation conditions require a comprehensive knowledge of the local circumstances. Rice growing in the Cordilleras is difficult and labour intensive. No machines can be used, e.g. for ploughing, and water buffaloes are rarely found for field preparation due to the difficult accessibility of the fields (steep and narrow paths between the terraces) or due to high acquisition costs. The current farmer generation started to work in the fields in their early childhood, however, the average age of farmers has risen to above 50 years. Increasingly, women take over the main tasks regarding field maintenance, as due to increasing livelihood costs male farmers seek for secondary incomes and off-farm employment.

3 METHODOLOGY

For the qualitative data collection 36 in-depth guideline interviews (Fig.3) with local rice farmers were carried out (interview duration: between 1 up to 2.5 hours) between November 2011 and June 2013. All interviews were conducted in English language with the support of translators, if possible recorded, otherwise notes were taken, transcribed and finally paraphrased following the qualitative content analysis based on Gläser and Laudel (2010). In Ifugao 15 interviews were conducted, 21 interviews in Sapa. Due to often different tasks in the field and in the house, and due to gender-specific perceptions regarding livelihood problems, women and men were interviewed separately, in order to complement the results, to ensure the flow of conversation, and to capture both genders’ opinions, views, and knowledge.

Limitations of this research design and of the methodological and interview approach lie in the authenticity of results, as they are interpreted based on translated transcripts and protocols, in the selection of interview partners (gate keeper and snow ball system), and further in the local context of interviewees. However, this research is explorative and serves as preliminary survey to deliver important background information regarding the actual situation and farming practices in the LEGATO landscapes.

4 RESULTS

Traditional forest and rice farming systems in both case study areas have developed over a long time period and over several human generations (Lào Cai, ca. 6-7 generations; Ifugao, centuries to millennia). Traditional cultivation practices have been developed as a consequence of adapting to local conditions and the optimal utilisation of local resources. Both
case study areas are strongly characterized by agricultural activities; and an increasing competition between different categories of land use can be observed (mainly between agriculture, mining, and commercial forestry). The marginal conditions in these mountainous areas are, compounded by their remoteness, poor soils, difficult topographies and changing local climate conditions. Transformation processes reinforce urban sprawl in connection with problems such as pollution or increasing costs for livelihoods. Traditional agricultural practices are still predominant patterns, however, partly poverty-driven (Sapa), partly due to the preference of traditional rice varieties (Ifugao). Most farmers cannot afford investments in the modernization of agricultural machinery, which is also reflected in the manner of ploughing (spade, small tractors or water buffalo). Still, the work in the rice fields is very labour intensive and mainly family business. Overall, and despite regional differences, the drivers of current change are comparable (Tab.1).

Although belonging to different countries with different histories the socio-cultural and socioeconomic characteristics are partly similar:
• **Spirituality:** mainly important for the older generation; younger generations often have different values and aspire to follow modern and, mainly western, lifestyles; spiritual places and symbols and celebrations are very important; ethnic minorities in Vietnam (Lào Cai) and the Philippines (Ifugao) have numerous traditional festivals and rituals related to rice cultivation;

• **Settlement structures:** rural village communities with fields close to the houses and partly private gardens around the house or remote gardens in the forest (Ifugao); depending on social status rice fields are located close to the houses or partly 2-3 km away, private gardens are always located close to the house (Lào Cai);

• **Illiteracy:** gender bias in Lào Cai (younger and older women); in Ifugao only farmers in very remote areas who are older than 60yrs);

• **Agriculture as main source of income:** secondary incomes are increasingly important and mainly generated through tourism; farmer families in both areas have family members working abroad (with a longer tradition in Ifugao); income from agriculture is too low to cover the increasing livelihood costs; off-farm jobs are not well paid or not available;

• **High poverty incidence:** most farmers are poor compared to the average growth of incomes in other sectors;

• **Cultural traditions:** most farmers feel obliged to their ancestors to cultivate rice; older farmers feel that the inheritance of their fields to their children provides them food and social security in old-age;

• **Collective farming systems:** due to topography and different labour tasks farming systems need cooperation and communal organisation;

• **Child labour:** division of labour in the family partly includes the children to help in the field (e.g. weeding, taking care of the water buffalos, transplanting, production and selling of souvenirs), mainly found in touristic areas of Sapa;

• **Strong family orientation:** family cohesion and support was highly valued in both areas.

