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To Laos and its landscapes

Preface

This book originates from a university teaching initiative for landscape architecture courses on ecological planning in Southeast Asia. Over the past 7 years, it evolved into a platform for knowledge exchange, planning consultancy and environmental advocacy. An outcome of this multi-year and multi-targeted initiative, this book synthesizes landscape architecture with critical awareness of the global development disciplines, connections not entirely new but which have radically diverged in recent decades. This awareness, together with landscape architecture's spatial and ecological acumen, is strategically used to explore the often-opaque planning, design and implementation processes of large-scale infrastructure and to complicate simplistic notions of development and urbanization frequently reproduced in the Laos-China frontier region.

The 414-kilometer China-Laos Railway, one of the first infrastructure projects implemented under China's Belt and Road Initiative (BRI), is nearing completion at the end of 2021. Coupled with hydroelectric dams, industrialization of new mineral belts, and super-highways, landscapes along this and similar development corridors in BRI countries are undergoing rapid and unprecedented transformation. Exploring diverse conceptions and issues of development, including cultural and scientific knowledge exchanges between Laos and China, nature tourism, resource networks and new town planning, this book provides chapters on the historical and interdisciplinary framing and pedagogy propelling its site-specific strategies that promote a wider "landscape approach" to development.

Most often the agents and accomplices of neoliberal development, the planning and design professions, including landscape architecture, have little dialogue with either the mainstream natural sciences or critical social sciences that form the discourse of development projects in Laos and similar contexts. Seldom do the planning and design professions engage post-development theory, and hence, they lack critical and tractable scholarly reflection on their socio-environmental impact and lack adequate methodologies in the academy and professional practice for mitigating that impact. Addressing this scholarly lacuna, this book advocates for ecological planning as a more momentary and political practice of sustainable development supported by post-development theory and emancipatory aspirations. Illustrated in a

selection of nine planning strategies developed by students, who followed this pedagogy since the ground-breaking of the China-Laos Railway in 2016, this book uses landscape architecture's interdisciplinary focus on planning and landscape ecology to synthesize critical development studies with the design disciplines' capacity, if not naive predilection, to intervene on the ground.

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Both authors contributed equally to this book.

Contents

Chapter 1
Introduction

Landscape as Development

1 Introduction

Landscape architecture participates in development. Whether that participation is self-reflective or uncritical, complicit or compromised, this discipline has had significant impacts on development practice and academia that are often unacknowledged outside what is otherwise a relatively narrow professional field. In the ways landscapes are planned and studied, for instance, both geographic information systems and modern landscape ecology, which are today established parts of diverse social and natural sciences, owe their origins distinctly to landscape architecture.

In 1967, landscape architect Ian McHarg, often referred to as the father of Geographic Information Systems (GIS), wrote that "[w]here the landscape architect commands ecology he is the only bridge between the natural sciences and the planning and design professions, the proprietor of the most perceptive view of the natural world which science or art has provided" (p. 105). With global urbanization increasing, both as physical land use change and as expanding discourse and rhetoric, not at any time since the beginning of the twentieth century's environmental movement in the early 1970s has this burden of "bridging" been more imperative. New allegiances between development agencies and planning institutions, such as in China's recent ecological "red line" policies (Bai et al., 2018), are extending these institutions' (and their planners and landscape architects') remit into sensitive non-urban landscapes and socio-ecological systems. While often the agents and accomplices of neoliberal development in countries such as Lao PDR, the planning and design disciplines generate scarce critical scholarly reflection on development and offer few models of practice for critically engaging or mitigating large projects.

A significant portion of this book presents planning proposals for rural development situated in northern Laos. "Development" here includes such projects, practices, and processes as land conversion, linear infrastructure building, ecological resilience, impact mitigation, and resource access and redistribution. These planning proposals are intended to be presented and debated with regional and national governments, multilateral banks, international environmental and human rights NGOs, civil

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society, and environmental movements. These actors are not the urban real estate developers, town planning boards, and city governments most landscape architects, architects, and planners are trained or accustomed to interact with. The most well-informed expertise in critical development studies rarely enters these professions or their projects, and there is a lack of publications in the planning and design fields that engage the implementation of large-scale infrastructure development. This book addresses this scholarly lacuna and uses landscape architecture's interdisciplinary focus on planning and landscape ecology to synthesize or "bridge" critical development studies with the planning and design disciplines' capacity, if not naive predilection, to intervene on the ground.

This bridging is admittedly uncomfortable, and intellectuals and professionals will disagree with this book. Green academics and geographers may, at least in the first half of this book, read little new here but a rediscovery of decades of their literature. Conservation biologists may see and rebuke a deconstruction of nature and scientific authority. Development practitioners, from both the international development community and built-environment camps, will argue that they are already practicing in interdisciplinary ways. Landscape academics will admonish us for shedding decades of landscape architecture discourse. When teaching our students as well as writing this book, we bear this potential crossfire in mind and deploy them as productive motivators in our search for alternative models of landscape architecture education and practice that more effectively bridge development, geography and natural sciences.

2 Critical Interventions

While this book details a pedagogy of planning, its primary reflections are on how planning for environmentally sensitive, rapidly developing contexts such as northern Laos should be approached by planners. There are at times unresolved tensions in our presentation of "critical" landscape planning as a pedagogy versus as a practice. This tension results from whether such a practice is relegated to the academy, the profession, consultancy, advocacy or a combination of these. There are strong institutional fields that make such a practice near impossible regardless of the host or medium. We must admit that this pedagogy is situated in two ways: Firstly, it is reactionary to ongoing rapid development in Lao PDR, primarily spurred by China's Belt and Road Initiative launched in 2013 and the assemblage of agro-industrial and infrastructural projects that predate or accompany it; and secondly, this pedagogy is taught as a required design studio course in landscape architecture at the University of Hong Kong, which enables or enhances varying degrees of access to Southeast Asia and relieves some burdens of the institutional fields present when operating from North American and European contexts.

Doyle and Doyle (2000) assert that environmental studies' "strategic problem-solving, … eclectic methodology of interdisciplinary approaches, [and] … critical and at times radical thought and propositions" are useful "to bridge the gap between

theory and practice" (p. xxx). However, doing planning, as opposed to studying it or the sciences that may (or may not) underpin it, is arguably different than being a critic of planning. It is important to consider how critical development specialists (e.g., a critical geographer or critical anthropologist) are trained and their frequent hesitation to generate tractable proposals from what are otherwise very robust, critical, and generative disciplinary spaces. For anthropologist Tania Murray Li in *The Will to Improve*, a book based on her fieldwork and consultancy in Indonesia's Sulawesi highlands, this hesitation is reflected in her inability to suggest effective development programs:

> I find an ethnographic appreciation of the complexities of rural relations to be antithetical to the position of expert. This might seem counterintuitive. Surely a person like me, after more than a decade of research, has ideas about how to translate that knowledge into effective programs to help people? Indeed, I am sometimes asked by anthropologically trained development administrators in Indonesia to provide suggestions about what they should do. More specifically, they ask me to provide them with a bridge between my research describing the dynamics of rural life, which some of them have read, and the world of projects, which they inhabit. Such a bridge eludes me. Why is it, I ask myself, that so many experts can examine Indonesia and devise programs to improve it, whereas I cannot? (Li, 2007, p. 3)

Li further describes how development projects result from acts she calls the "rendering technical" from a field of preexisting, predetermined capacities or solutions, the construction of "an arena amenable to management and calculation" (p. 28). This act is similar to what political ecologists Forsyth and Walker (2008) articulate as "problem closure" in their work in northern Thailand (p. 12). Li articulates her critical position here primarily as "diagnostic" (p. 3); for her, the role of critic and expert (e.g., the planner) are distinct because of the expert's necessity to define problems in terms of the solutions that can be offered. Geography's various interdisciplinary constructions for studying nature-society relationships, such as political ecology and land change science (Turner & Robbins, 2008) or, more recently, a call for a critical physical geography (Lave et al., 2014), hold, to various degrees, cultural-technological positions that challenge Li's distinction between critic and expert. A large portion of *Chapter Two: A Pedagogy of critical landscape planning* is dedicated to developing a cultural-technological position for landscape architects doing development planning, i.e., landscape planning, and exploring Li's circumscription of what constitutes a "project."

3 Landscape Planning as Sustainable Development

Although this book is written from the perspective of the design disciplines and is intended to effect change in and for various silos of landscape architecture education, in programs both design-oriented and science-oriented, we offer considerable bridging into development, geography, and natural sciences. Indeed, in the book as in teaching, we hold an outward valence and deploy mostly foreign discursive sounding

boards to make and justify both pedagogical choices and suggestions for how to do planning.

This book also offers a significant break with the ecological planning and landscape ecology literature from landscape architecture. Landscape ecology is defined as "the science and art of studying and improving the relationship between spatial pattern and ecological processes on a multitude of scales and organizational levels" (Wu, 2008, p. 2103). Richard T. T. Forman, professor emeritus in Harvard's Department of Landscape Architecture, is considered the father of modern landscape ecology, as well as the subfield of road ecology. Since its inception in the mid-1980s, modern landscape ecology has become a vibrant field over the last three decades in various biological, geographical, and social sciences (Cushman et al., 2010). Furthermore, early geographic information systems (GIS) research and development addressed questions of "development suitability" among human landscape use (such as agricultural or industrial), environmental limits (such as slope, soils, and water supply), and their consequences or services (such as erosion and pollution control) (Chrisman, 2006). Indeed, throughout the 1990s, land-use planning in Laos was rationalized through "scientific" expertise stemming from such land suitability analysis and geospatial software environments (Lestrelin et al., 2012, p. 583). Although, in the course of their learning, our students have engaged with landscape ecologists, none of those landscape ecologists had trained in landscape architecture, and, indeed, they recognize little if any disciplinary lineage with landscape architecture. The same is true for natural and social scientists deploying GIS.

Significant ideological barriers are also present. With few exceptions, most landscape architects and planners are disciplinarily short-handed to engage sustainable development outside of what is termed urban sustainability. This inadequacy requires a shift (not merely expansion) in design discourse and related built-environment fields from urban sustainability to conservation and sustainable development. Sustainability is most commonly defined as "…a dynamic balance among three mutually interdependent elements: Protection and enhancement of natural ecosystems and resources; economic productivity; and provision of social infrastructure such as jobs, housing, education, medical care and cultural opportunities" (Dominski et al., 1992, as quoted in Bell & Morse, 1999). Alternatively, the International Union for the Conservation of Nature (IUCN) has, since the 1980s, defined "sustainable development" as "…development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987). Key to this latter definition is the framing of sustainable outcomes in terms of "ability," which foretells the focus of post-development theory on, rather than material outcomes, the means of development, the process of development, and ensuring that people have the capacity to improve their own lives (Sen, 1999). Arguably, most of the planning and design disciplines (i.e., landscape architecture, architecture, urban planning) take the former definition, which presumes a necessity to quantify resources, to be economically productive, and that social infrastructure, including health and well-being, is something to be provided. For landscape architecture to effectively engage in landscape planning and development, landscape architects must wield a discourse of sustainable development and shift away (not merely expand) from design's dominant

forms of economic or urban sustainability. This shift is explored through situated, Laos-specific discourse from geography in *Chapter Four: Locating discourses and narratives for intervention.*

4 A Definition of Critical Landscape Planning

Landscape architects are not traditionally trained to be critical; they are also not trained as natural scientists, and landscape architects' expertise in development should be treated with suspicion. Landscape architects are mostly designers (e.g., artists) who tend toward ecologically conceptualizing their practices with varying degrees of social and (natural) scientific sophistication. Although landscape architecture claims distinct lineages in human geography and town planning, it is often the more mainstream town planning traditions that drive the field both academically and professionally. However, Gerald Young, in his 1974 survey of applied human ecology fields, remarked that:

> [S]everal of the soundest and most successful ecologically based environmental consultant firms are essentially converted landscape architecture firms, e.g. Wallace, McHarg, Roberts and Todd in Pennsylvania or Steinitz and Rogers in Massachusetts. This latter trend presents a difficulty in trying to distinguish an ecological method specifically for landscape architecture; most of its more prominent practitioners, at least those in print, tend not to separate it from the field of planning and generally make little attempt to distinguish method (Young, 1974, p. 53).

Although we by no means have naive faith in the capacity of "design" (as a holistic approach from the design disciplines) to offer ways to improve improvement, we do argue that landscape architecture's role in the institution of planning remains, in its capacity (and responsibility) as McHarg had argued in 1974, to "bridge" planning with natural science. We further this argument in this book to suggest landscape architecture's contemporary role to bridge planning with critical development, as well as conceptions of nature that hold it, in its own right, distinct from humanistic social deconstruction (e.g., conservation biology; see Soulé, 1995).

There are numerous, almost assuredly insurmountable, barriers to what could be considered "critical" planning. Planning is largely mainstream, dominant and an active participant in the neoliberalization of science. Planning suffers from a lack of effective interdisciplinary knowledge and praxis with both critical social science and applied ecology. We do not address these issues, nor do we provide a comprehensive survey of critical social theory or critical approaches as they pertain to development. Instead, we demonstrate the use of critical reflection as conceptual generators in the making (and drawing and designing) of plans. We bridge tenets from design, such as process-based and iterative approaches, to similar process-based axioms and methods in post-development theory.

Our working definition of critical landscape planning is as follows:

A practice of critical landscape planning, routed in landscape architecture, uses multiple forms of sustainability to plan for landscapes engaging in (or encountering)

development. The critical landscape planner holds a cultural-technological position and simultaneously applies science to specific site conditions, is critical of that science, and in the process and practice of applying it, refines and deepens the relevant scope of work.

Whether done by a consultancy firm or a large international NGO (with no designers or planners), planning is almost always a compromised effort. We are attempting to push planning towards a more momentary and political practice of sustainability (not economic or urban sustainability) that is supported by post-development theory and emancipatory aspirations. The conceptual approaches in students' projects presented in *Part Two* of this book are driven by a critical development focus, which can be distilled even from the project titles, such as: *Negotiating with ethno-ecology: Landscape management strategies for northern Laos's ecotourism boom*; *Empowering a labor transition during enclosure and securitization of Luang Prabang's natural heritage*; or *Water risk and responsibility: A political-chemical land genealogy for the Muang Sing Valley, Laos.*

5 Organization of This Book

This book is divided into two distinct parts. The three chapters in *Part One* have a wide remit, covering issues from pedagogy to practice, reframing the development history of northern Laos as an assemblage of projects, and surveying the discourses necessary, hopefully, to make development planning better—or as anthropologist Li (2007) would say—"for how improvement can be improved" (p. 2). *Part Two* surveys nine strategic planning proposals developed from that pedagogy and discourse.

In *Chapter Two: A Pedagogy of critical landscape planning*, we suggest a form of critical research and practice in landscape architecture that actively engages the global development community. We frame critical landscape planning as produced through three primary struggles: holding cultural-technological positions; ensuring transdisciplinary approaches through culturing and immersion; and maintaining momentum via process-oriented approaches to development. We cover critical landscape planning's definition as an applied critical research practice, address its primary challenges institutionally, academically, and practically, and describe the aspects of the landscape architecture design discipline that enable it. This is conveyed through reflection on our approaches to project case study selection and design exercises, stakeholder relationships, approaches to fieldwork, capacity for intervention, and association with parallel research efforts. Much of the contents, although supported academically, are structured as suggestions that are equally important as methods for design research and professional practice. These suggestions include replacing "site analysis" with a process of site-specific interdisciplinary socialization and replacing design and planning "concepts" with generative (even if often incommensurable) cultural-technological positions.

Chapter Three: From land-locked to land-linked? constructs a history of infrastructure-building in Laos understood through economic connectivity. This

chapter challenges the dominant narrative of a dehistoricized, often linear progression from land-locked to land-linked or from isolation to integration by contextualizing the contemporary imaginations and developments of Laos within the broader social, economic and political transitions across the Mekong region. We ground the distinct histories of three loosely defined historical periods between the mid-nineteenth century and present day in discourses specific to their times and places, each with their own geographic conception of the Mekong region and particular combination of socio-economic and geopolitical imperatives driving investment in large-scale infrastructure projects. This chapter presents development projects in Laos as relational and cumulative and supports an understanding of development as a process instead of product.

Chapter Four: Locating discourses and narratives for intervention explains why particular literature (i.e., secondary sources) were included as supporting knowledge for our approach to landscape planning. This chapter argues that planners and designers engaging in a "critical" landscape planning need a proactive, rigorous and reflective approach to assembling the discourses, both global and local, in their projects. Discourse is assembled from post-development theory, cultural anthropology, sociology, political science, political geography, and political ecology. Drawing from a selection of articles on the recent (i.e., since establishment the Lao People's Democratic Republic in 1975) political economy and ecology of Laos by Lestrelin et al. (2012), Goldman (2001), Barney (2009) and Dwyer (2020), we foreground four critical concepts that function as conceptual drivers of the strategic planning proposals featured in *Part Two* of the book. These critical concepts are: the politics of land-use planning; sustainable development paradigm; frontier resourcification; and the promise of infrastructure.

The strategic planning proposals in *Part Two* are loosely grouped into four thematic areas: (1) Infrastructural connectivity and difference; (2) Western alternative development and Chinese development; (3) Chinese mass nature tourism and ecotourism; and (4) Northern scientific knowledge and indigenous knowledge. These planning proposals engage the development of large-scale agro-industry, infrastructure and extractive projects, and the milieu of green developmentalist projects that contest and enable them, such as protected areas, community forestry programs, and corporate social responsibility projects. Political economist Simpson (2014) following Hirsch (1998) argues that most environmental movements in the Global South have "crystallised most clearly around large-scale resource projects" and that they are "movements that 'oppose something'" (p. 50). Although not overtly activist in nature, most of the included planning proposals in *Part Two* do have, as evidenced in their thematic groupings by chapter, normative or emancipatory objectives aligned with the deconstruction of development and nature.

Indeed, for every special economic zone, development enclave, satellite city, or resettlement site in rural Laos, there might just be an unassuming planner, architect or landscape architect doing a landscape impact assessment, drafting a new plan or making a rendering to motivate investment. The planning and design disciplines are often complicit in development violence through mainstream professional practice. Deeper awareness of the development process, starting from an immersion and

culturing of landscape designers in the critical and technical disciplines that actually debate and practice sustainability in Laos and related contexts, however flawed, is necessary to improve development outcomes.

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Part I
Framing

Chapter 2
A Pedagogy of Critical Landscape Planning

1 Introduction

Outside the design disciplines, the conservation of "landscapes" is now a dominant agenda, narrative and rhetoric that binds together the scientific study, planning, finance, and development of the project of conservation globally. Today, "landscape" displaces and "consumes" both the older strict national park paradigm and newer community-based conservation approaches of the last three decades (Goldman, 2009, p. 336).

Very different disciplines dominate development in these landscapes. In urban Vientiane, the capital of Lao PDR, familiarity with urban design and planning and real estate institutions, even for the urban periphery, necessitates an urban awareness. However, in rural Laos, both the impacts and academic insights come from either the global development machinery (e.g., the environmental impact assessment process) or critical reactions to it.

Landscape architecture, as is much of planning and architecture, is highly imbricated in development. Landscape architects and planners create masterplans for building resettlement camps, development enclaves, and special economic zones; they offer (and sell) their expertise and impose their authority. Plainly put, these disciplines, both in praxis and academia, are largely complicit in neocolonialist practices and the destruction of the natural world. The role of "landscape" in the planning and design disciplines (i.e., landscape architecture, architecture, urban planning) is at its best and most critical when deploying the complexity of human-oriented ecology to champion normative sustainable agendas. Such deployment is rare in landscape architecture's academia and professional practice, which are dominated by client-consultant relationships, due to the compromised nature of those relationships, poor familiarization with conventional scientific material in ecology, and scant engagement with contemporary critical environmental literature. "Landscape," in this case, gives no effective resistance to the broader neoliberalization of environmental science and its practice. Critical geographer Lave (2012) suggests three characteristics of the neoliberalization since the 1990s of the science of environmental management in

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policy, in practice, and in part, the academy, including: privatized knowledge claims, applied research that targets market or agency demands, and new metrics enabling market-based environmental management. These are all present to various degrees in the academic science and professional practice of the landscape disciplines.

A pedagogy and practice of critical landscape planning is important for both the design disciplines' and conservation fields' framings of "landscape," especially given the increasing territorial expansion of the planning and design professions from their historical urban centers into nature, the countryside, or the rural.

Rural development is an outlier for most urban planners and designers, as well as a place and discourse most academics and practitioners of landscape architecture may never encounter. These different development contexts and foci necessitate a varied range of teaching approaches, which in turn require instructors to have significant interdisciplinary backgrounds outside the design disciplines and a significant expense of academic institutional capital in transdisciplinary teaching and research (Perz et al., 2010). The development contexts we claim and the discourses of sustainability we conjure are used in service of teaching rather than teaching a better way for a discipline (not necessarily landscape architecture) to engage development.

Weller (2014), chair of Landscape Architecture at the University of Pennsylvania, affirms "there is a significant disconnection between landscape architecture and the global conservation effort and community, who are otherwise extremely active and well organized" (p. 94). He continues by relaying a conversation with Braulio Ferreira de Souza Dias, executive secretary of the Convention on Biological Diversity, in which de Souza "indicated that he was unfamiliar with the capabilities of landscape architects and had never heard of Ian McHarg. This is *our* problem, not his" (emphasis in original) (p. 94). While Ian McHarg is a central figure in both landscape architecture and, for his theoretical and methodological contributions to suitability planning, a foundational figure in Geographic Information Systems (GIS) (Chrisman, 2006), this is unsurprising. Landscape architecture turned away from large-scale planning towards the end of the twentieth century, just as the global development machinery, headed by the World Bank, was beginning to reshape the global physical, political and epistemological natures of the developing world and their most attendant disciplines (Goldman, 2005). The design and planning disciplines' involvement, including landscape architecture, is either nascent or, when it exists in regional or master planning, disciplinarily siloed. Accordingly, addressing these issues both in the academy and in the field requires greater disciplinary awareness and innovative approaches to learning and practice.

Contemporary landscape (or ecological) planning, a waning subfield of landscape architecture, comes from the generally positivist approaches promoted by landscape architect Ian McHarg in his 1969 canon "Design with Nature" (Young, 1974). However, neither planning nor landscape architecture exists within a constellation of disciplines able to offer critical interdisciplinary research (e.g., anthropology and geography's political ecology, land change science, sustainability science). A potential "critical" repositioning of landscape planning is as follows: To combat the design disciplines' reproduction of disciplinary and organizational inequalities and

injustices in problem framing and approach requires (or is always requiring) sensitivity to postcolonial, post-development, and gendered approaches to science and planning. Such a sensitivity may only be possible if landscape architecture can turn beyond the design disciplines and hold an outward valence to both natural science, as McHarg had argued, and critical development theory.

This chapter introduces, primarily using insights from critical and applied anthropology and geography, a pedagogy of critical landscape planning run for six years at the University of Hong Kong that rapidly builds landscape designers' abilities to wield global development and sustainability discourses in landscapes undergoing transformation in the biodiverse frontiers of mainland Southeast Asia. In design education, design "studio" courses are the dominant taught pedagogy for disciplinary training, at least in terms of time and effort. These courses are often taken for granted as the most effective means of learning how to design and plan (They are often a pedagogical leap of faith). They are problem-based, with the scope usually set by a defined "program," i.e., the required components of a building, landscape, urban design, or urban plan. In our studio courses on strategic landscape planning, which were focused on northern Laos each year from 2018–2020, instead of program, we provide students with a loose assemblage of non-design case-based literature, working theses, and constellation of ongoing development projects disbursed along the 400 km China-Laos Railway corridor.

In this chapter, we first define the "critical" in critical landscape planning, followed by three key struggles that both define and sustain a pedagogy and practice of critical landscape planning. We describe the ways that landscape architecture, when holding cultural-technological positions, is similar to and distinct from various critical approaches to the environment in geography and other social sciences. Thereafter, drawing from these same disciplines, we propose a method of interdisciplinary socialization by which a landscape architect simultaneously assembles the discourses of a site of engagement and enhances their awareness of various actors' capacities and positions. We explore the utility and limitations of critical approaches for "making plans" and describe how critical geography and anthropology have informed students' planning proposals' scopes and narratives, particularly in the ways these fields converge on cultural-technological and sustainability themes.

The sequence for our design studio courses on landscape planning includes multi-sited and multi-scale research, cross-disciplinary case studies, direct and diverse cross-sector stakeholder engagement, and student-led scoping of strategic landscape planning proposals. The organization of the components (i.e., how the pedagogy is "run") of this design studio course on landscape planning are relatively straightforward (Fig. 1) and are described in the following paragraphs. However, that structure largely obscures why pedagogical decisions were made, as well as limits its translation into and implication for a critical practice. For these reasons, we structure this chapter and frame critical landscape planning as engaged in three primary struggles:

- holding cultural-technological positions;
- ensuring transdisciplinary approaches; and

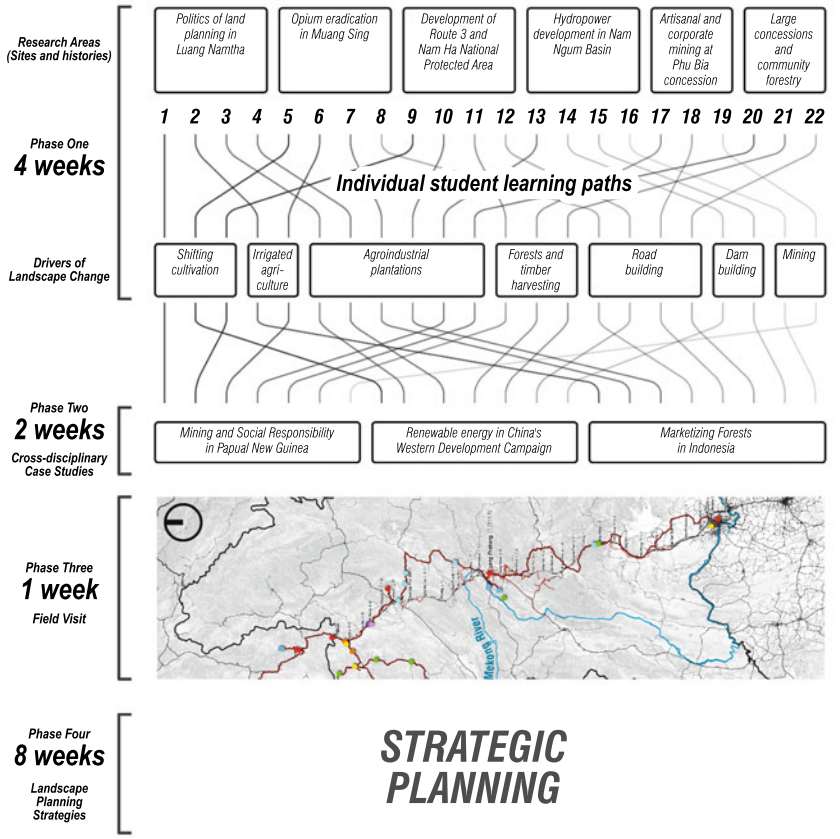

Fig. 1 Four-phase organizational schedule of 15-week landscape planning course showing individual learning paths for 22 students as they assemble knowledge across diverse research areas, drivers of landscape change, and cross-disciplinary case studies in development

- maintaining momentum, especially via process-oriented approaches to development.

Students spend the first half of the term, approximately eight hours in class each week for six weeks, actively coupling a process of landscape transformation with critical texts on Laos and other regions in Southeast Asia. Such processes of landscape transformation are highly physical and technical, including: agricultural cycles, conversions, and transitions; highway planning, material sourcing, construction, and operation; and mining prospecting, extraction, and remediation. The selected critical texts, which form the basis for *Chapter Four: Locating discourses and narratives for intervention*, are situated case-based literature that challenge the mainstream narratives of scientific land-use planning, alternative development models, the decentralization of environmental governance, and technical scopes of various

infrastructure and development programs. Students use their landscape architecture design backgrounds in visual arts, supported by generalist technical knowledge in ecology, site engineering, and participatory planning, to re-represent these critical texts. This reflective and translational process often involves drawing and modelling the geographical and anthropological field sites described in that literature while foregrounding the role of each student's assigned process of landscape transformation. Students struggle with questions of information and data (e.g., stakeholder transparency; abstraction and contingency; partiality or scope; integration or incompatibility) and environmental determinism (and the very real struggle to resist deterministic representations). This process is an exercise in imagining, constructing, manipulating and holding, however momentary and brittle, a cultural-technological position. It is also an intensive immersion or socialization in critical studies.

Following the preceding exercise, the group of approximately 20 students and two instructors travelled to northern Laos for ten days. Figure 2 shows the travel route, projects, China-Laos Railway corridor, and other important context. This fieldwork component to these courses, while not structured around social sciences methods, also does not follow planning methods that stress on-the-ground documentation of landscape or physical systems; it is not a "site visit." Instead, focus is on stakeholder interaction with a purposefully wide spectrum of agents, from domestic civil society groups to international NGOs, and visiting upwards of 20 development programs or projects selected purposely for their contrasting ideological approaches to conservation and development. No partner organization manages or oversees the entire field visit, and the class typically only stays with a single stakeholder from a few hours to two days. The diversity of sites and diversity of stakeholders are crucially important for students to recognize the nuances of stakeholder positions, specifically both in how these agents present themselves and their projects and in how they react to the students' own presentation of "desktop research" done prior to the field visit. These experiential learning activities have engaged students directly with no less than 12 major international NGOs and more than 16 domestic civil society organizations focused on development and environmental conservation. Most of these organizations had never before spoken to a landscape architect or anyone from the design disciplines. Although substantial work is required to create and sustain these expansive non-academic, non-design-related, and often conflicting networks and associated campaigns, they are invaluable for research and pedagogy. Indeed, when navigating complex stakeholder relationships, Perz et al. (2010) recommend choosing partnerships "assuming pre-existing conflicts … which reduces time spent on downstream courtships" (p. 428). Daily debriefing sessions are held for one to two hours each evening for the students and instructors to discuss the complexity of interactions and observations from the day and how these compare with previous days. Together with students' immersion in development literature, the aforementioned stakeholder meetings provide students with invaluable awareness of the professional and disciplinary positions of a wide spectrum of stakeholders. Maintaining access to these stakeholder networks requires dealing with dominant "institutional fields" (p. 425).

For the second half of the term, for another approximately six weeks for eight hours in class each week, students each developed strategic planning proposals for engaging

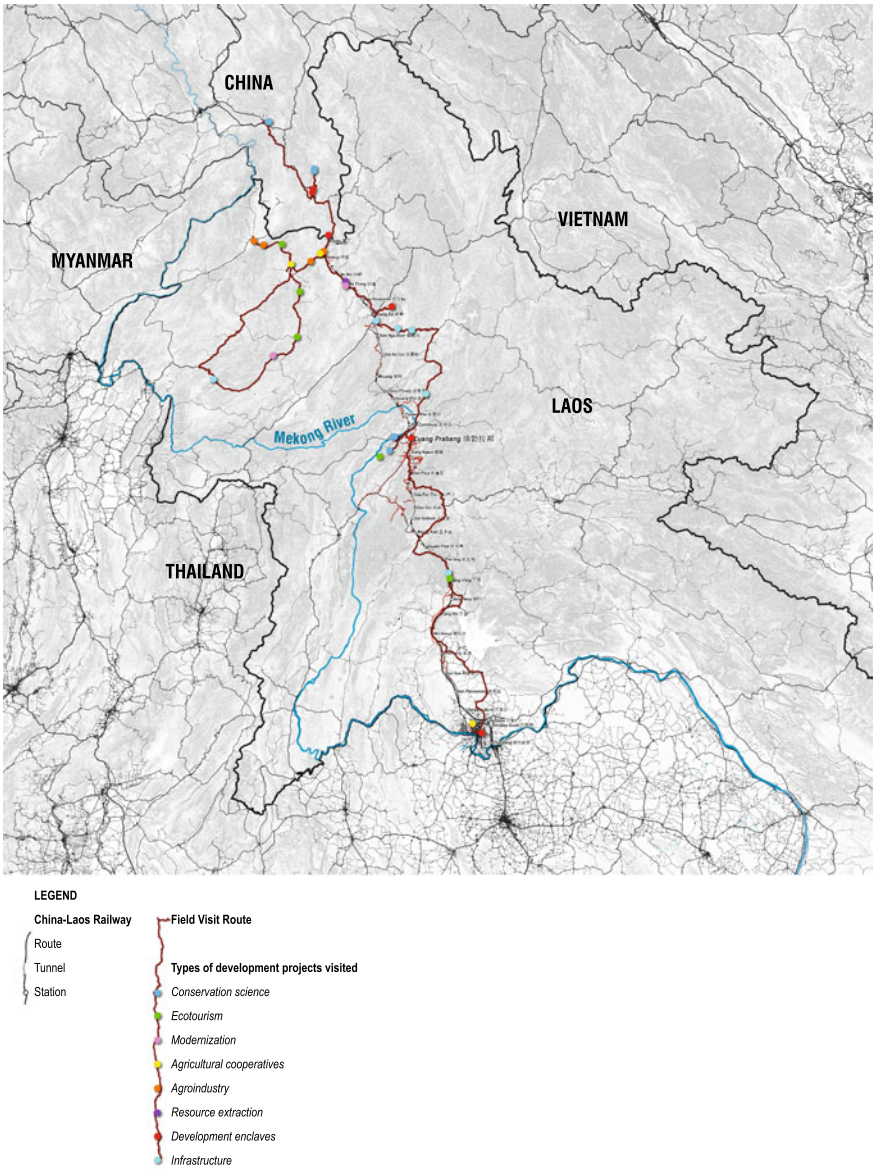

Fig. 2 Twenty-two development projects, all located in landscapes impacted by development of the China-Laos Railway, and the route along which they were visited by University of Hong Kong landscape planning students in 2018 and 2019; these projects are categorized by sector, subsector, or broad development approach

in or mitigating a wide range of development sites and contexts. A selection of these proposals is presented in *Part Two* of this book, and they are grouped by the primary ideological friction used to generate each strategy: (1) Infrastructural connectivity and difference; (2) Western alternative development and Chinese development; (3) Chinese mass nature tourism and ecotourism; and (4) Northern scientific knowledge and indigenous knowledge. To start the brainstorming process, the approximately 20 development programs or projects visited were paired in different combinations generally following these contrasting approaches to development (Fig. 3). Students reflected on their field visits by drawing and modelling those sites, using similar skills and approaches as the first half of the course where they were re-presenting or elucidating on the critical texts and processes of landscape transformation. Student speculations have included such diverse topics as: Resilience strategies for China-Laos Railway temporary access roads; Remediation strategies for agricultural concessions based on a highly heterogenous land genealogy; Negotiation between ecosystem science research and community forest initiatives; and Landscape-oriented knowledge toolkits to help communities argue for international compensation standards.

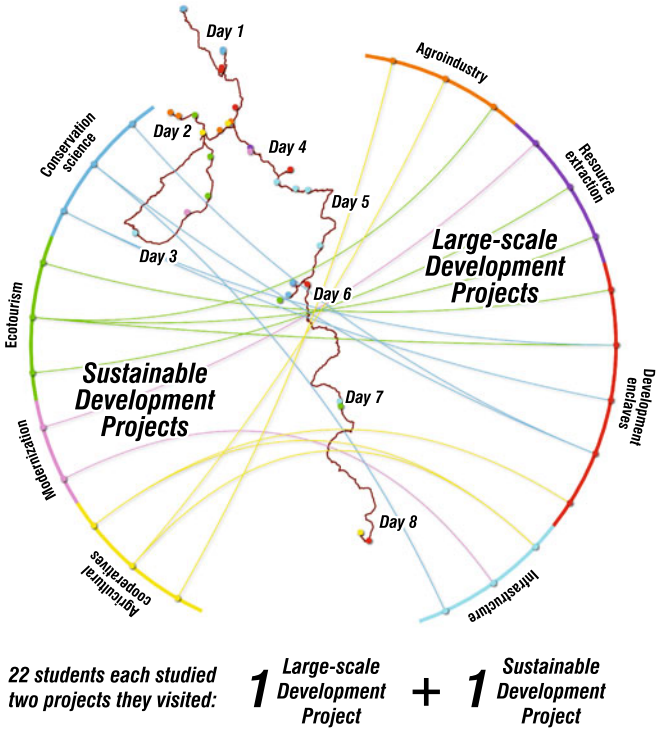

Fig. 3 To begin brainstorming potential landscape interventions, students studied contrasting development approaches between two projects or programs they visited; these contrasts included frictions in development ideology, scale, speed and scope

At the end of the term, students present their strategies to a cross-disciplinary panel juried largely by non-designers: academics including political ecologists, landscape ecologists, sociologists, and environmental managers; agencies and international NGOs engaged in development, including NGO directors of conservation, philanthropy, and green economy; and domestic NGOs and civil society organizations' field biologists.

Frameworks, especially more aspirational ones, are often academically tenuous. Admittedly, we are careful in how we define the "struggles" necessary, as both means and ends, to achieve a pedagogy and practice of critical landscape planning. Although certainly not a panacea for addressing the deficiencies in the training of planners and the institution of land planning in development, as an isolated component of a landscape architecture curriculum, this framework is manageable and facilitates a basic disciplinary awareness necessary for more critical, reflective engagement with development. Ideally, such training could indeed be multidisciplinary, but after decades of calls for planning curricula to diversify—to have staff compositions that reflect their interdisciplinary mandates—few (if any) universities have achieved that diversity. The academic capital necessary to start is significant (Rasmussen & Arler, 2010).

2 Critical Approaches to Landscape Planning

As with most "critical" disciplinary turns, being critical of landscape planning requires more reflexivity about the impacts of our practices. Periodic critical turns across academia have occurred since the linguistic and deconstructivist turn of the 1980s. More recent turns in nature-society studies, which focus predominantly on the forms of development studied in this book, include critical political ecology and critical physical geography (Forsyth, 2003; Lave et al., 2018).

Landscape architecture holds separate origins in geography and town planning and has historical synergies with human ecology (Young, 1974). However, as a practiced profession, its mainstream town planning and environmental management legacies are distinctly dominant in academia and praxis. Environmental theorists from political ecology and science and technology studies, along with other various subfields of geography and anthropology, have been ardent in their critiques of expertise, authority, and scientific practice institutionally, in the lab, in the field, and in consultancy (Forsyth, 2015). Introduced earlier in this chapter, Weller's discontent with opportunities for landscape architecture in the "conservation community" are well-founded, if not overly aspirational. A critical practice and pedagogy of landscape planning in the design disciplines requires recognizing at times uncomfortable but instructive bridges between design and approaches in critical and physical geography. Although calls for synergy between physical and critical geography occur periodically, a recent debate over political ecology and land change science is useful to summarize, particularly given these fields' approaches to problem framing.

