

LIVING LANDSCAPES

Embracing Agro-Biodiversity in Northern Laos



Andrea Rodericks

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With illustrations by Manilla Chounlamountri

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FOREWORD

The Lao PDR is endowed with an enormous wealth of biodiversity resources, many of which are central to the lives and livelihoods of northern upland communities. These communities have nurtured agro-biodiversity resources in multi-functional landscapes, drawing on knowledge passed down and adapted over generations. It is the responsibility of the government and communities to continue to safeguard, protect and use these resources in sustainable and regenerative ways.

Over the past two decades, Lao PDR has made impressive progress in reducing poverty, improving agricultural productivity, becoming self-sufficient in food, and linking to regional markets (China, Thailand and Vietnam). But this progress has been accompanied by significant and rapid changes for northern upland communities. Pressure to shift from subsistence to commercial agriculture has disrupted long-standing systems of shifting cultivation and is changing the structure of rural work and labor, opportunities available for young people and eating habits. Added to this, climate change is affecting how people farm, where they collect natural foods, and the quantity and quality of income-earning NTFPs. Upland farming communities are challenged to weave together livelihood strategies that meet the needs of their families in this rapidly changing environment, while adapting to new conservation and development laws, and continuing to ensure that agro-biodiversity resources thrive. Perhaps, the upland farming areas of Laos are one of the most complex and dynamic regions of change in the world. Ensuring appropriate development pathways there is a national priority.

Over the past decade TABI has worked with a range of government, non-government, and private sector organizations and programs to build a better understanding of the importance of agro-biodiversity. This work has helped communities evolve strategies to build viable livelihoods while nurturing the unique natural resource heritage of the Lao PDR. TABI's work on participatory land use planning has demonstrated how bottom-up village level planning and management based on actual land use and resource needs can support national development and conservation goals. The long-term funding commitment of 11 years toward TABI has allowed continuity of efforts and informed policy on forest conservation, land use, and sustainable agriculture. It has also generated valuable information needed to develop new programs, such as on Nutrition Sensitive Agriculture.

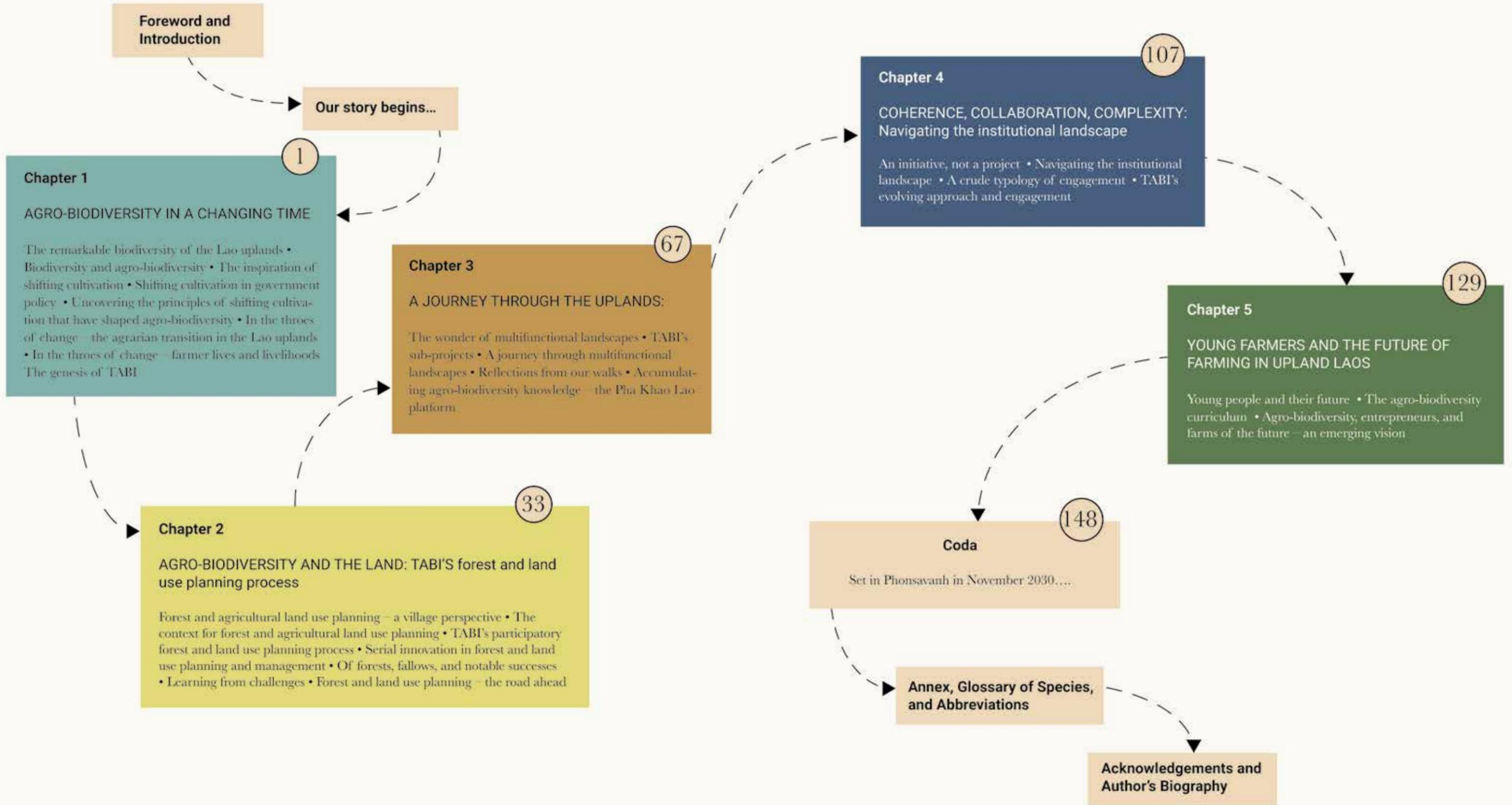
This book capturing ten years of TABI's work is a tapestry of people, change, challenges and success stories that help us remember where we have come from and provides important lessons and possibilities for the future.

In 11 years we came a long way. TABI has been and is one the most successful projects once again from SDC and represents a strong footprint and legacy of SDC support to the Lao PDR. All projects from SDC have a very long lasting impact to our rural development and rural poverty alleviation and we thank SDC for their great contribution and most importantly their patience to working with the poor communities which include women, children and the disabled to ensure wide range impacts for the local people. I thank SDC for the very good work done.



Dr. Phouang Parisak Pravongviengkham
Deputy Minister
Ministry of Agriculture and Forestry, Lao PDR

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INTRODUCTION

“The best arguments in the world won't change a person's mind. The only thing that can do that is a good story.” (Richard Powers)

The Lao uplands have long been recognized for their rich agro-biodiversity. Home to globally important species of animals, plants, and micro-organisms, this agro-biodiversity is the legacy of the upland farmers' agricultural knowledge and practices passed down over generations. Towards the end of the 20th century and the start of this one, the agrarian transition and the integration of Laos into the regional and global economy brought economic opportunity to upland communities. It also brought challenges and contradictions for traditionally subsistence farmers and threats to the biodiversity of the region.

In 2009, the Lao government's Ministry of Agriculture and Forestry and the Swiss Agency for Development and Cooperation entered into a bilateral agreement for the implementation of The Agro-Biodiversity Initiative (TABI) in upland Laos. The intent of the initiative was to leverage the country's rich biodiversity to help realize development goals in the near term without jeopardizing future capacity to do so. The initiative sought to conserve, enhance, manage, and sustainably utilize the biological diversity found in upland farming landscapes in order to improve the livelihoods of farming families in the region. This initial agreement grew into a 10-year commitment over three phases and came to a close in 2020.

This book tells the story of TABI's journey from 2009 to 2020 and of agro-biodiversity in the uplands, looking back over these years and ahead to what may come in the future. This is also a story about embracing complexity and change. Through the story we learn about how TABI worked with farming communities as they navigated the complexity of the agrarian transition, drawing from their deep knowledge and interaction with nature and ecology. We explore what they have achieved and learned in the process, and it gives us hope for the future. It is important to point out that this book is not an evaluation or assessment of TABI's performance and neither is it a comprehensive documentation of all of TABI's work – those materials can be found elsewhere. Rather, it is a sincere effort to learn from the work that TABI did along with a wide range of partners and stakeholders over its 10-year journey.

Our story opens with an introduction to Somchan (aged 63) and Tou-Kue (aged 32) - both upland farmers - Lar, a 10-year-old girl studying in grade five, and Bounmee, a budding young officer at a District Agriculture and Forestry Office¹. We get a glimpse into their lives and preoccupations. We meet them again through the course of the book, as we explore what the years of TABI have meant for farming communities and what their future may hold. In Chapter 1, we take a close look at the practice of shifting cultivation, its significance in the lives of farmers, and how it has shaped agro-biodiversity in the Lao uplands. This helps us uncover the regenerative principles of agro-biodiversity that lie at the core of upland farmers' practices. These principles stay with us through the book. We then take a look at the agrarian transition from different vantage points. And we are introduced to TABI.

In Chapter 2, beginning with Somchan's narration of his experience, we take a deep dive into TABI's participatory forest and land use planning and management process. We uncover what was unique about this process that built on upland communities' existing uses of land and forests. And, through the story of its successes and challenges, we unpack some lessons to inform land and forest policy and the

future of forest and land use planning in Laos. We also get a glimpse into the value of agro-biodiversity and land use data for development policy going forward.

Chapter 3 takes us on a journey through multifunctional landscapes accompanied by Tou-Kue, Lar, and others from their villages. We learn what multifunctional landscapes are, why they are valued by upland farmers, and how they are changing. And we take a look at TABI's sub-project investments in agro-biodiversity species in these multifunctional landscapes and their significance for agro-biodiversity-based livelihoods. This chapter closes with a reflection on Pha Khao Lao – a digital platform designed to make agro-biodiversity knowledge more accessible to stakeholders – and a vision for its future.

TABI was intentionally set up as an “initiative” and not a project, consciously designed to mobilize the ownership, commitment, and participation of a diverse range of organizations, individuals, projects and departments across sectors and levels. It was an ambitious undertaking, and Chapter 4 offers us insights into what we learn from TABI's efforts at engaging and collaborating with others and how their approach shifted over time. We discuss what it takes to work collaboratively to address systemic issues in complex and changing times.

Chapter 5, the last chapter in our story, looks to the future. What does agro-biodiversity mean to young people in the uplands, and what will it mean for their lives and livelihoods in the future? We get to hear about TABI's experience with developing a school-based agro-biodiversity curriculum and we hear from some of the teachers and students who worked on it. Our story closes with a short description of an emerging vision for agro-biodiversity inspired landscapes, enterprises, and farms of the future. A short graphic story at the end of the book takes us to 2030 when some of this vision becomes a reality, and we see where Lar and Bounmee's paths have taken them.

The timing of this book on agro-biodiversity is important. In contrast to a decade ago, there is today a global consciousness that “business as usual” in our relationship with nature and the environment would be suicidal. This book was born in the shadow of the COVID-19 pandemic. And, as the pandemic progressed, we were reminded time and again of how precious agro-biodiversity and the knowledge held by upland farmers is. The story makes a convincing case for both the economic potential of agro-biodiversity and the need for and value of farmer innovation and learning for strong, resilient food and agriculture systems and regenerative development in the Lao uplands.

August, 2020

¹ These characters were created from a composite of interviews with communities in Xiengkhouang and Houaphanh provinces during the preparation of this book. They are fictitious but informed by conversations with real people.

OUR STORY BEGINS...

It's a warm morning in Phoukout district in northern Xiengkhouang province. **Somchan** stands at the edge of his home compound, looking out at the chestnut trees on the next hill over. They are in bloom and their light green foliage shines in the sun. The new year has just passed and they are waiting for the first rain, after which the red mushrooms will appear. Somchan is an elder in his village and is responsible for conflict resolution. He makes a mental note to himself to remind people at their next village meeting about the zones they have allocated for collecting mushrooms in their village land use plan. He is happy and proud that everyone has agreed to the plan to collect mushrooms from two areas initially, and over time to spread to two other areas. This way, they will avoid over-collection of these resources.

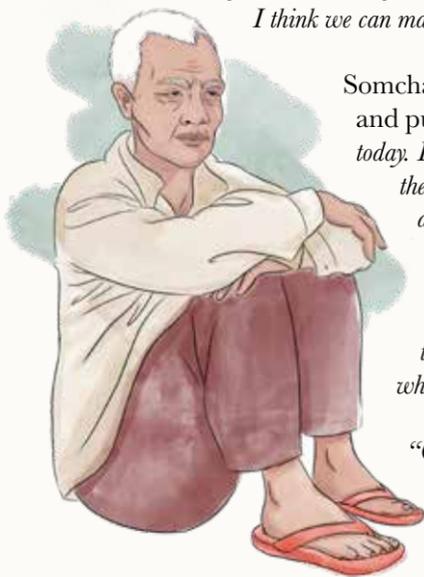
As he walks back to the house, he stops by the swallow trap² on the edge of the next compound, where his son is closing the hatch on a few unsuspecting birds. His son asks him what he was thinking about looking out into the distance.

Somchan says, *“I was thinking about the mushroom season beginning. And I was wondering what kind of price we will get this year for the special red mushrooms. It depends on the Chinese trader. I have not yet seen him this season. Will you also come and pick with us?”*

“Of course, we will come,” says his son. *“To be honest, these days we are not thinking too much about mushrooms. I hear the future is in cattle [he smiles]. It is good that in our village we have allotted grazing land for all families together in one area in the west of the village. Now it is easier to manage grazing, and the cattle do not destroy our other crops. Maybe we can get one more cow this year.”*

“Do you think your brother and sister will come this season to help with the mushroom harvest?” asks Somchan.

“You know as well as I do, father... their lives are now in the city – there are no jobs here. They do not follow the rhythm of our harvests. If we really need their help, we can ask them. But since we stopped planting so much rice, I think we can manage ourselves here.”



Somchan's wife, Somdee is now out in their garden picking wild passion fruit and pumpkin leaves. She calls out to her son... *“So, I see we have some swallows today. Bring the family and come and eat with us later. The neighbor's daughter is back from the tea roasting training organized by the Chinese trader, and she is coming to tell us about it. Their family has been allocated some land on the hill behind the tea nursery to plant wild tea trees.”*

Somchan is still looking out into the distance. *“What has got into you today?”* Somdee asks him. *“You have been staring into the distance for a while now.”*

“Oh, nothing... just admiring the chestnut blooms... the bees must be happy,” says Somchan.

Somdee says, *“I'm going in to check on my stew.”* As she steps into

her kitchen, she softly sings a song that she learned from her mother. It is a song about the friendship between a mushroom and the chestnut tree under which it grows. She wonders if her daughter in the city remembers the song and whether she will teach it to her children when they are old enough.



Meanwhile in northern Houaphanh, **Tou-Kue** has an early start. Her youngest baby daughter had a sleepless night and kept her awake, but she has a full day planned. After the morning cleaning, she leaves the children with her mother and makes her way to the young forest to gather some bamboo shoots. It was a cold night and the hills are still shrouded in fog and clouds. Tou-Kue wants to return early as the officer from the District Agriculture and Forestry Office asked for her assistance in showing some visitors around their area. It's going to be a busy day. She has left some money with her mother-in-law in case the children start to trouble her. She thinks how nice it is to have a little money to spend on the children, but now they are always asking for chips and candy, and she wonders how good it is for them.



Tou-Kue walks past the paddy fields. It is almost planting time and, later in the month, they are all going to be busy. As she walks through their native orange tree fields, she sees some late fruit on the trees. She wonders what they can do the following year to get a better harvest and to keep the pests away. Maybe the officer from the District Agriculture and Forestry Office or some of the visitors will have ideas.

She reaches the entrance to the young forest on the hill. This was an upland rice field three years ago, but their family has stopped planting upland rice, and they now focus on paddy. She cuts the bamboo shoots and herbs she wants, uprooting a few medicinal herbs to plant around the house. While there, she also notes where the broom grass has matured so she can return and cut it before her neighbors do and dry it in time for the Vietnamese trader's visit later in the month.

As Tou-Kue leaves for home, she looks up the hill at an empty field. She is pleased to see it bare. Some families had been cultivating maize in that area to send to Vietnam. They had seen this as providing a ready market and an assured source of cash - money which they were paid immediately upon selling the maize to the trader. But when their productivity dropped, the families started to apply heavy chemical fertilizers and pesticides, and Tou-Kue had been worried about the chemicals seeping into the river. She heard from a neighbor that since they had not got a good yield, these families were now thinking about planting *nor loy* bamboo in that field instead. She hopes this is true.

Tou-Kue sets off for home. She drops off the herbs and tells her mother-in-law about the broom grass, making plans to harvest it the next day. She leaves for the roadside market with the bamboo shoots.



² A locally made device to catch swallows as they migrate at particular times of the year. These birds are a local delicacy in Xiengkhouang province.

Elsewhere, school is out in 10-year-old **Lar's** village at the north-eastern edge of Xiengkhouang province. She sets off home. Her sister had stayed home today with a stomach ache. As she walks on the path, she hums the tune they learned about medicinal herbs at their agro-biodiversity class at school. There is one herb that cures stomach aches and her teacher said that it could be found in their village. Maybe she should look out for some for her sister. On most days at this time of the year, as Lar and her sister walk home, they search for broom grass that is ready for harvesting. Their mother has taught them where to look. She always says, *"Look in places where the land has been left fallow for a few years after the rice harvest or where the land was disturbed or burned."* As the fields on the hillsides were planted with rice three years ago and allowed to return to nature, the hillside is full of broom grass. Lar can see some in the distance that looks ready for harvesting, but she wants to take the path by the river today to look for the plant that cures stomach aches.



As she approaches the river, she sees a small group of people, animated in conversation, sitting by the banks with charts and papers. The conversation is being led by her 20-year-old cousin, Phaeng. This gives her the courage to get closer. As she nears the group, her cousin calls her over. But Lar is shy and says she has to get home in a hurry. She nevertheless did get close enough to overhear the subject of their conversation. They were talking about an experiment they conducted in their fields, and Phaeng was carefully recording their findings on the chart. It all looked very professional and Lar is proud of her cousin. She wants to be like her when she grows up. Phaeng is a village facilitator in an agriculture project, and she helps farmers learn from each other and from their own research.

Lar goes on her way. A little further she discovers an area that has some moisture and is full of different kinds of herbs. She imagines herself as a botanist, searching for the perfect specimen. She takes out her notebook. She had carefully drawn the shape of the leaf at school, hoping it would help her recognize the herb she wanted. But she can't see it anywhere. This is disappointing. After a while she decides to leave, as her mother will be getting worried if she does not get home soon. As she walks a short distance up the path, she suddenly spots that familiar shape of the leaf – it is just perfect! She plucks some, and rushes home.

Lar's mother greets her as she enters and says, *"I thought you would return with some broom grass today – there is a lot along the new road."*

Lar is a little worried that her mother is upset. She knows money is tight these days. Perhaps she should have harvested some broom grass. She sheepishly pulls out the herbs she has picked from her bag, and explains to her mother their use.

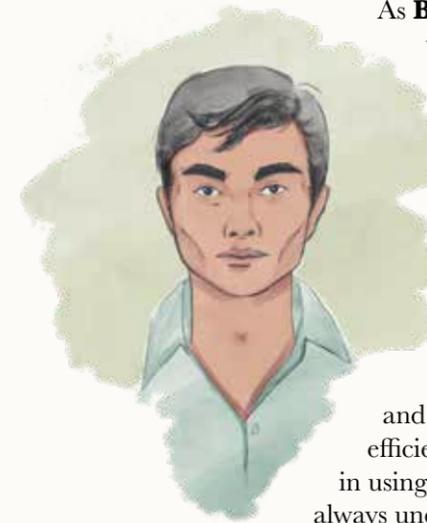
Her mother's disappointment disappears in an instant and her eyes light up. She says, *"We used to have this herb in the place where our village was located before the government moved us – there was plenty of it, all over the forest. My grandmother was a herbalist."*

Then she sighs and says, *"I feel bad that I have not been able to teach you girls about the uses of these plants. I am glad you get to learn this at school. You have to show me where you found it. We may be able to grow some of them at home."*

"Yes, yes, I will show you," says Lar... *"but first, shouldn't we use them to make little sister better?"*

Her mother smiles and begins to boil the herbs. *"What else did you learn today?"* she asks Lar.

But Lar's mind is on something else... She has a faraway look in her eyes, and she says, *"I want to learn to do what Phaeng does."*



As **Bounmee** cleans his bike, he thinks about which route he should take and which village to go to first. He is an officer at the Viengxay District Agriculture and Forestry Office in Houaphanh province. He has received several requests from different villages. One of them would like him to help them make plans for a fruit tree nursery and, in the other, the honey processing group wants to show him their produce and get advice on how to market it. Another village is inaugurating their fish cultivation zone in the afternoon. He is going to be busy today. Fortunately, it is bright and sunny, and it will be nice to be out in the fields.

Younger than his peers, Bounmee has a reputation in the villages he supports for being very responsive. His peers at the District Agriculture and Forestry Office think he tries to do too much, and he makes them look less efficient. He has also been provided with a computer and is much more proficient in using it and accessing information than most of his colleagues. Bounmee does not always understand their way of doing things. He loves this job and is determined to succeed and to help as many farmers as he can. He thinks of the challenges his parents used to face on their farm and the kind of support they would have appreciated. And that motivates him to do more.

Today Bounmee is especially excited, and his mind is full. Last week he participated in data management training run by the Department of Agricultural Land Management and an international university. He had been able to work with the land use data from the villages he supports and learn about all the things that could be done with that data. He was learning to use Excel on his computer for different kinds of analysis, and was building skills in presenting it in visually interesting ways. And he got to meet district agriculture and forestry officers from all the different districts. He is eager to tell colleagues from his district about his experience and to see if he can get them interested in assembling their data and making it more accessible to people.

But today, he will spend the day with farmers talking about fruit trees, honey bees and fish.





CHAPTER

1

AGRO-BIODIVERSITY IN A CHANGING TIME

“Please lend us your land and forest.

We vow to return them after harvest.

We are asking for your permission according to the traditional ritual.

Please give us a good crop of rice.

May we have enough to eat our fill.

Oh forest spirits! Oh mountain spirits!

Please help us celebrate a great harvest.”

- A traditional Khmu prayer



In a world where up to a million species are threatened with extinction, the Lao uplands could be a source of hope. Home to globally important species of plants, animals, and micro-organisms, this biodiversity is the multi-generational legacy of the knowledge and shifting cultivation practices developed and adapted by indigenous farmers through years of interaction with their natural surroundings in the uplands. It has helped sustain them through periods of colonization, war, and other disasters.

Almost like a rite of passage on its path to development, over the past three decades, Laos has been in the throes of immense change - an agrarian transition, driven in part by the increasing importance of regional and global markets. In its efforts to overcome poverty and conserve forest cover, government policy has focused on commercial agriculture and large-scale land investments, taking steps to eradicate subsistence shifting cultivation. How have rural upland farmers navigated this change?

The agro-biodiversity initiative (TABI) emerged in 2009 amid this changing environment. Underlying its design was a belief that the conservation and thoughtful utilisation of agro-biodiversity in multifunctional landscapes could offer a viable alternative to large-scale commercial agriculture, and contribute to both development and conservation goals. This is where our story begins.

THE REMARKABLE BIODIVERSITY OF THE LAO UPLANDS

With between 8,000 and 11,000 species of flowering plants, 166 species of reptiles and amphibians, 700 species of birds, 90 known species of bats, 500 species of fish, and 100 species of mammals, Laos is one of the most biodiverse places in the world. It is home to one of the greatest genetic pools of glutinous rice varieties in Asia, and places in northern Laos, along with some parts of northern Myanmar and Yunnan province in China, are the origin of all tea trees in the world. This range of biodiversity in our current global environment of diminishing species is a treasure and should be a source of power and strength for the Lao people and future generations. In the uplands particularly, people depend on this biologically diverse ecosystem for water, food, income, and other products that it provides - medicines, wild fruits, bamboo shoots, mushrooms, edible insects, amphibians, vegetables, material for constructing houses, and for making handicrafts and paper.

The Lao terrain is characterized by three distinct formations - mountains, plateaus and plains - ranging in height from 800 to 2,800 meters. These are the uplands. They are part of the Phou Luang or Annamite range which cuts through Indochina forming a spine adjacent to the Lao-Vietnam border. The Lao uplands cover 70 percent of the country and are home to several

different ethnic groups whose beliefs and local traditions are rooted in a profound respect for nature. Our story is set in three provinces of the northern uplands (Xiengkhouang, Luang Prabang, and Houaphanh). These provinces are populated predominantly by three main ethnic groups - Lao, Khmu, and Hmong. While each ethnic group has different food and cultural preferences and traditions, for generations shifting cultivation of upland rice has guided their interactions with land, forests, rivers, ecosystems and wildlife.

In this stunning, rugged, mountainous terrain, life is hard, but people are resilient. They have shaped a regenerative relationship with nature from years of close interaction with their natural environments. And they have passed on the knowledge, wisdom and values from this interaction over generations through stories and practices for living off the land. These stories and practices have played an essential role in developing and nurturing agro-biodiversity in the region.

Figure 1.1: Map of Laos with TABI focal provinces outlined. (Source: TABI)



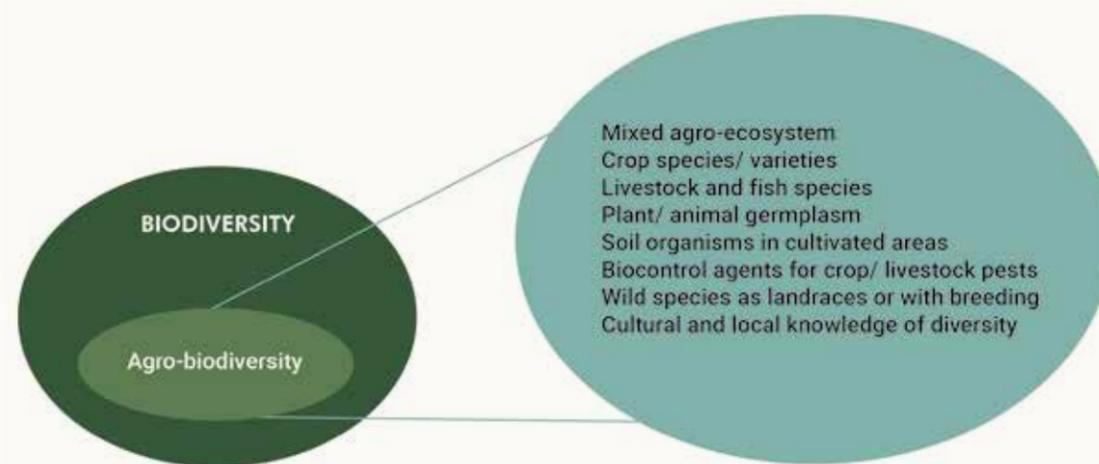
Over the past 20-30 years, as part of a larger agrarian transition, life has been changing rapidly in the northern uplands. Growing links to regional markets and their increasing demand for natural resources, a young and

growing population, and the government's ambition to end poverty, have brought to the uplands a mix of promising development opportunities and difficult challenges. What has this meant for agro-biodiversity and for the lives of upland farmers who have been its stewards? We will explore these questions in this chapter as a way to better understand the context in which The Agro-biodiversity Initiative (TABI) grew. But first, let us look at what we mean by agro-biodiversity.

BIODIVERSITY AND AGRO-BIODIVERSITY

In conversations for this book, we noted that many people used the terms agro-biodiversity and biodiversity interchangeably. But the difference between the two is important to our story, so let us try to clarify what we mean. In simple terms, agro-biodiversity is created through the introduction of human agricultural activities within, adjacent to, or replacing natural environments, for the production of food or to obtain non-food resources that people value. It includes not only what farmers grow but the natural plants and animals that live and evolve in these systems. So we may call it a sub-set of biodiversity – that part of biodiversity that is related to agriculture, production, or the collection of food and other natural resources.

Figure 1.2: Biodiversity and agro-biodiversity. (Source: FAO, 2018)



According to the FAO, agrobiodiversity is:

“The variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non-harvested species that support production (soil micro-organisms, predators, pollinators), and those in the wider environment that support agro-ecosystems (agricultural, pastoral, forest and aquatic) as well as the diversity of the agro-ecosystems.” (FAO, 2018)

Agro-biodiversity occurs in natural landscapes but is both actively and passively managed by women and men farmers. It requires human interference or disruption and, without this kind of disruption, many species would not exist or survive. In that sense, agro-biodiversity is human-made and is intrinsically linked to people's lives and livelihoods. Because human activity shapes and conserves this type of biodiversity, people's local knowledge and culture are integral parts of agro-biodiversity management.

For agro-biodiversity, diversity within species is at least as important as diversity between species. This is why the changing composition and number of the 70 varieties of eggplant, 50 varieties of chilies and thousands of upland rice cultivars add to the richness of agro-biodiversity in Laos. This diversity has been actively propagated by farmers in rotational shifting cultivation systems. In these systems, farmers allow cultivated land to incrementally evolve toward natural forest environments. Biodiversity emerges in this process, contributing to their resilience in the face of changing conditions. This is different to industrial agriculture systems where much of the crop diversity is held offsite in gene banks or breeders' materials.

Because of the degree of human management involved in these processes, conservation of agro-biodiversity requires the sustainable and regenerative use of products from these production systems. Establishing conservation areas that are protected from any human intervention in order to preserve agro-biodiversity is meaningless since agro-biodiversity depends on human management. In addition, many economically important agro-biodiverse agricultural systems evolve by introducing crop or livestock species from elsewhere.

The northern uplands of Laos have been home to a diverse mix of indigenous communities, and the nature of agro-biodiversity in the uplands has been largely shaped by their practice of shifting cultivation or swidden agriculture (*Hai* in Lao). These practices have been developed through long histories of interaction with their land, forests, and natural environment over generations. This makes it important for us to understand agro-biodiversity in ecological as well as social and political terms. It is not something that just exists... but something that has been created and sustained over hundreds of years of practice and continues to evolve. It is not just a set of technical practices or ecological principles... it is also social and cultural, intersecting with every aspect of people's way of life. It is not just something that is protected or lost... but it is constantly evolving through disruption, breeding, experimentation, exchange and use at so many different levels. It is a creative endeavor and people who farm in the uplands are essentially the innovators and creators of this type of biodiversity.

This raises questions like: Who holds agro-biodiversity knowledge and whose knowledge counts? When is something protected or lost? What kind of social and ecological interaction is needed for people and nature to coexist sustainably over long periods of time and how can we support this interaction? What can we learn from the shaping of agro-biodiversity in upland Laos to inform sustainable and viable agricultural development going forward?

THE INSPIRATION OF SHIFTING CULTIVATION

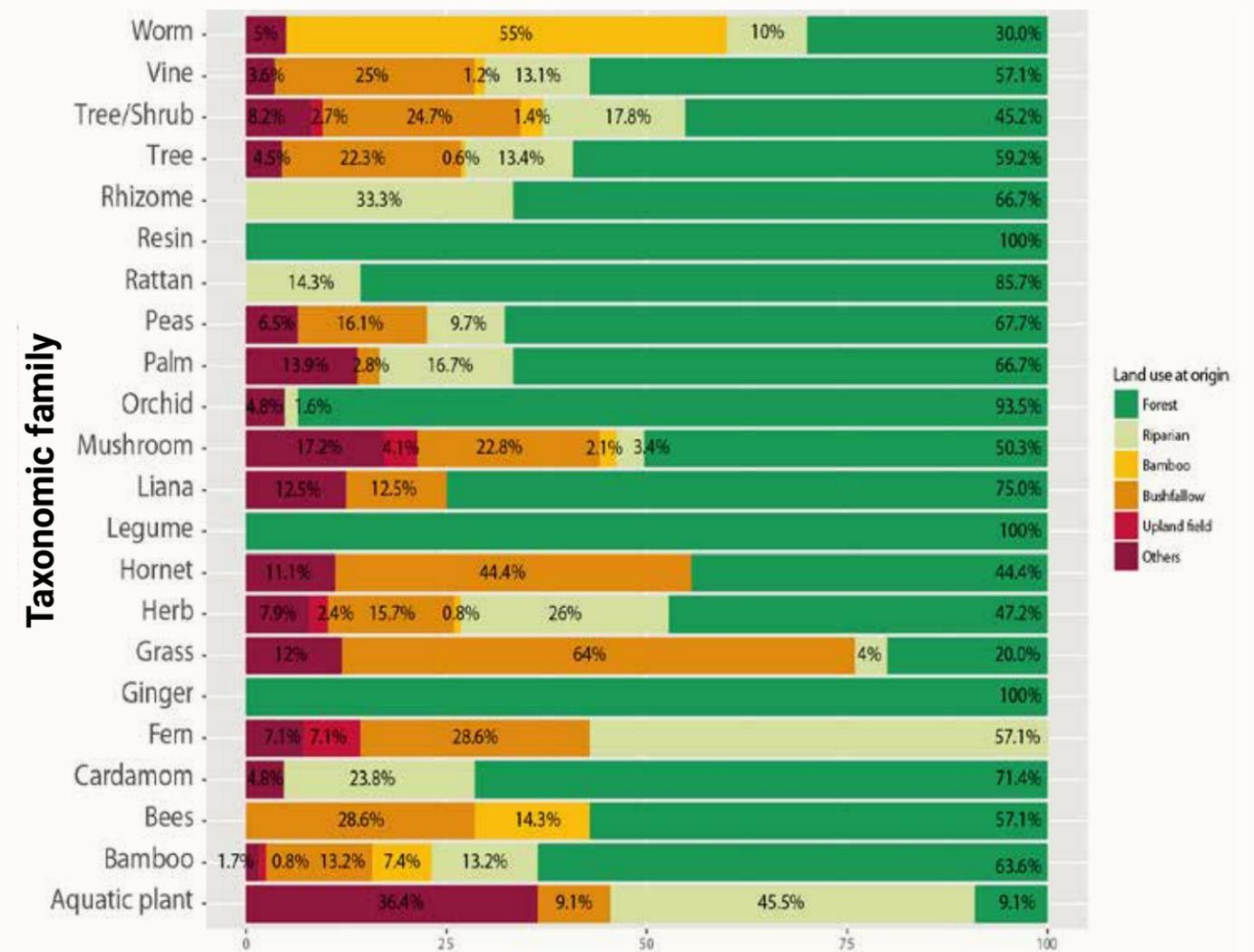
Since shifting cultivation has been the principal way through which upland farmers nurture agro-biodiversity, it is a good starting place for our story. At the core of shifting cultivation is a broad set of practices, basically involving a method of growing crops where farmers clear secondary forest growth on a parcel of land, typically to plant upland rice (but it may include maize, root vegetables, squash, or beans). After the harvest, the land is left fallow and another plot selected to cultivate crops. During this time the fallow land continually evolves back towards a forest system and, in this transition, bamboo, mushrooms, broom grass and other species may be harvested. Some of these species may not have been prominent in the adjacent natural environments, and their growth is triggered by human-made disturbance to the soil and increased access to sunlight through clearing or burning. This form of cultivation is typically practiced by indigenous populations living in mountainous regions in many parts of the world, drawing on knowledge that they have developed over generations through their interaction with their natural environments.

Much of the value of shifting cultivation emerges from the wisdom and magic of fallows. Fallows play a critical role in the provision of food, medicines, water, and other products, and in enhancing biodiversity as well as nurturing the productivity of upland rice cultivation. They provide essential ecosystem functions and services. These functions, such as carbon sequestration or improving soil structure and quality, enhance the productivity, health and resilience of the socio-ecological system of the uplands as a whole. The length of time a plot of land is left fallow may vary before it is cleared again to grow crops, but farmers know that longer fallows provide more ecological services. Some valuable species, such as the benzoin tree (*ton yarn*) that produces a resin used in high quality perfumes and certain kinds of mushrooms, take some years before they emerge and become valuable in these fallows. Indigenous farmers view the fallows created through the practice of shifting cultivation as different types of co-existing forests, and in these forests they find food, medicine, materials to build their homes, non-timber forest products to use and sell, and land to graze their animals. These secondary and tertiary forests that evolve in the fallows are essential to life and their way of life. Looking across a shifting cultivation horizon, the landscape is a mosaic of fields in various stages of forest growth, performing multiple functions for upland communities. In Chapter 3, our story will take us to some of these areas to understand the character and promise of these multifunctional landscapes. Figure 1.3 below gives us a sense of the kinds of non-timber forest products that upland communities gather from different sources, fallows being a significant source for these products.

For some communities, shifting cultivation practice does not involve rotations in a limited number of fields but movement of their village settlements to new sites and clearing new forest cover after exhausting the nearby forests. This is known as “**pioneering**” **shifting cultivation** (*hai leuan loi*), as opposed to “**rotational**” **shifting cultivation** (*hai moun vien*) described

earlier. The distinction between these types is important as they have significantly different impacts on land use and forests. In Laos, rotational shifting cultivation is the most commonly practiced type.

Figure 1.3: Proportion of collection of different species by land use type (by volume). (Source: CDE)



To fully appreciate the significance of shifting cultivation, let us try to understand its underlying inspiration. For generations, indigenous farmers have shaped their practice of shifting cultivation by harnessing various natural processes such as forest regeneration and nutrient cycling that they have observed in the natural forests in which they live. Some researchers have coined terms to describe this idea of learning from nature, such as “hitching a ride with nature” (Xu *et al.*, 2017, drawing from writings by Brookfield) or Eduardo Kohn’s ‘thinking with and like forests’ (Kohn, 2013). This philosophy of mimicking nature lies at the heart of the regenerative and adaptive nature

of shifting cultivation. It is also important to note here that this underlying philosophy also complements the scientifically established idea of ecosystem services, which is essentially the recognition that natural ecological processes often provide the most efficient support for agricultural production and that these processes can be fostered by appropriate land management. This inspiration from, and connectivity with, nature is important to our understanding of agro-biodiversity and its future in Laos.

Shifting cultivation is not a fixed set of practices, and they are not static. Communities that practice this form of agriculture are continuously innovating and adapting in interaction with nature, the policy environment, changing market and livelihood opportunities, labor availability, and their cultural and food preferences. Shifting cultivation is constantly changing, and there are many related practices surrounding the kind we have described here. Many communities have been progressively evolving their practices over the years to more sedentary forms of agriculture. For example, in some shifting cultivation systems, farmers may enhance the quality of a particular species of indigenous tree in their fallows (such as tea) that interacts with those naturally growing there (oak), and then while the trees are still young, they may plant a rotation of increasingly shade-tolerant food crops. Through this kind of innovation, they may integrate new high-value cash crops such as coffee into their shifting cultivation cycle.

This constant choice-making and adaptation is an essential feature of shifting cultivation, and women have traditionally played a key role in these decisions. In the Lao uplands, women typically decide which species of upland rice or other crops to cultivate in shifting cultivation systems based on a range of interconnected factors. It is through this adaptive and regenerative form of agriculture that farmers have nurtured, protected, and evolved the agro-biodiversity of the uplands over generations.



Typical rotational agriculture system on the far hills with upland rice on the foreground. (Credit: TABI)

SHIFTING CULTIVATION IN GOVERNMENT POLICY

While upland farmers in Laos have practiced shifting cultivation for a very long time, until the mid-1970s they were not well integrated into state decision-making or land use planning, and there was little appreciation of the knowledge they held. Further, there was a perception among policy makers that shifting cultivation was backward and associated with poverty, low levels of productivity, environmental degradation and deforestation – an impediment to biodiversity and conservation goals. Therefore, as policy makers sought to better integrate the uplands into national development planning, policies consistently aimed at eradicating shifting cultivation³ in favor of more modern and sedentary forms of agricultural production and a shift from subsistence to commercial agriculture, largely comprising annually planted monocultures for export.

A series of policies in the 1990s and early 2000s (village-scale rezoning, or the land use planning and land allocation program) sought a fundamental change in land use in the uplands away from shifting cultivation to a sedentary system, in effect reducing fallow length (from 10-15 years to 2-3 years). This had damaging effects on fallow health, soil fertility and farmer livelihoods. Shorter fallows also increased the presence of weeds and, therefore, labor time that farmers, especially women farmers, needed to spend on production. As shifting cultivation is sensitive to social and demographic dimensions, it is affected by changing population density. Beyond natural population increases, earlier attempts at village relocation and development policies, such as village consolidation and focal area development, contributed to rapid changes in population density in certain areas, decreasing the potential for sustainable shifting cultivation. In viewing shifting cultivation as an impediment to biodiversity, these policies underestimated the value and biodiversity of fallows. Policy makers, therefore, did not anticipate the potential harmful impact on fallows that could result from these policies

Policy intent to eradicate or stabilize shifting cultivation has been consistent, but there has been ambiguity about how it is to be achieved. In part, this ambiguity comes from the question of whether it should be eradicated or stabilized and what is meant by “stabilizing” shifting cultivation. Another source of confusion is whether the term “shifting cultivation” refers to pioneering shifting (*hai leuan loi*) or rotational (*hai moun vien*) cultivation, or both. Although the stabilization and ultimate eradication of shifting cultivation has remained at the center of government policies, the methods and processes to achieve this have become more moderate over the past two decades (Kenney-Lazar, 2013). While formal policy has since moved away from the “eradication” of shifting cultivation to its “stabilization”, in practice development programs continue to put pressure on shifting cultivation to allow forest regeneration in pursuit of Laos’ 2020 Forest Strategy that aims for 70 percent forest cover by 2020.

³ Forestry Law of 1996, Agriculture Law of 1998, and the Background document on the National Poverty Eradication Programme (2003)



A very young fallow field beginning the evolution back to native vegetation. (Credit: Joost Foppes)



The young dark green forest area in the center of the photo is an older fallow field with high biodiversity. (Credit: TABI)

These policies and changes in land use were accompanied by efforts to promote commercial agriculture of monoculture cash crops such as rubber, cassava and maize. Many farmers have engaged in these commercial farming opportunities, but this does not necessarily mean that they have completely abandoned traditional shifting cultivation and their interaction with forests and fallows. While it has been changing, shifting cultivation remains widespread in the uplands and critical to the availability of agro-biodiversity resources and the resilience of farmers' livelihoods. According to the last Agricultural Census (conducted for the period 1999 to 2011), more than 30 percent of all households (roughly 2 million individuals) were engaged in rotational shifting cultivation, involving around 212,000 hectares of cropped land. Along with the fallows that are integral to this system, this may comprise as much as 6.5 million hectares, more than six times the total paddy rice production area of the country (Ingalls *et al.*, 2019). Shifting cultivation based on ecological, social, and cultural principles that enriches livelihoods while achieving positive environmental goals is achievable and desirable.

UNCOVERING THE PRINCIPLES OF ROTATIONAL SHIFTING CULTIVATION THAT SHAPE AGRO-BIODIVERSITY

Since the management of agro-biodiversity in Laos has been shaped by shifting cultivation, the principles of rotational shifting cultivation as practiced by upland farmers can help us understand agro-biodiversity and imagine its potential trajectory and significance for sustainable development in the uplands⁴.

People's reality | Shifting cultivation (and therefore agro-biodiversity management) is intertwined with the culture, belief, and agricultural practices of upland farmers. It is evolutionary, building and evolving from wherever people are, taking into account their existing relationship to the land, forests, rivers, and living species within them. This reinforces the idea that agro-biodiversity is not just a set of technical agricultural practices but is social and political too. It may be guided by customs, rituals (for example, praying to the spirits before selecting a new farming location and after harvest), festivals (for example, celebrating the new year and praying for plentiful harvests), and relationships. This makes agro-biodiversity well-suited to bottom-up processes that build from people's existing reality.

Iterative and adaptive | Rotational shifting cultivation is essentially an iterative practice that evolves with each iteration, responding to ecological and climate conditions, as well as market, policy, and social factors. The iterative nature of this practice allows it to adapt to complex and changing environments. Farmers' choices and adaptation with each iteration have shaped the nature of agro-biodiversity in their environment.

⁴ The description of the principles of shifting cultivation draw from Xu *et al.* (2017) and conversations with communities in Xiengkhouang province for the preparation of this book.

Place specific and scalable | Shifting cultivation practices and agro-biodiversity in upland Laos have been nurtured through place-specific local innovation based on the specific ecological, social, and (increasingly) economic and political conditions of the place in question. But because there is local adaptation and innovation across a wide range of diverse contexts, when we step back and look across these contexts, it is possible to observe patterns and draw meaning at landscape or ecosystem scale. In addition, the fact that shifting cultivation systems have evolved in so many different upland contexts around the world validates their potential for scale.

Deliberate management of resources for regenerative growth | Shifting cultivation requires the deliberate management of resources (mainly the plant community) through notching, slashing, felling, trimming, and controlled burning. The cutting and burning phase to clear land allows annual crops, such as rice, to be grown in a full sun environment in soils enriched by the recycling of nutrients. Over the following fallow years, actions are taken to promote tree or species regeneration and interaction, and to accelerate production of valuable resources and biomass (and thus enhance potential for expanded ecosystem services). This deliberate human disruption and provocation for the regeneration of specific species is core to creativity in shifting cultivation and an essential feature of agro-biodiversity.

Diversity and interconnectivity | Agro-biodiversity thrives on a diverse mix of crops and trees that harness positive inter-organism and plant-soil interactions. This also applies at ecosystem level in relationships between particular perennial species and networks of interacting species, for example, particular kinds of mushrooms that emerge from mycelial networks under chestnut and oak trees under certain seasonal conditions. Those who nurture agro-biodiversity value diversity, and they pay attention to these kinds of symbiotic relationships between diverse species in their ecosystem, and between themselves and their natural environment.

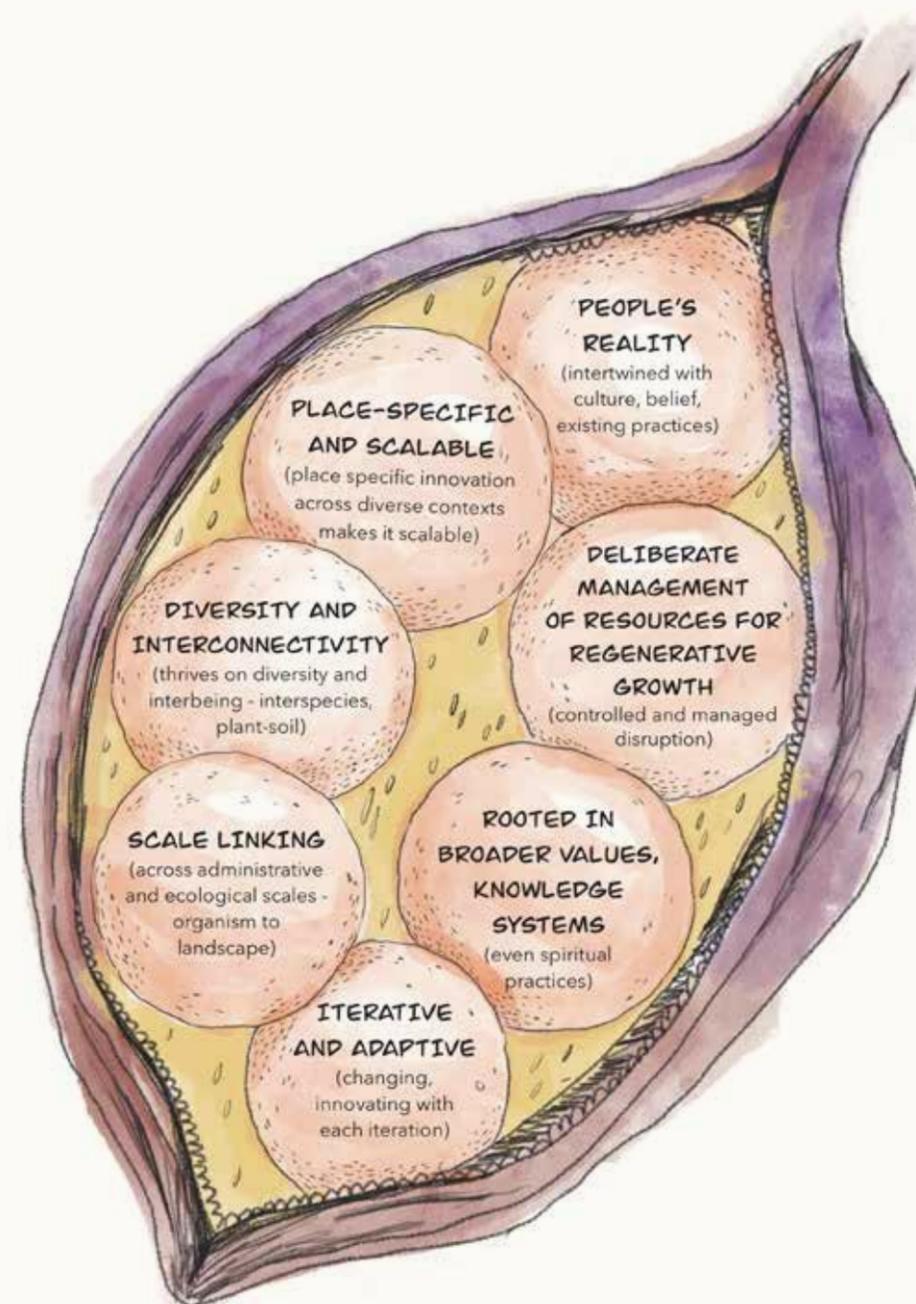
Scale-linking - organism to landscape | *"Nature's processes are inherently scale-linking, for they inherently depend on the flow of energy and materials across scales."* (Van der Ryn and Cowan, 2007) Farmers that practice shifting cultivation seem to draw on this principle from nature, as they actively manage their agro-biodiversity by approaching their ecology at landscape scale. They are able to shift their attention seamlessly between the detail of individual organisms and the scale of landscapes, overcoming the limitations of administrative boundaries. The decisions they make on their land are, therefore, likely to also benefit the ecosystem as a whole. This way of life nurtures systems thinking and enriches their understanding of land cover types, watersheds, stream buffer forests, protected cemeteries, sacred forests, and seasonal change. Essentially, they have instinctively developed an ecosystems view of the ecological niche in which they live.

