



# Integrated Livelihoods and Landscape Approach for Smallholders in Northern Thailand

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## Abstract

This paper examines the strategies and techniques researched and implemented by the International Union for Conservation of Nature (IUCN) in villages in the vicinity of Doi Mae Salong in Chiang Rai Province, Thailand. The strategies revolve around the paradigm linking poverty alleviation, conservation and landscape restoration. IUCN and its partners specifically researched and implemented schemes directed toward diversification of the household economy through alternative and sustainable intensified agriculture techniques based on balancing conservation and livelihood objectives. The projects aimed to reduce poverty and build the resilience of smallholders through decentralised governance arrangements including land use planning schemes and stakeholder negotiation. Considering the agro-ecological system on a catchment-wide scale enhances the conceptual understanding of each component, collectively forming a landscape matrix with requisite benefits for biodiversity, smallholder livelihoods and ecosystem services. In particular, the role of enhancing ecosystem services and functions in building socio-ecological resilience to vulnerabilities such as climate and economic variability is paramount in the process.

## Introduction

Smallholder farming forms the backbone of the rural economy in the area of Doi Mae Salong, located in northern Thailand's Chiang Rai Province. This area has undergone vast landscape and population change over the past 50 years due to the combined forces of migration and the population-resource squeeze (IUCN, 2012). Unsustainable agricultural practices including over-reliance on monocultures have resulted in increased pressures on ecological health, food security and income stability. Rural economic development in the Doi Mae Salong area is driven primarily by agricultural productivity (ICEM, 2013), hence these socio-ecological pressures are expected to be exacerbated in the future.

Economically, several factors pose a risk to the welfare of the rural poor including the availability of alternative livelihoods, land tenure and market variability (Pingali, 1995). The variability of markets is further amplified by reliance on monocultures, increasing the vulnerability of smallholders to shocks in economic systems and climate threats.

Environmental degradation of the agro-ecological system on which smallholders depend for their sustenance and income exacerbates the long-term viability of monoculture agricultural practices. Catchment-wide land use change has resulted in impacts such as erosion, soil in-

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fertility, landslides and water cycle imbalances, which affect communities at the household level. The spectre of changing climate regimes is also of critical importance to the socio-ecological system within which the smallholder farmer exists. Thus, the historical context of socio-economic change in Doi Mae Salong and resultant environmental degradation conceptualises the role of landscape restoration to simultaneously reduce poverty and improve environmental health. Implementation of approaches to address these issues is critical to the stabilisation of rural livelihoods and to increase resilience. This paper explores the strategies and techniques researched and implemented by the International Union for Conservation of Nature (IUCN) to integrate agricultural diversification and landscape restoration to address environmental degradation and poverty in the Doi Mae Salong landscape. The methods for the study were researched, developed and implemented based upon prior experience of IUCN in the northern watershed areas of Thailand. Participatory rural appraisals conducted collaboratively with government departments to research and assess the most appropriate strategies for achieving the mutually beneficial development and conservation outcomes was undertaken. The paper firstly reviews current literature on the conceptual framework of achieving development outcomes via integrated agriculture and conservation techniques. The application of this strategy in Doi Mae Salong as a case study is explored in detail, followed by presentation of the results and a discussion of the outcomes.

### **Literature Review: The Importance of Diverse Landscapes**

Tropical agro-ecology refers to the landscape mosaic incorporating remnant forest ecosystems interspersed with agricultural systems collectively forming a diverse polyculture landscape. This agricultural system is also known as 'natural systems' agriculture (Perfecto, Vandermeer & Wright, 2009). Diversified agro-ecosystems have developed in past centuries from the interaction of farmers and the environment in the absence of external inputs, capital, or scientific knowledge (Wilson, 1999). The performance of such traditional systems stems from the richness of agro-biodiversity, which en-

hances the function of the agro-ecosystem, upon which smallholders rely for their income streams and sustenance (Vandermeer, 2003). Complex evolutionary processes between natural and social systems form the historical driver for this diversity, and farmers' adoption of these systems for multiple uses enabled self-sufficiency in food and resources (Altieri, 2004). A high degree of tolerance to changing conditions is implicit in such agricultural systems, which can act as a buffer against variations in the environment, including climate change, hence being vitally important to smallholders (Thrupp, 1998; Altieri, 2002; Verchot et al., 2007). Such systems embody a high degree of adaptive capacity to system shocks, in the context of degraded landscapes and future climate challenges (Berkes, Colding & Folke, 2000). Verchot et al., (2004) state that agriculture is highly susceptible to climate variability, which amplifies stress on adjacent forests and ecosystem services such as water supply and sources of food to supplement income and nutrition. Forests also act as reservoirs of biodiversity, the forest fragments in the landscape mosaic containing clusters of subpopulations collectively comprising a 'metapopulation' (Hanski, 1999). Research indicates that localised extinction rates of subpopulations are greater where poor quality, petrochemical-reliant agricultural systems exist amongst those forest fragments (Swift, Izac & van Noordwijk, 2004). Maintaining viable linkages between forest fragments is critical to ensuring species' migration pathways traversing the landscape mosaic remain intact and the extinction risk of the larger metapopulation is reduced (Adger et al., 2005). Preserving and enhancing the agro-ecosystem is therefore critical to realising the mutually beneficial aims of improving smallholder livelihoods and conservation (Perfecto, Vandermeer & Wright, 2009). This approach has been utilised across the tropics where smallholder agriculture is predominant in a landscape mosaic containing high levels of biodiversity.