Although political ecology and land change science diverge respectively into constructivist and post-positivist perspectives, both trace their origins to the emergence of environmental studies in the 1960s when human ecology was reinvented as an interdisciplinary "subversive science" with strong problem-oriented and ethically driven approaches (Rasmussen & Arler, 2010, p. 39). Both of these subfields of geography are case-based and share topics covering "land degradation, desertification, deforestation, conservation, institutions and governance, ecological impacts of economic development, and equity and environmental trade-offs," as well as shared spatial themes, such as "the efficacy of park or reserve boundaries, the role of spatial connectedness to understand human–environment relationships (e.g., access, isolation, and distance), and the use of spatial knowledge and information" (Turner & Robbins, 2008, p. 299).

While political ecology and land change science share interests and similar conclusions, they differ in base research questions, explanatory frameworks, problem framing, analytical approaches, and institutional positioning. Land change science employs and refines methods of geospatial and statistical science to relate environmental change to human decision making and engages policy through formalized institutional arrangements (Turner & Robbins, 2008). In contrast, political ecology stresses the divergent needs of stakeholders and deploys a wider set of skills, including "archival analysis, ethnography, discourse analysis, historical narrative construction, interviews, as well as tools and theories from environmental sciences" (Kull, 2013, p. 79). While greatly inspirational for a landscape architect considering a practice of regional landscape planning, a planner (or planning team of any size, for similar and additional reasons) would not accomplish such groundwork, especially in the course of professional practice. Before we address what is useful here, it is important to describe the expertise of an individual holding both physical and critical geographical positions.

Although early political ecologists, circa 1980s, conducted their own natural science research, political ecology today has largely moved away from natural science as an object of analysis (Lave et al., 2018; Walker, 2005). Political ecology "expresses concern about simplifications of concepts borrowed from ecological science for policy and development applications" (Turner & Robbins, 2008, p. 304). Early political ecology focused on disproving dominant explanatory frameworks; this disproval methodologically often replaced one form of data with another and often via mixed methods (Lane et al., 2018, p. 37). This approach led to very particular types of projects that often did not require (although they should have) an acute fluency with those sciences' methods.

Lave et al.'s (2018) recent framework for a "critical physical geography" proposes training geographers in both critical theory (e.g., political ecology, science and technology studies) and a specific natural science niche, either biophysical or technological, such as field biology. They argue that because such geographers can "speak a forest ecologist's language," these geographers' "arguments (hopefully) gain more traction in those fields" (parentheses in original) (Law, 2018, p. 100). This training is effectively a horizontal knowledge base in critical studies with a vertical natural science knowledge base. Such a construction in many ways mirrors actual silos of

training in these fields and, if strategic and mentored, might be achievable with only minor transgression of academic institutional structures. Lave et al.'s framework can be extended to suggest a model whereby landscape planners can be "critical" negotiators of complex development programs and projects, but only by becoming more proficient (i.e., vertical) at the science and more horizontal in critical development knowledge.

Although an attractive model, there are distinct if not insurmountable differences in most landscape architects' training (not to mention again the heavy orientation towards professional practice) and their weak exposure to science and engineering curricula. Landscape architects are educated with a diffuse combination of civil engineering, physical geography, human geography, ecology, and design histories, theories, and applications. They are taught predominantly by landscape architects in a field far more homogenous and with far fewer academic centers than geography. Design often speaks in a collective "we" (and we are culpable of that in this book). A landscape architect's expertise is largely interactional, meaning it exists on a continuum somewhere between minimal or no expertise to the ability to contribute to a field of knowledge (Collins et al., 2007). Interactional expertise primarily enables one to see connections, to understand and to communicate across fields but rarely deepens an individual field's disciplinary knowledge.

For the aforementioned reasons, our pedagogy for critical landscape planning requires practitioners to draw primarily from secondary studies and data. However, such methods do require advanced expertise in data integration and a working knowledge of these fields. Importantly, this is not an approach to academic research; it is an approach to a critical practice of landscape planning that draws heavily on the axioms and problem frameworks of various critical academic fields and draws heavily on secondary sources, both academic and gray literature. We have no intention to debate academic research against applied research or forms of practice. There are many volumes on this divide, and indeed, such debate can often be productive for interdisciplinary practices (See, for example, Perz, 2019). For our purposes, the central epistemological questions of research, i.e., what should be studied and how, are less important unless they are reframed as—*in order to intervene*—what should be studied and how.

Arguably, a critical landscape planner shares more affinities with political ecology than Lave et al.'s critical physical geography. Over its approximately four decades, political ecology has rarely collected its own physical and social data (Walker, 2005). Political ecology emphasizes the environment's "immediate resource implications," does not document the "full array of ecosystem provisional services," and includes the "flow of values of that ecosystem beyond its immediate ecological context" (Turner & Robbins, 2008, p. 300). Political ecology primarily focuses on how nature is represented and not on its materiality. This is a highly relational and partial perspective of the environment. However, landscape planners must be very careful in their use of political ecology as a "conceptual driver" for design or research for design, particularly given that political ecology does not offer a substantive theoretical base for practice and application. However, geography's theorization of its select

subfields' cultural-technological dissonance provides a useful, directed rearticulation of landscape architecture's art-science debate, which we cover in the next section.

3 Holding Cultural-Technological Positions in Landscape Planning

Design has a disciplinary mandate to intervene (i.e., to practice), and although ethically and epistemologically perilous in most disciplines, "applied," "action," "advocacy" or "activist" positions can yield intense understanding of the primary issues and tensions of a site, landscape or region (Hale, 2006). This understanding results from the knowledge built from moving, with necessary hesitation and self-reflection, towards a solution but resulting in scenarios or futures construction in order to change the present situation. Critical theory, because it is normative, helps one understand how to apply knowledge. In practice, this amounts to synthesizing, or better put holding in contradiction, lessons from environmental studies and environmental management. Although not necessarily activist in nature, Hale's definition of a politically engaged anthropology, i.e., "activist research," summarizes this position well. For Hale (2006), activist research is to align with political struggle, "to occupy a space of profoundly generative scholarly understanding" that provides "an often-unacknowledged basis for analytical understanding and theoretical innovation" (p. 98). Hale aptly calls this space the "cognitive dissonance" between political and academic commitments in critical applied research (p. 113). Salisbury et al. (2013) extend this dissonance to describe applied research holding cultural-technological positions.

Numerous critical nature-society scholars have deployed Tsing's (2005) concept of "friction" since she used it to describe her ethnographic work in Indonesia's forests: Friction is "the awkward, unequal, unstable, and creative qualities of interconnection across difference" (p. 3). This concept can be conceived of as both the friction arising from epistemological pluralism when (truly) multidisciplinary teams are brought together (Perz et al., 2010), as well as the generative dissonance created when critical theory and applied sciences are brought together. This dissonance and pluralism, in essence the questions of sustainability that preoccupy and define critical nature-society disciplines, as it does for critical theory, is also generative conceptually for landscape planning. The example strategic planning proposals constituting the entire *Part Two* of this book each hold such dissonance: (1) Infrastructural connectivity and difference; (2) Western alternative development and Chinese development; (3) Chinese mass nature tourism and ecotourism; and (4) Northern scientific knowledge and indigenous knowledge.

However, many question the coherence, at least academically, of cultural-technological positions in the development disciplines (Hale, 2006). Critiques of ethics and objectivity of researchers holding cultural-technological positions similarly come from both mainstream and critical discourses and from questioning

alliances to large institutions, NGOs and civil society (Baird, 2014; Goldman, 2005; Simpson, 2014). Periodic calls within geography for a synthesis of cultural and technological subdisciplines are met with a mix of aspiration and pessimism (Turner & Robbins, 2008). Indeed, objective science (e.g., wildlife and landscape connectivity modelling) is often in empirical conflict with following an overt advocacy agenda; conversely, post-structural political ecologists do not easily align with the "pragmatic short-term decision-making" of local groups or cannot risk deconstructing them (Salisbury et al., 2013, p. 131). Yet, as Wainwright et al. (2013) assert, "we crave technical research with a political edge" (p. 185), which is a reflection on the failure of technical research to create positive impact for development. Hale (2006) reflected that critical applied research must recognize "that political mobilization must always be re-created anew and according to articulations of the moment" (p. 112). Accordingly, averting essentialist positions of art versus science (cultural-technological) of any transdisciplinary construction requires an acute awareness of expertise, as well as a "tall order" of knowledge in the relevant fields. To understand the unique ways landscape architects currently hold cultural-technological positions, we consider here landscape-specific articulations of space, scale and the integration of social and natural sciences.

Landscape architects' cache of technical knowledge includes basic terrestrial ecology (generally focused on urban forestry, arboriculture, and horticulture), civil engineering (concentrated primarily at the scale of site engineering), and geographic information science. This technical knowledge is usually complemented by a substantial focus on representation, both theoretically as "to represent" and technically as graphic communication and visual arts. Together with design-oriented architecture and planning fields, landscape architecture frequently claims "space," in theory (spatial theories) and praxis (spatial approaches), as one of its expertise or distinguishing characteristics in problem framing and methods. Note that this focus on ecology and space does not translate into the academic field of spatial ecology, which has extended landscape ecology since the 1990s into modelling landscape patterns and processes with species' population dynamics (Cushman et al., 2010). For comparison, anthropologists have taken a "spatial turn" within the last two decades, leading to sub-fields of spatially integrated social science, such as geo-ethnography and geo-narrative.

Distinct from spatial practices in architecture or planning, the spatial focus in landscape architecture often translates to a predisposition toward complex landscape forms, patterns and processes. The planning and architectural fields may work with such phenomena, but they do not impose such spatial description, often rooted in ecology, as fundamental to the scope and concepts of design projects. From geography's land change science subfield, Roy Chowdhury (2013) notes the "privilege" precise models of land change give to "detail, nuance, and finely scaled differences in characterization or quantification, rather than characterizing components, patterns, or process in the aggregate" (p. 226). Landscape architecture *as planning* frequently makes this agenda and privileging explicit, almost obdurately, whether the problem being defined necessitates it or not. In general, the design disciplines are characterized by a focus on precision and realism and are weak at generalization or transferability.

Lestrelin et al. (2013), through considering an integration of land change science and political ecology, argue for more nuanced and "aware" definitions of land use and economy that recognize a "genealogy of land cover classification," such as anthropocentric definitions of "degraded" forest types, in service of revealing knowledge and power constructions (p. 61). While Swaffield and Deming (2011) may consider such reclassification as a landscape architect's practice of "interpretation" (p. 39), as well as having roots in critical regionalism or place-based drivers of sustainability, the critical reflection on power and knowledge in development discourse is essential, as is the critical reflection on technical data and its use. This practice can be paralleled to the detailed site- or ethno-specific land use classifications used in counter-mapping strategies (see, for example, Harris & Hazen, 2006).

With this predisposition to the local, however, one must not fall into geography's "local trap," where one may "assume that organization, policies, and action at the local scale are inherently more likely to have desired social and ecological effects than activities at other scales" (Brown & Purcell, 2005, p. 607). In other words, considering the political as "wider" and conflating the "local" with culture and ecology may lead to structural adjustment at the local scale (p. 613). Furthermore, environmental research requires multiple scales and different spatial and temporal units, thereby making "standardization of sampling and measurement crucial but difficult" for interdisciplinary work (Perz et al., 2010, p. 423). Such multipurpose "standardization" relies heavily on moving across scales and upscaling and downscaling information.

Rosa et al. (2014), while acknowledging the benefits of multi-scale studies, assert that data availability and computational power often drive the scale of study and not "research choice." This assertion is typical of more positivist approaches to environmental research. Pedagogically, exercises in our landscape planning studio courses are constructed to resist the "scalar trap," "territorial trap," or "local trap" (p. 607), especially since Brenner's (2001) "singular connotations" of scale (p. 599) are prevalent across most of the planning and design disciplines. Space can be an expertise of the landscape architect, addressing "plural connotations" (p. 604) without using scale as an organizing driver. The emergence of multi-sited ethnography in the 1990s has enabled anthropology to "follow webs of power" and, through cultural critique, produce emancipatory knowledge (Hale, 2006, p. 102). In our landscape planning design studio courses, detail, in the form of physical data and case studies, is often proxied from comparative sites with more information.

In order to hold cultural-technological positions, Lave et al. (2018) argue that their critical physical geographers must work iteratively between their "biophysical and social findings" and ensure that their research questions require both physical and social analyses (p. 9). This ensuring or requiring is important and, in most cases, must be forced and constantly fought for, less one risks "slipping" into a "multi-disciplinary framework in which results from different parts of a study are simply juxtaposed at the end or in which ties between the different parts disintegrate altogether rather than informing each other in any way" (p. 9). Iterative research and design are a core tenet of design methodologies, and critical landscape planning focuses on the iterative, reflexive and critical creation of detailed sites, often in contexts lacking otherwise rudimentary spatial data. In the process of iteratively scoping, deepening, and refining their strategic planning proposals, students are required to create and

manipulate geospatial data (i.e., not the mere borrowing of datasets), generate landscape patterns using basic computer programming, and fabricate highly complex 3D landscape surface models that combine otherwise irreconcilable environmental and social parameters.

Perz et al. (2019) argue that a major barrier to interdisciplinary work is the division between those who collect and manipulate data and understand a region locally (i.e., data specialists) and modelers who focus on data integration. The former focuses on retaining variations in data, whereas the latter concentrates on processes and generalization. Even if only operating at the level of critic, the designer's translations of natural science and social science research begins to break down, or at minimum foreground, such divisions.

Holding cultural-technological positions is primarily about engaging science (i.e., the technology) from within, about having effective ways to reflexively channel that dissonance. Critical landscape planners, to be effective, must be acutely aware of the neoliberalization of science, particularly the privatization of knowledge claims in professional practice; the standards, metrics and indices enabling market-based environmental management; and shifts towards "applied" research that meets market and government demands (Lave, 2012, p. 376). Although critical studies provide explanatory frameworks for deconstructing seemingly neutral science, a critical landscape planner holding (i.e., maintaining, sustaining) cultural-technological positions requires both science's deconstruction and its subsequent empowering or championing—its dismantling and reconstitution—into a principled authority.

4 Ensuring Transdisciplinarity Through Culturing and Socialization

At the beginning of this chapter, we asserted that compromised professional positions, poor familiarization with conventional scientific material in ecology, and seldom (or at least noncommittal) engagement with contemporary critical environmental studies were root deficiencies in landscape architects' training for landscape planning. This is also true whether landscape architecture follows the design traditions of its architectural lineages or the applied scientific traditions of its landscape ecology and human ecology lineages. In this section, we propose a method of immersion in interdisciplinary critical and scientific literature that can both inform the making of plans and introduce or enhance a landscape planner's awareness of local discourses to inform their strategic positioning, planning and collaborations.

Interdisciplinarity requires that individuals train in epistemology and methodology "beyond what is typically considered relevant to the discipline in which they are socialized" (Rasmussen & Arler, 2010, p. 44). For the development arena, the critical landscape planner must be able to embrace and appropriate (not reproduce) geography's interdisciplinary constructions focused on nature-society relationships, particularly those engaged in land-related debates. Note that this embrace

and appropriation requires planners to actively recognize that they are not intellectually "trespassing" (Portes, 1995) in or borrowing from other disciplines. Each of these interdisciplinary subfields sit more-or-less uncomfortably at the art-science nexus.

Anthropologists Harvey and Knox (2015) in their work on road-building in the Peruvian Amazon argue that civil engineers do not practice in modernist stereotypes but are instead "recombinant scientists" who are reflexively aware of their expertise and post-positivist positions (p. 198). Such professional expertise "lies in their ability to produce resilient structures out of the dynamic relational properties of the material and social worlds in which they find themselves" (p. 197). Landscape architects may argue, for instance, that site engineering or constructing buildings engender a similar process; however, the critical landscape planner, as is necessary in transdisciplinary geography, must be "immersed" (Lave, 2014) in a wider range of development literature, both critical and scientific. From the design disciplines, South African architect Kurgan's (2013) concept of "para-empiricism" calls for similar kinds of immersion, albeit in geospatial technology, to reveal the politics of cartography and remote sensing.

Instead of case studies, which are a dominant mode of knowledge accrual and transmission in the planning and design disciplines (i.e., landscape architecture, architecture, urban planning), we promote a practice of transdisciplinary immersion. Students are immersed (i.e., socialized, cultured) in both highly technical and positivist literature (e.g., conservation biology) and critical literature (e.g., political ecology, science and technology studies) specific to these geographies. Students are tasked, using their landscape design and training in the representation of biophysical systems and other creative visual communications, to narrate, problematize, and appropriate scientific research on conservation in service of more situated, contingent, and site-specific sustainable development objectives. This process has enabled these students' rapid introduction into and awareness of both place-specific narratives and the dominant non-design disciplines operating there. Because of the compromise in selecting location-specific over canonical development studies literature, a second exercise in this design studio course requires students to focus on a set of international case studies, which have included rich anthropological writings on highway development in Peru (Harvey & Knox, 2015), mining in Papua New Guinea (Kirsch, 2006), and logging in Indonesia (Nevins & Peluso, 2008).

Importantly, this culturing is not for reproduction or to conduct basic research but instead: (1) to gain rapid introduction to very foreign geographies; (2) to become keenly aware of those disciplines' projects, axioms, ethics, problem framing, knowledge sources, and vocabularies; and (3) to deploy those disciplines' own critical reflections in strategic planning proposals (e.g., mitigating the industrialization of indigenous botanical knowledge). This pedagogy of critical landscape planning, largely because most design pedagogy (and practice) is Socratic, assumes that students (and practitioners) have a weak liberal arts foundation. Indeed, transdisciplinarity requires creating something that transcends the disciplines involved and is often a very conscious struggle constructed by individuals.

Many academics and practitioners within the planning and design disciplines (i.e., architecture, planning, landscape architecture) would consider the education and practice of their fields as unarguably interdisciplinary. Their claim often refers to some practice of interdisciplinarity, which is usually articulated through teams of architects, planners, and landscape architects collaborating on projects; engineers and ecologists are often part of subcontracted expertise. Biermann et al. (2018), in a pun on *business as usual*, call this "interdisciplinarity as usual" (p. 563). It is useful here then, in contradistinction to interdisciplinary, multidisciplinary, and cross-disciplinary, to introduce the concept of transdisciplinarity.

We challenge the imperative for interdisciplinary "integration," which is often dominant in problem-led science and in the gray literature and professional projects of the planning disciplines. The integration of theory, methods, and data is itself the question of integration, not a matter of cross-disciplinary problem-solving. For Lave et al.'s critical physical geography, integrated research "is not an intellectual advance if it simply brings a wider range of tools to answer the same old questions, or if it fails to question the concepts and theories that limit current understanding, not to mention the political commitments that undergird them" (Biermann et al., 2018, p. 562). Trandisciplinarity is a struggle that is "a gesture out of the ordinary, which is subject to questioning due to suspicion" (Perz, 2019, p. 2). To achieve this in multidisciplinary teams, members must undergo a process of "collaborative deconstruction," whereby team members actively deconstruct one another's disciplinary perspective (Yarime et al., 2012; Smithwick et al., 2019, p. 155). Similar to the concept of friction or dissonance involved in holding cultural-technological positions, Laborde et al. (2019) consider actively embracing epistemological friction as necessary for effective interdisciplinary collaboration, in which their team's "[p]rogress was certainly not smooth or linear, and at times the team experienced inertia, blockages, and frustration" (p. 107).

Much that is required of a transdisciplinary practice is necessary in a correlative pedagogy, including requiring academics, instructors, and team leaders to have significant interdisciplinary backgrounds, significant academic capital to pursue transdisciplinary teaching and research, and conducting such work outside normative institutional frameworks (Perz et al., 2010). Perz et al. argue that academic reward systems are "not readily compatible with problem-driven science;" thus, "disciplinary boundary-crossing becomes a political act" (p. 423). Most of these challenges will not change in the near term, including the extra costs of grappling with multiple disciplines, traditional academic reward systems (Rasmussen & Arler, 2010), the academy's reluctance to validate results (Salisbury et al., 2013), and incompatible temporal frameworks among the academy, NGO donor cycles, and development timelines (e.g., the wet-dry season cycles of infrastructure-building). These are dominant institutional fields which must be negotiated. We now argue that such a strategic position requires process-oriented approaches to development and its planning.

5 Process-Oriented Development and Planning "Projects"

In *The Will to Improve*, anthropologist Li (2007) reflects on her inability to offer development and planning agencies suggestions on what to do or how to intervene in the "world of projects, which they inhabit" (p. 3). Landscape architecture and planning are almost unescapably within this "world of projects," especially as professionally oriented disciplines in close alignment with real estate development interests and the development apparatus. Li describes development projects and programs as "pulled together from an existing repertoire, a matter of habit, accretion, and bricolage" (p. 6). After Foucault, she further describes "failed" plans as "not 'abortive schemas for the creation of a reality. They are fragments of reality'…. [P]rograms, and the messy consequences of programs, are equally real" (p. 28).

If such plans are indeed "real" and have impact regardless of whether they are implemented, plans are also frequently erased during the process of development. Controversial and risky development often progresses slowly, outlasting political transitions, investors and design scopes. For these and other reasons, anthropologists Harvey and Knox (2015) suggest that one should focus on the "when" rather than "what" of infrastructural formation (p. 5). Feasibility studies, environmental and social impact assessments, plans and designs are often shelved in reaction both to political instability and to breaks in team composition and expertise, as plans are handed-off between consultants at various stages. Harvey and Knox consider this process a form of systematic "amnesia" in the development process, especially in areas of weak environmental governance (p. 87). To be critical in landscape planning, one must treat it as relational—as an assemblage. Li (2007) describes a process by which experts (e.g., planners) effectively "render technical" their development programs and projects (p. 11). She wants to understand "the conditions under which expert discourse is punctured by a challenge it cannot contain; moments when the targets of expert schemes reveal, in word or deed, their own critical analysis of the problems that confront them" (p. 11). Landscape architects have a unique capacity, in their understanding of land-use planning, civil engineering, and ecology and strong capacities for data integration introduced in the previous section on holding cultural-technological positions, to synthesize development plans and retrace and narrate their impacts.

Understanding development as an assemblage requires redefinition of what a development "project" or program is in critical landscape planning, and, as we argue in this section, such understanding is closely related to critically recognizing and approaching development as process-oriented. Although there is a long and diffuse lineage of understanding design as a "process," the focus here is on process-oriented development and its implications for pedagogy, research, design, and practice, i.e., for studying and intervening.

From the environmental scenario literature, Biggs et al. (2007) argues that the actual storylines and narratives are often less important than the process of knowledge sharing and empowerment from developing scenarios. Similarly, in his writing on the Thai and Myanmar border regions, political scientist Simpson (2014) argues that

environmental governance should be understood not by outcomes but by a process of "trust-building activities" and that the success of any environmental campaign should be measured "in terms of the development of emancipatory processes" emphasizing "democracy, social justice, ecological sustainability, and nonviolence" (p. 24).

Academically, outcomes and outputs are actively debated in applied research in development, particularly surrounding the institutional, ethical and practical considerations presented in this chapter. For instance, for Perz et al. (2010) in their countermapping efforts along the borders of Peru, Bolivia and Brazil, production of material for stakeholders (largely civil society) is prioritized before scholarly output in order to keep stakeholders invested and informed and minimize political damage. Even within mainstream institutions, impact assessment consultancy is unfortunately often a form of subjective "rapid appraisal" (Goldman, 2005, p. 164) or "rapid ethnography" (Fisher, 2008, p. 235). These are arenas that require iterative and negotiated approaches and are where the critical landscape planner may excel. Further, these complex networks and the politics of applied research, as opposed to cultural critique, often lead to "forced analytical closure" and research that is "simplistic, unproblematized, and undertheorized" in the near-term, straining its claims to scholarship (Hale, 2006, p. 101). Critical applied research in anthropology often tends toward oversimplified "'how to' manuals," i.e., scholarship on praxis that is undercut by both the politics of the research and the traditions of the academy (p. 108).

Although the design disciplines, including landscape architecture and urban and regional planning, often champion their methods as "problem-based" approaches, they are typically more solution-based rather than how critical theory might describe (and celebrate) problem-based approaches. In Turner and Robbers (2008) comparison of geography's subfields of political ecology and land change science, they surmise that political ecology investigates "case-based outcomes or socioenvironmental events as informed by theory that stresses the role of distal or exogenous processes that usually operate to disadvantage local land managers and are often captured in social conflict and land or resource degradation" (p. 303).

To sustain access to networks and field sites, instructors led parallel research with global environmental NGOs and institutions that allow for "in-action" reflection directly in the classroom on the potential for landscape architects' participation in the global development community. Such research has included objective science (e.g., ecosystem services and predictive wildlife modelling), technical studies (e.g., species-specific highway mitigation guidelines), and activist research (e.g., automated 3D-printed stakeholder engagement models, political-economic investigations into the impact assessment process) (Helsingen et al., 2019; Kelly et al., 2016, 2018). As a practice, this work often requires "mid-course corrections" (Perz et al., 2010, p. 427) and managing vested interests, which are complex and cross-sectoral, especially surrounding large development programs and projects. Importantly, because of developments' strong "institutional fields" (Perz et al., 2010, p. 425), substantial amounts of the teaching and parallel research are realized outside normative institutional frameworks, including lacking formal research agreements and significantly reduced advantages or impossibility of university-to-university collaboration.

Further, in development consultancy, academic work is often manipulated or influenced to legitimate economic and political agendas (Goldman, 2005). Baird (2014) encourages "principled" academic engagement, lamenting that "restrictive contracts have become the norm, whether coming from private companies, the World Bank, United Nations agencies, bilateral donors and even NGOs such as WWF and Conservation International" (p. 502). Unsurprisingly, developers and multilateral banks often prefer to deal with NGOs (to meet their international obligations) and local communities separately (Harvey & Knox, 2015). Perz et al. (2010), from their work on the transboundary region of Peru, Bolivia and Brazil, assert that governments and large international NGOs maintain "dominant institutional fields [that] obstruct collaborative advantages" (p. 425).

In the aforementioned context, a "project" may be better articulated as a more nimble, process-oriented assemblage or "campaign." In complex development circumstances, such a campaign requires sustained momentum and rapid course correction. For the design disciplines, including landscape architecture, the conceptualization of projects as assemblages may also aid the chronic scholarly weakness whereby the "project" rather than the scholarship or praxis is dominant. Although the examples given are from a distinctly North American context, landscape architects Thering and Chanse (2011) propose a science of "transdisciplinary action research" that "investigates the similarities, differences, and outcomes of discrete [case-by-case, project-by-project] research initiatives with the intention of developing innovative ways to address the complexities and multiplicity of scales of sustainability" (p. 9; see also, Stokols, 2011). Since the late 1980s, landscape architecture academics have theorized pedagogical approaches to engagement, such as "action research," which is usually realized directly through or in close synergy with design studio courses (Deming & Swaffield, 2011, p. 193). For instance, Deming and Swaffield reference Forsyth, Lu and McGirr's 1999 "Service Learning Studio in Urban Design" run at the University of Massachusetts, which recognizes multiple publics, champions disadvantaged communities, and challenges mainstream definitions of poverty and illiteracy (p. 198). However, even when such efforts have more emancipatory aims, they are aligned with very Northern struggles and situated in discourse entirely foreign to the global development and conservation community. Given the professional orientation of most landscape architecture teaching programs, extreme care must be taken to ensure critical engagement. Otherwise, these efforts may tend toward educational discourse surrounding service learning and global citizenship, which are often naively neocolonial (Martin & Pirbhai-Illich, 2015).

Although engaged research is at times a difficult form of scholarship, it is necessary as an emancipatory knowledge-building process. For these design studio courses, outputs targeted to stakeholders must be distinct from high-level educational outcomes for students. The long-term impact from the students' strategic proposals is not about creating solutions to be implemented in the field. Instead, they are used to create conversations about how development should move forward. For landscape architecture's "ecological urbanism" movement, postcolonial theorist Bhabha (2010) suggests that "[t]he crucial task of the ecological agent then is to maintain a 'momentary equilibrium' between these various practices of sustainability and their

diverse definitions of what constitutes the 'future'" (p. 80). As with any successful sustainability practice, design for the development community offers momentary solutions.

6 Conclusion

Although critical human geography often academically defines itself in opposition to realist ontologies and research approaches, a critical practice of landscape planning must not be defined in opposition to practice. For those encountering the plans of experts, as anthropologist Li (2007) writes, "the will to improve can be taken at its word" (p. 9). Such a practice must also recognize its compromised position, both academically and professionally.

This chapter summarized a pedagogy of critical landscape planning and identified three defining struggles within that pedagogy that have implication for how we study and plan development, including holding cultural-technological positions, interdisciplinary socialization, and engaging in process-oriented development. We offer ways for landscape architects engaging in development to recognize both the compromise and the potential of holding cultural-technological positions. In a design studio engaged in landscape planning, this cultural-technological pluralism or dissonance can act as conceptual generators for planning and design. Indeed, as anthropologist Bateson (1972) argued in his 1941 essay "Experiments in Thinking about Observed Ethnological Material," "advances in scientific thought come from a combination of loose and strict thinking, and this combination is the most precious tool of science" (p. 73).

Moreover, this chapter offers a series of constructive bridges between applied critical geography and anthropology and a practice of landscape planning. One might term these as "trespassing" or "borrowing" from geography; however, true transdisciplinary work overcomes "incommensurate perspectives," does not imply the erasure of disciplinary boundaries, and requires a willingness to "delineate the limitation of [one's] home discipline as a motivation to learn more from others" (Perz et al., 2008, pp. 420–421).

Hirsch (2014), founder of the Mekong Research Group (formerly the 1997 Australian Mekong Resource Centre, AMRC) at the University of Sydney's Geosciences program, reflects on the "potentials of an applied critical social science of environment" (p. 516). Hirsch affirms that "the response is clear—if we were to conceive of ourselves as an activist entity rather than a research—and teaching-based one, we would immediately diminish our value to those NGOs with whom we work closely" (p. 522). He further declares that after nearly two decades of operation, the continued engagement of governments, agencies and NGOs with AMRC in research, dialogues and initiatives is a "testament to the niche for critical engaged analysis, and its substantive emphasis lies squarely within the realm of an engaged political ecology" (p. 522).

If we hold that the practice of design is our expertise, then we must actively seek the knowledge of disciplines "where" we practice. For a practice of design in the development arena, we propose that both critical and technical culturing and immersion in geography is necessary. If landscape architecture and planning wish to participate in principled ways in the global development community, in what is often termed "the rural," then we must overcome the wide chasm between urban sustainability and sustainable development. This is true both "in the field" and in cities where these landscape architects are educated. Our use of "urban" and "rural" in this book refer, rather than to regions, respectively to the disciplinary familiar and disciplinarily foreign institutions and actors in development.

To work in these geographies requires sustained momentum and diverse forms of practice and expertise, from construction knowledge for sustainable road engineering to geographic information science for wildlife habitat modelling. Landscape architecture here provides fertile ground for bridging, not only between the professional built environment disciplines of planning and natural science, as Ian McHarg had suggested in 1960s, but also between planning and critical development approaches in geography and anthropology. This bridge is admittedly tenuous and disciplinary diffuse. For the built environment disciplines, landscape architecture has in many respects been a sort of free-wheeling form of semi-critical physical geography. Although such work is at times a difficult form of pedagogy and scholarship, it is necessary as an emancipatory knowledge-building process that offers sustained momentum through momentary solutions.

The next chapter builds a biography of Laos through its many large-scale infrastructural projects and plans, real and unrealized. Redefining how planning and landscape architecture conceptualize "projects" is an important first step in training individuals to be critical of development and to be effective in creating more principled plans. For our most biologically and culturally sensitive landscapes, landscape architecture here may be rearticulated as a highly impactful "subversive science" for the twenty-first century.

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Chapter 3
From Land-Locked to Land-Linked?

Laos Within a Continuum of Connectivity in the Mekong Region

1 Introduction

> On November 5, 2017, just after the rainy season and as the dry season was coming, the construction site of the Mekong River Bridge in Luang Prabang, a key project of the China-Laos Railway, was a hive of activity as the builders of China Railway No. 8 Engineering Group Co., Ltd. were taking advantage of the rare golden opportunity and making full use of the time to construct.
>
> Laos is the only landlocked country in Southeast Asia. Its transportation infrastructure is extremely backward. December 25, 2016 saw the beginning of a new era with the inauguration of the construction of China-Laos Railway, which will be completed and open to traffic by the end of 2021. Connecting the railways of not only China but also Thailand, Malaysia, and Singapore in the future, this railway bears Laos' dream of becoming a land-linked country from a land-locked country and will greatly promote its economic and social development.
>
> people.com.cn (2017, November 14).

A map of the Lao People's Democratic Republic (Lao PDR) shows a country situated in the northeast-central mainland of Southeast Asia and bordering five other countries: Thailand, Cambodia, Vietnam, China, and Myanmar. The Lao PDR's borders generally follow two prominent natural geographical features that define the country's elongated shape, which stretches over 1,700 km from north to south. The northern border with Myanmar and much of the western border with Thailand run along the Mekong River, while the eastern border with Vietnam largely follows the ridgeline of the Annamite Mountain range. This cartography confirms the mainstream depiction of Laos as an isolated "land-locked country," which is deployed by most accounts justifying ongoing regional integration projects that aim to redefine Lao PDR as a "land-linked country," as exemplified by the above People's Daily (2017) coverage on the China-Laos Railway project.

This chapter challenges the dominant narrative of a de-historicized, often linear progression from land-locked to land-linked or from isolation to integration by contextualizing the contemporary imaginations and developments of Laos within the broader social, economic, and political transitions across the Mekong River region

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since nineteenth century European colonialism. In addition to defining boundaries, colonial powers inaugurated an era of (modern) infrastructure planning and construction to consolidate their authority. Rather than connecting the region, however, this colonial infrastructure redefined preexisting patterns of connectivity. Gupta and Ferguson (1992) argue for an approach to understanding connections that foregrounds such preexisting patterns (p. 8). Understanding "cultural and social change becomes not a matter of cultural contact and articulation but one of rethinking difference *through* connection" (emphasis in original). For a demonstration of the instrumentality of this conception of connectivity, see landscape planning proposals in *Chapter Five: Infrastructural connectivity and difference.*

"Laos," as portrayed on modern maps, was hardly an historical inevitability and is in fact a recent arrival on the world stage. Present-day Lao territory was part the former Lao Kingdom of Lan Xang (1345–1707), the "Land of a Million Elephants," which included territory on both sides of the Mekong River south of Yunnan. Lancang, the Mekong River's name in Chinese, echoes ancient Lan Xang. The three kingdoms of Lan Xang (Luang Prabang, Vientiane, and Champasak) were under Siamese suzerainty (1707–1779) by the time France secured control over the lower reaches of the Mekong River. "Laos," formed on the east bank of the Mekong through a series of Franco-Siamese treaties in the last decade of the nineteenth century, arrived during the demise of pre-modern states yet without the defined boundaries that dominated Southeast Asian colonial geopolitics (Stuart-Fox, 1995).

Flowing for 4,300 km from the Tibetan plateau, the Mekong River defines the region's connectivity. As part of the historic Southern Silk Road, various caravan and river-based routes linked southern Yunnan's Sip Song Pan Na (now Xishuangbanna) with Lan Na in northern Siam. These riverside lowland areas were celebrated as regional rice bowls (*Na* means "rice paddies," thus *Sip Song Pan Na* means "the land of twelve thousand rice fields" and *Lan Na* means "the land of a million rice fields") (Beyrer, 1998, p. 75). Prior to the establishment of the French protectorate of Laos in 1893, the Siamese town of Lan Na and the Lao town of Luang Prabang were key centers controlling the regulation of trade in the upper-Mekong borderlands. One of the main trade routes linked Mengla in Sip Song Pan Na, Luang Namtha, Viang Phoukha and Houay Xay in Lan Na. From Houay Xay on the east bank of the Mekong, trading caravans could cross the river to Chiang Khong to trade with Chiang Rai and Chiang Mai in Greater Siam or follow the river directly to Luang Prabang, also known as Mang Luang or "principal city," the capital of the Lao Kingdom and present-day cultural and tourist hub of Lao PDR (p. 75).

While the French colonial government of the protectorate of Laos (1893–1953) denied the existence of the Southern Silk Road, the route continued to operate after the Mekong River was made to form the colonial boundary at the turn of the twentieth century. Existing land- and river-routes connecting the territory east of the Mekong to the Kingdom of Siam across the river were actively delegitimized because they were outside direct colonial control and contradicted the aspiration to incorporate Laos into French Indochina. Nearly a century later, these old trading routes have been romanticized since the 1990s to bolster various economic initiatives advocating the integration of the region surrounding the Mekong, including the Greater Mekong Subregion

(GMS) initiative by the primarily US and Japanese controlled Asian Development Bank and the more recent Belt and Road Initiative (BRI) by China. The lack of "modern infrastructure," such as roads and railways, once described as an obstacle to colonial rule, is today purported as an obstacle to economic development and integration of the Mekong region.

Natural resource-rich Laos, the only land-locked GMS country, finds itself central in these recent regional integration enterprises. Restrictive regulation and closed borders characterized the decade following the 1975 establishment of the Lao PDR in the aftermath of the Second Indochina War (also known as the Vietnam War). In comparison, the post-Cold War efforts to integrate Laos into the regional market since the late 1980s appear substantial. Seen from a wider historical perspective, however, a remarkable continuity persists in how historical narratives and practices are reproduced to enable and constrain development. In the following historical analysis, we examine the malleable identities of "Laos," "border" and "infrastructure" in the strategic importance of the Mekong River region and the struggles to control and reshape its interconnectivity, especially during the period between colonial-era obscuration and more recent revitalization of the Southern Silk Road. Rather than strictly chronological and comprehensive, this chapter focuses on three loosely defined historical periods: the colonial period from the mid-nineteenth century to the mid-twentieth century, the Cold War period from the mid-twentieth century to the late 1980s, and the post-Cold War period from the late 1980s up to the present day. We ground the distinct histories of these periods in discourses specific to their times and places, each with their own geographic conception of the Mekong River region and particular combination of socio-economic and geopolitical imperatives driving investment in large-scale infrastructure projects.

The Colonial period was characterized by efforts to de-link Laos from Greater Siam and incorporate it into French Indochina. Influenced by nineteenth-century Anglo-French geostrategic rivalries in Southeast Asia, the French secured navigation of the Mekong River and drew it as their colonial boundary. The Mekong River, together with the newly established French protectorate of Laos on its east bank, was a strategic opportunity to establish new trade routes linking French Indochina with the fabled wealth and markets of imperial China. However, the narrative of Laos as a "formidable frontier" and "colonial backwater" (Ivarsson, 2008) resurged with each unsuccessful attempt to transplant the rationale and expertise of road and railway development from rural France to mountainous and flood-prone Laos.