Broader values and knowledge systems | Shifting cultivation (and therefore agro-biodiversity management) is rooted in values and knowledge systems that have been passed down and evolved over generations of people's interactions with their natural environments. This knowledge may be techni-

cal or scientific knowledge, and may also draw from their social or spiritual practices, values, and decision-making patterns. Indigenous knowledge may include locally developed ecological or climatic indicators, for example, the emergence of certain naturally occurring species may signal the quality of soil in a particular area. Even as communities become more responsive to markets, this deeper knowledge guides decisions like the selection of species for domestication or the management of naturally occurring species in fallows. It is not only the knowledge itself that is important, but it is also crucial to understand the ways in which shifting cultivators generate further knowledge and apply it to their management of natural resources.

Figure 1.4 depicts these regenerative principles of agro-biodiversity that have been inspired by the shifting cultivation knowledge and practices of upland farmers. Several of these regenerative principles make agro-biodiversity especially suitable to navigating the increasing complexity that upland farmers face in their environments. Their ability to iterate and adapt, understand interconnectivity, manage for diversity and regenerative growth, and take a systems view are competencies strongly recommended by complexity theorists. When we realize this, it helps us see the shaping of agro-biodiversity as not just something of the past, but as a powerful, positive example of human-environment relations that demonstrates possibilities for a better regenerative and resilient future. These regenerative principles of agro-biodiversity in upland Laos will accompany us through our story.

Figure 1.4: Regenerative principles of agro-biodiversity (inspired by shifting cultivation and ecosystem behavior). (Source: Original depiction)





This rotational agriculture landscape with fields and forest areas contains a wealth of agro-biodiversity species important for food and income which may end up in the evening meal, a Chinese medicine or an expensive French perfume. (Credit: TABI)

IN THE THROES OF CHANGE - THE AGRARIAN TRANSITION IN THE LAO UPLANDS

Almost every conversation with upland farmers during the preparation of this book danced around change. Not a specific event or policy change, but momentous, constant, increasingly complex change that has been unfolding at accelerating pace, sweeping farmers' lives and livelihoods in its path. This

change is part of a much bigger transformation in Laos and many other parts of the world, and is often referred to as the 'agrarian transition'. Some elements of this transition are exciting and filled with opportunity, but the pace and degree of change can be bewildering. Even read-

ing about it may leave you breathless.

The agrarian transition typically refers to a set of processes linked to the increasing influence of a market economy in a globalized world. While the market economy is a defining feature of this transition in most places, change is driven by a complex and dynamic interaction between multiple forces and triggers. In the Lao uplands, the integration of the sub-regional market economy, related pressures on land and natural resour-

ces in and beyond Laos, increasing industrialization, changing demographics, and the Lao government's development vision and commitments have all played a part.

This current of change has swept through rural upland farming communities for the past three decades, strongly influencing farmers' lives, livelihoods and prospects for the future. It has heralded certain types of progress, but not everyone has benefited – it has created winners and losers and complex devel-

opment choices and trade-offs. This makes it important to our story of agro-biodiversity in Laos. Let us take a look at some broad trajectories of change and how these changes are playing out in the lives of upland farmers.



The last economic frontier in east Asia opens | Following the signing of the Paris Peace accord and the end of the proxy war between global powers in 1973, the Mekong sub-region with its rich natural resources and promising consumer base re-emerged as an area of global significance - the last economic frontier of East Asia. Governments in the region responded by opening their markets and connecting their economies. Within this region, Laos came late to globalization. Its mountainous topography and disadvantage as a landlocked country meant that much of the country had remained isolated. This was especially true of the uplands. The Lao government was determined to change this. In the 1990s they began to promote the perception of Laos as a connecting land bridge. They joined regional economic integration efforts and positioned their country as an important partner in China's infrastructure plans in the region. Many refer to these developments as the transition of Laos from a landlocked country to a land-linked one.

As China, Vietnam, and Thailand grew in their status as emerging economies in the region, there was increasing pressure on natural resources, and they began to make more demands on less developed neighbors like Cambodia and Laos. The Lao uplands, with its rich natural resource base but limited capacities and skills to process the resources, began to be seen as a site for transnational resource investment. The Lao government welcomed large-scale foreign direct investments in land. These changes (in the late 1980s and early 1990s) signaled the integration of the Lao countryside within the southeast region and it opened the gates to commercialization

of upland agriculture systems.

A periphery country enters the fray | From the perspective of a world systems theory⁵, Laos is a typical periphery country - a country that possesses a disproportionately small share of global wealth. Periphery countries are often characterized by weak governance systems, which makes them vulnerable to exploitation by other more powerful countries. What does it mean to be a periphery country surrounded by emerging economies in a fast-growing region in a globalizing world? For the Lao uplands it meant a huge international interest in its raw materials. This led to large land investments and shifts in land use executed at an astonishing pace with limited transparency, and with very little bargaining power for farmers or for the Lao officials brokering these transactions. Upland farmers have both embraced this change and struggled to keep pace.

The government embraces development | As we look back over the past three decades, it is clear that Laos has made impressive strides in economic progress, poverty reduction and agricultural productivity. The government development agenda is driven by ambitious development targets articulated in the 2030 Vision of the Ministry of Planning and Investment, the 8th five-year National Socio-Economic Development Plan, and the Ministry of Agriculture and Forestry's strategic plan to 2025. These targets include achieving 70 percent forest cover by 2020 and graduating from Least Developed Country status by 2024. They are consistent with the Lao government's commitments to global targets such as the Sustainable Development Goals of the UN Agenda 2030 and Reduced Emissions from Deforestation and Forest Degradation (REDD).

Accompanying these policy directives, Laos has adopted a development approach that favors large-scale land-based investments. Land policy is driven by a focus on *'Turning Land into Capital'*, which drives investments in commodity-oriented commercial agriculture (rubber, maize, sugarcane, and cassava) for export markets and infrastructure development for regional con-

nectivity (roads, trade corridors, and mobile networks). These investments have undoubtedly contributed to GDP growth and benefits for some rural communities. But they have also played a major role in the degradation of rural landscapes, forest loss, increased local land tenure insecurity, and poverty for some communities.

"As of 2018, around 1 million hectares have been granted as concessions and leases to foreign and domestic investors, 31 percent of which were allocated within areas categorized as forests. In addition to forest impacts, concession-based investments have also largely fallen within areas that were previously held by local communities, either as individual agricultural parcels or, more often, communal lands and forests."
(Ingalls et al., 2019)

The Lao government has tried to manage these trade-offs between its development and conservation goals through a *"land sparing"* approach, that segregates lands reserved for protected natural habitats from those dedicated to intensive agriculture. In this view, traditional methods of farming are seen as a driver of poverty. Development policy embeds a modernization narrative that propels a shift away from extensive subsistence agriculture (characterized by shifting cultivation, forest gathering, and livestock farming) to intensive commercial agriculture of monoculture cash crops. As a result, development efforts in the uplands have included the large-scale adoption of improved technology, heavy use of chemical inputs for high productivity, investments in big agri-business, and a focus on crops grown for export mainly to China, Thailand, and Vietnam. In this approach, agriculture is treated as an extractive industry similar to mining or hydropower with a focus on increasing the efficiency of agricultural landscapes.

The policies associated with this development approach have welcomed cross-border investments in land through plantation concessions, sharecropping arrangements, and contract

farming schemes. The commercialization of extensive annual crops like maize and cassava has boosted exports and overall rural wealth. Farming households with some savings to invest were able to engage in these opportunities. But this kind of agriculture also accelerated soil erosion, and yields have been declining for farmers on sloping lands. The commercial cultivation of annual monoculture crops requires extensive production and large land areas to provide adequate profits, decent livelihoods, and employment over the long term. Most households in the uplands have small plots of land and, as the population has grown, without being able to open new farmland they have little land to pass on to new generations (DoPLA, 2019). As a result, many farmers who attempted to shift to this kind of cultivation have seen declines in their income. For those participating in contract farming, their success depends on how contracts are managed and enforced and whether companies follow labor law, take care of worker health, and support their children's education. While these contracts may seem like potentially good employment opportunities, the combination of poor compliance with labor law and the low negotiating power of farmers has meant that many of them were not. They began to drive a different kind of poverty and unemployment in the uplands.

Other macro trends influence change | Other trends intersect with and fuel this transition. The period of the agrarian transition has been accompanied by increasingly pronounced impacts of climate change in the uplands. These include rising temperatures, longer dry seasons, late onset of the main rainy season, decline in annual average rainfall, and more frequent and more intense storms, flash floods, and periods of droughts. Changing weather patterns have made upland farmers, especially rain-fed rice farmers, more vulnerable.

Laos has a young population with half its people under the age of 24. But the unemployment rate for rural youth is high (above 20 percent) and growing. Its demographic dividend⁶ can be realized only if there is decent work for young people in the areas in which

⁵ World systems theory is a multi-disciplinary, macro-scale approach to world history and social change which emphasizes the world system (and not nation states) as the primary unit of social analysis. It divides the world into core countries, semi-periphery countries, and periphery countries. The best known version of this theory was developed by Immanuel Wallerstein in the 1970s.

⁶ Demographic dividend, as defined by the United Nations Population Fund, means, "the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population."



Dams in the highlands of Laos are built to generate electricity destined for cities in the Mekong region. (Credit: Joost Foppes)

they live (DoPLA, 2019). The opening of the economy brought with it new technology and increasing connectivity. Farmers now have better access to information. This is changing their perceptions of their opportunities and constraints. Young people today have much greater exposure and connection to life beyond their village or district. Having lived through poverty in farming families, most of them

do not want the life of a farmer. They want to earn cash and make their own way in the world. They do not see good prospects for themselves in the rural uplands and are leaving in search of work in Vientiane or across the border in Thailand. Given the chance of decent work or opportunities to access markets or develop a business, many of them may stay, or return.

IN THE THROES OF CHANGE - FARMER LIVES AND LIVELIHOODS

What has the agrarian transition meant for the lives and livelihoods of rural upland farmers and for the agriculture and food systems of which they are a part? In general, we see that their lives are being reoriented from a subsistence to a market economy and that their reliance on cash and other sources of income is increasing. The percentage of households selling some part of their production in the market

increased from 35 percent in 1999 to 71 percent in 2011 (FAO, 2014). But this change from a subsistence to a market economy does not happen in one clean sweep or necessarily in a consistent direction, and it does not happen for everyone. To tell a more precise and meaningful story, we are going to have to peel back the top layer of these headlines and look a little deeper.

Before the uplands were linked to regional markets, most households were engaged in shifting cultivation to some degree. Narrow valley bases suitable for paddy were limited, and even those who could grow paddy rice supplemented their production with upland rice cultivation in order to be self-sufficient. Social and economic differentiation between households was mainly driven by access to the most fertile fields and household dependency ratios⁷. Early settlers would have had privileged access to the limited paddy areas available and to the best upland soils. And families with a large labor force and fewer dependents could produce rice surpluses that could then be saved or invested in livelihood improvements. But as new opportunities became available, social and economic differentiation between households was influenced by the paths households took to accumulate capital and improve their lives.

To understand the changes the agrarian transition brought to upland farmers' lives, we need to have a sense of the general path that these farming households have taken to improve their lives. As farming households save and accumulate some capital, they tend to invest in small livestock like pigs, goats, and poultry for domestic consumption or for sale to meet the costs of religious or family-related events, or they may invest in large cattle as living savings. A household may also mobilize these savings by selling livestock to cope with critical shocks in their lives, such as disease or the death of a family member (Castella *et al.*, 2013). This was the general path of capital accumulation and improvement that most farming households in the uplands followed.



Different types of households and farms | We may use the general contours of the capital accumulation process described above to understand the socio-economic differences between households and their different trajectories of change during the agrarian transition. Drawing on research conducted in Luang Prabang we imagine four types of households⁸ that may exist in a village at any point in time

(described below), each type at a different place in the trajectory. These different types of households were impacted by the agrarian transition in different ways, and each type responded differently to their changing context.

- *Subsistence cultivators*: Those engaged in rice production – through shifting cultivation and/ or paddy – mainly for subsistence purposes.
- *Savers*: Rice-growing farmers who have reached rice sufficiency and have begun to accumulate capital through livestock or agro-forestry systems as living savings. Typically, those with access to paddy fields would find it easier to reach rice sufficiency.
- *Investors*: Those who have been able to take advantage of commercial agriculture income diversification opportunities with limited financial risk, for example, by cultivating annual (maize or Job's tears) or perennial cash crops (teak or rubber). They may still practice limited rotational shifting cultivation. But through commercial tree plantation activities, they may generate sufficient regular income to invest in riskier off-farm businesses.
- *Off-farm investors*: Those who have a larger share of their income from off-farm activities, and likely do not practice fixed rotational cultivation anymore.

In general, this typology details the path that many upland farming households seem to pursue as economic opportunities open up, although the path is not necessarily linear: Some households may move back and forth between categories or not fit into any one. At any point in time in any village, all types of households may exist. But research shows that over time, as markets have opened, there has been a de-

⁸ This typology is drawn from research in Luang Prabang (Castella *et al.*, 2013). The names for each category, however, are our own. Further descriptions of the path taken by various households are drawn from interviews and discussions in the preparation of this book.

crease in *Subsistence cultivator* households and an increase in the other types. Village accessibility and degree of market integration also influence the spread of households across these different types. In more remote villages, there is likely to be a higher concentration of *Subsistence cultivators* and *Savers* than the other two types. We must interpret this path and typology of households with the caveat of cultural differences between ethnic groups. Khmu families, for example, are less likely than Lao Lum families⁹ to abandon upland rice cultivation and their interaction with the forest for paddy land cultivation and a more sedentary form of agriculture. They have traditionally not distinguished between forests and agricultural land, cycling between agriculture and forests through their practice of shifting cultivation.

This description gives us a basic understanding of the overarching contours of the transition that farmers are going through, but our story does not end here. In fact, it is just the beginning and, from here, it only gets more complex. As more farmers engage in monocrop commercial agriculture or become *off-farm investors*, it changes the resource and asset base, labor dynamics, and levels of biodiversity in their environment, which in turn affect opportunities available for other farmers. So, while it is tempting to leave the description of the agrarian transition here, we are going to venture a little deeper into the murky waters of these multiple moving parts to explore the ways in which farmers' lives have been changing and becoming more complex.

Villages are getting better connected and farmers embedded in regional networks | A common initial step in setting up contract farming arrangements for the production of cash crops has been the cutting of new feeder roads to connect upland villages to expanding government constructed road infrastructure. Villagers (typically *Investor* households) who participate in contract farming are contractually bound to produce maize for the trader until the costs of the road are repaid. This may take more than

⁹ Lao Lum or Lao Thai are the predominant ethnic group in Laos, and referred to as "Lao."

five years, depending on location, and as a result, these semi-subsistence farmers in the uplands become embedded in regional networks involving some of the largest regional and global agro-industrial corporations (Cole and Rigg, 2019).

The presence of improved roads has also had broader significance for rural upland households. They have made children's access to schools easier and have allowed adults to travel more freely to urban centers (*Ibid.*). Even *Subsistence cultivators* or *Saver* households who were not able to engage in contract farming began to use these roads to bring forest products to markets. For many farmers in villages that became better connected, these roads have been transformational, changing the exposure and aspirations of a generation.

New local market actors emerge | As the uplands became better connected, there was a growing interest and demand for their forest produce. Upland farmers began to meet a new kind of market actor in their villages, trading formally or informally in products such as wild tea, broom grass, medicinal herbs and mushrooms. These traders have opened opportunities for upland farmers to sell forest products, albeit as price takers with low bargaining power. In many cases these traders have also provided them with some basic training, for example, on how to dry mushrooms, or pick and roast tea leaves. In the absence of other sources of training and support, these opportunities have been especially valuable for *Saver* or *Investor* farmers who are able to make small investments in these activities and can communicate easily with these traders.

But land is being distributed away from smallholder farmers and shifting cultivation | Due to its mountainous topography, there is limited agricultural land area in the uplands. With the "*Turning Land to Capital*" and land-sparing policies, there began a shift in land distribution away from smallholder farmers to large-scale land investments. At farm level, farmers have been facing increasing pressure to convert the diverse mix of crop and fallow fields to commercial monoculture tree plantations and annual cash crops like maize, cassava, banana, and rubber. Combined with the large concessions being granted to private companies, these

⁷ Household dependency ratio refers to the ratio of non-working-age individuals to working-age individuals. Working-age individuals or producers are often defined as being 15–64 years of age, while those less than 15 years or older than 64 years are considered dependents.



Nor loy bamboo shoots being packed and loaded onto a truck for sale in provincial markets. (Credit: TABI)

commercial monoculture crop fields are taking up an increasing amount of land area. In addition, when forest and agriculture lands were segregated (through the Land and Forest Allocation Program beginning in 1995), many mature fallows were mistakenly treated as forests, and some families lost access to fallows and forest lands that they had been using for decades. Others may have lost land due to mining or infrastructure development such as dams.

As a result of all these factors, in many areas, shifting cultivation landscapes with their patchwork of cultivated areas, managed fallows and early successional forests are giving way to large-scale commercial production fields and large infrastructure. Many of these fields are controlled directly or indirectly by regional and global actors and markets beyond Lao borders. The land sector in the uplands is becoming increasingly commoditized, and privatization of land is eroding common resources on which farmers, especially *Subsistence cultivators*, were dependent. This shortage of agricultural land has inevitably led to a shortage of food production for growing populations.

And subsistence systems are in decline | With less land on which to practice shifting cultivation and the absence of support to change their practices, many farmers (*Subsistence cultivators* and *Savers*) have continued rotational shifting cultivation, but with shorter fallows. This has led to land degradation, as shorter fallows no longer provide substantial ecological goods and services (non-timber forest products, regeneration of land fertility, protection against erosion, or a carbon sink). Their productivity has suf-

fered, which in turn has reinforced perceptions about the damaging effects of shifting cultivation and the lack of capacity of subsistence farmers to manage natural resources. This vicious cycle has contributed to further restrictions on their use of forest resources and increasing marginalization of traditional shifting cultivators. In some cases, they have become daily laborers on lands they formerly cultivated. What we see here is a decline of subsistence systems with diminishing food security, and potentially devastating losses for agro-biodiversity over time. As these systems decline, the path of capital accumulation that we discussed earlier may no longer work for upland farmers, and it will become harder for *Subsistence cultivators* or *Savers* in our typology to accumulate the savings to invest in commercial agriculture opportunities.

Non-timber forest products are diminishing |

In shifting cultivation systems, farmers have traditionally relied on forest products for food, water, medicines, tools and housing materials. They were used to collecting several products daily or seasonally for consumption and other household needs. When populations were less dense and collection was mainly for their own use, they were able to apply their traditional knowledge to collect in regenerative and sustainable ways. With population growth, increasing demand for non-timber forest products from neighboring countries, better access to markets, and the possibility of good earnings, farmers have changed their collection patterns towards more intensive collection of fewer species that have higher economic value. The intensity of their collection varies with price fluctuations and, in many places, has led to unsustainable levels of harvesting of certain species and forest degradation in the most accessible areas.

A loss of species diversity | As farmers move away from shifting cultivation, they have started to lose some traditional seed varieties, and biodiversity knowledge among younger farmers is diminishing. Their adoption of improved crop varieties for sale, especially lowland rice cultivars, is driving genetic simplification. This loss in species diversity is affecting labor requirements and the resilience of farming systems. For example,



Commercial land concessions given to a Chinese company to grow bananas for China providing local labor opportunities. (Credit: Stewart Ling)

short duration varieties may help spread labor requirements and escape unseasonal drought or floods. Loss in species diversity is most visible and most clearly articulated by local farmers, although the impact for Laos as a country is also significant, threatening its genetic resource base, national heritage, and biodiversity standing in the world. As women have traditionally played important roles in maintaining the diversity of rice species and often held the responsibility for selecting which species to plant, loss of species diversity may also signal a loss of women's power in agriculture systems.

Farmers diversify their livelihood strategies |

In the face of growing complexity and uncertainty, upland farmers have demonstrated remarkable flexibility and adaptiveness in diversifying their livelihood strategies. Despite the challenges they have faced in sustaining profits from monoculture commercial agriculture and the government's discouragement of shifting cultivation, for some households the temporary injection of capital allowed them to invest in more sustainable agricultural practices such as paddy terracing or domestication of forest products. But these practices required new skills and knowledge which may not have been easily available. For many *Investor* households who have been able to generate sufficient capital, rather than re-investing it back into agriculture and uncertain profits they choose to invest in off-farm opportunities - forms of transport, jobs in town, and education for their children to improve their chances of getting a secure,

wage-paying job, preferably with government, or other off-farm opportunities.

With mounting pressure on land and declining returns from farm versus off-farm activities, migration has become an increasingly important livelihood strategy for upland households. For many young people, migration offers the opportunity to earn cash, to escape the drudgery of farming and have access to a more modern life. For farming households that face increasing risks and uncertainty in agriculture and few rural employment options, having some family members working in urban areas helps mitigate their risks. Eighteen percent of the Lao population moved away from the district of their birth in the 2000s (DoPLA, 2019). And, as employment opportunities in the domestic economy are limited, many people from upland communities ended up migrating to Thailand. But not everyone has access to safe migration. Those who are more educated or have some resources and networks to make their way in the city are likely to find the best opportunities. Women or young people from *Subsistence cultivator* households with weaker education are more vulnerable, and may end up in precarious or harmful situations. Nevertheless, as a result of migration, remittances have become an increasingly important input to agrarian system and to farming households - another way in which livelihood strategies are being diversified.

In villages with good market access, some farmers are attempting to diversify their livelihood strategies by domesticating forest products for which there is high demand, such as broom grass, paper mulberry, medicinal herbs, tung oil trees and certain kinds of bamboo shoots. But domestication of forest products requires new knowledge related to the propagation and management of these species, which is not always easy to acquire. It is nevertheless an important way to diversify their livelihoods and to practice commercial agriculture linked to their agro-biodiversity. However, these households are gradually losing interest in products of lower value that they may have earlier gathered for food and over time they are losing some of their traditional ecological knowledge.

Changes in the structure of labour | *Subsistence cultivator* households that are unable to take advan-



There is a large number of Lao people migrating to areas of Laos and Thailand in search of labor opportunities. (Credit: Andrew Bartlett)

tage of cash crop opportunities, but are affected by declining subsistence systems, are finding new forms of work, for example, providing labor on someone else's farm or on private concessions. This has given rise to a new class of rural landless labor in the uplands.

Households diversifying their livelihood strategies to include off-farm strategies are faced with a significant decrease in the labor available on the farm and therefore their farming options. Many have naturally abandoned shifting cultivation. When they are able to get some technical support and planting material, they shift to more manageable strategies like cultivating fruit tree orchards or coffee, or domesticating forest products. This became increasingly possible in the provinces of Houaphanh, Luang Prabang, and Xiengkhouang in the years after TABI began.

New forms of vulnerability | For many farmers, trying to service regional or global markets in which Laos does not have a lot of power and for which they have little information has made them vulnerable to market risks such as price and demand fluctuations. Further, as commodities are exported to neighboring countries as raw agricultural products, there is little value-added to the local economy which as a whole has become more dependent on these external markets.

Increasing soil and water degradation caused by

monoculture commercial agriculture has made farmers in *Investors* households more vulnerable to extreme climatic events, plant diseases, declining productivity, and food insecurity. In trying to sustain productivity with degraded soils, many farmers have had to resort to heavy chemical inputs and this has resulted in a toxic landscape and polluted water bodies, with detrimental effects for human and environmental health and soil fertility and potentially devastating effects for agro-biodiversity.

Farmers from the poorest *Subsistence cultivators* category in villages that may not have been well connected through feeder roads are the least mobile. With declining shifting cultivation systems and increasing pressures on land, these families have become even more isolated and vulnerable. Those who engage as labor on other people's lands have little opportunity to accumulate capital and improve their livelihood strategies.

Another form of vulnerability has come from the decline of food systems and changing food preferences in the uplands. With more land devoted to cash crops, food shortages have emerged. And, as communities are more strongly linked to regional markets, their food preferences are changing, moving away from local foods to more processed and packaged products, including candy and junk food.

Subsistence systems remain important safety nets | Even *Investor* and *Saver* households that take advantage of cash crop commercial agriculture opportunities do not fully give up rotational shifting cultivation. They continue to use forests and forest resources as a safety net to ensure food security for their families and to cope with unforeseen crises such as human or livestock disease, and losses of agricultural production. Many upland farmers are both subsistence and commercial farmers, and these lands are a source of resilience for them.



The journey of upland farmers through the agrarian transition paints a picture of increasing complexity, uncertainty, and change. Their experience in navigating this complexity and diversifying their livelihood strategies shows us that this transition cannot be understood in simple binaries – subsistence or commercial agriculture, rural or urban enterprises, agricultural or non-agricultural strategies. They practice both commercial and subsistence cultivation; they have interdependent family members spread across rural and urban locations and out of the country; they operate in the agriculture

sector and beyond, as government employees or in other wage jobs. Their participation in the workforce is flexible and sometimes seasonal (DoPLA, 2019).

We also see new and different kinds of vulnerabilities emerging and danger of agro-biodiversity loss. Upland farmers have been stewards of the rich biodiversity of Laos. In a world where genetic variety is rapidly declining, these farmers are an important asset. Through the story of TABI, we hope to unpack some of these issues and explore potential paths forward.

“Imagine that you could pass through two doors at once. It’s inconceivable, yet fungi do it all the time. When faced with a forked path, fungal hyphae don’t have to choose one or the other. They can branch and take both routes.” (Merlin Sheldrake)

THE GENESIS OF TABI

With this changing canvas as a backdrop, TABI was born. The initiative was designed by the Swiss Agency for Development and Cooperation (SDC) and the Ministry of Agriculture and Forestry (MAF) in 2007-08 primarily to focus attention on the role of agro-biodiversity in supporting farmers to respond and adapt to their rapidly changing contexts. The design was based on the hypothesis that *“agro-biodiversity based development offers a viable alternative to large-scale, unsustainable monoculture and concession-based agricultural development in the uplands of Laos to the benefit of upland populations, and contributes to increased food security and resilience, and reduced poverty and inequity.”* (Gonsalves and Fujita Lagerqvist, 2018)

The initiative was implemented by the Ministry of Agriculture and Forestry and housed initially within the Department of Planning and Finance. It was later shifted to the National Agriculture and Forestry Research Institute (NAFRI), allowing for greater sustainability of results through direct links to ongoing agriculture and forestry research, but with some loss of visibility for the program in its last few years. The implementation of TABI was supported by Ramboll Natura AB for phase 1, and NIRAS Sweden AB for phases 2 and 3, with the University of Bern's Centre for Development and Environment (CDE) as a core research, data management and analysis, and policy dialogue partner to TABI.

The intent behind TABI was to leverage the country's rich biodiversity to help realize development goals in the near term without jeopardizing future capacity to do so. The initiative sought to conserve, enhance, manage and sustainably utilize the biological diversity found in upland farming landscapes in order to improve the livelihoods (food, income, and materials for use) of farming families in the region.

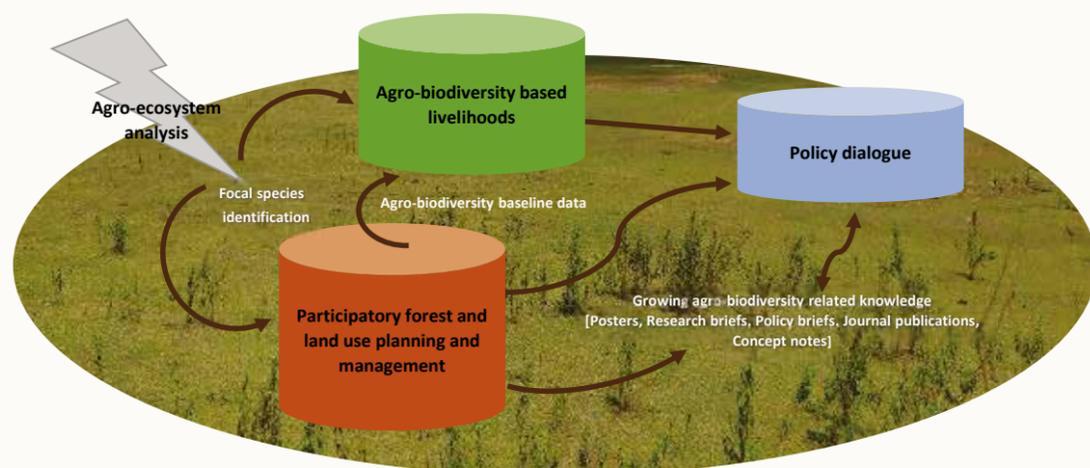
After a collaborative design process lasting a year and a half, TABI was established in April 2009, through a bilateral agreement between the Swiss Agency for Development and Cooperation and the Lao government's Ministry of Agriculture and Forestry. The overall goal agreed for the initiative at the time was to maintain and protect Lao PDR's biodiversity as one key to poverty alleviation, and

its purpose, to improve the livelihoods of poor upland communities based on the productive use and conservation of agro-biodiversity resources in the focal provinces of Houaphanh, Luang Prabang, and Xiengkhouang.

TABI's inception report drew attention to the complexity of the initiative, acknowledging that, by its very nature, agro-biodiversity spans a wide range of disciplines (agriculture, forestry, land, water, wildlife, health, and education) and demands work across highly divergent administrative levels (regional, national, provincial, district, village, and farm-family). For this reason, TABI was deliberately positioned as collaborative initiative and not a stand-alone project, interfacing with a wide range of partners across multiple sectors of work. We will explore this approach and TABI's positioning through various themes in our story and with a deeper dive in Chapter 4.

The initiative ran through three phases¹⁰, with some adjustment of focus in each. In its early days TABI focused significant attention on supporting the Lao Secretariat for the global Convention on Biological Diversity (CBD) in meeting its obligations, for example by contributing to the preparation of national reports to the CBD and the assessment of the first National Biodiversity Strategy and Action Plan (NBSAP-I). The most significant adjustments in later phases of TABI included greater attention to the integration of agro-biodiversity principles into national strategies and plans rather than on global initiatives such as the CBD (for which other players were better placed), as well as an increased focus on developing agro-biodiversity-based livelihood options alongside sustainable forest and agricultural land use planning. By its third phase TABI's goal was: "To contribute to poverty alleviation and improved livelihoods of upland communities through sustainable management and use of agro-biodiversity in multifunctional landscapes." Figure 1.5 below depicts the key areas around which TABI's work and outcomes were organized.

Figure 1.5: TABI's key areas of work. (Source: Original depiction)



TABI's entry point in its focal provinces was through an **agro-ecosystems analysis**, an interdisciplinary and holistic analysis and planning methodology that was used as a primary planning tool to develop District Agrobiodiversity Action Plans in TABI's operational areas. This analysis was conducted with local partner agencies to surface critical issues related to agro-biodiversity and poverty as the basis

¹⁰ Phase 1 of the initiative ran from May 2009 to July 2012, Phase 2 from July 2012 to April 2017, and Phase 3 from April 2017 to September 2020.

to inform TABI's focus and approach and to build capacity among key stakeholders in agro-ecosystems analysis. The agro-ecosystems analysis methods included participatory tools to analyze spatial, temporal, social and economic patterns related to resource use and local livelihoods at district level.

The issues surfaced through the agro-ecosystems analysis directed the focus of TABI's work on participatory forest and land use planning, the development of agro-biodiversity livelihoods, and engagement in policy dialogue. The analysis pointed to threats such as increasing food insecurity and loss of agro-biodiversity in the uplands, heavy use of pesticides to maintain productivity and profit in monocrop systems, as well as the emerging chronic indebtedness of farmers. But it also highlighted some promising examples of livelihood strategy adaptation, such as the successful domestication of a number of forest products that helped to stabilize their supply and obtain tax breaks (as taxes on farm produce were lower than for wild non-timber forest products). The analysis also pointed to areas for further inquiry such as how shifting cultivation was changing and how farmers were interacting with markets, and it surfaced social issues like the differences in gender roles in agriculture between different ethnic groups and the need for improving the participation of women in decision making.

The **forest and land use planning** process built on this analysis and was shaped as a multi-year engagement with villages and village clusters using tool-based but participatory and flexible approaches. The starting point of this planning process was farmers' traditional uses of forests and agricultural lands as the foundation for improved management plans. A team of government staff were intensively engaged in the participatory preparation and monitoring of forest and land use plans, and they gained skills in facilitating the planning process, using satellite imagery and GIS mapping systems, and preparing maps, making sure they could be easily understood by villagers and local government staff. This process also led to the creation of two databases. The first contains records of agro-biodiversity species and existing land uses, with hundreds of thousands of data points that tell a complex and persuasive story of the uplands. The second contains the forest and land use plans and maps that emerged from this participatory process with village communities. Beyond their obvious uses, these maps and data are social documents that demonstrate local land claims, including those over which there is tenure insecurity. Our story will explore the work associated with forest and land use planning and management more deeply in Chapter 2.

The agro-ecosystems analysis and the forest and land use planning processes surfaced priority species and opportunities to enhance **agro-biodiversity-based livelihoods** options that were beginning to emerge. TABI used the mechanism of sub-projects to channel resources to districts and villages to develop these opportunities. Through extension, action research, demonstrations and other activities, these sub-projects engaged farmers in better management, domestication, harvesting and processing of non-timber forest products and aquatic resources. A critical part of this work involved strengthening the capacity of government staff to develop, implement and monitor sub-project activities. TABI also engaged in market and value chain analysis to support work on agro-biodiversity based livelihoods. We will explore these efforts more deeply in Chapter 3.

All of these activities surfaced policy constraints and opportunities for constructive **engagement in policy dialogue**. With support from the Centre for Development and Environment, TABI used data and evidence from the agro-ecosystems analysis, and work on forest and land use planning and agro-biodiversity based livelihood sub-projects to engage in policy dialogue at different levels through formal and informal forums. The main policies on which TABI focused attention related to tenure of communally managed commons, the nature of forest and land use planning suitable for nurturing agro-biodiversity, and clarity of policy on shifting cultivation.

Accompanying all of the above areas of work throughout TABI's life was a focus on **recognizing and**

building agro-biodiversity related knowledge. This began with the collection, analysis, and compilation of agro-biodiversity baseline data from the agro-ecosystems analysis process and the forest and land use planning and management process. Over time there was a greater focus on its presentation using geo-spatial and other knowledge management and data visualization tools to support policy dialogue and decision making. A range of knowledge products and platforms were created through the life of TABI. These included: research briefs; policy briefs; videos for television; radio spots; a series of books (with Pha Thad Ke – the botanical garden in Luang Prabang); local communication products; a database of agro-biodiversity species, and land values and uses; a land use information system (being developed by GIZ and CDE to make land use maps and plans accessible); an agro-biodiversity curriculum for primary and secondary schools and non-formal education; a website with project documents; and a digital platform – the Pha Khao Lao agro-biodiversity information and knowledge sharing platform. TABI also led the sector-wide working group on agro-biodiversity. All of these efforts were intended to contribute to raising awareness and celebrating, enhancing and improving access to agro-biodiversity related knowledge in Laos.

“The history of the world is on your plate, all food is the expression of a long struggle and a long story.” (Anthony Bourdain)

REFERENCES

Castella, J., Lestrelin, G., Hett, C. *et al.* (2013) *Effects of Landscape Segregation on Livelihood Vulnerability: Moving From Extensive Shifting Cultivation to Rotational Agriculture and Natural Forests in Northern Laos*. *Hum Ecol* 41, 63–76 (2013). <https://doi.org/10.1007/s10745-012-9538-8>

Cole, R. and J. Rigg. (2019). *Lao peasants on the move: Pathways of agrarian change in Laos*. *The Australian Journal of Anthropology*, (2019) 30, 160–180 doi:10.1111/taja.12312,

Department for Policy and Legal Affairs (DoPLA). (2019). *Toward People Centered Agriculture: Rethinking rural labor, youth employment, and the agrarian transition in Laos*. Ministry of Agriculture and Forestry. Vientiane.

Epprecht, M., Weber, A-K., Bernhard, R., Keoka, K., Saphanthong, T., Manivong, V., Inxay, P., Vongsamphanh, P., Bosoni, N., Hanephom, S., Vanmeexay, P., Kaungbounhieng, A., Sisouvan, H., Khounthikoumman, S., Xaichounorxa, P., Ingalls, M., Nanhthavong, V., Liu, J., Norasingh, I., Wiesmann, U. and Breu, T. (2018). *Atlas of agriculture in the Lao PDR: Patterns and trends between 1999 and 2011*. Open Bern Publishing, Centre for Development and Environment, University of Bern, Switzerland and the Ministry of Agriculture and Forestry, Vientiane.

Food and Agriculture Organization of the United Nations. (2018). *Agrobiodiversity: A training manual for farmer groups in East Africa*.

Food and Agriculture Organization of the United Nations and Swiss Agency for Development and Cooperation. (2014). *Lao Census of Agriculture 2010-11: Analysis of selected themes*.

Gonsalves, J. and Y. Fujita Lagerqvist. (2018). Mid-term Review: *The Agro-biodiversity Initiative (TABI) Phase 3*. Swiss Agency for Development and Cooperation. Vientiane.

Kenney-Lazar, M. (2013). *Shifting cultivation in Laos: Transitions in policy and perspective*. Report commissioned by the Secretariat of the Sector Working Group for Agriculture and Rural Development (SWG-ARD).

Kohn, Eduardo. (2013). *How forests think: Toward an anthropology beyond the human*. University of California Press, Berkeley, Los Angeles, London.

Ingalls, M. L., C. Hett, P. Thanasack, K. Phouyyavong, R. Bernhard, Y. Chanthasumlet and P. Philakone. (2019). *New directions for participatory land use planning: Can bottom-up approaches achieve a win-win for sustainable development and forest conservation?* NAFRI Research Brief No. 002. Ministry of Agriculture and Forestry and the Centre for Development and Environment, University of Bern: Vientiane.

Van der Ryn, S. and S. Cowan. (2007). *Ecological Design*. Island Press.

Xu, J., T. McLellan and L. Hiwasaki. (2017). *Integrating swidden agricultural knowledge systems into sustainable intensification in the central Mekong region. Addendum, Chapter A3 in Shifting Cultivation Policies: Balancing Environmental and Social Sustainability*. Edited by Malcolm Cairns with the assistance of Bob Hill and Tossaporn Jurupunya, CABI International.

Source of quote on title page: “The Value of Forest, the Value of People: The Kmhmu of Laos and Shifting Cultivation”, a documentary film produced by Mekong Watch in 2010 (<http://www.youtube.com/watch?v=JTTIVxMMg0eM> – last accessed on July 27, 2020).

Source of quote on page 27: “Sheldrake, M. (2020). *Entangled Life: How Fungi make our worlds, change our minds, and shape our futures*. Random House.

Source of closing quote: Bourdain, Anthony. (2019). *The last interview and other conversations*. Edited by Melville House Publishing, Brooklyn, New York.



CHAPTER 2

AGRO-BIODIVERSITY AND THE LAND: TABI's forest and land use planning process

“Wilderness in the twenty first century is not a site of nostalgia for what once was, but rather the seedbed of creativity for what we have yet to imagine.”

– Terry Tempest Williams



For generations, shifting cultivation was the main form of land use and the basis of people's livelihoods in the rural uplands. It was also the way in which these communities nurtured the incredible biodiversity of Laos. But from the late 1980s, shifting cultivation began to be seen as a poverty trap and one of the main causes of deforestation. Subsequent government policies targeted changes in land use, separating forest and agricultural land, and dismantling the practice of shifting cultivation. These policies were driven by the idea that large-scale agri-business was the best route to economic development in the rural uplands, especially as regional markets developed.

But shifting cultivation did not stop. Many small farmers continued the practice under sub-optimal conditions, unable to reconcile their complex reality with policy demands, and having little access to alternative sustainable and viable livelihood options.

Nurturing agro-biodiversity in the Lao uplands demands that we understand the complex realities of upland farmers and their natural resources. TABI launched a participatory, multi-stage forest and land use planning process with village communities that built on their existing realities, resources, transitions, and aspirations as the basis for future land use planning, zoning and management. What emerged was a vibrant and complex mosaic of the multiple functions and uses of their land that not only make sense locally, but clearly contribute to achieving national goals for both conservation and development. This chapter tells the story of this participatory forest and land use planning process, and its significance for development and agro-biodiversity in the rural uplands.

FOREST AND AGRICULTURAL LAND USE PLANNING – A VILLAGE PERSPECTIVE

Sitting beside his village forest and land use zoning map, Somchan¹¹ recounts his experience of land use planning in his village...

“In April 2014, a team from [the Ministry of Agriculture and Forestry’s Department of Agricultural Land Management] DALaM and [District Agriculture and Forestry Office] DAFO came to our village saying they were going to help us make a plan for our land. We did not know what this was about and some people were worried that this was another land zoning campaign like in the 1990s, or an effort to enforce a ban on shifting cultivation. Also, about ten years earlier, some families had lost some of their land to a private concession for rubber, and people were wary of new development.

In our village, we had managed our land well. Most people kept to the plots they were allocated.

¹¹ We were introduced to Somchan, an elder in his village, at the start of the book (Page vii).

There were a few difficulties earlier when some people from the next village on the north side would come to our village to fish and collect mushrooms to sell. The village boundary was not clear. Aside from this, we did not have any major problems with our land. But we had two concerns – the first was, how to increase our earnings. Some families had cultivated maize to sell, but after a few years, its productivity had declined and the soil was not good any more. And the price of maize kept fluctuating, so they could not rely on that income. Our other concern was that some non-timber forest products were disappearing from the forest – medicines, mushrooms, certain herbs. When Chinese traders became interested in these products, people started to collect more of them from the north forest, and some species were slowly disappearing. In 2001, the government had moved another village from the top of the mountain closer to us, so many more people were gathering products from that area. We knew we had to manage our collection from the forest better. Also, we were not generating a high number of benzoin trees any more since we reduced the period of our rotational plots – it grows naturally only in older fallows, and even if planted, its resin can be tapped only when it is about eight years old.

I, too, was a bit worried when the DALaM team came to talk about our land. But they explained what TABI was and that they wanted to understand how we used our land and natural resources. They said they would work with us over two years and help us to make our own plan. And they assured us that this was not part of a land re-zoning exercise. This sounded interesting... we needed some help. They asked me if I could organize a small land use planning team with members from all the various sub-committees. We discussed this and I got agreement from everyone.

The first thing we did together was clarify the boundary of our village. This took some time, but we enjoyed it. For the first time ever, we walked as a group all along our village boundary. People from neighboring villages also accompanied us for parts of the walk. We clarified the border in the north. The team showed us how to use a GPS and how to plot geo points using GIS coordinates. We plotted the rivers, hills, forests, and other features of our land. We learned many new things about this land on which our families have lived and worked for generations.

The team came again after a few months and they worked with us to plot all of our agricultural activity on the map. Everyone in the village participated in some way, and it was good to see everything we were doing. We marked our fields and fallows, where we were growing upland rice, how many years of rotation different families were following, what kinds of mushrooms and other species people were collecting, and where they were grazing their cattle. The team also tested the soil and gathered information from every household about their lives. We talked about so many things, even land titles. They gave us our maps with all this information and told us to



Villagers waiting to be introduced to a new land use planning initiative in their area with some trepidation. (Credit: Joost Foppes)

think about what we may do in the future.

Later, they invited us to participate in a workshop in which we looked at all our information, and talked about our future plans. We shared our knowledge of income earning opportunities, and ideas about how we could better manage the collection of non-timber forest products that we wanted to sell. We discussed the possibility of growing some valuable forest species like nor loy bamboo and a few medicinal plants that could be cultivated nearer to our homes so that we do not deplete the forest. Using our map we talked about the land that was available, which families still wanted to practice rotational agriculture and how we planned to manage our rotations. We were very happy that the team was open to our ideas about maintaining the number of rotations so that we could have longer fallows. They even shared with us ideas from other villages where they planned to locate every family's rotational fields close to each other and coordinate their rotations. After the workshop, we discussed all these ideas in our village

During the team's next visit, they helped us zone our forest and agricultural land and prepare a management plan for the future. We agreed on areas for paddy fields, areas for cattle grazing, and where we would locate our upland rotational agriculture fields to allow for six rotations. Everyone agreed to coordinate rotations and manage them together. All our rotational agriculture land is in this area here [pointing to an area on the map]. We also zoned for areas to conserve three different species of bamboo and the area where we would protect and grow 'yarn' trees for benzoin. We can earn well from this. Water in our streams had been decreasing, and we decided to protect a larger area around the streams as a natural buffer. Even though this means giving up some agricultural land, it is good for the water, and also helps us get access to some traditional foods and herbs. We coordinated with the neighboring villages so that these buffer zones could join up across the border.



Enthusiasm grows for participating in forest and land use planning activities. (Credit: TABI)

We marked all the forests – the old growth forest, the areas we would leave for regrowth, as well as the areas we would use to gather mushrooms and food. Some families had earlier started to farm in the forest, and they agreed to use the rotational field zone instead. In our village we have a lot of land available, so it was easy to make these decisions. Everyone was happy. Many more families are now interested in gathering mushrooms because the Chinese and Vietnamese traders come looking for them every year. They give us good prices. You see, we have been gathering these mushrooms our whole lives for ourselves – we know exactly when to go looking for which mushroom. But we did not know that anyone else would want them. One day when we came out of the forest, a Chinese man saw the mushrooms we had gathered, and he got very excited, and asked us where we got them... he has been buying more and more from our village since then. But we do not want these mushrooms to disappear, so we wanted to make a plan. In our plan we kept three forest areas for picking mushrooms and are using just one now.

There are many things that are different in our new zoning plan. See these areas marked for cattle...

Many families had begun to raise more cattle, and they were grazing their cattle in different places. But they sometimes destroyed the crops. In our new plan we allocated grazing land, and together we have now fenced it off. It took a long time to make this plan, but it changed many things for us. Most people are keeping to the plan and we can see the changes in our village. Since we began following this plan, there is more water in every stream. And we feel happy that we are protecting our forests, which were being denuded – we made our own rules and people now know where they can collect food and forest products and where they may not be collected. Now in our village we talk about all these things regularly.

Our village is also contributing to the country's plans. We have allocated more land for forests because we, too, believe in conserving the forest. With older fallows we can have more area under forest. In our plan we have marked different kinds of forests and how we will use them or not use them. We also have plans to earn more income from special products without destroying the land and forests, and we are able to eat better. We don't feel alone now. We work together, and are confident of what we are doing because the district office has signed off on our plan. There are some challenges and we may make some changes in our plans. But this map and our plans have given us more power."



Community members participate in reviewing the forest and land use management plans. (Credit: TABI)

THE CONTEXT FOR FOREST AND AGRICULTURAL LAND USE PLANNING

To better appreciate Somchan's experience of TABI's forest and land use planning process, let's think about the context in which it played out. Farmers like Somchan always had a close relationship with their natural surroundings - forests, watersheds, agricultural lands. Their families had been shifting cultivators for generations, and they had actively managed agricultural land and fallows of varying degrees of maturity for most of their lives. Their lives and livelihoods were deeply intertwined with these lands through the range of functions and services they derived from them, and the hundreds of species and resources that they collected and propagated from their surroundings.

From the end of the 20th century, the rural uplands were being transformed by increased competition for land and forest resources, and economic growth in and surrounding Laos. We reflected on this agrarian transition in Chapter 1. This transition was accompanied by state-driven forest and agricultural land use planning campaigns. Since the late 1980s government policies for socio-economic growth, poverty reduction and environmental conservation had consistently targeted changes in land use and landscapes by promoting a separation between land used for agricultural purposes (or economic development) and land for forest conservation and regeneration. These kinds of policies were not unique to Laos - they echoed the international debate described in Chapter 1 between land-sparing approaches (that segregate lands dedicated to protecting natural habitats and intensive agriculture) and land-sharing approaches (that integrate economic and ecological objectives in multifunctional landscapes). One of the ways land-sparing was accomplished in Laos was through a *"Turning Land into Capital"* policy that promoted a shift from extensive subsistence shifting cultivation to intensive commercial agriculture, and farmers from traditional shifting cultivators to farm entrepreneurs.