The review of literature provides the context for understanding the theoretical framework utilised in the project undertaken at Doi Mae Salong. This framework conceptualises the landscape as a complex matrix of interlinked components functioning dependent upon another.

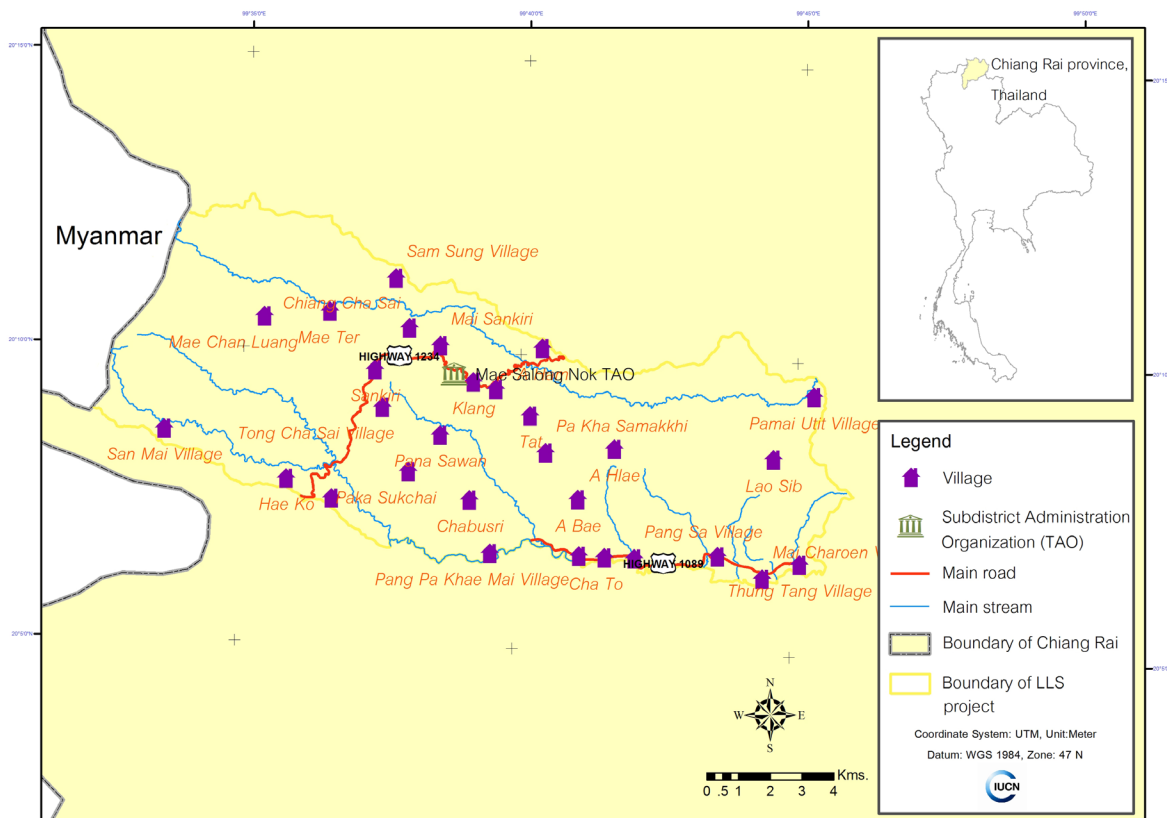
This framework lies in opposition to the paradigm perceiving agricultural systems as independent of nature. Healthy agro-ecological matrices function to improve biodiversity conservation and provision of services for ecosystem function and products for rural livelihoods. Enhancement of the landscape matrix in Doi Mae Salong embodies the practical application of this conceptual framework.