The Cold War period was characterized by efforts to de-link Laos and other lower Mekong countries from communist China and North Vietnam and to bring them under greater US influence. Surveys and feasibility studies for the Pa Mong Dam and Mekong Basin Development Plan were carried out from the mid-1950s through the early 1970s as part of a broader US geopolitical and developmental strategy to coerce newly independent states by providing water resource development among more general technical assistance. Although these visions never materialized due to economic, socio-ecological, and political obstacles, the characterization of the Mekong region as natural-resource rich "waiting to be developed" (Sneddon, 2015) has persisted to the present day.

The post-Cold War period has been characterized by market-led and state-directed efforts to integrate Laos into the global market. The French aspiration of establishing trade corridors via road- and railway-building and the American plan to facilitate international cooperation through (mainly) water resource development were reincarnated under neoliberal globalization and its poverty alleviation and sustainable development objectives. The imagined geographies of a "formidable frontier" and "natural resources" have hybridized into a "resource frontier" (Barney, 2009). The Lao authorities and their international development partners deployed concurrent processes of infrastructure-building and land assessment to expedite connectivity and accessibility of the Laos resource frontier. These processes have reshaped the socio-economic and geopolitical landscape of Laos and the Mekong region, resulting in uneven patterns of development.

2 The Colonial Period: Integrating Laos into the Colonial Space of Indochina

> The antique kingdom of Lan Sang [Xang] that became Laos under the French protectorate was until 1926 more or less isolated from the rest of Indochina. Separated from the ports in Tonkin and Annam by the Annamese Cordillera [mountain range] and only linked to the rest of the world by the Mekong, the destiny of this country seemed to be the economic satellite of Siam as the politics seemed to link by railroad the various locations of the Mekong with Bangkok instead of with the French ports, especially Saigon.
>
> Marty (1938).

The formation of colonial boundaries along the Mekong River was heavily influenced by nineteenth-century Anglo-French geostrategic rivalries in Southeast Asia. After Louis Napoleon came to power in 1852, France perceived a pressing need to counter British influence in East Asia. French priorities were the consolidation and expansion of French colonial possessions, the containment of Britain's colonization of Upper Burma and the suppression of British economic interference in the Southeast Asian subcontinent (Keay, 2005). French consolidation of Cochinchina (the southern region of modern-day Vietnam) in the early 1860s raised the question of dominance over the Mekong River. French ambitions were to turn Saigon (now Ho Chi Minh City), the capital of Cochinchina lying immediately to the east of the Mekong Delta, into a successful commercial center. Just as the British controlled Shanghai at the mouth of the Yangtze, the Mekong offered the French a path to the largest potential market in the world, imperial China.

When six French explorers left Saigon in the summer of 1866 in search of a navigable route to south-west China, the Mekong River was largely unknown to modern cartography. The best available maps of the Indochinese region showed few sections of the Mekong with any degree of accuracy, leaving large stretches of the river to the imagination of early cartographers (Osborne, 1975, p. 14). The Mekong Expedition of 1866–1868 unveiled, for the first time, a complete map of the Mekong

river from Saigon in Cochinchina to Dali in Yunnan. However, French hopes that the Mekong would immediately open a great new trade route to China were thwarted by the discovery of impassable rapids and waterfalls and treacherous shoals and sandbanks. Ambitions persisted regardless, and officials repeatedly questioned whether the rapids were really an absolute barrier or the islands of Khone truly impassable (de Carné, 1872, p. 36). Further surveys, military missions and expeditions were carried out throughout the late-nineteenth century, notably in four missions led by colonial civil servant Auguste Pavie (Mission Pavie Indo-Chine 1879–1895). These missions resulted in the production of the first definitive atlas of the Mekong and at least six volumes of observations, noting in particular the political affiliations and strong Siamese influence over Lao principalities on both banks of the Mekong River (Wong, 2010).

Throughout the last two decades of the nineteenth century, the strategic annexation of French protectorates to the east of the Mekong and the adoption of the river as a colonial boundary was informed by these cartographic advances and the persistent hope in the Mekong as a potential trade route linking Saigon and southern China. Following the successful French colonial acquisition of Tonkin and Annam (parts of modern-day Vietnam) in 1884 and the establishment of the Indochinese Union in 1887, Laos and Cambodia became protectorates of French Indochina after the French victory in the Franco-Siamese War of 1893. Under the 1893 Treaty of Bangkok, Siam was obliged to give up its claim to the Shan region of north-eastern Burma to the British and cede the Lao principalities on the east bank of the Mekong to France. The French argued the Mekong was the obvious boundary between the colonial possessions (Walker, 1999, p. 45). The demarcation line was generally established along the deepest sections of the main river channel, and islands in the river were allocated to French Laos such that the French could maintain control over Mekong navigation (p. 8).

At the turn of the twentieth century, after securing the Mekong River, which formed the western colonial boundary, the French prioritized road and rail infrastructure projects in Indochina up until World War II, especially in Laos. The colonial government's objective was to de-link Laos from the cultural and economic influence of Greater Siam on the other side of the Mekong River and link it with the rest of French Indochina beyond the Annamite Mountains (Ivarsson, 2008). This rationale was a continuation of the rapid internal integration of France itself since the late nineteenth century, where the consensus was that "there could be no national unity before there were national circulations" (Weber, 1976, p. 218 as quoted in Ivarsson, 2008, p. 95). Infrastructure was an "agent of change" in the modernization and nationalization of rural France and the cementing of the modern French nation-state (Weber, 1976, p. 256). Infrastructural development was considered an effective tool for "spatial and moral rapprochement" (Marty, 1938, p. 72 as quoted in Ivarsson, 2008, p. 100) which not only "makes space manageable but can be linked with movements in time and mind as well" (Ivarsson, 2008, p. 95). Integrating Laos in an Indochina-wide infrastructural network was seen by the French as the only possible means to counter the geographical proximity between the Mekong's east bank and Greater Siam on its west.

Laos was strategically important for connecting southern China and Indochina in its entirety, safeguarding not only the Mekong River route but also a French-favored land route linking the eastern Himalayan foothills extending across Siam, Burma, China and Laos to the Indochinese coast. The French colonial government was well aware of the existence and significance of the Southern Silk Road that linked southern China with Southeast Asia (Walker, 1999, p. 32). Nineteenth-century French Mekong expedition members had noted that Yunnanese muleteers carried Chinese products such as silk, salt, tea, opium, furs and metal goods on their southward journeys, selling them in villages along the route, in the northern-Siamese markets and even as far as the coastal Burma. On their return trip to Yunnan, the muleteers carried local produce as well as British manufactured goods (de Carné, 1872; Garnier, 1885; Pavie, 1906). These observations were useful when demarcating the border between French Laos and China in the late 1890s, as exemplified by the French insistence on incorporating Boten within Lao territory. Known for its numerous salt wells, Boten was an important salt producer and was a well-established caravan stop along a major trade route. The importance of the colonial acquisition of Boten was not territorial; rather, it provided the French access to commercially important areas in southern China (Walker, 1999, p. 57). Preoccupied with Japanese aggression in the first Sino-Japanese war (1894–1895), China signed an agreement with the French in 1895 handing over control of Boten and granting preferential terms for French goods entering Yunnan (Prescott, 1975, 450). Boten remains of strategic importance today; for an exploration of its continued cultural, ecological and economic significance, see landscape planning proposal "Negotiating with ethno-ecology: Landscape management strategies for northern Laos's ecotourism boom" in *Chapter Seven: Chinese mass nature tourism and ecotourism.*

Once control over the connections between northern Laos and southern China had been secured, the next urgent priority was to link Laos with the rest of Indochina to divert trade with adjacent territories away from Bangkok, the capital of Siam, thereby replacing the China-Laos-Siam-Burma trade route with a China-Laos-Indochina trade route. During the first two decades of the twentieth century, railway development proceeded apace as the French colonial government considered it an effective way to build Indochina's basic infrastructural network. In 1898, a railway network was proposed across Indochina with several east–west lines crossing the Annamite Mountains to link French Laos, the "interior of the colony," with the rest of French Indochina (Demay, 2015, p. 7). These lines were to intersect with a north–south line running along the coast between Saigon and Hanoi. Due to Laos's mountainous terrain, this grand scheme never materialized and only the coastal line was constructed (Ivarsson, 2008, p. 96). After World War I, colonial priorities shifted to the construction of durable roads, in particular construction of the east–west arterial roads linking Laos with the Indochinese coastal areas. Of the numerous roads originally planned across the Annamite Mountains, by the end of the 1920s, only the 280 km Route Coloniale No 8 (1924) and the 330 km Route Coloniale No 9 (1926) were constructed (p. 97). While R.C. 9 was passable all year around, R.C. 8 was prone to monsoon flooding and only passable for trucks in the dry season (p. 97). Consequently, the newly established arterial roads did not lead to a diversion of trade with Bangkok.

Siam's infrastructure developed more rapidly over the same period, and, given easier terrain, territories on the west bank of the Mekong were soon better connected by road and rail to Bangkok (Kakizaki, 2005). By the early 1900s, durable infrastructure already connected Bangkok and the Siamese town of Nong Khai, which overlooked the Mekong, to the Laos colonial capital of Vientiane. A railway linked Bangkok and Khorat, and this was connected to Nong Khai on the west bank of the Mekong by a network of roads and tracks (Ivarsson, 2008, p. 97). Siamese internal connections were further improved when an air service and road were opened between Khorat and Nong Khai in the early 1920s (p. 97). In addition, the long-standing link between Bangkok and the Siamese town of Chiang Khong, overlooking the Mekong at Houay Xay in French Laos, had also been considerably improved by the early 1920s. A railway linked Bangkok and Chiang Mai, which was connected to Chiang Rai and Chiang Khong by road (p. 96). By the early 1930s, Laos's development was oriented more towards Siam than the rest of French Indochina in terms of infrastructure, much to the chagrin of French authorities. Not only did the China-Laos-Siam-Burma trade route still dominate the region, even French citizens returning to France from Vientiane in Laos preferred the 25-days travel via Bangkok over the 50-days via Saigon (p. 97).

French efforts to counter Siam-Laos connections, including Air France making Vientiane a destination in 1935, persisted throughout the 1930s until the outbreak of World War II and, in terms of infrastructure investment, focused on constructing two inter-regional roads. Firstly, the 640 km east–west Route Coloniale No 7 connecting coastal Vinh to Xieng Khuang and Luang Prabang in Laos, and secondly, the 1,650 km north–south Route Coloniale No 13 following the Mekong valley connecting Pakse, Savannakhet, Thakhek, Paksane, Vientiane and Luang Prabang in Laos to Saigon (Ivarsson, 2008, p. 98). R.C. 7 and 13 were hailed for "bringing Laos firmly into the Indochinese family" and "implying a definite break away from Siam" (p. 98). However, there was great disparity between the cartographic representations of these roads and the realities on the ground. Much of R.C. 7 and 13 were impassable for up to half the year due to monsoon flooding. Ultimately, only the Saigon-Thakhek and Paksan-Vientiane sections of R.C. 13 were constructed, and by the end of the 1930s, French Laos remained an economic satellite of Siam rather than an integral part of the colonial economy (p. 98).

Even four decades after the demarcation of the colonial boundary along the Mekong River in the late 1890s, Laos remained a contested space caught between Siam and French Indochina. The geographical reputation of Laos as a "colonial backwater" formed through many attempts at road and rail development, which together embody the complex persistence of the idea, ambition, and discourse versus material reality of infrastructure planning and construction in colonial Laos. French investment and resources consequently failed to reach this mountainous and flood-prone colony (Stuart-Fox, 1995). France began exploiting Indochina's natural resources in order to diversify the colonial government's revenue base in the 1930s, which included transforming Cambodia into a center for rice and pepper production and Cochinchina, Annam and Tonkin (together encompassing modern-day Vietnam) into a source of tea, rice, coffee, pepper, coal, zinc and tin (Miller, 1947). Although having

some small-scale timber exploitation, colonial Laos was considered economically unviable, and its socioeconomic development lagged far behind the rest of Indochina. The reimagining and transformation of Laos and the Mekong region entered a new phase during the Cold War, when European colonial rivalries across Southeast Asia were supplanted by the ideological struggle between capitalism and communism. French Indochina ceased to exist once the Kingdoms of Laos and Cambodia proclaimed independence in 1953, and the French evacuated Vietnam following the Geneva Accord of 1954. The colonial plan to integrate the French protectorate of Laos into Indochina was replaced by a capitalist engineering blueprint to re-link Laos with other lower-Mekong countries for the explicit geostrategic purpose of usurping communist power in the region.

3 Cold War Period: Integrating Laos into the US Sphere of Influence

> The task is nothing less than to enrich the hopes and existence of more than a hundred million people. And there is much to be done. The vast Mekong River can provide food and water and power on a scale to dwarf even our own TVA [Tennessee Valley Authority]. The wonders of modern medicine can be spread through villages where thousands die for lack of care. Schools can be established to train people in the skills needed to manage the process of development. And these objectives, and more, are within the reach of a cooperative and determined effort.
>
> Johnson (1966).

The 1954 Geneva Conference witnessed France relinquish all claims to territory on the Indochinese peninsula and the start of concerted US involvement in Southeast Asia (Osborne, 2000). The Mekong River was once again center stage on the geopolitical arena, now post-colonial Southeast Asia. In the mid-1950s, 90 years after the French-led Mekong Expedition of 1866–1868, extensive surveys of the Mekong basin resumed, this time including, most notably, a reconnaissance survey carried out by the United States Bureau of Reclamation in early 1956 and an investigation by the United Nation's Economic Commission for Asia and the Far East (ECAFE) in 1957. The earlier French expeditions were carried out within nineteenth-century Anglo-French geostrategic rivalries and facilitated the demarcation of colonial boundaries along the Mekong River. By contrast, the US and UN reconnaissance surveys were carried out within the Cold War-era rivalry between capitalism and communism and were intended to facilitate development of the Mekong basin in order to steer the Mekong region's newly independent governments towards "international cooperation" with each other and more importantly the US (Black, 1969; Sneddon, 2015). The French ambition of turning the Mekong into a navigable river was reenacted as a basin-wide development program that included irrigation, power production, flood control, and improved navigation.

After the 1954 Geneva Conference, the US urgently sought to fill the political vacuum, left after conclusion of nearly a century of French influence, to avoid a

Communist takeover of South Vietnam (1955–1975), the Kingdom of Laos (1946–1975), and Cambodia (1953–present). Numerous Southeast Asian specialists advised the US of the importance of steady economic growth and political and social stability in the non-Communist countries in the region (Sneddon, 2015, p. 108). Water resource development became an effective geopolitical tool to modernize Southeast Asia with an orientation toward the US rather than the USSR, thereby hobbling any perceived Communist expansion. As early as 1954, the US government had urged Thai officials to consider regional economic cooperation under the banner of a "Mekong River Authority" and emphasized the huge power and irrigation potential of the Mekong benefitting four Southeast Asia countries (p. 108). The completion of the US 1956 and UN 1957 survey missions, along with other behind-the-scenes lobbying, led to the 1957 creation of the Committee for the Co-ordination of Investigations of the Lower Mekong Basin (simply known as the Mekong Committee) (Palumbarit, 2017). Although the Mekong Basin covers parts of six countries, only Thailand, Laos, Cambodia, and South Vietnam were member nations of the Mekong Committee and participated this international planning initiative. China was not a member of the United Nations in the early 1950s and Burma was not interested in participating (Mekong Secretariat, 1989).

The United States Bureau of Reclamation (USBR) spearheaded the ambitious US- and UN-led development venture in the lower Mekong basin. Initially a modest initiative set up in 1902, the USBR was originally charged with constructing infrastructure to irrigate the arid Western US (Pisani, 2002, p. 3). In the 1930s the bureau transformed into a dynamic political player, closely involved in Federal efforts to stimulate domestic economic development through construction of multi-purpose projects in President Roosevelt's New Deal (p. 151). During this period the USBR shifted its attention to comprehensive river basin development programs, including the construction of large-scale hydroelectric dams, and conducted technical analysis and design of many dams under the Tennessee Valley Authority (TVA) (Billington & Jackson, 2006, p. 12). The USBR's political significance expanded into the global arena when it officially started "foreign activities" in 1950 (Sneddon & Fox, 2011, p. 451). Technical assistance dominated by water resource development was deployed as development aid by the US government to persuade newly independent states to ally with the West during the Cold War. As part of this process, the TVA became a symbol of US overseas development and the USBR was celebrated as the world's preeminent water development agency. The USBR played a central role in hundreds of water resource development programs throughout Africa, the Middle East, Latin America and Asia, promising the creation of "modern" river basins as a means of becoming a "modern" state (p. 451).

As part of a broader US geopolitical and developmental vision to globalize river basin planning strategies, Mekong basin development constituted the most ambitious overseas project in the history of the USBR (Biggs, 2006). Because two-thirds of the lower Mekong River and one-third of the total basin area falls within Lao territory, Laos figured prominently in the US blueprints for the region and was dubbed "the TVA of Southeast Asia" (Johnson, 1966). In 1961, the Pa Mong Dam was proposed across the Mekong's main channel at the Thai-Lao border, approximately 20 km

upstream of the Lao capital Vientiane. The project was the linchpin of Comprehensive Mekong River Basin Development Plan (CMRBDP), comprising of eight massive hydroelectric dams on the main channel and numerous ancillary projects on the Mekong's tributaries (Mekong Committee, 1961).[1] The Pa Mong Dam was envisaged as an "impact type" project intended to showcase the US team's experts "in full command of the science of putting water and land to use for economic development" for Mekong countries and for the Thai and Lao governments in particular (Sneddon, 2015, p. 109). A 1960s USBR brochure promoted the Pa Mong Dam as a multi-purpose project, with benefits including improved upstream navigation, additional water provision during drought, "modern irrigation development" for more than one million hectares of farmland in Laos and Thailand, and 4,800–5,400 MW of hydroelectricity annually to power regional industrialization (United States Bureau of Reclamation, 1970).

In 1963, the US State Department granted the USBR the necessary funding to implement a two-phased feasibility study for the Pa Mong scheme on the basis that the studies "will have the value of tagging the Pa Mong site as an American project" (Sneddon, 2015, p. 111). Phase One (1963–1966), aimed to establish the dam's technical feasibility from biophysical and economic standpoints. Although confirmation of the project's feasibility might have seemed a foregone conclusion given its geopolitical significance, an extraordinary amount of information, including stream gaging, rainfall, soil, hydrographic, topographic and land classification, was surveyed and collated (See United States Bureau of Reclamation, 1965). Basic data collection was paramount, as earlier surveys carried out by the US and UN in the mid-1950s had noted that basic data for "orderly development of the basin" was practically non-existent (United States Bureau of Reclamation, 1956). Data collected during Phase One "successfully" demonstrated the feasibility of the Pa Mong Dam, and US President Johnson exclaimed that the "vast Mekong River can provide food and water and power on a scale to dwarf even our own TVA" (Johnson, 1966, p. 397). The optimism conjured in Phase One soon evaporated during Phase Two, as new feasibility studies encountered significant economic, socio-ecological, and political obstacles.

Phase Two, started in late 1966 with an expected duration of five to seven years, was to estimate the costs and benefits of all aspects of the Pa Mong project including irrigation, power production, flood control, improvement of navigation and reduction of estuarine saltwater intrusion (United States Bureau of Reclamation, 1966, p. 4). Estimated at US $600 million, Pa Mong Dam would cost more than 12 times that of the Hoover Dam in the US. Full estimates for the entire project, including transmission lines and irrigation projects, ballooned to $1.1 billion (Sneddon, 2015, p. 120). The project's viability was further questioned given that while construction of the dam and power plants was estimated to take five to ten years, other components, such as transmission lines and irrigation channels, were unlikely to produce the tangible benefits envisioned in the project plan for some 25 years (p. 120). Even USBR staff

[1] The eight dams planned on the main channel are: High Luang Prabang, Sayabouri, Upper Chiang Khan, Pa Mong, Upper Thakhek, Ban Koum, Stung Treng, and Sambor.

began to question the socio-ecological practicability of the project. An estimated 312,000 to 500,000 people would be displaced and 948,000 acres of productive farmland inundated due to the dam. Irrigation development targets were also doubted as experts debated the geological, soil and land classification findings in the Pa Mong region (United States Bureau of Reclamation, 1970).

Aside from apprehension over the project's economic viability and socio-ecological practicability, the region's political dynamics and the US's geopolitical objectives had changed dramatically by the end of the 1960s, leading to the Pa Mong Dam's termination in the early 1970s. By 1968, at the height of the Vietnam War, Vietnam, Laos, and Cambodia were war zones, rendering large-scale water development projects in the lower Mekong basin completely "infeasible." Following US President Nixon's election in 1969, the US government re-focused its foreign policy in Southeast Asia with a view to effectively withdraw military engagement in Vietnam (McMahon, 2010). Phase Two feasibility studies ended abruptly when the Pa Mong Project and CMRBDP were officially shelved in 1973. Nevertheless, vast amounts of data collected in both project phases formed the basis of the 1968 *Atlas of Physical, Economic and Social Resources of The Lower Mekong Basin*. This exhaustive tome included 20 plates covering the biophysical and socioeconomic aspects of the lower Mekong basin including: Geology, Hydrogeology, Population, Education, Industries, Tourism, Telecommunications, Geophysics, Water Resource, Railroads, Hypsometry, Health, Engineering Geology, Construction Materials, Mineral Resources, Rice Lands, Soil Engineering, Land Use, Land Potential, and Electric Power (Mekong Secretariat, 1968).

Although the Pa Mong Dam and the CMRBDP never materialized, the technological and geopolitical expertise gained through promoting these projects and investigating their feasibility set the stage for an imagined geography of the Mekong basin as a "natural resource" capable of being managed, regulated and "developed." The comprehensive data generated throughout the different phases of the investigation from the mid-1950s to the early 1970s, together with the USBR map highlighting the most critical engineering projects across the basin, conjured up an imaginary geography of a "developed" Mekong region. That vision survived well beyond the post-Cold War era and was revived under new socio-economic and geopolitical imperatives. The repercussions of US foreign policy changes in Southeast Asia since the Nixon administration (1969–1974) have persisted over the decades. With little resistance to Communist influence, the 1970s saw the Mekong's development repositioned as an engine of "peacetime reconstruction and development of the Indo-China countries" (Sneddon, 2015, p. 121). The direct role of US agencies such as the USBR in the Mekong region was increasingly reduced in favor of various United Nations agencies such as the United Nations Development Programme (UNDP) and multilateral entities, such as the US-led World Bank (est. 1944) and Japan-led Asian Development Bank (est. 1966). Following the end of the Vietnam War in 1975, the 1980s boasted a more stable Indochinese Peninsula. The USBR's vision of the Kingdom of Laos as the "Tennessee Valley Authority of Southeast Asia" was transformed by the Mekong states and affiliated development agencies into the Lao People's Democratic Republic, the "resource frontier" of Southeast Asia.

4 Post-Cold War Period: Integrating Laos into Global Markets

> 'The Economic Quadrangle' is now the focus of Asia. ... Investors, businessmen and manufacturers who are intent to expand their trading, and investment can aim at increasing their benefits. We are ready for those investors, who are aiming for success, and profits, by cooperating with the Lao People's Democratic Republic. This is a golden opportunity in doing business, in the area full of natural resources and labour with lower wages. Therefore we can assure you of stability and achievement in business.
>
> The Economic Quadrangle Joint Development Corporation (1996).

As regional tensions relaxed with the end of the Cold War, the Mekong region witnessed a burgeoning of overlapping inter-state cooperative ventures supported by the United Nations Development Programme (UNDP) and multilateral development banks (MDBs) such as the World Bank. Three main vehicles of development were established in the first half of the 1990s. The first, the Mekong River Commission (MRC), was established after Thailand, Laos, Cambodia and Vietnam signed the Mekong River Sustainable Development Cooperation Agreement in 1995 (Jacobs, 2002). A reincarnation of the Mekong Committee formed in 1957, the MRC focuses on water resource development including commercial shipping and energy generation. The second, the Greater Mekong Subregion economic cooperation program (GMS Program), was established with the assistance of the Asian Development Bank (ADB) in 1992 and has actively involved all six Mekong countries. Focusing on identifying and implementing projects across diverse sectors, the GMS Program coalesced around a transnational network of "North–South" and "East–West" trade corridors after the 1997 Asian financial crisis (Chen, 2005, p. 195). The third, the Golden Economic Quadrangle (GEQ), encompasses the upper-Mekong borderlands, and membership consists of Laos, Myanmar, Thailand, and Yunnan. Instigated by Thailand in 1992, the "Golden Quadrangle" was to supersede the infamous Golden Triangle of an earlier era (Walker, 2000, p. 123). With the geographical proximity of four international borders and the existence of old trade routes, GEQ advocates argued these would lead to fruitful economic cooperation in an increasingly integrated market under the GMS Program.

The unbuilt road and rail trade corridors of French Indochina and the American blueprints for international cooperation through basin-wide water resource development coalesced in the plans and programs of Southeast Asia's new inter-state cooperative development mechanisms. These mechanisms no longer operate explicitly as colonial domination nor to contain the rising tide of Communism; rather, they operate in the name of neoliberal sustainable development and poverty alleviation. The Mekong and its basin as "resource" are central to discourses of regional integration rooted in visions of economic connectivity (Glassman, 2010; Hirsch, 2001). In neoliberal discourses, the Mekong region is described as the "last resource frontier" of the Global South, while Laos, land-locked at the region's geographic center and surrounded by five GMS-member countries, is further positioned by state agencies, companies, development banks, the MRC, GMS, and the GEQ as an "untapped

space." Military conflicts of the 1960s and 1970s and the post-conflict isolationism imposed by the Lao People's Revolutionary Party in the 1970s and early 1980s has kept Laos outside the reach of most international capital. The rhetoric of frontiers is today "a legitimating ideology" for new forms of capitalist exploitation (Barney, 2009, p. 147).

The idea of Laos as a "resource frontier" formed from the ideal conditions following the Cold War together with the Lao PDR's failed attempt at socialist reconstruction. After 1975, Laos was one of the world's 49 Least Developed Countries (LDCs), measured in terms of its low per capita GDP, weak human-resource base and high level of economic vulnerability (Rigg, 2005, p. 20). However, Laos was also situated within one of the world's most economically dynamic regions, sharing borders with Thailand and China, two of the rising economic powers of Asia. In the 1980s, Thailand was shifting its foreign policy towards former Indochina to turn the region's "battlefields into market places" (*ao sanam lop pen sanam kan kha*). In the early 1990s, China's ambition to make Yunnan "a grand passageway to Southeast Asia" was a significant about-turn for a government that had seen its southern border as a security threat for most of the years since WWII. There was a growing consensus that opportunities for economic growth and development would be created if adjoining countries were encouraged to exploit their complementarities, with Myanmar and Laos aided by Thailand and China's increasing capital, technology and infrastructure (Walker, 2000, p. 125).

The increasing demand for natural resources from its neighbors coincided with the Lao government's need to find other sources of revenue after Soviet aid dried up in the mid-1980s (Lestrelin et al., 2012). The way to tackle Laos's "underdevelopment" and a collapsing domestic economy was through a national strategy of radical economic reforms encapsulated in the New Economic Mechanism (NEM) or "New Thinking" (*chintanakan mai*) introduced in 1986. Abandoning central planning in favor of opening the economy to trade and investments, the NEM adhered closely to the principles established by the neoliberal Washington consensus of the World Bank, the IMF and the US Treasury (Rigg, 2005, p. 22). To an extent, the economic reform of Laos was indeed a response to pressure from the country's main creditors. The World Bank and the ADB promoted the NEM as a way for the Lao government to effectively gain access to new funding, loans and revenue from international finance institutions and foreign investors (Stuart-Fox, 2005). Since then, harnessing the country's natural resources has been touted a significant driver of economic growth, and various business-friendly "untapped frontier" narratives have been devised to help the Lao government recruit investors. In the post-reform era since 1986, the export-oriented resource sectors, including large-scale hydropower, mining, forestry and agri-business, are considered by key Lao and international agencies to be the mainstays of the country's developmental future as the nation seeks to graduate from its LDC status by 2020 (Government of Lao PDR, 2003).

Two major concurrent processes, infrastructure construction and land assessment, each rationalized through discourses on neoliberal sustainable development and poverty alleviation, have enhanced the "accessibility" of Laos as a resource frontier over the last three decades. The first process, infrastructure construction, focuses on

improving physical accessibility across Laos's challenging terrain. Echoing earlier French colonial campaigns, road planning and construction has often usurped traditional patterns of connectivity, such as those preferred by upland communities, to make way for the taxation and property regimes enabled by road construction (Scott, 2009, p. 198). Yet, unlike the colonial rationale of competing against Siam's influence, modern roads are to battle poverty. Neoliberal development discourse considers "inaccessibility" by infrastructure a proxy for poverty in rural developing economies. Moreover, quality of life is believed to depend on the degree populations are linked to or isolated from markets (van de Walle, 2002; Hentschel & Waters, 2002). In such narratives, poor infrastructure is a problem requiring development intervention, because it erodes the terms of trade for rural communities by raising the costs of inputs and lowering the value of outputs, thereby undermining livelihoods. Lao state agencies and development banks prescribe to infrastructure development as a panacea that can alleviate poverty, boost incomes and raise living standards. In fact, the Lao government had tried to improve accessibility during the pre-reform era, but due to an enduring lack of investment capacity, achieved little beyond the relocation of remote populations to more accessible areas along existing roads (Rigg, 2005, p. 16). Construction and upgrading of infrastructure gathered pace in the 1990s through trade corridors promoted by the ADB under its GMS Program.

As previously mentioned, the GMS Program prioritized transport projects over other sectors following the 1997 Asian financial crisis. While facilitating some improvements to regional airports and air services, the GMS Program has mainly promoted economic corridor-based connectivity: road-based integration, cross-border trade, and growth-oriented prosperity (Sturgeon et al., 2013; Su, 2012). This connectivity is a patchwork of new transportation projects and strategic upgrades, coupling cross-border sub-regional projects with national development plans. The East–West Economic Corridor (EWEC) and North–South Economic Corridor (NSEC) are the two main arteries linking Laos to its neighbors. The EWEC stretches 1,450 km from Mawlamyine in Myanmar through Thailand and Laos to Da Nang in Vietnam. The NSEC runs 1,750 km from Bangkok via either Luang Namtha in Laos or Keng Tung in Myanmar to Kunming in Yunnan. The NSEC, promoted as a revitalized ancient trading route now linking the region's largest national markets (China and Thailand), incorporates roads through Laos and Myanmar connecting Xishuangbanna and Chiang Rai, both centers of the Golden Economic Quadrangle. When constructed, these infrastructures improve Laos's physical accessibility and transform it from a land-locked to land-linked country. In an advertisement calling for international investment, the Lao Deputy Prime Minister and Minister of Foreign Affairs Thongloun Sisoulith pitched Laos as a "New Frontier of Opportunity" with supportive, confidence-building investment policies and "an expanding volume of intra-regional trade made possible through infrastructure upgrades" (Fortune, 2007 as quoted in Barney, 2009, p. 147).

The second process, land assessment, has facilitated the legal "accessibility" of Laos's natural resources most central to the livelihoods of much of the population. In the late 1980s and early 1990s, Lao authorities, with the support of its development partners, carried out country-wide assessments of its natural resources and

agro-ecological potential, which together constitute the foundation of the nation's socioeconomic development. Like the US-led surveys and feasibility studies of the lower Mekong carried out in the 1950s and 1960s, the Lao government's land assessments were, through the discourse of neoliberal sustainable development, ultimately political-economic calculations carried out to render territory measurable and developable. Unlike the US attempt to legitimize its presence in a region facing perceived Communist expansion, these assessments of Lao land define "qualities of territory" to legitimize the exclusion of existing forms of land use considered "unsustainable" and "unproductive" according to neoliberal market ideology (Goldman, 2005, p. 184). Shifting agriculture, for example, is the target of a yet ongoing exclusion process, despite being the dominant mode of agricultural production in the Lao uplands that constitute some 80% of the country's land area (Hodgdon, 2010). Lao state planners and their multilateral development bank backers face serious challenges because the on-the-ground land use often contradicts their imagined geography of Laos as an empty landscape ready for commodity extraction and production. Development agencies identify Laos, ranked among the world's poorest economies but with great ecological wealth, as a potential hotspot for a "poverty-environment nexus," where poverty and the environment are caught in a mutually reinforcing spiral of degradation. The discourse of "poverty-environment nexus" further legitimizes the process of freeing up land and forest resources for capitalization (Dasgupta et al., 2005; World Bank, 2006). The simplistic chain of degradation narrative, whereby shifting cultivation is equated with poverty and land degradation, is routinely applied in mainstream development discourse (Lestrelin & Giordano, 2007).

In post-reform Laos, foreign consultants employed by international development agencies (IDAs) have helped promote and codify numerous decrees and laws relating to property rights and natural resource management (Goldman, 2005; Barney, 2009). They map and legitimize new state-sponsored land use definitions, while traditional property systems are unmapped and delegitimized. Eco-rationality and market forces have both intensified this phenomenon. The first decade of the post-reform era was dominated by scientific expertise that rationalized land use to balance development and conservation objectives. For example, the Tropical Forestry Action Plan (TFAP), one of the first joint projects initiated by the Lao government and major IDAs, was launched after the first national forestry conference was held in 1989. The TFAP recommendations included forest conservation and tree plantation measures covering over 70% of Laos's land area and the planned resettlement of around 170,000 households, constituting two thirds of the population engaged in shifting cultivation at that time (Evrard & Goudineau, 2004). Since the late 1990s, the national strategy of "Turning Land into Capital" (*kan han thi din pen theun*) in the name of sustainable development has promoted the identification of "empty" space suitable for large scale mining, hydropower, plantation and other agribusiness concessions. For example, the National Land Titling Programme (NLTP), established in 1997 with help from the World Bank and AusAID, provided incentives for landholders to invest in productive and market-oriented land uses (Lestrelin et al., 2012). By allocating swidden land to companies able to invest in modern and more productive technologies, the NLTP

was deemed an effective tool to improve the productivity of supposedly unutilized or underutilized land.

Infrastructure construction and land assessment continuously reshape Laos's physical and legal landscapes, transforming an imagined geography into a "resource frontier" reality for global capital. Improved road networks are turning "land-locked" Laos into a land-linked "land bridge" providing the most direct overland routes to its seaboard neighbors. Land classification and other forms of ecological differentiation enable the identification of abundant tracts of supposedly unoccupied degraded land for ecological improvement or economic development. However, these very processes carried out in the name of sustainable development and poverty alleviation are generating new forms of poverty and ecological degradation due to the sudden disruption of preexisting modes of connectivity and the routine delegitimization of livelihoods by neoliberal notions of market value and optimal resource allocation. Inadequate allocation of time and resources to establish viable alternative development models during large-scale, fast-tracked human resettlement and dramatic landscape change is devastating for an overwhelmingly rural population heavily reliant on mixed subsistence and semi-subsistence agriculture. Many scholars have pointed out that the ongoing debasement of subsistence production in favor of the demands of the regional and global market have compromised the livelihoods of the rural poor, especially vulnerable upland communities. Increasing Chinese state and business engagement in Laos and the wider Mekong region since the launch of Belt and Road Initiative in 2014 has accelerated foreign capital inflows and regional integration.

5 Conclusion

Even during the dry season, the Mekong is a truly immense river, flowing slowly but inexorably through the surrounding sunbaked brown rice fields. With the advent of the monsoon rains the waters of the Mekong swell, inundating hundreds of hectares of scorched land transforming it into a seemingly endless patchwork of ponds and lakes. This vast natural spectacle has inspired geographical imaginations and infrastructural ambitions since at least the nineteenth century when mainland Southeast Asia was increasingly subject to European colonialism.

When the French secured control of Cochinchina in the Mekong delta in the mid-nineteenth century, the region's geography of connectivity was defined by preexisting trails across and along a largely uncharted Mekong River. Various overland caravan routes and river-based routes in the upper Mekong combined to form an important part of the Southern Silk Road, a major trading link between China and Southeast Asia by which Chinese merchants from Sichuan and even the central plains traded a wide variety of products with their Indian, Burmese and Siamese counterparts. French colonial ambitions and American postwar aspirations gave rise to new geographical imaginations, reconfiguring regional and geopolitical connectivity. Surveys were conducted, data collected, and plans created in support of the French effort to de-link Laos from Greater Siam and incorporate it into French Indochina, and later American

ambitions to de-link Laos and other lower Mekong countries from communist China and North Vietnam in order to bring them under the umbrella of US influence.

While most of the physical infrastructure proposed in both historical periods failed to materialize, it collectively established a way of perceiving Laos, the Mekong River, and the Mekong basin that would persist to the present day. Colonial maps charting long stretches of the Mekong River helped establish a gestalt for the French protectorate of Laos on the river's east bank, while unsuccessful attempts to develop roads and railways generated a narrative describing Laos as a "formidable frontier" and "colonial backwater." US and UN maps identified the upper and lower Mekong basin as two separate socio-economic entities, and data collected through technical surveys and feasibility studies of the Mekong basin development plan generated a narrative of Laos and the larger Mekong region as an area of untapped "natural resources." The imagined "formidable frontier" and "natural resources" geographies have hybridized into a perceived "resource frontier" in the post-Cold War period. In the name of sustainable development and poverty alleviation, the Lao authorities and their international development partners have deployed the concurrent processes of infrastructure construction and land assessment to expedite the accessibility and connectivity of the Laos resource frontier.

The ambitious transportation networks that largely failed to materialize during the colonial era have been gradually realized over the last three decades. Today the geopolitical landscape of Southeast Asia has been transformed, even though the territorial and infrastructural configurations shared by these two periods have remained largely unchanged for over a century. French ambitions of travelling through Laos to reach the markets of imperial China, then by far the world's most populous country, have been replaced by today's Chinese southward-looking vision of reaching into Laos and the other lower Mekong countries with their resource-abundant economies and market over 320 million people strong. Whereas past colonial governments sought to obscure the Southern Silk Road and establish their own substitutes, multinational development banks and Mekong region governments now seek to revitalize the Southern Silk Road with modern infrastructure. The traditional Southern Silk Road was never a single fixed route but rather a shifting network of routes used by caravans of heavily laden oxen and mules. Now reincarnated under the Belt and Road Initiative (BRI) as a "Modern Silk Road," it comprises numerous planned tarmac roads and the 3,000 km Pan-Asian Railway planned to connect Yunnan's Kunming with Singapore. Three railway lines are planned to link Kunming with Bangkok: one through Myanmar, one through Laos, and one through Vietnam and Cambodia. From Bangkok the railway is planned to run the length of Peninsula Malaysia to Singapore. The 414 km Laos section of the Pan-Asian Railway, known as the China-Laos Railway, spearheads this project, with construction commencing in 2016 and due for completion at the end of 2021.