This shift specifically targeted widespread changes in land use by: integrating marginal lands into the global market economy as a pathway to addressing rural poverty (through contract farming or private monocrop plantation concessions); and discouraging shifting cultivation, which the government believed was backward and environmentally destructive, in order to regenerate forest cover and thus support future timber values. The reality of being surrounded by more powerful economies and emerging markets - China, Thailand, and Vietnam - presented a strong rationale to policy makers to prioritize commodity-oriented exports. How did these changes affect someone like Somchan?

Policy-driven changes in land use were implemented through centrally driven campaigns of land use planning and allocation and village rezoning. As part of the land use planning and land allocation program (LUP/LA) that began in Laos in 1995, each household was allocated three upland plots. This meant that the maximum fallow period possible for shifting cultivators was limited to two years - a big change for farmers who had been managing more than 10-year fallows. The program was intended to regenerate forest cover and support the development of permanent and commercial agriculture. But in the absence of knowledge about alternative cropping systems and technical and financial assistance, farmers tried to adapt their shifting cultivation practices as best they could. In areas where compliance was enforced it resulted in fallows with poor vegetation re-growth and land degradation due to rapid crop rotations. This had negative consequences for crop yields and food security, in part due to the absence of many wild foods and medicines that grow in longer fallows.

As part of the focal site strategy, endorsed in 1998, that built on and expanded existing resettlement programs from the 1980s, the most remote villages were moved closer to roads to bring them nearer to existing infrastructure and development services in order to make more efficient use of scarce development resources. However, these resettlements were not always accompanied by timely development

activities, and displaced families had to cope by themselves in their new locations. This led to the pursuit of shifting cultivation with shortened fallow periods along the roads, leading to low productivity, erosion and the disappearance of mature fallow secondary forests. There are examples from some areas where compliance was not enforced, and even after being moved, some families would return to cultivate their land in their original villages. For communities that had been practicing and evolving shifting cultivation for generations, along with some improved development services, these campaigns brought challenges and contradictions.



Forestry officials are met with skepticism when they do not share a common vision with communities. (Credit: TABI)

arrangements with private companies). In other cases, fallows were zoned as state forestlands, contributing to meeting the national policy goal and thus protected from clearance or rotational cultivation. Through this period, some farmers took up contract farming and replaced their upland rice fields with permanent commercial crops such as maize. But productivity began diminishing after a few years, and without additional knowhow and the ability to organize rotations, they were turning to chemical inputs even as their debts mounted.

Seen from a forest regeneration perspective, it was not clear that these land use planning and allocation campaigns were having the desired result. There was a loss of secondary forests from long fallows, and the low capability for enforcement of these policies in some areas meant continuing loss of primary forest. Higher population density created through focal site development (in which villages were moved to create integrated rural development clusters) and naturally growing populations also led to unsustainable over-gathering of non-timber forest products in the most accessible areas, leading to their scarcity. Further, as land use allocation campaigns were also designed to identify land available for concessions and for other investments, they inevitably contributed to loss of forest cover.

In 2009, a nationwide process of participatory land use planning (PLUP) had been convened by the Ministry of Agriculture and Forestry (MAF) and the National Land Management Authority of the Ministry of Natural Resources and Environment (MONRE) and was still in process at the start of TABI. But its starting point was the three-category national level forest classification ("Conservation forests"¹²,

¹² Where human activities are prohibited in order to preserve fauna, flora, biodiversity and areas of cultural, educational or scientific interest.

The perception of shifting cultivation as damaging led to its neglect in Laos' first national forest inventory when it was constructed at the turn of the 20th century. This resulted in many upland fallow systems being classified as "unstocked forests". This erroneous classification had created an inaccurate understanding of the country's forest cover. It ultimately reinforced longstanding policy goals of restoring 70 percent forest cover (slated for achievement by 2020), zoning 70 percent of the land as state forestland, and the subsequent creation of three main forest categories. Together these changes formalized the limited access to land for shifting cultivation. In some cases, farmers had lost land because land use planning and zoning that did not involve substantial local participation misidentified their fallows as idle or unused land (and thus available for development through concessions or lease arrangements with private companies).

“Protection forests”¹³, and “Production forests”¹⁴) driven by the policies described above, thus emphasizing policy priorities over local needs, perspectives and knowledge. While intended to be participatory, it had limited participation as it did not incorporate an understanding of people’s existing land uses and resources. And, as it required formal village agreements to be developed immediately after the land management zones were drawn on the map, it could not accommodate feedback and revision or exploration of new ideas.

When we consider this context, it is easy to understand the initial apprehension about land use planning that Somchan and others in his village felt. We can also appreciate their interest in a participatory process of land use planning that explicitly built on the diverse functions and uses they derived from their agricultural lands and surrounding forests. As Somchan describes, TABI’s land use process opened an opportunity for them to take stock of their practice, to observe changes and tensions, to discuss and compare opportunities and challenges, to hear about what other villages were doing, and to develop a plan to make their practice more sustainable and productive. As the TABI process was iterative and spread over two years, it allowed them the opportunity to test ideas and observe the implications of various land use decisions before they became official. Importantly, it opened space to develop local solutions and synergies aligned with policy objectives, and to understand and possibly negotiate the contradictions between development and conservation goals as they played out at the village level.

TABI’S PARTICIPATORY FOREST AND AGRICULTURAL LAND USE PLANNING AND MANAGEMENT PROCESS

Recognizing forest and agricultural land use as critical to nurturing and leveraging agro-biodiversity for development, TABI embarked on a Participatory Forest and Agricultural Land Use Planning, Allocation and Management Process (p-FALUPAM)¹⁵.

It was a process conducted primarily at the village level to develop forest and agriculture land zoning and management plans that:

- reflect local needs and priorities and are owned and implemented by villagers;
- meet government requirements and can be approved at local and national levels; and
- ensure the sustainable use of local resources and agro-biodiversity.

Village level outcomes were later aggregated upward to village cluster (kumban) and district levels. Most previous land use planning processes had been driven by policy or land administration/titling objectives.

For TABI, land-use planning is the process of regulating the use of land in an effort to ***promote more desirable socio-economic and environmental outcomes as well as a more efficient use of resources***. In doing so, local government can plan for the needs of the community while safeguarding natural resources.

¹³ Where human activities are prohibited in order to prevent soil erosion and associated natural disasters as well as to protect water sources and maintain national defense areas.

¹⁴ Where controlled logging and the limited collection of forest products are permitted.

¹⁵ As the process did not incorporate land use titling or formal certification, the word “allocation” was later dropped.

As land use policy straddles “agricultural land” and “forest” stakeholders and discussions, these earlier processes were not structured to come together holistically at the village level. TABI’s participatory forest and agricultural land use planning process was inherently different, as it was driven by planning for local economic development and to nurture agro-biodiversity. Therefore, while the team used guidance from previous land use planning processes, it treated all of the land within village borders as an integrated spatial unit with which farmers interacted in myriads of ways for food, water, income, agriculture, and a range of other services.

Scope of TABI’s Participatory Forest and Land Use Planning, Allocation and Management Process

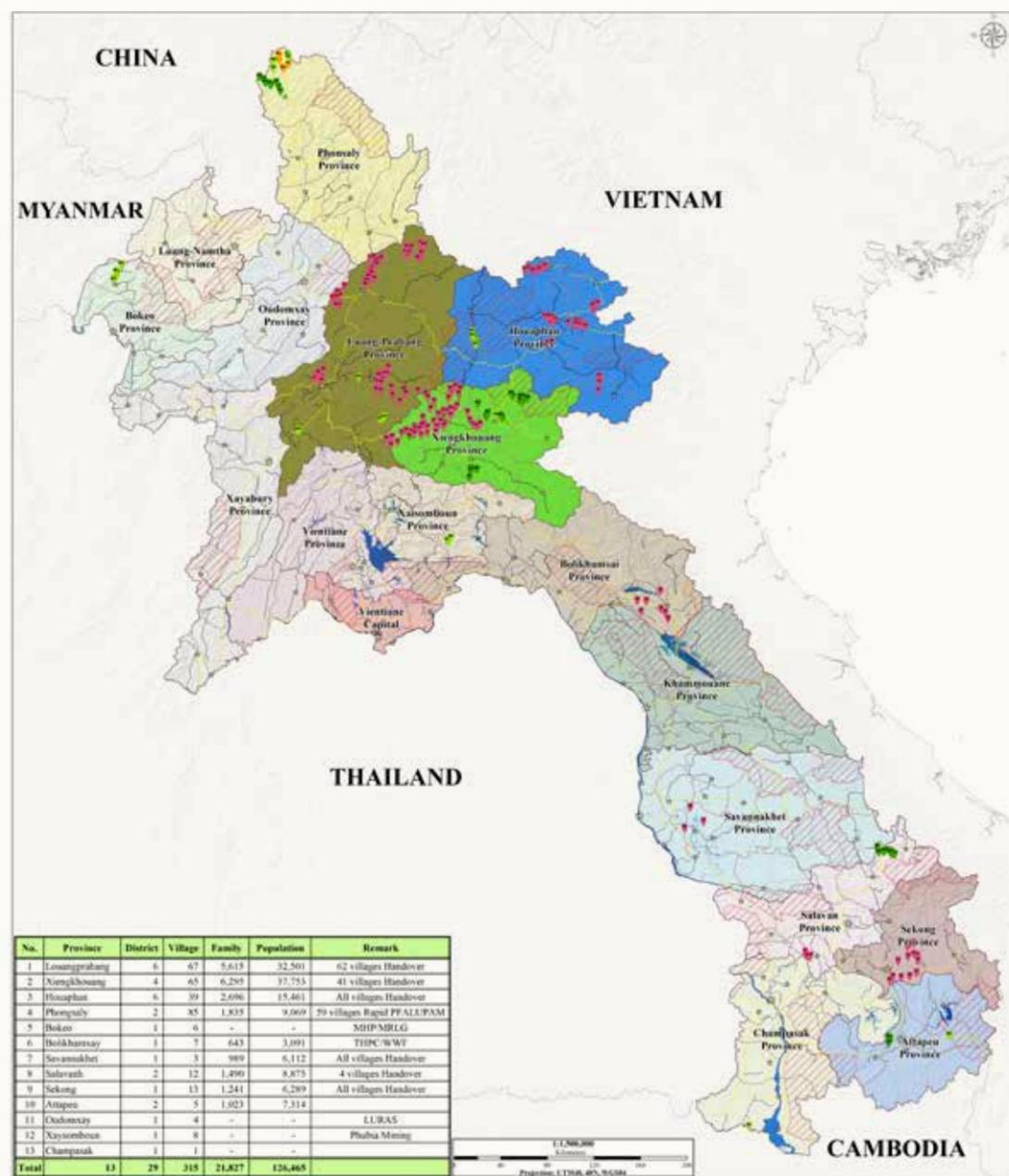
Developed by TABI, and beginning in 2011, for use in three focal provinces: Houaphanh, Louang Prabang, and Xiengkhouang.

Implemented by MAF’s Department of Agricultural Land Management (DALaM) and their provincial counterparts, MONRE’s provincial and district offices on Natural Resources and Environment, with support from NIRAS and the Centre for Development and Environment (CDE) at the University of Bern, and the participation of civil society partners: World Wildlife Fund for Nature (WWF), Groupe de Recherche et d’Echanges Technologiques (GRET), Wildlife Conservation Society (WCS), Comité de Coopération avec le Laos (CCL), Lao Upland Rural Advisory Service (LURAS), Mekong Regional Land Governance Project (MRLG), and World Renew. Also including the participation of multi-lateral agencies: the International Fund for Agricultural Development (IFAD) under the umbrella of their community-based livelihood opportunities project.

Implemented in 147 villages across 16 districts in TABI’s three focal provinces. These include northern upland areas where forest conservation needs are highest and where rotational shifting cultivation is a predominant land use. Beyond the three focal provinces, TABI’s support for land use planning reached 130 villages in 10 additional provinces, in response to demand from local government, development organizations and private companies. At its close, TABI had implemented or directly supported the process in 315 villages across 13 provinces covering an area of 1,000,000 hectares.

More than 70 people were trained at the provincial level in leading participatory land use planning implementation. A manual outlining the Forest and Land Use Planning and Management process has been completed and endorsed by MAF, and managed by DALaM.

Figure 2.1: Location and status of TABI's participatory forest and land use planning activities as of January 2020. (Source: TABI)



TABI PFALUPAM Activities:

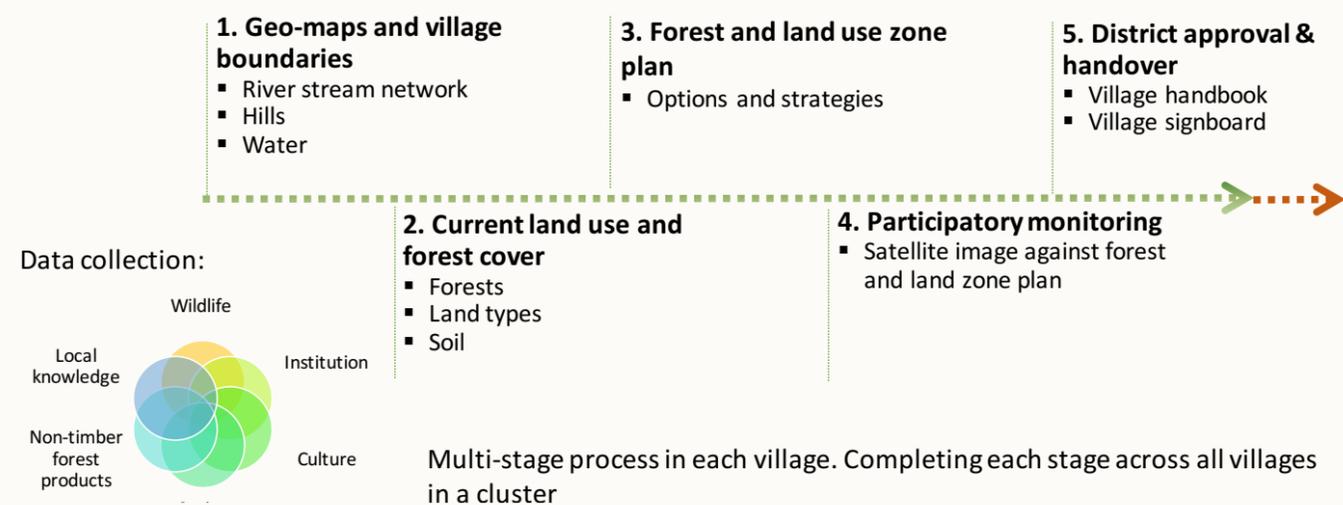
- Village at Stage 1: Geo Village Boundary Completed (All 315 Villages Completed)
 - Village at Stage 2: Current Land Use and Forest Cover Completed (311 Villages Completed)
 - Village at Stage 3: Forest and Land Use Management Zone Completed (245 Villages Completed)
 - Village at Stage 4: Forest and Land Use Management Zone Monitored (198 Villages Completed)
 - Village at Stage 5: Signboard Installed and Report Handover (163 Villages Completed)
- Total: 315 Villages**

Legend:

- Province Capital
- District Capital
- National road
- Provincial/District road
- Provincial Boundary
- District Boundary
- National Biodiversity Conservation Area

Figure 2.2 below describes the multi-stage process that TABI used to develop participatory forest and land use management plans in each village. The process involved three visits of the land use planning team from DALaM, the Provincial Office of Natural Resources and Environment (PONRE), the Provincial Agriculture and Forestry Office (PAFO), DAFO, and TABI to each village in a village cluster, followed by monitoring of the land use plans prior to finalization with village and district authorities. The initial visit included consultations with village authorities in contiguous villages within a cluster, introducing the approach, seeking their participation and consent, and reaching **agreement on village boundaries**. During the second visit, along with members of the community, the team undertook a detailed assessment of their existing land uses, livelihood activities, and resource endowment, producing a current land use and forest cover map (CLUFC). The team also collected socio-economic data from households and special interest groups at this stage to understand the links between socio-economic characteristics and land and forest use preferences and practices.

Figure 2.2: TABI's multi-stage forest and land use planning process: Working with the complexity of rural landscapes. (Source: TABI)



The third visit typically took place the following year, by which time villagers would have had the opportunity to consider and analyze their existing land use and forest cover map, as well as to discuss future plans for resource use zones. At this stage they produced their future land use plan, called the **forest and land use management zones (FLUMZ)**. Agreeing on zones rather than detailed plans built-in the flexibility to work out issues that arose over time around the use of these zones, specifically the allocation of land to families for cultivation purposes. The last stage involved participatory monitoring supported by satellite images and, based on this monitoring, amendment of their plan if required. The last village plan would then be **signed off by the District Governor's office**. The final step was handing over the village handbook and signboard to village authorities, with all the maps, data, plans, and management tools.

SERIAL INNOVATION IN FOREST AND AGRICULTURAL LAND USE PLANNING AND MANAGEMENT

When TABI began, the participatory land use planning process (called PLUP) developed by MAF and MONRE was in process, but was progressing slowly. As forest and land use planning was an essential ingredient of its work on agro-biodiversity, TABI decided to build on PLUP, i.e. to use the PLUP manual, but rescale its implementation spatially and temporally to make it more efficient for government staff and less of a burden for villagers. In practice this meant working village cluster by village cluster, spending a few days in each village, working through one step for each visit rather than completing all steps in one go in a village over a period of a few weeks. This was the first of TABI's innovations in its forest and agricultural land use planning process. More were to follow. We describe these innovations here as a way to illustrate the uniqueness of TABI's process, and its implications for agro-biodiversity and development in the uplands as well as for land use planning in general¹⁶.

An extended iterative, multi-stage process | In sharp contrast to previous land use planning methods, TABI decided to work with communities one step at a time over successive visits with gaps in between each step. This resulted in an iterative process, which had several advantages. Besides being more time efficient for government staff who fitted in these activities alongside other work, this kind of iteration allowed villagers to reflect on each step among themselves between the planning team's visits. During these periods they could review their zoning and land allocation ideas or decisions and make plans for how to manage them. It allowed time to build consensus around land use decisions, conduct trials, sort through disagreements, fill gaps in information, and adapt their plans, if needed, before they were formalized. In this way, the process also helped communities build their collective capability for adaptive change, an ability well suited to the complexity of their landscape and rapidly changing context. Villagers also benefited indirectly from the closer relationships they built with local government representatives.

“Besides zoning, villagers have gained a lot of benefit – the process included many visits of the government to the village. Every time they visited, their relationships grew, they built trust and connections, and they [government representatives] brought an understanding of policies and legal aspects. Villagers can now contact them just with phone calls. It has brought them closer.” (Dr. Luck Bounmixay, FALUPAM Manager, TABI)

Bottom-up participatory process | In most previous land use planning efforts, village level land use plans were designed as village-scale implementation of larger district development plans. The process was usually campaign-based, rolled out village by village based on higher level district plans that emphasized policy goals like forest conservation or eliminating shifting cultivation. As a result, they did not always link well to farmers' realities. In contrast, TABI's process was designed to be bottom-up and participatory, beginning with local participation at village level for each village in a cluster based on people's existing land uses, and then viewing and aggregating maps and plans at higher spatial scales.

Example: Advantage of an Iterative Process

Villagers in Mien village in Phoukout district in Xiengkhouang province wanted to consolidate their shifting cultivation fields to be able to have longer fallows. But not everyone in the village agreed to this kind of zoning. However, when they trialed the consolidated shifting cultivation, people realized it was much more “fun” to work on the upland in a bigger group and there were labor saving benefits such as collectively managing livestock grazing or fire control.

(Gonsalves and Fujita Lagerqvist, 2018)

As a result, these plans were more likely to incorporate a more realistic transition process from people's existing practice.

Further, an extended and iterative process allowed for greater participation of villagers, with attention to the participation of different ethnic groups, women, and youths. The levels of participation and engagement naturally varied from village to village based on social structure and power relations. But this kind of process was more likely to open opportunities for villagers to share relevant information with each other, understand and analyze ideas and proposals from different perspectives, and find local solutions to perceived trade-offs between conservation and development. It potentially allowed the space to collectively explore the implications of proposed land use changes on people's livelihoods and on ecosystem functions and services. This kind of process offered a chance to more substantially draw on farmers' deep agro-ecological knowledge that had accumulated over generations through daily interactions with the land, soil, water, trees, animals, and wildlife in the mountains. The process also included collecting data from households and disaggregating it by special interest groups, like youth, women, and ethnic communities.

As a result, many villagers built skills and interest in working with their maps and plans, and in monitoring the use of their forests and lands. People who went through this process felt better positioned to defend encroachments on their land and to understand the implications of development proposals such as land concessions. Processes of data collection and analysis also gave government officials who were involved the opportunity to understand socio-economic ethnological characteristics, and to observe links to agricultural practice and land use.

Identifying and mapping existing forest and land use | Pressure to eliminate shifting cultivation had marginalized traditional shifting cultivation and cultivators over the years. And, as most land use planning processes were policy driven, they did not necessarily acknowledge farmers' ongoing practices of rotational agriculture and management of fallows. As TABI focused on agro-biodiversity that had been nurtured through these practices, understanding the actual diverse functions and uses that farming households derived from their forests and agricultural land was an important starting point.

An early stage in TABI's forest and land use planning process focused on mapping the existing reality of upland farmers - current land uses, livelihood activities and available resources. In an environment where land use planning had typically been driven to meet policy goals or administration needs, this process was counter-intuitive to some at the beginning, but as capacities grew, the process gained traction. Over time, this step to map current use of forest and land resources proved to be transformational, and it spawned many other innovations in TABI's forest and agricultural land use planning process:

- In beginning the process with farmers' current realities, teams mapped shifting cultivation as a legitimate land use, plotting it on current land use maps, and, through this process, generating reliable evidence of its practice. Based on this mapping, in their engagement with local authorities, TABI staff discussed **shifting cultivation as a use of land that was a key part of upland livelihoods** (rather than solely linking the practice to upland poverty, as was the common perception among many government agriculture staff), and thus as something to work with and improve, rather than eliminate (Dwyer and Dejevongsa, 2017). These early steps contributed to greater recognition of the value of shifting cultivation, and greater clarity as to how it may be stabilized rather than eradicated for improved food and livelihood security and forest conservation.
- Mapping existing land uses led to the development of more realistic land use plans as they captured the lived realities of upland farmers. And, importantly, these plans now present a **basis on which to advocate for a change in the national land-use classification system** to in-

¹⁶ Several of the innovations presented here are described in greater detail in NAFRI's Research Brief No. 2, along with corresponding data (Ingalls *et al.*, 2019).

clude upland agriculture and fallows as an official category of agriculture (Heinimann, 2017) and to advocate for related amendments to the three national forest categories.

- The process of capturing existing land and forest use uncovered a rich diversity of land and forest types - over 200 sub-categories of locally identified land uses. Most state-driven planning relies on simplified land and forest types to make administration easier. But the level of detail generated through the TABI plans was very useful in supporting local decision-making related to livelihoods opportunities which we discuss in Chapter 3. As the process progressed, the land use planning teams were able to aggregate the detailed land and forest use categories generated at village level, up to national categories. This allowed for interaction with state planning tools. And with that, suddenly, we have a powerful **link between the diverse and complex reality of upland farmers' use of natural resources in their forests and land, and national policy.** This is significant because it means that local solutions to navigate the interface between forest and agricultural land can be interpreted in terms of policy goals. It also means that, while the village maps and plans are place-specific across a wide range of diverse contexts, they can also be used for higher scale analysis (Ingalls *et al.*, 2019).

Co-location of rotational upland fields | An important innovation that grew from the changing perception of shifting cultivation was the clustering or co-location of rotational upland fields. Co-location of rotational fields made the land use plans look neater than a map with individual household fields and fallows scattered across the landscape. And, while neat maps may seem like an obscure argument, TABI's experience shows that it was a crucial factor in convincing local authorities to approve plans that included shifting cultivation practices beyond the government's three-plot policy (Heinimann, 2017). Co-location of rotational fields also resulted in important collective action and economies of scale, with benefits such as fire protection, labor saving, and cattle management that individual families on their own could not afford. For example, villagers in O An village in Paek district in Xiengkhouang province decided to work on improving the management of tea trees in the forest, as well as to plant trees in selected agricultural areas. Their land use plans reflect these zones. But households' increased commitments toward tea production meant that they were no longer able to carry out shifting cultivation as before. Through their land use planning process, they decided to zone for co-located rotational fields, which allowed families to share agricultural labor more easily (Gonsalves and Fujita Lagerqvist, 2018).

Scale Linking | TABI's forest and land use planning process zoomed in to focus on detailed land use plans and priorities at village level, and zoomed out to observe coherence across village cluster and district level, as well as alignment with national priorities and categories.

“We introduced the plans prepared by communities to district and provincial government offices to explore opportunities to integrate people's priorities in the district socio-economic development plans.” (Dr. Luck Bounmixay)

Co-location of rotational upland fields

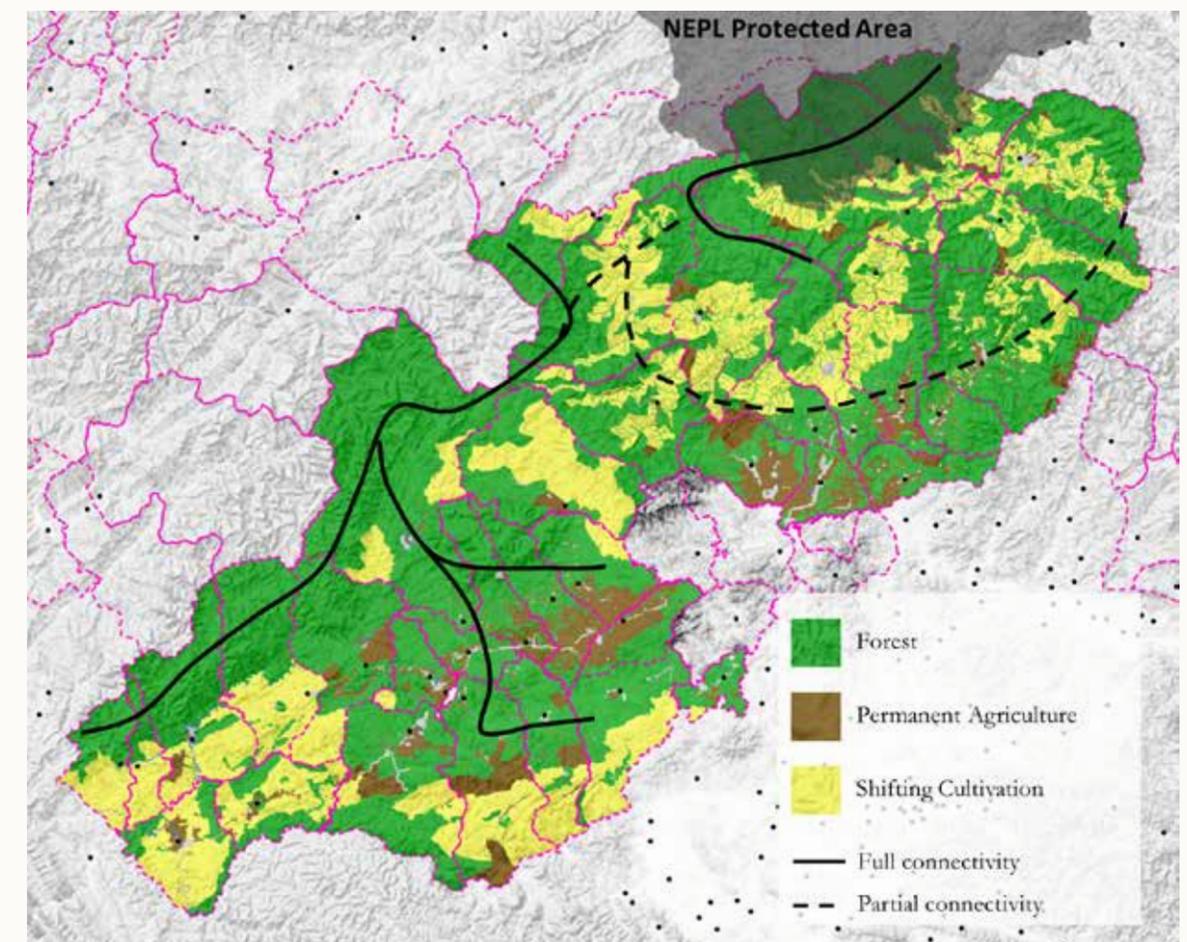
Co-location refers to a decision taken by shifting cultivation farmers in a village to coordinate and consolidate their shifting cultivation rotational fields, rather than have individual family plots scattered through the village. Co-location was a traditional agricultural practice among some communities, and was piloted at greater scale through TABI's participatory forest and land use planning process.

The practice produces several economies of scale and labor-saving benefits for farmers. It supports forest conservation goals as it facilitates longer and better managed fallows, creating more forest cover and reducing the risk and impact of uncontrolled forest fires. Ecosystem services (such as wild biodiversity and agro-biodiversity, carbon sequestration and water regulation) generated from rotational agricultural fallows have a generally positive correlation with the length of the fallow period.

But forests, watersheds and ecosystems do not follow administrative boundaries. While area coverage and quality of forests is important for conservation goals and for maximizing ecosystem services, their connectivity and disturbance patterns across the landscape and watersheds are also important.

*“Planning at the landscape scale allows for the identification of connectivity corridors and movement pathways for species, supporting the conservation of large mammals and other species. Landscape-scale connectivity also supports ecosystem service functions by linking ecosystems across boundaries, creating opportunities for synergies. This is especially critical for the protection of water provisioning services at the catchment- or watershed-level.” (Ingalls *et al.*, 2019)*

Figure 2.3 Forest connectivity at landscape scale, Phoukout district, Xiengkhouang province. (Source: Ingalls, 2019)



Forest areas that span administrative boundaries require deliberate planning at higher spatial scales to enable collaborative management of resources. Making zones and plans visible and monitoring them across village, cluster, and district levels helped people to see links across administrative and landscape scales. In this way, the land use plans provide an effective platform for working together at different levels to manage resources and negotiate solutions to resource-based conflict. Speaking with upland farmers

like Somchan about their forest and land use plans reveals that their knowledge and ability to navigate attention across scales – organism to landscape and village to district – is impressive.

On-going monitoring for a two-year period | In order to assess the effectiveness of the future forest and land use zones and plans generated through the process, the land use planning team and local DAFO monitored village level plans over a period of two to three years. They drew on data from village and district reporting systems and high-resolution satellite images. The team would visually examine the spatial patterns of rotational upland agriculture from satellite images to see if they conformed with the land use plan, and whether natural forest regeneration was protected in practice as was planned. They would share their observations with village authorities and revise the plans, if needed, before sign-off by the district office. This process helped build skills in monitoring and adaptive planning at district and village levels.

State-of-the-art technology | Throughout the forest and land use planning process, DALaM, with support from CDE, used multi-year high-resolution imagery to support community consultations on current land uses and land covers, complementing local knowledge and providing quantitative measures of change through time. They used topographic maps to help identify and zone steep slopes and other areas requiring special management provisions. After the completion of planning processes, high-resolution spatial imagery was used during monitoring periods to support on-the-ground reporting and assessment of the effectiveness of management plans and zoning. However, these innovations were not only useful at the local-level. The spatial information resulting from the multi-perspective process (bringing together on-the-ground local knowledge with high-resolution imagery and expert classification) was then collated across all areas to help inform, revise and verify national-level datasets, creating a precise, locally-informed repository of information across nearly 1 million hectares. At the close of TABI, this repository of data is being used for innovative approaches to, among others, ecosystem service valuation and to assess the implications of boom crop expansion.

Handover of village forest and land use plans | At the end of the planning process in each village, TABI would hand over a village handbook and signboard to village authorities. The handbooks catalogued the village's detailed forest and agricultural zones, with maps and plans, and with management rules and tools agreed with district authorities. They also contained a baseline record of households' access to land and their use of natural resources and other social and economic data collected during the planning process. Signboards measuring 3x4 ft. were installed at a central place in the village or at the village entrance, with a map of the future forest and agricultural land use management zones that had been approved by district authorities.

The handbook and signboard provided communities with a transparent, accessible, concrete reference to all their geophysical, agro-ecological, and socio-economic data and plans. Community representatives place great value on these products as they were signed off by district authorities, and therefore “*provided a tool to legitimize their communal access to, and use of land and forest resources in the absence of formalized communal titles.*” (Gonsalves and Fujita Lagerqvist, 2018, 4)



Figures 2.4 (page 50) and 2.5 (page 51) contain images of a Current Land Use and Forest Cover map (CLUFC) prepared in 2016 and a Forest and Land Use Management Zones map (FLUMZ) prepared in 2017 respectively for Lankang village in Namdouan kumban, Nambak district in Luang Prabang province. The differences between these maps offer us insights into some of the key decisions taken and agreements reached by this community and the resulting changes in land use and zoning.



Forest and land use maps allow communities to coordinate, plan, and manage. (Credit: TABI)

Figure 2.4: Current land use in Lankang village, Namdouan kumban, Nambak district, 2016. (Source: TABI)

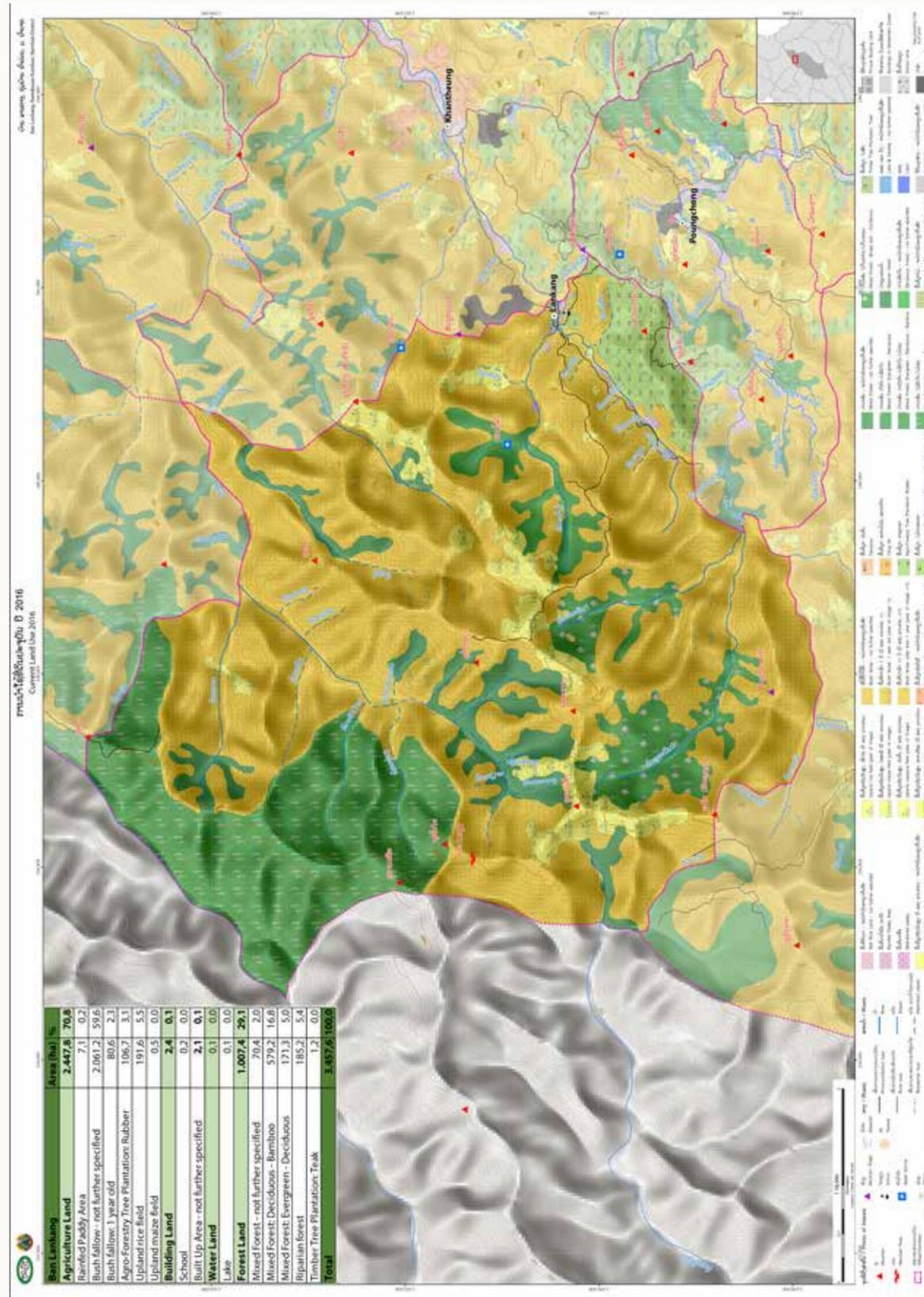
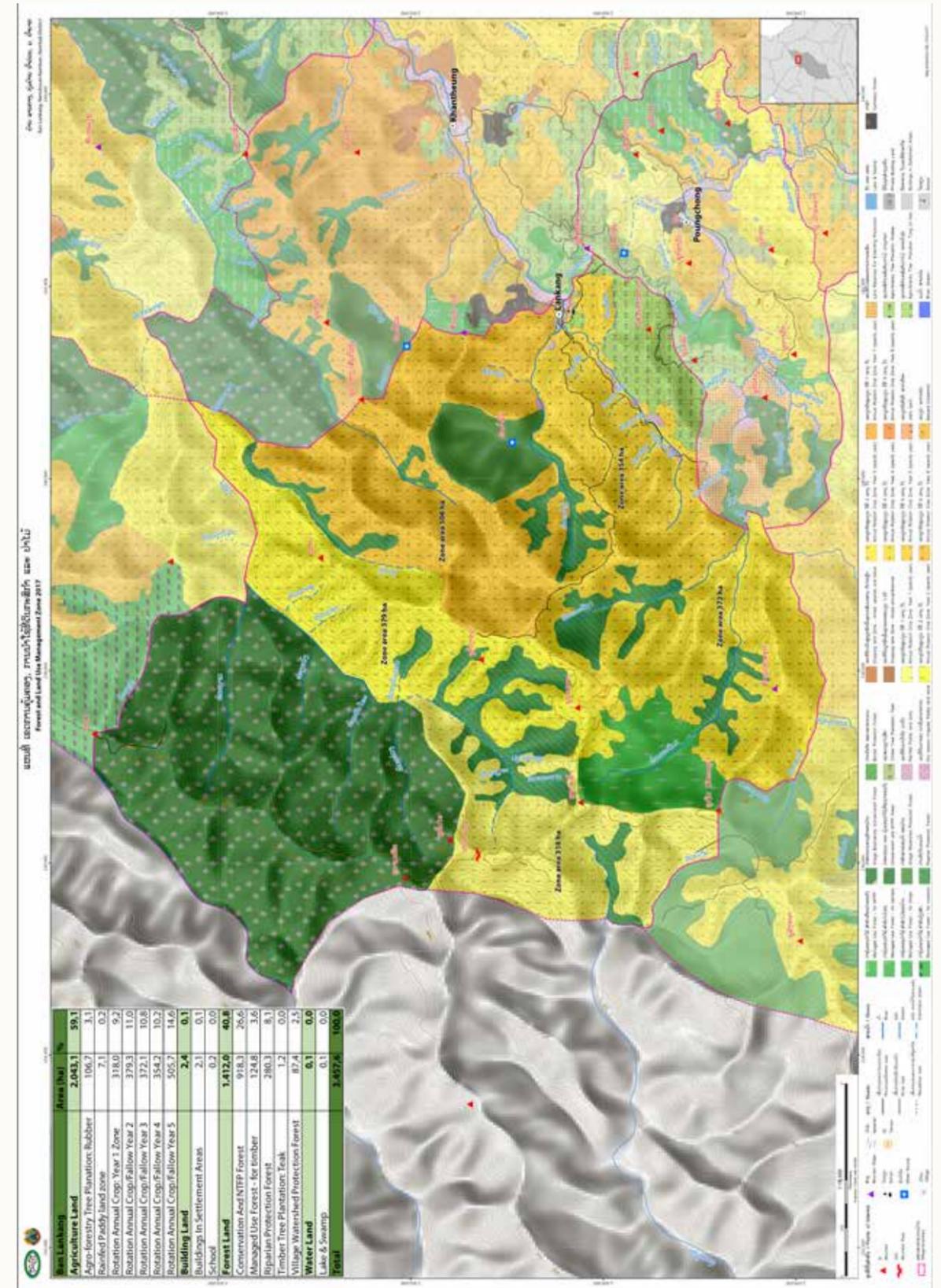


Figure 2.5: Future forest and land use management zone for Lankang village, Namdouan kumban, Nambak district, 2017. (Source: TABI)



What do the land use maps of Lankang village tell us?

With just a cursory look we can immediately see a “future” map with more green areas, signaling a greater area committed to forests. Looking at the summary of land use in the box on the top left, we see that the area the community has allocated as forest land has increased by 11.7 percent (or 405 hectares). This is an important observation given the commonly held perception that shifting cultivation leads to a reduction in forest cover. The maps record a corresponding decrease in the area of land devoted to agriculture.

In their future forest and land use management zoning, the community of Lankang village has further specified areas for rotational agriculture indicating a plan for five rotations. The community has also more clearly specified forest uses, indicating areas to be used as village biodiversity conservation forest, conservation and non-timber forest product forest, village watershed protection forest, and riparian protection forest. The plan also indicates areas for managed use forests, with separate areas for collecting non-timber forest products and timber, and for harvesting bamboo and grazing livestock.

OF FORESTS, FALLOWS, AND NOTABLE SUCCESSES

Land use planning is time consuming and resource intensive, and can have strong socio-economic and political influences. So it is important that we be clear-headed about the outcomes and challenges from TABI’s forest and land use planning process. We first focus on some positive outcomes.

Forests, conservation and land use | There is a view in Laos, as in several other places, that participatory land use planning that recognizes shifting cultivation will cause the area allocated for forests to diminish, which will in turn undermine national targets for forest conservation or expansion. However, TABI’s data shows the opposite. While land investments through state-planned concessions have led to deforestation, bottom-up participatory planning has increased forest areas. Across all TABI-supported villages that engaged in the participatory forest and land use process, areas allocated for forest increased by 9.6 percent (or 52,600 hectares) from the existing allocation (See Figure 2.6). In some districts this was higher - for example in Chomphet District in Luang Prabang, average forest area increase was around 15 percent¹⁷ (Ingalls *et al.*, 2019). The range and variation in the proportionate area allocated to forests across different villages also validates the value of locally established forest area allocations.

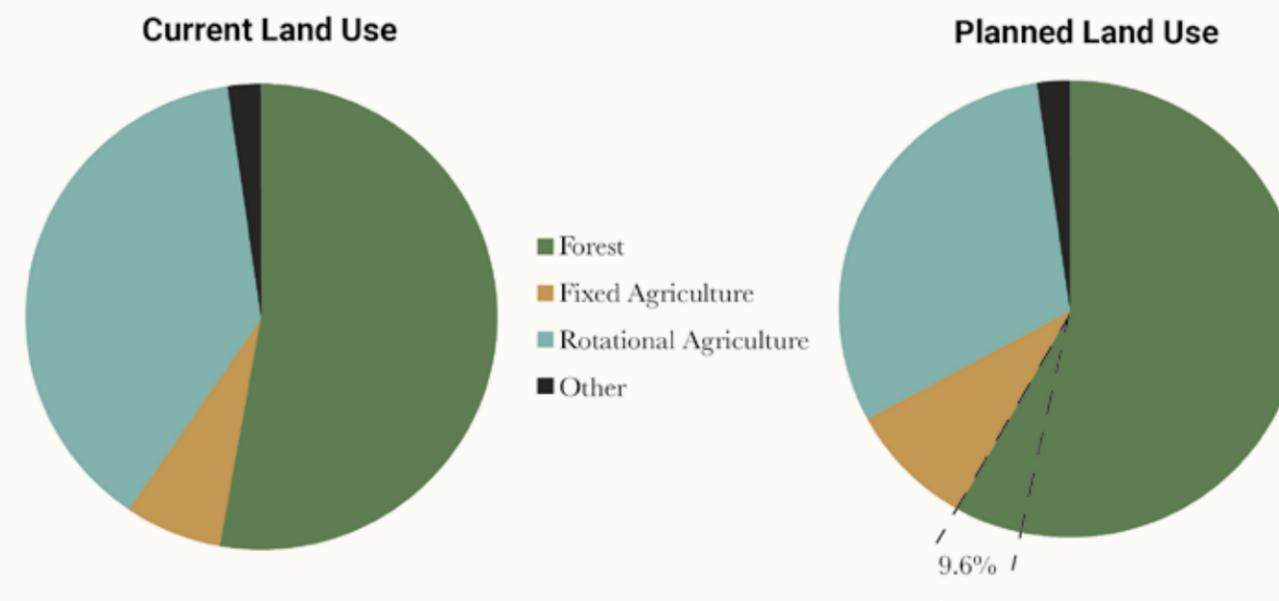
At village level, farmers achieved forest conservation goals in several different ways: protecting existing forests for regrowth and preventing them from encroachment; creating riparian forest buffers; and co-locating rotational agriculture fields, allowing for longer consolidated fallows and more forest cover. The particular mix of strategies used in each place depends on many factors such as: land availability; topography; livelihood opportunities; access to markets; history of land use; population density; social dynamics; and labor constraints. One size does not fit all.

¹⁷ In these calculations, forest areas refer to those areas allocated for stable forest cover. They do not include large areas of old fallow, which nevertheless provide a number of forest functions, and often meet the national definition of a forest.

Both the current and future maps generated through TABI’s process distinguish between different kinds of forests based on local uses, for example, tea forests, forested livestock areas, areas to collect non-timber forest products, and other locally agreed purposes. This locally determined use and planning brings clarity to potential livelihood opportunities and benefits, food choices, and safety nets, while continuing to support forest conservation goals and to generate ecosystem services. These results regarding locally driven forest conservation through participatory forest and land use planning are encouraging. But it is important to note here that communities’ ongoing support for forest conservation depends on continued access and clarity of farmers’ rights to forest areas. For many, this is not yet clear.

“Land use planning is not simply about zoning and conserving forests. It is also about human rights – rights to food, water, land, education, and livelihoods. We have to change mindsets and increase awareness about this aspect. Unless people have an understanding of their rights, they will not work together. Or even if they work together, they may not be able to envision the potential future impact of what they are doing today.” (Dr. Luck Bounmixay)

Figure 2.6: Changes in land use across TABI sites showing increase in area allocated for forest. (Source: Ingalls, 2019)



Land conflicts and tenure claims | There is substantial evidence from TABI-supported villages of the value of village zoning and management plans in addressing land conflicts, and as a basis for supporting local tenure claims. This is not an insignificant achievement given the low coverage of land titling for agricultural lands, the lack of clarity of village boundaries in some places, and the fact that land conflicts have become violent in several neighboring countries.

While the legal status of these land use plans as the basis for tenure security is unclear, having forest and agricultural land use zones and plans signed off by the office of the District Governor signals official recognition and legitimacy of people's land use claims. In areas where land titling has not been carried out, TABI makes the case for these locally developed land use zones and plans to be used as the first step toward systematic registration of lands and titling of individual parcels. The specific recommendation from the Department of Policy and Legal Affairs at the Ministry of Agriculture and Forestry, emerging from TABI's work, is to treat these land use zones and plans at least as functionally equivalent to communal titles. To implement this recommendation, agreement needs to be reached between the Department of Land (DoL) in MONRE and the Department of Agricultural Land Management (DALaM) in MAF. At the close of TABI, these issues were taken up and agreement reached to pilot them within new initiatives to address land claims and tenure security in forest areas through joint action by DoL and DALaM, with support from the MRLG Project and Village Focus International.

Land use planning for livelihood development | As TABI-supported forest and land use plans are built from an understanding of farmers' actual uses of land, they offer the basis for improving farmer livelihoods in ways that are compatible with their local context and transitions. The plans offer communities a way to assess emerging development opportunities and their compatibility with their preferred land and forest uses and development aspirations. In this way, these plans are not just a basis for resource management, but they also serve as a platform upon which a range of development interventions may grow, consistent with people's aspirations and priorities.

Over the period 2010 to 2020, the livelihood activities that TABI helped grow from these plans (such as beekeeping, crispy weed processing, and the production of non-timber forest products) leveraged local resources and species that communities prioritized and raised local revenues significantly across the three TABI provinces (from US \$400,000 to \$1.8 million per year).

Reliable, accessible, transparent land use data and evidence | Despite there being a long history of land use planning in Laos, there had not been systematic management of village land use planning data at district, provincial or national levels (Dwyer and Dejvongsa, 2017). This may have been because of the inherent complexity of land use planning, where responsibility for planning for different land classes lies within different ministries and departments, and the division of responsibilities may not have been clear to everyone involved. In addition, most land use planning processes in Laos have been driven by donor-funded development projects, each with their own agenda and limited duration and resources. In the absence of central coordination, the data from these processes is not always available to the government or other organizations.