## Materials and Methods

Doi Mae Salong (**Figure 1**) is located in the mountainous part of Northern Thailand within the Mae Chan watershed, a tributary of the Mekong River classified as a Class I watershed. The Mae Chan watershed encompasses an area of 335 km<sup>2</sup>, within which the study area covers an area of 90 km<sup>2</sup>, containing a population of 15,000 inhabitants. The population consists of approximately 50% ethnic Chinese, the remainder consisting of ethnic groups including Akha, Mian, Lisu, Lahu, Shan, Thai and Yao (IUCN, 2010a). The main sources of income comprise agriculture, daily wage labour, tourism and

minor trade flows (Colonel, 2007), supplemented by collection of non-timber forest products (NTFPs) for food, medicine and building materials (ICEM, 2013). Reliance on the health and productivity of the landscape is paramount for smallholder livelihoods in the study area, their susceptibility to bio-physical and economic variation of a high degree.

The landscape surrounding Doi Mae Salong is highly fragmented consisting of remnant forest, grasslands, upland rice and corn fields, terraced paddy fields, tea and coffee plantations, orchards, flower gardens and vegetable plots (IUCN, 2012). Deforestation and degradation of land within the study area is a corollary of the increasing population-resource squeeze observed in the area since the influx of migrants in the 1960s. Expansion of agriculture onto steep slopes and cultivation of monoculture crops such as upland rice and maize reduces the stability of soil strata leading to erosion and landslides. Previous land practices included extensive shifting cultivation which was replaced by opium production in the 1960s.



**Figure 1. Location of study area in Chiang Rai area, Northern Thailand**

Source: IUCN, 2010b

These different land uses resulted in the loss of biodiversity in the landscape matrix and stabilisation of agricultural yields in the study area (IUCN, 2012). The co-benefits of biodiversity migration, maintenance of ecosystem services and agricultural diversification are observed to be diminished with the increasing conversion of cropping areas to monocultures. Additionally, reductions in crop yields are common in degraded agro-ecological landscapes whereby yield loss can be seen as a loss in resilience, often masked by the usage of fossil-fuel based fertilisers and pesticides to maintain yields (Berkes, Colding & Folke, 2000). This information provides the background for understanding the strategies designed and con-

ducted by IUCN in the study area (IUCN, 2012).

A series of techniques designed to address the observed social and environmental issues in villages surrounding Doi Mae Salong were researched and implemented by IUCN from 2007 to present. These projects were developed and implemented in association with Royal Thai Armed Forces (RTAF), a military body typically dissociated from conservation efforts. The strategies fostered an inclusive community-led approach that viewed the development of smallholder livelihoods in unison with achieving conservation aims. The strategies and techniques employed by IUCN in Doi Mae Salong are summarised in **Table 1**.

**Table 1. Strategies and techniques implemented in Doi Mae Salong**

Approach	Strategy / Technique	Goals / Outcomes
Landscape Approach	Collaboration with local groups to reforest 600 hectares of degraded forest lands	Analysing carbon sequestration and improvement of biodiversity and watershed function
	Intercropping of indigenous forest species with carefully chosen perennial fruit trees and cash crops, essentially forming a 'food forest'	Replicating structure and function of the original forest while providing food and income sources
	Implementation of bio-engineering projects such as excavation of contour lines on steep maize and rice fields where fruit trees and native species are planted (Figure 2)	Increasing infiltration rates, reducing erosion and preserving soil fertility, forming a synthesis of traditional knowledge and modern technology
Governance	Establishment of a multi-stakeholder platform to approach land-use planning involving villagers, sub-district leaders and officials from various government agencies	Bottom-up governance approach aimed at regaining sustainability of the environment (IUCN, 2012)
	Trial of a new policy on communal land use rights, <i>Chanot Chum Chon</i> (Community Land Title) in collaboration with the Hill Area Development Foundation (IUCN, 2010b)	Demonstrating communal land management and sovereignty
Poverty Reduction	Intensification of multi-cropping and agro-forestry systems	Introducing alternative income generating activities and reducing household expenditure
	Introducing income diversification schemes such as nature and community-based tourism	Increasing the economic situation at the household and village level and developing women's livelihoods (IUCN, 2013)

<sup>1</sup>. An imitation of a natural forest environment which divides the forest into distinct levels using intercropping which forms the area into an edible polyculture landscape.

Photo Credit: Tawatchai Rattanasorn, 2013



**Figure 2. Terraced paddy fields and integrated agriculture plots with contour lines**

Photo Credit: Sayan Chuenudomsavad, 2013



**Figure 3. Ethnic Akha farmer amongst the varied agricultural landscape of Doi Mae Salong**

The approach utilised in the study area comprised a multifaceted, holistic view of integrating conservation and livelihoods aims on a landscape scale. Inherent in this approach is the need to balance multiple land-use types to meet conservation and social development objectives. Restoration and diversification of the agro-ecological landscape is the key driver in all projects implemented by IUCN in this landscape. Demonstration of commu-

nal land management and sovereignty within the complexity of governmental land tenure was addressed through a programme of land use planning. Utilising land allocated for intensified multi-cropping and simultaneously supporting greater income generation allows a larger amount of land for forest restoration whilst meeting development outcomes (Fisher & Rattanasorn, 2010). The aims of the project included a parallel improvement in watershed functions; as

such poverty alleviation is thus linked with improved natural resources management (Fisher, 2013).