Understanding how contemporary developments are enabled and constrained by past perceptions and activities allows us to evaluate them through a wide conceptual lens and critique them with historical depth. This chapter details the machinations by various parties to control and reshape the Mekong region's connectivity and challenges the dominant narrative of a linear progression from land-locked to land-linked

and from isolation to integration, by focusing on three loosely defined historic periods between the mid-nineteenth century and the present. Challenging the characterization of Laos as a land-locked country isolated from modernity, this chapter highlights its journey along a continuum of contingent transnational flows of ideologies, technologies and capital since the nineteenth century. The pursuit of more equitable forms of development requires a more inclusive socio-environmental valuation system than has yet been imposed, supported by critical, sustained investigation of the spatial, temporal, and discursive dimensions of development models, whether "sustainable," Chinese or yet to be devised.

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Chapter 4
Locating Discourses and Narratives for Intervention

1 Introduction

Building enough awareness of local discourse to make effective change is difficult. In the *Introduction*, we conveyed anthropologist Li's (2007) sentiments that when asked by officials to provide a "bridge," between her critical, anthropological research and their "world of projects," she could not (p. 3). The reason that bridge was "elusive" is partly explained by the difficulty of holding cultural-technological positions—to be critical and simultaneously to intervene technically, which were introduced in *Chapter Two.*

For planners untrained in ethnographic methods and critical social theory, particularly that targeting the Global South since the emergence of the sustainable development paradigm in the 1980s, research approaches (i.e., for doing planning) must be cultivated in ways that are proactive, efficient, rigorous and, on some level, a blunt force pushing those planners up an undeniably steep learning curve. Put in simpler terms, they must be *untrained* as planners. This chapter assembles a cache of recent critical discourse on development in Laos. The selected references are field studies undertaken by political scientists and critical geographers, anthropologists and sociologists that: (1) provide for these planners' socialization in foreign, critical disciplines; (2) engender an awareness of local discourse; and (3) provide positioning, narratives and conceptual materials capable of giving inspiration and momentum to a planning and design process.

Importantly, the assembled discourse in this chapter must be considered a highly oblique entry into critical development studies, as it circumvents more canonical literature in development theory in favor of a Laos-centric survey. These field studies critically theorize and describe development projects and their contexts, including land-use planning cum resettlement projects, hydropower construction and watershed management, corporate social responsibility programs for large gold and copper mines, and regional economic corridors structured around road-upgrading projects. Theoretical genealogies are traced where necessary, and this chapter is admittedly

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heavier in its citations, offering both discipline- and actor-specific discourse for designers and planners.

The literature reviewed here offers a diverse and sometimes conflicting tapestry of theories and concepts from development studies, including sections: (1) The politics of land-use planning and its deployment in the state's territorial strategies; (2) A brief recounting of origins, since the 1980s, of the paradigm of sustainable development as it was imposed on regulatory institutions of the Global South; (3) The ways large-scale resource extraction is reproduced at capitalism's frontiers via complex and overlapping patchworks of relations between large-scale infrastructures, state land concessions, and their administration at various scales; and (4) Discourse on "infrastructure" as a concept and our capacity to plan and assess it. These sections are held together by their constructivist and critical theory approaches, focus on the means and ends of neoliberalism, and undercurrents of authority, expertise and the politics of intervention found throughout this book.

2 The Politics of Land-Use Planning

A 2012 article on the politics of land-use planning in Laos by geographers Lestrelin et al. opened with a detailed examination of how land-use planning is defined by the United Nations Food and Agriculture Organization's (FAO) Guidelines. According to the FAO (1993), "Land-use planning is the systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adopt the best land-use options… Its purpose is to select and put into practice those land uses that will best meet the needs of the people while safeguarding resources for the future." Lestrelin et al. (2012) argue that land-use planning, rather than being a straightforward technical exercise undertaken by well-intentioned experts as framed by FAO, is in fact highly political and involves "the territorial projection of particular socioenvironmental perspectives and values" (p. 3). To better understand Lestrelin et al.'s assertion that land-use planning is an important instrument of territorialization, as well as to understand its central position in political debates over society and the environment, our investigation embraces two interrelated scholarly discussions, firstly the "politics of space" and secondly the "state's territorial strategies."

The disciplinary shift towards the theorization of space across many geographical and social sciences has progressed through several manifestations, mostly responding to the increasing mathematization, abstraction and formalization of space and time in everyday life (Peters & Kessl, 2009). Positing space as socially constructed, historically produced, and politically active, neo-Marxist researchers such as Henri Lefebvre, David Harvey, Doreen Massey, and Edward Soja have been highly influential in "spatial" disciplines such as architecture, urban planning, and geography. In particular, Lefebvre's seminal work *The Production of Space* (1991, first published 1974) provides a platform for understanding the modern complexities of form, structure, organization and experience. His assertion of the "politics of space" challenges

planners and designers of the built environment to navigate the complexity of "the production of space."

In various works on space, the city, and modernity including *The Production of Space*, Lefebvre (1971, 1977, 1987, 1995, 2003, 2009) repeatedly asserts that space is not a scientific object separated from ideology or politics; it has always been political and strategic. Challenging the objectivity and "purity" of space planning as a science, Lefebvre argues, "If space has an air of neutrality and indifference with regard to its contents and thus seems to be 'purely' formal, the essence of rational abstraction, it is precisely because this space has already been occupied and planned, already the focus of past strategies… Space has been fashioned and molded from historical and natural elements, but in a political way" (2009, p. 170). Lefebvre defines space as a social construct and demands a critical analysis of how any given space is produced and the strategic objectives that dictate its design.

Lefebvre (1991) recognized three dimensions of the production of space, namely social practices (perceived space), representations of space (conceived space), and spaces of representation (lived space) (pp. 33, 38–39). Of these, he identified the representations of space (conceived space) as the most influential, the "space of scientists, planners, urbanists, technocratic sub-dividers and social engineers… the dominant space of any society (or mode of production)" (pp. 38–39). According to Lefebvre, representations of space are deeply entwined with their ideological history. The professionals' conception of space, as conceived and represented through maps, models, drawings, plans, etc., merely reflects how power molds the dominant discourses, which in turn determine how space is surveyed, controlled, delimited, delineated and organized to meet particular ends. He states that "any representation is ideological… Ideology is therefore inseparable from practice" (Lefebvre, 1977, p. 29), and "it is the role of ideologies to secure the assent of the oppressed and exploited" (Lefebvre, 1996, p. 76).

Lefebvre argues that in order to grasp how modern environments are created, change and impact the lived experience of their populations, it is important to understand how space is produced, who produces it, who it is designed for, and what functions, purposes, and ends it is intended to serve. Space is the subject of conflicts over ownership, meaning, values, and uses—a crucial battleground where social justice and equality are routinely contested. Lefebvre points out that current spatial forms and configurations are not spontaneous; they are products of history. Dominant spatial forms are imposed, not by competing ideas and values in modernity, but by those who wield power and seek to control it in their own interests. Their ownership and regulation of space permits some actions and activities while limiting or prescribing others. "Spatial and temporal practices are never neutral in social affairs. They always express some kind of class or other social content and are more often than not the focus of intense social struggle" (Harvey, 1990, p. 239).

Lefebvre and other neo-Marxist writers on the politics of space pay particular attention to how the representations of space dominant under capitalism are enabled by processes of abstraction, including the quantification of space (alienation) and the elimination of differences (homogenization) (See, for example, Lefebvre, 1977, 1991; Harvey, 1978, 2001; Soja, 1989, 1996). Given the power to organize, regulate,

delimit and delineate space according to functional priorities, these representations of space (conceived space) help create capitalist and neo-capitalist spaces that are quantified and increasingly homogenous and which facilitate production, consumption, reproduction and circulation in ways organized and structured to meet the requirements of capital. All the elements of such commodified space are exchangeable and thus interchangeable; it is also a policed space where no resistance or obstacles are tolerated by the state. "Economic space and political space," Lefebvre (2009) argues, "converge toward the elimination of all differences" (p. 192).

While theories of the production of space enable geographers and social scientists to analyze ideas and values in modernity, a range of other authors are calling for more rigorous recognition of how Lefebvre's spatial theory and analyses can be adapted, i.e., put to use, for more humane and just approaches to the planning and design of urban and rural environments (See, for example, Coleman, 2015; Fraser, 2011; Stanek, 2011; Zieleniec, 2018). Planners and designers, with their analytical preoccupation with abstract space, should actively respond to and engage with Lefebvre's critical analyses of the processes of alienation and homogenization, particularly the spatial dimensions of his lifelong multifaceted critique of "the devastating conquest of the lived by the conceived, by abstraction" (Lefebvre, 2006, p. 10 as quoted in Wilson, 2013, p. 366).

Following intensified scholarly interest in the geographies of state space since the late 1990s, social scientists and political geographers, such as Agnew (1994, 2005), Sassen (1996, 2006), Brenner (1997, 2004) and Elden (2004, 2009), have further developed the territorial dimensions of Lefebvre's thinking on state space. Although Lefebvre did not systematically conceptualize territory, his reflexive attention to the relationship between territory and modern state power supports territory as an essential feature of modern state space (Brenner & Elden, 2009). Brenner and Elden (2009) highlight three key dimensions of Lefebvre's approach to "state space as territory," namely the production of territory, state territorial strategies, and the "territory effect;" the latter refers to the state's tendency to normalize its transformative effects on socio-spatial relations by means of its territorial form.

As socially constructed spaces, territories are recognizable as "discrete, distinctive, bounded, measurable, communicable spaces that are deliberately created in an effort to achieve certain social goals" (Murphy, 2012, p. 164). Territory is both a relation and an outcome of territoriality, a process defined by Robert Sack (1986) as the "attempt by an individual or group to affect, influence, or control people, phenomena, and relationships by delimiting and asserting control over a geographic area" (p. 19). According to Sack, territoriality involves the dual processes of classification and communication (pp. 21–22). Classification refers to theoretically eliminating or altering the need to regulate specific resources or individuals within a territorial zone, and communication refers to visually or textually conveying both the territorial boundaries and the restrictions on activities within the territory. Specific territorial projects where territorial strategies (territoriality) are deployed by various actors to produce bounded and controlled spaces (territory) to achieve certain effects is defined as territorialization, a common goal of which is to govern people and resources located within and around the territory (Scott, 1998).

In their influential analysis on the ways state power is territorialized within the borders of a politically defined space, political ecologist Vandergeest and sociologist Peluso (1995) identify territory as a practical facet of state control and the state's territorial strategies as tools to control people and their access to land-based resources. When analyzing forms of classification and communication, they argue that the territoriality of the modern state is based on abstract space, which "can be cut up into discrete units… and measured" (p. 388). Echoing Lefebvre's critical analysis of alienation and homogenization, Vandergeest and Peluso point out that abstract space is homogeneous in that, firstly, "any unit can be compared and rendered equivalent to another unit by spatial categories" and, secondly, imposing seemingly equivalent and comparable grids onto space "permits the location or nesting of an area in a larger abstract space" (p. 388). Maps and land codes (land laws) are highlighted by Vandergeest and Peluso as tools to classify and communicate abstract space. Maps do not simply represent reality, they "are instruments by which state agencies draw boundaries, create territories, and make claims enforced by their courts of law" (p. 389). Being "textually mediated" (p. 388), land codes insulate the state's territorialization from earlier regimes of rule and production.

Echoing Lefebvre's critique of the conquest of the lived by the conceived through abstraction, Vandergeest and Peluso (1995) assert that, firstly, the creation of an abstract space implies the annihilation of lived space and, secondly, the incompatibility between lived space and abstract space is at the root of the instability of modern states' territorial strategies. They describe territorial land-use planning as "a utopian fiction unachievable in practice," given that it often overlooks and contradicts "peoples' lived social relationships and the histories of their interactions with the land" (p. 389). The mismatch between lived space and abstract space makes the enforcement of the state's territorial claims a necessity, one attained through "their recognition by a relevant audience, by social pressure, and by the threat and use of violence" (p. 389). In their analysis of enforcement institutions, Vandergeest and Peluso note that where there are overlapping and conflicting claims by different legitimating authorities, "the one that is the most enforceable in practice (de facto) will have a greater influence on behavior and resource use that de jure controls" (p. 389). They also point out that more often than not, more powerful states and international non-state groups offer economic and military assistance to poorer or strategically important states facilitating such territorial control.

It is important to understand the motivations behind territorialization. Contrary to many theorists, Vandergeest and Peluso argue that global forces typically reinforce state-based claims over space instead of disrupting them; the authors foreground the importance and sophistication of territorialization as a strategy of state control of resources. In the modern world-system, which primarily legitimates territorial claims, states must make claims on territory to secure access to people and income from taxation and exploitation of natural resources. Moreover, in the context of global competition, territorialization is increasingly dependent on commercialization. Territorialization facilitates the state's ability to collect taxes, thereby providing a regular source of financial support for government investments to sustain local production. In addition to the need to make territorial claims, protect resources, and collect taxes,

Vandergeest and Peluso (1995) also surmise that given their large mobile populations of highland peasants, Southeast Asian states use territorial administration to "organize surveillance, gather information about the population, force them to settle down… and organize close control over people's everyday activities" (p. 390).

Land-use planning must be understood through the politics of space and the state's territorial strategies. Many development scholars link the practice of land-use planning to the realities of social organization (See, for example, Whatmore & Boucher, 1993; Whatmore, 1994; Hillier, 1999; Perry, 2003). Perry (2003) identifies land-use planning as part of the production and reproduction of social relationships with power, given that "the plans produced serve the dominant political economy as much as they challenge and reshape existing social configurations" and "planning is always remaking itself as it is embedded in and responds to a world that itself is always in the process of being remade" (p. 151). Geographers Whatmore and Boucher (1993) see land-use planning as a key regulator of environmental boundaries and transitions, representing "an institutional terrain which is deeply implicated in policing the ontological divide between society and nature" (p. 176). In other words, by representing nature as a series of discrete parcels and elements instead of as an integrative system of relationships, land-use planning "formalizes the separation between nature and abstract space" (p. 169) and the spatial narratives of land-use planning "can be seen to constitute strategic representations of natural and social relations, both in the sense that they are unavoidably partial, and that they are frequently a focus of deliberate political action" (p. 168).

Building on these critical analyses of land-use planning and focusing specifically on Laos, Lestrelin et al. (2012) identify three concurrent territorialization projects that have driven diverse land-use planning exercises across the country. With the goal of national integration, immediately following the Lao People's Democratic Republic (PDR) establishment in 1975, Laos's first territorialization project was characterized by an extensive internal resettlement program and nationwide agro-ecological assessments conducted with the assistance of development "partners" such as the World Bank, the United Nations and various bilateral aid agencies. In the context of growing environmental concerns, the increasing involvement and power of foreign experts and the rapid expansion of what was termed "sustainable development" globally, Laos's land-use planning efforts intensified in the 1990s under a the second territorialization project effected by scientific expertise. This project was characterized by land cover classification, land-use zoning and land allocation programs that, developed with the assistance of major multilateral and bilateral development agencies, attempted to rationalize land-uses and limit environmental degradation. The increasing influence of neoliberal ideas introduced by international donors further transformed the land-use planning arena leading to a third territorialization project ushered in by the National Land Titling Programme in 1997. With market forces as the key land-use planning instrument, this territorialization project was (and remains today) characterized by new concession-based land policies and large-scale land-use plans for the purpose of facilitating the development of private land and large capital-intensive development.

3 Sustainable Development Paradigm

In his 2001 article on the remaking of Laos as an environmental state, sociologist Michael Goldman opened with a description of a hand-drawn map of the Lao People's Democratic Republic prepared by US-based environmental NGO Wildlife Conservation Society for the World Bank. "This map does not demarcate the nation's capital, its towns or villages; the only cartographic markings are round, oblong, and kidney shapes, each labeled with initials such as WB, SIDA, WCS, and IUCN" (p. 499). According to Goldman, the map illustrates an important political story about "new efforts to classify, colonize, and transnationalize territory in the name of environmentally sustainable development" (p. 499). Amorphous bubbles depict the zoning of nearly one-fifth of Laos's land area for conservation with abbreviations standing for the World Bank, Swedish International Development Agency, Wildlife Conservation Society, and the IUCN-World Conservation Union. Situated within a broader investigation of the role of the World Bank in development and the role of development in the world system, Goldman's article argues that the introduction of standardized models of environmental governance imposes a hegemonic and neoliberal "eco-governmentality" on developing countries. Our reading of Goldman's thesis focuses on two aspects, firstly Green-Neoliberal Development and secondly Environmental States in the Global South.

Contemporary development literature, however diverse, can generally be pooled into two broad camps, namely pro-development scholarship rooted in modernization theory and post-development scholarship characterized by critiques of modernization, including critical social theory. Both approaches, however, largely assume few if any alternatives to Western-style capitalist development, whether for or critical of it (See, for example, Hoselitz, 1960; Rostow, 1971; Dasgupta, 1998; Dollar, 2002). The supposition that development must always unfold naturally in accordance with the laws of capital has left development scholars increasingly obsessed with the question, "Why does development fail?" or "What is the best model of development?" and then pursue solutions and modifications deemed required to "improve" the development process. These quests for improvement, however, as Goldman (2005) points out, only serve to legitimize and promote development projects, "justifying it as a necessary if flawed uniform project of modernity and progress for the South" (p. 13).

The emergence of green neoliberalism, the most recent development regime of the World Bank, is reflected in how dominant rationales of "no alternative to development" and a "better model of development" drive the World Bank's reform process, giving rise to a capital-driven green hegemony since the 1980s. Stemming from growing transnational social movements critical of its capital-intensive development practices, Goldman describes a "reform or die" situation whereby the World Bank began to "green" itself. In the decade leading up to this reform, the Keynesian economic worldview emphasizing government economic intervention diminished in the 1970s in favor of a neoliberalism advocating deregulation of flows of international finance capital. Tapping into this surfeit of capital, World Bank president Robert McNamara (1968–1981) rapidly expanded the Bank's project lending across

the world. After this decade of the "McNamara revolution," however, the World Bank's large-scale developments in the Global South had resulted in significant deforestation, river contamination and the displacement and subjection of forest-dwelling indigenous peoples resulting from Bank-financed infrastructure development and neocolonial timber, mining, and agricultural schemes.

Worldwide strikes, rallies and mass demonstrations protesting against World Bank and IMF policies and projects ensued, exposing the World Bank to a crisis of legitimacy and forcing it to either "green" its global development policies or cease its dominant role in global development. Reductive arguments would claim this greening as largely a public relations strategy; however, Goldman (2005) describes it as "the Bank's latest and most profound discursive framework, producing a power-knowledge regime of green neoliberalism" (p. 5). This green neoliberalism, Goldman (2001) argues, not only enables the World Bank to "aggressively incorporate lessons from its worst critics" (p. 191) but also to "expand into more places and insinuate its worldview into more life-worlds than ever before" (Goldman, 2005, p. 6). The World Bank simultaneously does improvement, improves its development practices, and sets the terms by which its interventions are rationalized. It actively builds on "new global problems as well as on its own global expertise, new mechanisms for intervention as well as new reasons for countries to borrow, new development subjects and subjectivities as well as new forms of its own legitimation" (p. 34).

As Goldman (2005) pointed out, the "failures" of development generate new actors and networks (p. 37). The production and distribution of information and power in the field of green neoliberalism are not limited to the World Bank's ambit; these extend as "a series of events and practices centered on professionals working in government, firms, NGOs, and the scientific community" (p. 33). In the 1990s, the World Bank embarked on a quest to re-establish its legitimacy by conducting scientific assessments of environmental and social repercussions, developing additional projects or project components in order to mitigate adverse impacts; these became known as environmental impact assessments (EIAs). Through this process, the World Bank turned previously combative relationships with NGOs into development-oriented alliances for generating "green project assessments, projects and regulatory reforms" (Goldman, 2001, p. 193). New NGOs were cultivated. Instead of occupying a "civil society" middle ground between the "state" and the "market," the positions and roles of NGOs have become increasingly disparate in the world of development where "individuals often wear multiple hats and move across agencies and structural locations" (Goldman, 2005, p. 37). NGOs engaged by the World Bank and other international development institutions as consultants to conduct project-related research and help implement and improve development have become increasingly invested in expanding the business of development (Nelson, 1995).

Goldman's (2005) scrutiny of the World Bank's production of information and power, its green neoliberalism deployed to buoy its faltering global legitimacy, led him to assert that "the realms of knowledge production and political economics are mutually constitutive and codependent" (p. 33). The greening and neoliberalization of the Bank's development agenda allow it to accommodate both "the critics' demand for democratization and the investors' call for privatization" (Goldman,

2001, p. 191) while simultaneously reinventing itself as a global "knowledge bank" (p. 208). Goldman (2001) uses the term "authoritative green knowledge," defined as "the particular set of facts that are produced to differentiate, classify and categorize populations and their natural environments," to describe the World Bank's flavor of environmentalism and approach to environmentally sustainable development (p. 194). The science of environmental and social needs assessment becomes crucial to justifying the intervention, generating green knowledge that enables the World Bank to "reinvent itself, tame its critics, and intervene in an ever-growing number of institutions, terrains, and social bodies" (Goldman, 2005, p. 5). Green neoliberal development logic serves the needs of transnational capital and permeates throughout transnational professional-class networks such that, today, it is near impossible to practice development outside the parameters of environmentally sustainable development and green neoliberalism (p. 7).

As just detailed in the preceding section, the significance of the World Bank's "remaking" and co-option of environmentalism since the 1990s is not limited to legitimating the organization itself; it has far-reaching repercussions for borrowing states' institutions and their resource-dependent populations. By introducing standardized models of environmental governance to its borrowing countries, the World Bank generates new national and international administrative structures, i.e., environmental states for the Global South. Goldman (2005) challenges the dominant narrative that the emergence of environmental authorities in Southern countries is motivated by the inexorable Western rational of environmental sustainability by arguing that these authorities primarily serve "the specific needs of transnational capital" (p. 183). Deploying Foucault's "art of government," which questions framing the state as the nexus of modern societal power, Goldman establishes a concept of "eco-governmentality," central to political ecology discourse for the past two decades, that describes the political rational "compelling states and citizens to improve their care of nature and their care of each other for the greater good of the economy" (p. 184).

Green neoliberalism is the dominant force pushing sweeping reform and configuring eco-rationalities in the Global South. These reforms purport to improve the "art of government" not for the sake of nurturing and strengthening states themselves but to privilege the demands of the economy. According to the World Bank's brand of environmentalism, it is through the nourishment of markets and economy that we provide "sustenance, development, human rights and justice, and environmental sustainability" (Goldman, 2005, p. 184). Based on consultation with Western environmental organizations, academics, in 1992 reports, the World Bank argued that economic valuation of the environment was requisite for "sustainable development" (Goldman, 2005, p. 10 citing World Bank, 1992, 2003). Through aid, incentives and its dominant lexicon, the World Bank coerces social institutions that otherwise regulate the environment according to non-capitalist principles to follow their economic-environmental rationale.

By declaring Southern countries' common-pool resources such as river basins, forests, wetlands, and aquifers as undervalued, the World Bank frames these reforms as a precondition for conserving and efficiently using natural resources; these reforms are "the catalyst to integrate countries into the global economy and to move out of

debt" (Goldman, 2005, p. 39). There is no alternative to development, and "the only question is how to make it more sustainable" (p. 7). Both World Bank experts and academic elites focused on sustainable development blame "underdeveloped" Southern administrations and their populations for destroying local environments and impairing global interests and "globally shared prosperity" (p. 10). This justifies green prerequisites for the approval of loans, with borrowers required "to restructure state agencies, to write national legislation that creates new commercial land and resource markets, and to adopt new scientific protocols that result in the shaping of knowledge and expertise on the causes and solutions of ecological destruction and halted development" (p. 11). Given that many Southern countries, particularly the most indebted, depend on external development grants and loans for their operating budgets, the threat of loan denial compels these states to surrender to the preconditions of sustainable development.

To achieve the World Bank's version of sustainable development, states are obliged to restructure, resulting in what Goldman (2005) describes as "unevenly transnationalized" environmental states (p. 183). By following the Bank's doctrine of economically valuing the environment, borrowing states' restructuring processes considerably narrow the ideological and practical separation between financial and environmental ministries. In the effort to support large capital projects, some state functions are empowered while others are neglected. For example, ministries of environment, forests, agriculture, mining, land management, and water in the Southern states are increasingly involved in the receipt and management of foreign capital inflows and their staff integrated into the transnational professional class of experts. As Goldman (2005) points out, many Southern countries experience increasing "disparity between public expenditures on health, education, and public services and expenditures on the increasingly transnational energy, forestry, construction, and transport sectors" (p. 207). Such uneven transnationalization results in the deprivation of social sectors in favor of newly capitalized sectors and the prioritization of large-scale investment projects that resource-related agencies are now obliged to finance, implement and regulate.

Environmental states are effectively restructured to "make sites and populations more compatible with these large-scale capital investments" (Goldman, 2005, p. 200). Goldman emphasizes the material impacts of newly imported environmental concepts (e.g., conservation, biodiversity, sustainable development and watershed management) when actualized as new regulatory regimes, reformed state agencies, and large-scale capital investments (e.g., dams, tree plantations, and biodiversity and conservation parks). These imported concepts supersede or subjugate traditional ways of valuing nature and accessing land and natural resources, replacing them with transnationally managed eco-territories. A hegemonic discourse rooted in neoliberal market ideology has emerged which reinterprets the ecological qualities of different parts of state territory, "defining some 'qualities of territory' as degraded and others as appropriate for commodification, and hence for improvement" (p. 184). This new classification system constitutes a knowledge regime for land relations and a mechanism for political-economic calculation, which declares "socially diverse, semi-nomadic, shifting, kinship-based, interdependent relations of production are 'out' in

the new framework, while biodiversity conservation, sustainable timber production, and watershed management are 'in'" (p. 203). This categorization and reduction of ecological differences facilitates and legitimizes these normalizing practices that transnationalize resource access in the Global South in the service of neoliberal goals of "improving" the conditions of environments and populations for the benefit of international markets.

Goldman's insights on green-neoliberal development and environmental states in the Global South reveal sustainable development as a global technology of governance expanding over the past three decades. In the name of sustainable development, new types of knowledge and institutional norms are created by "neoliberal discourse and its rights-based orientation, on the one hand, and new disciplinary mechanisms of globalized environmentalism, on the other" (Goldman, 2001, p. 193). Although Goldman's reading of sustainable development and eco-governance echoes Foucault's concept of the "art of government," Goldman focusses on nature, qualities of territory, and the political-epistemic rationales that were undifferentiated by Foucault and his adherents. Environmentally sustainable development as a "technology of government" can be understood as a system of "mundane forms of violence perpetuated in the name of development" (Goldman, 2005, p. 12). Mundane violence differs from the gross violence of development projects well-documented by others and refers to "the everyday forms of building up hegemony that influence and pressure people to participate in the formation and stabilization of the World Bank's green-neoliberal agenda" (p. 12).

Based on his critical reading of how sustainable development has reshaped Laos, Goldman (2005) reveals how the World Bank's simultaneous offer of "better" models of development and suppression of any possibility for alternatives through its dominant discourse actively legitimized a new Lao environmental state, resulting in the subsequent reclassification of the country's territory into various eco-zones since the early 1990s. Given that the Lao government was fiscally poor to prioritize protecting its environment, the World Bank and its partners argued that only large-scale capital projects could finance protection of the country's precious ecosystems (p. 194). Restructuring and policy reorientation of state "software" became a precondition in order to qualify for the Bank's loan for developmental "hardware" (p. 200). In the 1990s, with the help of foreign fiscal advisors, natural resource planners and lawyers, the Lao prime minister's office passed a number of important decrees relating to property rights and natural resource use, especially forests, water, and land (p. 201). This process paralleled new data collection on ecological resources, especially in terms of these resources' degradation and recovery rates, with the expanding market demands for natural goods and services (e.g., hardwoods, hydropower, eco-tourists, biodiversity aesthetics). These decrees and laws facilitate the redrawing of administrative and cultural boundaries into new eco-zones delineated based on "scientifically" valued natural resources and projected demands of different groups of resource users.

4 Frontier Resourcification

In a 2009 article, geographer Keith Barney recounted the exploration process of Australian multinational Oxiana Ltd.'s gold and copper mines in the uplands of Laos's Savannakhet province, where the company spent nearly a decade roaming the jungle tracks of the Ho Chi Minh trail in Laos. On finding a USD $4.29 billion gold and copper deposit, the first such discovery in Laos by an overseas mining company, the team's geologist remarked, "We were leading the push into new frontiers" (Bloomberg, 2004 as quoted in Barney, 2009, p. 149). According to Barney (2009), this quote captures the shift in perception of Laos as a frontier, from the colonial conception of "Laos as an underpopulated frontier zone" (p. 149) to today's capitalist conception of "Laos as a 'last frontier'… an available site for transnational resource sector investment" (p. 156). In his analysis of the contemporary geographies of enclosure in Laos, Barney deploys a relational perspective on nature, economy and livelihood to foreground the historical and relational complexity of frontier "resourcification," a process whereby "Laos, and territories within Laos, are being actively 'peripheralized' in a globalized economy" (p. 156). In this section, we contextualize Barney's thesis within discourse on "the production of frontiers" and "patchworked frontier."

Frontier theory, as originally advanced by American historian Frederick Jackson Turner (1894, 1920), follows a spatiotemporally linear, colonist- and colonizer-centered approach. Extending and often challenging Turner's theories, the metaphor of "frontier" is frequently used by geography and political economics fields to refer to the absorption of peripheral regions into capitalism and is closely related to the concept of resource commodification, such as in "resource frontiers" (Barney, 2009; Fujita Lagerqvist, 2013), "commodity frontiers" (Kelly & Peluso, 2015; Moore, 2000), "extraction frontiers" (de Jong et al., 2017; Temper et al., 2015), "capitalist frontiers" (Tsing, 2003, 2005) and "neoliberal frontiers" (Brannstrom, 2009; Carmody & Owusu, 2016; Sims, 2015). In contrast to the Turnerian perception of the frontier as an empty, unoccupied wilderness, these positions acknowledge the frontier as "a zone of destruction of property systems, political structures, social relations, and life-worlds to make way for new ways of resource extraction" (Rasmussen & Lund, 2018, p. 389).

A frontier does not exist naturally; rather, it is a discursive and physical construct. Following his analyses of various forms of capitalist enclosure, political economist Massimo de Angelis suggests the production of frontiers can be understood through the geographical extension of capitalist means of production. De Angelis (2004) argues, "it is capital that identifies a frontier, and the identification of this frontier implies the creation of a space of enclosures, a horizon within which policies and practices promoting further separation between people and means of production in new spheres of life" (p. 73). In this case, a frontier, rather than being space itself, "happens in and to space" (Rasmussen & Lund, 2018, p. 388). The production of frontiers begins as moments where capital recognizes a frontier, which "implies the

identification of a space of social life that is still relatively uncolonized by capitalist relations of production and modes of activity" (de Angelis, 2004, p. 73). These moments are succeeded by new property regimes and forms of authority that legitimize their power through defining proper uses and users, setting enclosure in motion. As De Angelis argues, "the identification of a space of enclosure implies the attempt to overcome necessary resistance by what capital regards as 'enclosable' subjects. All classical examples of enclosures…fall in this category" (p. 73).

Over the past two decades, resource frontiers have proliferated throughout the Global South, with dramatic increases in demand, consumption, prices and rates of new capital investment across resource extraction sectors. Political ecologists carrying out research on Southeast Asia have used the resource frontier metaphor to analyze forest transitions, including logging and cash crop expansion, resource degradation and community displacement (See, for example, Tsing, 2005; McCarthy, 2006; Walker, 2006; Barney, 2009). Keith Barney (2009) uses the term "frontier-neoliberalism" to explain the strong connection in the twenty-first century between global market demands, intensive resource extraction and new state or private land enclosures in Southeast Asian countries such as Myanmar, Papua New Guinea, Laos and Cambodia. Driven primarily by capital, the production of resource frontiers in these countries is in part made possible by a process described by anthropologist Holly High as "resourcification." High (2010) pointed out that natural features that were previously seen as physical obstacles to investment capital have been "framed within a language of resources" in recent decades. Resourcification occurs as "natural features are judged as useful in relation to human wants," and the drive to turn natural resources into capital derives from the ways political actors judge or appraise resource values and benefits (p. 156).

The metaphor of the "last frontier" is being widely deployed as the global machinery of resource extraction and commodity production encroach on the few remaining landscapes where natural resources have not yet been enclosed, extracted, and processed (Barney, 2009, p. 146). Focusing on the production of frontiers in Laos, Barney argues that state agencies and multilateral development banks such as the Asian Development Bank (ADB) strategically deployed "last frontier" as discourse to attract transnational investment and legitimize the conversion of upland areas into capital-intensive resource extraction zones. The "last frontier" metaphor implies that the Lao uplands are vacant, un-governed and uninhabited (or underpopulated), in other words enclosable for large-scale logging, plantations, mines, hydropower dams, and other resource-based industrial projects. Omitting rural peoples and their livelihoods, on the one hand, serves "a useful ideological function for resource capital" as it reproduces popular conceptions of the rural as empty, thus promising higher rates of return on investment, and on the other hand, is part of "a crucial method of externalizing the true costs of resource development mega-projects, and shifting the damages and the responsibility onto local populations" (Barney, 2009, p. 151). The deliberate denial that various groups of largely ethnic minorities, whose livelihoods are intimately linked to the land, do indeed inhabit Laos's uplands reveals the close correlation between enclosure and exclusion (or dispossession) inherent in the establishment of resource frontiers. This phenomenon results in "dramatic changes

in socio-natural landscapes" and "new patterns of marginalization and livelihood insecurity for a vulnerable rural population" (p. 146).

Critical geographers identify the close linkage between enclosure and expropriation of land and resources in line with Karl Marx's concept of primitive accumulation (Baird, 2011; Fujita Lagerqvist et al., 2014; Lund, 2011; Neef, 2016). According to Perelman (2007), as significant populations in the Global South have not yet fully integrated into the wage-labor economy, primitive accumulation persists and "involves the direct expropriation of people's conditions of production, the purposeful forcing of people into wage labor, and the intentional manipulation of the social division of labor" (p. 59). For example, regarding state land concessions for plantations in Laos, geographer Ian Baird (2011) reveals that the system of issuing large-scale concessions not only involves the enclosure and expropriation of land and resources but also forcibly integrates subsistence and semi-subsistence farmers into the labor market. In Baird's words, the national policy "to 'turn land into capital' is crucially intertwined with … 'turning people into labor'" (p. 12). He further describes how the transition of Laos's labor force into the market economy is a primary part of the state's rhetoric justifying the current land concession system. For many state officials, the dispossession of the rural population's existing means of subsistence is "a necessary evil … needed to propel Laos into the modern world and eventually out of poverty," and the violent primitive accumulation is "a necessary step in the direction of fuller human development" (p. 12).

Many geographers investigating the broad implication of large-scale natural resource concessions in Global South countries foreground the co-existence at multiple scales of various actors, both state and private, whose everyday practices reshape people's relationship with land and resources and transform the rural landscape (See, for example, Hardin, 2002; MacLean, 2008; Barney, 2008, 2009; Fujita Lagerqvist et al., 2014). They argue that new frontier places and landscapes are not exclusively the outcomes of either global political-economic or elite state-bureaucratic forces. Instead, these are landscapes where "alternate regimes of investment, extraction and accumulation" aggregate and aggravate each other (Barney, 2009, p. 152). In Laos, while political processes determine how natural resources are valued, the party-state is not a hegemonic force determining development outcomes and multinational capital-intensive development projects often overlap with other resource-extraction interests often tied to military or provincial authorities (Barney, 2009; Fujita Lagerqvist et al., 2014). Acknowledging these processes as situated and contingent further requires that local people and local landscapes feature as crucial players in the production and reproduction of frontier spaces (Raffles, 2002; Tsing, 2005; Walker, 2006).

As agents compete for access and control over land and resources, their authority and interests overlap and are in tension, producing "fragmented and overlapping mosaics of resource governance and territorial control" (MacLean, 2008 as quoted in Barney, 2009, p. 147). Resources are valued in different ways by different actors; for example, tourism agencies place aesthetic value on the landscape, which is in direct opposition to the material value imposed by mining, hydropower, and tree plantations. Following MacLean, Barney (2009) deployed the phrase "patchworked

frontiers" to describe distinct frontiers in Laos that are "associated with different, elite fractions [*sic*] and power configurations, and different state agencies" (p. 152). Land concessions of divergent sizes granted under various authorities at different times create a patchwork of overlapping governance regimes, where new multinational resource sector investments "interact with previous spatial regimes of resource governance" (p. 147), and various political-economic blocs compete against each other. As Fujita Lagerqvist et al. (2014) demonstrate, a further lack of coordination and effective regulation across various resource-related sectors in Laos has cumulative as well as project-specific repercussions.

In a "striated and patchworked landscape" (Barney, 2009, p. 152), new resource enclosures interact with the socio-environmental impacts of previous land reforms, with concession-induced migrations overlaid on Laos's long legacy of internal and international migrations. Laos's 1953–1975 civil war and the government's long-standing policy, since the establishment of the Lao PDR in 1975, to eradicate upland swidden farming are major factors contributing to contemporary migrations. At the local level, many long-established communities have witnessed several waves of migration since the 1950s, including those caused by the creation of large-scale resource concessions over the past two decades; these migrations have exacerbated resource competition and subsequent resource scarcity. For example, in Feuang District, part of the 16,000-square-kilometer Nam Ngum River basin, Fujita Lagerqvist et al. reveal the complexities of intense resource competition. The lower Nam Lik valley, a rural area that first received wartime refugees from northeastern Laos, was designated to accept a large influx of migrants displaced by the construction of a large-scale hydropower dam in another district in the basin. The resulting intensification of local resource competition in Feuang District led to a surge in land prices and rising tensions between the resettled community and existing villages (Fujita Lagerqvist et al., 2014).

While some communities such as those in Feuang District have experienced several rounds of immigration, others underwent repeated displacements. In the village of Ban Pak Veng in the lower Hinboun valley, Barney examines a case of "double displacement," whereby village livelihoods were threatened by the combined externalities of a major hydropower project and industrial tree plantations, projects from two of Laos's leading extractive sectors. Serious upstream riverbank erosion caused by the hydropower dam altered the flooding regime of the middle and lower Hinboun valley, rendering existing lowland wet rice cultivation impossible and resulting in acute food insecurity. Villagers who lost their lowland rice paddies switched to swidden cultivation in nearby upland forests, and soon afterwards, a third of these villagers' swidden agriculture land was designated under the Land and Forest Allocation program as "degraded forest land" and expropriated for commercial eucalyptus plantations with minimal compensation. The lack of compensation and ineffective mitigation measures provided within the hydropower and plantation projects led to villagers' intensified, short-term exploitation of their remaining resources and to village youth emigrating for job opportunities within and outside Laos (Barney, 2009).