TABI tried to mitigate this problem in two ways – first, by developing and maintaining a database and data process management system for village-level land use planning within DALaM. This strategy was

Example: Resolving Local Land Conflict

After completion of land use planning in Na Meuang village in Viengxay district in Houaphanh province, neighboring villagers encroached into the village forest for upland rice farming. The villagers of Na Meuang used the village management rules and agreement on village boundaries to resolve conflict with the help of district authorities.

(Gonsalves and Fujita Lagerqvist, 2018)



Government staff take the lead for land use planning with communities. (Credit: TABI)

intended to strengthen the capacity of government offices over the long term. The second strategy was to build a short-term mechanism to share locations and data (maps, GIS data, and agreements) relating to village land use planning activities as they occurred. It was designed as a crowd-sourced platform, where land use planning data and information could be uploaded. This platform was intended to temporarily overcome the absence of a central government data coordination mechanism and to help make data more transparent and accessible, allowing all agencies involved a way to access or validate data, find partners with common interests, or draw from it evidence for advocacy. As TABI comes to a close, these data platforms are being converted into a common, accessible, online interface – a Land Use Information System - developed by GIZ, also supported by TABI and CDE through DALaM. This is important because the village level forest and land use plans serve as social documents articulating local land claims, including those for which there is weak tenure security. Making this information open and accessible is an important step in improving land governance, creating a transparent environment wherein it is hard for developers and others to claim that there are no rights holders in these areas.

“It is not enough just to have data and information from one or some sectors, but instead we have to bring together data and information from all concerned sectors if we want to be able to comprehensively and effectively manage resources, support the Lao people in development and ensure a sustainable future. Because development is the responsibility of us all, which includes not only government agencies and private entrepreneurs but also local communities, this data and information cannot be held privately by only the few: It needs to be shared with the people, particularly those at the grassroots level so they can be active participants in their own development and support the government's efforts relating to both poverty alleviation and sustainable and equitable development in the country. Until now, strong progress has been made in many sectors and regions to bring together key information and make it public, but, nevertheless, more work needs to be done.”

(Chanthavong Inthavong, Deputy Director General, Cabinet office, MONRE, quoted in Ingalls *et al.*, 2018)

The rich spatial and land use detail of TABI's data is also valuable at the national level to validate and influence forest and land use categories. For example, in 2015, facilitated by TABI, this data served as the basis for a formal National Forest Re-delineation Pilot in Luang Prabang which aimed to adjust the maps of Laos' administrative forest categories to better match conditions on the ground. TABI's data may be further used to illuminate the current problem of over-classifying land as restricted forests and to explore more livelihood accommodating forest categories such as forest harvesting, livestock grazing, or longer upland fallows.

New capacities and capabilities | The land use maps and plans give us a sense of the nature of technical capacities that were built among government staff through TABI's forest and land use planning process - from central to district level. The capacities that were strengthened included the participatory planning process, zonation, and GIS-supported technologies, including spatial analysis and remote sensing data interpretation. Beyond technical capacities, the iterative process with an embedded monitoring component helped grow adaptive capabilities within villages, as well as at higher administrative levels. However, these practices would need to be reinforced through repeated practice over time for them to be sustainable.

A less visible benefit, but a very important one, is the growing interest in, and understanding among many stakeholders relating to the complex dynamics associated with land and forest use that this kind of extended bottom-up participatory process instilled. It is rare to walk into rural villages anywhere in the world and hear people offer detailed explanations of their maps and land use plans and how they relate to neighboring villages, to watersheds and ecosystems, and to national policies. This growing capability, combined with upland farmers' deep knowledge of indigenous species, provides a fertile ground for investing in agro-biodiversity-based development opportunities. Even in cases where the land use planning process has not been able to successfully satisfy people's aspirations, the analysis they conducted will be valuable in any future decisions related to their land and livelihoods, as in the example in the box above.

It is also important to note that not every village engaged in forest and land use planning processes with a high level of interest. In a context where people have experienced a battery of development projects approaching them with their own agendas, people in some villages would have perceived these land use planning activities as yet another project in a series of many - something that outsiders came to do, from which they may draw some benefit, and then would end. This is certainly true of some of the older villagers we met in researching this book. But this does not diminish the excitement and sense of agency that many farmers demonstrated, and the possibility to surface ideas and engage new stakeholders, including the private sector actors in supporting village plans and aspirations.

Example: Understanding Land Dynamics

Namai village in Nambak district of Luang Prabang province had a large rubber concession area and the community had seen waves of migration over the years. Competition for land had intensified and community members had entered into arrangements to buy and sell land prior to the land use planning process. During the zoning process, those who had purchased land were not willing to let others use it without charge. Because of the limited remaining land, they could only zone for four areas. They knew this was not enough to produce food to support the village population. The community nevertheless valued the land use planning process that helped them understand the trade-offs and losses caused by giving up land to the rubber concession. They understood the importance of ensuring legitimate access to their remaining land for food production.

(Gonsalves and Fujita Lagerqvist, 2018)

*"We strongly believe that FALUPAM as a **proof of concept** for participatory land use planning has been highly relevant in illuminating the intricate agriculture and forest interface in upland regions of Laos. Widespread demand to carry out FALUPAM beyond TABI's three focal provinces in northern Laos also attests to the usefulness of the approach beyond upland areas. This growing demand for TABI's land use planning demonstrates the overall importance and the immediacy of revisiting land use planning in Laos, and the need to recognise communal tenure over land and forest."* (Gonsalves and Fujita Lagerqvist, 2018, 2)

Policy Dialogue | Over the years, through the leadership of the CDE, TABI leveraged its rich village level data for research and policy dialogue at various levels around land classification, re-delineation of forest categories, the principles of land use planning, the value of multifunctional landscapes that contribute to development and conservation goals, and other lessons from the participatory forest and land use planning process. Some examples of this policy engagement and dialogue include:

- Discussions and sharing of lessons from participatory forest and land use planning and management with the Land Sub-Sector Working Group under the Natural Resources and Environment Working Group.
- Engaging the Ministry of Natural Resources and Environment as they developed principles for land use planning, which led to the use of land classifications emerging from TABI's participatory forest and land use planning process.
- Working closely with the Department of Policy and Legal Affairs at MAF for the issuance of policy recommendations related to the need for better bottom-up planning initiatives, policies, and regulatory provisions that support multifunctional land and forest uses (MAF 2019a and 2019b).
- Dialogue to influence the revised Land Law and revised Forestry Law as part of a multi-agency Land Law Advisory Group. There has been some success with respect to influencing the Forestry Law. The Department of Forestry agreed to some changes in the treatment of shifting cultivation, softening the language to move away from an outright prohibition to censure "erratic" or "unplanned" shifting cultivation. This opens the door for greater tolerance for planned, rotational shifting cultivation.
- Advocacy on upland livelihoods was instrumental in prompting the National Assembly's request in 2014 for government agencies to review and re-delineate the National Forest estate, taking into account the actual use of land by local communities in the uplands. This led to a pilot re-delineation process in Luang Prabang, which was well received by district and provincial authorities. The results of this pilot have greater significance since the passing of the revised Land and Forestry Laws, as tenure claims now need to be redefined within state forest areas.
- International programming and policy interventions through a special session on shifting cultivation in Asia during the United Nations Convention to Combat Desertification (UNCCD) 14th Conference of Parties in India, in 2019.

LEARNING FROM CHALLENGES

As you may expect, any process around complex issues like forest and land use planning must navigate its way through many challenges. But these challenges are valuable as they provide direction to focus attention going forward. We highlight three areas of challenge here that offer us useful insights to build on TABI's work on forest and land use planning.

Tenure and the legal basis of local land use plans | Land use plans signed off by district authorities clearly give people some sense of protection. Several farmers gave testimony to their value in addressing conflict over village borders or alternate uses of their land. But the legal status of these land use plans in establishing local land use claims remains unclear as TABI ends. Will local farmers' land use claims stand up against claims by investment projects approved at higher levels of government? It is particularly urgent to clarify the legal status of these plans, especially given the low degree of current land titling coverage for agricultural parcels of land, which is estimated to be 3 percent (MAF, 2019b).

Toward these ends, learning from TABI captured in the Policy Brief No. 04/2019 issued by DOPLA in collaboration with NAFRI, TABI and CDE suggests several areas for action that may be usefully pursued. One of these is that the land use plans that communities developed with TABI support through an approved participatory process and certified by local authorities, be considered as interim-legal basis of tenure rights provisionally equivalent to communal titles. This would demand that any new development projects conform with approved land use plans and that land could be taken for other uses only with the free, prior and informed consent of land holders. In the absence of greater clarity on tenure, the value gained from the efforts of zoning and building village level forest and land management plans will be compromised.

Social dynamics, informal practices and unintended consequences | In an environment where the legal status of informal land allocation and claims is murky, social dynamics and power relations play an important role in land use planning. During a strategic review of TABI's forest and land use planning process, researchers noted a particular type of land scarcity that surfaced in the annual allocation of upland agricultural land. This scarcity occurred due to an existing indigenous land tenure institution called *din jap jong* (land reservation).

In the case described by the researchers, a Khmu woman in B. Som village in Chomphet district explained that they were experiencing land shortages that year because much of the good agricultural land for allocation had already been reserved by Lao residents of the village, who had been paying taxes on it for years. The remaining agricultural land in the allocation for that year was of poor quality and, in order to get good land for production, she had to lease land from Lao members of the village. In this case, the land use planning process had interacted in combination with the existing informal

land allocation institution (*din jap jong*) and unintentionally created land scarcity and an informal land rental market. The woman said that she preferred the earlier government land and forest allocation process to the participatory one because the former had been poorly coordinated and compliance was not monitored. The additional participation and monitoring had, in fact, made it harder for her.

The issue was even more complex, as the practice of *din jap jong* was an important component of the village's tax base. This provided village power holders with an incentive to continue the practice. In an environment where there had been many years of powerful rhetoric to eliminate or stabilize shifting cultivation, the voices of communities that most valued it - in this case the Khmu community - were marginalized. It is likely that TABI's current set of forest and land use planning tools are not sufficiently developed to process these kinds of socio-political issues and power differences that may emerge through local level planning in multi-ethnic villages or from the practice of historical informal indigenous systems of land allocation. Going forward, it will be useful to focus more attention on analytical tools and skills to better surface and address social dynamics, informal practices, and power relations, especially in working with multi-ethnic villages.

"We do not have problems with the GIS and mapping work – there are clear guidelines. When it comes to collecting and interpreting socio-economic data, there is more experience in the economic, than in the social. In Laos we have 49 officially recognized ethnic groups, more than 300 sub-ethnic groups, and many have not been identified officially. The TABI area includes more than 34 ethnic groups, and every group has different characteristics and experiences. Land use planning needs adjustments to suit the needs of different ethnic groups. The challenge was that in our team we did not have people with social expertise. This is an area that can improve." (Dr. Luck Bounmixay)

Understanding the purpose of TABI's forest and land use planning approach and its achievements | Researchers who analyzed TABI's progress in implementing its forest and land use planning process have highlighted a critical constraint to sustainability of its results - the resistance that TABI's approach has encountered at the central level among some stakeholders.

Unpacking this resistance, one of the critiques that people express about the process is that of cost, based on the view that TABI's process is "overkill" - too long and complex.

"It's a Rolls Royce when what you need is a just a good Toyota."
(Quoted in Dwyer and Dejvongsa, 2017)

“If one’s goal is to have a title deed at the end of land use planning, there is no need to delve into fine-grained detail of land use types, as well as various resources used by households. The FALUPAM process collects far too much information. Do we really need the ‘Mercedes’ of land use planning?” (Quoted in Gonsalves and Fujita Lagerqvist, 2018)

During discussions for this book some people in Vientiane reflected a similar perspective. The high cost of TABI’s participatory forest and land use planning process is often cited as a barrier to its application at scale. But this is a questionable claim as there is no cost analysis to back it. Even if we were able to calculate comparative costs of different methods of land use planning (per village or village cluster), there is no consensus yet on what these processes are expected to actually achieve on the ground making cost-benefit comparison difficult.

The mid-term review raised the question of how well TABI’s land use planning approach and its achievements were understood by central level stakeholders:

“Despite the support that was observed at the local levels, the relevance of TABI’s land use planning approach and its achievements were less well understood among policy makers at the central level and among other organisations engaged in forest and land management in Laos.” (Gonsalves and Fujita Lagerqvist, 2018).

Some stakeholders believe that more effective branding or communication could have addressed this gap in understanding.

But perhaps the cost of this method, the amount of data collected, or how it was branded and communicated are not the most useful points of discussion at this point. It may be premature to consider these kinds of factors without a shared understanding about the purpose of land use planning in the uplands. Our story tells us that TABI’s approach was clearly different to previous approaches in a number of ways. And there were important reasons for these differences. In seeking to improve upland livelihoods and promote the sustainable management of agro-biodiversity resources, TABI’s process leveraged the experience and knowledge of upland farmers to illuminate the interface between forests and agricultural lands. This village level participatory process went much deeper than demarcating forest areas, which is where some of the earlier processes focused most attention, and hence TABI’s need to collect more data. Further, if land titling is to be achieved as promoted through the new Land and Forestry Laws, it will require even more in-depth detail (to individual household level, not just village level).

In going forward, perhaps a more useful question to discuss is, **“How may we establish a shared understanding of the value of land use planning in helping to navigate the agriculture-forest interface for the benefit of farmers and sustainable agro-biodiversity in**

upland Laos?” If development stakeholders can arrive at a shared understanding at this purpose level, questions like cost, communication, data collected, and length of process can be more meaningfully discussed to build practical solutions.

FOREST AND LAND USE PLANNING - THE ROAD AHEAD

What does TABI’s experience of forest and agricultural land use planning leave us with for the road ahead in forest and land governance? We close the chapter with three ideas to fuel potential follow-up from TABI: i) building on the actual forest and land use village maps and plans that were developed with TABI support; ii) leveraging TABI’s evidence for dialogue and advocacy related to land and forest governance; and iii) using learning from TABI’s forest and land use planning and management process to inform the nature of future land use planning in the uplands.

Forest and land use plans on which to build | In up to 315 villages across 13 provinces, farmers are pursuing their aspirations as captured in their village forest and land use zone maps and plans that they developed with TABI support. These plans serve as a powerful entry point to any development effort seeking to work with these communities to improve their lives. How may development stakeholders help farmers like Somchan realize their aspirations?

Evidence to inform land and resource use governance | TABI’s forest and land use planning process produced important evidence to inform advocacy and policy dialogue in four directions. Each of these four areas offers an opportunity for others to build on this work: a) Influencing changes to land and forest categories that take into account people’s actual uses of land and its potential to contribute to their livelihoods, food and nutrition security, and the local agricultural economy; b) Drawing attention to the importance of tenure rights in respect of communally managed lands. Communities need to know that they can have continued access and use of these lands and resources if they are to continue to invest in them. Meanwhile, communities’ land use maps and plans may offer an interim basis for tenure security in the absence of a formal tenure arrangement; c) Completing the process to make data from TABI’s participatory forest and land use planning process accessible and raising awareness around its use. This contributes to more transparent land governance and protection of communities’ tenure rights; and d) The principles (further discussed below) that should guide forest and land use planning in the uplands in the future, learning from how upland communities navigate the forest-agriculture interface for agro-biodiversity.

On the principles for forest and land use planning and management in the uplands | The land use approach adopted by TABI was based on a series of innovations that were markedly different to the campaign-led land use approaches previously used. Some of these innovations,

unique features of TABI's land use planning process, were critical to its effectiveness and, going forward, may inspire principles for future forest and land use planning in the uplands.

- TABI used a participatory process to acknowledge and **build on people's current reality** of forest and land use and, in so doing, explicitly put shifting cultivation and its associated practices, culture and beliefs on land use maps. This led to evidence-based and realistic land use plans, and it empowered communities with enhanced skills to draw on their experience and practices to navigate change and improve their lives.

- TABI employed a **multi-stage, iterative, adaptive process**, with time in between stages for reflection, and to test forest and land use decisions. It also embedded a monitoring process that allowed for adaptation before plans were formalized. This iterative process helped communities navigate the complexity of the rapid changes in their operating environment.

- The village level zones and plans that were developed with TABI drew on villagers' knowledge and encouraged innovation in their local context. They were **place specific** but, in using a common frame and agro-biodiversity lens, patterns and lessons began to surface over a wide diversity of contexts, making the application of the methodology and the plans themselves **scalable**.

- The approach used by TABI was intentionally **scale-linking** across administrative and ecological scales, building meaningful links between local innovation and national policy goals, as well as from organism to landscapes or watersheds. This helped maximize benefits from forest protection and ecosystem services, and it builds capability for collaborative management of natural resources across administrative boundaries.

- The process helped farmers and local authorities embrace a **diversity** of forest and agricultural land uses and functions and the **interconnectivity** within and between species, markets, people, and levels. It spurred collective action in managing their natural resources. It also built a greater connection between village communities and local authorities around their natural resources, improving their ability to work together for improved forest and land governance, meeting local needs as well as contributing to policy targets.

- It encouraged innovation and the **deliberate management of resources** and tools for adaptive plans. In beginning with farmers' existing uses of land, it promoted realistic plans that built on people's knowledge and practice, and made the space to embrace new thinking and opportunities. The use of state-of-the-art technology for commu-

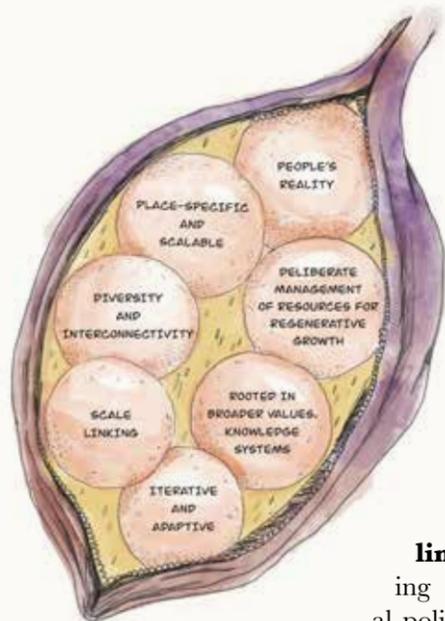
nity-based land use planning enhanced people's technical and adaptive capacities (of both communities and local agriculture and forestry authorities) and opened opportunities for real time monitoring of land and forest use.

- It purposefully respected and **drew from people's wider knowledge of indigenous species, cultivation practices, and the functions and uses they derived from their agricultural land, fallows and forests**. It opened the door to a culture of land use planning that was rooted in local knowledge, culture and people's aspirations.

Many of these characteristics may sound familiar to you. They resemble closely the regenerative principles of agro-biodiversity that we uncovered from shifting cultivation practice in the uplands in Chapter 1.

In a context where farmers instinctively navigate the interface between forests and agriculture and their own connectedness with the land, it is not surprising that an effective approach for forest and land use planning embeds these regenerative principles of agro-biodiversity. In thinking about forest and land use planning in upland Laos, could these principles guide us in assessing land use planning options for the future?

"You are not Atlas carrying the world on your shoulder. It is good to remember that the planet is carrying you." (Vandana Shiva)



REFERENCES

Dwyer, M. B. and V. Dejevongsa. (2017). *Situation Mapping/Analysis and Strategic Planning for SDC TABI Forest and Agriculture Land Use Planning in Lao PDR*. Field Report. Swiss Development and Cooperation (SDC): Vientiane.

Gonsalves, J. and Y. Fujita Lagerqvist. (2018). *Mid-term Review: The Agro-biodiversity Initiative (TABI) Phase 3*. Swiss Agency for Development and Cooperation. Vientiane.

Heinimann, A., C. Flint, R. Bernhard and C. Hett. (2017). *Putting upland agriculture on the map: The TABI experience in Laos*. In: Cairns, Malcom (ed.) *Shifting Cultivation Policies: Balancing Environmental and Social Sustainability* (pp. 819-835). Wallingford, United Kingdom: CABI.

Ingalls, M. L., Diepart, J.-C., Truong, N., Hayward, D., Neil, T., Phomphakdy, C., Bernhard, R., Fogarizzu, S., Epprecht, M., Nanhthavong, V., Vo, D.H., Nguyen, D., Nguyen, P.A., Saphangthong, T., Inthavong, C., Hett, C. and Tagliarino, N. (2018). *State of Land in the Mekong Region*. Centre for Development and Environment, University of Bern and Mekong Region Land Governance. Bern, Switzerland and Vientiane, Lao PDR, with Bern Open Publishing. 209 pp.

MAF. 2019a. *Benzoin at the Forest-Fallow Interface: Options for Promoting Sustainability in Long-Rotation Systems*. Policy Brief No. 005. Ministry of Agriculture and Forestry: Vientiane.

MAF. 2019b. *Securing National Sustainable Development and Conservation Goals through Local Land Use Planning*. Policy Brief No. 004. Ministry of Agriculture and Forestry: Vientiane.

Ingalls, M. L., C. Hett, P. Thanasack, K. Phouyyavong, R. Bernhard, Y. Chanthasumlet and P. Philakone. (2019). *New directions for participatory land use planning: Can bottom-up approaches achieve a win-win for sustainable development and forest conservation?* NAFRI Research Brief No. 002. Ministry of Agriculture and Forestry and the Centre for Development and Environment, University of Bern: Vientiane.

Source of quote on title page: Williams, Terry Tempest. (2019). *Erosion: Essays of Undoing*. Sarah Crichton Books.

Source of closing quote: Attributed to Dr. Vandana Shiva, Indian scholar and environmental activist.



CHAPTER **3**

A JOURNEY THROUGH THE UPLANDS: Agro-biodiversity and multifunctional landscapes

“We brought with us only the essentials: our words, our ancestors, our hands, and our hunger. We nourished ourselves with stories, soil, rituals, and hunting. We learned to fear Tiger, who is the Demon King of Illusions, and to love Squirrel, who—like us—is chased by his enemies from all directions but never caught: because Squirrel knows how to hide in plain sight.”

– Lisa Lee Herrick



Village land use plans tell us vital stories of farmers' relationships to their land and the value they derive from it. The plans that grew out of TABI's forest and land use planning process offer us insights into the range of socio-economic and environmental functions of land that upland farmers most value.

In this chapter we dwell on the multifunctionality of upland landscapes, and learn from TABI's investments in agro-biodiversity species and habitats that farmers prioritized. We invite you to accompany us on two walks through multifunctional landscapes. You will hear farming families describe their lands and forests in transition, the many functions and uses they derive from them, the opportunities they see emerging, and their plans and dreams for the future.

Through this journey we learn how nurturing agro-biodiversity in multifunctional landscapes helps us navigate a path through some of the dilemmas and contradictions the agrarian transition presents in Laos. And we think about the lessons this holds for the future of farms and upland farmer livelihoods for a regenerative and resilient rural economy.

THE WONDER OF MULTIFUNCTIONAL LANDSCAPES

Between 2011 and 2018, TABI's land use planning field teams worked closely with local communities in the uplands of Houaphanh, Luang Prabang, and Xiengkhouang provinces to create village level forest and agricultural land use plans. Their starting point was the identification of existing functions and uses that people derived from forests and agricultural lands in their village. The diversity of land use was striking. The 49 land use categories and 200 sub-categories identified presented a powerful testament to the wide range of functions, services and uses these rural landscapes provide. They offer us insights into the ways in which communities interact with the natural resources distributed across their landscape, and they surface local opportunities to build sustainable and resilient agro-biodiversity-based livelihoods.

Upland farmers have shaped their landscapes through generations of shifting cultivation practices. These landscapes perform many closely inter-related socio-economic, environmental, and spiritual functions – promoting food and livelihood security, maintaining productive and environmental sustainability, and contributing to a resilient rural economy. We refer to this as **landscape multifunctionality**. While the term sounds complicated, it is a simple concept, central to human interaction with the natural world and to nurturing high levels of agro-biodiversity. Figure 3.1 below is a rudimentary attempt to depict the multiple functions and services from agro-biodiverse landscapes that upland communities have highlighted in the course of TABI's agro-ecological assessments, forest and land use planning process,

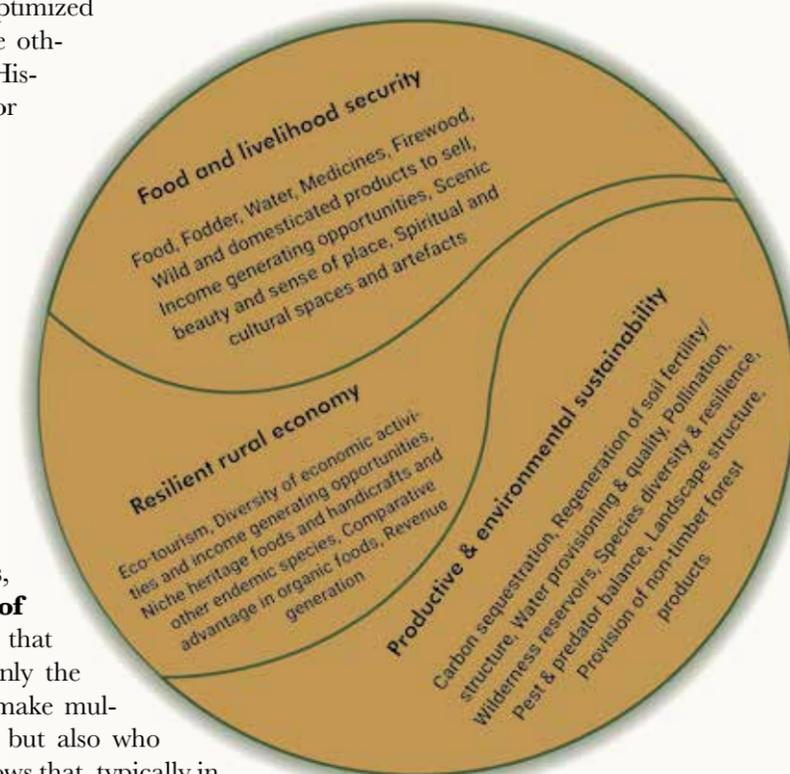
and during our research for this book.

The Figure shows an impressive range of functions by any measure. In the uplands, this multifunctionality is born from the overlap between farmers' agricultural practices and their interactions with forest systems. At a higher scale, this kind of integration of agriculture and conservation in multifunctional landscapes is also linked to a greater supply of ecosystem services, such as low carbon emissions, rich biodiversity, and resilience to changing weather patterns.

But, the ecological **value¹⁸ of landscape multifunctionality** is controversial. Advocates of “land-sparing” approaches, driven by poverty reduction targets and the need to maximize food production from limited land to feed growing populations, often favor the separation of landscapes into two “monofunctional” entities – one optimized for agricultural production and the other for biodiversity conservation. History has shown that preferences for “land-sparing” tend to be stronger in countries shaped by frontier cultures. However, people who have long histories on the land they inhabit, such as indigenous populations like upland farmers in Laos, tend to favor “land-sharing” – the integration of agriculture and conservation within multifunctional landscapes. We see this tension play out in the uplands.

Beyond these ecological functions, we have **social dimensions of landscape multifunctionality** that often go unrecognized. It is not only the nature of benefits generated that make multifunctional landscapes interesting, but also who receives those benefits. Research shows that, typically in multifunctional landscapes, a more diverse set of ecosystem services is accessible to a broader range of beneficiaries than in monofunctional landscapes. The benefits flowing from these ecosystem services are usually experienced more locally, and local people are more likely to be in charge of landscape management (Fischer *et al.*, 2017). This is in sharp contrast to monofunctional landscapes that are optimized for the “production” of crops. The benefits from these landscapes tend to flow to a few privileged or distant powerful actors, and the products are often exported beyond national

Figure 3.1: Functions performed by agro-biodiversity landscapes. (Source: Original depiction)

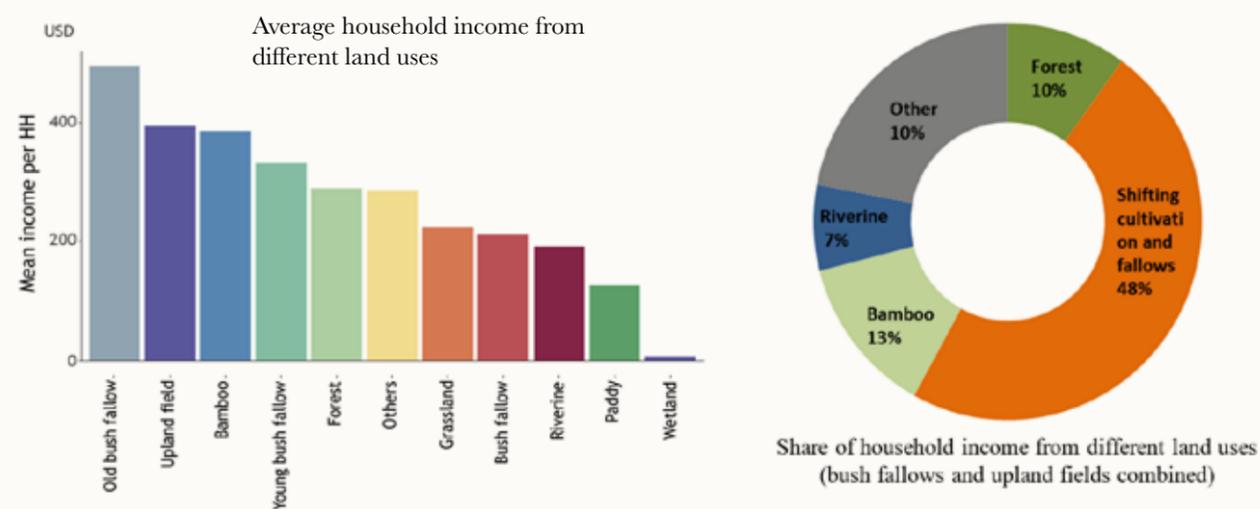


¹⁸ The level of benefits that the space, water, minerals, biota, and all other factors that make up natural ecosystems provide to support native life forms.

borders. People in these ecosystems then tend to import goods generated in ecosystems elsewhere to satisfy their own needs, reinforcing a separation between people and their local landscapes and ecosystem services.

As TABI's interest was in nurturing agro-biodiversity, as well as reducing poverty among upland farmers, our story weaves around both the nature of services generated through multifunctional landscapes, as well as who benefits and how their lives are improved. Once again, the regenerative principles of agro-biodiversity that we uncovered in Chapter 1 serve us well in understanding multifunctional landscapes. Understanding people's existing practices, local challenges and solutions, and their broader values and knowledge systems, helps us appreciate both these social and ecological dimensions. This is not a prescription for all landscapes to be multifunctional, but in the uplands of Houaphanh, Luang Prabang, and Xiengkhouang, TABI data shows that multifunctional shifting cultivation fields and fallows contributed more to household incomes than forests and permanent agriculture fields. Figure 3.2 below, drawn from this data, shows household income from different land uses. Shifting cultivation fields and fallows contribute 48 percent of household income. This makes these multifunctional landscapes a central piece of our story.

Figure 3.2: Household income from different land uses. (Source: CDE)



INVESTING IN AGRO-BIODIVERSITY - TABI'S SUB-PROJECTS

The land use plans that communities developed with TABI's support represent people's development vision for their village. Along with land use allocations, these plans contain insights about the natural resources, species and habitats they most value and the development activities and investments in which they are most interested. In this way, the village land use plans are a good record of investment opportunities related to agro-biodiversity activities, products, skills, and markets. TABI chose to build on these plans, inviting agro-biodiversity related investment proposals from villagers in collaboration with their district and provincial agriculture and forestry offices. The activities in these proposals spanned a wide range, including, for example, domesticating forest products, protecting particular strains of indigenous species, improving fallow management, enhancing capacities for production, quality, and marketability of local produce, and strengthening prioritized agro-biodiversity value chains to enable their commercialization with equitable benefits for upland farmers. In many cases, the work proposed on specific agro-biodiversity species was intended to help farmers transition from annual to perennial agricultural systems¹⁹ by domesticating forest products or integrating perennial crops, forage or trees in diverse farming systems.

Based on these proposals TABI provided small grants for local sub-projects managed by district or provincial agriculture and forestry offices. Most sub-projects focused on a particular agro-biodiversity species. Given TABI's overall mandate to improve livelihoods and contribute to poverty alleviation, the selection of sub-projects was guided by their potential to contribute to farmers' incomes, with particular attention to including activities in which women play an integral role. The mechanism through which TABI transferred and managed these grants was called a "**Sub-Project Agreement**", which was signed by TABI and the district or provincial agriculture and forestry offices. In some cases, these sub-projects were designed as pilots that could later be scaled. In other cases, they served as action research opportunities (even though they may not have been designed to be research-oriented at the start) to surface indigenous knowledge and learn from local experimentation. Many of the sub-projects were based on ongoing local or traditional activities that could benefit from product improvement, knowledge enhancement, or market linkages. The choice to support local experimentation instead of following a blueprint approach was well suited to the complexity of agro-biodiversity where solutions and possible options were not all known at the start. In addition, funding a large number of sub-projects at the start and then later culling them down to a selected few offered the chance to test or prototype new ideas and solutions, a process well suited to addressing complex problems.

¹⁹ Perennial species (crops, forages, shrubs and trees) are those able to regrow and continue to reproduce grains, seeds, fruits and biomass after a single harvest. Perennial agriculture systems aim to integrate perennial species in diverse farming systems, landscapes and agro-ecosystems.

And so it was, that over a ten-year period (from 2010 to 2020), TABI supported local initiatives led by government counterparts related to the conservation and commercialization of priority species and enhancing and sharing related knowledge. Support given to these community initiatives ranged from US \$500 to \$3,000 and focused on more than 30 species and habitats encompassing a wide range of themes, spread over 1,275 villages in three provinces, involving more than 66,800 households. Each sub-project included an intensive body of work that built on ideas emerging from village land use plans. Each tells a heartening and sometimes challenging story of change and has left behind valuable lessons. Importantly, most of these sub-projects have opened the door to new agro-biodiversity opportunities and innovations. They have contributed to positive outcomes such as improved production, better food security, enhanced nutrition, increased income and better integration with markets. The cards on pages 75 to 81 are an invitation to dive into a sample of TABI's sub-projects, and the annex at the end of the book has a more complete list showing the range and scale of these investments.

Activities for almost all sub-project agreements were managed by provincial and district agriculture and forestry offices, along with a few by national research and other government agencies. They were a direct and visible way to channel resources to provincial, district and village levels, and to test agro-biodiversity-related livelihood strategies to improve the income and asset base of upland farming households. They also offered a concrete opportunity for provincial and district agriculture and forestry offices to engage intensively with communities they supported, and in the process the sub-projects helped build the capacities, ownership, and commitment of local agriculture and forestry staff to support agro-biodiversity. These projects and their spread across the uplands were instrumental in drawing greater attention to the importance of agro-biodiversity.

The provincial agricultural plans from this period are testament to the growing attention to agro-biodiversity. Ms. Phonvannh Inthavong, Deputy Director of the Department of Industry and Commerce in Houaphanh province, says that their department, in collaboration with the Provincial Agriculture and Forestry Office (PAFO), now promotes all biodiversity-based products that yield a good income for farmers. Their plans include facilitating relationships between producers and buyers thereby encouraging small and medium enterprises to produce higher quality products for both local and international markets. In Xiengkhouang province, Mr. Bounhome Thedthany, Deputy Director General of the PAFO, says that they plan to continue supporting the collection of mushrooms and medicinal plants in conserved forest areas. They also have plans to support farmers in the bamboo sector to generate income and produce more for consumption. The Department of Industry and Commerce is convinced that there are many agro-biodiversity products with marketing potential. They particularly view khao kai noi rice and Phou san tea as high priority commodities. In many ways, these localized investments through TABI's sub-projects have served as a platform to engage other actors to work with communities around specific agro-biodiversity opportunities, investments and research.

By 2017, through this mechanism of sub-project agreements, TABI had supported experiments with 25 agro-biodiversity strategies to promote the sustainable management of natural resources and to improve farmer livelihoods. These strategies helped spread TABI's footprint, and they were instrumental in generating greater awareness of the importance of agro-biodiversity. But as TABI spread and evolved, this approach needed adjustments. While the breadth of strategies in the early years provided an inclusive umbrella to test a range of different activities, it also amplified some constraints in the operating environment, among them the tendency toward a project-focused, piecemeal approach. In the case of the sub-project agreements this translated to an over-emphasis on short "single commodity focused" micro projects, but a limited understanding of agro-biodiversity and its principles. Some members of the TABI team reflect that this left little room for long-term strategy, investment in learning, or in developing feedback loops to tailor the nature of support to farmers' evolving needs. Conventional extension methods used by most District Agriculture and Forestry Offices (DAFOs) tended to focus on the provision of inputs, top-down training, and model farmer extension, with limited capacity for participatory approaches or facilitating collaboration with other projects and organizations. It was thus challenging to recognize and address systemic issues such as emerging policy and institutional constraints or power imbalances in skewed markets.

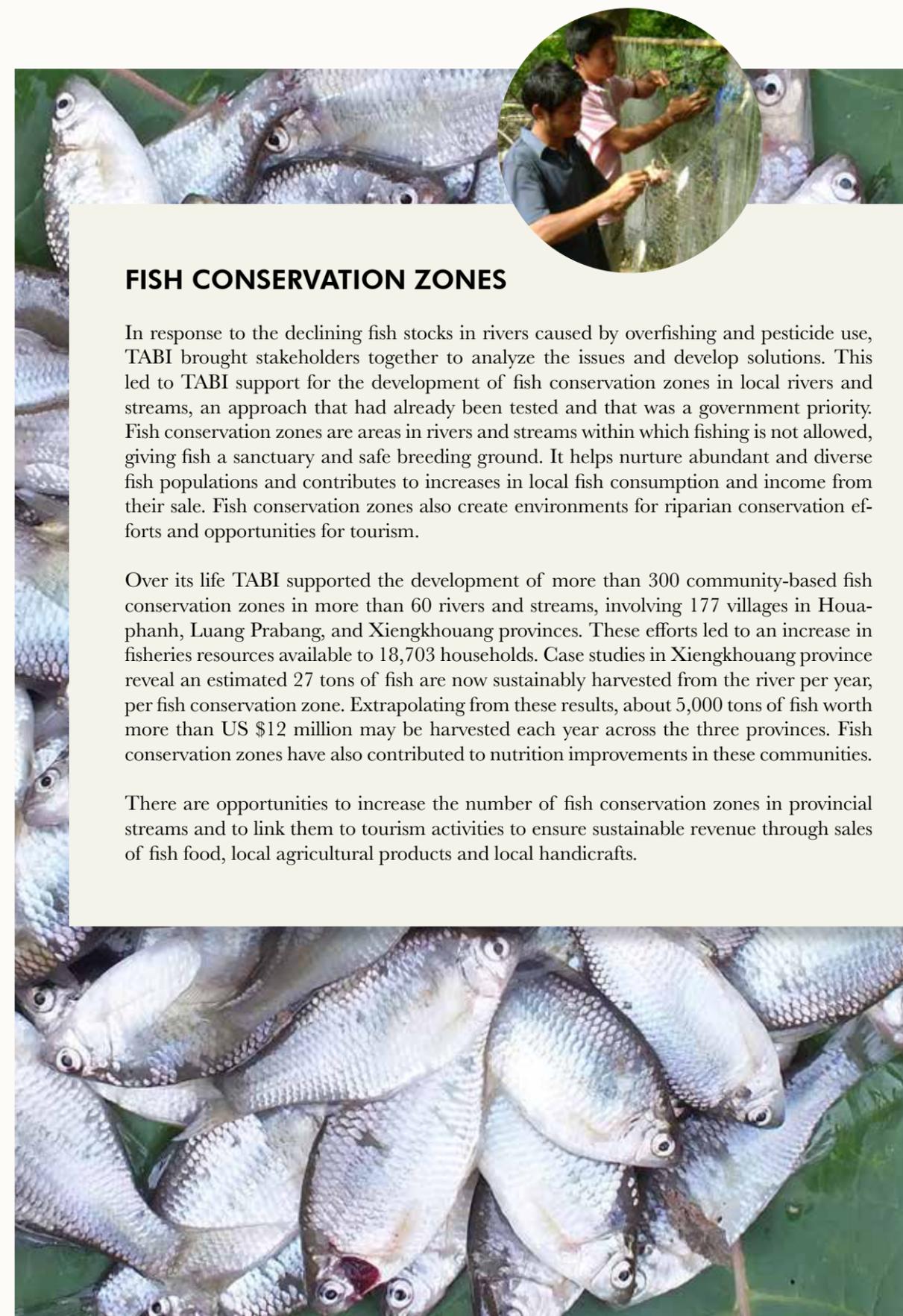
In response to some of these issues, in its last phase TABI attempted two important shifts: The first was moving sub-project support from a piecemeal, project-focused approach to working in a more systemic way. The second shift was clarifying TABI's agro-biodiversity approach as distinct from the broad realm of sustainable agricultural practices. In practice, this meant:

- Focusing on a limited number of carefully selected strategies and commodities that had demonstrated successful outcomes and strong potential to improve livelihoods;
- Inviting collaboration for these strategies from a wider range of stakeholders across the system including non-governmental, private sector, research, and advocacy organizations;
- Articulating a longer-term vision linked to these strategies;
- Paying greater attention to learning and higher-level outcomes than to project activities and fund accounting; and
- Putting more emphasis on indigenous species and their interconnectedness, and capitalizing on an emerging resurgent interest in Lao biodiversity and indigenous foods.

This change in approach began to shift the focus of attention in meaningful ways. For example, in supporting wild tea farmers, there was a distinct attempt to move beyond land use planning and zoning for tea to land registration, processing and marketing. In working with honey farmers, sub-projects were adapted to go beyond the provision of technical inputs and micro-project marketing to include farmer-to-farmer action research, value chain analysis, and support for the creation of a honey producers' network. For fish conservation zones, there was a shift in emphasis from ground level organizing around rules and regulations to greater attention to networking,

participatory action research, and the development of community fish hatcheries. This shift in approach had important implications for the nature of TABI's relationships and collaboration, and we will reflect on this further in Chapter 4. It also encouraged an element of iteration and adaptation, building on lessons from earlier work. And while the sub-projects still had a commodity focus, greater attention to agro-biodiversity opened the space for conversations and learning about indigenous species, their interconnectedness, and the value of multifunctional landscapes.

In hindsight, we observe that these adjustments in TABI's approach - greater attention to diversity and interconnectedness of species, people and organizations; enhanced capability for iteration and adaptation in evolving livelihood strategies; more support for farmers to connect across scales; and attention to learning and knowledge - were in alignment with the regenerative principles of agro-biodiversity that permeate our story. Some of the TABI team reflect that this shift to a more systemic approach may have come too late in TABI's life to fully realize its intent in the time remaining. This is an important reflection on what it takes to work in systemic ways and we will explore it more fully in Chapter 4.



FISH CONSERVATION ZONES

In response to the declining fish stocks in rivers caused by overfishing and pesticide use, TABI brought stakeholders together to analyze the issues and develop solutions. This led to TABI support for the development of fish conservation zones in local rivers and streams, an approach that had already been tested and that was a government priority. Fish conservation zones are areas in rivers and streams within which fishing is not allowed, giving fish a sanctuary and safe breeding ground. It helps nurture abundant and diverse fish populations and contributes to increases in local fish consumption and income from their sale. Fish conservation zones also create environments for riparian conservation efforts and opportunities for tourism.

Over its life TABI supported the development of more than 300 community-based fish conservation zones in more than 60 rivers and streams, involving 177 villages in Houaphanh, Luang Prabang, and Xiengkhouang provinces. These efforts led to an increase in fisheries resources available to 18,703 households. Case studies in Xiengkhouang province reveal an estimated 27 tons of fish are now sustainably harvested from the river per year, per fish conservation zone. Extrapolating from these results, about 5,000 tons of fish worth more than US \$12 million may be harvested each year across the three provinces. Fish conservation zones have also contributed to nutrition improvements in these communities.

There are opportunities to increase the number of fish conservation zones in provincial streams and to link them to tourism activities to ensure sustainable revenue through sales of fish food, local agricultural products and local handicrafts.



LITTLE CHICKEN RICE (*Khao Kai Noi*)

Laos is known for its rich rice biodiversity that includes both upland and lowland, glutinous and non-glutinous rice varieties. In a country that is dependent on rice, having a diverse mix of different maturity rice species also helps distribute labor needs and mitigate climate risks. *Khao kai noi* (KKN) is a traditional lowland variety of rice that grows only in special upland environments in Xiengkhouang and Houaphanh provinces. Its popularity is growing in and beyond Laos as an organic rice with a unique taste and aroma. It has six distinct strains, each with different characteristics.

With the National Agriculture and Forestry Research Institute (NAFRI) and PAFO, TABI supported farmer-level seed production to build a decentralized, locally-managed provincial clean seed system for KKN in Xiengkhouang and Houaphanh provinces. This included support for production, packaging and marketing of high-quality breeder seed, foundation seed and registered and certified seeds. Clean seeds can boost yields by 20 percent and provide better quality produce. TABI used a socially inclusive approach, supporting spontaneous farmer-to-farmer seed flows. In Xiengkhouang and Houaphanh provinces, more than 400 farmers from 80 households and 13 farmer groups in as many villages now produce more than 20 tons of high quality KKN rice seed per year for farmers, benefiting 24,143 households across 626 villages. Working intensively across two provinces and involving NAFRI in these efforts has brought additional recognition to the conservation of rice landraces in Laos and has tested an approach that may serve as a model for Laos and other countries.

In future, there are opportunities to: expand the popularity of KKN as a high quality rice unique to Laos; capitalize on the special environments in Houaphanh and Xiengkouang provinces to expand production of KKN; and utilize the newly registered Geographical Indication for the registration of KKN for market expansion.

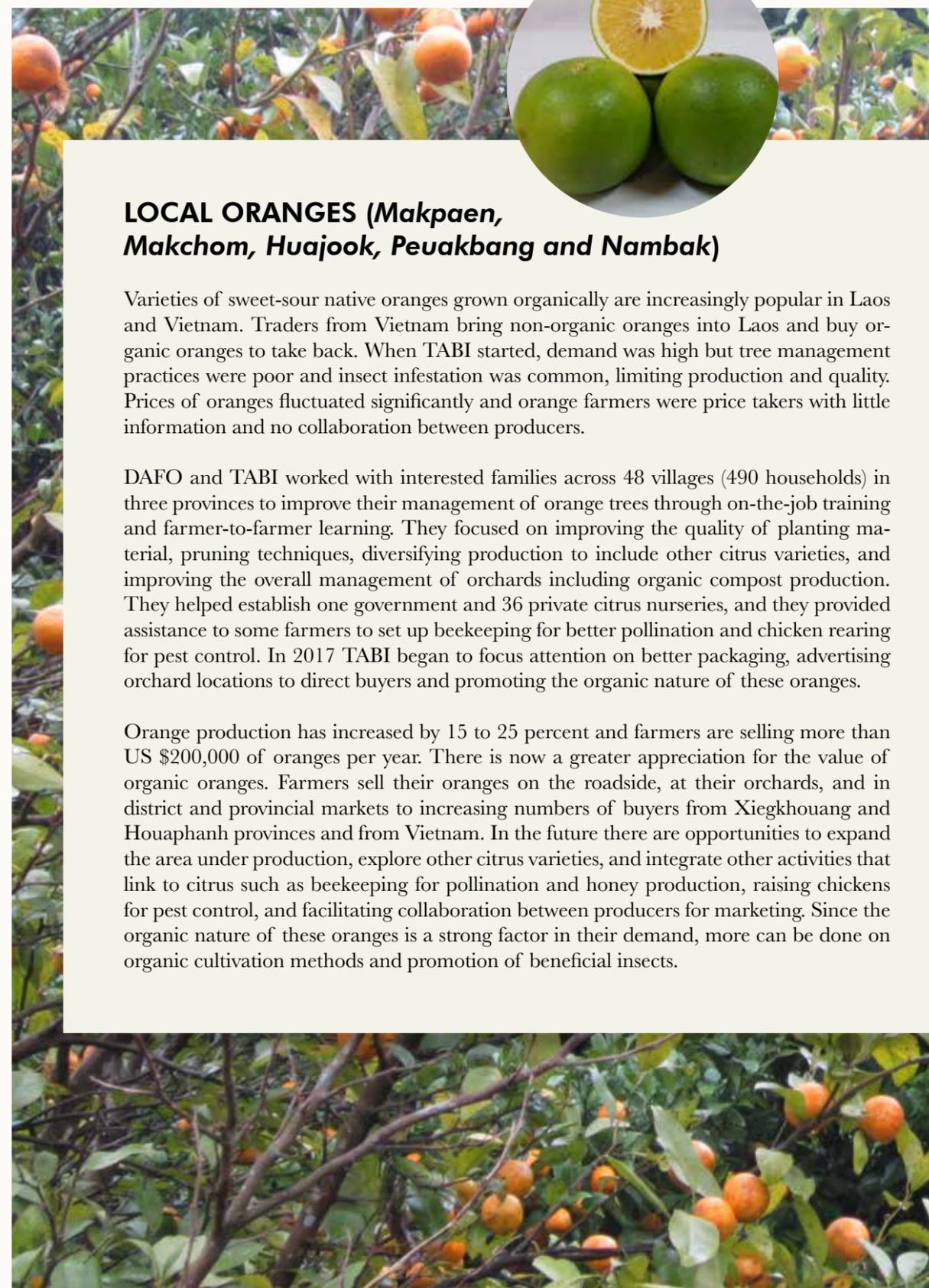


LOCAL ORANGES (*Makpaen, Makchom, Huajook, Peuakbang and Nambak*)

Varieties of sweet-sour native oranges grown organically are increasingly popular in Laos and Vietnam. Traders from Vietnam bring non-organic oranges into Laos and buy organic oranges to take back. When TABI started, demand was high but tree management practices were poor and insect infestation was common, limiting production and quality. Prices of oranges fluctuated significantly and orange farmers were price takers with little information and no collaboration between producers.