In Vietnam, the historic cultural landscape shows moderate effects of structural change, traditional agricultural practices disappear along with changing landscapes (e.g. loss of forests – disappearance of agroforestry). The growing private tourism sector does not share the benefits with the farmers while relying on farmers’ efforts to preserve the scenery and with this making the region attractive for tourists. This lack of equal participation and benefit sharing
increases poverty and causes conflicts among ethnic minorities (as well observed by Truong et al. 2014). Further, the influence of socioeconomic change has a serious influence on local biodiversity. The conversion of natural forests and open land into farmland areas (terraces) affects the landscape and reduces the heterogeneity of agricultural practices. Poverty and population growth leads to an expansion of agricultural areas under increasingly difficult conditions. Deteriorating soil conditions, and increasing insect pest infestations often result in attempts to solve the problems with chemical inputs (synthetic fertilizers, pesticides, etc.). While the aim is to improve agricultural productivity by using modern means of production this modifies or reduces agrobiodiversity, leads to altered field work processes and to decreasing returns mainly due to high expenses for agricultural inputs. Most farmer families also depend on a second source of income to cover livelihood and production costs.

Tab. 1: Drivers of change affecting traditional rice landscapes.

**Tab. 1: Hauptimpulse für die Transformationsprozesse in traditionellen Reis-Kulturlandschaften.**

<table>
<thead>
<tr>
<th>Driver of change</th>
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| **Demographics** | • population growth  
• off migration to urban areas or overseas  
• urbanization |
| **Socioeconomic** | • increasing livelihood costs (e.g. for mobility, electricity, education, communication, social media, food)  
• agricultural policies targeting chemical-intensive increase of rural food self-sufficiency  
• subsistence and small-scale farmers as promising sales markets for agrochemical companies |
| **Socio-cultural** | • lifestyle changes and aspirations for higher social status of the present and upcoming farmer generation  
• intergenerational tensions between adhering to old traditions and searching for more profitable land use strategies  
• new social media influence social practices, education, and community relations |

In Ifugao, terraced rice production receives particular attention due to its recognition in the UNESCO World Heritage List. The area attracts large numbers of domestic and international tourists. The maintenance of the rice terraces therefore does not only represent the basis for subsistence food production but as well the prerequisite for the preservation of the typical scenery which is the dominant tourist attraction. But most farmers need secondary incomes, as subsistence rice and vegetable production do not generate enough income to cover the livelihood expenses. This creates a considerable dilemma, as the younger generation prefers to find income opportunities in the tourism sector rather than working in the fields. The subsequent shortage of family manpower in the fields often forces farmers to hire workers for support in field and harvest work. Traditional social structures are dissolving and with this the
long-term fundament of cultural identity – the collective rice farming system, characterized
by precisely synchronized agricultural workflows and processes (the Ifugao synchronization
system). A “better life” and “easier work” for their children is also the parents’ best aspirati-
on and was mentioned in all interviews in Ifugao. Nevertheless, previous generations were
also affected by migrations of Ifugao community members. This is not a new effect. Partly,
some of those who once migrated to seek for a better life come back to the area and restart
with rice cultivation. These returnees are important agents for the preservation of cultural
diversity and cultural heritage and the promotion of cultural identity.

Tab.2: Transformation impacts in traditional rice landscapes.
Tab.2: Auswirkungen von Transformationsprozessen in traditionellen Reiskulturlandschaften.