## Results and Discussion

### **Stakeholder Participation**

The Livelihoods and Landscape Strategy (LLS) project has strengthened environmental planning by supporting stakeholder participation, while building local capacity to make informed choices about restoration and protection. The project has also implemented agricultural practices that allocate more land for reforestation while sustaining local livelihoods and restoring the watershed's ecological functions in the Doi Mae Salong landscape. Successful governance strategies incorporating land use planning and conflict resolution between various stakeholders supported and enabled LLS project implementation.

### **Poverty Reduction**

A review of the Poverty Reduction in the Doi Mae Salong Landscape project (Fisher, 2013) indicates that the project generated valuable deliverable outcomes including annual incomes from coffee of 45,000 THB per household; establishment of a coffee production and marketing cooperative for Doi Mae Salong; an increase in rice yields by 15% in 2012 compared to 2009 yields; income generation from livestock diversification; development of a women's handicraft cooperative and craft centre; and establishment of a community tourism group (IUCN, 2013). Indicative figures for the additional income generated through measures instituted during the scheme demonstrate that significant amounts of cash income were raised through intensification of cropping areas (Fisher, 2013). Importantly, significant future income increases are expected as development of diversified income streams occurs.

### **Linking Conservation with Livelihood Development**

The case study highlights the importance of executing a participatory style of rural development balancing the interrelated aspects of poverty alleviation, conservation and livelihood improvements on a landscape scale. The results of the activities undertaken by IUCN concur with the literature, empha-

sizing the vital role of livelihoods development in achieving conservation objectives, representing an essential function of ecosystems. Participatory governance practices enable the sustainability of such interventions on a long term basis. A careful choice of cash crops ensures that the agroforestry plots yield profit for local villages so that reforestation is not associated with land loss, but rather with income generation. Biodiversity conservation across the tropics depends on maintaining the health of the landscape matrix (Perfecto, Vandermeer & Wright, 2009), and implementation of activities in Doi Mae Salong work toward this goal of sustainable land management. Principles underlying the long-term sustainability of the system include species diversity, nutrient recycling, closing the loop on resource usage, and water conservation (Altieri, 2002). The agronomists' raison d'être of yield maximisation gives way to the smallholders holistic management of the agro-ecosystem, a neat fit with the aspects of sufficiency economy common within the rural Thai social framework. This model of rural development in tropical areas spearheads the paradigm in landscape management benefiting smallholder farmers and conservationists, a model advocated for tropical regions of the world.

## Conclusion

Conservation, development and landscape restoration approaches can be mutually beneficial in the context of agricultural systems in rural Thailand and in tropical regions around the world. The impetus for combining the approaches into a holistic model for sustainable rural development is clear when the techniques are applied at the landscape scale. The benefits for smallholders manifest through increased food security and livelihoods gained through income diversification. Biodiversity and ecosystem services similarly benefit from this integrated approach to landscape management, which enhances the productivity of ecosystems for human use and increases the resilience of communities and ecosystems to future threats such as climate change. The case study demonstrates the positive outcomes gained from the multiple socio-ecological and conservation challenges facing tropical agro-ecosystems at present. The imperative for transmitting the practices

to smallholders is evident considering population growth and pressure on land availability in such landscapes. Importantly, achieving a common goal for the competing interests of smallholders, conservationists and land managers is a realistic outcome of these strategies. The strategies have great potential for up-scaling and applying at a regional scale, particularly in those areas reliant on the agro-ecological system for livelihoods.

Limitations to achieving success in areas could include the absence of existing networks and institutions such as those present in Doi Mae Salong. Also the willingness and cooperation of government departments and the communities is vital to advancement of the project, notwithstanding, the unrestricted legal and political atmosphere of the project area. Consideration of recommendations following analysis of the case study indicates that local networks and institutions should be prominently involved in the design and implementation of project activities to ensure efficiency in achieving milestones and overall project success.

Working within areas containing different ethnic groups should be taken into account to build on their traditions and harness the wealth of indigenous knowledge inherent within each community. Further, maintaining the multi-stakeholder platform post-project cessation, should be a key function of local governance arrangements even with changes of legislation, particularly in relation to land tenure.

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### Conflicts of Interest

The authors hereby declare that there is no conflict of interest.

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