DAFO and TABI worked with interested families across 48 villages (490 households) in three provinces to improve their management of orange trees through on-the-job training and farmer-to-farmer learning. They focused on improving the quality of planting material, pruning techniques, diversifying production to include other citrus varieties, and improving the overall management of orchards including organic compost production. They helped establish one government and 36 private citrus nurseries, and they provided assistance to some farmers to set up beekeeping for better pollination and chicken rearing for pest control. In 2017 TABI began to focus attention on better packaging, advertising orchard locations to direct buyers and promoting the organic nature of these oranges.

Orange production has increased by 15 to 25 percent and farmers are selling more than US \$200,000 of oranges per year. There is now a greater appreciation for the value of organic oranges. Farmers sell their oranges on the roadside, at their orchards, and in district and provincial markets to increasing numbers of buyers from Xiengkhouang and Houaphanh provinces and from Vietnam. In the future there are opportunities to expand the area under production, explore other citrus varieties, and integrate other activities that link to citrus such as beekeeping for pollination and honey production, raising chickens for pest control, and facilitating collaboration between producers for marketing. Since the organic nature of these oranges is a strong factor in their demand, more can be done on organic cultivation methods and promotion of beneficial insects.





RIVER WEED (*Khai phaen*)

Between January and March, when the river runs cool and clean in Luang Prabang, light green river weed (algae) appears on river rocks, growing to between 40 and 80 centimeters long. Local communities collect, wash and spread it in thin sheets on bamboo or mesh trays to dry and they add spices and herbs before storing it. The sheets are fried crisp and usually consumed with sticky rice for breakfast and in restaurants for all meals. It is a rich source of protein, vitamins B1 and B2, and it has high levels of calcium and selenium (an important anti-oxidant). Its fiber content is the same as common green leafy vegetables. Other herbs and dried vegetables are sometimes added for additional flavors and nutrients. The production and marketing of crispy river weed is an important economic activity for women in the uplands.

TABI supported farmers to improve washing and drying methods, and this intervention was later taken up and continued by other projects, including a Korean project at Souphanouvong University. TABI also facilitated farmer exchanges, inviting farmers from Luang Prabang to train farmers from Phoukout district in Xiengkhouang province. Through its sub-projects TABI and DAFO helped 2,227 families in 24 villages improve their river weed collection and processing for a better quality product. They also supported farmers with marketing and sales. With the support of a food entrepreneur, a particularly innovative approach was tried to remove sand and other impurities, using washing machines to wash the river weed.

More work is needed around river weed habitat protection and in exploring production in new areas or through different methods. As water quality has been decreasing due to upstream dams, construction and agricultural pesticides, the end line processors of river weed are seeking new sources. Rehabilitation of existing streams is possible and should be a priority activity in the future as communities work together to address these challenges.



WILD MUSHROOMS (*Het kordeng, Het bee, Het wai, Het poak, Het khon khao, and Het kan chong*)

Due to the rich ecological landscape and biodiversity of Laos, wild mushrooms grow naturally in the uplands and have been collected by upland communities for generations based on their deep knowledge of these species and mycelial networks, their habitats and ecological interactions. Many of these mushrooms are in high demand for their good taste and nutritive value and others for their medicinal properties. There is a scarcity of scientific records of the edible and medicinal mushrooms of Laos. There are, however, estimates that at least 100 species are eaten by Lao people. During the rainy season a very lucrative mushroom sector awakens in Laos with roadside markets springing to life and a wide variety of special seasonal mushroom dishes available in restaurants. Mushrooms offer a lucrative economic opportunity for upland farmers lucky enough to be part of this network. Women play an important role in mushroom collection and sales, and in the selection of mushrooms to eat at home.

Through the sub-projects, TABI worked in 15 villages with 1,530 households in Xiengkhouang province to help them conserve and exploit the potential of wild mushrooms. Through the forest and land use planning process, communities developed forest management plans that included specific protocols for mushroom conservation and harvesting. This helped reduce potential conflicts over mushroom harvesting within and between communities. The organization of farmers around mushroom conservation and management has also led to coordination for improved negotiations with Chinese or Vietnamese middlemen who seek the highest value mushrooms.





BENZOIN (*Ton Yarn*)

Lao benzoin is the resin extracted from the *Styrax Tonkinensis* tree and is used in perfumes, incense and other oriental herbal medicines. It is also known as “Siam Benzoin” and is considered the highest grade of benzoin, in high demand because of its exceptional scent. It grows in the highlands of Laos as a late emerging species in rotational agriculture systems. Its resin can begin to be tapped in the sixth or seventh year of growth. It is managed as both a communal or private tree. Marketing of benzoin is monopolized in Laos by a few main buyers and middlemen who control prices, and farmers have typically had low negotiating power.

TABI helped communities identify specific areas for benzoin production in forest and land use management plans in nine villages in Luang Prabang province involving 728 households. Thirty percent of the participating farmers were women. Through the sub-projects, TABI helped improve the management of trees for a better quality product that commands a higher price. Farmer producer groups were set up to strengthen their negotiating power with buyers. Typically, men took the lead in harvesting benzoin resin from high up in the trees and women focused on sorting, cleaning, and quality control.

There are several opportunities to improve the production, management, and timely harvesting of benzoin trees and to obtain better benefits for upland farmers. These include ensuring secure tenure of land on which benzoin trees grow, strengthening benzoin producer groups and promoting their recognition by buyers. Among other opportunities are enhancing farmer negotiating power in interactions with buyers, exploring quality improvement mechanisms such as participatory guarantee systems that link producers to end users, and establishing a Geographical Indication for Lao benzoin. In addition, the identification of specific areas for benzoin production and management should continue to be encouraged in land use plans to allow for longer fallow periods required for high quality benzoin.



BAMBOO (*Mai Nor Loy and Mai Nor Lai*)

Bamboo is a perennial grass species that provides significant nutritional, income and material benefits to local communities without the need for replanting. It is important for the environment – protecting soils from erosion, creating microhabitats for a diversity of plants and animals, and sequestering carbon. It is considered one of the most economically important non-timber forest products for upland communities and is also socially and culturally important. The increasingly popular *nor loy* species of bamboo, valued for its special taste and hollow shoot, can be found only in dispersed locations in a few northern provinces.

TABI supported communities in eight villages, working with 260 households on two edible species (*mai nor loy* and *mai nor lai*) using two main strategies: The first was to support the sustainable preservation and management of natural bamboo forests to increase bamboo shoot production. The second was to help communities domesticate bamboo in homestead areas, along streams and rivers, in upland fallow land and in degraded forest lands. These strategies helped to increase forest cover rate and protect the environment, and they helped communities directly benefit from the sale of bamboo shoots and canes. TABI also supported bamboo producers to upgrade their bamboo processing skills, adding value at source and facilitating links to bamboo merchants within and beyond their provinces.

There are opportunities to expand *nor loy* production and links to market areas and to attain secure tenure of areas delineated for permanent *nor loy* production. Recent studies suggest there is a high and growing demand for *nor loy* shoots and opportunities for value-added processing. With better organization of marketing groups bamboo producers could access markets in distant towns.



A JOURNEY THROUGH MULTIFUNCTIONAL LANDSCAPES

We are going on a walk through agro-biodiversity-rich multifunctional landscapes in the uplands and we invite you to join us on one or both of the walks that follow. Our guides are farming families who know these hills and forests intimately. Colleagues from the local DAFO and the TABI team will also accompany us.

Paek District in Xiengkhouang Province, October 2019

Our walk begins at an altitude of 1,200 meters in Paek district in Xiengkhouang province. Over 90 percent of this district is mountains that reach more than 2,000 meters in elevation. We have gathered in a small wild tea (*cha pa*) nursery ❶ that local farmers have set up with support from the District Agriculture and Forestry Office. The region of northern Laos, parts of Myanmar, and Yunnan province in China are the origin of all tea trees everywhere, and so the story of this variety is one of the oldest tea stories in the world. From the time of the Tang dynasty this tea has been valued for its medicinal properties and it continues to be very popular in China. These tea trees stand tall in the forest with strong roots, as they did in ancient times.

About 10-15 years ago Chinese traders discovered that these wild tea trees were still abundant in the forests of northern Laos, and they began to source them from the forest, cutting whole trees to sell the tea in China. Realizing their value, local farmers also started taking a greater interest in the trees and began to propagate and harvest them more sustainably. During the participatory land use planning process in this village, farmers decided to allocate land to domesticate this species of wild forest tea. The community nursery is located at the center of this land, with farmer plots surrounding it. From a drone aerial view, it must look simply like a big tea orchard. The borders of the nursery and individual farmer plots are marked with orange paint on the trunks of trees.

The tea nursery has trees of different ages, ranging from a few months to seven years old. Our guides point to small tea saplings emerging at the base of the older trees. The area around each tree is clear, to allow these saplings to grow. In between the tea trees

farmers have planted cardamom (*mak neang pah*) that they also intend to market. It is appropriate to begin our walk here because tea is a big influence in their lives.

One of the farmers explains, *“In 2006, a Chinese trader came to buy tea. He brought a contract and deposited three million kip to get a three-year supply. He also taught us how to process the tea. Later, he helped us divide the area for planting tea trees, as there were only a limited number of wild tea trees in the forest. In 2008 or 2009 we planted small saplings in areas where we used to grow upland rice. By 2014, many of us replaced rice with tea fields. We can earn much more this way. Higher up, where you will walk later, the Khmu families still plant upland rice.”*

We are surprised by the height of the trees, much taller than tea bushes in plantations. He explains, *“For these tea trees, the taller and older they are, the better. We are learning which ones the Chinese pay a higher price for and during which seasons. That is how we know which ones are of high quality. Six years ago, I did not have any knowledge about tea. But now, I can close my eyes and taste the tea and I know which one is better. I can also tell the difference in quality from the thickness of the leaves, the quality of processing, and the age of the trees. Prices vary by season. In March we are able to get 30,000 kip a kilo. In April it may be 45,000. We share information about prices with each other, so we*

²⁰ These numbers may be used to navigate the landscape on pages 84 and 85.

²¹ The Khmu are indigenous inhabitants of northern Laos. It is generally believed that they once inhabited a larger area, and were forced to higher ground with the influx of Lao/ Thai people in the lowlands.

know what everyone is being offered.”

One of the women farmers points to their homes in the valley below... *“Because of this tea, we have been able to build cement homes and fit new roofs. We can buy a few things for our families. I have bought a motor-bike, which means we can transport the tea leaves quickly for processing. This is important for its quality. We are happy that this new road brought the Chinese traders to our village. After they trained us, many of us have set up roasting facilities so we are able to get a good price. Our forest tea has changed our lives.”*

Another farmer joins in... *“We are going to develop this nursery for more families to get involved so that we can propagate these special trees and increase our supply. Later we plan to register the special tea from our district, and market it to China for a higher price. While we do that, we could also grow some medicinal herbs or cardamom that they would like to buy,”* he says, pointing to bushes at the base of some of the trees.



Tea leaves and seeds

At the far end of the nursery, a few farmers are sorting tea tree seeds and discussing prices and grades of tea. One of them is worried about the new Chinese tea factory being built in the valley. He asks the others, *“When they start roasting in that factory, do you think there will still be demand for the tea that we process?”*

One of our guides hurries us along. He says, *“We can talk about tea forever, but it is time for you to go. These families are waiting to take you to the upland rice fields.”*

²² We were introduced to Lar, a 10 year old girl from a Khmu family, at the start of the book (Page ix).

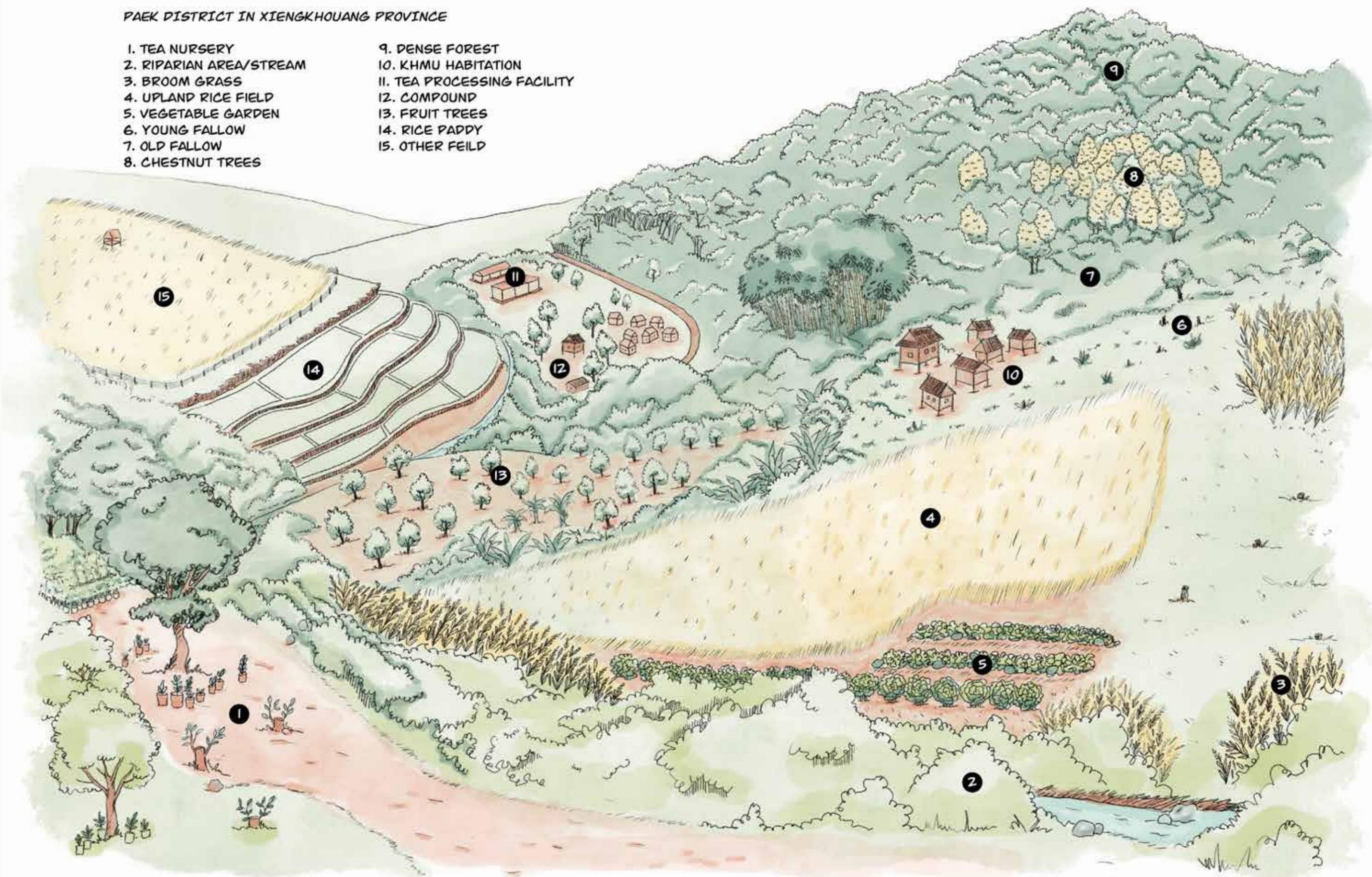
Lar's family²² and their neighbors have come to walk with us to their rice field. As we climb, we go through someone's tea field. This one has many herbs at the base of the trees and bamboo clumps dispersed throughout the field. At the end of the field, we skirt around a naturally wet area surrounding a fresh water stream. Lar's mother explains that this riparian habitat area ❷ is a patch of wilderness between fields that runs all the way up to the spring where the stream begins. It is a part of a wilderness corridor that the village has intentionally protected to allow animals, insects and birds a more natural habitat around the stream. These riparian areas are also important for frogs and certain insects that will keep other harmful pests under control, provide a source of food for the community, and help preserve the quality of the spring water. She points to a giant tea tree within the riparian reserve... *“Most of the old tea trees from the forest are gone, but we still have some of these old giants.”*

As we continue our climb, we pass a patch of broom grass ❸. Lar points it out to her mother. They tell us that broom grass from Laos (*dok khem*) has become quite popular, and Vietnamese traders come to their village once a month in search of a fresh supply during the harvest season. They pay a higher price if the florescences are harvested at the right time and dried well. Introducing her neighbor, Lar's mother explains that she is an expert broom maker. The expert smiles and tells us that she went to the broom making classes organized by TABI two years earlier. *“The brooms we make are more durable than most that we see in the market. Whenever we can we make brooms to sell. We can sell brooms for 30 kip per broom, but if we just sell the dry grass, we get only 5 kip per kilo. Broom grass grows in fallow areas a few years after cropping stops – we should see some more when we take you to the fallow fields.”*

We soon reach an upland rice field ❹. Lar's father tells us how happy they are to show us this field. They are going to harvest the rice later in the week, and they invite us to return for a gathering after the harvest. *“We will invoke the rice spirit and take the rice to our small granary,”* he

PAEK DISTRICT IN XIENKHOANG PROVINCE

- | | |
|-------------------------|-----------------------------|
| 1. TEA NURSERY | 9. DENSE FOREST |
| 2. RIPARIAN AREA/STREAM | 10. KHMU HABITATION |
| 3. BROOM GRASS | 11. TEA PROCESSING FACILITY |
| 4. UPLAND RICE FIELD | 12. COMPOUND |
| 5. VEGETABLE GARDEN | 13. FRUIT TREES |
| 6. YOUNG FALLOW | 14. RICE PADDY |
| 7. OLD FALLOW | 15. OTHER FEILD |
| 8. CHESTNUT TREES | |



says. “Not everyone in the village cultivates upland rice as many of the Lao Lum²³ and Hmong²⁴ farmers have now shifted to tea cultivation. We are Khmu people, and for us this rice is our life. When the village was doing land use planning, we were able to allocate some land here for us to grow upland rice and practice shifting cultivation. We Khmu families cultivate this area together.”

One of the ladies begins to tell us more about the specific varieties of rice they cultivate. She says, “We used to have many more varieties, but we have lost some of them. Our families were moved to this village from higher up in the forest, and we don’t have access to some of the land of our ancestors. But we still plant the most important varieties. The Khmu calendar is linked to the rice cultivation seasons. After the new year, the men prepare their tools, which need to be very sharp. They choose the cultivation area and clear the land, and we women decide which variety to cultivate. This depends on the shape of the land, the weather pattern, and the kind of soil in the area. If the land has just been cleared of big trees, we sow ‘tuup’. When young forests are cleared, we sow ‘phuuc’. If the land is relatively flat, we sow ‘im’²⁵. Next year, we will not plant in this field.”

The rice we see ready for harvest was planted in May. Along with the rice, they planted many vegetables in the field. The group of children tagging along begin to name them all – “cucumber (*mak deng*), yard-long bean (*thoua yao*), okra (*phak muak*), Indian spinach (*phak bang*), cabbage (*phak kad*), chilies (*mak phet*), different kinds of eggplants (*mak khouam*).” They have also just finished harvesting pumpkin (*ma euh*), and sweet sorghum (*oij liem*) that they sold to make sugar. They take us to the edge of the field and point to some more vegetables and herbs ⑤, “ginger (*king*), sponge gourd (*khadom*), bottle gourd (*maknam*), lemon grass (*huasikai*), taro (*peuk*), sweet potato (*mandang*).” As we walk along the edge of the field, we see some maize growing. We ask if they will sell it. They explain that this is sweet corn (*sali*), and they just grow

a little on the edge of their rice fields to eat.

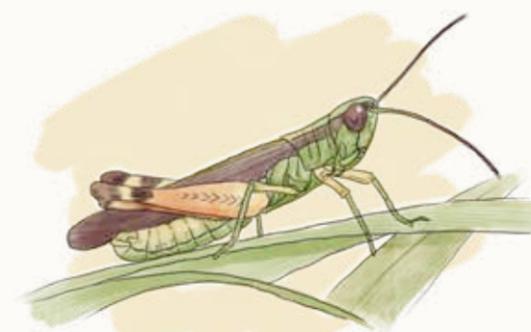


Taro plant

We walk on, and enter a young forested area. “This was the field from which we harvested rice last year. It is a young fallow ⑥,” Lar’s father explains. “We may get some twigs and firewood here, but we don’t come in here much, as we want it to recover.” There is some broom grass growing in this field and we ask if more will grow when they harvest this growth. The ladies explain, “It has been one year since we harvested rice here. We can harvest this growth of broom grass, and more will grow, but, after the third year, there will be no more broom grass until we use fire again.” They explain that, in a community one village over, they are trying to develop a broom grass nursery so that they can produce larger quantities (of domesticated broom grass). Our guides are not sure it can be grown in this way, but they will visit the neighboring village to find out more. The children start telling us about other useful things they find in the young fallow including grasshoppers (*dakadan*), rats (*nu*), snakes (*gnu*), dung beetles (*jujui*), mole crickets (*jinai*), Asian giant hornets (*tordan*), weaver ants (*motdang*), and termites (*buak*).

We walk on to a more forested area - an older fallow (or secondary forest) ⑦. This was a field from which they had harvested rice two years earlier. We see some more broom grass here, and older trees. They explain that they will clear this land the following year to plant rice, as they currently have only three rotational fields. They would like to have more to properly allow the soil to recover and to be able to collect species like the rosy russula (red) mushroom (*het*

kordeng) that appears only on fallows older than five years. They point to some fields on the next hill over, where a few families from the village had been growing maize to sell over the past few years. They were getting a good price when they started, but the soil is now bad. “There is some discussion in our village to bring that land back into rotation. It is also an area where a special type of bamboo (*nor loy*) used to grow, and since there is now high demand for *nor loy*, we want to have a plot where we can grow and protect it for a more productive and sustainable harvest.”



Grasshopper

One of the older farmers begins to talk about mature fallows. “Where we lived earlier, we had six or seven rotations. If we have more rotations, we can gather enough firewood to meet our needs, and timber for pillars for our homes.” Some of the others start talking about other species they find in mature fallows and lament the fact that they are slowly forgetting about them.

Lar’s mother explains the value of older fallows, “If we keep the land fallow for longer, it recovers better and we don’t have so many weeds. The forests on older fallows are very useful to us. We get food from them, like bamboo shoots, wild plants, insects, and wild animals. There are many useful herbs, such as betel pepper (*pu laan*) for toothaches, Indian borage (*bi huseua*) and malabar tree (*puakmuak*). We can sell some of these.”

We can relate to her description of the importance of these areas – TABI’s data tells us that 21 percent of the non-timber forest products

collected in TABI areas are from young and old bush fallows. Lar calls out to her mother excitedly. She has found the herb used for stomach aches that she learned about at school.

We keep walking... I am still thinking about the mushrooms that will emerge after five years... I imagine a magical mycelial network under the ground on which we walk, growing, connecting, strengthening over five years, waiting to push out this special *het kordeng* mushroom. Noting my interest in mushrooms one of the younger farmers points to a densely forested area higher up, one of four that the village has designated for mushroom picking. “Those trees you see there, they are chestnut (*makkaw*) trees ⑧. After the second rain we get the red mushrooms growing under the chestnut tree. We pick many other wild mushrooms in that area. Some people in the valley sell them in the district market, and others even dry and sell them to the Chinese trader.” He starts naming some of the mushrooms they pick, “Split gill mushroom (*het bee*), jelly ear mushroom (*het sanoon*), tiger lentinus mushroom (*het kadang*), termite mushroom (*het puak*), rose mushroom (*het kordeng*), and white king bolete mushroom (*het phung*).” They eat some of these or sell them in the district market. They dry the split gill, jelly ear, and rose mushrooms to sell to the Chinese trader, who trained them in drying and storing mushrooms. There is a heavy demand for them in China for medicinal purposes and they bring a high price. The young farmer says, “Our whole family goes to collect mushrooms. While we are there, we also collect other herbs and bamboo shoots. For now, the village has developed regulations to collect mushrooms in just one area, but we have a plan to develop the regulations to collect from four areas.”

He goes on to explain that they noticed that the forest products that people were collecting to sell such as Vietnamese ginseng (*bombigating*), herb paris (*homsammeang*), and orange solomon’s seal (*bompakwan*) were disappearing, and so they are trying to manage them better by regulating their collection. Some species like *nor loy* can be domesticated and grown in areas closer to their homes if they protect them from cattle damage. “Since the road came, many people collect forest products to sell. But just because people want to give money for what we collect, it doesn’t

²³ Lao Lum, or Lao Thai are the predominant ethnic group in Laos known more generally as “Lao”.

²⁴ The Hmong are an ethnic group in East and South-east Asia, originally from the Yellow river region in China. They are one of three main ethnic groups in Laos.

²⁵ Local names for varieties of upland rice.

mean we should take them all out. Without them what will our lives be like? We are Khmu – we understand nature from earth to sky – we are part of it [pointing to the dense forest 9 in the distance]. That is why we are making plans to manage our collection better.”



Emerging mushrooms

We are now descending to a gently sloping area where the Khmu families of the village have built their homes 10 – they are made of bamboo and constructed on stilts. There is a stream on one side where a few children are fishing and catching frogs. Two ladies are gathering *khai mai*, a kind of river algae that grows on rocks in the stream. There is a small spring basin a little further down that looks like an area where they go to bathe or wash clothes. We see black pigs and red jungle fowl in an enclosure under the stilts of some homes. They explain that jungle fowl and pigs are especially important before the rice harvest, when they don't have grain.

There are a few fruit trees and wild flowers around the area. We notice bees buzzing around so we ask if they keep bees. An older farmer who is part of a bee-keeping group supported by TABI and the District Agriculture and Forestry Office volunteers to show us their new bee boxes in which they have the Asiatic honey bee. Their group is trying to organize better processing and packaging of their honey to sell in the provincial market. He says, “We have enough honey for ourselves... I am happy. But my son wanted to join the bee group and now they are talking about how to increase our production of honey, improve its quality, and sell it in Phonsavanh and Vientiane. In the processing center, they showed us how to remove the excess moisture and seal the

bottles. We also learned how to test the honey. They say that our honey enterprise is good for the bees too [he smiles]. Let's see what they do. Maybe people in Vientiane are waiting for our honey. I don't know.”



Giant honeybee

We say goodbye to our Khmu guides, and continue to descend down to the valley for a bit of a rest and tea with some of the tea farmers in one of their compounds. We are surrounded by plants and herbs, a passion fruit (*mak not*) vine, eggplant (*mak khouam*) bushes and some local chickens roaming around. At one end of the compound the family has built a tea processing facility 11 – dryers and roasters. Our host is brewing some forest tea on a little table, pouring out the first brew into a set of small cups. Sitting here in their compound 12, we look out west at the hills through which we just walked... the dense regrowth chestnut and bamboo forests; the mosaic of shifting cultivation fields - upland rice, and young and old fallows. Immediately to the north we see a field of fruit trees 13 and in the distance, the domesticated tea forests where we began our walk; the riparian buffer areas and their wilderness; the stream running down... each of these playing multiple functions for humans and other species and hosting a vast diversity of species and habitats important for food, medicine, income, recreation, spiritual practice, heritage, and providing important natural services. An adapting, shifting, productive mosaic that we now understand and appreciate so much more.

Our colleague from the District Agriculture and Forestry Office says, “I have been working with these communities for many years... we always talk about the tea, khao kai noi rice, and honey, because we support these commodities in this area. Today I was a student... I learned about what this land means to them, how they protect it. Without these efforts, we will lose so much.”

As we look out east, we see grazing lands for cattle fenced off from fields, and further down near

the river some paddy lands 14 and a natural riparian buffer near the water. The farmer in whose compound we are resting is talking about his village's growing interest in cattle, and how their community collectively allocated land for cattle grazing during the land use planning process. In the distance we hear the sound of a ken²⁶. A flock of swallows (*nok en*) is flying south for the winter. There is a clacking sound - the sound of the swallow trap closing. Perhaps the little birds will end up in the market or be part of their lunch later this week.

Houa Meuang district in Houaphanh province, January 2020

We begin our walk in the compound of Tou-Kue's²⁷ family in Houa Meuang district. After introductions and a welcome cup of tea she says she will first take us around their homestead. Five others from the village have joined us for the walk – some of them are members of an orange producers' group that TABI had organized.

We are standing in Tou-Kue's favorite part of the garden – a mini fruit orchard 1²⁸ behind their house. Nearest to the house there are several native plum (*makman*) trees – their white blossoms shining in the sun. Behind them, we see a selection of native pear (*makjong*), peach (*makhai*), mango (*makmuang*) and longan (*lamnyay*) trees. Further back they have the bigger jackfruit (*makmee*) and tamarind (*makkam*) trees. Around the corner on the side of the house, they have banana (*makguay*) and papaya (*makhung*) trees 2. These are all native varieties, but not found in the forest as they need sun to flourish. It was a cold night, but the sun has been out a while, and the bees are beginning to buzz around the plum blossoms. Tou-Kue points them out to us. Their family has been trying to keep two species of bees – Asian hive bees (*peung kon*) and giant honey bees (*peung louang*). We walk around to the side of the house to look at the new design of bee boxes 3 with multiple stacks that TABI and the District Agriculture and Forestry Office

had introduced. Her brother-in-law tells us that the bees love them. He describes the new practice they learned of introducing the bees to the hive, which seems to be working well. Our colleague from the district office explains that honey production has now increased significantly in this village, and they would like help to package and sell their honey.

Tou-Kue and her neighbor point to their citrus fields in the distance. With TABI and the District Agriculture and Forestry Office support, about four years ago they started growing oranges to sell. Her neighbor says, “Our children are all in the city now, and we don't have much help. When the district office said they could help us, we decided to grow orange trees because they are easier to manage.” The head of the orange group adds, “The Vietnamese love the variety of oranges we have, and ours are organic. They bring oranges to sell in Laos, but they are full of chemicals... and they want to take back organic oranges. Our oranges are special. When the organic market starts functioning in Sam Nue, there will be even more demand for our oranges.”

Tou-Kue hurries us along. She is eager to take us to their paddy fields. As we walk along the front of the house, we pass her mother-in-law tending to their vegetable garden, and picking herbs and leaves for the afternoon stew – cucumber (*mak deng*), lemon

²⁷ We were introduced to Tou-Kue, a young woman from a Hmong family, at the start of the book (Page viii).

²⁶ A local mouth organ with multiple pipes made of bamboo, commonly played by upland communities.

²⁸ These numbers may be used to navigate the landscape on pages 92 and 93.

grass (*huasikai*), and chilies (*makphet*). In one corner of the garden there are a few dragon fruit (*makmung kone*) vines. They tell us that many people in the village have started experimenting with growing dragon fruit. One of our guides points to the road we came in on, “When that road came in, a local market started to operate on the roadside two times a week. We are very close to the Vietnamese border, so now we try to sell a wider variety of things. We can walk past the market and show you.”

We walk along the road to get to the paddy field. The small market ④ is spread out on the side of the road and there are about a dozen customers. The villagers are selling all kinds of local vegetables and plenty of bamboo shoots of different sizes. One of the ladies in the group says, “Fifteen years ago, we would sometimes sell our pigs and buffaloes in the market, but could not sell vegetables. If we had extra bamboo shoots, we would just give them to our friends. Electricity came to our village in 1996, then the road came. We got the primary school and piped water and the irrigation system in 2006. There have been many developments. And now this market is here, and people are interested in buying our produce.”

As we reach the end of the market stretch, one of the vendors calls out to Tou-Kue, “Look, sister... I have laid out your bamboo shoots, too. We have had some customers.” Tou-Kue explains that she had collected some bamboo shoots early that morning and asked another farmer to sell them at the roadside market as she was going to be busy with our walk.

We are now on the edge of the paddy field ⑤. It is January and these paddy farmers are getting ready to sow irrigated rice, which they will harvest in June. The rain-fed rice is planted in June and will be



Plum fruit and flowers

harvested in October. One of our guides says, “Now that we have an irrigation system, we have two harvests a year. Since we can easily get it to the market, we decided to focus our efforts on this lowland rice. Our family no longer practices upland rice cultivation.”

There are a row of plastic covered low profile greenhouses laid out on the ground covering the seedbeds. Tou-Kue explains that this is how they germinate the rice seed. We peep under the plastic and admire the little rice seedlings. There are similar miniature greenhouses on all the fields. Tou-Kue says, “The next time you come, we may have these structures covering the entire field, with all kinds of local vegetables to sell in the district market or organic market in Sam Nue. People in this district are not able to get enough of these local herbs and vegetables from the natural wetlands. They used to grow everywhere before... not any more. But everyone needs these vegetables to eat with *laab*²⁹ and sticky rice.”

In the field, Tou-Kue’s husband and their neighbor are getting the field ready for planting. As they do this, they are harvesting China smilax root (*mat popeng*), tuber fleecflower (*man-o-ling*) and wild asparagus (*mat samsip*), which they will dry and sell to traders from Vietnam. They show us how they have split the field for the dry season, and planted vegetables in one section ⑥ – small cucumber (*makdenggua*), big cucumber (*makdenglai*), watermelon (*makmo*), chilies (*makphet*), onion (*homdeng*), and garlic (*krateum*). This is to sell in the district market. Intrigued already by the variety of food available from the rice field, we ask what other food their rice field produces. This leads to an animated conversation among our guides and a few others from the next field over.

“We have many different kinds of food at different times of the year. Now, in January, there are dung beetles (*jujuu*) and true water bug (*maakhang*). When we channel water into the field, frogs start to lay their eggs, so we also have frogs (*kob*), small

²⁹ A local meat dish

frogs (*kiet*) and tadpoles (*i-heuk*). When there is water in the field we have different kinds of fish in the rice field – mud carp (*pakinya*), tilapia (*panin*), Chinese carp (*panai*), common carp (*paffay*), catfish (*padouk*) and eels (*ein*).” They explain that the District Agriculture and Forestry Office has been working with them on breeding natural fish in their rice fields. From May onwards, the grasshoppers (*dakadan*) come, and from May to November, pond snails (*hojjub*) and cyclophorid snails (*hoyhom*). One of the young boys shouts gleefully, “And we also have crabs (*bu na*)!” We ask him, “Are you old enough to catch crabs?” His mother laughs, “He’s six... of course he can catch crabs. He could recognize them when he was 2! In July and August, it is easy to dig them out.”



Climbing dayflower

One of the women continues... “On the sides of the rice fields we plant sweet leaf gooseberry (*phakwan*), flowering fern – it is a medicine to cool the body (*phaknok*)– eugenia (*phaknek*), morning glory (*phakbong*), four leaf clover (*phakwen*), galanga (*phak khaa*), climbing wattle (*phak nao*), false daisy (*phak keep*), and climbing day-flower (*phak nyakap*). They all have different cycles but some of these plants are always there. We even sell some in the market on the road.” Seeing our surprise at the number of species they name, one of our guides explains, “Earlier, the advice to us rice farmers was to keep the borders of the rice field clean – we would cut down the weeds, thinking it would keep pests away. But now, from research, they have realized that the pests were not coming from these borders. The good insects that control the pests live here. [She laughs]. If we have diverse plant species on these borders, it creates a wilderness area of good

insects that help control the pests in the rice field.” Our colleague from the district office smiles. He says, “I could not have said it better.”

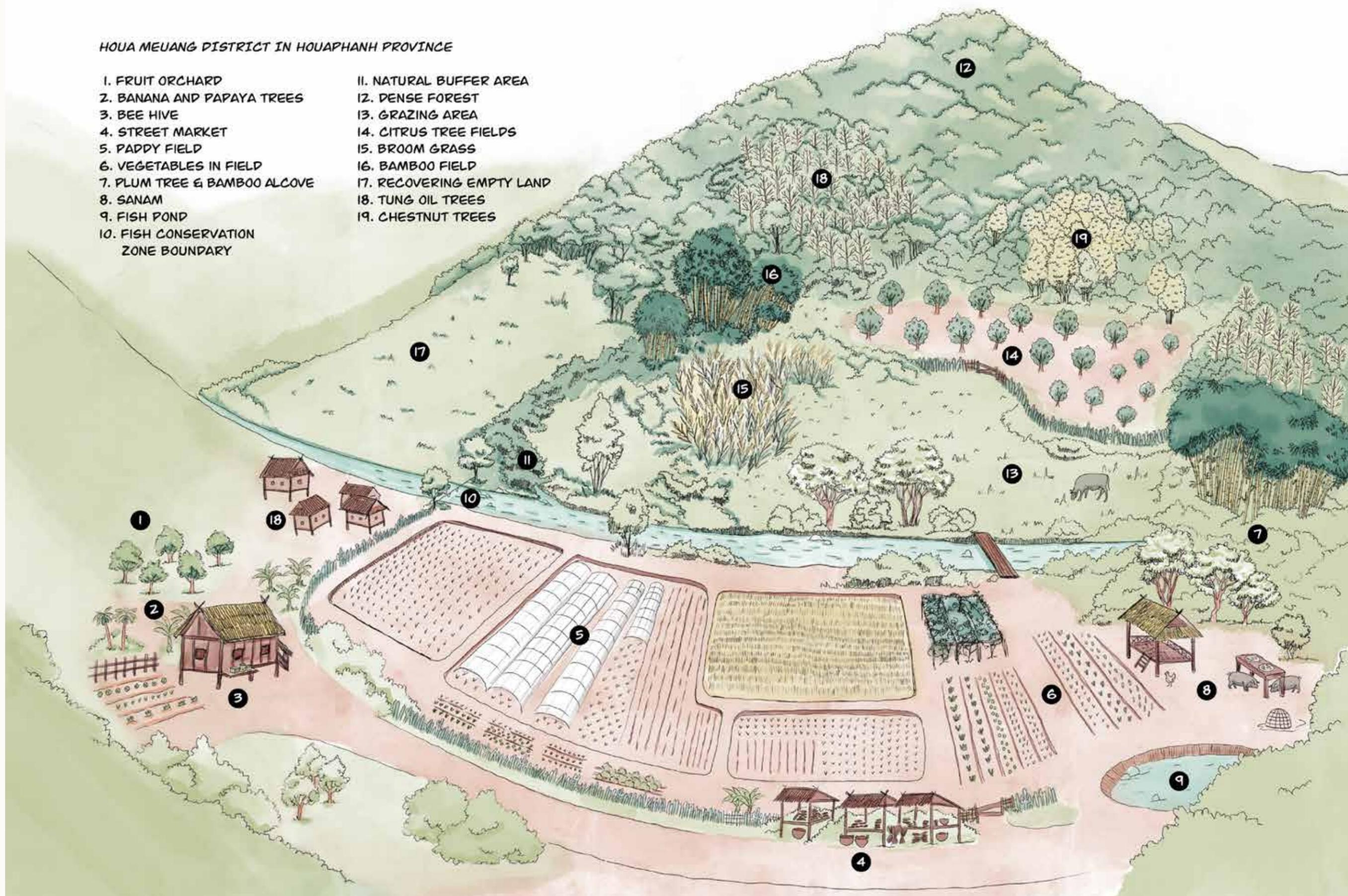
Tou-Kue herds us along past the rice field. She wants to show us the wilderness reserve along the riverside – a riparian buffer area. As we are walking toward the river, she invites us to step into an alcove created by a boundary of plum trees and bamboo ⑦ to take a look at her family’s small *sanam* ⑧ – a rest and recreation area with a bamboo and grass roof structure, usually a little distance away from the home where families sometimes relax at the weekend. It has a fishpond ⑨ connected to a stream, and Tou-Kue’s nephews, who are back from school on holiday, are fishing. There is a small platform with a thatched roof where people can rest or eat. All around the thatched structure there are herbs and small vegetable plants. Local chickens run around, pecking grain under the raised platform. In the far corner we see another raised platform where some leaves are drying. Two black pigs are feeding under it. Tou Kue points to the black pig pen. “Many people are nervous about keeping pigs now because of the African swine fever virus. These are local pigs – they take a long time to grow, but are very tasty, and they fetch a higher price than the hybrid ones that everyone is raising now. Our family likes to raise these pigs – they don’t need special feed... they eat anything.” The *sanam* looks like the perfect resting place to spend a lazy afternoon. But our guides hurry us on – they want to show us the low and high hills.

We take the small wooden bridge across the river. As we cross it the group points in the distance down river to a Fish Conservation Zone ⑩ they have created in their village with support from the district office and TABI. The Fish Conservation Zone is a section of the river where all the villagers have agreed to restrict fishing activity. They have clear signs to demarcate the zone, and they have developed regulations for what is permissible in that area, and how it should be managed.

Along the river banks our guides point to areas of wilderness they have left as a natural buffer area ⑪ to protect the riparian ecosystem and prevent erosion. They point to other such areas higher up in the hills surrounding the streams. These natural wilder-

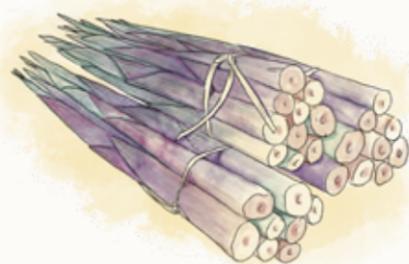
HOUA MEUANG DISTRICT IN HOUAPHANH PROVINCE

- | | |
|--|---------------------------|
| 1. FRUIT ORCHARD | 11. NATURAL BUFFER AREA |
| 2. BANANA AND PAPAYA TREES | 12. DENSE FOREST |
| 3. BEE HIVE | 13. GRAZING AREA |
| 4. STREET MARKET | 14. CITRUS TREE FIELDS |
| 5. PADDY FIELD | 15. BROOM GRASS |
| 6. VEGETABLES IN FIELD | 16. BAMBOO FIELD |
| 7. PLUM TREE & BAMBOO ALCOVE | 17. RECOVERING EMPTY LAND |
| 8. SANAM | 18. TUNG OIL TREES |
| 9. FISH POND | 19. CHESTNUT TREES |
| 10. FISH CONSERVATION
ZONE BOUNDARY | |



ness habitats follow the stream over into the next village. Beyond the ecosystem services that these areas provide such as pure water, TABI data tells us that about 13 percent of non-timber forest products that upland farmers collect are from these kinds of riparian buffer zones, including food, medicines, and products to sell or to use for making handicrafts.

When we get to the end of the bridge, Tou-Kue points to the horizon. As we look out in the distance, with the river and paddy fields behind us, our horizon from left to right ahead is gently sloping farmland stepping up to a low range of hills and then further up a higher range. Way in the distance, much higher up, there is dense forest 12. The land directly in front of us is being used as grazing land for cattle 13 and is fenced off from the low hill fields behind. Along the river there is a row of plum trees waving their white blossoms. Our guides describe what they are growing on the low range of hills. There is a large area with fields of citrus trees 14. To the left of the citrus field, there is broom grass (*doc khem*) 15, and a little higher, a large bamboo (*nor loy* and *nor lai*) field 16. The broom grass and bamboo fields are village plots that they manage collectively. On the far left there is a large, empty field 17. We ask if it is being prepared for planting. They explain that it was an area where some families had planted maize and sesame as commercial crops. The soil now needs to recover. The prices were fluctuating a lot and those families are now thinking they may put in bamboo or something else. Straight ahead we see a patch of wild grass. A farmer is cutting some of the grass and filling a large basket to take to her cattle. Looking out right we see a large section of bare trees with light colored branches. These are tung oil (*mak kao*) trees 18. The oil pressed from the nuts in their seeds is fast drying and used in varnishes. Most of the produce from this lower hill range is sold to Vietnamese traders.



Bamboo shoots

On the higher hills we see the distinctive light green blossoms of the chestnut trees 19 and more of the pale branch leaf-bare tung oil trees. The forest there is dense. Tou-Kue points to an area of the high hills where they go to collect the red mushrooms (*het kordeng*) and several other medicinal herbs. “We have designated areas for collection – Up there we get mushrooms, medicinal plants, different kinds of bamboo shoots and wild cardamom (*mak neang pah*).”

We start walking toward one of the broom grass patches, and as we go, we have one of the most sophisticated discussions on how agricultural practices are evolving. One of the older farmers explains, “We have planted indigenous species in these fields. They evolved on our land through shifting cultivation, and could keep evolving through that practice. We have taken these species out of that rotation and stopped their evolution, and we are trying to cultivate them in these fields. You see, broom grass is useful, and we can earn from it. But it grows on its own in young fallows. As we are not practicing shifting cultivation in this area, we do not have young fallows and broom grass is diminishing. We are trying to see if we can provide a suitable environment and the right kind of soil disturbance to cultivate it on these hills.

Similarly, some of the orange trees here are native oranges – they were brought here long ago from Vietnam and are unique to this area. We are seeing which ones we can make productive here. The District Agriculture and Forestry Office and TABI have been helping us. It is the same with the tung oil trees. You can see them up there in the forest. We are trying to cultivate them in an orchard setting. *Nor loy* too – we can cultivate *nor loy* and start to earn from it in four months. We have created a common village *nor loy* and *nor lai* garden. Everyone can collect to sell or eat, and there are rules for when we can cut the stems. But we have to test these things. We have tested *nor loy* and it is doing well, but our soil and elevation here may not be so good for broom grass. In the next village they have been successful with broom grass and in the village beyond that one, they are cultivating red tea (*cha sa*).”

We ask them what other species they may experiment with in the future. One of the younger farmers says, “Well, we can try mulberry (*makkam*), some different types of bamboo. Maybe we can try our local chestnut (*makkaw*) and mushrooms and introduce another species of chestnut that the Chinese want to buy. You see, when the traders come looking for these products, people start taking them directly from the forest. We want to manage it better so these species don’t disappear.” One of the older farmers says, “You have big plans, but there is no mulberry project and you have a job in town.” The young farmer looks over at our colleague from the district office and says, “Maybe we can do it with just some guidance and not a big project?”

We walk into one of the tung oil fields. It is spread over a large area with different families cultivating different sections. There is quite a heavy undergrowth and we ask if the weeds are a problem. Like in the paddy field, our guides start pulling at various plants naming them and describing what they use them for. “This soil is full of seeds. So, this isn’t just an orange or tung oil orchard. We disturb the soil enough so that some of these other plants come up. They are all connected to each other. They are useful too – see here... in this area we have a lot of cardamom. And ginger, galangal (*kha*) and other medicinal herbs over there. We even get some kinds of mushrooms here. These days everyone is more interested in agro-biodiversity. For some time we were being told that shifting cultivation is bad and we should not take these things from the forest. But now, everyone understands how important these indigenous species are and how important our agriculture system is for generating these resources.”



Tung oil seeds

We admire their vast expanse of tung oil trees and ask how they produce the oil and who buys it. They tell us that they sell the seeds to Vietnamese traders. There is a high demand for them in Vietnam. One of the younger farmers says, “If we could press our own oil, we could get an even higher price and have better control over the pricing. Maybe we will find a way to get a small oil press. But before we invest, we must secure tenure of this land.”

We come back through someone’s field of orange trees. Some of the trees seem to be diseased. We ask about this. Tou-Kue’s neighbor says, “We have not managed these trees well. The district office sent two of us for training to Thailand this year. We have learned many new things about how to manage the trees. If we prune them better, they will be easier to manage.”

We start making our way back toward the river and over the bridge. As we walk, we reflect on how different these landscapes look compared with 10 years earlier – fallows giving way to cultivated orchards and wilderness reserves. And then we realize that it all makes much more sense when we zoom out and consider the change across the broader landscape, rather than in small patches. When we zoom out, we are able to understand the diverse functions and uses of this land – croplands, grazing lands and fields of different indigenous species, interwoven with riparian buffer areas, wilderness reserves, and regenerated forests. And the ability of these farmers to make sense of it all is impressive.

Tou-Kue takes us back to the *sanam* to rest and debrief, and we are joined there by a couple of food entrepreneurs from Vientiane who are visiting the area and the young people who were fishing earlier. Over the next hour, as we eat and describe our walk, they marvel at the opportunities for food businesses. By the time we are through with lunch, they have dreamed up about seven different projects related to various food chains, combined with handicrafts and local fibers for packaging, and an elaborate plan to showcase Lao heritage foods. It is time for us to go, and the older farmers are off. We leave the young people talking excitedly, about possibilities – eco-tourism, chef competitions....

REFLECTING ON OUR WALKS

Tired and happy after our walk, we reflect on what we have seen, heard, and felt... and some insights surface.