<table>
<thead>
<tr>
<th>Impacts of current change processes on..</th>
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<tbody>
<tr>
<td>..environment and biodiversity</td>
</tr>
<tr>
<td>• clearing of mountain forests, erosion and pollution due to mining activities</td>
</tr>
<tr>
<td>• „Green Revolution“ effects due to the chemical-intensive land use</td>
</tr>
<tr>
<td>• biodiversity feedbacks – reduction of species diversity, increase of pests</td>
</tr>
<tr>
<td>• loss of functional linkages between the various elements of production (buffalo manure, crop residues for soil composition)</td>
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<tr>
<td>• changes in rice field food web structures</td>
</tr>
<tr>
<td>• reduction of genetic variety</td>
</tr>
<tr>
<td>..traditional land management</td>
</tr>
<tr>
<td>• reduced wild food diversity</td>
</tr>
<tr>
<td>• disappearance of traditional rice varieties</td>
</tr>
<tr>
<td>• from sufficiency to homogenized and input-intense type of land management</td>
</tr>
<tr>
<td>• need for off-farm incomes leads to lack of labor power in the farm work</td>
</tr>
<tr>
<td>• disappearance of collective, synchronized systems of rice cultivation</td>
</tr>
<tr>
<td>• individual decisions replace community decisions, e.g. regarding choice of crops</td>
</tr>
<tr>
<td>• non-profitable fragmentation of rice field parcels</td>
</tr>
<tr>
<td>• traditional knowledge no longer applied or applicable, e.g. soil requirements of crops</td>
</tr>
<tr>
<td>• loss of socio-ecological interlinkages (agrobiodiversity and landscape scenery)</td>
</tr>
<tr>
<td>..socio-cultures</td>
</tr>
<tr>
<td>• new values - externally induced changes to enhance productivity cause change of social structures, traditions, beliefs, and perceptions of nature: from appeasing nature to controlling nature</td>
</tr>
<tr>
<td>• traditions and beliefs, e.g. spiritual rituals, are esteemed as “old-fashioned and become historic artefacts</td>
</tr>
<tr>
<td>• dissolving of cultural identity, in particular of the former identifiers: belonging to a group, location, architecture, food</td>
</tr>
<tr>
<td>• changing of family structures: labor tasks, family responsibilities</td>
</tr>
<tr>
<td>• loss of traditional practices that maintain social cohesion</td>
</tr>
<tr>
<td>• loss of traditional institutions: tacit knowledge and its transfer, dialects and languages, social roles and hierarchies, ethnic law systems</td>
</tr>
<tr>
<td>• individual replace collective decisions</td>
</tr>
<tr>
<td>• changing value of heritage: from tradition to tourist attraction</td>
</tr>
<tr>
<td>• traditional architectures replaced by more practical constructions</td>
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</tbody>
</table>
The drivers of change are comparable for the two regions, the effects or impacts are similar (Tab.2). Traditional farming systems, even if still more pronounced in Ifugao, will disappear. Socioeconomic change processes affect the livelihood conditions of farmers and their families. Rice cultivation has a long history, and has created impressive sceneries. However, subsistence rice production is hard work, the returns are too low to cover livelihood costs, and being a farmer is not at all an attractive job perspective for the younger generation.

Both regions, remote and scarcely developed, became eco-ethno tourist attractions, with farmers as “living” relics and preservers of ancient lifestyles, landscapes, arts, and craftsmanship of centuries past. While in Ifugao many farmers have developed strategies to profit from tourism revenues, the situation of farmers from ethnic minorities in Lào Cao continues to deteriorate (Tab.3). In Lao Cai, the interviewed members of ethnic minorities (Dao, Giay, H’Mong) have only limited economic, social, and higher education opportunities and they therefore mostly stay in their native region, where at least the basic needs for living are warranted. Also the younger generation has only limited possibilities to embrace highly qualified positions, even if their educational attainment is higher than that of their parents. This is in total contrast to the situation in Ifugao, where efforts to preserve traditional customs and indigenous knowledge on rice cultivation and terrace maintenance attains governmental support. Traditional varieties in Sapa are no longer cultivated and replaced