In their analyses of the socio-environmental impacts of resource development in Laos, both Fujita Lagerqvist et al. (2014) and Barney (2009) emphasize that farmers are not unresponsive to the drastic changes of their rural landscapes and those landscapes' degradation. Land reform programs and capital-intensive resource projects entangle with legacies of local resource management practices, transforming the local environment and mediating villagers' responses. In their struggle to respond to this degradation, villagers adopt a variety of strategies, including livelihood diversification and reorientation toward newly accessible markets, which in Feuang District and Hinboun valley involved villagers planting cash crops such as cassava, rubber, and agarwood. However, these smallholder investments take place amidst the privatization of land and common-pool resources, a process that is often highly uneven and unequal. Well-off households, including some receiving remittance from migrated youth, can readily diversify their livelihoods by undertaking new agricultural practices and can make substantive claim to previously communal agricultural lands. Poorer households also diversify their livelihood activities when adapting to change. However, given their lack of basic means of production and reduced access to capital, they are disadvantaged in the competition for local resources. By observing how villagers respond to fast-changing circumstances and how such responses feed further changes in land tenure and landscape dynamics, geographers such as Fujita Lagerqvist et al. and Barney reveal both planned and unexpected trajectories of development projects in the rural Laos.

Geographers have shown today's resource frontiers to be a product of capitalism and how new frontier places and landscapes have become patchworks where diverse regimes of investment, extraction and accumulation contend for influence. In Laos, large-scale resource concessions have been detrimental to upland communities in a country where upland areas account for nearly 80% of the territory (Hodgdon, 2010). The Lao uplands are imagined as an empty frontier space, by and for transnational investment, despite being the means of subsistence for ethnic minorities who make up over 40% of Laos's total population (Hodgdon, 2010). These people are heavily reliant on mixed subsistence and semi-subsistence agriculture and obtain most of their food from family farming, fishing, hunting, and gathering non-timber forest products (Baird, 2011; Fujita Lagerqvist et al., 2014). While the wage-labor economy is becoming increasingly important in rural Laos, geographers highlight the degree of spatial and demographic unevenness in which it incorporates the population. Upland ethnic minorities are disproportionately less reliant on wage-labor than the overall population (Baird, 2011; Rigg, 2005). Land managers should neither romanticize nor undervalue subsistence agriculture where a large segment of the population's livelihoods have historically been and remain intimately tied to the land (Baird, 2011).

In his analysis of the complex reworking of Laos's upland frontier, Barney (2009) emphasizes that decades of development and land policies continue to have "a deep transformative effect upon the Lao landscape" (p. 148) and that "there is no singular political-economic rationality or intentionality at work in the Lao uplands" (p. 153). He conceptualizes frontier resourcification in Laos within a longer history of

resource development in two interrelated phases. Referring to "programmes associated with French colonial, war-era and subsequent decentralised political structures in Laos," a "first frontier" was created when Vietnamese, Thai and Chinese businesses, particularly in the logging sector, engaged the Lao military, provincial governors and central Party officials (p. 152). More recent projects associated with "capital-intensive, neoliberal inspired resource investment, including new land reform policies" contributed to the formation of a "second frontier" that "overlaps with the processes and outcomes of the first frontier" (p. 152). Barney (2009) highlights how, in this second frontier phase, historical and contemporary land reform policies, including Laos's Land and Forest Allocation (LFA) and Participatory Land Use Planning and Land Allocation (LUPLA), upland resettlement and "focal site" rural development have deployed a reductive area-based approach to development that facilitated "the freeing up of land and forest resources for capitalization" (p. 153). In many cases, customary lands did not receive full legal recognition during the implementation of new upland tenure policies, and policies such as LFA became the very mechanisms by which villagers would lose customary lands and resources to plantation firms (Barney, 2008, 2009). The severe livelihood insecurity induced by these past and recent policies has prompted alternative approaches to land development, reallocation and regularization, including an overhaul of LFA and LUPLA and collective land titling. However, a more effective system that recognizes customary and common property rights for upland communities is still needed.

5 The Promise of Infrastructure

In his 2020 article on the politics of infrastructure development in northwest Laos, geographer Michael Dwyer cited Chinese Academy of Sciences academics describing the BRI as "a model in which the hand of the state accompanies the hand of the market … to deliver not simply net gains as in the neoliberal case but win–win outcomes" (Liu & Dunford, 2016, p. 325 as quoted in Dwyer, 2020, p. 1). Dwyer challenges this claim and the discrepancies between the "BRI-as-idea" and "BRI-in-practice" through revealing the tensions between BRI investments and earlier development plans and projects. He provides a detailed examination of Laos's Northern Economic Corridor (NEC), a highway-centered regional trade corridor launched in Laos's rubber boom years of the mid-2000s that was later retroactively labelled part of the BRI. Dwyer (2020) argues that since the BRI-in-practice is largely an assemblage of existing projects "firmly planted, at least in part, in the world of neoliberal development," the real debate must shift from BRI versus neoliberalism to considering that "the same questions of regulatory protection that have plagued neoliberal development projects continue to confront the BRI" (p. 10). Wider scholarship firstly on the discourse of "infrastructure" and secondly on the discourse of "planning and assessment" will help theorize Dwyer's contention.

According to economist Batt (1984), the earliest documented use of the term "infrastructure" in English was in 1927 when it appeared in the Oxford English

Dictionary under an entry for a French rail line, noting "the tunnels, bridges, culverts and 'infrastructure' work generally … have been completed" (p. 2). Despite the term being credited to civil engineers during the nineteenth century boom in railway construction, the discourse surrounding infrastructure today only emerged from its use in military and economic jargon of the mid-twentieth century.

During the Cold War, the term was used by defense experts to describe the "fixed installations which are necessary for the effective deployment and operations of modern armed forces" (Ismay, 1954, p. 10 as quoted in Batt, 1984, p. 2). The term also entered postwar economic development and national-building efforts, particularly those targeting low-income countries (Batt, 1984, p. 2). In contrast to nineteenth-century railway development largely supported by private capital and deliberately non-public, the appropriation of the term by military and postwar development planners in the mid-twentieth century led to its close association with state policy, investment and public spending (Batt, 1984). Immense capital investment became a precondition both for modern war mobilization under the North Atlantic Treaty Organization (NATO) and other alliances and for lifting underdeveloped nations out of poverty. The phrase "infrastructure development" was increasingly used to describe these capital investments seen as prerequisite for efficient development of heavy industry, trade, and nation-building, all efforts readily understood as necessarily state-led (Batt, 1984, p. 2). Given the high initial costs and long payoff periods of these investments, new planning processes were deployed by military and development planners, replacing nineteenth-century patronage systems and facilitating more "responsible" public spending (p. 2).

During the 1970s, infrastructure discourse further expanded, and its focus shifted away from military defense towards economic development with the mainstreaming of neoliberal ideas advocating deregulation of international financing and the rebranding of development as international aid (Dwyer, 2020, p. 3). Development lending broadened from focusing on material elements such as roads, airports, and water supply systems, which are often the subjects of market-rate loans, to social services such as health care, education, and social organization financed by grants or soft loans (Rankin, 2009, p. 69). Accordingly, "infrastructure" became both modern society's industrial capital base and the human capital, the training and education, that support it (Batt, 1984, pp. 2–3). Acknowledging this, in 1984, Batt defined the term as "that element of capital overhead which is supportive of all other economic investment in a society, necessary to its further development" (p. 1).

The anticipation of this further development, the promise of a "future perfect," along with its accompanying risks, led in the 1980s and 1990s to the World Bank and other multilaterals' institutionalization of formal safeguards in infrastructure planning practices, most notably the introduction of environmental and social impact assessment (ESIA) and mitigation planning. As explained earlier in this chapter's section on the sustainable development paradigm, significant socio-environmental impacts, the consequence of a decade of rapid development lending in large infrastructure projects by McNamara's World Bank, led, during the 1980s and 1990s, to the creation of formal safeguards. Often resultant from conflicts between development banks and civil society (See, for example, Rich, 2013; Wade, 1997, 2016; Dwyer,

2020), these safeguards' main objective was the mitigation of development risk, effectively institutionalizing assessment and planning methods that would "more adequately anticipate the impact zones and their associated effects before projects were actually approved" (Dwyer, 2020, p. 3). Acknowledging that safeguards are intrinsically political and spatial, with each infrastructure sector having unique impacts, geographer Dwyer argues that formal safeguards turbocharge the "politics of valuation at multiple scales" (p. 3). Assessment questions such as "whether, how, where and when various types of impacts should be counted" are politically entwined with questions such as "which projects would be funded, how they would be designed and supervised, who would receive and not receive various types of project-financed mitigation" (p. 3).

Over the past three decades, while the meaning of "infrastructure" expanded, new ideas for its financing were limited due to neoliberalization. Geographer Furlong (2020), in her analysis of economies of infrastructure, draws from Brine and Poovey's (2013) work on the history of capital where they recognize capital not as "stock" but instead as "expectation." Here, Furlong emphasizes the importance of the "time element" in infrastructure financialization, "whereby the capital 'stock' must yield a 'flow' of income 'in the form of the incremental payments of interest it would return over time'" (Furlong, 2020, p. 576). Like Furlong, many have pointed out that, regardless of whether development is underwritten by debt or more recently by financialization, it often takes the form of wealth extraction. Analyzing the recent origins of infrastructure in development economics, post-development theorist Escobar (1995) highlights that built infrastructures are expected to generate sufficient returns to repay any associated debt, interest and fees. In her investigation of the "infrastructures of austerity" including outdated technologies and degraded infrastructure, anthropologist Laura Bear (2015) argues that sovereign debt provides the political rationale for austerity, which "leads to an intensified extraction of value from public infrastructures" (p. 4). In this way, infrastructure investment has increasingly become a spillway for over-accumulated capital in the global economy. Where Furlong and Escobar assert the expectation, or promise, of infrastructure giving it momentum, Bear describes the simultaneous glut of financing producing infrastructures that too often result in massive maintenance, refurbishment and adaptation shortfalls and mistrust between communities, local governments and investors (See, for example, Pieterse & Hyman, 2014; Harvey, 2017; Furlong, 2020).

Economic geographers Flyvbjerg et al. (2009), in their analysis of the conditions whereby "across the globe, large infrastructure projects almost invariably arrive late, over-budget, and fail to perform up to expectations," argue that the sheer number of unsuccessful projects is too significant to be explained by chance alone (p. 172). While project executives frequently attribute the discrepancy between project expectations and performance to unforeseen circumstances, Flyvbjerg et al. argue that proponents often succumb to "delusion and deception" and that psychological and governance issues are the underlying reasons for such discrepancy. Delusions, including honest mistakes, result from psychological biases influenced by "planning fallacy," whereby executives make decisions based on delusional optimism rather than a rational weighing of gains, losses, and probabilities (p. 172). In contrast,

deceptions, including the strategic manipulation of information or processes, result from poor governance influenced by "principal-agent problems," whereby executives deliberately overestimate benefits and underestimate costs such that their projects have a better chance in the competition to gain approval and funding (p. 173). Flyvbjerg et al. (2014) argue that delusion and deception, rather than being alternative explanations for why large infrastructure projects fail, are complementary and difficult to disentangle in practice.

Dwyer (2020) builds on Flyvbjerg et al.'s insightful analysis of development planning's "delusion and deception," which undermine estimates of the anticipated benefits and costs of large infrastructure projects, by examining how developers (and their consultants) use a complex lexicon on impact prediction to discursively make a given infrastructure project appear financeable, often by externalizing its true costs. As mentioned above, the institutionalization of environmental and social impact assessment (ESIA) and mitigation planning during the 1980s and 1990s was born out of conflicts between development banks and civil society actors. While initially oppositional, much of today's civil society has succumbed to the hegemony of the World Bank's development discourse on mitigation (Goldman, 2005). In particular, the development banks' lexicon of project-related impacts, such as "direct," "indirect," "induced," "regional" and "in-combination" impacts, enabled development experts and planners to counter critics and discredit claims of these experts' "planning fallacy" or irrational optimism by making the outcomes of large-scale interventions seemingly foreseeable and quantifiable. According to Dwyer (2020), however, these impact assessment and mitigation planning frameworks frequently exaggerate pre-project estimates of both benefits and profitability. Dwyer argues that the lexicon of direct and indirect impacts "allows for the nuanced specification of complexity, such as the cascading effects that infrastructure projects regularly induce beyond the immediate physical ('direct') impacts of, say, losing one's land to a new road" (p. 4). Here, financers and planners have latitude to define impacts in order to mitigate complexity and, at the same time, discretion in how thoroughly these impacts are to be investigated and addressed.

Dwyer uses the case of Laos's Northern Economic Corridor (NEC), a road-upgrading project connecting China with Thailand via Laos and co-financed by the Asian Development Bank (ADB) and the governments of China and Thailand, to exemplify how developers mold the project's discursive and financial terrain via its "project area of influence" (PAI). Defined by the World Bank as "[t]he area likely to be affected by the project, including all its ancillary aspects" (World Bank, 1999, p. 2), a PAI enables planners, in Dwyer's words, to "cast the net of impact assessment widely, while also allowing for flexibility in whether an anticipated effect is formally labeled an 'impact'" (Dwyer, 2020, p. 4). For the NEC, a two-fold compromise enabled by the PAI kept certain anticipated effects outside the zone of mitigation, thereby creating a leaner loan package while boosting the estimated profitability. The first part of the compromise was to finance the georeferenced documentation of any permanent agriculture or other improved land uses within the immediate 50 m from the highway's centerline; this allowed planners to explicitly define a

zone of mitigation (Dwyer, 2020). The second part of the compromise was effective in transferring the developer's responsibility of the larger NEC, their societal obligation for managing the acute tenure insecurity that existed beyond that zone of mitigation, into a separate poverty-reduction project, thus enabling the ADB and three governments to proceed with construction (Dwyer, 2020). This displacement of responsibility further suppressed mitigation costs to a level entirely insufficient to address the major socio-environmental issues identified during the ESIA process.

Frameworks for community participation developed and deployed by multilateral development banks (MDB) are also theorized within Flyvbjerg et al.'s "delusion and deception" (See, for example, Guttal & Shoemaker, 2004; Lawrence, 2009; Hatcher, 2006, 2015). In the 1990s, mechanisms for local community participation became central to a new set of approaches devised by MDBs such as the World Bank and ADB for managing expectations around the societal benefits of development and for managing, or rather containing, opposition to large capital projects. In their 2005 report on *Extractive Industries and Sustainable Development*, the World Bank (2005) had acknowledged that large capital projects may "aggravate or cause serious environmental, health, and social problems, including conflict and war" (p. 1); however, they insisted that negative impacts are not inevitable if proper mitigation measures are taken. The World Bank soon replaced its recommended policy framework with one adopting a strong social-economic development narrative that advocated the involvement of local communities in risk mitigation (Hatcher, 2015). While the World Bank describes its social-development model (SDM) as centered on poverty reduction and environmental sustainability, Pascale Hatcher (2015), a political economist writing on Laos's transnational mining sector, argues that these new development models such as SDM are effectively management tools offering "a depoliticized path to vent … local opposition," thereby limiting the socio-political risks faced by capital and multilateral institutions (p. 340).

Hatcher reveals the extreme disparities between the SDM's narrative and experiences on the ground by closely examining Laos's Sepon gold and copper mine and Nam Theun II hydropower dam, two of the World Bank's largest resource extraction projects in Laos. Hatcher challenges the Bank's self-proclaimed "neutral position" (World Bank, 2010) by juxtaposing the World Bank Group's highly political and duplicitous roles in Laos, from direct credit provider to leading the country's structural reform or "liberalization" process, including promoting SDM as the dominant strategy for developing Laos's large capital projects (Hatcher, 2015, p. 325). SDM's participatory mechanisms are defined by Hatcher (2015) as "neoliberal modes of participation," strategies employed by pro-market interests with "a clear attempt to mitigate political risk in order to facilitate capital accumulation" (p. 323). Despite the World Bank's awareness of Laos's challenging political landscape characterized by "a one-party regime, …clear conflicts of interest in regulatory bodies, and institutional capacity deficits" (p. 340), Hatcher argues that there is a certain hypocrisy in the Bank's simultaneous promotion of socio-environmental standards, on the one hand, and rapid liberalization and opening of the natural resource sectors to foreign investment on the other. Just as Dwyer observed in the NEC case, Hatcher (2015) notes that ESIA and mitigation planning have often been superficial, "alluding to further

studies and further elaboration of details later," and that participatory processes have been limited to an information dissemination process, "which mainly consisted of providing information and not having discussions" (p. 333).

The discourse of infrastructure has been closely associated with state policy and investment since the mid-twentieth century. Critical geographers, critical anthropologists and political scientists argue that it is the conceptual plasticity and materiality of infrastructure that made this once (French) engineering term dominant in postwar military and economic knowledge-power systems (Carse, 2017; Dwyer, 2020). This plurality of "infrastructure" persists, as evidenced in the growing body of scholarship and recent "infrastructural turn" in anthropology, the social sciences and broader humanities fields, where social relations, political forms and environmental concerns are increasingly analyzed through the lens of infrastructure. Critical academics approach infrastructure as a set of "dense social, material, aesthetics, and political formations" (Anand et al., 2018, p. 3) often oscillating between "the modernist move to standardize and the anthropological move to pluralize" in their infrastructure studies (Carse, 2017, p. 36). They focus their ethnographic and historical scrutiny on sites of tension and discrepancy, revealing infrastructure as a discursive assemblage that can act "both as a foundation for economic development and social inclusion and as an instrument of wealth extraction, enhanced inequality and potential crisis" (Furlong, 2020, p. 572; Harvey & Knox, 2012; Howe et al., 2016).

In northwest Laos, geographer Michael Dwyer (2020) describes China's Belt and Road Initiative (BRI) as embedding these contradictions in its projects "as-ideas" and "in-practice." *BRI-as-idea* offers "the promise and possibility of more inclusive development via the presence of a stronger regulatory state" (p. 10). *BRI-in-practice*, however, will still need to contend with the complex development legacies of Laos's Northern Economic Corridor (NEC). Development of the NEC has been a widely uneven process where "state power has come down largely on the side of enclosure and extraction rather than of social protection of poor and vulnerable sub-populations in the corridor's impact zone" (p. 2). Similarly, while neoliberalism-as-idea is often framed as "the elimination of state 'barriers' to 'the market'," neoliberalism-in-practice is actually "predicated on active (if often disguised or downplayed) state interventions" (p. 10). Dwyer concludes that to achieve genuine social inclusivity and equity in infrastructure development, it is the process of development that matters and not the financing, vision or states' involvement. He offers three suggestions to facilitate more inclusive development: First, he calls for reassessment of how responsibility is allocated, particularly in the ways development banks' existing practices mandate mitigating "direct" impacts while leaving responsibility for mitigating "indirect" impacts to borrowers. Second, he suggests rethinking the ways that geographies of influence and impact are mapped, critically, to shift focus onto issues of equity and blunt planners' formal spatial practices, projects, and preoccupations with making infrastructure. Lastly, he recognizes that inclusive development will require devoting far higher levels of financing and institutional resources toward regulatory protection, particularly for proactive mitigation efforts carried out on behalf of the most vulnerable stakeholders.

6 Conclusion

In this chapter, we reviewed: (1) the politics of land-use planning in Laos, covering the politics of space and the state's territorial strategies; (2) the sustainable development paradigm, green-neoliberal development approaches and the emergence of a Lao environmental governance; (3) frontier resourcification, enabled by capital's construction of frontiers as patchworks, assemblages or mosaics of development plans, projects, programs and policies; and (4) the discursive origins of "infrastructure" and the analytical arms race of the environmental impact assessment process since the 1990s. Importantly, this is not a literature survey or review so much as a purpose-built, efficient and rigorous assembling of theory and field studies meant to simultaneously untrain planners and engender ways of actioning critical landscape planning.

Land-use planning is a social process that reproduces dominant power relations and formalizes the divide between society and nature. While presented episodically, Laos's territorialization projects over the past four decades, including national agro-ecological assessments, land reallocation and resettlement programs, and concession-based land policies for capital-intensive development, have followed the similar global currents producing environmental governance states across Southeast Asia. Recurrent themes on the importance of land use and land cover classification are echoed throughout upwards of three-quarters of this chapter, in the sections on the *Politics of land-use planning*, the *Sustainable development paradigm*, and *Frontier resourcification.* Together with the anthropological reflections on standards in the final section, the *Promise of infrastructure*, we have a very clear portrayal of Li's "rendering technical" of social and ecological issues and the immense challenges of holding principled cultural-technological positions in Laos and similar contexts.

The cache of literature by political scientists and critical geographers reviewed in this chapter, while not offering a comprehensive survey of relevant planning and development literature given its predominant focus on Laos, it does demonstrate that such literature can be surveyed in a relatively short time for the education of landscape planners and its deployment conceptually in their strategic proposals. The literature assembled in this chapter is indeed the literature by which we engage our landscape architecture students as they learn "development." This engagement occurs through seminar-style discussion and through students' visualization of critical theory in space, over time, and via representing the landscape through drawing. This provides for these landscape architects' socialization in very foreign disciplines and critical social theory while building an awareness of local, situated discourse on Laos's development.

Each of the four chapters in *Part Two*, which together contain a series of nine strategic planning proposals for Laos, make explicit references to the discourses and histories outlined in this chapter—i.e., they put them to use. The wide range of development project types and sectors reviewed, including resettlement projects, dam-building and watershed management, social development models in large-scale resource extraction, and regional road-building schemes, are tackled simultaneously

by individual students in the same university course. Most of these featured strategic planning proposals presented in *Part Two* assume highly imperfect development contexts where most development impacts will not be addressed by any of the formal planning or implementation processes discussed in this chapter. In that sense, they are critical and reactionary. These proposals assume many of infrastructure's "promises" will be broken. To do critical landscape planning requires longer-term studies, the construction of new rigorous and authoritative histories, and the forecasting and backcasting of models where past and future events and impacts are uncertain or unknown. They require a deeper understanding of development and discourse.

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Part II
Strategies

Chapter 5
Infrastructural Connectivity and Difference

1 Introduction

This chapter presents two strategic planning proposals dealing with "direct" impacts of the construction of the China-Laos Railway. It draws from discourse on "frontier resourcification" and the "promise of infrastructure" introduced in Chap. 4.

We earlier cited Gupta and Ferguson's (1992) conception of connectivity, whereby "cultural and social change becomes not a matter of cultural contact and articulation but one of rethinking difference through connection" (p. 8). Anthropologists Harvey and Knox in their 2015 book *Roads: An Anthropology of infrastructure and expertise*, in addition to similarly querying "previous histories of connectivity," are also critical of the promise of integration and remind us to always question "who or what is being integrated" (p. 52). Practices of "sustainable" development, in those practices' approaches, however genuine, to physically and economically connect communities to new markets and generate new economies, disrupt preexisting modes of connectivity, whether socioeconomic, cultural or ecological.

The two strategic planning proposals included in this chapter are: *Curating rural connectivity: Strategic maintenance of temporary access roads of the China-Laos Railway*; and *Before the bulldozer: Strategic agricultural cooperation for an uncertain rail alignment*. Importantly, in neither of the two proposals are we discussing the connectivity directly brought by the China-Laos Railway itself—its primary economic justification. Instead, the focus is on recognizing preexisting and tenuous forms of connectivity. For instance, in "Curating rural connectivity," which deals with the temporary access roads built tens of kilometers into rural landscapes to construct the railway (Figs. 1 and 2), existing peoples, places and economic nodes, such as local markets, become bypassed and marginalized. In "Before the bulldozer," agricultural irrigation networks are disrupted and farmlands fragmented by the construction of the railway. While these disruptions may under certain economic terms be deemed necessary, the years of uncertainty in planning transparency and mechanisms of compensation amplify and distort the process. As we described in Chap. 2, plans, even if unconstructed, have impacts years before groundbreaking, as people and

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economies reorganize in speculation and anticipation. Although neoliberal processes often create smooth connections and do bring economic growth potential (Figs. 3 and 4), the impacts of supporting infrastructures create new, sometimes ephemeral and often uneven connections. Geographers writing on Laos cited earlier help us understand impact as relational and to strive for more critical articulations of what "cumulative" impact is in the development process (Barney, 2009; Dwyer, 2020). Dwyer asserts that projects in the Belt and Road Initiative (and most global development campaigns for that matter), whether new or drawn into that framework post-hoc, are assemblages of existing projects and relations.

In Chap. 4, we also reference Dwyer's (2020) contention that meaningful debates and reflections on the Belt and Road Initiative should not center on its similarities and differences with neoliberalism but instead on the recurring faults of regulatory protections, especially the environmental and social impact assessment (EIA or ESIA) processes promoted worldwide since the early 1990s. We also introduced the World Bank's and environmental governance state's "lexicon of impact" as described by Goldman (2005) and Dwyer (2020) in their respective writings on Laos. This discourse or lexicon of direct and indirect impacts (as well as induced, in-combination, or cumulative impacts) facilitates planners' agency to deploy a "nuanced specification of complexity" that, because of these planners' compromised positions in a project's power structure, ultimately tends toward reductions in overall economic risk and the concomitant externalization of the true costs of development, displacing responsibility for socioenvironmental mitigation and adaptation onto local populations (Dwyer, 2020, p. 4). The planning proposals in this chapter redirect such nuanced specifications of complexity, primarily in social and ecological terms, to purposefully accentuate difference and heterogeneity and encourage structures that reproduce such qualities.

One example of this purposeful, indeed critical, nuance is in the recognition of plural publics and plural perceptions of environmental impacts. Fujita Lagerqvist et al. (2014) reason that villagers have complex responses to degradation (including both real degradation and the environmental governance state's construction of the concept of degradation), whereby they often pursue livelihood diversification or resiliency and reorient their production and practices towards newly accessible markets. Strategic planning proposals in this chapter (as well as in Chap. 6) offer politically and ecologically tuned guidance to aid villagers' responses to degradation, especially under uncertain development conditions and pathways. These strategic proposals capitalize on the shared uncertainties impacted communities face. Yet, where these strategic proposals suggest state-, NGO-, or developer-led interventions, such as the social responsibility schemes considered in "Before the bulldozer," they do not assume or make their strategies contingent on such intervention. At most, such suggestions are included to help principled actors argue for such programs, supported by the contextually rich details and awareness-raising components of these bottom-up strategies.

Fig. 1 Temporary access roads built for constructing remote segments and 109 tunnel portals of the China-Laos Railway. Consisting of both new construction and upgrades of existing tracks, these roads potentially increase connectivity among remote villages, but their maintenance beyond the opening date of the railway remains uncertain. Photo by Xiaoxuan Lu (March, 2019)

Fig. 2 A tunnel portal of the China-Laos Railway under construction above the Nam Khan River south of Luang Prabang. Photo by Ashley Scott Kelly (March, 2018)

Fig. 3 At Nanla New Town Planning Exhibition Center in southern Yunnan province, an hour drive from the China-Laos border gate, one of the galleries is dedicated to "The Belt and Road" and features a simplified timeline of the vast trade network connecting Eurasia and North Africa via land and sea starting from the second century BCE and continuing into the future. This gallery also highlights Nanla's strategic importance in Yunnan and globally, summarized in hyped-up titles such as "Opening up the Border Area to Build an Attractive Yunnan" and "Reviving the Historic Silk Road to Build a Better-Connected World." Photo by Ashley Scott Kelly (March, 2019)

Fig. 4 Located near the China-Laos border in Southern Yunnan, Mengla city is undergoing rapid transformation given its strategic location along the southern corridor of the BRI. The city's expansion on the east bank of the Nanla River is branded as Nanla New Town. This photograph shows the newly completed "Water Splashing Square" designed to host 6,000 people in the foreground, and a two-story Nanla New Town Planning Exhibition Center with its pitched roof was a replica of the traditional Dai-style architecture, only ten times the scale. Photo by Ashley Scott Kelly (March, 2019)

2 Curating Rural Connectivity: Strategic Maintenance of Temporary Access Roads of the China-Laos Railway

By early 2018, nearly all the China-Laos Railway's 110 tunnel portals had started construction.[1] One-third of these are sited between Luang Prabang and Muang Xay along the most inaccessible portions of the China-Laos Railway corridor. Due to its remoteness and mountainous terrain, this 86 km segment required construction of new access roads, some extending up to 44 km in length to reach northern Laos's primary north–south vehicular corridor, Route 13 (Fig. 5). Since beginning construction in 2016, these access roads have served not only building the railway but also communities along those access roads. Regardless of whether being composed of new construction or upgrading of existing tracks, when the China-Laos railway becomes operational in 2021, these "temporary" roads face future uncertainty when the construction companies that maintain them vacate. This is compounded by risk hazards, including floods, drought, and landslides prevalent across the study region (Fig. 6; Hearn, 2011; Hearn et al., 2008).

Given the insufficient government resources allocated to district and rural road development, this project reveals potentials of these access roads to aid social and economic development of remote rural communities. Laos's road sector has been long plagued by underfunding, irregular targeting of priorities, and poor communication and collaboration between government departments (Fig. 7; Barma & Oksen, 2014). Established in 2001, the Road Maintenance Fund (RMF) is the primary agency charged with road maintenance nationally. 74% of the agency's funding currently targets the maintenance of national roads, such as Route 13, and 18% goes to district and rural roads at a 1 to 1.5 ratio (Figs. 8 and 9; ADB, 2015). While funding has generally increased year-on-year, it does not meet current maintenance needs and generally deteriorating road conditions across the country (ADB, 2015). The government's future upgrade plans are primarily surface improvements, including engineered natural surfaces and increased lanes (Fig. 10). Further, road safety audits in Laos focus within the right-of-way only; roadside conditions are not considered yet are key to road performance and longevity.

Using the Laos's 2015 census (Lao Statistics Bureau, 2016), a comparison between communities along highly accessible Route 13 and those extremely remote along the rail corridor shows that average literacy rates, unemployment rates, electricity access, poverty incidence, and length of the "longest route to school" are similar (Fig. 11). This suggests that physical accessibility may not be the dominant factor affecting living standards and thus the need to focus on service provision.

This project develops scenarios and designs for six prototypical locations (Figs. 12, 13, 14, 15, 16 and 17), including their five nearest settlements so that livelihood opportunities and impacts can in part shape the proposed mitigation methods. Site and material preparation, implementation, and maintenance strategies

[1] China-Laos Railway construction status determined by authors by comparing planning drawings marking the railway's route and tunnels against 10-m resolution European Space Agency Sentinel-2 satellite imagery from March 2018.

are suggested for each scenario. Key criteria for each approach include: Local material sourcing, technical knowledge and on-the-ground capacity, short-term economic and ecological incentives (including roadside ecology enhancement), short- and long-term labor costs, and phase durations of each strategy. Roadside conditions were sampled and categorized into farmland, rubber plantation, degraded slopes, bare ground, and close proximity to perennial and non-perennial streams. Staged implementation (Fig. 18) first prioritizes those road segments (1) with the highest geotechnical risk and (2) most critical for the school-market networks. Stage three focuses on remaining routes necessary to secure livelihood and education. Stage four focuses on remaining villages that rely primarily on river transport.

This project further focuses on the potential of maintaining access roads, long after the railway's construction is complete, to increase education access and efficacy in rural areas. According to the UN Special Rapporteur's assessment of Laos in March 2019, education is key to poverty alleviation and future development in Laos. A key suggestion from those recommendations is the need for primary school education to be conducted in pupils' native languages, not just in Lao language as currently mandated by the national government (Fig. 19). Based on ethnolinguistic groups and possibilities resulting from the new access roads' increased connectivity, a modified network of schools is proposed to cater to the Lao, Palaungic, and Tai-Thai speaking communities in the study region (Figs. 20, 21 and 22). This proposal redistributes 352 schools, assuming an anticipated future primary school-going population of 47,000, which was derived from statistic in the census.

As a byproduct of the China-Laos Railway, temporary access roads could create new potential for resilient livelihoods, improved market and school networks and service provision. Villages previously isolated, or at least disconnected due to poor road conditions during the monsoon, have new viability of commercial agriculture, inter-village trade, processing, and contract farming, if the access roads could be maintained strategically as this project demonstrates.

Landscape planning for development, especially development such as roads that are driven ideologically, economically and physically engineered by and for connectivity, must be done assuming preexisting connections. Likewise, one must also assume that development happens upon preexisting development, including past implemented projects, past planned projects, supporting infrastructures, and current planned projects.

The design proposal "Curating rural connectivity: Strategic maintenance of temporary access roads of the China-Laos Railway" and accompanying illustrations were developed by Heather Lam Hoilok during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong*.

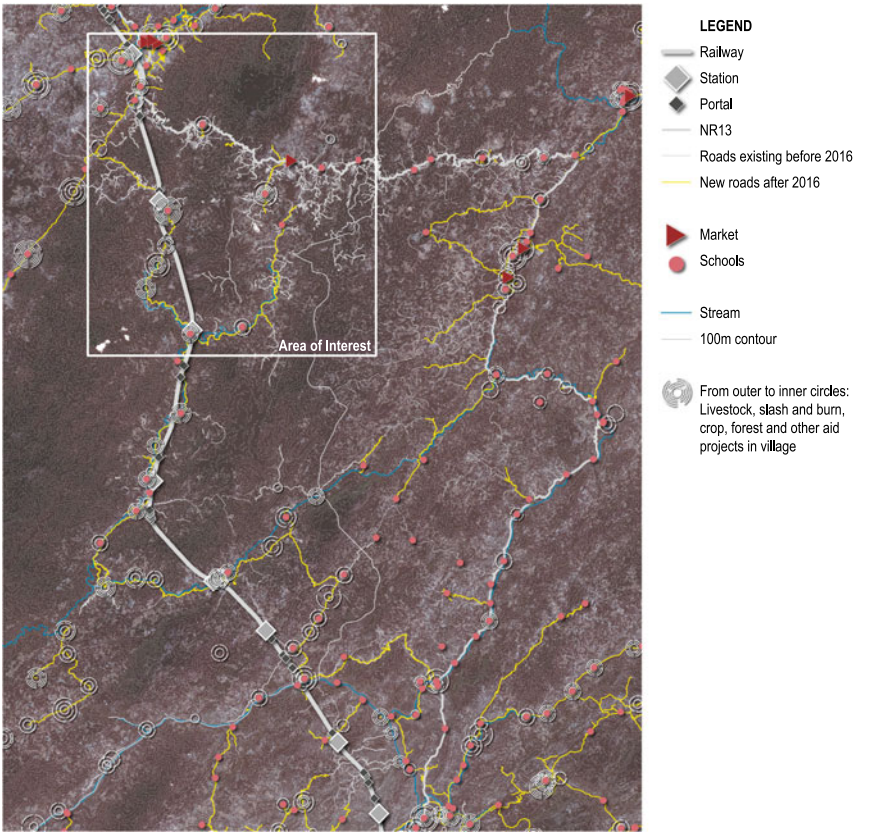

Fig. 5 Between Luang Prabang and Muany Xay in northern Laos, this 86 km segment of the China-Laos Railway route contains seven planned stations and 38 tunnels totaling 59 km

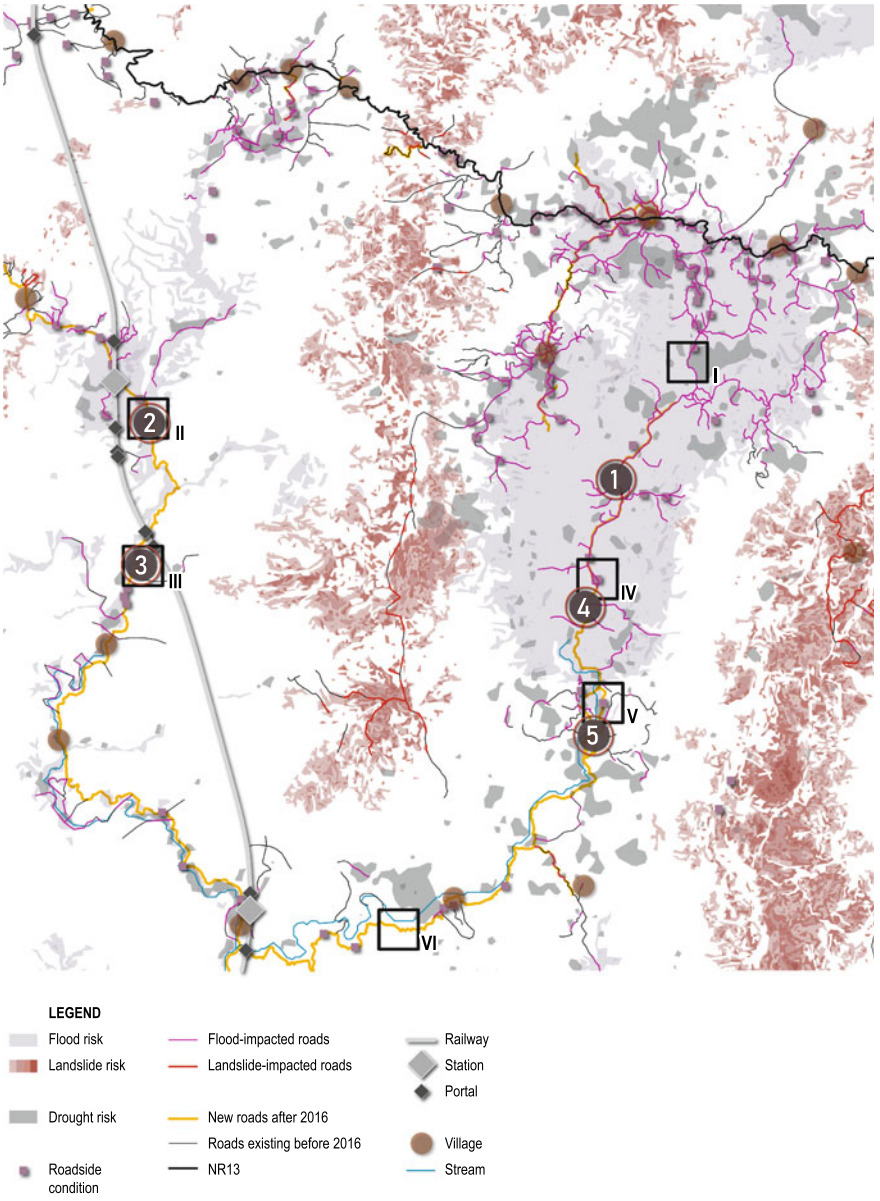

Fig. 6 Preliminary geotechnical risk assessment showing spatial distribution of flood, drought, and landscape risk to roads, including temporary access roads built for the construction of the China-Laos Railway, in the study region