Continued relevance of multifunctional landscapes | From our walk we learn that upland farmers deeply value the diversity of their lands and forests and the multiple functions and services they derive from them. They are able to navigate a complex mix of croplands, forests, fallows, and grazing lands; they actively manage them in regenerative ways that contribute both to national poverty reduction and conservation goals. Their ecological knowledge and the symbiotic relationships that they continue to nurture with their natural environment are important assets for Laos. And they are treasures in a world in which biodiversity is under severe threat. We are also struck by the uniqueness of these multifunctional landscapes. Each landscape holds a story and history of local people and place but also embeds a wider scale awareness of ecosystems, bioregions, and the principles of agro-biodiversity.

Diversity of multifunctional landscapes breeds resilience | Our walk has reinforced the importance of diversity at many levels – diversity powers the multifunctionality of landscapes and helps farmers remain resilient in the face of climate shocks, market volatility, policy and governance failures, and natural disasters. Diversity in farming systems contributes to better nutrients, water and soil management, and provides pest control and pollination services. Diversity of crops and species helps mitigate risks from seasonality and changing weather patterns. Having diverse strategies to link to markets mitigates risk from price fluctuations and dependence on buyers. And, importantly, if we allow ourselves to move beyond a “rice-centric” view of food security, we have a deeper appreciation of the role these landscapes play in the food security of upland farming households, providing a safety net in the lean season and serving as a regular source of supplementary nutrition. These benefits of multifunctional landscapes are currently underestimated as agricultural performance is still measured through quantities of production and sales of individual commodities.

The transition from shifting cultivation | In many upland villages, farming communities have transitioned or are transitioning from shifting cultivation, or they are adapting its form. But this is not a black and white (either-or) choice between the extremes of traditional shifting cultivation and commercial monocropping agriculture. Their transition from shifting cultivation is driven by many factors (climate, labor availability, policies, markets, and available support, among others) and they are changing in complex ways. In some cases, they are experimenting with the domestication of species traditionally found in shifting cultivation fallows. In others, they are attempting to regulate their collection of non-timber forest products. Some farmers are shifting their focus to particular products in order to manage their labor supply. But, in transitioning their practice, they continue to retain the diversity and multifunctionality of land, forests, and grazing grounds. There is much to learn from their efforts. They offer us real-life examples of how shifting cultivation may be “stabilized” - a government forestry policy goal. There is no one magic solution, but the experiences of farmers in adapting their shifting cultivation practice in their diverse local environments show us a way forward.

Our walk also validates the importance of long fallow rotational systems that enhance ecosystem services and the regenerative potential of the land. Several indigenous species that farmers value such as benzoin, tung oil, and certain kinds of mushrooms have adapted to long-rotation cultivation systems. Demand for these species is high in international markets and continued access to them through longer fallows will enhance the economic value of the upland agricultural system.

Multiple types of forests | Our conversations with our guides are evidence that upland farmers

continue to have close relationships to forests and that they manage and interface with many different types of forests – including regenerated forests, young and mature fallows of different ages, wild natural reserves and buffer areas, forests of domesticated species, and other secondary and original forests. This interaction with a wide variety of forest types is valuable and more sophisticated than the existing three-class categorization of forests in national policy. Old growth forests are essential, but other types of forests also perform multiple functions and provide valuable services. A better understanding of the different types of forests with which communities interact and the services they generate, could help progress toward attaining conservation policy goals.

Resurgence of interest in indigenous species | Our conversations with farmers and entrepreneurs confirm the resurgent interest in and beyond Laos in agro-biodiversity-related indigenous species and products including spices, herbs, medicines, vegetables, fruits, traditional foods and other non-timber forest products grown or sourced organically. Traders and markets in Vietnam, China, and Laos recognize the Lao uplands’ comparative advantage in these products. This is an opportunity to leverage greater power for upland farmers in these agriculture systems.

Security of tenure | With support from their DAFO, TABI, and other development projects, upland farmers are making important investments in their land and landscapes. Many of these investments are in areas managed as village commons such as the domesticated bamboo, tung oil and broom grass fields we were shown during our walk. This interest and investment will be difficult to sustain and, in some cases, will be lost unless communities are more secure in their tenurial rights to this land. TABI’s research attests to this:

“Without adequate security of upland resource tenure, local communities will fail to fully realize socioeconomic and environmental benefits. While formal tenure security in Lao PDR is low, rotational shifting cultivation areas—which are typically managed as communal commons—are particularly insecure, being generally ineligible for titling or other types of formal tenure recognition. Innovations are needed to capitalize on the productive and economic potential of local agrobiodiversity within upland systems, to enhance the economic returns from upland fallows and fields, and ensure local tenure over these resources.” (Vongkhamho et al., 2019, 2)

Negotiating power in regional markets | The experience of the tea farmers we met during our walk showed us how linking to regional markets can be transformational. But their experience also shows us their high level of dependence on Chinese traders who came to their village and the risks this entails. One of the farmers was understandably worried about a new Chinese tea processing factory that was being constructed in their village and the effect it may have on demand for their tea. Sharing price information among themselves was clearly helpful, but they did not have access to good market information or much choice as to where and to whom to sell their product. This gives them little power in negotiating the terms of trade. More accessible market information, links to a wider range of buyers, and better negotiation skills could improve their returns and lower their risk. Several of our guides also pointed to opportunities to add value to their products before sale such as by pressing tung oil rather than selling the raw seed or making brooms rather than selling broom grass. New ideas and opportunities for farmers to add value at source are emerging all the time and, with some support, farmers may build on these ideas to increase their power in regional markets.

Supporting chains versus webs | Lessons from TABI’s sub-projects and our conversations with upland farmers and local entrepreneurs offer us insights about supporting agro-biodiversity based livelihoods. In TABI, sub-project investments in the value chains of specific indigenous crops and non-timber forest products prioritized by communities helped farmers address production and quality constraints

and gain better access to national and regional markets. These investments helped them expand their spectrum of livelihood opportunities from a binary choice (focused on subsistence cultivation at one end and monoculture-focused commercial agriculture at the other) to an expanded range of choices, including commercial agriculture of indigenous crops and products. But with our growing understanding of agro-biodiversity and multifunctional landscapes, TABI's sub-projects also demonstrate how a narrow commodity focus aimed at getting specific products to markets can be limiting. Many of the low hanging market opportunities for indigenous products were driven by national or regional demand for raw materials and support for farmers to access these opportunities focused on connecting them to trader-established supply chains. They may not have sufficiently explored local ideas and opportunities for value addition or market development and the true economic potential of agro-biodiversity that comes from the interconnectedness of species and farmers' deep appreciation for multifunctional landscapes.

The use of the word "chain" in "supply chains" or "value chains", unfortunately consciously or unconsciously, has its origins in the early capitalist era of colonization, where traders and landowners literally used slaves in chains to supply agricultural commodities to their expanding empires (Soloviev and Landua, 2016). And even though this is now not the case, thinking about commodity transfers as chains in the context of agro-biodiversity can be problematic as it tends to focus attention on the uni-directional extractive movement of a specific commodity to supply a market elsewhere. This is not to suggest that a value chain approach is not useful. In addition to tracking the path to markets, good value chain analysis can help uncover value addition opportunities and address barriers like quality shortfalls or power differences along the chain. But an exclusive single commodity-focused value chain approach may not align well with the complex multi-directional networks and exchanges through which these materials actually grow and have been traditionally used (Ibid.). The ecological interconnectivity that guides farmers' interactions with a range of diverse species, breeds resilience. By prioritizing attention to financial capital, an approach that focuses exclusively on single commodity value chains, may not pay sufficient attention to other forms of capital such as ecological, social or cultural capital that are important, as we have seen, for the resilience of upland farmers and their natural environment. How may we support farmer livelihoods in ways that better honor and leverage the interconnectivity between species and the complexity of their interaction in multifunctional landscapes?

In a conversation, Nongnut Foppes, founder of the XaoBan food group, imagines the kinds of enterprises that could emerge in Xiengkhouang province.

"I see great opportunity for people to sell their products... They have a lot – chestnuts, forest products, fruit trees, flowers... it's tropical and it's temperate with high altitude. In the same place you have mangoes and you also have mountain plants. It's a unique place. It would be possible to create very good eco tours in these areas. Or they could do food business – Iberian pigs really love to eat chestnuts. Bees love chestnut flowers. You could have honey from the chestnut trees. So, you could combine all these and make a honey and free-range pig business. Then you have mushrooms under the chestnut trees... You could create specialty ham or sausages from Xiengkhouang, packaged using local materials. You can add to this over time... they could introduce improved varieties of strawberries, and even sell seedlings. These areas can attract tourists..."

But most young people want to run away from their village because they are so poor, and farmers have low status. We have to help them recognize the value of what they have and increase it there. They will become proud of their villages once again. I don't see many people working on this – most organizations help farmers with production, but aside from coffee, there is not a lot of work on processing, making a business, connecting people to other entrepreneurs, packaging,

branding, marketing..."

With these reflections from our walk and TABI's experience, we brainstorm on the characteristics of approaches that are well-suited to supporting agro-biodiversity related livelihoods in multifunctional landscapes:

A **systemic approach** that goes beyond the confines of a single commodity and supply chain focus to support **multi-directional links and meaningful collaboration** between producers, consumers, traders, entrepreneurs, and development players in food and agriculture systems.

An approach that supports enterprises that produce and exchange goods and services to **connect in ways that continuously add value** to each other, their customers, their investors, and importantly to the land and ecosystems of which they are a part. This kind of approach overcomes false sectoral boundaries to nurture links that cut across rural and urban locations and across levels and sectors, reaching into the service industry, food, tourism, health, and so on.

An approach that **helps enhance value locally** around indigenous species and associated products and services, reducing the trade of bulk raw materials in international markets.

An approach that actively **encourages new entrepreneurial ideas and rewards local innovation** especially from the margins, recognizing the hard work and new kinds of expertise and support needed for small agricultural enterprises to succeed in a market-driven world. This kind of inclusive approach would actively seek out ideas and innovations from those who typically have less power in development and market systems – women, young people or marginalized ethnic groups.

Support that **goes beyond providing financial capital** to help nurture and develop ideas, facilitate networks and connections, support risk analysis and mitigation, trouble shoot and solve problems.

An approach that **values the agro-biodiversity knowledge of farmers** as integral to the value of their products and produce, and that evolves through farmer innovation and learning. Such an approach would take into account the different roles and types of knowledge held by women and men, younger and older farmers, more remote and better connected households, and different ethnic groups and cultures.

ACCUMULATING AGRO-BIODIVERSITY KNOWLEDGE – THE PHA KHAO LAO PLATFORM

To close our reflection on multifunctional landscapes and their value, we turn our attention to knowledge. In Chapter 1 we asked the questions: Who holds agro-biodiversity knowledge and whose knowledge counts? When is something protected or lost? Our story is testimony to the rich agro-biodiversity knowledge that upland farmers hold and use in their everyday lives. But it also alerts us to threats to this knowledge and the need for expertise and support to leverage it.

By 2017 there was a growing appreciation of the wealth of knowledge about agro-biodiversity species and forest products being accumulated through the efforts of TABI and associated initiatives, but there was some concern that it remained scattered and hard to access for many who needed it most. Responding to this concern, TABI set up the Pha Khao Lao platform -- an Agro-biodiversity Information and Knowledge Sharing Platform with a **mission to highlight the importance of agro-biodiversity for sustainable development in Lao PDR as well as to provide practical resources for students, academics, policy makers, development professionals and the private sector.** There was also an emerging need for a space that would inspire young people to engage in the development of green products, and for a platform for traders, restaurants, and other stakeholders to share agro-biodiversity related experiences and products. TABI considered youth an important audience for this platform because of their growing share of the population. There also was a noticeable re-emerging interest in local green products and national pride in the incredible biodiversity of Laos and it presented an opportunity on which to build.

A message from the Pha Khao Lao platform...

Every day the Lao people eat a bit of their heritage. Whether eating bamboo shoots, having crispy river weed with a beer or having specialty Xiengkhouang noodles with their Pho.

That is why we called this initiative Pha Khao.

A *pha khao* is a low standing table used for eating meals in Lao and a poignant symbol of Lao people's connection to agro-biodiversity. The table is usually made of rattan or bamboo and made locally. Family and friends gather around the table and share meals which consist largely of "agro-biodiversity food" such as fish, sticky rice, local vegetables, stews and hand-made dipping sauces.

We aim to do the same online.



The Pha Khao Lao platform comprises four interlinked spaces:

1) **A knowledge base** to serve as a compendium of formal knowledge and policy-related information on Lao biodiversity, agro-biodiversity and information about a growing number of diverse Lao-specific species of economic, environmental and social importance. At the close of TABI, Pha Khao Lao had more than 700 species profiles. Populating this knowledge base was a collaborative effort drawing on contributions from many different organizations, for example, for non-timber forest products: [the International Union for Conservation of Nature (IUCN), SNV Netherlands Development Organization, and Groupe de Recherches et d'Echanges Technologiques (GRET), the World Wide Fund for Nature (WWF), Pha Tad Ke Botanical Garden]; for species information: [the National University of

Laos (NUoL), the National Northern Agriculture and Forest College (NAFC), Souphanouvong University (SU), the National Agriculture and Forestry Research Institute (NAFRI), the National University of Laos and the FAO]; for documentation on fish conservation zones: [the Living Aquatic Resources Research Center (LARReC) and the Mekong River Commission (MRC)]; and for rice: [the International Rice Research Institute (IRRI) and NAFRI].

2) **An E-zine, story-telling platform** to present high quality stories and an interactive vehicle to illustrate the powerful connection between agro-biodiversity and Lao communities. It includes video and blog post stories on agro-biodiversity, Lao heritage products, local knowledge, business start-up tips, "How-To" guides, and "Lao Kitchen." The Lao Kitchen section has more than 126 food recipes from different regions of Laos, showcasing the use of local Lao ingredients.

3) **A News space** for agro-biodiversity news updated frequently. At the close of TABI, more than 250 news headlines had been posted since its start. Initially, this was conceived as conversation space, facilitating engagement and outreach activities to amplify the messages of the platform and promote changes in attitudes and behaviors. It could potentially grow to more of a conversational space over time.

4) **Events** where important events related to agro-biodiversity are posted. More than 45 events had been posted at the time of this book's publication.

Figure 3.3: Screenshot of Pha Khao Lao home page (<https://www.phakhaolao.la/>)



The Pha Khao Lao site has accompanying social media channels:



A snapshot of Pha Khao Lao Usage in March 2020

- 230,867 users based on website traffic – 50% between 25 and 34 years of age; 47% women
- 73% of users are active on smartphones, which may or may not include children of farmers
- 3,898 followers on Pha Khao Lao Facebook page, with 80,000 people being reached on Facebook
- More than 30,000 views of agro-biodiversity videos posted on the website

What does the future hold for Pha Khao Lao?

When asked about their **vision for Pha Khao Lao**, a group of young staff and interns who had worked on the platform said...

“In the future, Pha Khao Lao will be the main portal for information on biodiversity in Laos. It will have an audience within and outside the country.”

“When you mention agro-biodiversity in Laos, Pha Khao Lao will be the first thing people think about.”

“Everyone will feel some ownership for the information and will contribute to growing it. Pha Khao Lao will become a platform through which different organizations connect – private vendors and processors with producer groups.”

“If you are interested in local bananas, for example, in the future you should be able to reach all the different people working on bananas through Pha Khao Lao, including accessing advice about problems associated with producing, processing or marketing bananas.”

“In future I see Pha Khao Lao being an important resource to connect students and researchers interested in agro-biodiversity species and issues.”

“Students who associate with Pha Khao Lao will find many ways to engage in issues related to biodiversity – these may be internships, participation in events, data and research materials, or meeting knowledgeable people on particular issues.”

“In the future, Pha Khao Lao will be hosted by the government, an association, or private organization, but many actors will co-own and work on it together.”

“Pha Khao Lao will not just be for people in cities. Farmers from different parts of the country will also access it electronically and through various events. They will be able to get useful information like farmgate prices. It will have valuable information for all different kinds of people in Laos.”

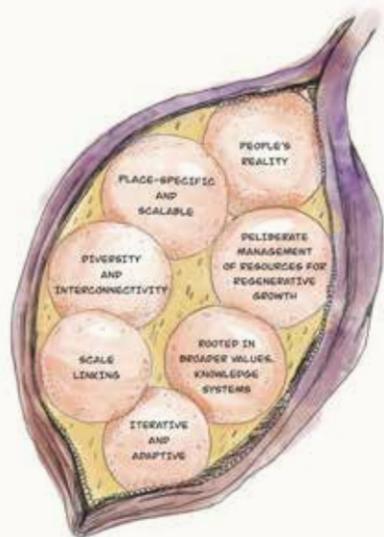
“Pha Khao Lao will make people more interested in Lao food. Chefs from other parts of the world will want to sample or innovate with Lao heritage food.”

“I think that Pha Khao Lao also has the potential to engage other organizations and government in policy dialogue because it will be able to bring together people with different perspectives to explore an issue deeply, drawing on real data.”

Many stakeholders acknowledge Pha Khao Lao as an important part of TABI’s legacy. At the end of 2019, the TABI team consulted with a few private sector and civil society actors about the value of digital platforms, the nature of their collaboration with TABI for Pha Khao Lao, and their ideas for its future. Those interviewed from the private sector thought that in the future Pha Khao Lao could play a role in connecting producers and consumers and in promoting Laos to the outside world. To do so, they suggest that Pha Khao Lao should develop a clear strategy, more visual material, and an independent identity not tied to a donor-funded project. Civil society stakeholders thought that Pha Khao Lao should remain an information platform with outreach to organizations and businesses. They, too, suggested a clear strategy and more visual material.

The future of Pha Khao Lao is not certain as we tell this story. But it is clear that a substantially diverse range of organizations in Laos see strong potential for such a platform to take on even greater significance for agro-biodiversity in the coming years. Reflecting on what we learn from TABI about the regenerative principles of agro-biodiversity, we imagine the characteristics of an extended Pha Khao Lao platform:

- That it is built from the real experience of upland communities, and that it represents a diversity of voices; that it evolves as their practice and understanding grow;
- That it is dynamic, changing, and adaptive, to suit the complexity of agro-biodiversity and the rapidly evolving operating environment in the uplands. That it evolves along with the context, changes in practices, knowledge, new technologies and emerging markets, and that it offers updated information in these domains;



- That it identifies and actively supports innovation in diverse places and, by linking agro-biodiversity innovators in different spaces, feeds into broader learning;

- That it serves as a platform that facilitates and shapes connections and dialogue across levels - from organism to landscape, and farmers to policy makers and market actors in Laos and beyond; that it surfaces ground level experience to inform policies and decisions at multiple levels; that it connects various actors along value chains and production and supply webs of high-value agro-biodiversity species, linking producers with technical services, processors, traders, consumers, and market information; and that it connects researchers, data analysts and farmers in their inquiry on agro-biodiversity;

- That it exemplifies the principles of diversity and interconnectedness, linking diverse actors from across the system and the various spaces they inhabit, valuing and drawing together their different perspectives and deliberately dismantling siloed ways of working. This also implies working across generations – engaging and motivating youth on issues related to agro-biodiversity and the opportunities it offers; and that it cultivates trust and helps balance power and access to information and knowledge;

- That it deliberately provokes dialogue and attracts resources and interest toward testing new ideas; that it serves to create more agro-biodiversity related opportunities for upland farmers, as well as agriculture, food and eco-tourism entrepreneurs, traders, processors, innovators and restaurateurs; and that it helps disrupt power imbalances in agriculture and food value chains and supply webs;

- That it is rooted in broader values, historical wisdom and knowledge (especially the knowledge of farmers) while pursuing current trends and opportunities; that it aids the evolution of extension and other services in support of agro-biodiversity; that it contributes to enriching the education and vocational training of young people, thereby transferring and evolving knowledge across generations; and that it supports the maintenance of diverse genetic resources and knowledge that uphold diverse farming systems, for example, by supporting village seed banks and the knowledge they accumulate;

- And, importantly, that the platform itself remains cost effective, enjoys broad ownership, and is not taken over by narrow interests that skew the balance of power towards inequality; that it grows in legitimacy, is sustainable, and adds value to agro-biodiversity and related dialogue, research, policy, and programming in and beyond Laos; and that it celebrates the innovation, creativity and resilience of the multifunctional landscapes of the uplands.

Like the multifunctional landscapes we explored that thrive on interconnec-

tivity, this emerging vision for Pha Khao Lao reminds us that the regenerative principles of agro-biodiversity can help shape the knowledge, learning and relationships that fuel the future of agro-biodiversity in upland Laos.

"We can only sustain democracy when it is not all about the people alone, but includes the environment because we are part of the environment and [the] environment is part of us. It's a two-way thing"
(Oladosu Adenike)

REFERENCES

- Castella J.C., Lestrelin G., Hett C., *et al.* (2013). *Effects of landscape segregation on livelihood vulnerability*. Human Ecology, <http://dx.doi.org/10.1007/s10745-012-9538-8>.
- Fischer, J., M. Meacham and C. Queiroz. (2017). *A plea for multifunctional landscapes*. Guest editorial in *Frontiers in Ecology and the Environment*. The Ecological Society of America.
- Pimbert, M. (1999). *Sustaining the multiple functions of agricultural biodiversity*. Gatekeeper series no. SA88. International Institute for Environment and Development, Sustainable agriculture and rural livelihoods program.
- Soloviev, E.R. and G. Landua. (2016). *Levels of Regenerative Agriculture*. Terra Genesis International.
- Vongkhamho, S., M. L. Ingalls, P. Thanasack, K. Phouyyavong, R. Bernhard and Y. Chanthasumlet. (2019). *Negotiating the forest-fallow interface: Benzoin tree in the multifunctional landscapes of Lao PDR*. NAFRI Research Brief No. 001. Ministry of Agriculture and Forestry and the Centre for Development and Environment, University of Bern: Vientiane.
- Source of quote on title page: Essay by second-generation Hmong American writer, artist, and media specialist, Lisa Lee Herrick: *We learned to fear tiger and to love squirrel*. *Emergence Magazine*, Issue No. 6, (2019). 'Food'.
- Source of closing quote: Tweet by Oladosu Adenike (@the_ecofeminist), a young Nigerian eco-feminist and climate activist advocating for a green democracy.



CHAPTER

4

**COHERENCE, COLLABORA-
TION, COMPLEXITY:**
Navigating the institutional
landscape

*“To be is to interbe. You cannot just be by yourself alone. You
have to interbe with every other thing.”*

– Thich Nhat Hanh



Agro-biodiversity is not just about agriculture. It is about forests, food, biology, land, medicines, insects, fish, and more. It involves farmers, fishing communities, scientists, traders, policy makers, and researchers. It is built on and evolves through the knowledge, practice, and ideas of children, young people, and elders passed on over generations. This makes it a complex endeavor. And, it is made increasingly complex in a globalized world in the throes of change. The principles at the core of agro-biodiversity help farmers navigate this complexity.

But the culture of development programming tends to discourage engagement with complexity. The track record of most development projects in dealing with complex problems that demand working across organizational, disciplinary, and sectoral silos, is not good.

It was clear to those who designed TABI that it should not be set up as a stand-alone project but rather as an initiative, co-owned by, and embedded in the work of agro-biodiversity stakeholders at multiple levels.

In this chapter we focus on how TABI engaged with this diverse range of stakeholders. We look at how TABI's engagement shifted over its life, and we reflect on what we learn from this journey.

AN INITIATIVE, NOT A PROJECT

Our story so far has taken us over the complex terrain of shifting cultivation and agro-biodiversity, forest and land use planning, multifunctional landscapes, and agro-biodiversity linked livelihoods. It has woven across sectors and levels, from field level to policy, from organism to landscape and bioregion, and over multiple generations. It's about agriculture, food, botany, economics, geography, forestry, and many more subjects. In the course of our story we have heard from farmers and their children in the rural uplands, artisans, entrepreneurs, traders, chefs, policy makers, administrators, agronomists, development workers, and data and policy analysts in rural and urban areas. How does a development intervention set itself up to be effective across all these areas?

From the design stage, TABI was set up as an "initiative", and not a project. Precisely because agro-biodiversity (and therefore TABI's work) cuts across so many themes and is influenced by efforts at multiple levels, it needed ownership, commitment and contributions from many diverse players. A typical short-term project approach with linear logic and highly controlled upward accountability could not have been successful.

"When we were designing TABI, it was very clear to me that it needed to be an initiative and not a project. The only way it could work is if it were co-owned by all the different stakeholders and embedded in the work of various ministries and development projects." (Kevin Kamp, leading TABI design and Chief Technical Advisor, 2019-20)

"TABI is different from other projects in that it is an 'initiative' that develops and facilitates opportunities to integrate agro-biodiversity and agro-ecosystems into relevant programmes and policies by providing funding and technical support to on-going programmes and new initiatives in agriculture, environment, livelihood, education, health, etc., with the intention of embedding agro-biodiversity issues in decision making processes at the national and local levels." (Gonsalves and Fujita Lagerqvist, 2018)

But what does it take to set up an initiative? How do you build coherence across such a wide range of inter-connected themes, players, and levels? And, what have we learned from TABI's efforts to do so? These are some of the questions we begin to explore in this chapter. Key to understanding TABI's approach as an initiative is observing its engagement with other players. This includes collaboration efforts and partnerships, but also the paths TABI took to influence decision makers, channel resources to farmers, and share learning with others.



We are living in increasingly volatile, uncertain, complex and ambiguous (VUCA) times. Google VUCA and you will stumble upon hundreds of papers and management case studies from around the world on the subject. In this VUCA world of many interconnected moving parts, a small change somewhere can produce a disproportionate and unpredictable effect in a totally different place. For example, following the agrarian transition in the uplands, an unforeseen and sudden shift in health or environmental consciousness in a province in China or Vietnam due to factors totally unrelated to agriculture may have a disproportionately large influence on an upland farming household's income. A defining feature of these kinds of complex problems is that it is not possible to identify a linear direct cause and there are no known solutions to many of the challenges that are emerging. In fact, with multiple actors and factors interacting, there may not even be agreement on what the problem is. This is why the only way to address complex challenges is to understand how the system works and focus attention on underlying systemic barriers.

Why are we talking about this in a chapter focused on TABI's approach and collaboration? Well, we know that a systemic response is generally not possible solely through the work of a single entity or organization or even a single type of organization. It demands multiple perspectives and actions from stakeholders across the system, seeing the problem from different directions.

And, as there are no stock solutions to uniquely complex challenges, we learn as we do. The most viable solutions may come from the margins and from newcomers to a subject rather than from established experts. Solutions may emerge suddenly and may be caused by disruption rather than through careful planning. As we intervene to address a problem, it may cause the system to shift, requiring new understanding and constant re-learning. In this way, complex problems are thus inherently different from simple problems – for which solutions are generally widely known and practiced – and different from complicated ones – where even if the solution is not widely known, the patterns are predictable and problems can be solved with the right kind of expertise. So, it is important that we recognize complexity where it occurs and shape our response accordingly, especially in the way we work and learn with other actors in the system including emerging actors.

But, even when we know we are dealing with a complex challenge that we cannot solve on our own, that we are traveling in unfamiliar and untested territory, we tend to search for predictable familiar patterns based on our past experience and what we believe we can control. Most of our professional training and management tools, including those for cultivating development partnerships, reinforce this tendency. But complex challenges require us to imagine new solutions and ways of working that may be possible, but not necessarily likely based on our past experience - the realm of possibility is different to that of probability. In these increasingly complex and volatile times, where can we draw inspiration for our engagement with others?

The regenerative principles of agro-biodiversity that we have brought along through our story have several characteristics well suited to addressing complexity: acting from people's real experience, rather than what we think their experience to be; encouraging iterative adaptation in local contexts instead of applying pre-known stock solutions; understanding and honoring diversity and interconnectivity; exploring links across scales; enabling place specific solutions across diverse contexts; deliberately nurturing innovation and emergent solutions; and being rooted in broader knowledge systems and values, facilitating their evolution. The instinct of the TABI design team to set up as an initiative was appropriate to the complexity of its operating environment and aligned well with these regenerative principles. It encouraged the team to go beyond the trappings of a conventional development project and to build coherence through a different way of working, engaging a wide and diverse range of players. Some of these efforts worked, and some did not work as well. Some people involved understood them and others did not. But all of this is valuable learning for working in our increasingly volatile, uncertain, complex, and ambiguous contexts.

“We need to work at it if we are going to create new patterns of behavior for thinking and acting in this new world. We need to talk to one another differently, gather information differently, build strategies and plans for the future in new ways. We need new habits of mind that stretch and expand us to deal in more thoughtful ways with the complexity the world offers.” (Berger and Johnston, 2015, 11-12)

NAVIGATING THE INSTITUTIONAL LANDSCAPE

We arrive at the TABI office. Our task for the morning is to try to draw a picture of TABI's institutional landscape and engagement strategy. The task has some of the team puzzled and others a bit worried about how much time the exercise may take. The team is in the midst of preparing for closing workshops in each province, and everyone is stretched for time. We start by mapping various institutional actors at village, district, province, and national level, noting in different colors community organizations, non-profit associations, government ministries and departments, public institutions, universities, private organizations, and technical experts.

As we do this, we have conversations about the relationship that TABI tried to cultivate with these various players or how these players engaged TABI. In about 20 minutes, our whiteboard is a crowded space, with numerous organizations, lines and arrows criss-crossing between different stakeholders and across levels. The complexity is palpable. But as we look at our drawing, what is not clear is the purpose of various relationships and how (and why) they may have shifted. We begin to talk about the purpose behind these different types of engagement, how work was organized between various players, why it was organized in that way, and how these relationships evolved through TABI's life... And at last we have a breakthrough. We realize that there are some pieces of information that are essential to our understanding of TABI's engagement with other players and its journey as an initiative.

These essential pieces of information are: the purpose of engagement; the range and kinds of organizations involved; the modalities used for engagement; and collaboration practices, capabilities, and mindsets that were at the heart of these relationships. And so, to get a better understanding of the range and scope of TABI's engagements, we draw a different picture.



Figure 4.1 below is a representation of TABI's engagement landscape. The four essential pieces of information are arranged like rings on half an onion. In the inner ring we have the **purpose of engagement** between various players³⁰. Although most of these purposes are represented in the Figure, it is not intended to be a comprehensive listing but to offer an idea of the range of purposes for which TABI engaged other players. You can see this is quite a wide range, from management and coordination, sourcing technical inputs, facilitating capacity strengthening, to spreading knowledge and awareness of agro-biodiversity, joint analysis and policy advocacy, and mobilizing support for the creation of an agro-biodiversity digital platform. We will explore later

³⁰ We intentionally use the word “players” here to include organizations, projects, influential individuals and groups.

how some of these purposes may have evolved over the life of TABI.

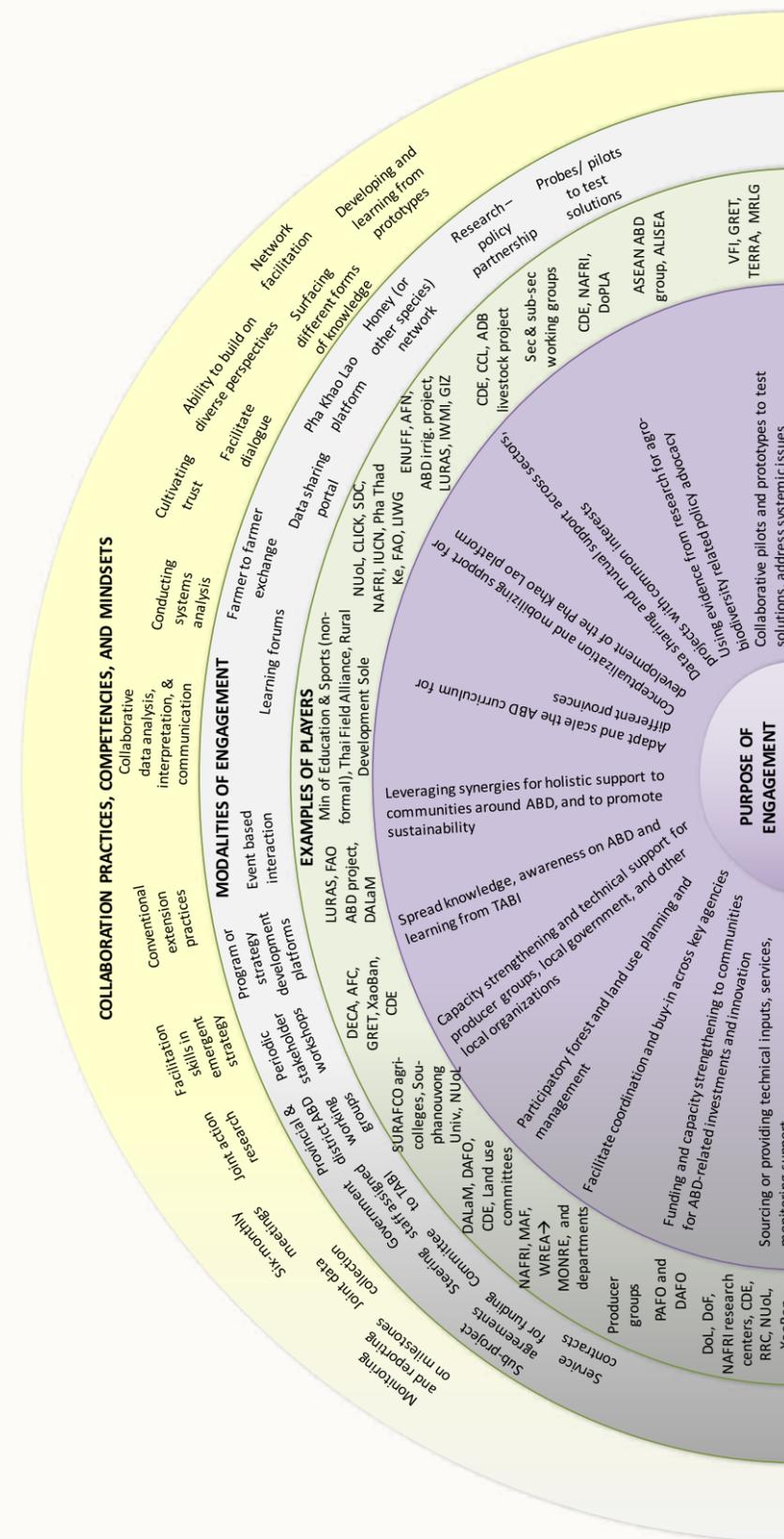
One ring up in the figure we include examples of some of the **players with which TABI engaged**. They include organizations, departments, projects, and working groups or committees that already existed at the start of TABI. They are government bodies, non-profit associations, private sector enterprises, social enterprises, and other service providers.

Another ring up we have what we call the **modalities of engagement** which may be formal mechanisms like sub-contracts, service agreements, consultant agreements, and memoranda of understanding, or informal modalities that contribute to collaboration such as informal monthly catch-up conversations between key players, or joint reflection or debriefing after key events. Modalities may also include bodies like TABI's steering committee that was set up to engage representatives of various stakeholders and to enable coordination and direction setting. We may even think about government staff assigned to TABI from various relevant departments as a kind of modality for engagement, as these individuals played important roles in linking with their home organization or department. Modalities may also be digital platforms such as Pha Khao Lao or data sharing interactive portals that were designed to enable players to engage with each other and share or jointly analyze information. The definition of modalities is not so important, but what is important is that they are not *ad hoc* or one-time events. Modalities are predictable mechanisms through which diverse players engage with each other toward some common purpose over a period of time. We use them to understand how TABI engaged or was engaged by other players and how they shifted over time.

The outermost ring represents **collaboration practices, capabilities, and mindsets**. These may include activities like reporting progress against milestones or budgets, joint data collection and field visits, collaborative action research, and data sharing and communication. Capabilities may include: particular facilitation techniques; the ability to see systems, convene networks, or set up platforms; the skills to communicate with diverse audiences, to facilitate dialogue, to manage the production of joint events or publications; and so on. These practices, capabilities and mindsets are influenced by the culture of collaboration in the operating environment.

TABI may have engaged with a single organization for different purposes, and the purposes of engagement may have shifted over time. Some of these were bilateral engagements, and others, multilateral. The modalities for engagement and nature of practices and the capabilities required for many of these relationships evolved over time. It is not possible to depict the dynamism of TABI's engagement in a diagram, but our Figure gives us an idea of the diverse range of players with which TABI engaged and some sense of the scope and nature of that engagement. This engagement cut across multiple levels from relationships with producer groups in villages involved in sub-projects to national and global level policy actors. But, to really learn from TABI's experience, we need to go a little deeper and explore how and why TABI's engagement shifted over time and what happened as a result.

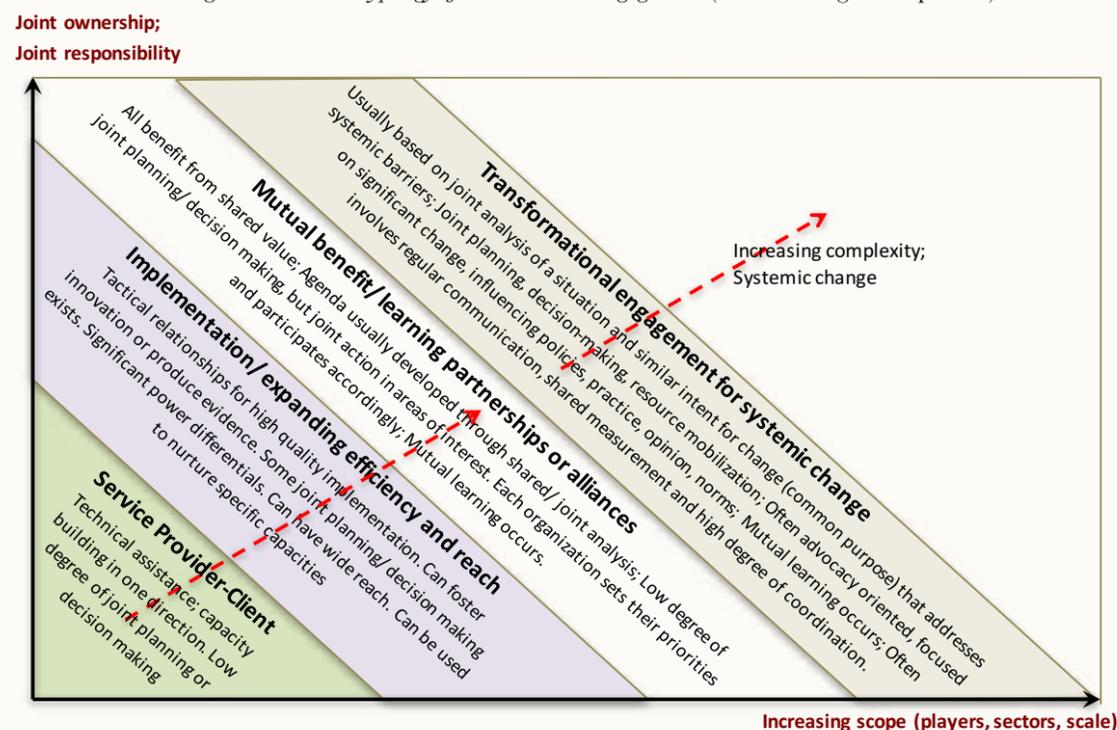
Figure 4.1: Institutional landscape and TABI engagement. (Source: Original depiction)



A CRUDE TYPOLOGY OF ENGAGEMENT

The large number of purposes and players on TABI's institutional landscape can be bewildering. So, we clustered these different relationships into something of a typology by plotting them along two axes: on the x-axis we have increasing scope (players, sectors, scale), and on the y-axis we have increasing ownership and joint responsibility. From this exercise, we were able to broadly cluster the various purposes of engagement into four types (see Figure 4.2 below) to help bring more clarity to our discussion. These four types of engagement are further discussed below. While this is a crude typology, it is nevertheless helpful and more suitable to TABI's case than other frequently used partnership typologies as it accommodates multiple variables and levels of complexity.

Figure 4.2: A crude typology of collaboration/ engagement. (Source: Original depiction)



Note: TABI may have more than one type of relationship with some organizations. And, as relationships evolve, they do not have to pass through every category

Service provider-client | This type of engagement is typically used to source or deliver particular kinds of services, technical expertise, or capacity strengthening. It may be governed by a sub-contract, including a transfer of funds, as the main modality. These tend to be bilateral engagements, and there generally is a low degree of joint planning or decision making. TABI commissioned a number of technical studies and pieces of research conducted by consultants that may fall under this category such as the market research for honey or the feasibility assessment of sustainable management

of wild orchids. This kind of provision of technical assistance is suited to simple or complicated problems, but is not so well suited to complex ones.

Implementation and expanding efficiency or reach | This is tactical engagement that is intended to further implementation or to improve efficiency. These relationships may be set up explicitly to be able to reach more people, to focus on particular kinds of innovation, generate specific kinds of evidence, or nurture desired capacities. There is typically some degree of joint planning and decision making in these relationships, but there may be significant power differences. TABI's relationships with communities and district and provincial agriculture and forestry offices for many sub-projects fall in this category (although some of them functioned more as a type of service provider-client relationship). TABI's early relationships for coordination may also fall in this category, engaging organizations or departments as part of the steering committee to ensure good coordination and efficiency and to enable buy-in and support for TABI's work. The main modalities for this kind of engagement are funding agreements, memoranda of understanding, and coordination groups such as steering committees.

Mutual benefit and learning | As the name suggests, this type of engagement revolves around mutual benefit for the creation of shared value. This could be an attempt to draw more resources to an issue or initiative that is of mutual interest to all parties or to divide work between organizations so as to increase efficiency and improve complementarity (and not step on each other's toes). This type of engagement may involve a low degree of joint planning or decision making, but there is joint action in areas of shared interest. Each party sets its own priorities and participates accordingly. Mutual learning occurs in these relationships, and they are not characterized by large power differences. Learning forums, workshops, and strategy development platforms may be suitable modalities for this kind of engagement.

TABI's relationship with the Lao Upland Rural Advisory Service (LURAS) project is an example of this type of engagement. LURAS and TABI divided their roles in working with coffee, tea, and Khao Kai Noi rice producers in Xiengkhouang province to avoid duplication and to enable more holistic support for farmers. TABI focused on supporting seed multiplication and production and LURAS on linking to markets and obtaining geographic registration. In addition, LURAS drew on TABI trained beekeepers to build the capacity of coffee farmers with whom they worked on how to raise bees. Relationships with the Development Environment Community Association for honey production, Agro-forestry Development Consultants (AFC) for mushrooms, or Groupe de Recherche et d'Echanges Technologiques (GRET) for bamboo may also fall into this category.

Engagement for systemic change | This type of engagement tends to be based on joint analysis of challenges and the articulation of a common purpose for change. It tends to focus on a complex problem and aims to address systemic barriers, engaging multiple stakeholders from across the system. These arrangements often involve joint planning and decision making as well as joint resource mobilization. They may be advocacy oriented,

focused on influencing policies or norms for large-scale change. They usually involve a high degree of coordination, regular communication, shared measurement, and mutual learning. The collaboration between the National Agriculture and Forestry Research Institute (NAFRI), the Ministry of Agriculture and Forestry's Department of Policy and Legal Affairs (DoPLA), and the University of Bern's Centre for Development and Environment (CDE) around land tenure policy using evidence from TABI, may be of this type. The vision of the future for Pha Khao Lao that we described in Chapter 3 may also call for this kind of engagement among a number of players. The modalities for this type of engagement may include policy forums and alliances, networks, and platforms. These modalities demand very different kinds of competencies and mindsets including facilitating dialogue, building trust, drawing out and building on diverse perspectives, surfacing different types of knowledge, collaborative resource mobilization, and so on.

As we look across these four types of engagement, from *Service Provider* to engaging for *Systemic Change*, we notice an increasing need for more equal power. While *Service Provider* and *Implementation* types of engagement work well with differences in power and may even work more efficiently in some cases, *Mutual Benefit* and *Systemic Change* modalities of engagement call for more equal power and the cultivation of trust between players. Moving in this direction we also notice a shift from predominantly bilateral one-on-one relationships to more multilateral forms: groups, networks, and multi-stakeholder platforms. This also implies a changing role for the player initiating the engagement (in this case, TABI), from coordination and management of resources and activities, to more facilitation, participation, and engaging with others for collaborative learning. These latter roles are essential for an "initiative".

TABI had all four types of engagement over its life, although it is fair to say that over time the balance shifted from *Service Provider* and *Implementation* relationships toward a greater emphasis on engaging for *Mutual Benefit* and *Systemic Change*. In some cases, relationships with the same players evolved over time, in pursuit of more systemic goals and purposes. In others, TABI began to engage an expanded set of organizations to work in more systemic ways. We can explore this evolution further to learn from TABI's experience.



PAFO staff lead and collaborate on project planning. (Credit: TABI)

TABI'S EVOLVING APPROACH AND ENGAGEMENT

In its third and final phase, TABI attempted to shift its approach to more systemic ways of engaging, and facilitating a greater degree of ownership among other players. In part this was a natural evolution as TABI matured, to better harness the value of agro-biodiversity to address the complex challenges that come in the way of poverty reduction and sustaining the biodiversity of the uplands. But it was also to improve the chances of sustainability of results and follow-on from TABI's efforts when it ended. What did this mean in practice, and what can we learn from it?

Shifting purpose of engagement and TABI's range of partners

We explore this shift in TABI's purpose of engagement and range of partners through four examples: engaging for sub-projects; research policy and dialogue; Pha Khao Lao; and engaging with private sector actors.

Engagement for sub-projects | The best example of the shift in purpose of engagement and range of partners comes from TABI's work with sub-projects to cultivate agro-biodiversity-based livelihood opportunities. In 2017, the sub-projects had achieved an impressive spread across 31 districts across four provinces through the implementation of 52 initiatives, working directly with 14,712 households and the district and provincial agriculture and forestry offices. The sub-projects had helped build capacities in many different areas but as TABI was nearing its end the team began to think about the effectiveness of the sub-project agreements going forward. Many of these sub-projects were implemented by the District Agriculture and Forestry Office (DAFO) using conventional extension approaches, such as provision of inputs, training and model farmer extension. While these approaches improved the technical skills of many farmers, they were limited in supporting reflection, learning, and feedback to practice. Also, while there were similarities in the nature of the work within the various sub-projects, they did not necessarily connect to each other in any meaningful way. And most sub-project interactions, activities and resources were focused on individual commodity value chains, which did not attend to the principle of interconnectivity between species, people, and the multiple functions farmers derived from their land – an essential characteristic of agro-biodiversity.

TABI's engagement with district and provincial agriculture and forestry offices for the sub-projects largely focused on an annual plan of activities and on monitoring achievements relating to this plan. As a result, emerging issues that required brokering different kinds of relationships, such as addressing constraints in marketing products, advocating for policy changes, or drawing attention to other institutional barriers, were not being addressed. The TABI team also noted that it was not easy to identify and to learn from farmer innovations. They felt a need to move from such a broad piecemeal approach of disconnected investments in sub-projects to deeper work confronting some of the institutional and systemic barriers that farmers faced³¹. This also meant incorporating, more clearly, the regenerative principles of agro-biodiversity in their work.

This Table (Figure 4.3), drawn from internal TABI documents, describes some of the practical changes that the TABI team planned for this shift.

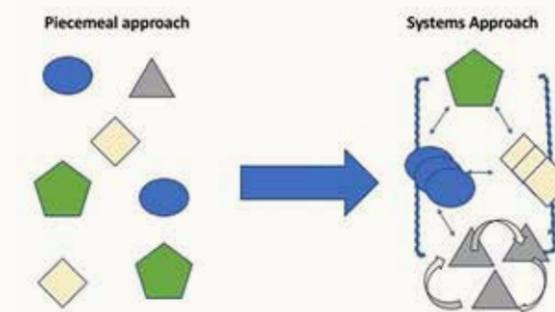
Figure 4.3: The difference between a piecemeal and systemic approach. (Source: TABI)

Piecemeal approach	Systemic approach
A focus at activity level	A focus at outcome level
Planning based on pre-conceived ideas of what needs to be done	Planning to understand and address systemic barriers, and pursue long term plans and visions
Limited connection between different interventions	Learning links between interventions and feedback loops to encourage iterative decision-making and adaptive and emergent plans
Limited testing of assumptions, no lessons captured	Action research to explore different options, prototype solutions, generate new knowledge
Limited interaction among stakeholders	Dynamic learning relationships between stakeholders; Create and join relevant networks and alliances

To implement this shift, in its third phase, TABI undertook an exercise to streamline its sub-projects, reducing the number of projects and focusing on specific investments that could provide a triple win – improving local livelihoods, sustaining the local agro-biodiversity resource base, and having the potential to be scalable to benefit large numbers of farmers and communities. This streamlining process was also intended to clarify the focus on agro-biodiversity.