**Tab.3: Regional differences in the case study areas Ifugao (Philippines) and Sapa (Vietnam).**

<table>
<thead>
<tr>
<th>Ifugao province, Philippines</th>
<th>Sapa province, Vietnam</th>
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<tbody>
<tr>
<td>high income diversity</td>
<td>low income diversity</td>
</tr>
<tr>
<td>high awareness and appreciation of own Ifugao culture/ethnicity</td>
<td>members of ethnic minorities feel stigmatized as “poor”</td>
</tr>
<tr>
<td>positive landscape perception (UNESCO World Heritage)</td>
<td>loss of control over landscape development</td>
</tr>
<tr>
<td>older farmers wish children to proceed with rice farming to „preserve cultural knowledge and traditions“ or to „provide the family with pesticide-free rice“</td>
<td>older farmers wish their children „a better life“</td>
</tr>
<tr>
<td>off-farm incomes (from tourism, migrant workers) very important</td>
<td>ethnic minorities only marginally profit from „rice landscape“ tourism</td>
</tr>
<tr>
<td>off migration of family members contributes to poverty reduction and livelihood improvement due to remittances</td>
<td>biodiversity loss due to expansion of cultivated areas and logging</td>
</tr>
<tr>
<td>rural development is improving due to remittances</td>
<td>change or loss of characteristic landscape scenery</td>
</tr>
<tr>
<td>Ifugao traditions are appreciated and preserved as cultural heritage</td>
<td>remittances of off-migrated family members are very low and often cannot stabilize family incomes</td>
</tr>
<tr>
<td>strong cultural identity</td>
<td>ancient traditions and values are getting lost</td>
</tr>
<tr>
<td></td>
<td>loss of cultural identity</td>
</tr>
<tr>
<td></td>
<td>increasing income disparity between ethnic minorities and Vietnamese Kinh majority</td>
</tr>
<tr>
<td></td>
<td>dissolution of traditional family authorities</td>
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</table>
by government-supported high yielding varieties to encounter the frequently occurring hunger problem, while Ifugao rice varieties are currently experiencing a revival branded as „heirloom rice“ (http://www.heirloomrice.com/).

5 DISCUSSION

Rice producing systems in the provinces Ifugao and Sapa are based on traditional and collective management systems. A century-long process of adaptation to environmental conditions, agricultural innovations and societal development has resulted in unique socio-ecological systems, cultural patrimonies, which are now on the threshold of vanishing. Human activities have shaped striking landscapes that constitute an immense natural and cultural heritage of great value for tourism and the environment. Both regions are currently undergoing many structural changes leading to landscape transformation and to the loss of significance of cultural traditions. Traditional knowledge and farming competences are gradually disappearing from generation to generation instead of being further advanced or revised. New techniques aiming at controlling natural processes and optimizing yields are replacing traditional functional linkages in agro-ecological systems (Tekken and Settele 2014). Transformation processes at different stages contribute to the loss of characteristic natural and cultural landscape elements, either due to agricultural intensification and continued parcelling of land (Sapa), due to the abandonment of terraces (Ifugao) and urban sprawl (Ifugao, Sapa), due to economic pressures forcing farmers to reduce farm work in favour of off-farm occupations, and due to environmental problems that emerge as a consequence of (chemical-based) agricultural intensification modernization (Sapa), deforestation (Sapa), and pollution (Sapa, Ifugao).

Most important potentials for sustainable development: agriculture, biodiversity, and socio-cultural system

Both regions have opportunities for creating sustainable perspectives and adequate livelihoods for the local rural population based on the optimal use of regional characteristics and comparative advantages. Rice cultivation, agrobiodiversity and socio-cultures are interlinked as social-ecological system; the degradation or elimination of one of these elements will influence the others.