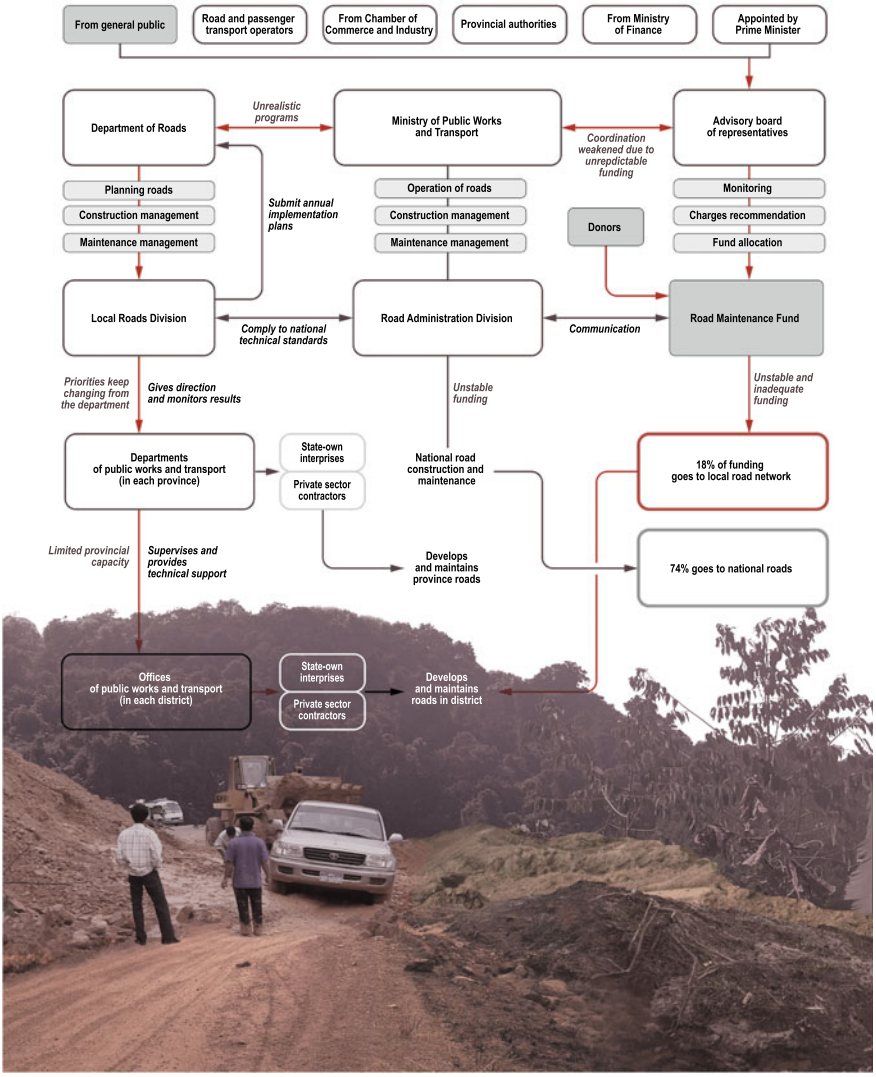

Fig. 7 Institutional structure for road maintenance showing proportion of government road budget allocated to national versus district and local roads

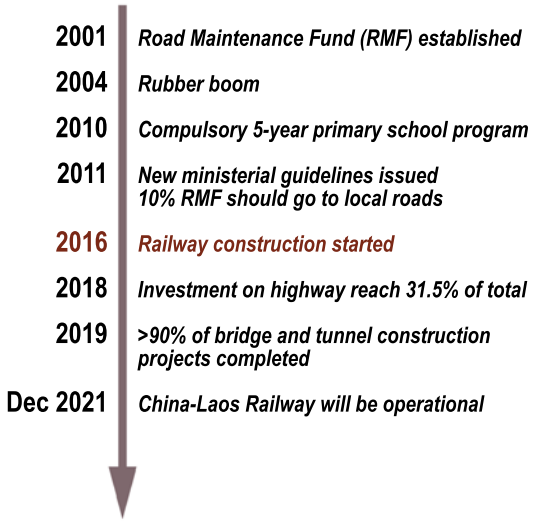

Fig. 8 Timeline of key events in road, railway, and school development in the study region

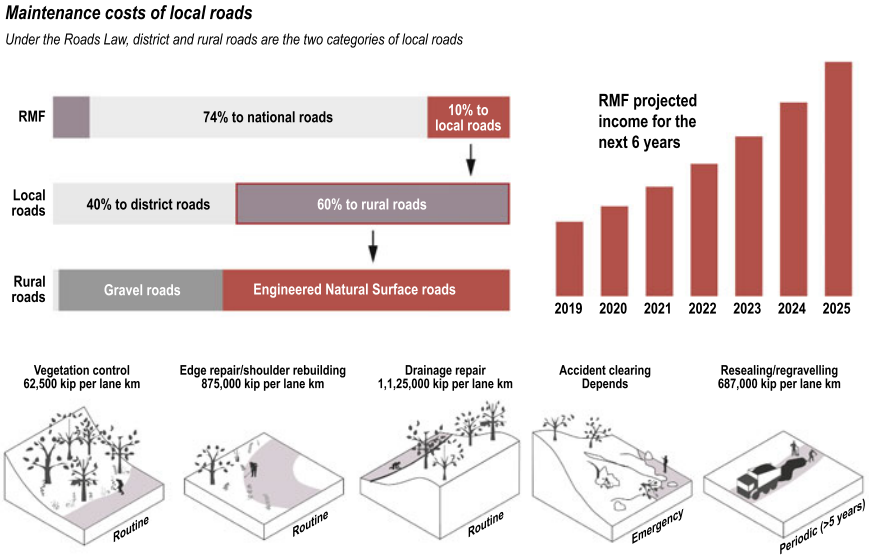

Fig. 9 Road maintenance costs and budget for district and rural roads

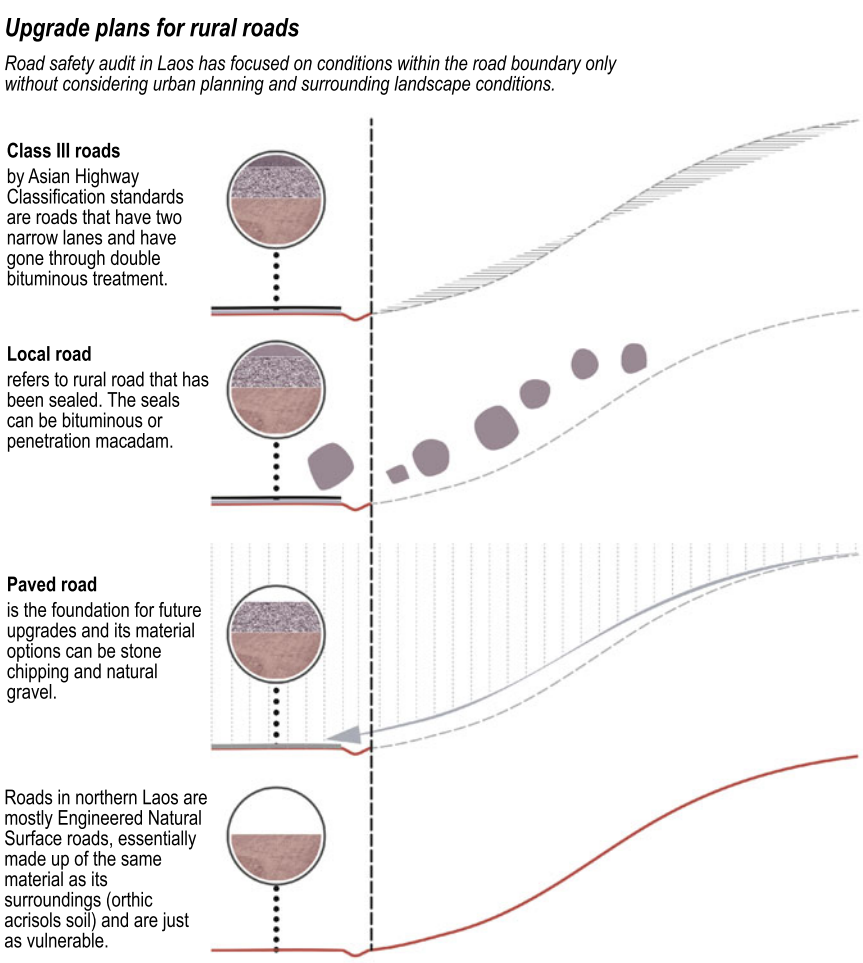

Fig. 10 Rural road typologies include Class III, local, paved, and engineered natural surface roads

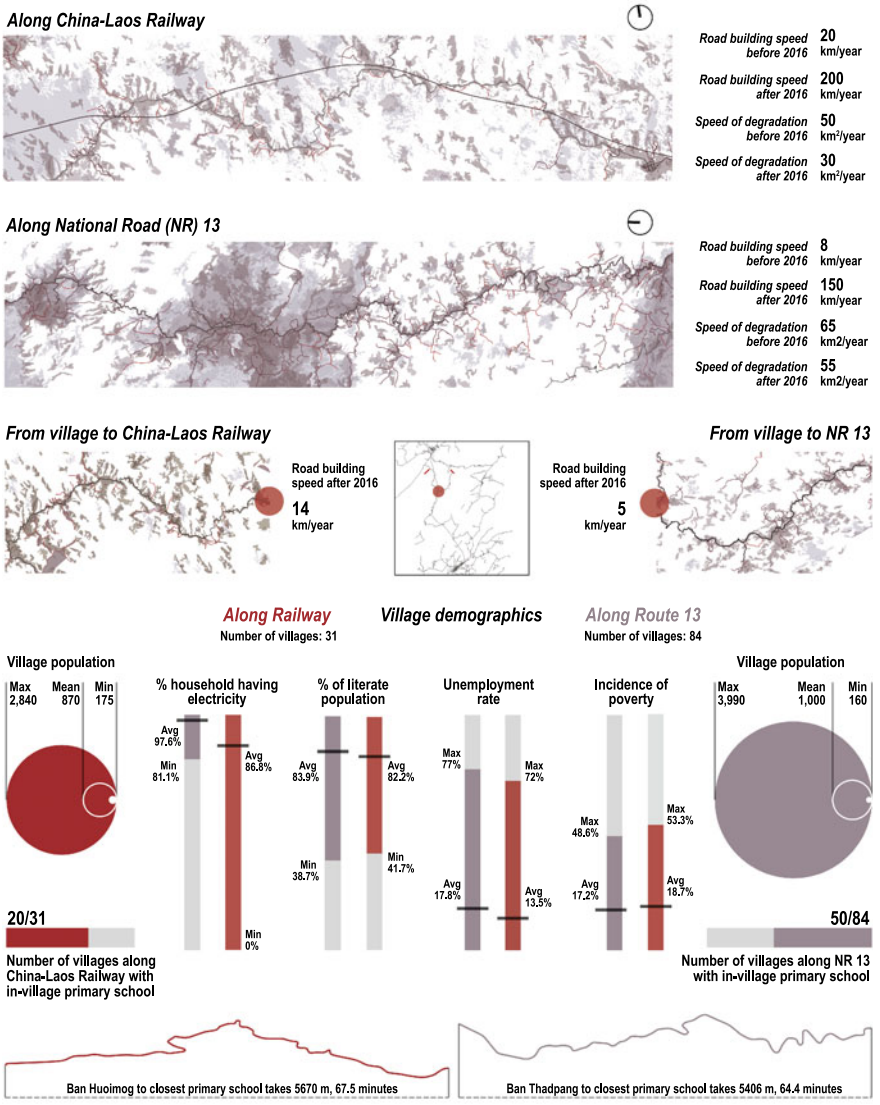

Fig. 11 Demographics of communities between Luang Prabang and Muang Xay comparing (1) communities along northern Laos's primary highway Route 13 and (2) remote communities along the China-Laos Railway route

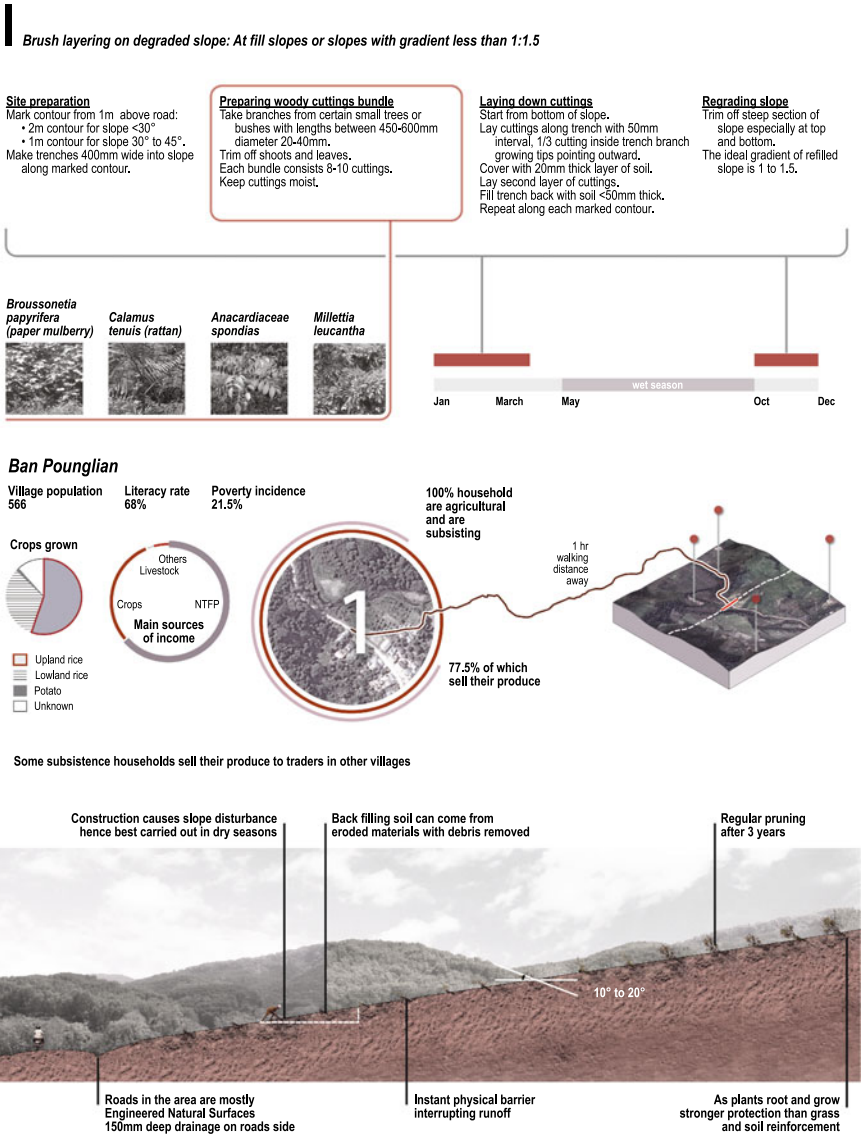

Fig. 12 Strategy 1: For temporary access roads near Ban Pounglian village, brush layering on degraded fill slopes and slopes with gradients less than 1:1.5 is proposed

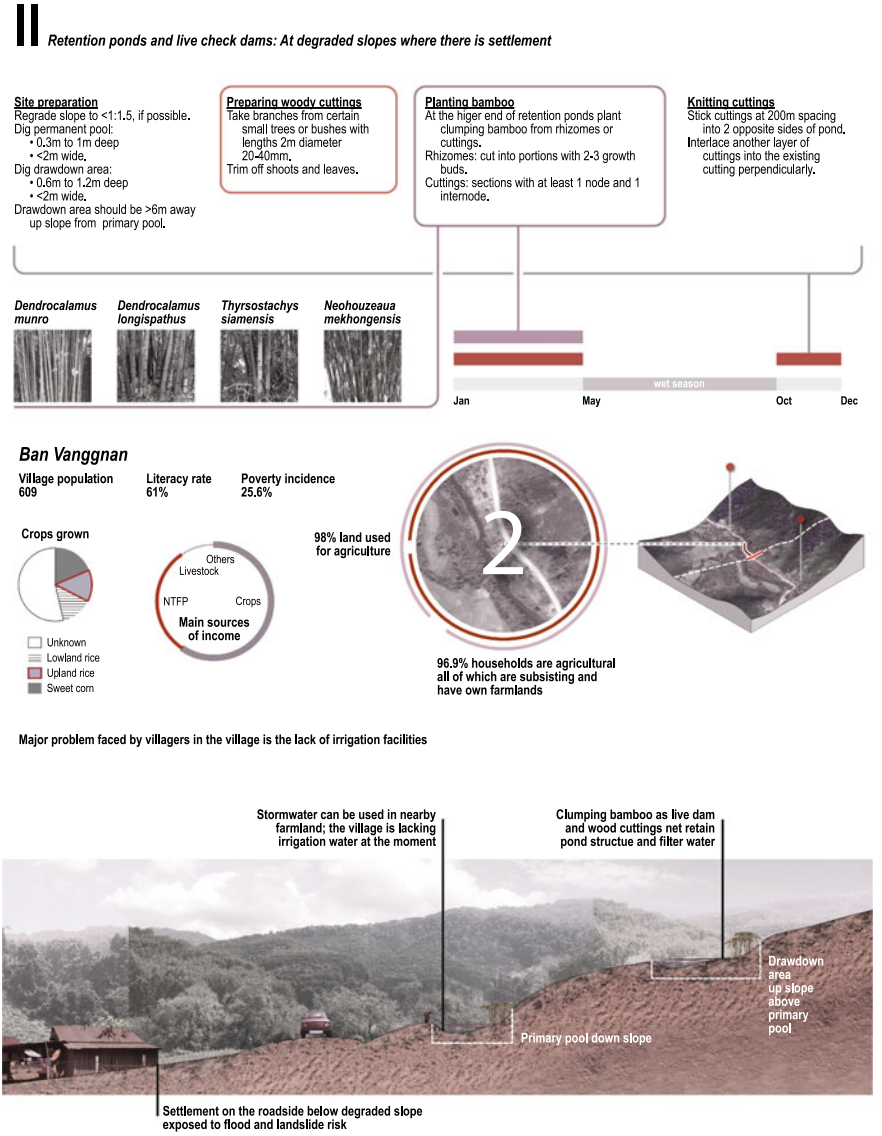

Fig. 13 Strategy 2: For temporary access roads near Ban Vanggnan village, retention ponds and live check dams on degraded slopes near settlements are proposed

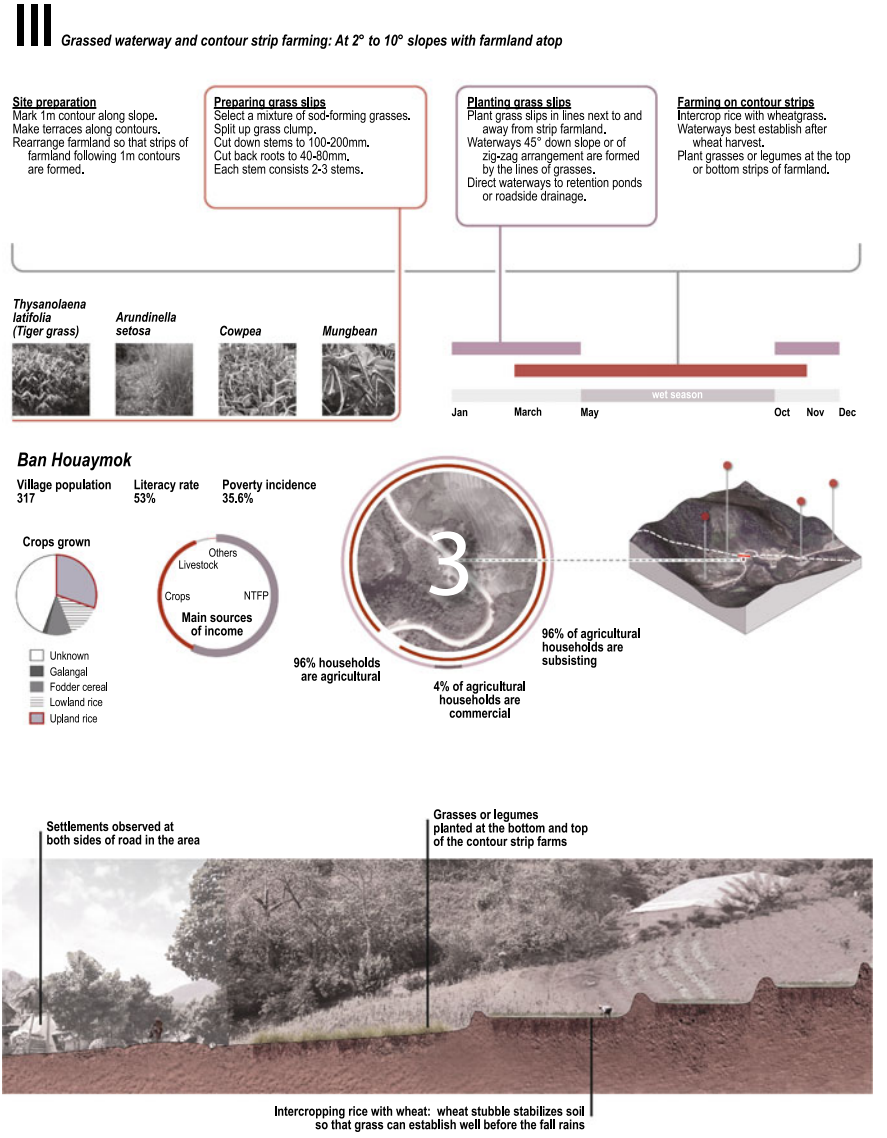

Fig. 14 Strategy 3: For temporary access roads near Ban Houaymok village, grassed waterways and contour strip farming on 2° to 10° slopes are proposed. Crops and grass species are suggested that complement existing farming practices and promote a more diverse crop mixture

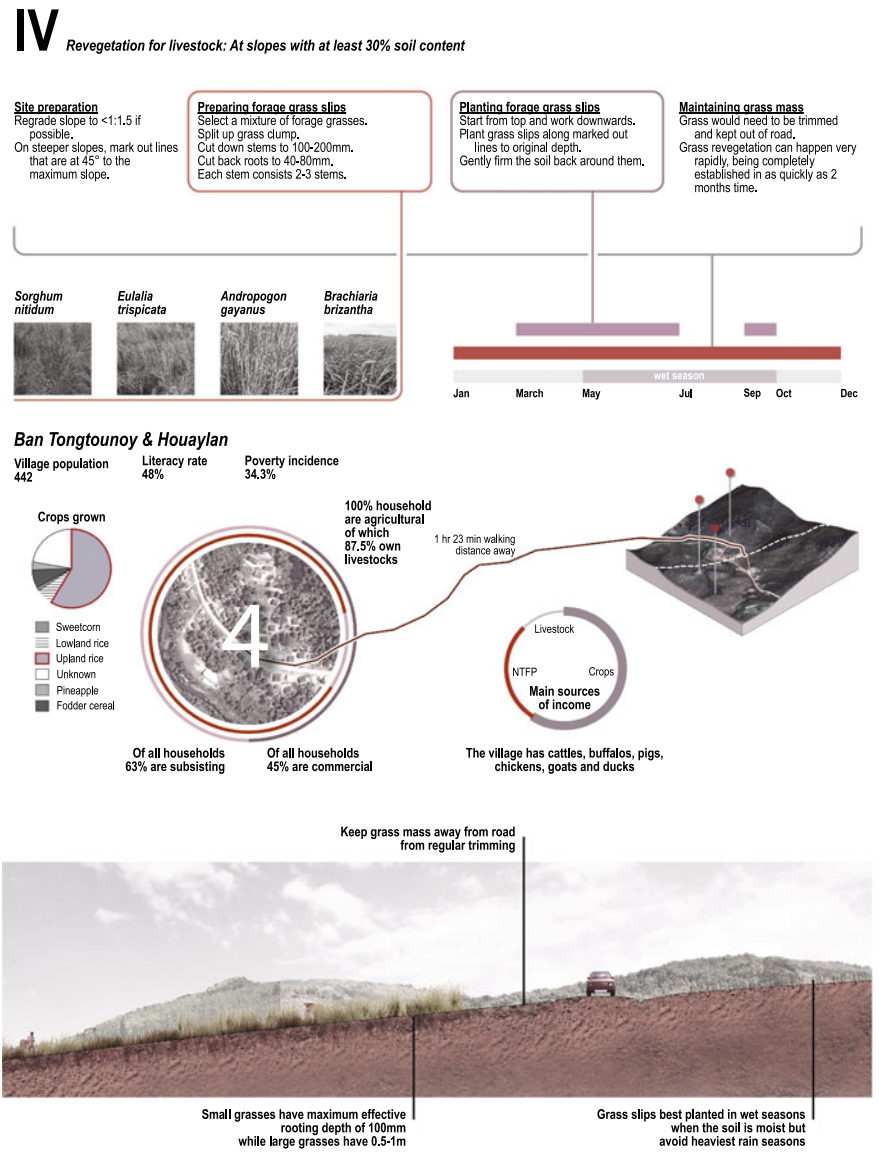

Fig. 15 Strategy 4: For temporary access roads near Ban Tongtounoy and Houaylan villages, revegetation for livestock on slopes with at least 30% soil content is proposed. Because these two villages have a relatively larger livestock sector, suitable forage grass species are suggested

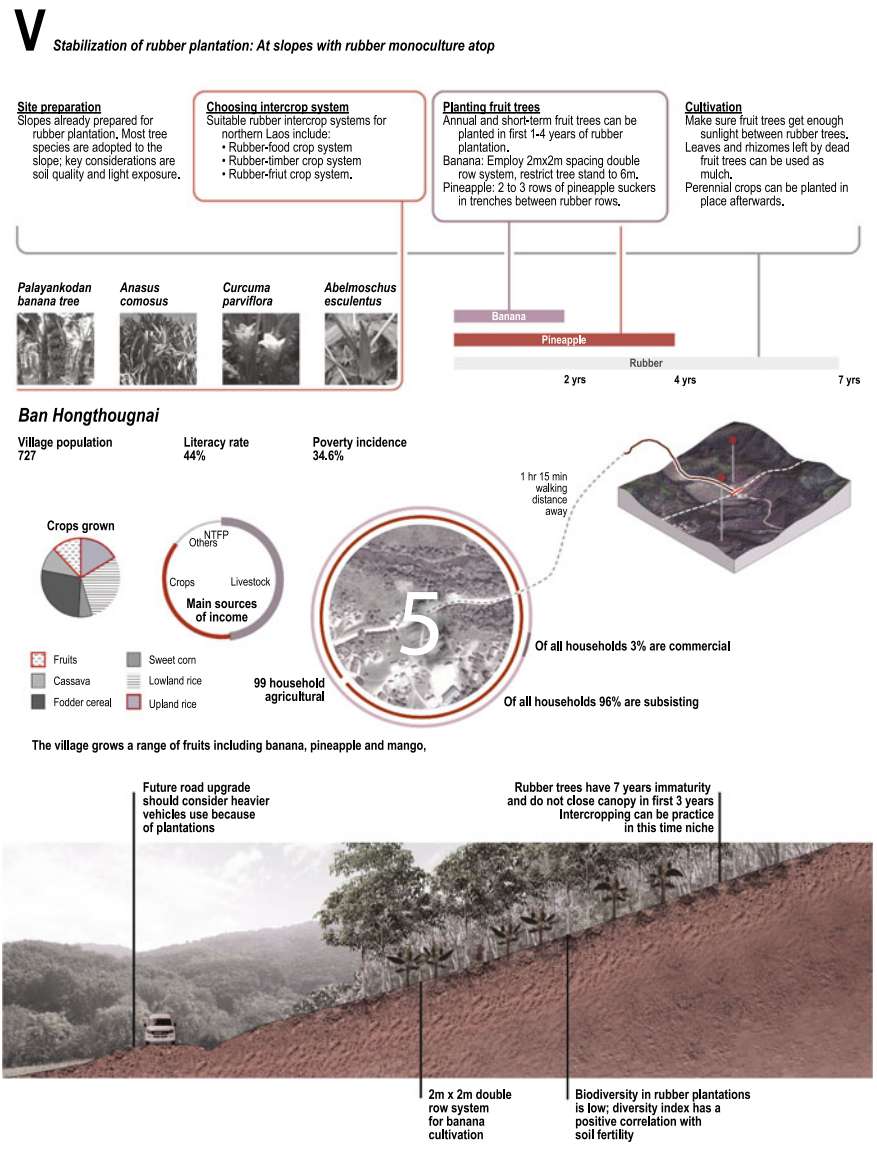

Fig. 16 Strategy 5: For temporary access roads near Ban Hongthougnai village, stabilization of rubber plantation monocultures is proposed. Suitable fruit tree species are suggested to complement the villages existing plantations practices and to complement the lifespan of the existing rubber plantations

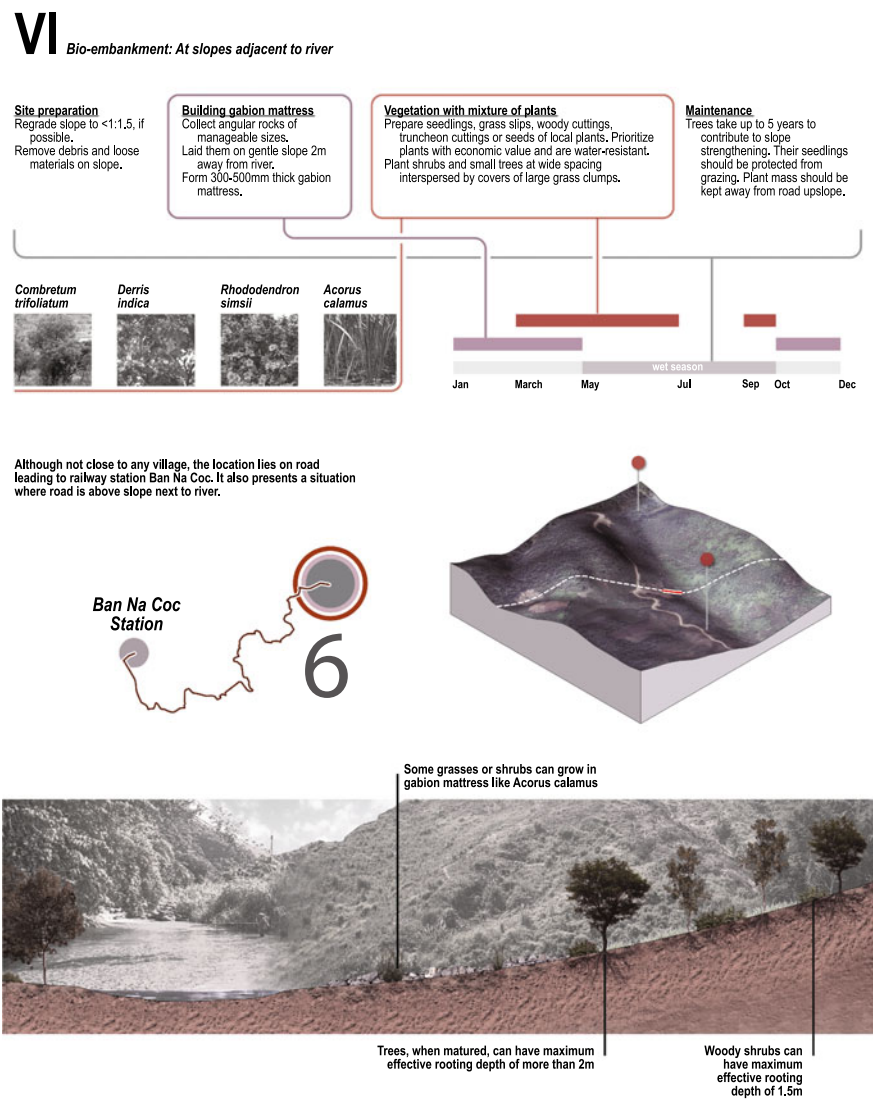

Fig. 17 Strategy 6: Bio-embankment is proposed for slopes of temporary access roads adjacent to rivers but far from villages. Suitable tree, shrub and grass species are suggested

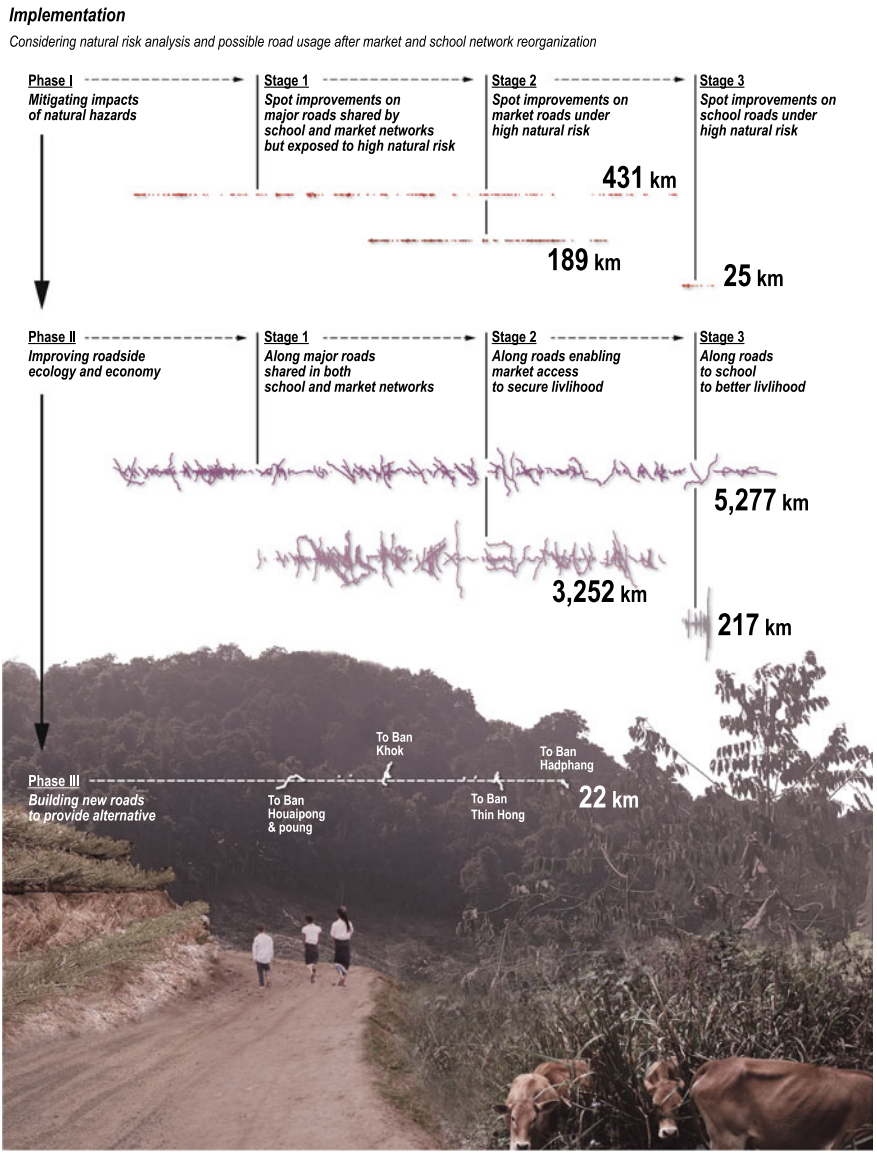

Fig. 18 Proposed road improvement and maintenance phasing strategy that prioritizes access, education, and trade on networks enabled by access roads constructed for building the China-Laos Railway

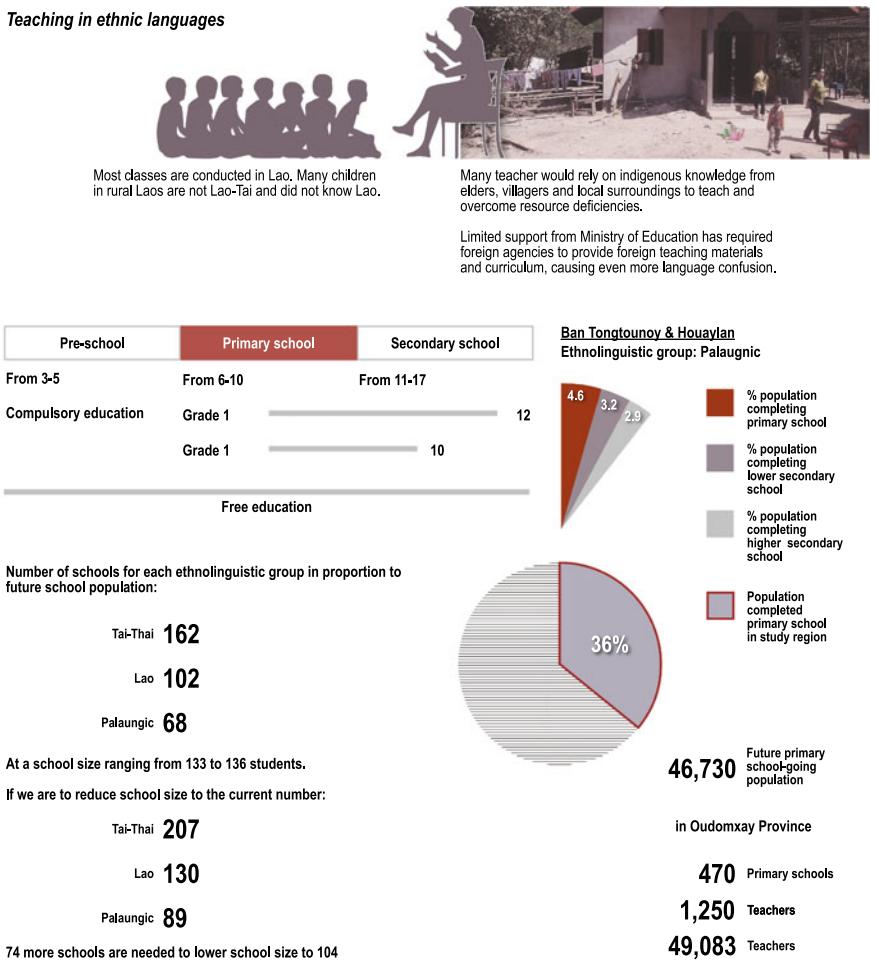

Fig. 19 Ethnolinguistic groups in the study region. Primary school children learn best when taught in their native language