Figure 4.4: Shift in TABI's approach to sub-projects from a piecemeal to systemic approach. (Source: TABI, adapted from Bartlett, 2017)

This evolution of TABI's approach demanded the cultivation of different types of relationships, in effect shifting the purpose of engagement around its sub-projects from an emphasis on implementation, fund distribution, and spreading reach, in the direction of collaborative learning, action research and addressing systemic barriers. Looking at our typology of engagement (Figure 4.2), we see a movement along the red line trajectory toward increasing complexity and systemic change. As TABI was nearing its end, it was also important to engage with and cultivate synergies with other organizations in the system that could follow-on and build on TABI's work on agro-biodiversity-based livelihoods.



For each theme that TABI continued to support, based on its selection criteria, it engaged with a small group of organizations from across the system at district, provincial and national levels, inviting them to collaborate on a more strategic agenda related to that theme. This was an invitation to collectively address challenges and leverage opportunities. For example, in the case of work with honey producers within the agroforestry theme, TABI began to involve other projects,

³¹ The design for this shift in TABI was in part inspired by learning from the LURAS project as it transitioned from phase 1 to 2. See Bartlett, 2017.

non-profit associations, private food enterprises, and researchers, inviting them to collaborate on a multi-stakeholder honey network.

Involving actors across the system in more strategic and interconnected relationships is essential for a more systemic approach and was certainly more appropriate to handling the complexity of the issues at hand. But it meant significant changes – in the players involved, the purposes of engagement and collaboration, the modalities required, and most of all, in mindsets and capabilities. From directly and independently implementing their own activities with funding governed by annual contracts, DAFOs were being guided to coordinate and build synergies with national experts, non-profit associations, private entrepreneurs and enterprises. It was the first time that non-profit associations were invited as formal partners for TABI in working with farmers on sub-projects. And, while everyone may have understood the shift intellectually, it was very challenging in practice. It demanded a different set of modalities and competencies, which may have been impossible to build in the remaining time TABI had available. It is a lesson in what it takes to work collaboratively to address systemic issues in complex environments.



CDE and partners produced documents to support policy dialog using TABI data and experiences. (Credit: TABI)

Engagement for research and policy dialogue

Engagement for research and policy dialogue | In 2017, a department of Policy and Legal Affairs (DoPLA) was set up within the Ministry of Agriculture and Forestry. TABI, CDE, and DoPLA came together in a strategic research-policy partnership. The purpose of this partnership was to make effective use of TABI's research data and other evidence to explore implications for national policy. The partners focused their attention on policy related to: forest classifications and forest conservation; measures for enhanced tenure security over communally managed resources; the principles of forest and land use planning going forward; and recognition of the value of multifunctional landscapes and agro-biodiversity for development in the uplands. Through this partnership, TABI has convened policy dialogue on these issues between the Department of Agricultural Land Management (DALaM), Department of Forestry, Department of Livestock and Fisheries, and NAFRI, and worked with the Ministry of Agriculture and Forestry to publish a series of policy briefs. Working together as a research-policy alliance is an example of a shift in the nature of TABI's engagement from the *Implementation* or expanding reach type (in the early implementation of forest and land use planning process) to *Transformational engagement for systemic change*.

Engagement for the Pha Khao Lao platform | The Pha Khao Lao platform (described in Chapter 3) was established initially as a digital space that housed knowledge on agro-biodiversity and non-timber forest products. Many stakeholders had felt that TABI and other projects were surfacing valuable information and knowledge, but that it remained scattered and inaccessible to many stakeholders. The establishment of a digital platform helped bring this knowledge together in one place. However, it was clear from early days that there was demand for more than just a repository of information, and the platform gradually began to serve as a catalyst for a resurging interest in local niche heritage foods and local green agro-biodiversity products.

Pha Khao Lao's interactions with various players have surfaced several ideas for the future such as serving as a platform to bring together producers, traders, restaurateurs, consumers interested

in agro-biodiversity products and traditional Lao foods, and as a platform to inspire youth to take an interest in Lao heritage products and species. Here, too, we see an evolution from a more tactical purpose of engagement with different players for the compilation of technical agro-biodiversity information and knowledge toward engaging stakeholders around a much more complex agenda related to agro-biodiversity, farmer knowledge and livelihoods, and the local economy. Key to realizing the vision behind this transformation will be the engagement of farmers and farmer organizations in the platform, which will, again, require a shift in modalities, competencies, mindsets, and power relationships.

Engaging private sector enterprises and actors | Private sector enterprises and other market actors are an increasingly important player in agro-biodiversity systems in upland Laos. In its second and third phases, TABI consistently recognized the importance of engaging these organizations and individuals, and took advantage of opportunities that presented themselves to successfully broker links to traders, processors, and other market actors through some of its sub-projects. But it was a challenge to do this consistently and in a way that would be regenerative and would ensure sustainable and ongoing benefits to farmers' livelihoods and the environment. At the provincial level closing workshops for TABI held in early 2020, it was clear that the district and provincial agriculture and forestry offices had not really been able to build these connections at the scale imagined.

In Chapter 3 we discussed the limitations of a single commodity value chain approach that focuses exclusively on financial capital with insufficient attention to other forms of capital (ecological, social, and cultural) that are important for the resilience of upland farmers and their natural environment. Returning to this discussion from an institutional engagement perspective, we can see how engaging private sector enterprises and market actors mainly in activities related to single commodity-focused sub-projects or supply chains could be limiting. Learning from TABI's experience, future work to engage the private sector around agro-biodiversity in the uplands could perhaps benefit from attention to cultivating a common purpose for collaboration among various players in the food and agriculture system of the uplands. This common purpose could, for example, revolve around strengthening the local economy or creating a niche brand for agro-biodiversity products from the uplands. Working in this way can help pave a path for new collaboration modalities that include private sector players.



As TABI ends new linkages are created to carry on the work in final workshops. (Credit: TABI)

Changing modalities, competencies, mindsets, and culture

“Many of the existing tools for partnership management were largely developed in the late 1990s and early 2000s. Most of these tools are based upon a transactional approach to partnerships.”
(Roche and Kelly, 2014)

With the purpose of engagement much more in the realm of systemic change, sustaining results, learning, and influencing policy, TABI’s relationships also demanded different modalities, different ways of working, and different competencies and mindsets.

The dominant modalities for managing TABI’s sub-projects had been sub-project agreements for funding and the annual planning, reporting, and oversight mechanisms associated with them. As the TABI team attempted to move toward a more systemic approach in its last phase involving other players at different levels around common themes, an expanded set of modalities was called for: **Networks** (such as the honey network), farmer to farmer **learning exchange visits**, working as a true **platform** (as in the vision for Pha Khao Lao), and **joint action research** in which multiple organizations played facilitative roles, were new modalities of engagement for most players in this context.

These changes in modalities of engagement were ambitious for this final stage of TABI’s life, especially given its extensive spread across the three provinces and the volume of work that still remained to be completed before it closed. As a result, the changes were being driven at a fast pace and they demanded competencies that did not already exist in the team. Key partners like the district and provincial agriculture and forestry offices and even some TABI staff did not fully understand these new ways of engaging as shifts in modalities, but saw them rather as events and activities to be completed before TABI ended. For them, the bilateral sub-project agreements with funding attached continued to be the main modality for engagement, especially as the sub-project themes retained an individual commodity focus. This was challenging because suddenly having other actors at the table, including national organizations that also had contracts with TABI, signaled to them that the pool of TABI resources was being divided among a larger number of players. And, as some of these new partners were organizations with strong technical expertise at provincial and national levels, at district level they feared they would see diminishing resources and a potential loss of control and independence in their work on sub-projects.

These lessons emerging from TABI are important for those who wish to build on this work. For example, if Pha Khao Lao is to successfully evolve from a repository of information to fulfilling its vision as a true platform bringing together producers, traders, consumers, and others across food and livelihood systems, it will require investing in modalities, competencies, and mindsets for engaging as a platform. And it will require time.

In our discussions for this book, the term “platform” was used loosely and in many different ways. One stakeholder went as far as to say that he did not want to use the word at all, as it was losing all meaning because of the lack of clarity and shared understanding. As this is a promising modality with new thinking and research emerging around the world, a natural next step for the evolution of Pha Khao Lao may be to build a shared understanding around the emerging ideas and principles that shape effective platforms. Several of the ideas surrounding platform ways of working emerging around the world resonate with the regenerative principles of agro-biodiversity that have accompanied us through our story and the ideas emerging from TABI for the future of Pha Khao Lao. These include³²:

- Embracing interconnectivity, moving away from designing for users to designing with them.
- Recognizing the potential of players at the edge (who may not usually be at the decision table) to innovate and transform the system.
- Letting go of tight control by platform owners and shapers over implementation and moving into more of an enabling role, creating the conditions for the already existing ecosystem of players to connect, thrive, and create value.
- Moving away from attachment to individual identities and brands, and identifying more with the whole.

All of these changes will require shifts in power and continuous collective learning to be able to deal with the volatility, uncertainty, complexity, and ambiguity of the context of the uplands.



These changes, TABI’s evolving purposes of engagement and new modalities, called for different skills and competencies such as: network weaving; facilitating participatory action research and learning; nurturing diversity, interconnectivity, and the quality of connections between players; surfacing and building on diverse perspectives; building trust; and understanding and shifting power imbalances. These competencies did not all exist in the team and they take time and patience to cultivate.

Beyond the TABI team itself, as outreach to farmers typically occurred through district and provincial agricultural offices, staff in these government offices also needed to develop some of these newer competencies in order to successfully bring along farmers and producer groups as stakeholders in multi-stakeholder processes. To do this would require moving from conventional top-down extension approaches to more collaborative learning methods. At the time, these ideas were being more deeply explored by the LURAS project in their own transition toward a more systemic approach, and in many ways, this work inspired TABI’s evolution. LURAS’ journey led to the shaping of a community-led green extension and action research approach centered on green agricultural technologies and a basket of socio-ecological learning methods such as Farmer Field Schools, Farmer to Farmer Learning, and Participatory Action Research. Green extension and the need for these kinds of methods have been broadly accepted by the development community working in the uplands.

“Learning and behavior change are essential for uplands populations to adapt to their changing environment. Learning processes need to be location specific, responsive to local needs, multi-stakeholder and iterative. This calls for major changes in extension approaches that would turn extension agents from expert lecturers to facilitators in adaptive learning approaches.” (Castella, et al., 2018)

Success in building these competencies and shifting modalities for collaboration is also linked to the culture of collaboration among development stakeholders. The culture of collaboration is, in turn, influenced by many other factors such as the way in which development work is organized, histories of collective action, and structures that may aid or inhibit genuine collaboration and engagement.

In the preparation of this book, several people reflected on **how development work is organized** in the uplands (and in most contexts). There was unanimous agreement that the relationships, habits, resource flows, and engagement modalities of a project-driven approach to development in the uplands has inhibited working in more systemic ways. We heard repeatedly about how individual short-term

³² These characteristics have been inspired by Platform Design Principles from the Stories of Platform Design <https://stories.platformdesign-toolkit.com/7-key-platform-design-principles-d84cc78b9218> [Last accessed on June 6, 2020]

donor-funded projects tended to develop their own project specific links to government offices and to particular officers, each with their own sets of demands, data, infrastructure, methodology, and terminology. We also heard about how some communities had adapted to this reality, with some elites even benefiting from, and replicating these silos to their advantage. For resource-poor government departments, with donor-funded projects financing much of their work, playing along with the way donor-funded projects organize the work seems to be the most convenient option. Any other way of organizing would require significantly more effort and working against the grain. But the limits of this project-led model are clear to all stakeholders. They see them as increasingly damaging, unsuitable for addressing systemic problems, and as preventing learning and coherence in the overall development strategy for the uplands. Some also spoke about how this model is inevitably reaching its limits as other forms of investment such as foreign direct investment and Chinese infrastructure development take on greater significance.

It is not that those managing various projects do not want to work together or to address systemic issues. In our interviews for this book, many players were eloquent about the synergies they see across the various projects. In fact, many of these projects were designed explicitly to connect with each other. But they also think that even the most interconnected designs will be forced into silos given the existing project-driven approach with its embedded incentives and short timeframes, habits, mindsets, and modalities of engagement. There has been collective recognition of these barriers and efforts to overcome them. One such example is the Lao Uplands Initiative – a series of events (workshops, consultation meetings, and a concluding conference) organized by a consortium of projects and initiatives and convened over six months in 2018. The purpose of the initiative was to collectively reflect on recent transformations and their impacts on upland populations, take stock of lessons, review policy options, and develop a road map toward achieving the SDGs in the uplands.

The initiative concluded with agreement between stakeholders on three directions and nine big ideas toward sustainable upland development, including among them a shift in the development paradigm away from a “project approach”.

“Project[s] create silo effects, compartments between Government services and sectors, instead of creating the expected synergies. After managing the flow of ODA [Overseas Development Assistance] for a few years most projects close without leaving a durable impact on their beneficiaries and limited perspectives for scaling-up. There is an urgent need to favor cross sectoral approaches despite the constraints embedded into the governance system, bureaucracy and an administration inherited from several decades of project-led interventions.[...]”

“[...]Projects are based on the premises that they can provide technologies and support for upland populations, although in fact what is needed is to create an enabling environment that will allow people to develop themselves, which most projects cannot achieve.” (Castella, et al., 2018)

There is growing alignment around the future of development in the uplands and the important role of smallholder farmers and agro-biodiversity in this future. And there is also growing recognition of the need to shift the nature of engagement among stakeholders away from a focus on project implementation to making the space for collaborative learning, and greater visibility, voice, learning, and power of farmers, including young farmers, in development processes. The question for many is how to move toward this kind of future from current ways of working.

The history and nature of **collective action** in Laos is also an important factor in the culture of col-

laboration. It strongly influences the nature of participation of upland farmers in development processes and the extent to which their voices are heard. TABI facilitated the formation of informal producer groups in sub-projects to aid collective processing, aggregating and marketing of specific agro-biodiversity products, but did not focus much attention on group process and development. For this reason, we do not pursue the story of farmer groups here. But they (informal farmer groups, formal farmer organizations, value chain focused farmer group enterprises, other community level clubs and groups) are an important part of the development process in the uplands. And there is a significant body of work and analysis available on farmer groups – their successes, constraints, cases of elite capture, and potential for the future. Undoubtedly farmer groups, networks, and other modalities for farmer organization will be an important part of the engagement and collaboration story in the uplands going forward. They will be especially important entities in engaging the private sector in becoming part of a regenerative, green agro-biodiverse future in the uplands.

Another factor influencing the culture of collaboration and ability to work in more interconnected and systemic ways relates to **organizing structures**. In relation to agro-biodiversity, the clear separation of agriculture and forests due to land-sparing policies has influenced the nature of collaboration and engagement between various players. Some stakeholders point out that this separation between agriculture and forest land tends to be replicated in the structures set up for business and a clear separation between the two in policy, planning, and decision making.

“The landscape of land use policy is somewhat fractured between ‘forest’ and ‘agricultural land’ stakeholders, even though most of them recognize the intimate links between the two. However, as development structures driven by donor roundtable processes organize sector groups by ministries, and sub-sector groups along sub-ministerial lines, some of these conversations take place in parallel.” (Dwyer and Dejevongsa, 2018)

Through the ups and downs of TABI’s various efforts at collaborating and operating as an initiative (and not a project), there is agreement that TABI played a unifying role – drawing attention to agro-biodiversity and its potential for a regenerative future of development in the uplands. This was evident in the nature of participation in the three provincial closing workshops in 2020, at which there was representation from 44 government offices, 14 private sector companies, 37 non-profit associations or projects, 83 representatives of farmer organizations, and three news organizations.



TABI’s experience of setting up as an initiative, engaging a wide range of diverse players at different levels, and attempting to transition to more systemic ways of working, leaves us with some important lessons. We learn that it is important to take into account the complexity of the issues we address in shaping the way we engage with others. Working systemically around agro-biodiversity in the uplands requires engaging players from across the system (including the private sector) at multiple levels with clarity of purpose. TABI’s experience shows us that shifting the purpose of engaging others from implementation toward mutual learning and systemic change requires different modalities of engagement. These mechanisms take time and patience to develop and they require new practices, competencies and mindsets.

Lessons from TABI also show us that engaging systemically with others in a complex and changing environment around a multi-disciplinary issue like agro-biodiversity calls for a willingness to shift power, give up some control, and embrace more holistic and interconnected identities. It calls for ongoing learning, especially learning from farmer innovation. And it calls for a reimagination in the way de-

velopment work is organized, shifting the focus from individual project “implementation” and siloed identities to greater accountability around collective purpose and shaping a culture of collaboration, interconnectedness, and holistic identities.

TABI also brings us inspiration from the collaboration of upland farmers. Drawing on the regenerative principles of agro-biodiversity, farmers have been able to work in more interconnected and regenerative ways themselves. Many of them have embraced the complexity of the agrarian transition and have overcome the false binary mindsets often applied to development (agriculture or conservation; subsistence or commercial farming; urban or rural livelihoods; on-farm or off-farm strategies). They have navigated a way through the trade-offs and complexity that they face, diversifying their livelihoods, and working effectively with new players in their environment. TABI’s village level forest and land use planning processes also demonstrated upland farmers’ strength and willingness to come together, build a shared understanding of the system, overcome disagreements in their communities, and put in place collective plans and mechanisms for monitoring and learning around land use. Some of their achievements, such as increasing forest cover, were only possible through their willingness to go beyond individual benefit and think about issues at landscape scale. The best example of this is the agreement reached in many villages to co-locate individual farming plots in order to consolidate land use and improve forest cover. This is no small achievement. Other development players can harness this collaborative energy for regenerative development in the uplands.

“All regenerative systems are fundamentally collaborative. Optimization of the whole based on symbiotic relationships over the long term is the hallmark of regenerative systems.” (Wahl, 2016)

REFERENCES

- Bartlett, A. (2017). *What we are learning: Some observations by the Team Leader*. Lao Upland Rural Advisory Service.
- Berger, Jennifer Garvey and Keith Johnston. (2015). *Simple Habits for Complex Times: Powerful Practices for Leaders*. Stanford, California: Stanford University Press.
- Castella, J., K. Sysanhouth, T. Saphangthong, M. Victor, M. Ingalls, P. Lienhard, A. Bartlett, S. Sonethavixay, S. Namvong, I. Vagneron, P. Ferrand. (2018). *Adding values to agriculture: A vision and roadmap for sustainable development in the uplands*. Lao Uplands Initiative: Landscape of opportunities. Vientiane.
- Dwyer, M. B. and V. Dejvongsa. (2017). *Situation Mapping/Analysis and Strategic Planning for SDC TABI Forest and Agriculture Land Use Planning in Lao PDR*. Field Report. Swiss Development and Cooperation (SDC): Vientiane.
- Gonsalves, J. and Y. Fujita Lagerqvist. (2018). *Mid-term Review: The Agro-biodiversity Initiative (TABI) Phase 3*. Swiss Agency for Development and Cooperation. Vientiane.
- Roche, C. and Linda Kelly. (2014). *‘A Changing Landscape for Partnerships: The Australian NGO experience’ in Rethinking Partnerships in a Post-2015 World: Towards Equitable, Inclusive and Sustainable Development*, Reality of Aid Report 2014.
- Wahl, Daniel Christian. (2016). *Designing Regenerative Cultures*. Triarchy Press (Published with International Futures Forum).
- Source of quote on title page: Hahn, Thich Naht (1988). *The heart of understanding: Commentaries on the Prajnaparamita heart sutra*. Parallax Press, Berkeley, California.



CHAPTER **5**

YOUNG FARMERS AND THE FUTURE OF FARMING IN UPLAND LAOS

*The wind brings the fragrance of pear blossoms in January
You can savor spicy herb-dip with crab stew in February
Termite eggs and grilled sticky rice will make you happy in March
These foods feel like a dream, but they are real and unforgettable.*

- A poem from TABI's primary school agro-biodiversity curriculum

With half its population under the age of 24, Laos is a young country. A million of these young people (70 percent) currently reside in rural areas. They tend to be better informed and more mobile than their parents. What does agro-biodiversity offer for their future?

Many young people from the rural uplands want to escape the drudgery of farming and live a modern life, for which they need cash. They seek greater independence and the chance to do something different. Some will work as paid labor in the agriculture sector. Others will leave the rural uplands for work and new skills in cities or across the border in Thailand. Many young people have creative new ideas for agriculture-based small businesses, but they need support and mentoring to fulfil these aspirations.

The agrarian transition inhibited the passing on of agro-biodiversity knowledge to this young generation. TABI's work in schools to address this thinning knowledge offers us promising lessons to take forward. In order to nurture and sustain the rich agro-biodiversity of Laos, young people must be inspired by it, and they must see it as part of a viable and fulfilling future for themselves and their families.

In this chapter we bring these ideas together to imagine farmers, entrepreneurs, and farming enterprises in a green future that celebrates agro-biodiversity.

YOUNG PEOPLE AND THEIR FUTURE

What will you be doing ten years from now?³³

“My parents want me to be a doctor, but I want to be a tour guide. I will show people how beautiful this place is.” (young girl, aged 14)

“I need money... I want to be rich. I am looking for a job. I think I will have to go to Vientiane.” (boy, aged 17)

“I don't want to stay here. I want to see civilization. But I will miss the hot spring.” (boy, aged 18)

“We will invest in organic fruit trees. But I want my children to be in Vientiane, or have a good government job in town.” (village man, aged 55)

³³ A question asked in two different focus groups, one with older people, and one with youths - Pong village in Sobbao district in Houaphanh province, January 29, 2020.

“I cannot say because it has not happened. I want to have a car, but I don't have a pig or cow, or anything to sell, how can I get money? Is there a project that can help?” (village woman, aged 62)

Laos has a young population | With the youngest population of any Asian country, Laos has a median age of 21.6 years (World Population Review, 2020). Half the population is estimated to be under 24 years of age, and 70 percent of them (about a million people) live in rural areas. With a declining fertility rate and dependency ratio, Laos should be poised to reap a demographic dividend³⁴. But this economic potential can be realized only if there is decent work for these young people in the areas in which they live (DoPLA, 2019). As we think about the future of agro-biodiversity in Laos, the aspirations of young people and the livelihood opportunities available to them are important to our story.

But unemployment among youth is high | While rural areas in Laos are developing economically, unemployment³⁵ for young people is high, with only 28 percent of rural youth participating in the labor workforce. In a 2016 study by the German international development agency, GIZ, on the Expectations and Aspirations of the Lao Youth, 38 percent of 1,200 youths surveyed said that unemployment was a significant challenge in their lives and 20 percent added that earning enough money to buy food was a challenge. Of the 37 percent of youths who were not currently in school or college, more than half had never been employed at all and 42 percent were unemployed and looking for work (DoPLA, 2019). This is perhaps why many families in the rural uplands do not see a future for their children close to home.

Young people have different needs and aspirations | The agrarian transition that we explored early in our story has had a big influence on the lives of young people. As agricultural practices have been shifting, they have accumulated less knowledge of indigenous practices and agro-biodiversity. The opening of markets and the movement toward commercial agriculture also brought greater connectivity of villages through roads and mobile phones. Compared with their parents, young people have much more information and exposure to the world beyond their village or district – they are better connected, are



The youth are the stewards of tomorrow's agro-biodiversity resources. (Credit: TABI)

³⁴ Demographic dividend, as defined by the United Nations Population Fund is, "the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)."

³⁵ The definition of unemployment follows the changes adopted by the 19th International Conference of Labor Statisticians in 2013. In this definition, those who work only for their own subsistence are not considered to be in employment.

“Gender is an absolutely essential part of the broader conversation on migration in Lao PDR and beyond.”

“...women migrants are subject to numerous challenges. They tend to work longer hours for lower pay under worse conditions than their male counterparts and are more likely to receive arbitrary pay cuts and other forms of workplace abuse and exploitation, as well as facing discrimination and stigmatization.” (DoPLA, 2019)

more mobile, and have more knowledge about modern life and products. Young people want to escape the drudgery of farming and shape their own lives. Many of them are leaving their villages in search of work to be able to get some cash of their own, rather than continue to provide free labor on their parents' farms. Some work on commercial plantations for paid wages. Parents, too, do not want the hard work, uncertainties, and low status of farming for their children. When it is possible to accumulate some resources through commercial agriculture, many families invest in the education of their children in the hope that it will help them get a job in the city, preferably a secure government job.

Migration plays an important role in their lives | As agricultural households are diversifying their livelihoods, migration (mainly to Vientiane or across the border to Thailand) has become an increasingly important livelihood strategy, and remittances become an important lifeline for many families and a major input for agrarian systems.

For young people, migration also has other benefits like acquiring new skills and knowledge not available in their village, new life experiences, independence and empowerment. But they also encounter dangers like exploitation, occupational injuries, extortion by police, trafficking, drugs, and debt. Young women are especially vulnerable to trafficking and sexual crimes. Women make up 59.3 percent of internal migrants and over half of the Lao migrants in Thailand. Remittances from women are of critical economic importance and they challenge traditional gender norms.

There is also the question of whether migration is voluntary or involuntary – a necessity or a choice – and there isn't always a clear line between the two. Interviews with international migrants consistently show that, if there were employment opportunities in their home areas, many would return bringing back new skills and experiences (DoPLA, 2019). The dynamics of migration and the considerations that motivate people to migrate away from their homes are complex and dynamic, intersecting with various aspects of an overall agrarian transition and associated labor dynamics. And, these considerations differ for women and men.

While migration is often viewed as a strategy to move away from farming to wage paying work, this is not always the case. Many people who migrate maintain a strong link back to their families and farms and may use these wages to subsidize farming or to raise capital to invest in their farms. Some may intend to return to their farm or fall back on subsistence farming as a safety net between wage paying jobs. As farming livelihood strategies have diversified, many families are not completely dependent on agriculture but have also not moved out of agriculture. So, the questions around migration we may ask are: How can young people be supported to have safe and dignified migration experiences? And, how can we help young people to successfully and strategically leverage their migration experience for more secure livelihoods?

What does agro-biodiversity offer for young people's livelihoods and future? |

While many young people are eager to leave rural areas, many feel that they have no option. If there was opportunity in or near their village, some of them would stay. Others may acquire new skills and return. Having grown up on farms in changing times, these young people are accustomed to complexity and uncertainty. Enhanced mobility and wider exposure has helped many of them become more agile than their parents were – balancing and navigating through different strategies to make a living, circling in and out of wage income opportunities, and combining off-farm activities with farming livelihoods. Young people are more likely to be entrepreneurial and many of them have innovative new ideas for small agriculture businesses. But these ideas need to be nurtured, developed, and supported. The Lao Uplands Rural Advisory Services (LURAS) project, in collaboration with Enterprise and Development Consultants and a few agricultural colleges, has successfully run several rounds of competitions for rural youth in the uplands inviting creative agriculture-based entrepreneurial ideas and awarding small start-up funds and mentoring support for winning ideas. There clearly is opportunity here, but it takes hard work, support, and accompaniment, and such opportunities are currently few and far between.

As we reflect back on TABI's work, how can attention to agro-biodiversity, multifunctional landscapes, and participatory forest and agriculture land use planning open up opportunities for young people? What kind of support is needed to leverage these opportunities for a viable, green future in the uplands? We don't pretend to have the answers to these questions in our story... But our conversations on forest and land use planning, the value of multifunctional landscapes, regional market opportunities, the domestication of indigenous species, and renewed interest in local foods have highlighted a range of possibilities that greater attention to agro-biodiversity may yield for future upland livelihoods.



Teachers are key to the development of curricula on agro-biodiversity for local schools. (Credit: TABI)

THE AGRO-BIODIVERSITY CURRICULUM

*The river provides fish and crabs
The rice fields provide the frogs
These simple foods make our lives content
And with our ears we enjoy the birds' songs.*

(A poem from TABI's primary school agro-biodiversity curriculum)

Early in the life of TABI, it was clear that agro-biodiversity knowledge resided mainly with the adult population of the uplands and that children of the current generation were not as exposed to related knowledge and practices. TABI began an initiative to increase children's awareness, knowledge, and skills on the importance of biodiversity in their lives and agro-biodiversity practices by designing a curriculum around traditional knowledge that would be embedded in their school lessons. The curriculum was developed in collaboration with teachers, students and local farmers.

The curriculum design was led by Ajaan Soundeuang from the Ministry of Education and Sport in Xiengkhouang province. He tells us the story of the curriculum's genesis:

“My interest in developing the curriculum started long ago. In 2002 I was invited to Vientiane to look at the issue of how to live with unexploded ordnance. We ended up developing a curriculum for children, to build their awareness and knowledge about staying safe in an environment with unexploded ordnance. As this issue is so much related to land, it led to the development of another curriculum on local wisdom. The Ministry of Education wanted to link local wisdom to education, and we worked with many organizations to build this curriculum. It focused on sharing the knowledge of the older generation with children. We incorporated local practices in this curriculum, such as how to process crispy river weed, or how to make an intricate sculpture from banana leaves for festivals, how to weave mats from local grasses, and how to pickle different local foods.

Later, when TABI was being designed, I was introduced to the design team. The local wisdom curriculum had many things related to agro-biodiversity, and we discussed the possibility of developing material that could be integrated in the education curriculum. Our work grew from there. We developed the curriculum with teachers and local farmers. Now there are three curricula – one for children in grades four and five, one for children in grades six to eight, and one for non-formal education, dealing with issues around pesticides.

It is important that the agro-biodiversity curriculum is merged with the regular curriculum, and not be something separate. Our vision is to provide students with knowledge and practical experience at an early age, so that they do not destroy the environment. If they learn these things young, they will be more likely to conserve agro-biodiversity resources. They will have more love for their land and want to return to their villages.”

The Agro-biodiversity Curriculum – Key Features

Agro-biodiversity curricula (PDES, 2019-20) have been developed for grades four to five and grades six to eight (15 chapters for each grade). Each chapter focuses on a particular aspect of agro-biodiversity. For example, “Important factors for living and surviving”, is the opening chapter for the grade 5 curriculum and “Agro-biodiversity management – practice and implementation” is a chapter in the curriculum for grade 8. The curriculum for non-formal education currently focuses on issues related to pesticide use.

The school curricula and related activities are intended to be integrated with other subjects, such as mathematics, science management, social and global studies. They include five songs, 20 poems, and seven riddles that are adapted locally in schools in collaboration with students, teachers and parents.

The curricula were developed and refined over a period of 10 years in Xiengkhouang province through use in more than 30 schools. They were later adapted for 10 schools in Houaphanh province. At TABI's closing workshop in Luang Prabang in March 2020, Dr. Vongphet Oudomlith, Deputy Director of Education in the province, expressed interest in adapting them to create some chapters for use in Luang Prabang schools.



School classrooms become the center of local agro-biodiversity products and learning (Credit: TABI)

Early on an October morning, we drive to Naxaithong village in Phoukout district in Xiengkhouang province. This school had been working with the agro-biodiversity curriculum since 2010 and had adapted it to their needs over the years. When we arrive, an agro-biodiversity lesson is in progress with the fifth-graders. The Director of the school says we may observe them from the corridor. As we look in through the classroom windows, we see a number of different plants lying on the floor near the front of the classroom. The teacher calls on a few students and they come up and recite a poem about the plants, pointing out the medicinal benefits of each. The teacher then asks them to demonstrate how they harvest these plants. Self-conscious about our group peeping in from the window, they shyly show their classmates how the plants are to be harvested. We leave them to their lesson and go to the agro-biodiversity room that the school has created.

Teachers set up entire classrooms dedicated to learning about local biodiversity. (Credit: TABI)

The room is a pleasant surprise – the walls are lined with handmade posters of fish, insects, plants, amphibians, molluscs, reptiles, and crustaceans. On the tables against the walls are various traps and baskets used to catch fish and insects, specimen jars, and some fresh fruits and vegetables recently harvested. The room is sometimes used for agro-biodiversity classes, and is also open to villagers to come and offer lessons or to work together on their own plans related to agro-biodiversity. It's a good place to have a conversation with the Director of this school and one of the teachers. The following excerpts from our conversation show us what the curriculum means to them.

Mrs. Khankham, Director of Naxaithong School:

“In the beginning we were not ready for this curriculum in the school, but the teachers, parents and children wanted to have it. We set up a consultation with Mr. Soundeuang involving the village head and other people from the community to introduce the curriculum. Everyone was in favor.

Then we started to learn while doing. Teachers would take lessons and try out different things, and we would see how closely it could match with the curriculum and we would be in touch with Mr. Soundeuang, if needed. Every year we got better.

The curriculum is meant to be local – it belongs to the community. They want their children to understand and get this wisdom, and many parents too want to learn these things. We invite them to come and use our resources. We also invite villagers who have knowledge about plants, or cooking, or weaving to come and teach children, and sometimes parents, in this room. The villagers also have a chance to tell us which messages most interest them. We send a form that they fill in, and we try to use the messages they prioritize in our lessons.

The curriculum is designed to merge with other subjects, for example, mathematics or science management – sometimes the teachers will make handicrafts with students as part of their lesson on mathematics. The curriculum can be merged into seven subjects in this way. There are a lot of chapters in the book. The teachers select which chapters can match with which lessons in other subjects. You must talk to them about it.

Our biggest challenge is training. We had trained seven teachers, but some of them have moved to other schools. We need better training for newcomers and also refresher training. We help each other, but training would be good. I don't make things happen here on my own. Everyone has to want it and agree and then we can make it happen. It has been a good journey.”



Pointing out various things in the room, Mrs. Khankham says:

“This room is not only for the students. It is also for the community. They can come here and study and practice, or teach. This used to be a regular classroom, and we adapted it to be a center for agro-biodiversity knowledge.”

I am very happy we have this center, not just for our community... people come from other provinces. This helps expand the program to other areas. Our school is an example for others.”

We then speak with the teacher whose class we had observed earlier. Mrs. Phut is actually a maternity cover substitute for another teacher, but she seems to know the curriculum well.

“I am really happy that we are giving this knowledge to children. And not only children... they go home and teach their parents, and their parents tell them some things that they bring back. I have noticed that many people in the village are now more interested in talking about these things. Some of them come here to teach children or help with the practical lessons. We also have the garden outside where children can practice. I think the children enjoy it – you can talk to them.”

I have noticed other changes in the village – they are planting more trees, and have made a pond. Their fishing practices are changing. They are no longer using electric shocks to fish, and instead are practicing using the traditional baskets and nets.”

Talking about the challenges they face, she says,

“It is not always easy to integrate the curriculum in other subjects because the duration of each class is fixed. Sometimes, we just have a separate class for agro-biodiversity if we are not able to integrate it well.”

It is now recess time, and children are in the field, playing, singing, and some of them sitting in small groups, eating their lunch. Mrs. Phut calls out to one group of children and asks if they will speak with us. They agree and take two of us to their classroom. After introductions, we ask Mai, Bouasai, Phin, and Sommai (students from grade 5) what they learned that morning...

“Medicine garden! Today we learned about medicines for stomach ache and nose bleeds,” says Mai.

Bouasai cuts in... *“and we learned about a leaf to apply on cuts.”*

We ask them what they like best about these classes, and Phin says,

“The garden outside.”

They all agree and ask if we want to see the garden in which they work.

They walk us to the side of the school pointing out where they practice sowing and how they observe the soil. They point out the trees they have planted, and they are curious about where we live. Sommai says,

“We also plant things in the village. We show our parents what we learn and tell them to make a plan. Now they listen to us. I am going to plant many, many vegetables and herbs.”

Her classmates give her a look... they are eager to play before the break is over. They say bye and run off.

The visit inspires hope. When we think back to our walk through multifunctional landscapes and possibilities for the future, we can imagine some of these children ten years on, taking forward some of the entrepreneurial ideas emerging around agro-biodiversity. But how can the curriculum continue to evolve and help to hold, develop, and pass on critical knowledge and wisdom across generations? How can it be enriched by the innovation, changing practices, and learning generated by farmers interacting with their lands and forests? Could a link to a platform like Pha Khao Lao³⁶ help sustain this kind of intergenerational transfer of knowledge and ignite intergenerational relationships around agro-biodiversity?



Learning about traditional Lao foods builds an important life skill. (Credit: TABI)

AGRO-BIODIVERSITY, ENTREPRENEURS, AND FARMS OF THE FUTURE

“It is not always easy to convince young people that they have opportunity in these places. It is a hard life, and even if you have your own product and know how to process it (which many people do not), it is not easy. Logistics can be difficult and there are many bottlenecks to negotiate.”

“Young people are not excited by agriculture, but they are excited by agri-business. And they are looking for role models. I am happy that XaoBan has been a role model for some. We invite applications and accept interns. They spend a few months with us. If they do well, they may be able to join our team. Or

³⁶ A platform that was created by TABI initially as an agro-biodiversity knowledge and information-sharing platform, but with potential to be much more than that. You can read about Pha Khao Lao in Chapter 3.

they may return to try something on their own... they may organize supplies for enterprises like ours. You have to start somewhere. They work with us and we share our experience - they start to see that it is not easy. But if it was easy, there would be many like us. You have to do something new and difficult that others are not yet doing. You have to be patient and learn from your mistakes. Working together gives them the confidence to try." (Nongnut Foppes, Founder of XaoBan Food Group)

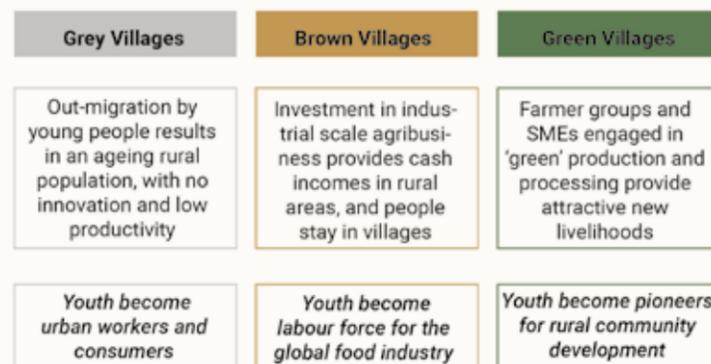
Let's think about the children we met at school. What might they be doing ten years from now? Assuming they grow up with an appreciation for diverse local plants, animals and fungi species, and love and pride for their land and village as envisioned by the architects of the agro-biodiversity curriculum – what then? Could they build viable agro-biodiversity related livelihoods in the future if they wanted to? What different roles could they play in these agro-biodiversity systems? What support would they have?

These questions are naturally linked to the overall future environment and agricultural context in the uplands. A 2016 presentation from the LURAS project explored three scenarios for the next generation of farmers in Laos: grey villages, brown villages, and green villages (Bartlett, 2016). In the grey village scenario, young people have migrated out of rural areas, leaving behind an ageing rural population with no innovation capability and low productivity. In the brown village scenario, industrial-scale agri-businesses provide cash income in rural areas. Young people stay, and join the labor force for the global food industry in which they have little agency. In the green village scenario, farmer groups and small and medium-size enterprises engaged in green production and processing provide attractive new livelihoods, and young people emerge as pioneers for rural community development. The presentation asks the audience to consider which scenario is likely to emerge and how development actors can support young people who remain in rural areas as well as those who leave.

From an agro-biodiversity perspective, the only scenario that makes any sense is that of the green village. It is the only one that would provide positive food inputs to communities and meet urban demand for local foods. A future that is closer to the grey or brown scenarios would mean an irreparable loss for the incredible natural resource endowment and unique heritage and treasures of Laos and a waste and erosion of the vast agro-biodiversity knowledge and experience of upland farmers. And, it would mean significant nutritional losses for upland communities.

So what may a green village scenario look like in a bit more detail? In particular, how could agro-biodiversity-rich multifunctional landscapes and related small and medium green enterprises play a role in enabling this scenario to become a reality? Development players working on agricultural systems often consider the question of whether youth will stay in rural areas or leave. We heard this question several times as we engaged people in conversation to build our story, including from old and young people in rural areas themselves. It is natural to ask this question given the effects of the agrarian transition on the structure and dynamics of labor, one of the most important inputs for smallholder agriculture. But these questions do not have easy answers in these changing times and may not be the most helpful questions. Time and again our story has reminded us that the black and white neatness of binary choices is giving

Figure 5.1: Scenarios for the next generation. (Source: Bartlett, 2016)



Which scenario is most likely to happen?

way to a much more complex reality in the uplands.

The answer to whether young people will stay or leave the rural uplands is probably neither and both. Most want to leave, and many of them will have no option but to leave. A few will inevitably fulfil their parents' dreams and obtain government jobs. Some who migrate to Vientiane or across the border to Thailand may earn enough to send back remittances and put aside some savings. But, if given the opportunity, they may return, bringing new skills and capital which they may choose to invest in high-value agro-biodiversity options. Others who leave may encounter grave danger and live with harm. Some may never leave if they have a chance to earn cash on commercial farms or if they see other promising prospects in the rural uplands. Some of them may even be able to access resources, accumulate some assets of their own, and operate productive agri-businesses. A few may set themselves up in nearby towns or in the big city from where they play critical roles as part of their family farming business.

There are many possible paths and most young people will criss-cross several of them through their working lives. There are more options imaginable today for young people than there were a decade ago. But the truth is that the more promising emerging opportunities are still few and far between and are not yet visible to most young people in the rural uplands. And they are harder to reach and seem unattainable for young women. It is currently not clear to most young people where they can get support and advice to pursue new ideas and alternative paths.

To close our reflections in this chapter, we have begun to paint a picture of what agro-biodiversity enterprises and farms of the future may look like in a green upland village scenario. This vision is created from a range of conversations we had with various people in building this story – farmers, their children, traders, district and provincial agriculture and forestry officials, TABI and other project staff, teachers, and non-profit association workers. The vision is in no way comprehensive, and it may not necessarily hold well together – it may be tempting to dismiss some of this picture as being naïve or unrealistic. But, pause a minute, if you can... these raw ideas and dreams are all the more precious for being rough, incomplete, and unpolished. They draw on real people's dreams and vision. It is an invitation to you, dear reader, to lift them, use them, engage in conversations that help shape a promising future of agro-biodiversity in upland Laos with particular attention to the evolving roles of young people in food and agriculture systems.

An emerging vision for agro-biodiversity inspired landscapes, enterprises and farms of the future

In 2030, across the uplands we see a green mosaic of multifunctional landscapes where fields and forests are actively managed by upland farming communities. There are still some concessions and monoculture plantations, but they are not the dominant feature of the upland landscape. Some elements of this vision include:

Interconnected webs of farms and agro-biodiversity related enterprises | Networks of diverse, interconnected and competing farms and enterprises are scattered across the landscape. They produce and exchange local agro-biodiversity-related goods and services, adding value to each other and to the land. They play critical functions in regenerating agricultural systems.

Many farms are engaged in both commercial and subsistence agriculture, managing and sustaining



Artistic depiction of an emerging vision for agro-biodiversity

multifunctional landscapes and connecting to local, national, regional, and global markets. Different enterprises specialize in different stages of agro-biodiversity production and use – processing, aggregating and supplying, marketing, branding and packaging, transport, interface with retail, offering services for microenterprises, and so on. They are spread over rural and urban locations, with some members on-farm and others in towns and cities linking to more distant markets, traders, consumers, investors, and related industries, or raising capital through other economic activities. These agro-biodiversity-related enterprises are not exclusively positioned in the domain of agriculture and forests. They overlap and are connected to the food industry, eco-tourism, health, handicrafts, hospitality services, and others. They are important drivers of economic development, food security, and environment conservation in the uplands.

Innovation and agility | Several farms and agro-biodiversity-related enterprises are engines of innovation and are run by young women and men. Being accustomed to uncertainty, they strive for agility, with low infrastructure, linked to shared platforms and resources, using technology to their advantage, and adapting and innovating as they progress based on real-time customer and partner feedback. As young people are naturally more mobile, they play roles of connectors and networkers between farms, enterprises, government and private services. They are able to operate across levels and between rural and urban areas. They no longer wait for projects to come to them but lead the development of new ideas and seek out diverse resources.

Unique identity of the uplands | While some farmers continue to work on monoculture plantations and concessions or engage in contract farming, the dominant narrative of development in the uplands is based on positioning them as a hub of green agriculture, unique and rich in agro-biodiversity, and a generator of ecosystem services in the region. Small agro-biodiversity enterprises leverage this identity to compete in national, regional, and global markets, with values rooted in agro-biodiversity, deep knowledge of their unique natural resources, and love of their land and forests. They have an increasing array of products that have a geographical indication registration³⁷ that allows them to be marketed as unique to Laos and to fetch a high price.

The role of technology | Technology is integral to these enterprises – for labor saving on farms; sharing and accessing information related to weather changes, agriculture techniques, and pricing; linking farmers, traders, processors and consumers; for complying with “Country of Origin Labeling” in order to trade internationally; learning new skills; facilitating safer migration and transfer of remittances; supporting business planning and business development services; enabling communication and transfer of learning; amplifying voices of small farmers and local agriculture-based entrepreneurs to influence policy and other decision makers; for marketing products; and for getting customer feedback.

Expanded roles and careers associated with agro-biodiversity | In 2030, agro-biodiversity careers are no longer limited to farmers and government agriculture and forestry officers. They include action researchers, village facilitators, teachers, entrepreneurs and innovators, green extension agents, food technologists, agronomists, artists and handicraft makers, data analysts, crop and food processors, village collectors/aggregators/traders, exporters, designers, eco-tour operators, butchers, heritage chefs, herbalists, botanists, agri-investors, network hosters, and many more. They attract young people, both women and men. As these expanded roles are increasingly linked to each other and visibly connected to farmers and their land, people begin to have a more holistic view of agriculture, moving beyond the perception of it as “dirty” and a “drudgery”. Farming the land will always be hard work, but it will be

³⁷ A Geographical Indication is a name or sign used on products which corresponds to a specific geographical location or origin (e.g. a town, region, or country). The use of a geographical indication, as a type of indication of source, acts as a certification that the product possesses certain qualities, is made according to traditional methods, or enjoys a certain reputation, due to its geographical origin.

easier through labor-saving technologies, and farmers will increasingly build the expertise to domesticate valuable indigenous species in regenerative perennial agriculture systems that mirror the natural habitats from where they originate.

These diverse roles and career options are visible and well-respected. They cut across rural and urban areas, small and large towns. They span a wide range of sectors and themes, and demand many different kinds of skills. Young people in these emerging roles are seen as role models, and in this respect, they are public figures. They are active communicators and networkers and receive support and publicity for their work. They serve as ambassadors for these emerging roles.

Learning opportunities for young people | In this future vision, children learn about agro-biodiversity from an early age, through an evolved agro-biodiversity curriculum with hands-on practical experience. The curriculum exposes them to an expanded range of roles and related skills that encourage learning about biodiversity as well as how to build it into desirable livelihoods. Children have the opportunity to meet and be inspired by young role models. Agricultural colleges have evolved through innovative public-private-civil society partnerships to prepare people for roles beyond government agriculture service. They are networked with a range of different kinds of private and public organizations offering skill-building opportunities, internships, competitions and awards, leadership and mentorship programs, learning exchange visits, trouble-shooting assistance, business planning and other business development facilities aligned with the green growth strategy.

These local, national, and international learning opportunities are funded through diverse government, civil society, and private sector resources, but they are not isolated within short-term donor-funded projects. Development players facilitate learning opportunities within a collectively shaped regenerative learning environment that enables a more systemic way of working than in the past. This environment is nurtured through formal and informal commitments of development players to engage in ways that promote transparency, active sharing of information about learning opportunities for young people, and data and lessons from their implementation. Platforms such as Pha Khao Lao play an important role in this way of working, as do various other private forums and government platforms. These platforms help connect various players, compile information and knowledge, and make it more accessible to potential users.

These opportunities are not centrally controlled by a single agency but are inter-connected and linked. There is agreement among development players that it is no longer acceptable to operate as a single short-term project without linking and contributing to this wider learning system that supports collective learning. Funding arrangements promote and mirror this way of working, with experimentation around co-funding, funding platforms, and social enterprise models. At a local level, traditions of sharing labor, seeds, food, and knowledge are revived, celebrated, and supported.

Support services for young farmers and entrepreneurs in food and agriculture systems | In 2030, different kinds of agro-biodiversity related livelihood strategies and diverse types of farm enterprises and organizations demand different kinds of support. The widespread adoption of participatory forest and agriculture land use planning and green extension, with its focus on what people learn as well as how they learn, has strengthened farmer decision making, action research, and learning capability. Formal and informal farmer and community groups and organizations are engaged in farmer-to-farmer learning and collaborative action research. They support each other, and amplify farmer voices and issues in decision making forums.

There is recognition of the important role agro-biodiversity-related producers and small entrepreneurs play in the economic development of the uplands and the risky and uncertain environment in which

they operate. This leads to enhanced support for these entrepreneurs and their enterprises after they leave the protected environment of agriculture colleges or project sponsors. This support includes, but is not limited to, start-up guidance and capital, trouble-shooting expertise, systematic risk assessment and mitigation, the development and use of appropriate metrics, access to credit, small subsidies to overcome challenges or explore new ideas, networking and linking services and events, access to support groups, learning and exchange visits, competitions and incentives to encourage innovation, and other small business development services.

There is clarity and dedicated thinking on the nature of support appropriate for different categories of farmers, agricultural entrepreneurs, and other agro-biodiversity-related roles. Extending beyond production and productivity training of traditional extension systems, a diverse range of support is now available through a reformed and responsive system of agriculture and forestry research through NAFRI that views upland farmers as critical to good research and learning.