In the agricultural sector, there are opportunities for additional, alternative income sources given that the regions will focus on their strengths and potentials, e.g. by

- the creation of regional labels, products and production chains, e.g. for heirloom rice varieties (Ifugao), or „Sapa mountain honey“ (Lào Cai),
enhancing the market value of products under concentration on organic production of high quality agricultural products, and/or

establishing these regions as role models for sustainable agricultural production.

In the tourism sector:

- The current portfolio could be complemented by „home“ or cultural tourism, spiritual tourism, nature tourism, and agricultural tourism to make use of the demands of different tourist target groups (fun and sports, adventure, science and education, nostalgia, ethno and cultural tourism);

- Tourism strategies must be developed in a participatory manner to ensure that the local population is equally represented;

- Perspectives for the younger generation must be created that include sustainable income and education opportunities, e.g. specified education for jobs in the tourism sector or agronomic expertise.

Environment and biodiversity as scientifically framed concepts are differently perceived by ethnic minorities in Sapa and Ifugao. Nature is not reduced to a functional value only in terms of yield results, recreation, or monetary returns. Many immaterial values are assigned to nature that evolve from the interactions between rice cultivation and the landscapes they are embedded in, e.g. bequest values. The global importance of biodiversity conservation is also reflected in the Aichi Biodiversity targets of the United Nations Decade on Biodiversity which address the underlying causes of biodiversity loss. Signing countries commit themselves to accomplish the strategic goals until 2020, inter alia that “areas under agriculture, […] are managed sustainably, ensuring conservation of biodiversity” (Goal A, Target 7), and that “… pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity” (Goal A, Target 8). In its National Biodiversity Strategy Vietnam admitted that population growth and “overexploitation of land and natural resources” has led to an alarming “decline of biodiversity”, under recognition of the immense importance for the national economy and human well-being (Ministry of Natural Resources and Environment Vietnam 2015, p.30). It is also noted, that the high level of poverty in rural areas such as Lào Cai province aggravates the problem due to illegal activities, and overexploitation of forests and biodiversity (Ministry of Natural Resources and Environment Vietnam 2015, p.30).

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4 See above.
and Environment Vietnam 2015). Locals thus need to participate in the growing tourism businesses to have an alternative livelihood outside meagre incomes from rice production which could lift them out of poverty, and at the same time support the preservation of unique landscapes and their biodiversity (Truong et al. 2014).

6 CONCLUSIONS

Many farmers are “losers” of the rapid socioeconomic transformation, as they are confronted with new risks and uncertainties. The preservation of traditional landscapes and cultural values is thus becoming less important for them compared to the increasing pressures caused by fast socioeconomic change. But social diversity is of high relevance for sustainable land use, in terms of knowledge, different roles in the rice production process, expert and tacit knowledge on soil and climate conditions, and regarding know-how on flora and fauna. Socioeconomic change is linked to changing perceptions of nature and its functionality, which leads to

- the increasing use of modern agricultural products to increase yield amounts, but causes biodiversity and genetic variety losses;

- changing landscape sceneries by urban sprawl, terrace abandonment, extension of industrial, transport and by increasing urban infrastructures;

- to social and cultural change with the risk of losing traditional knowledge on the contextual synergies of traditional farming systems and socio-cultural characteristics.

Cultural landscapes are dynamic systems; they are influenced by social, cultural and economic changes of societies, and as well by environmental changes. If these dynamic processes exceed a critical level, like in Sapa, the balanced interplay of humans and nature can be (irreversibly) harmed with subsequent impacts for human well-being.

To conclude, traditional agricultural systems like in Ifugao or Sapa will disappear if not actively supported and sustained by appropriate institutional framework conditions at both, national and regional levels that enhance socio-ecological resilience and create economic perspectives for the upcoming generations. Not only socio-cultural artefacts will disappear, but as well agrobiodiversity and comprehensive knowledge regarding food production under marginal conditions.

Needed in both regions are strategies that build upon local strengths and potentials, and to restore and protect biological diversity as the basis for well-being, livelihoods and economic activities.
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