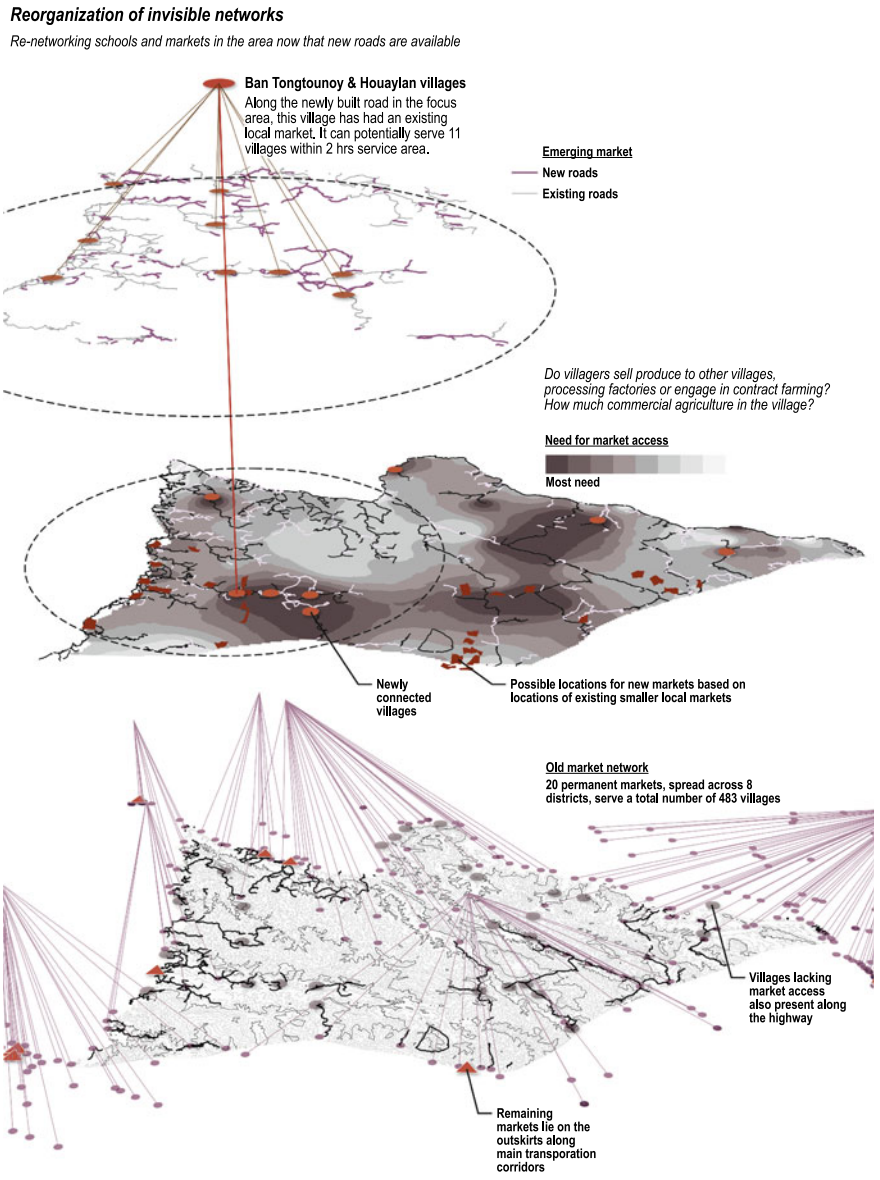

Fig. 20 Existing and proposed networks of markets enabled by new temporary access roads constructed for the China-Laos Railway

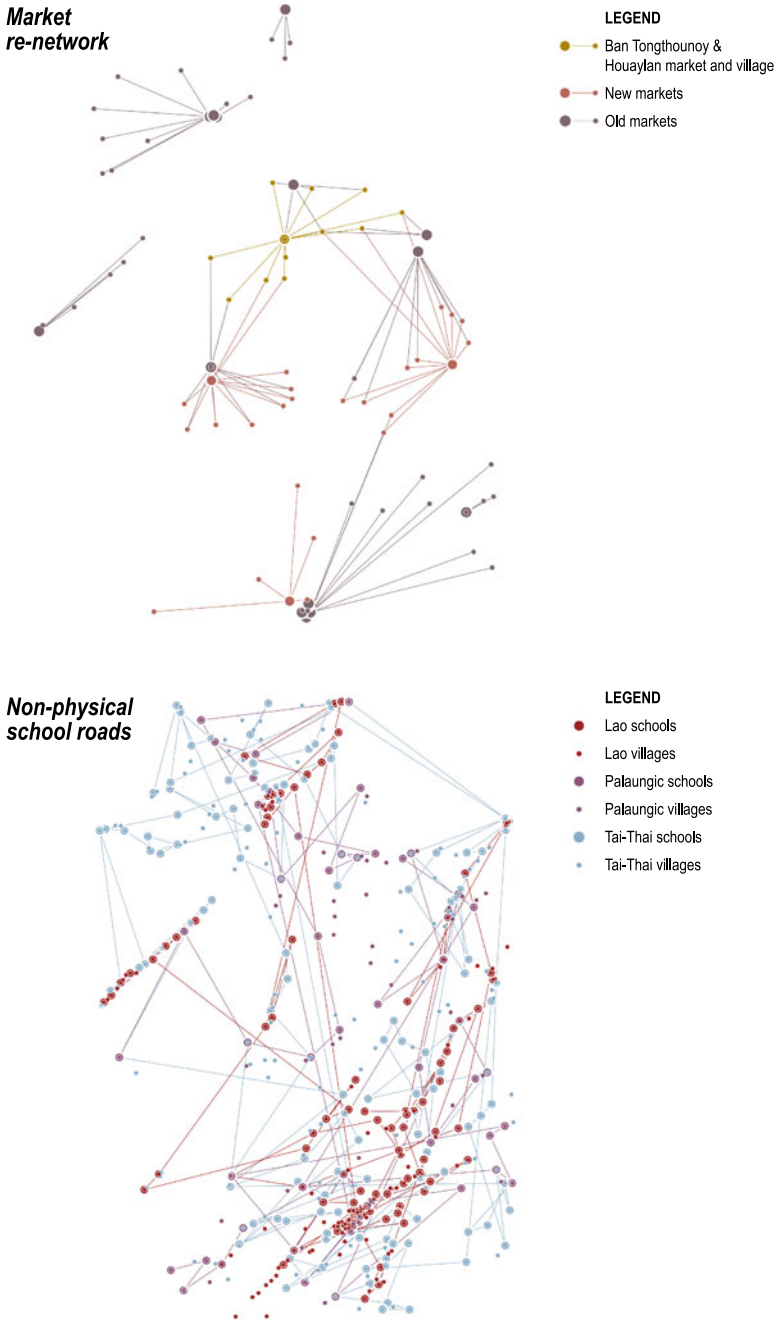

Fig. 21 Existing and proposed networks of schools, combining new temporary access roads constructed for the China-Laos Railway with existing ethnolinguistic clusters

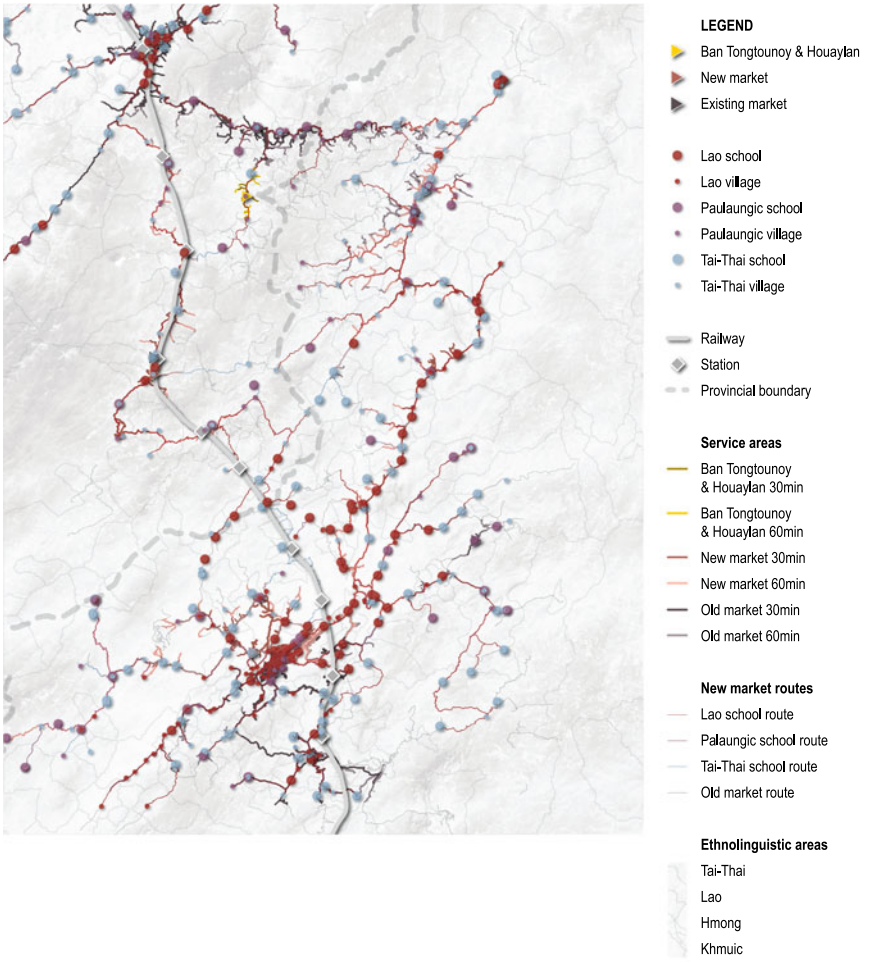

Fig. 22 Service areas for education and trade, with existing and proposed markets, schools, and road connections

3 Before the Bulldozer: Strategic Agricultural Cooperation for an Uncertain Rail Alignment

Laos and China signed a memorandum of understanding for construction of the China-Laos Railway in April 2010 (AFP, 2010). By July 2017, Lao provincial task force committees reported estimates that 4,411 families must be relocated along the 420 km China-Laos Railway route (Radio Free Asia, 2017, July 12). However, no official alignment plan at a scale or with sufficient resolution had ever been released that would allow local communities, or any level of civil society for that matter, to know if they would be directly displaced or impacted in other ways by the

project. Uncertain development timelines, i.e., when land clearance and construction would begin, are common, and targets are often missed even when dates for project components and stages are formally set. The China-Laos Railway is, at least in terms of construction, an exception in this regard, and although the project has greatly lacked transparency in its design, impact assessment, and construction processes, it has generally kept at or ahead of its construction schedule (after a few false starts) since its ground-breaking in 2016.

Also in 2016, the Lao government introduced Decree 84 on "Compensation and Resettlement Management in Development Projects," which replaced the 2005 Decree 192 and removed the previously existing legal requirement for land-for-land compensation. Although not without significant planning and implementation issues, a predominantly monetary form of compensation introduces a host of additional issues for people highly dependent on the land. Compensation calculations in Laos, especially when compared with World Bank standards, often neglect significant intangible costs, such as valuing agricultural investments, transportation, administrative costs, and market access. For the China-Laos Railway, delays, including those of more than two years from when households are displaced for the railway's construction until they receive compensation, were persistently reported in media such as the U.S. government-backed outlet Radio Free Asia (2019, July 16). Besides direct loss of land, railway construction has fragmented the irrigation patterns of agricultural land, and such indirect or other diffuse socio-economic impacts of the railway have not been formally accounted for.

The following proposal offers strategies that vulnerable groups could use to help plan for and direct their household's and communities' futures, given the significant uncertainty and often impossibility of knowing when or where the rail alignment and right-of-way are to be developed. A site for brainstorming various scenarios was selected near the planned Ban Phonsavang Station on the China-Laos Railway route in the northernmost part of Vientiane Prefecture (Figs. 23 and 24). In March 2018, University of Hong Kong researchers georeferenced a national-scale map and elevation profile of the China-Laos Railway of entire the 400 km route from Boten to Vientiane and documented segments under construction (Fig. 25). The red line representing the railway, while no more than a few millimeters on the original map, spans a width of nearly a kilometer in real space (Fig. 26). The selected site of study and scenario-building is an approximately 10 km-wide stretch of land between the Nam Souang Reservoir and Nam Ngum River, where both the rail corridor and northern Laos's major north–south highway Route 13 run parallel. Based on a coarse analysis of satellite imagery,[2] approximately two-thirds of agricultural land in the study area is assumed to be wet rice production, and there is wide variation in the land areas of farmed parcels.

A constellation of stakeholder- and context-specific development pathways is sketched out that can increase both stakeholders' awareness of risks and their capacity to cope with change (Fig. 27). Such pathways are structured to increase resilience

[2] Remotely sensed imagery included recent scenes hosted by Google Earth and recent monthly scenes from the European Space Agency's 10-m resolution Sentinel 2 satellite.

against the uncertain rail alignment, undefined compensation timetables, and potential direct and indirect impacts on land and water supply by balancing an increase in targeted redundancy with intensified agricultural production and returns. Several variables are considered, some based on secondary research and others necessary assumptions in order to construct sufficiently detailed scenarios that will foreground a range of livelihood and other strategic challenges.

Potentially impacted farmers were classified into six categories based on agricultural seasonal calendars, parcel size and livelihood sources. For instance, large holders' generally have both larger labor resources and greater access to diverse forms of capital, including land and water access, financial, and technological, while smallholders and those with subsistence livelihoods have a weaker capacity to adapt to change or to diversify their modes of production (Fig. 28).

This strategy counts forward hypothetically from 2012 after the first public release of low-resolution maps of the railway's general alignment. In an alternative past, over the next several years, agricultural cooperatives capable of capitalizing on the community's shared uncertainties are established (Figs. 29 and 30). New field preparation works carried out (Figs. 31, 32, 33 and 34) and agricultural intensification strategies are suggested that generally raise the value of land while targeting a range of potential compensation outcomes, including those that purposefully raise awareness of international standards and Laos's legacy of compensation lapses (Fig. 35) (See, for example, Stuart-Fox, 2009). For small holders, less labor-intensive crops allow time for vocational training. When official land surveys are finally carried out and villagers are informed of the precise location of the 50-m railway right-of-way, agricultural cooperatives must go through a reorganization process, prompted by the new information about whether their lands are to the east, west, fragmented by and/or directly within the requisition area. When required to leave, residual lands can be sold, if arable but not necessarily productive in isolation, into management by the cooperative.

While this strategic plan turns uncertainty into valuable time for preparation, it is necessary to gauge community solidarity and social choice when tested by rapidly changing development circumstances. The eventual distribution of compensation, as well as its imminent or always-present promise, will map unevenly against this agricultural cooperation. Engendering community building, management and local leadership is necessary for assessing risks and distributing knowledge of those risks, for incentivizing change, and for implementing improvement works. These cooperative structures may yield unexpected benefits, such as potentially facilitating communities' direct input into the any social responsibility schemes the developer may consider implementing. For large-scale developments such as the China-Laos railway, it is necessary to understand transparency as a process—to consider what is known, what will be known, and what can be known—as strategic considerations that can lead to more resilient futures.

The design proposal "Before the bulldozer: Strategic agricultural cooperation for an uncertain rail alignment" and accompanying illustrations were developed by May Zou Wenyao during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong*.

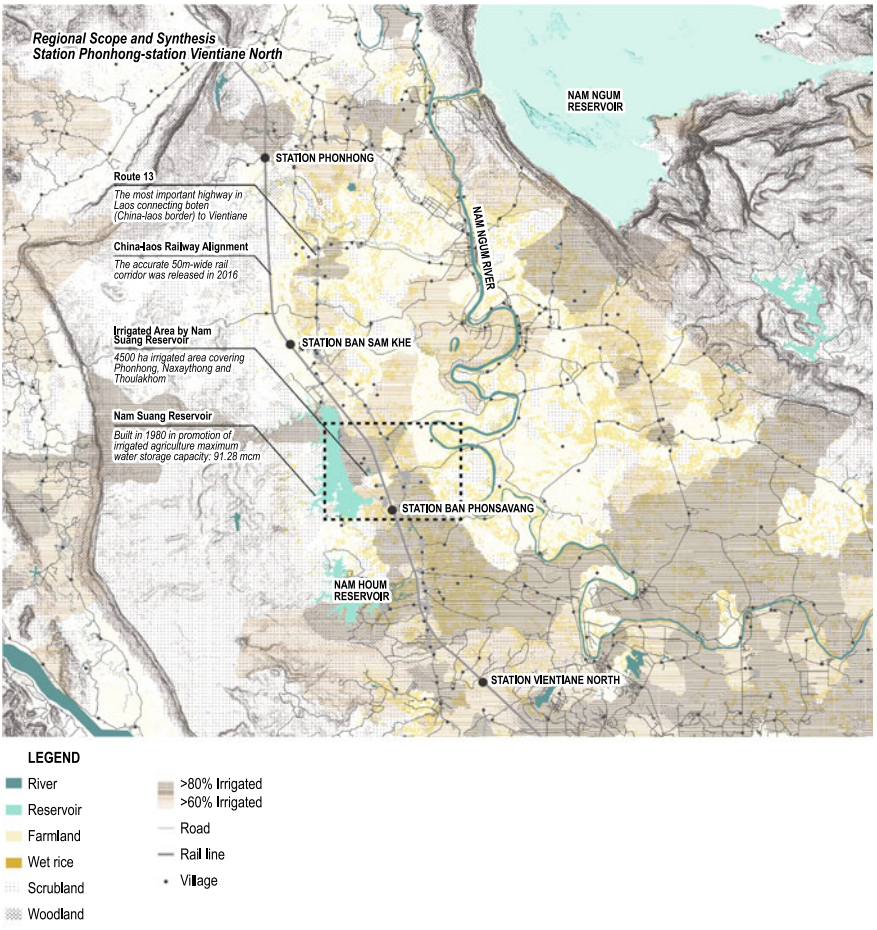

Fig. 23 The selected study site is located at the northern boundary of Vientiane Prefecture near the planned Ban Phonsavang station of the China-Laos Railway

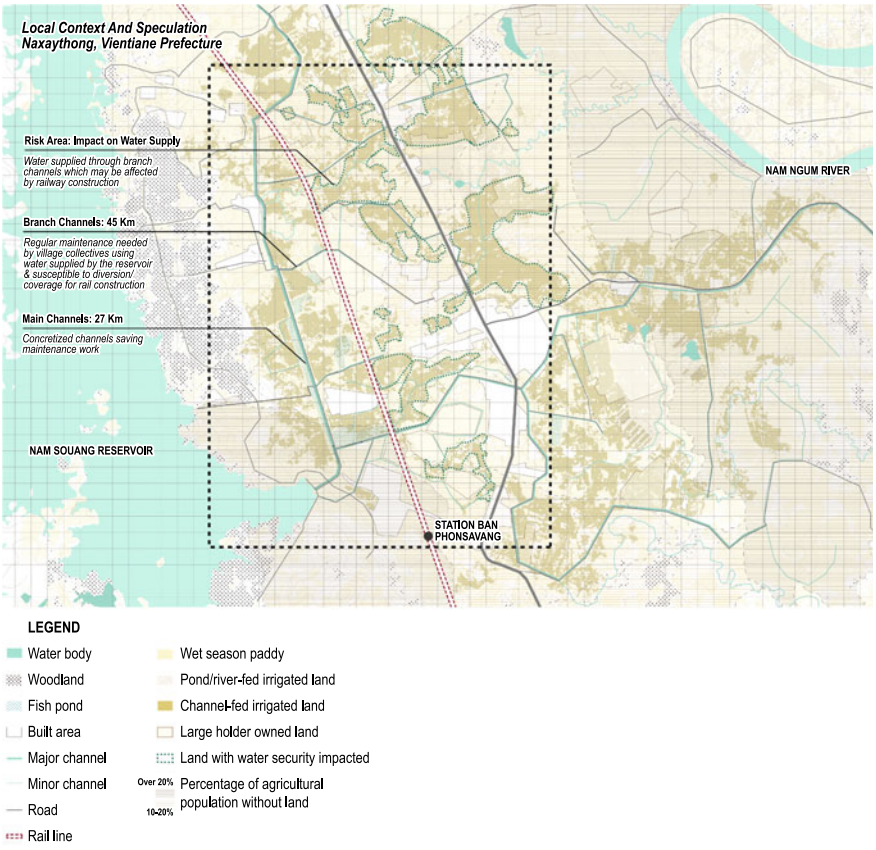

Fig. 24 This proposal's approximately 10 km-wide study site (black dotted line) includes agricultural fields fed by irrigation systems interrupted by the construction of the China-Laos Railway (red double line)

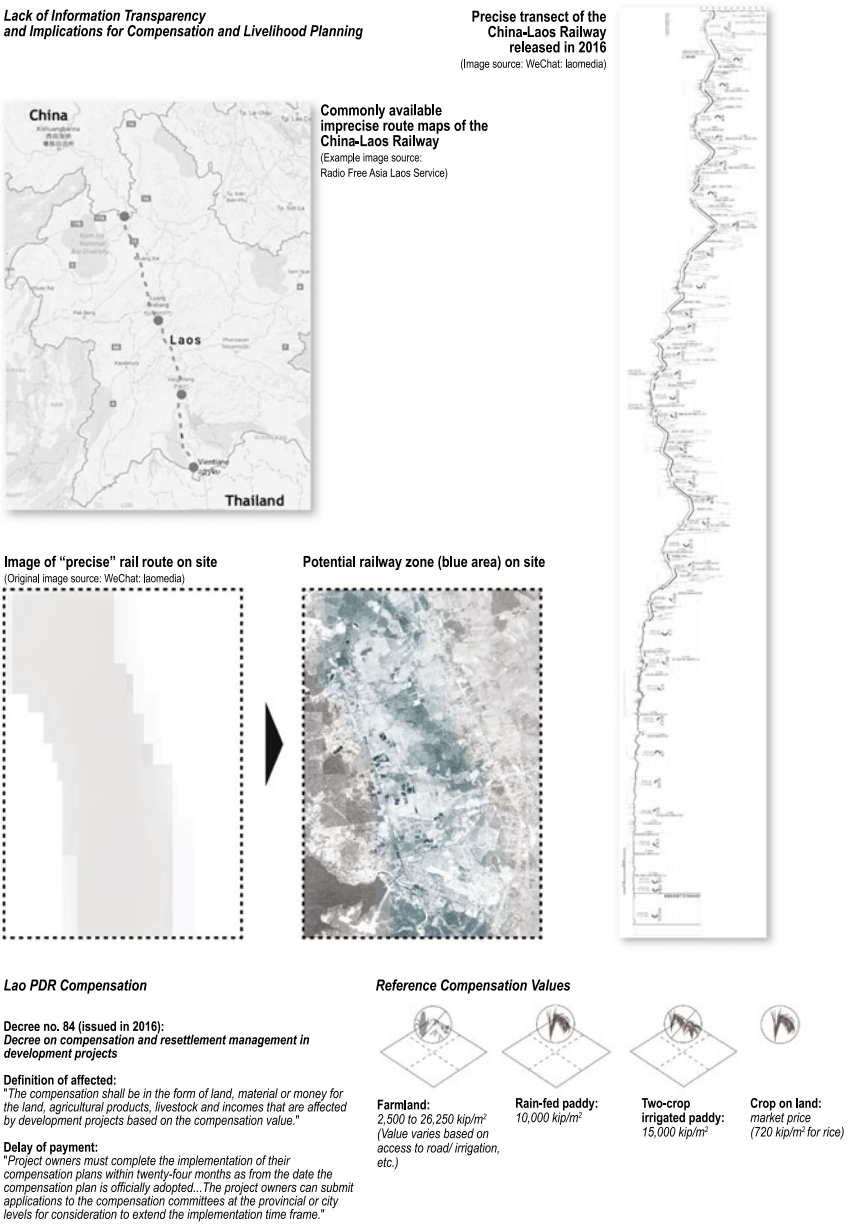

Fig. 25 A national-scale map and elevation profile of the China-Laos Railway planned route was released in 2016. While accurate, the low resolution of the route means that its precise location on the ground is only knowable within an approximately one-kilometer-wide span (blue shaded area)

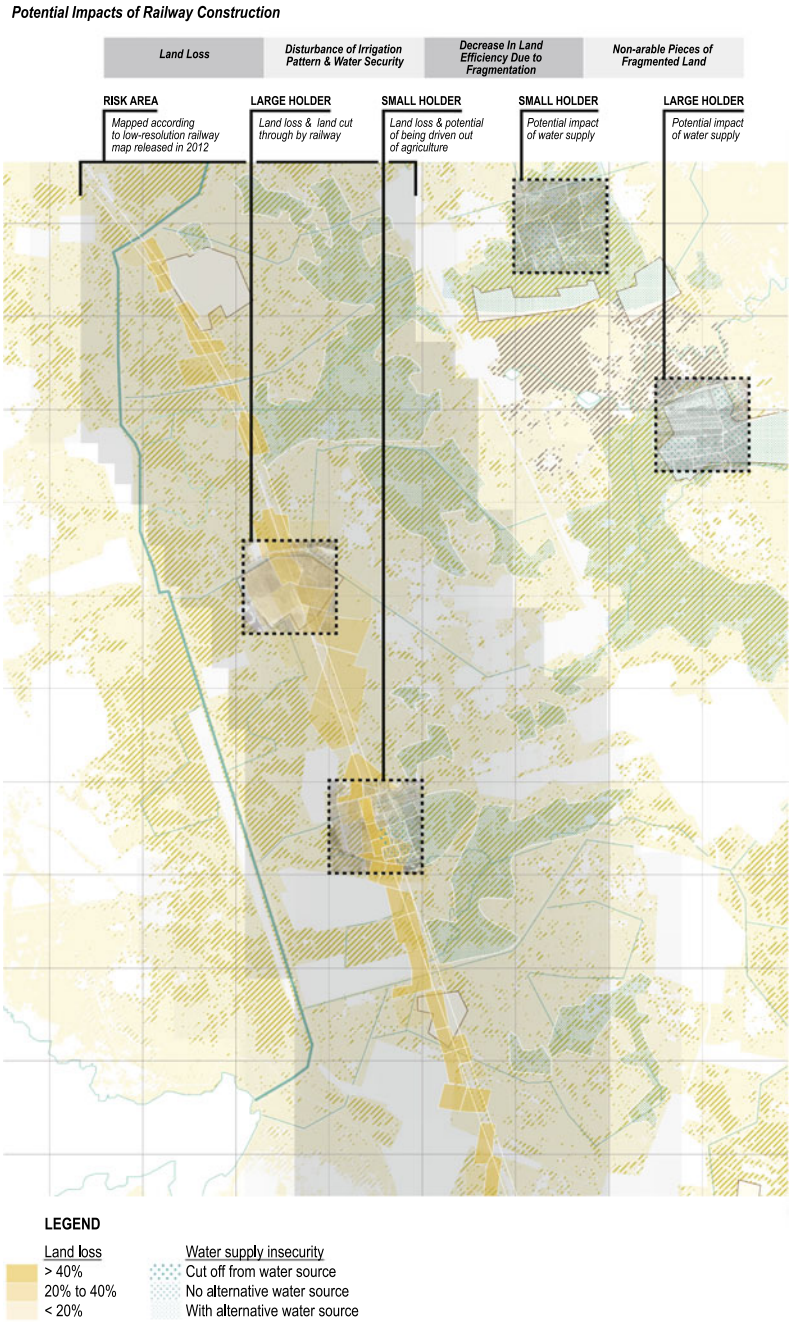

Fig. 26 Within the study area, significant amounts of both large- and smallholder agricultural land is at risk from either (1) direct land loss due to railway construction or (2) disruption of irrigation water supply

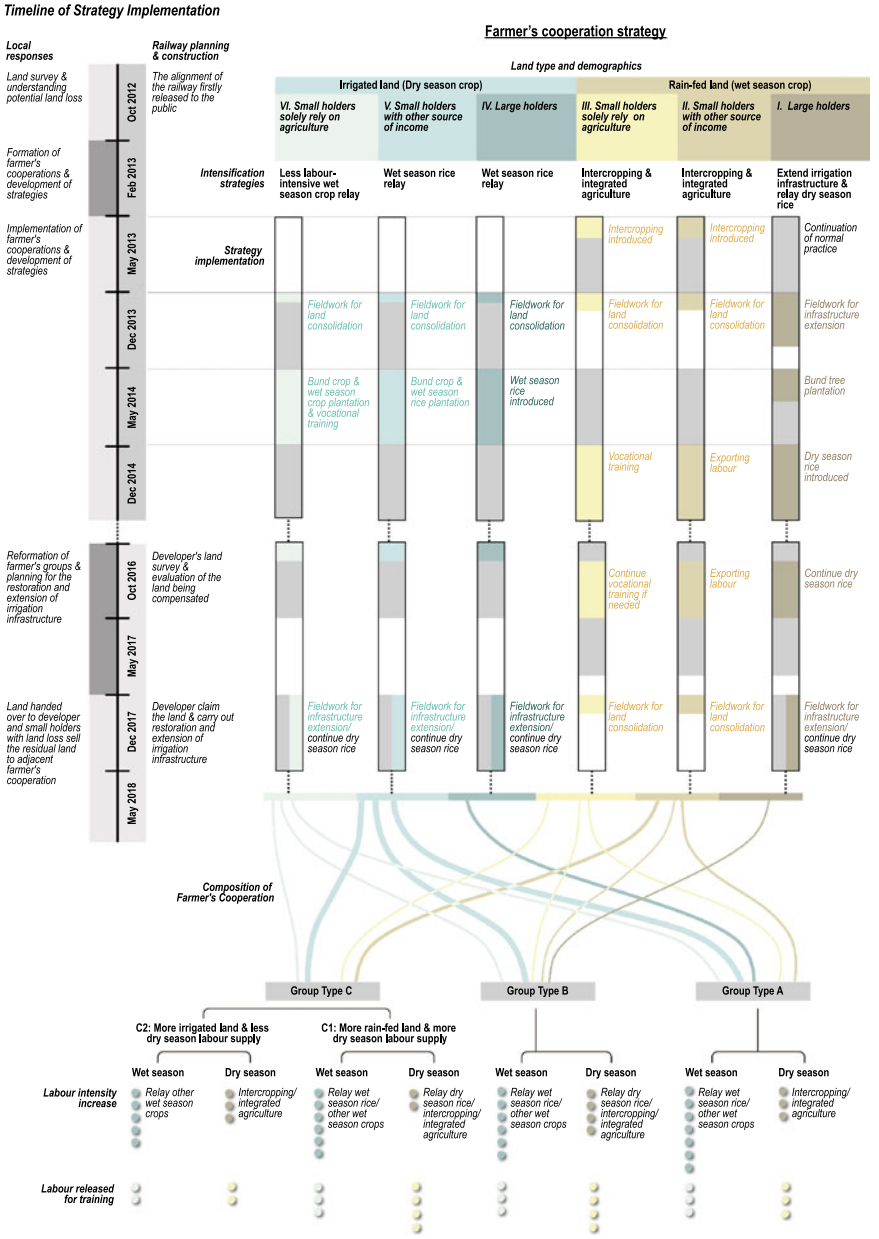

Fig. 27 Stakeholder- and context-specific development pathways and cooperation strategies are suggested that take into account landowner resources, agricultural practices and risk resiliency

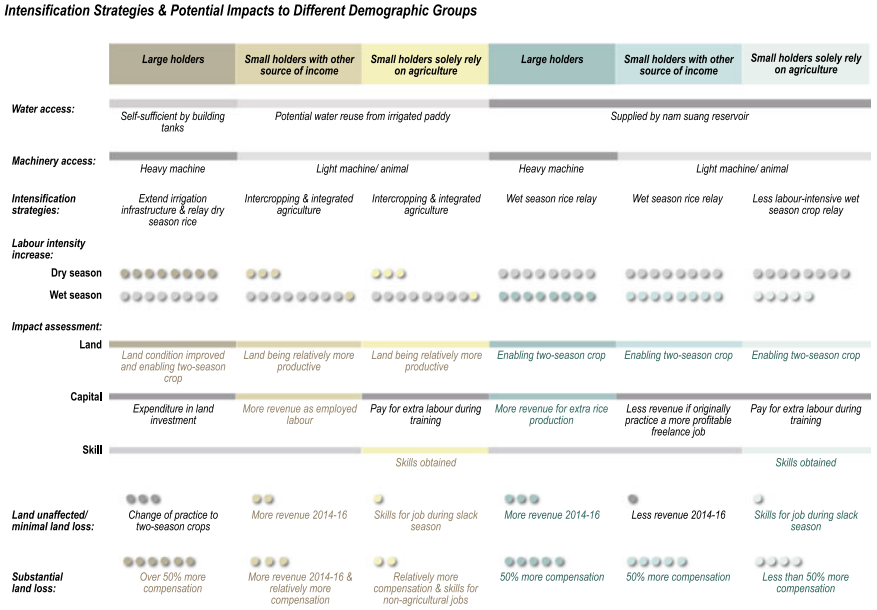

Fig. 28 Landowner cooperation strategies consider the level of development uncertainty (i.e., how much is known about the railway's direct impact on land and irrigation systems) and could be supplemented by social responsibility schemes and vocational training programs

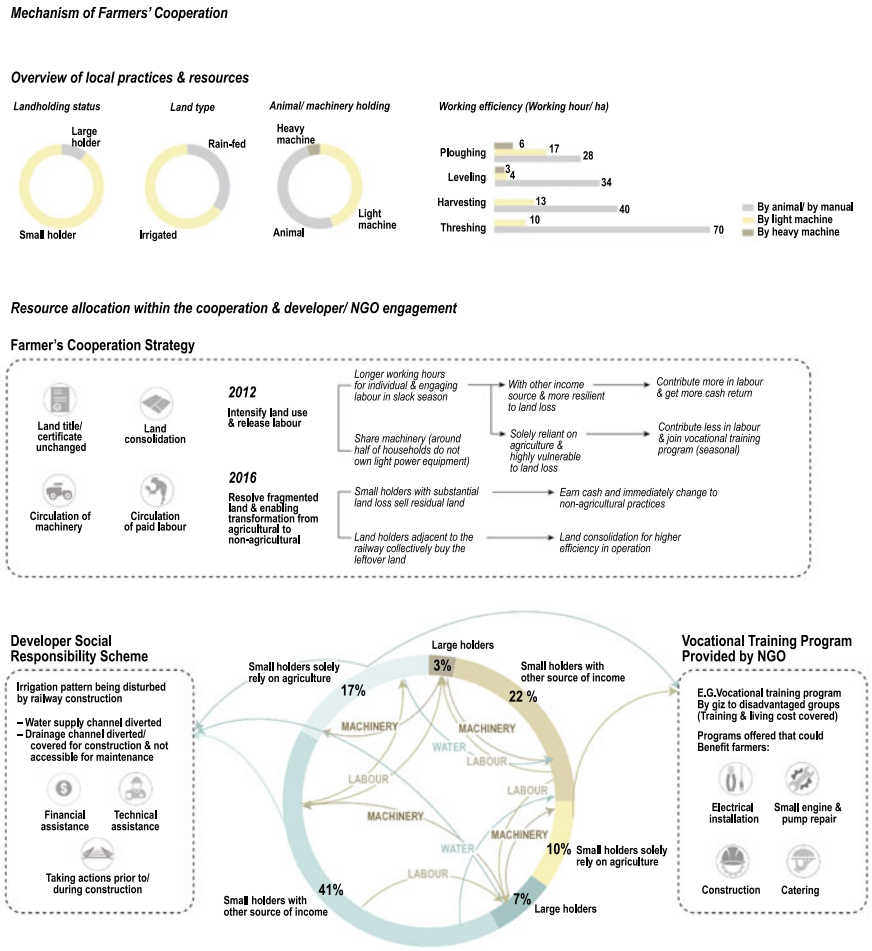

Fig. 29 Aerial perspective sampling a range of circumstances within the study site and suggested agricultural cooperation strategies to mitigate impacts of railway development

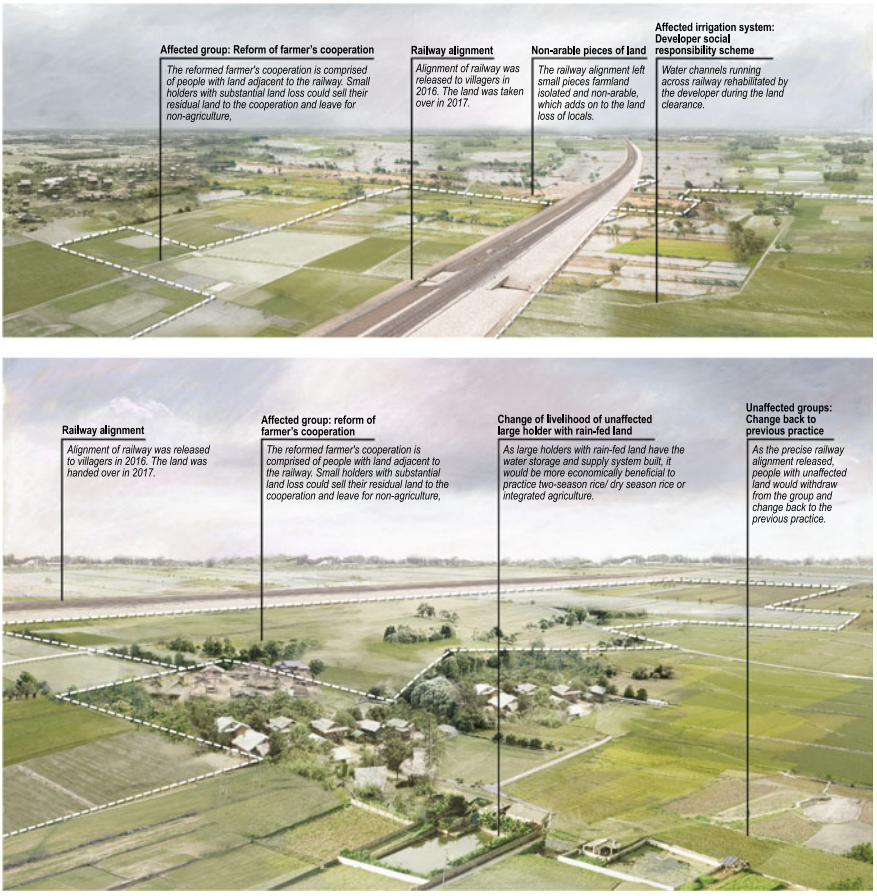

Fig. 30 Various agricultural intensification strategies, including relay intercropping and integrated agriculture, are considered for different community economic groups and impacts of future land loss due to railway construction