As with learning opportunities for young people, these support services are offered by a wide net of government, civil society, and private players, but are not isolated within short-term, donor-funded projects. Even when funded through short-term projects, they operate within an agreed framework and make a commitment to honor collectively agreed standards and principles, to share data and analysis, and to expand learning opportunities for young farmers and agro-biodiversity-related entrepreneurs.

Food and nutrition | Greater attention to agro-biodiversity is changing the “rice-centric” view of food security. Diets are becoming more diverse and micro-nutrient rich, drawing on a wider range of local foods that are collected and bought. A growing appreciation for heritage foods has led to greater attention to food processing and nutrition in the uplands and more accessible local knowledge about nutrition for young children. The uplands are known for organic foods, healthy eating, and good nutrition. Efforts to improve food and nutrition security have progressed way beyond supporting vegetable gardens and school lunch programs. They now include the inherent nutritional opportunities provided by local foods found in multifunctional landscapes, which support rural families with both more cash and continued ties to their land and to the natural foods they produce.

Shifts in policy | Agriculture, forestry, and land policies have become much clearer and enabling for upland farmers. There has been greater recognition of their contributions to meeting development and conservation goals. Shifting cultivation which is planned as a rotational system is no longer prohibited or censured – it is supported through green extension and is seen as contributing to the objectives of green agriculture. While there continue to be protected areas for conservation and areas in which intensive agriculture is practiced, agriculture, environmental, and forestry policies recognize the values and ecosystem services contributed by multifunctional landscapes. There is a growing understanding of different types of forests, including mature shifting-cultivation fallows, sustainably used forests, and domesticated and semi-domesticated fields, and Laos has emerged as a leader in global discussions on the subject. Agro-biodiversity and local species and cultivars are seen as central to the development of upland rural agricultural economies and to nutrition-sensitive food security. There has been growing evidence for its support through changes in land use planning processes and priorities, tenure policies, and taxation systems. As a result, upland communities invest more time and energy in sustainable land and forest management. There is increasing policy support for safe migration and return, and there are more developed remittance systems and incentives for agricultural enterprises.



Importantly, in this emerging vision, farmers (including young farmers) play a visible and critical role at many levels. Investments in learning processes through green extension are beginning to reap dividends beyond good agricultural practices and research outcomes. There is a strong, growing farmers' movement with many different kinds of farmer organizations, cooperatives, and producer groups networked and interacting with actors across food and agriculture systems. This strengthening farmer-led organizational infrastructure forms a learning core for agriculture and food systems.

“There's a song that wants to sing itself through us. We just got to be available. Maybe the song that is to be sung through us is the most beautiful requiem for an irreplaceable planet or maybe it's a song of joyous rebirth as we create a new culture that doesn't destroy its world.” (Joanna Macy)

REFERENCES

Bartlett, A. (2016). *The next generation of farmers in Laos*, Presentation for the Mekong Extension Learning Alliance in Yangon, June 2016. Lao Upland Rural Advisory Service.

Department for Policy and Legal Affairs (DoPLA). (2019). *Toward People Centered Agriculture: Rethinking rural labor, youth employment, and the agrarian transition in Laos*. Ministry of Agriculture and Forestry. Vientiane.

Provincial Department of Education and Sports (PDES), Xiengkhouang province. (2019-20). *Primary and secondary school agro-biodiversity curricula*. Lao PDR.

World Population Review. [<https://worldpopulationreview.com/countries/laos-population/>]. Last accessed April 23, 2020.

Source of quote on title page: TABI primary school agro-biodiversity curriculum (PDES, 2019-20)

Source of closing quote: Joanna Macy in an interview with Krista Tippett, “*A Wild Love for the World*” originally aired on September 16, 2010. [<https://onbeing.org/programs/joanna-macy-a-wild-love-for-the-world/>]. Last accessed on July 23, 2020.

Collage Credit:

The collage on page 142 was created by Andy Souvanphakdy, a senior at the National University of Laos who worked as an intern at TABI alongside her studies, supporting the Pha Khao Lao platform. The collage captures her vision of the future of agro-biodiversity-inspired landscapes using photographs from the TABI library and some of her own. In the future, Andy sees herself living in the cool highlands growing coffee and strawberries.

CODA

[A graphic story set in Phonsavanh in 2030]

In October 2030 Laos was recognized at the UN Biodiversity Conference for a “big leap forward” in protecting its biodiversity. This success was attributed to proactive investment in multifunctional landscapes and supporting agro-biodiversity based livelihoods in the uplands.

Building on this recognition, the Pha Khao Lao platform (PKL)³⁸ convened a day-long event in Phonsavanh, inviting interested players to come together, celebrate this success, brainstorm ideas and create new opportunities. The event attracted farmers, researchers, agri-entrepreneurs, government officials, craftspeople, restaurateurs, development practitioners, land use planners and others. Lar, whom we met as a ten-year old at the start of our story is active in the Pha Khao Lao platform as a connector and organizer. She has played a critical role in the planning group for this year’s event. And Bounmee, whom we met as a young District Agriculture and Forestry Officer ten years ago now heads a data analysis function in the Xiengkhouang Province Agriculture and Forestry Office. The conversations here take place in the evening just after the Pha Khao Lao event.

³⁸ A platform that was created by TABI initially as an agro-biodiversity knowledge and information sharing platform, but with potential to be much more than that. More information on Pha Khao Lao is available in Chapter 3.



PHA KHAO LAO CELEBRATIONS HAVE ALREADY SPILLED OVER TO THE GOLDEN CHESTNUT RESTAURANT. MANIVANH, AN ACTIVE MEMBER OF THE LAO WOMEN'S UNION FROM PAK DISTRICT IS ALREADY HERE WITH COLLEAGUES FROM THE ASSOCIATIONS THAT SPONSORED HER FARMER GROUP'S TRAVEL TO THE PLATFORM EVENT.



AH, THERE'S MANIVANH. SHE'S THE LADY FROM LAO WOMEN'S UNION WHOM WE ARE MEETING TOMORROW. I WILL INTRODUCE HER.



OH LOOK - THOSE THREE STUDENTS THERE ARE FROM THE AGRICULTURAL UNIVERSITY. THEY HAVE BEEN VERY ACTIVE IN PKL THIS YEAR AND ALSO VOLUNTEERED FOR TODAY'S EVENT.



YES, THEY HAVE BEEN BRINGING US EVENT POSTERS AND FLYERS TO SHARE WITH OUR CUSTOMERS.



CONGRATULATIONS PKL TEAM. YOU ALL DID A FANTASTIC JOB.

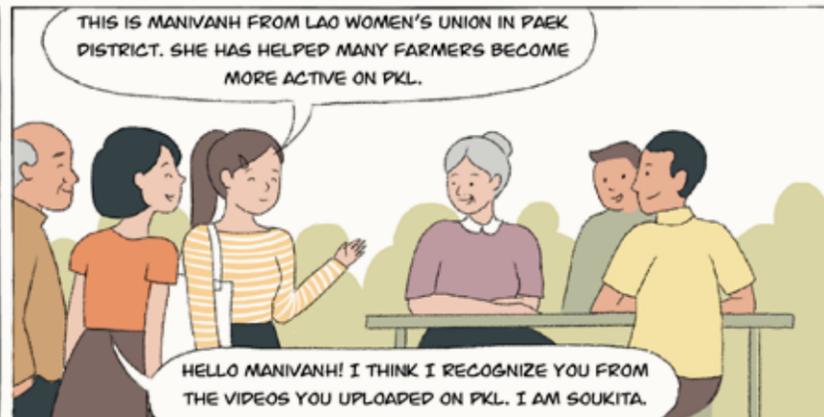
WE WERE JUST TALKING ABOUT THE 'AM I AN IDEA INNOVATOR' STALL. WHAT A FUN IDEA - YOU WALK IN WITH A HALF-BAKED IDEA AND WALK OUT WITH CLARITY AND CONFIDENCE ABOUT IT.

THE IDEAS ARE NOT ALL OURS... THAT ONE WAS DESIGNED BY A GROUP OF COMMUNICATION STUDENTS AT THE NATIONAL UNIVERSITY OF LAOS. EVERYONE ENJOYED IT.



... OUR FARMER GROUP LIKED THE VIDEO-MAKING SESSION A LOT. THEY EVEN SCREENED SOME OF THE VIDEOS WE MADE...

SABAIDEE MS. MANIVANH!



THIS IS MANIVANH FROM LAO WOMEN'S UNION IN PAK DISTRICT. SHE HAS HELPED MANY FARMERS BECOME MORE ACTIVE ON PKL.

HELLO MANIVANH! I THINK I RECOGNIZE YOU FROM THE VIDEOS YOU UPLOADED ON PKL. I AM SOUKITA.

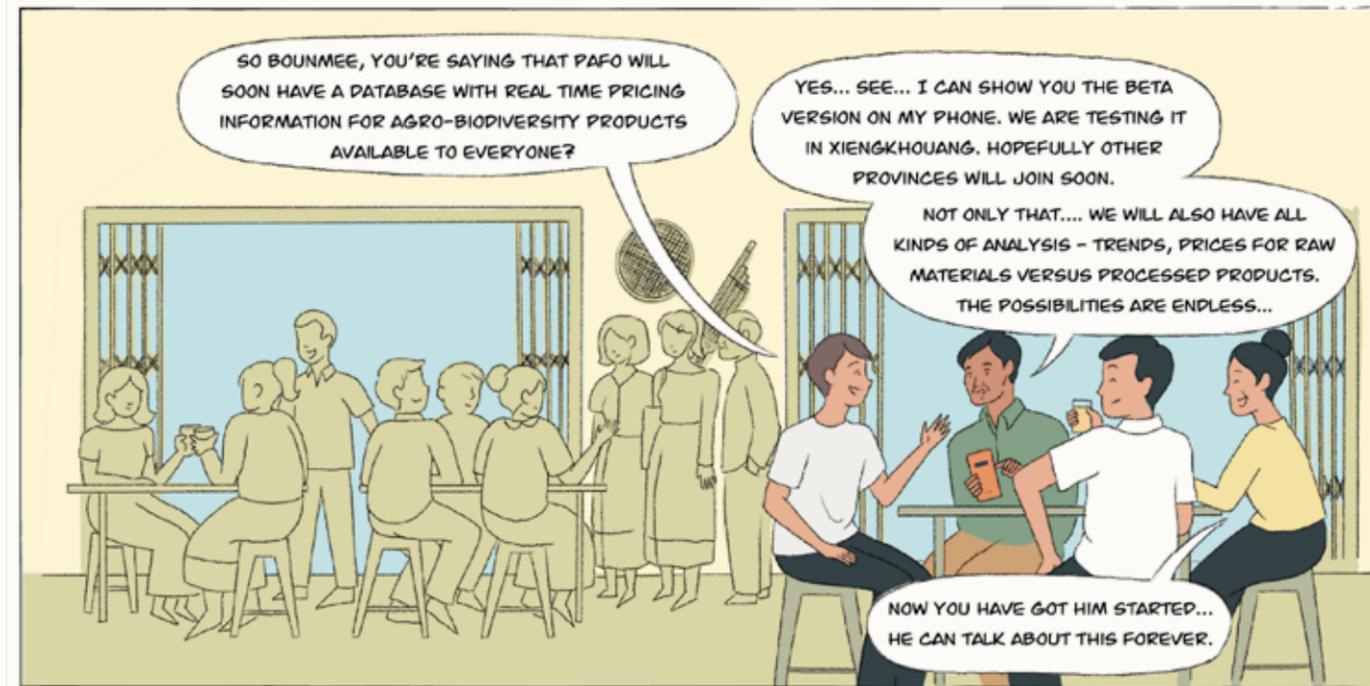


I ENJOY MAKING VIDEOS. IT'S A GOOD WAY FOR US WOMEN FARMERS TO SHARE OUR PERSPECTIVE.

I THINK WE HAVE A PLAN TO MEET TOMORROW?



YES, WE ARE VERY HAPPY THAT YOU ARE INTERESTED IN JOINING PKL'S STEERING COMMITTEE. WE WILL TALK MORE TOMORROW. ENJOY THE EVENING.

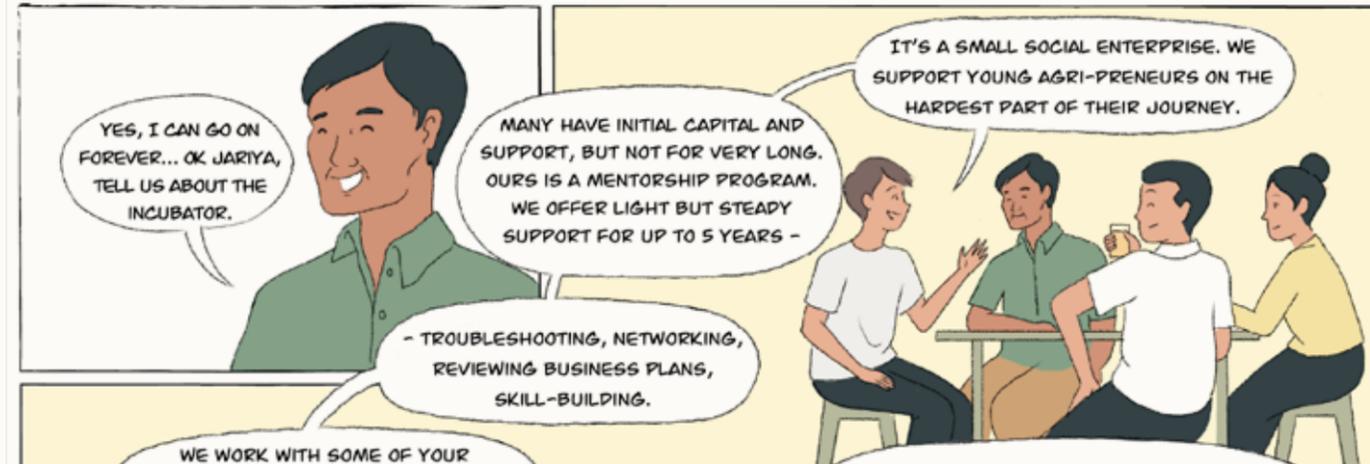


SO BOUNMEE, YOU'RE SAYING THAT PAFO WILL SOON HAVE A DATABASE WITH REAL TIME PRICING INFORMATION FOR AGRO-BIODIVERSITY PRODUCTS AVAILABLE TO EVERYONE?

YES... SEE... I CAN SHOW YOU THE BETA VERSION ON MY PHONE. WE ARE TESTING IT IN XIENGHOUANG. HOPEFULLY OTHER PROVINCES WILL JOIN SOON.

NOT ONLY THAT... WE WILL ALSO HAVE ALL KINDS OF ANALYSIS - TRENDS, PRICES FOR RAW MATERIALS VERSUS PROCESSED PRODUCTS. THE POSSIBILITIES ARE ENDLESS...

NOW YOU HAVE GOT HIM STARTED... HE CAN TALK ABOUT THIS FOREVER.

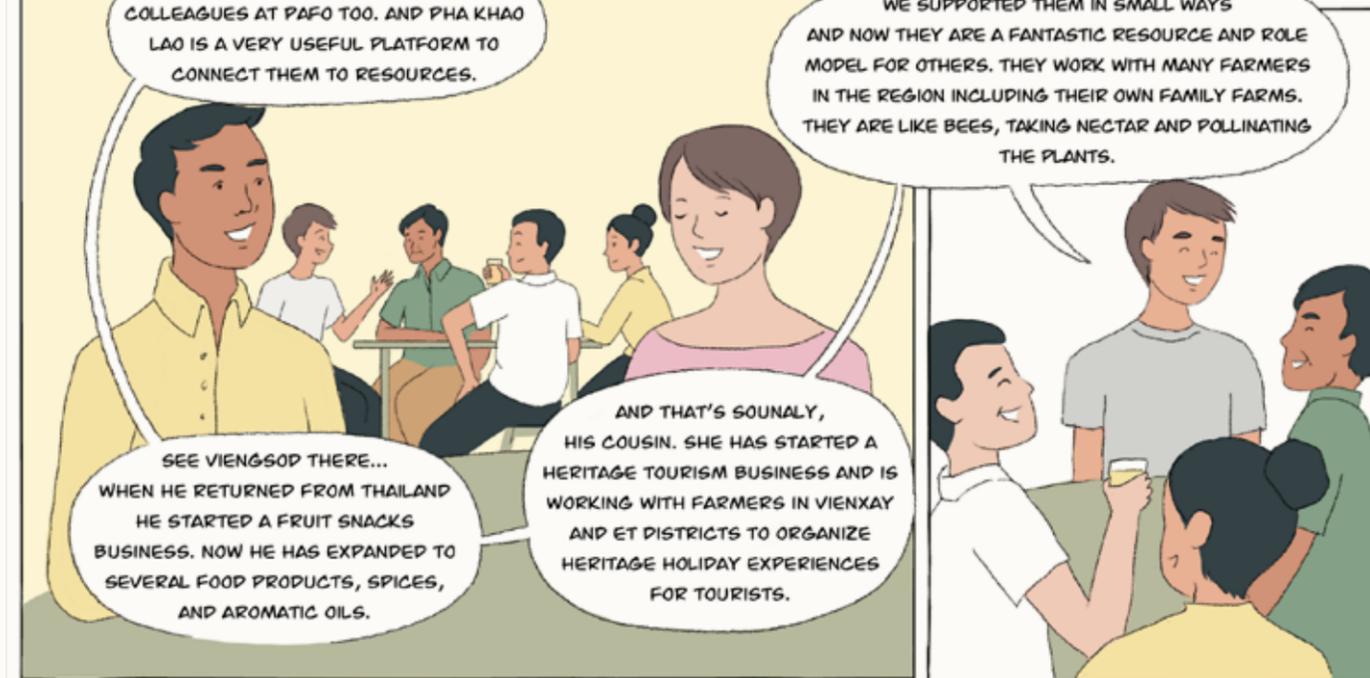


YES, I CAN GO ON FOREVER... OK JARIYA, TELL US ABOUT THE INCUBATOR.

MANY HAVE INITIAL CAPITAL AND SUPPORT, BUT NOT FOR VERY LONG. OURS IS A MENTORSHIP PROGRAM. WE OFFER LIGHT BUT STEADY SUPPORT FOR UP TO 5 YEARS -

- TROUBLESHOOTING, NETWORKING, REVIEWING BUSINESS PLANS, SKILL-BUILDING.

IT'S A SMALL SOCIAL ENTERPRISE. WE SUPPORT YOUNG AGRI-PRENEURS ON THE HARDEST PART OF THEIR JOURNEY.



WE WORK WITH SOME OF YOUR COLLEAGUES AT PAFO TOO. AND PHA KHAO LAO IS A VERY USEFUL PLATFORM TO CONNECT THEM TO RESOURCES.

WE SUPPORTED THEM IN SMALL WAYS AND NOW THEY ARE A FANTASTIC RESOURCE AND ROLE MODEL FOR OTHERS. THEY WORK WITH MANY FARMERS IN THE REGION INCLUDING THEIR OWN FAMILY FARMS. THEY ARE LIKE BEES, TAKING NECTAR AND POLLINATING THE PLANTS.

SEE VIENGSOP THERE... WHEN HE RETURNED FROM THAILAND HE STARTED A FRUIT SNACKS BUSINESS. NOW HE HAS EXPANDED TO SEVERAL FOOD PRODUCTS, SPICES, AND AROMATIC OILS.

AND THAT'S SOUNALY, HIS COUSIN. SHE HAS STARTED A HERITAGE TOURISM BUSINESS AND IS WORKING WITH FARMERS IN VIENXAY AND ET DISTRICTS TO ORGANIZE HERITAGE HOLIDAY EXPERIENCES FOR TOURISTS.

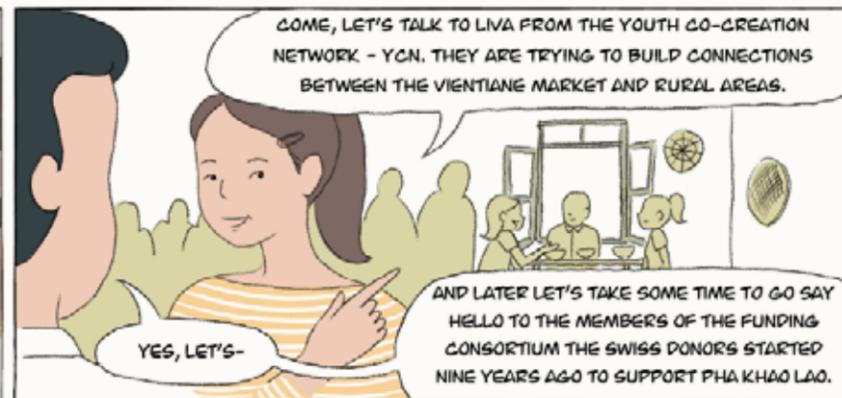


THE RESTAURANT IS FILLING UP. A LIVELY GROUP OF TRADERS HAVE OCCUPIED A TABLE AT THE CENTRE. A GROUP OF PHA KHAO LAO'S INVESTORS HAVE ALSO COME IN...



WAS THAT GROUP AT THE EVENT?

I SAW ONE OF THEM - A SPICE TRADER FROM VIETNAM.



COME, LET'S TALK TO LIVA FROM THE YOUTH CO-CREATION NETWORK - YCN. THEY ARE TRYING TO BUILD CONNECTIONS BETWEEN THE VIENTIANE MARKET AND RURAL AREAS.

YES, LET'S-

AND LATER LET'S TAKE SOME TIME TO GO SAY HELLO TO THE MEMBERS OF THE FUNDING CONSORTIUM THE SWISS DONORS STARTED NINE YEARS AGO TO SUPPORT PHA KHAO LAO.

EXCUSE ME EVERYONE... I JUST WANT TO SAY THANK YOU FOR COMING THIS EVENING. IT'S A SPECIAL CELEBRATION TODAY AND WE WOULD LIKE TO OFFER FREE MUSHROOM APPETISERS.



THE SPECIAL MUSHROOM IS FROM LAETHONG VILLAGE, AND THE FARMERS WHO PRODUCED THEM ARE RIGHT HERE. ENJOY THE EVENING.

HELLO LIVA... HOW WAS YOUR DAY?



IT WAS VERY EXCITING. WE HAVE POSTED MANY PICTURES AND HAVE ALREADY LINKED SOME PEOPLE TO OUR NETWORK MEMBERS - WE ARE STILL MEETING NEW PEOPLE.

THAT'S GREAT.



OH, EXCUSE ME. I SEE MY FRIEND, MAI COMING IN.

SENGPHET'S SISTER, MAI RUNS THE RESTAURANT BUSINESS WITH HIM. SHE AND LAR ARE GOOD FRIENDS FROM UNIVERSITY. THEY HAVE BOTH BEEN BUSY AND NOT BEEN ABLE TO MEET IN A WHILE.



MAI! I HAVE BEEN LOOKING FOR YOU. WHERE HAVE YOU BEEN? LET'S CATCH UP!



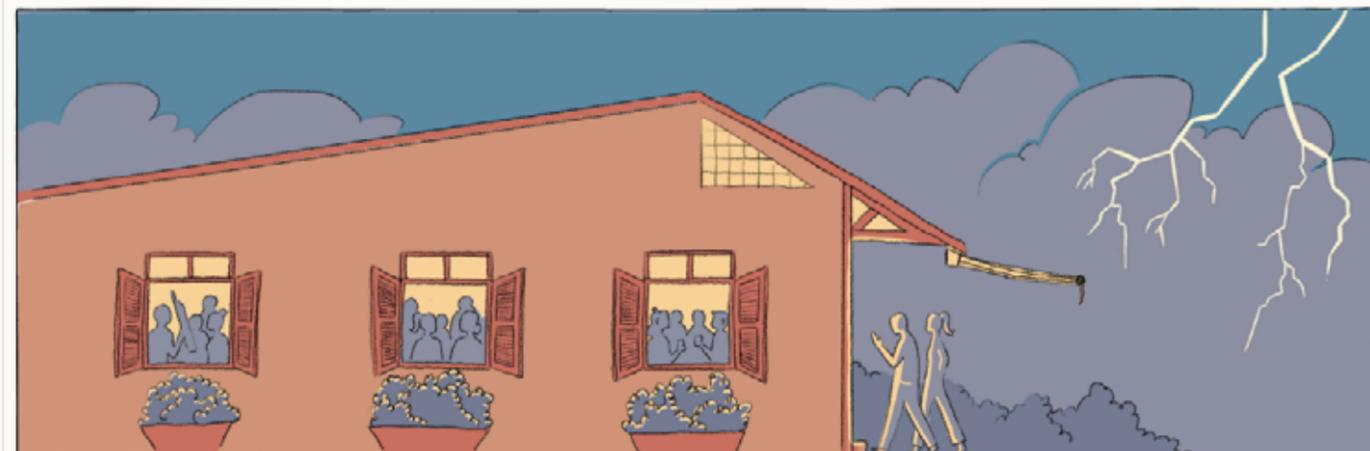
CONGRATULATIONS LAR! I HEARD THAT EVERYTHING WENT OFF VERY WELL.

THANK YOU MAI. I HAVE MET SO MANY INTERESTING PEOPLE AND THE DAY WAS FULL OF IDEAS... CONGRATULATIONS TO YOU TOO. THE RESTAURANT IS DOING SO WELL.

THANK YOU...YES, PEOPLE ARE NOW VERY INTERESTED IN EATING LOCAL FOODS MADE WITH ORGANIC INGREDIENTS.

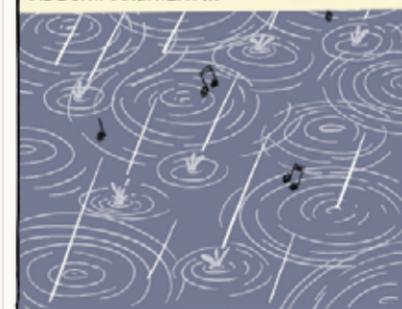


WE WERE CATERING FOR A PRIVATE EVENT AND I WAS BUSY SETTING UP - SO NICE TO SEE ALL THESE PEOPLE HERE!

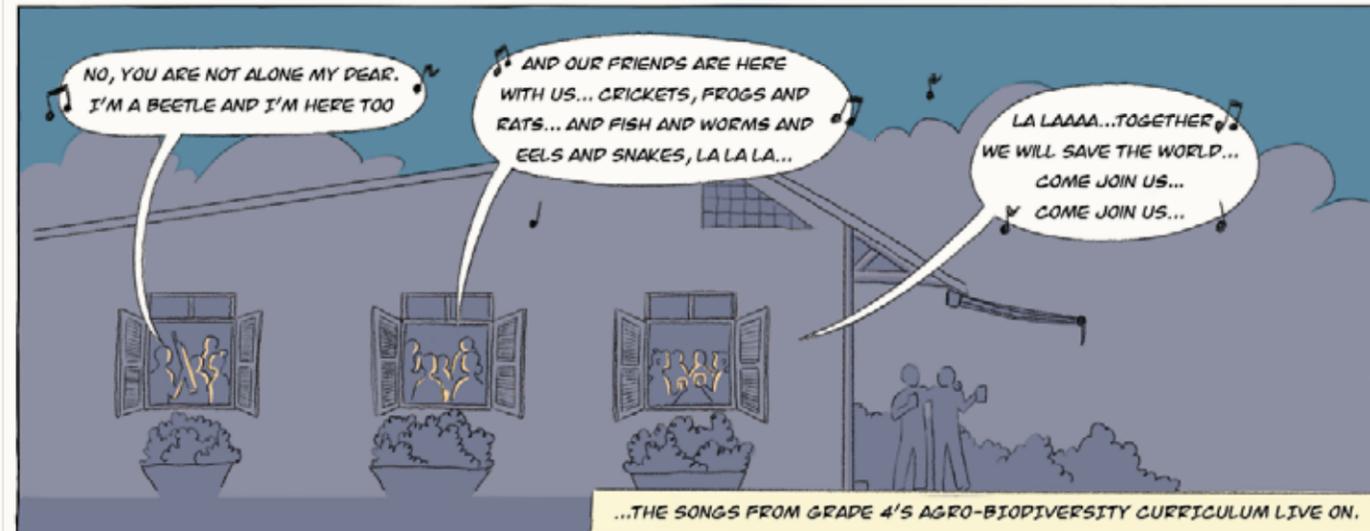


EXCUSE ME EVERYONE... THE ELECTRICITY DEPARTMENT HAS TURNED OFF THE POWER FOR A WHILE, UNTIL THE STORM PASSES. PLEASE RELAX. THERE IS PLENTY OF FOOD AND DRINK, AND WE WILL GET SOME MORE LIGHTS ON.

WITH THE RAINSTORM AS MUSICAL ACCOMPANIMENT...



AM I ALL ALONE HERE... WHAT AM I GOING TO DO?



NO, YOU ARE NOT ALONE MY DEAR. I'M A BEETLE AND I'M HERE TOO

AND OUR FRIENDS ARE HERE WITH US... CRICKETS, FROGS AND RATS... AND FISH AND WORMS AND EELS AND SNAKES, LA LA LA...

LA LAAAA...TOGETHER WE WILL SAVE THE WORLD... COME JOIN US... COME JOIN US...

...THE SONGS FROM GRADE 4'S AGRO-BIODIVERSITY CURRICULUM LIVE ON.

ANNEX

DESCRIPTION AND COVERAGE OF SUB-PROJECT ACTIVITIES

No.	Sub-Project Focus	Nature of TABI support
1	Agro-biodiversity education	Agro-biodiversity curricula development, teacher training, and initial school supplies for primary, secondary and non-formal education schools: 44 schools, 4,920 students.
2	Bamboo	Propagation, management, habitat planning, and processing of multiple bamboo species: 8 villages, 260 households.
3	Beekeeping	Training of farmers in basic beekeeping, honey processing, by-product development, and marketing: 46 villages, 1,000 households.
4	Benzoin	Basic benzoin tree management, benzoin tree habitat planning, benzoin resin management, and marketing: 9 villages, 728 households.
5	Biogas	Trials on biogas production using animal waste: 37 villages, 627 households.
6	Broom grass	Propagation, area expansion, habitat planning, broom construction training, group development, and marketing of broom grass and brooms: 11 villages, 85 households.
7	Cardamom	Propagation, extension, processing, habitat planning, and marketing for cardamom: 2 villages, 57 households.
8	Native chilis	Documentation and expansion of native chili varieties: 5 villages, 122 households.
9	Shade coffee	Coffee cultivation in forest shade ecosystems consistent with agro-biodiversity principles, followed by linking efforts to further support: 23 villages, 397 households.
10	Fire control	Preparation of fire control plans and construction of fire lines to control wildfires (promoted as part of the forest and land use planning program): 47 villages, 4,167 households.
11	Fish conservation zones	Establishment of fish conservation zones by communities, their expansion, and strengthening of their management: 177 villages, 18,703 households.
12	Rice-fish systems	Expansion of the local practice of fish cultivation in rice fields during the rice growing season, introduction of new species, and promotion of local species: 20 villages, 143 households.
13	Herbicide and pesticide use	Farmer learning in alternative pest management strategies which are less reliant on chemical pesticides: 146 villages, 15,902 households.

14	Irrigation	Support to local efforts to increase access to water for improved cropping in lowlands as a strategy to reduce the need for upland farming: 13 villages, 157 households.
15	Legume intercropping	Increased crop diversity and associated agro-biodiversity in cropping systems by means of intercropping legumes and other crops: 24 villages, 219 households.
16	Native vegetable varieties	Increase in crop diversity and agro-biodiversity in cropping systems by means of promoting native vegetable cultivation: 23 villages, 534 families.
17	Native bananas	Native banana cultivation and marketing as an alternative to concessions for large scale commercial cavendish banana destined for China: 19 villages, 210 families.
18	Native chickens	Improved animal husbandry for local chicken varieties: 69 villages, 965 families.
19	Native oranges	Improved management, planting materials, and marketing of local citrus varieties: 48 villages, 490 families.
20	Native pigs	Improved husbandry of native varieties of pigs, especially feeding with local foods (although later devastated by the swine flu): 12 villages, 172 families.
21	Non-timber forest product conservation	Identification, planning, and sustainable management of habitats known to be high in a diversity of non-timber forest products including their sustainable collection and marketing: 120 villages, 3,435 families.
22	Organic agriculture	Marketing of organic vegetables and connecting farmers to markets: 30 villages, 434 families.
23	Rice (Khao kai noi)	Support to government and farmer groups for the development and scaling up of high-quality seed for 7 strains of khao kai noi glutinous rice: 626 villages, 24,143 families.
24	Rice Seed Banks	Conservation of indigenous rice varieties by supporting community efforts for improved seed selection, collection, storage, and marketing: 24 villages, 1,115 families.
25	River Weed	Improved processing and marketing of river algae, followed by linking farmers to further support: 24 villages, 2,227 families.
26	Stic Lac	Stic lac cultivation (the lac insect) on pigeon pea plants followed by improved processing and marketing: 7 villages, 382 families.
27	Traditional medicine plants	Identification of medicinal plant habitats for abundant species in high demand, design of conservation plans, and development of marketing strategies: 15 villages, 1,830 families.

28	Tung Oil and Teak Trees	Tung oil tree cultivation and teak tree promotion, habitat planning, and marketing: 2 villages, 172 families.
29	Wild mushrooms (and chestnut forest) conservation	Conservation and leveraging the potential of a diversity of mushroom species through habitat (chestnut forest) planning, market assistance, and farmer group strengthening: 15 villages, 1,530 families.
30	Wild fish/shrimp	Enhancement of wild fish, shrimp, and frogs in waterways through selective spawning and release efforts: 12 villages, 1,200 families.
31	Wild tea	Protection of wild tea trees via the registration of old trees and the expansion of new trees in forest areas: 17 villages, 660 families.
32	Eco-tourism	Support for eco-tourism in areas high in biodiversity, such as wild tea forests: 5 villages, 526 families.

GLOSSARY OF SPECIES

PLANTS

Bamboo | Nor loy (*Indocalamus petelotii* (A.Camus) Ohrnb./ *Poaceae*), Nor lai (*Gigantochloa albociliata* (Munro) Kurz)

Banana | Makguay (*Musa acuminata x balbisiana* Colla (ABB Group) cv. Kluai “Namwa”/ *Musaceae*)

Betel pepper | Pu laan (*Piper betle* L./ *Piperaceae*)

Bottle gourd | Maknam (*Lagenaria siceraria* (Molina) Standl./ *Cucurbitaceae*)

Broom grass | Doc khem (*Thysanolaena latifolia* (Roxb. ex Hornem.) Honda/ *Poaceae*)

Cabbage | Phak kad (*Brassica oleracea* L./ *Brassicaceae*)

Chestnut | Makkaw (*Castanopsis indica* (Roxb. ex Lindl.) A.DC / *Fagaceae*)

Chilli | Mak phet (*Capsicum annum* L./ *Solanaceae*)

China smilax | Mat popeng (*Smilax glabra* Roxb./ *Smilacaceae*)

Climbing dayflower | Phak nyakap (*Commelina diffusa* Burm.f./ *Commelinaceae*)

Climbing wattle | Phak nao (*Acacia pennata* (L.) Willd./ *Fabaceae*)

Coffee arabica | Cafe Arab (*Coffea arabica* L./ *Rubiaceae*)

Coffee robusta | Cafe (*Coffea canephora* Pierre ex A.Froehner/ *Rubiaceae*)

Cucumber (small and big) | Makdenggua (*Cucumis sativus* L./ *Cucurbitaceae*) and Makdenglai (*Cucumis melo* L./ *Cucurbitaceae*)

Dragon fruit | Makmung kone, (*Hylocereus undatus* (Haworth) Britton & Rose/ *Cactaceae*)

Eggplant | Mak khouam (*Solanum melongena* L./ *Solanaceae*)

Eugenia | Phaknek (*Syzygium gratum* (Wight) S.N.Mitra/ *Myrtaceae*)

False daisy | Phak keep (*Eclipta prostrata* (L.) L./ *Compositae*)

Flowering fern | Phaknok (*Helminthostachys zeylanica* (L.) Hook./ *Ophioglossaceae*)

Four leaf clover | Phakwen (*Marsilea quadrifolia* L./ *Marsileaceae*)

Galangal/Galanga | Kha (*Alpinia galanga* (L.) Willd./ *Zingiberaceae*)

Garlic | Krateum (*Allium sativum* L./ *Amaryllidaceae*)

Ginger | King (*Zingiber officinale* Roscoe/ *Zingiberaceae*)

Herb paris | Homsammeang (*Paris polyphylla* Sm./ *Melanthiaceae*)

Indian borage | Bi huseua, (*Plectranthus amboinicus* (Lour.) Spreng./ *Lamiaceae*)

Indian spinach | Phakbang (*Basella alba* L./ *Basellaceae*)

Jackfruit | Makmee (*Artocarpus heterophyllus* Lam./ *Moraceae*)

Lao benzoin | Ton yarn (*Styrax tonkinensis* Craib ex Hartwich/ *Styracaceae*)

Lemon grass | Huasikai (*Cymbopogon citratus* (DC.) Stapf/ *Poaceae*)

Little chicken rice | Khao kai noi (*Oryza sativa* L. subsp. *japonica* Shig.Kato/ *Poaceae*)

Yardlong bean | Thoua yao (*Vigna unguiculata* (L.) Walp./ *Fabaceae*)

Longan | Lamnyay (*Dimocarpus longan* Lour./ *Sapindaceae*)

Malabar tree | Puakmuak (*Boehmeria glomerulifera* Miq./ *Urticaceae*)

Mango | Makmuang (*Mangifera indica* L./ *Anacardiaceae*)

Morning glory | Pakbong (*Ipomoea aquatic* Forak. var. *reptan*/ *Convolvulaceae*)
 Mulberry | Makmon (*Morus alba* L./ *Moraceae*)
 Native pear | Makjong (*Pyrus pyrifolia* (Burm.f.) Nakai/ *Rosaceae*)
 Okra | Phakmuak (*Abelmoschus esculentus* (L.) Moench/ *Malvaceae*)
 Onion | Homdeng (*Allium oschaninii* O. Fedtsch/ *Amaryllidaceae*)
 Orange solomon's seal | Bompakwan (*Polygonatum kingianum* Collett & Hemsl./ *Asparagaceae*)
 Oranges | Makpaen, Makchom, Huajook, Peuakbang, Nambak (*Citrus sinensis* (L.) Osbeck 'Valencia' / *Rutaceae*)
 Papaya | Makhung (*Carica papaya* L./ *Caricaceae*)
 Passion fruit | Mak Not (*Passiflora edulis* Sims/ *Passifloraceae*)
 Peach | Makhai (*Prunus persica* (L.) Batsch/ *Rosaceae*)
 Plum | Makman (*Prunus domestica* L./ *Rosaceae*)
 Pumpkin | Ma euh (*Cucurbita moschata* Duchesne/ *Cucurbitaceae*)
 Red tea | Cha, Sa (*Camellia sinensis* (L.) Kuntze/ *Theaceae*)
 River weed | Khai phean and Khai Mai (*Spirogyra varians* (Hassall) Kützing/ *Zygnemataceae*)
 Sponge gourd | Khadom (*Gymnopetalum chinensis* (Lour.) Merr./ *Cucurbitaceae*)
 Sweet corn | Sali (*Zea mays* L./ *Poaceae*)
 Sweet leaf gooseberry | Phakwan (*Sauropus androgynus* (L.) Merr./ *Phyllanthaceae*)
 Sweet potato | Mandang (*Ipomoea batatas* (L.) Lam./ *Convolvulaceae*)
 Sweet sorghum | Oiy liem (*Sorghum bicolor* (L.) Moench/ *Poaceae*)
 Tamarind | Makkam (*Tamarindus indica* L./ *Fabaceae*)
 Taro | Peuk (*Colocasia esculenta* (L.) Schott/ *Araceae*)
 Tuber fleecflower | Man-o-ling, (*Reynoutria multiflora* (Thunb.) Moldenke/ *Polygonaceae*)
 Tung oil | Mak Kao (*Vernicia montana* Lour./ *Euphorbiaceae*)
 Upland rice | Tuuc, Phuuc, Im (*Oryza ssp.*/ *Poaceae*)
 Vietnamese ginseng | Bombigating (*Panax vietnamensis* Ha & Grushv./ *Araliaceae*)
 Watermelon | Makmo (*Citrullus lanatus* (Thunb.) Matsum. & Nakai / *Cucurbitaceae*)
 Wild asparagus | Mat samsip (*Stemona tuberosa* Lour./ *Stemonaceae*)
 Wild cardamom | Mak neang pah (*Wurfbainia villosa* (Lour.) Škorničk. & A.D.Poulsen/ *Zingiberaceae*)
 Wild tea | Cha pa (*Camellia sinensis* var. *assamica* (J.W.Mast.) Kitam./ *Theaceae*)



FUNGI

Lao musutake | Het wai (*Tricholoma fulvocastaneum* same/ *Tricholomataceae*)
 Lizing mushroom | Het kan chong (*Ganoderma lucidum* (Curtis) P. Karst./ *Ganodermataceae*)
 Rosy russula mushroom (red mushroom) | Het kordeng (*Russula cf. rosea* Pers./ *Russulaceae*)
 Split gill mushroom | Het bee (*Schizophyllum commune* Fr./ *Schizophyllaceae*)

Termite mushroom | Het puak (*Termitomyces clypeatus* R. Heim/ *Lyophyllaceae*)
 White King Bolete mushroom | Het phung (*Boletus edulis* Bull./ *Boletaceae*)
 White log mushroom | Het khon khao (*Lentinus squarrosulus* Mont./ *Polyporaceae*)
 Jelly ear mushroom | Het sanoon (*Auricularia delicata* (Mont. ex Fr.) Henn/ *Auriculariaceae*)
 Tiger lentinus | Het kadang (*Lentinus polychrous* Lév./ *Polyporaceae*)



ANIMALS AND INSECTS

Asian giant hornet | Tordan (*Vespa mandarinia magnifica* Smith, 1852/ *Vespidae*)
 Asian hive bee | Peung Kon (*Apis cerana*)
 Dung beetle | Jujui (*Copris nevinsoni* Waterhouse, 1891/ *Scarabaeidae*)
 True water bug | Maakhang (*Cybister limbatus* (Fabricius, 1775)/ *Dytiscidae*)
 Black pig | Muu lath (*Sus scrofa davidi* Groves, 1981/ *Suidae*)
 Catfish | Padouk (*Clarias macrocephalus* (Günther, 1864)/ *Clariidae*)
 Chinese carp | Panai (*Cyprinus carpio* (Linnaeus, 1758)/ *Cyprinidae*)
 Common carp | Paffay (*Cyprinus carpio*)
 Eels | Ein (*Monopterus albus* (Zuiew, 1793)/ *Synbranchidae*)
 Frog | Kob (*Hoplobatrachus rugulosus* (Wiegmann, 1835)/ *Ranidae*)
 Giant honey bee | Peung Louang (*Apis dorsata*)
 Grasshoppers | Dakadan (*Cyrtacanthacris tatarica tatarica* (Linnaeus, 1758)/ *Acrididae*)
 Mole crickets | Jinai (*Neoscapteriscus borellii* (Giglio-Tos, 1894)/ *Gryllotalpidae*)
 Mud carp | Pakinya (*Ctenopharyngodon idella*)
 Rats | Nu (*Rattus rattus*/ *Muridae*)
 Red junglefowl | Kaipah (*Gallus gallus*/ *Phasianidae*)
 Rice field crab | Bu na, (*Esanthelphusa dugasti* (Rathbun, 1902)/ *Gecarcinucidae*)
 Small frog | Kiet (*Fejervarya limnocharis* (Gravenhorst, 1829)/ *Dicroglossidae*)
 Pond snail | Hoyjub (*Filopaludina martensi*/ *Viviparidae*)
 Cyclophorid Snails | Hoyhom (*Cyclophorus ssp.*/ *Cyclophoridae*)
 Snakes | Ngu (*Various*)
 Swallow | Nok en (*Artamus fuscus* / *Artamidae*)
 Weaver ants | Motdang (*Oecophylla smaragdina* (Fabricius, 1775)/ *Formicidae*)
 Tadpoles | I-heuk (*Amphibian Larva*)
 Termites | Buak (*Termites sp.*/ *Termitidae*)
 Tilapia | Panin (*Oreochromis niloticus*/ *Cichlidae*)



ABBREVIATIONS

ABD	Agro-biodiversity	PDR	People's Democratic Republic
ADB	Asian Development Bank	PFALUPAM	Participatory Forest and Agriculture Land Use Planning, Allocation and Management Process
AFC	Agro-Forestry Development Consultants	PKL	Pha Khao Lao (TABI's agrobiodiversity digital knowledge sharing platform)
AFN	Agriculture for Nutrition Program	PLUP	Participatory Land Use Planning
ALiSEA	Agro-ecological Learning Alliance in South East Asia	PONRE	Provincial Office of Natural Resources and Environment
ASEAN	Association of Southeast Asian Nations	REDD	Reduced Emissions from Deforestation and Forest Degradation
CBD	Convention on Biological Diversity	SDC	Swiss Agency for Development and Cooperation
CCL	Comité de Coopération avec le Laos	SDG	Sustainable Development Goals
CDE	Centre for Development and Environment, University of Bern	SNV	Stichting Nederlandse Vrijwilligers (Foundation of Netherlands Volunteers)
CLUFC	Current Land Use and Forest Cover Map	SPA	Sub-Project Agreement
COVID-19	Corona Virus Disease (the 2019 novel corona virus)	SU	Souphanouvong University
DAFO	District Agriculture and Forestry Office	TABI	The Agro-Biodiversity Initiative
DALaM	Department of Agricultural Land Management, Ministry of Agriculture and Forestry	TERRA	Terra Renaissance (A Japanese non-governmental organization)
DECA	Development Environment and Community Association	UN	United Nations
DoF	Department of Forestry, Ministry of Agriculture and Forestry	US	United States of America
DoL	Department of Land, Ministry of Natural Resources and Environment	UNCCD	United Nations Convention to Combat Desertification
DoPLA	Department for Policy and Legal Affairs of the Ministry of Agriculture and Forestry	VFI	Village Focus International
ENUFF	Enhancing Nutrition of Upland Farming Families	VUCA	Volatile, Uncertain, Complex, and Ambiguous
FAO	The Food and Agriculture Organization of the United Nations	WCS	Wildlife Conservation Society
FLUMZ	Forest and Land Use Management Zones	WREA	Water Resources and Environment Agency
GDP	Gross Domestic Product	WWF	World Wildlife Fund for Nature
GIS	Geographic Information System		
GIZ	German Agency for International Cooperation		
GPS	Global Positioning System		
GRET	Groupe de Recherche et d'Echanges Technologiques		
IFAD	International Fund for Agricultural Development		
IRRI	International Rice Research Institute		
IUCN	International Union for Conservation of Nature		
IWMI	International Water Management Institute		
KKN	Khao Kai Noi (Little Chicken Rice)		
LARReC	Living Aquatic Resources Research Center		
LIWG	Land Information Working Group		
LUP/LA	Land Use Planning and Land Allocation Program		
LURAS	Lao Upland Rural Advisory Service		
MAF	Ministry of Agriculture and Forestry		
MES	Ministry of Education and Sport		
MRC	Mekong River Commission		
MONRE	Ministry of Natural Resources and Environment		
MRLG	Mekong Regional Land Governance Project		
NAFC	National Northern Agriculture and Forest College		
NAFRI	National Agriculture and Forestry Research Institute		
NBSAP	National Biodiversity Strategy and Action Plan		
NEPL	Nam Et-Phou Louey National Park (a protected area in north-eastern Laos)		
NTFP	Non-Timber Forest Product		
NUoL	National University of Laos		
ODA	Overseas Development Assistance		
PAFO	Provincial Agriculture and Forestry Office		
PDES	Provincial Department of Education and Sports		

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Phouxay Phimsouvath	Deputy of DAFO, Viengxay district

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Andrea Rodericks, August 2020

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Over the past thirty years working on development challenges around the world such as social inequality, extreme poverty, and unsustainable use of resources, Andrea Rodericks has been increasingly drawn to exploring the complexity of these issues and the social and political forces that shape them. Her interests lie in understanding and telling the story of people's inner and outer journeys through these challenges. She currently works independently with a range of development organizations and social movements with a focus on multi-disciplinary learning and collaboration, organizational transitions, and exploring solutions for intergenerational equity.



In telling the story of agro-biodiversity in northern Laos, Andrea was guided by people's experiences (farmers, government officers, development practitioners, and traders) in navigating their complex environment through changing times. She wove together these stories with information from The Agro-biodiversity Initiative (TABI) to create the characters and ideas that make up this book.

Andrea grew up in New Delhi. She has a Bachelors degree in Economics from Delhi University and a Masters degree in Public Policy from the Princeton School of Public and International Affairs. She currently divides her time between Goa in India and Atlanta in the US, and may be reached at <https://www.linkedin.com/in/andrearodericks/>.



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