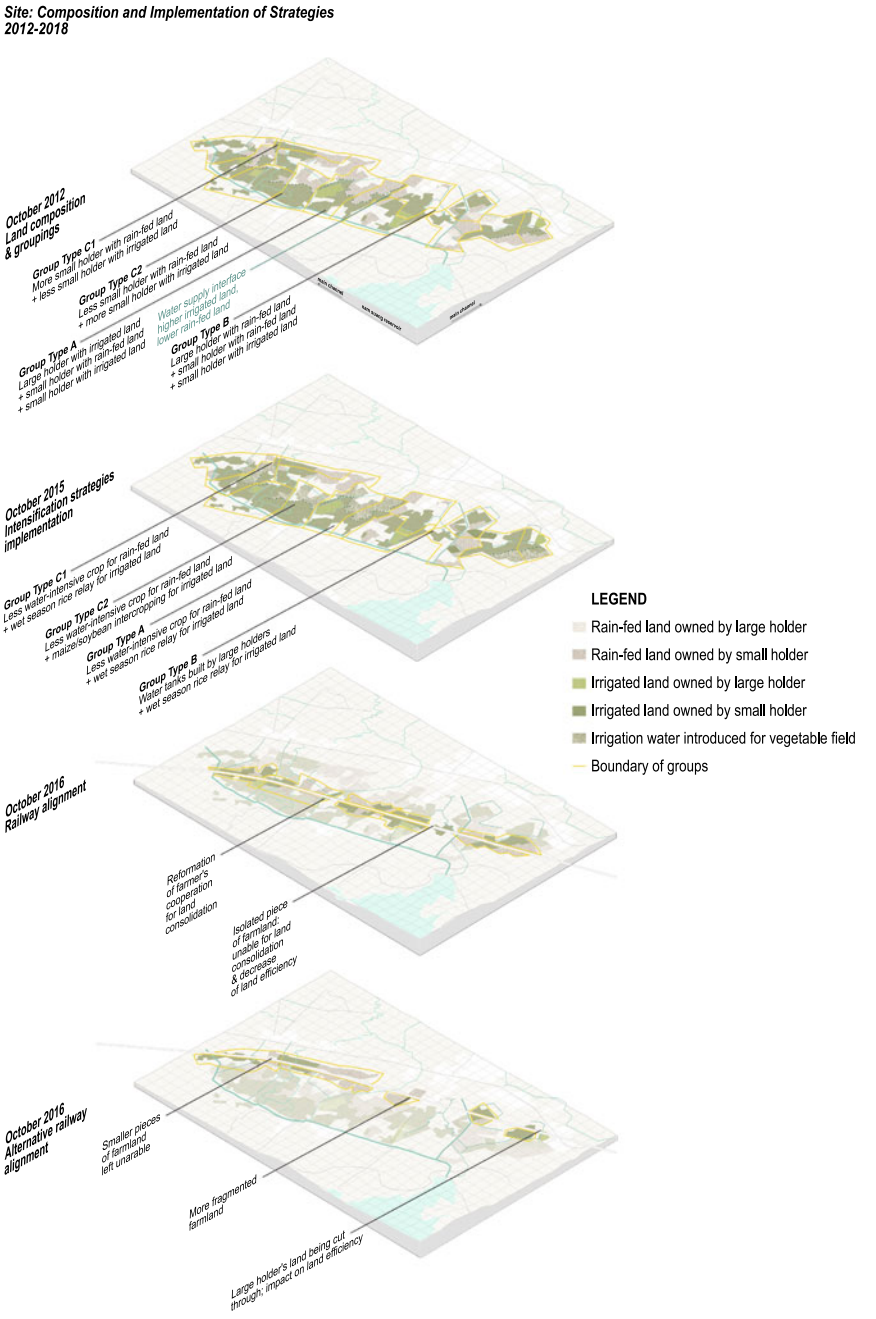

Fig. 31 Sampling of existing agricultural land uses (background) and suggested agricultural intensification strategies in-situ (circles in foreground)

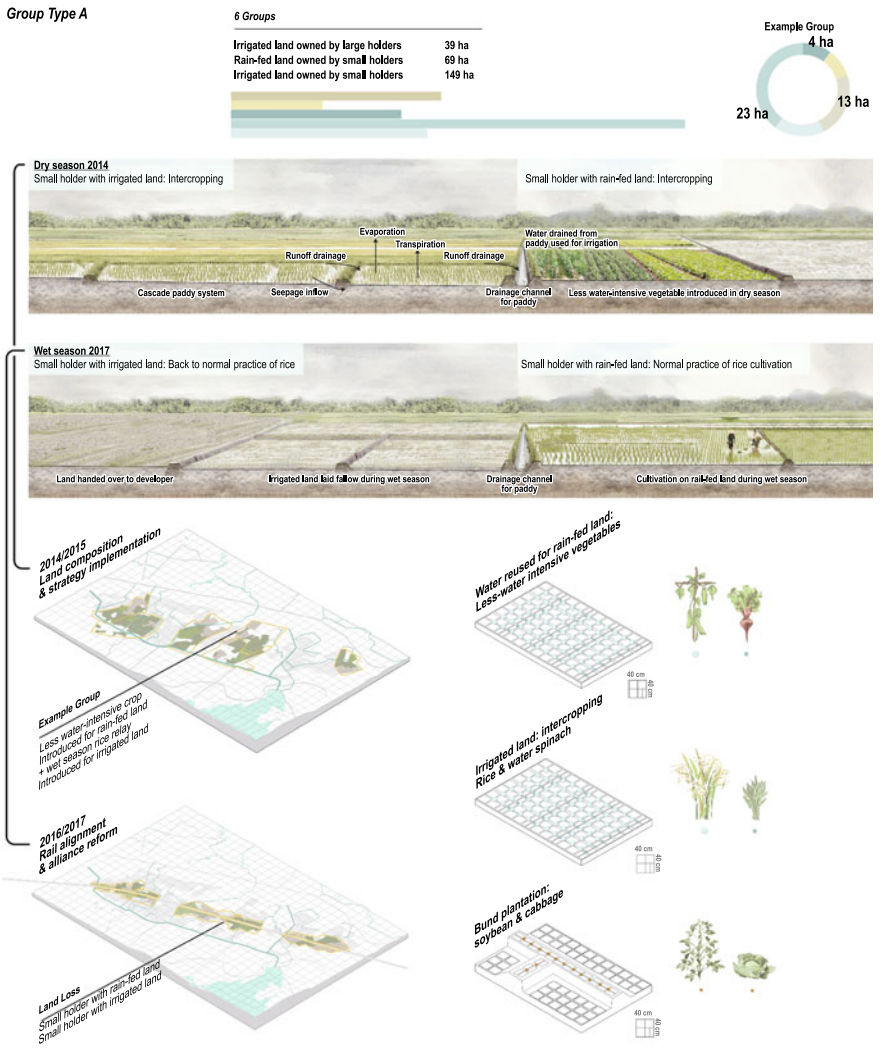

Fig. 32 Agricultural cooperative subgroups within the study area and their reorganization between 2012 to 2016 depending on level of uncertainty of the railway's potential, planned, and constructed impacts

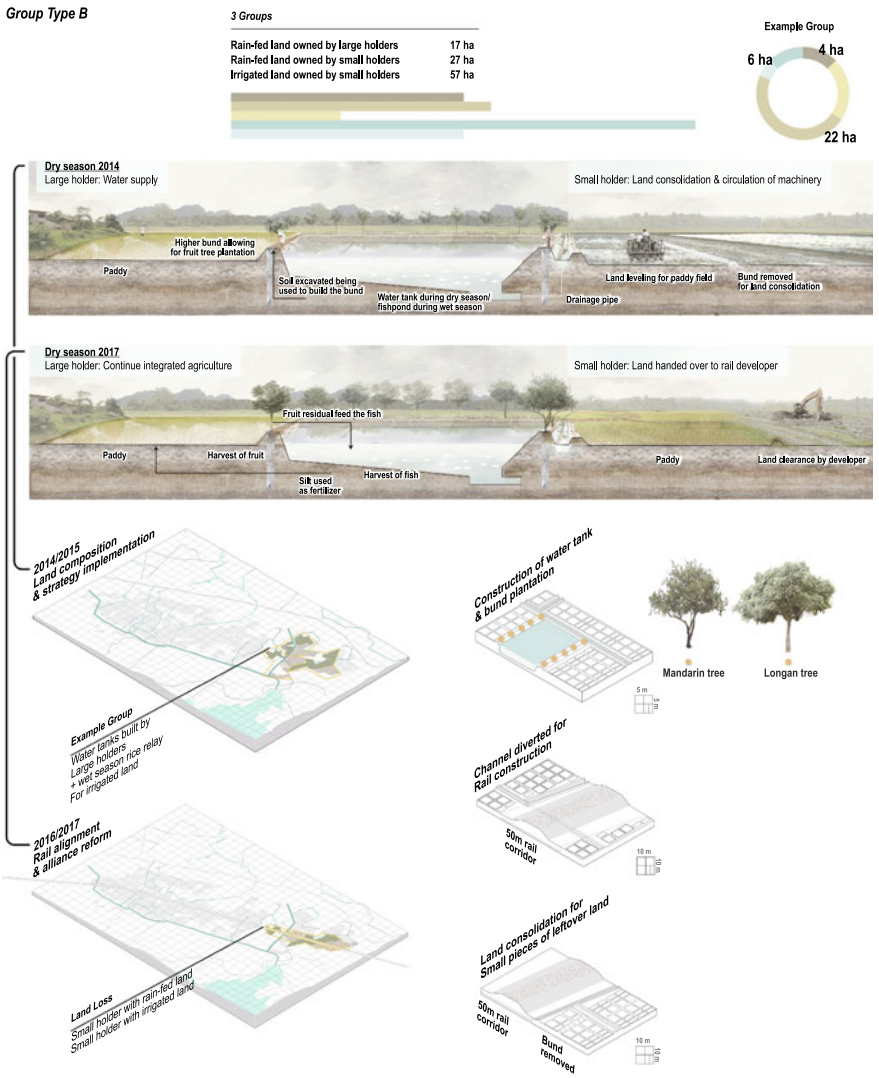

Fig. 33 Agricultural cooperation and intensification strategies for subgroup A within the study area

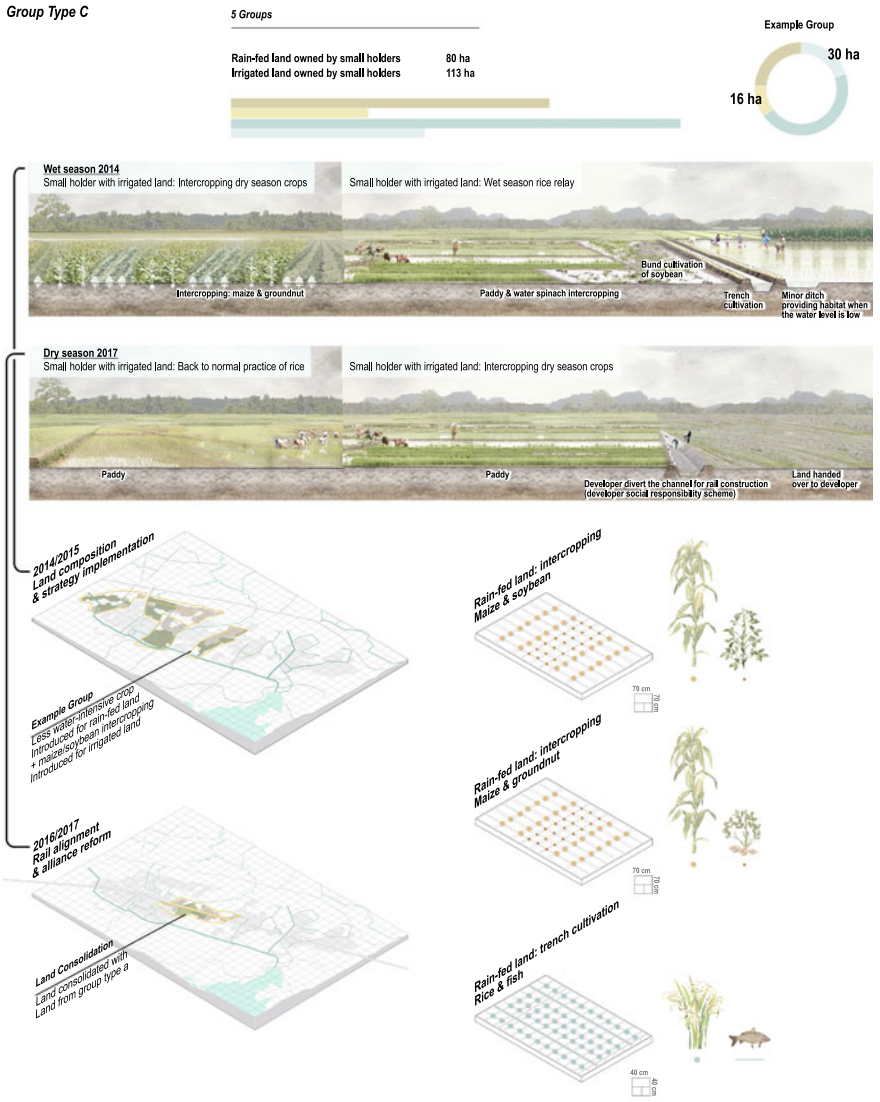

Fig. 34 Agricultural cooperation and intensification strategies for subgroup B within the study area

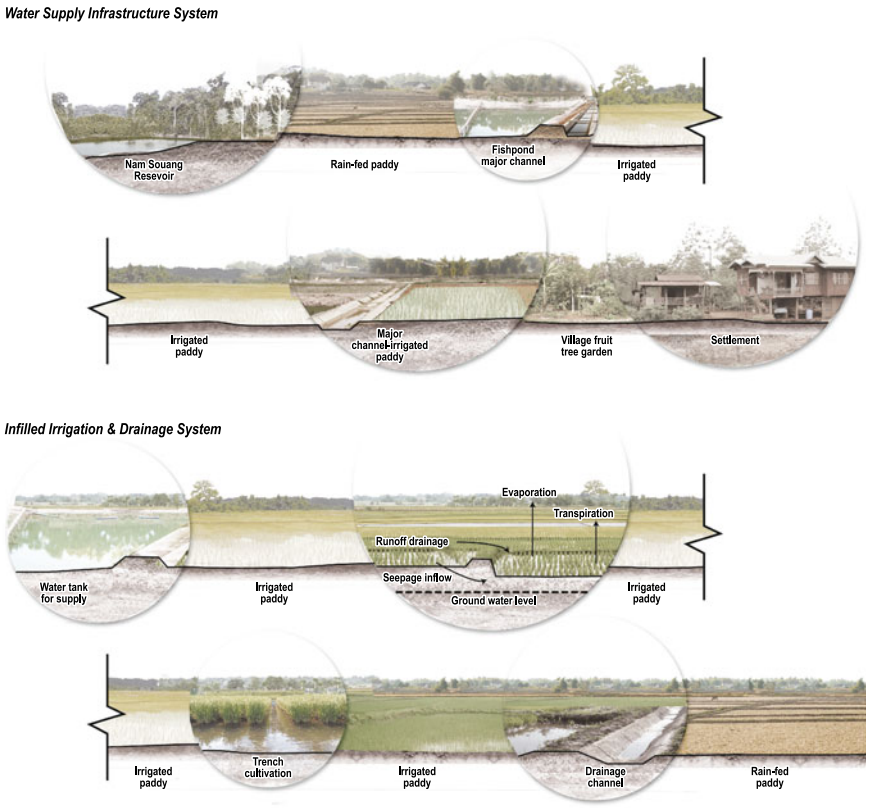

Fig. 35 Agricultural cooperation and intensification strategies for subgroup C within the study area

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Chapter 6
Western Alternative Development and Chinese Development

1 Introduction

Drawing from discourse on the "sustainable development paradigm" and "frontier resourcification" examined in Chap. 4, this chapter presents two strategic planning proposals that are generated from frictions between rural development as construed by western aid agencies and forms of Chinese aid and development, especially regarding the speed of development and their cache of neoliberal ideologies. This is not about Chinese versus Western but recognizing the legacy and patchwork of development assistance, forces dominating northern Laos in the 1990s and 2000s, in these landscapes to guide intervention today.

The UN General Assembly (1998) defined alternative development as the prevention and elimination of narcotics through rural development "in the context of sustained national growth and sustainable development … recognizing the particular sociocultural characteristics of the target communities and groups." Alternative development project components frequently include sustainable natural resource management, livelihood diversification (with a focus on food security and expanding market access), road and water infrastructure provision, health and education facilities and programs. These projects also hold some emancipatory ideals of the sustainable development paradigm, including capacity-building for village governance, explicitly targeting (and defining) vulnerable subpopulations, and recognizing opium cultivation as a symptom of poverty (rather than a cause) stemming from a reduction in land available for shifting cultivation (Cohen, 2009).

In Muang Sing, alternative development projects from the mid-1990s through 2010 were largely adapted from the German Technical Cooperation Agency (GTZ) and Norwegian Church Aid's (NCA) successful highland development programs in northern Thailand from the 1980s and 1990s. However, when paired with the higher speeds of implementation deemed necessary for opium eradication and substantially less advanced infrastructure in Laos, these programs were far less successful. Although GTZ had highlighted the necessity of a "cautious promotion" of para rubber, promoting rubber agroforestry to reduce soil erosion and preserve some

A. S. Kelly and X. Lu, *Critical Landscape Planning during the Belt and Road Initiative*, https://doi.org/10.1007/978-981-16-4067-4_6

biodiversity, they also recommended monitoring by local government and master contracts to protect villages interests from foreign investors, on top of clear demarcation of village boundaries, land titling, and agricultural diversification (Cohen, 2009, p. 428). This long list of regulatory and land tenure-related issues underscores the substantial economic forces and weakness of Laos's development context. Today these landscapes are dominated not only be rubber but cash crop expansion (Figs. 1 and 2), which has led to a cumulative reduction in available ground and surface water resources necessitating the construction of new irrigation and water supply infrastructure (Figs. 3 and 4).

The two strategic planning proposals included in this chapter are: *Low-labor landscapes: An Agricultural response to short-term construction employment on the China-Laos Railway*; and *Water risk and responsibility: A Political-chemical land genealogy for the Muang Sing Valley, Laos*. While these two proposals are not dealing with alternative development by its definition, the proposal "Water Risk and Sustainability" assembles the legacies of alternative development programs in the Muang Sing valley to help guide a strategy for basin-scale agricultural pollution remediation and increased water security. "Low-labor landscapes" traces the legacies of opium's replacement, primarily via Chinese investment, with rubber in northern Laos and the how the resultant patchwork of rubber, subsistence and cash crops, and ethnic diversity might deal with increasing rural–urban migration and significant associated strain on the rural agricultural labor force. As geographer Barney (2009) surmised in his writing on northern Laos, which we reviewed in Chap. 4, such legacies and mosaics create a "patchwork" (p. 147) landscape or frontier of resource enclosures—"fragmented and overlapping mosaics" that result in migrations and new economies (p. 152). These two proposals proactively reconstruct this patchwork or mosaic as both narrative and site of strategy development and preliminary testing, i.e., scenario-building.

Cohen contrasts Western-style "alternative development" with Chinese "opium replacement" programs in northwestern Laos's Muang Sing valley. These Chinese programs were effectively foreign investment, largely in rubber (Figs. 5 and 6), carrying different moral forces of "scientific rationality, technical competence and entrepreneurial spirit" characteristic of 1950s Western modernization theory (Cohen, 2009, p. 429) that were later rejected in the Alternative Technology Movement and post-development theory. Rubber had been promoted by provincial authorities to households in Yunnan since the mid-1980s. Large-scale rubber cultivation spread in northern Laos with the emergence of China as the world's largest rubber market, declining domestic rubber yields, and China's own restrictions on rubber cultivation across the border in Xishuangbanna due to environmental degradation from rubber monocultures, which resulted in reduced biodiversity, reduced food security, and large-scale hydrological and erosion impacts (Shi, 2008).

Farmers in northern Laos aspired for "Chinese modernity," while the Akha ethnic group used familial and patronage connections with clans in Yunnan for capital, technical assistance, saplings and market access (Diana, 2007 as cited in Cohen, 2009). The proposal "Low labor landscapes" recognizes these cross-border clan connections, in addition to the specific spiritual and seasonal calendars of different ethnic

groups in the study region. Cohen further describes how socioeconomic inequalities were aggravated and reproduced in household investment startups and access to productive land, in addition to Laos's limited credit, weak regulation and poor enforcement mechanisms. Both strategic planning proposals in this chapter not only recognize diverse publics but actively construct them. In "Water risk and sustainability," this construction is not only demographic but land-based, constructing a land genealogy from satellite imagery, with speculation on a diversity landholder socio-economic conditions and potentials of localized pollution accumulation in the landscape from herbicides, pesticides and fertilizers.

In his review of the World Bank and the emergence of the environmental state, Goldman emphasizes the creation of a hegemonic discourse of "authoritative green knowledge" rooted in neoliberal market ideologies—a knowledge regime of land valuation and classification that replaces cultural relations and ecological complexity with biodiversity conservation, sustainable forestry and watershed management development programs (Goldman, 2001, p. 194, 2005). The two proposals featured next exhibit the difficult balancing act between participating in the language and valuation metrics of development but with design concepts and approaches that actively resist easy constitution or reduction. The emphasis of alternative development on livelihood security, environmental sustainability and social development may be commendable, but the building of social capital takes time. Critical, landscape-oriented planning is necessary, especially as road and dam-building, resettlement programs, and large-scale agroindustry continue apace (Figs. 7 and 8).

Fig. 1 The boom in cash crops is increasing social disparities and environmental degradation in northern Laos. This photograph was taken at an experimental banana plantation, leased to a Chinese operator from a Lao landowner, testing new commercial species after a virus invaded banana crops in the Muang Sing Valley 2 years earlier. Photo by Brian Cheang (March, 2019)

Fig. 2 Amid controversy over chemicals reported to be causing deaths and illnesses among plantation workers, the government of Laos enforced a ban on the granting of new concessions for banana plantations in 2016. This photograph shows an experimental banana plantation and its surrounding rice fields in the Muang Sing Valley in the Golden Triangle. Photo by Xiaoxuan Lu (March, 2019)

Fig. 3 A worker constructs a Vietnamese-funded irrigation dam within Nam Ha National Protected Area. Photo by Brian Cheang (March, 2019)

Fig. 4 Cash crop farms producing watermelon, bananas, and other export produce in the Muang Sing Valley will lease water to pay off the dam's investment. While the dam is a top-down investment in water security for the valley, water equity remains missing for many small-to-medium land holders focused on rice cultivate in the valley, as water-hungry crops deplete the water table. Photo by Xiaoxuan Lu (March, 2019)

Fig. 5 The rubber boom in northern Laos is the co-production of increased demand for latex in China and the Laos government's land-use policy related to the stabilization and ultimate eradication of shifting cultivation. Acting as "water pumps," rubber plantations are frequently placed on lands that are important for biodiversity conservation and ecological functions, inducing adverse effects on the regional landscape. This photograph shows rubber tapping at Nam Deang Tay Village along Route 3. Photo by Ashley Scott Kelly (March, 2019)

Fig. 6 Nam Deang Tay Village, located within a half-hour drive of Boten Special Economic Zone along a planned "super-highway" to Thailand, contains several minority groups resettled here during the Laos government's land reallocation campaigns over the last three decades. Photo by Xiaoxuan Lu (March, 2019)

Fig. 7 Nam Tha River, a major tributary of the Mekong River, approximately two months before completion of a Chinese-funded hydropower dam 55 km downstream. This photograph shows: (1) an existing village (left) that will be inundated; (2) a newly constructed resettlement village (top-right) atop a ridge; and (3) a road (center) newly cut into the hillside, constructed above the soon-to-be reservoir draw-down zone. Photo by Jane Li Aijing (March, 2018)

Fig. 8 Nam Tha River hydropower dam, 97% complete, which will export the majority of its generated electricity to Thailand. Photo by Ashley Scott Kelly (March, 2018)

2 Low-Labor Landscapes: An Agricultural Response to Short-Term Construction Employment on the China-Laos Railway

Landscapes surrounding the Boten Special Economic Zone (SEZ) on the Laos-China border are undergoing transformation. Immediately south of Boten SEZ, a "smart" logistics hub is proposed by Thailand-headquartered Amata corporation. Amata signed concessions in 2018 for lands totaling 7,000 hectares near Nateuy village (Radio Free Asia, 2019b) at the intersection of Route 13, Laos's primary north–south highway, and Route 3, which is planned for upgrading into a four-lane highway to Thailand (Dwyer, 2020). While these developments have not removed large numbers of people from their lands, agricultural systems already unseated by two decades of large-scale rubber plantations and cash crops via Chinese contract farming need increased resiliency (Fig. 9). Dependency on the rubber market, which has weakened considerably in recent years, has led to shrinking subsistence rice production and food security problems (Baird, 2011). Construction jobs for the China-Laos railway, as well as illicit industries tied to Boten's development, are changing agricultural labor availability.[1] While these new developments create short-term job opportunities for the surrounding local population, further labor diversification away from the agricultural sector will likely lead to permanent loss of cultivated land and the indigenous knowledge embedded in it (Fig. 10). This project speculates how labor diversification and an ensuing agricultural labor shortage, especially one with variable annual and seasonal labor availability, may affect communities along the China-Laos Railway.

[1] Authors' discussion with village leaders in Luang Namtha in March 2019.

Timelines are constructed showing how the four dominant major agricultural practices are affected by construction of the railway and future related industrial developments (Fig. 11). These agricultural systems, including paddy rice, upland rice, rubber plantations, and non-timber forest products (NTFP), react differently, both ecologically and temporally, to labor shortages, which are themselves annually and seasonally variable. For instance, while fallow periods in upload rice are a normal part of the agricultural cycle, recently neglected fallow paddy rice can lead to uncontrolled weed invasion. Unmanaged rubber plantations still produce yield, although a slightly diminished one. These limited impacts can be mitigated if lasting only a short duration. However, owing to industrial developments in and around the planned Nateuy logistics hub, a sustained labor deficit would require substantial labor to reestablishment agricultural production, likely beyond what villages can provide or sustain. Additionally, households would need to contend with Laos's fallow land law, which stipulates that land can be resumed by the state if left fallow for more than 3 years (Lund, 2011).

This project develops scenarios and strategies for labor shortages, depopulation, decreasing subsistence, and cash crop market fluctuations together with demographics and traditional agricultural knowledge in villages surrounding Nateuy. Strategies are proposed to increase agricultural and livelihood resilience under changes in village labor availability, including suggesting crops that require less labor compared to existing produce and crops requiring preparation and harvesting but with minimal management (Figs. 12, 13 and 14). When expecting an agricultural labor deficit, high-return cardamom should be established in upland areas, as it requires one-third the labor of upland rice, takes 3 years to mature, and can be harvested will relatively low manpower. Excess labor can then focus on alternative low-labor crops such as maize. Maize fields can return to paddy rice as village labor becomes available and stabilizes. For those villages with high market-dependence from their rubber plantations but insufficient subsistence production, they may temporarily plant cash crops such as sugarcane in their paddy fields or leave these fields fallow with the intent to practice clean or organic farming in the future. For villages with high market-dependence and sufficient food production, they may adapt to a labor deficit by converting rice fields into alternative diversified cash crops such as orchards requiring three-years intensive preparation, followed by low maintenance with lasting yields for 20 years or longer and lower risk to market fluctuations than rubber.

These strategies are then modified based on cultural practices. The surrounding population consists predominantly of Hmong, Khmuic, and Mien ethnic groups (Fig. 15) (Epprecht et al., 2018). The Hmong maintain a strong clan system that enables high economic security and resource and knowledge access. This may facilitate greater market access and resilience in testing of new species or agricultural techniques. The Khmuic have strong traditional rituals tied to the agricultural calendars and ecological cycles of upland rice farming. The Mien tend a wide range of species in their home gardens, which range from food production to indigenous cultural and medicinal usage (Fig. 16). Recognizing that changes in agricultural practices at any scale are difficult to encourage, these agricultural strategies should be

read as an approach to development; on-the-ground research is necessary to assess actual viability.

The design proposal "Low-labor landscapes: An Agricultural response to short-term construction employment on the China-Laos Railway" and accompanying illustrations were developed by Brian Cheang during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong.*

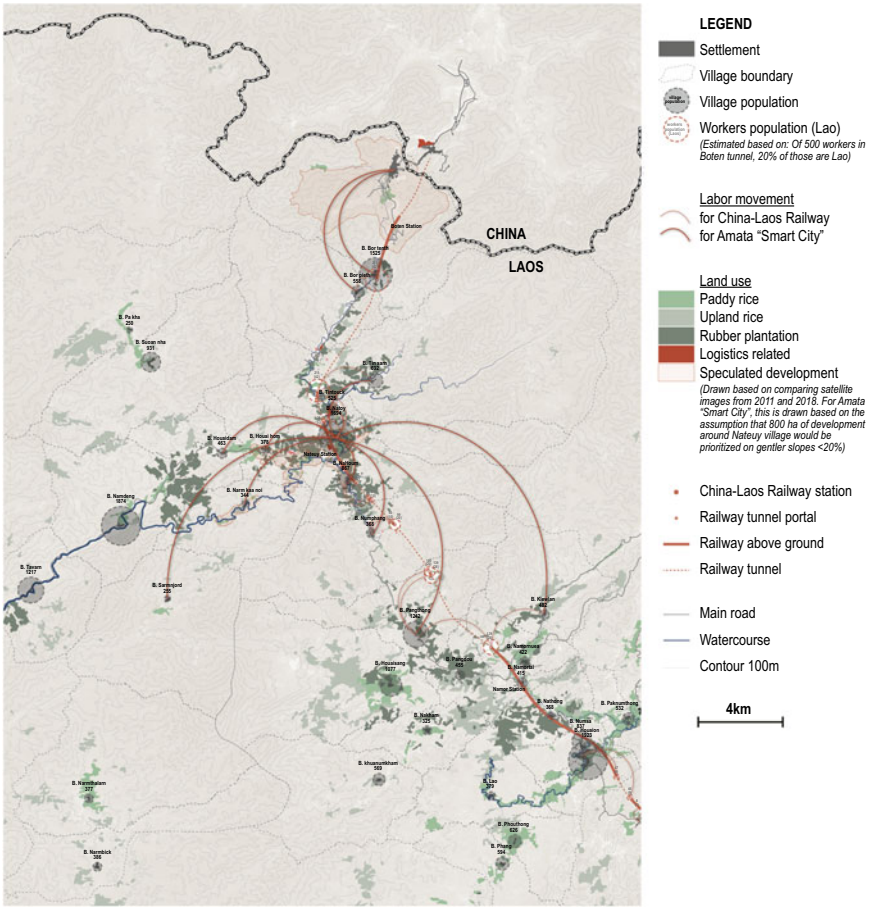


Fig. 9 Dominant village agricultural land uses, paddy and upland rice and rubber plantations, superimposed with recent speculative industrial development and potential labor flows from surrounding villages

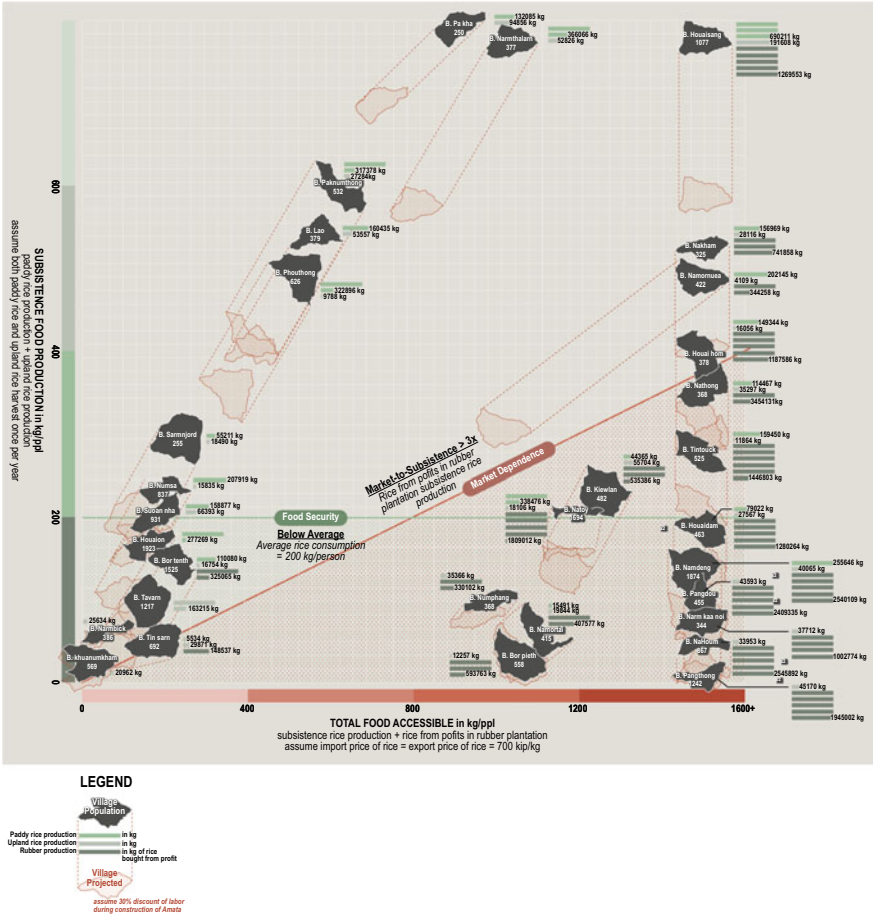


Fig. 10 Food security, as an outcome of production and available arable lands, and market dependency trajectories for villages in the study region

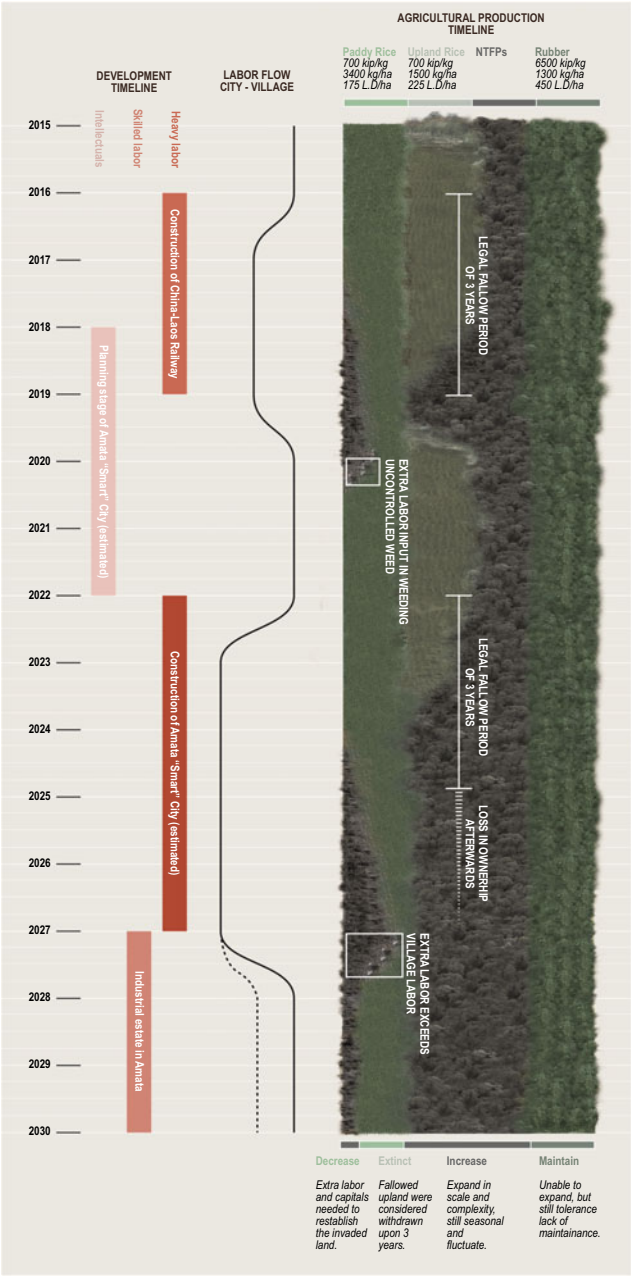


Fig. 11 Ecological consequences of labor deficits of various durations for the study region's dominant agricultural systems, including paddy and upland rice, rubber plantations, and non-timber forest products

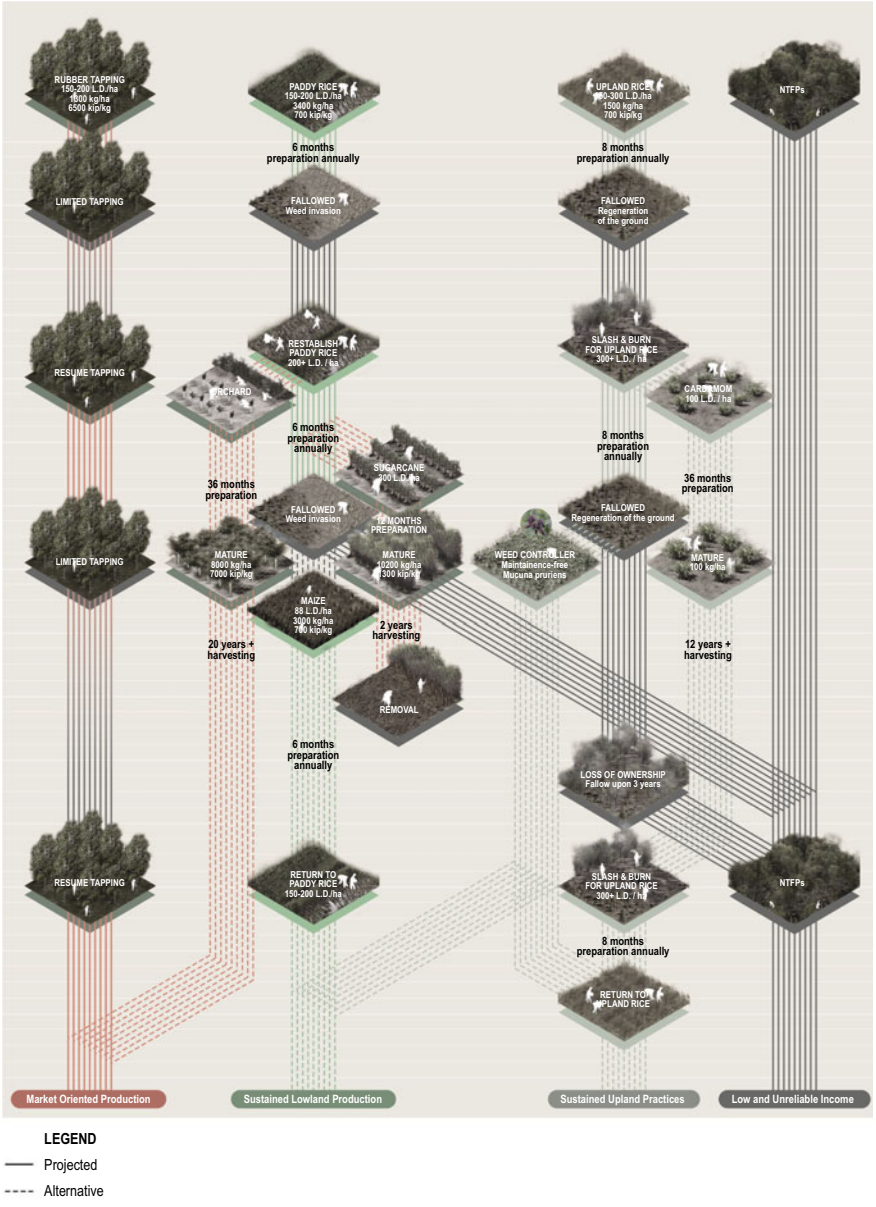


Fig. 12 Path dependencies for choosing alternative crops as a response to agricultural labor deficits

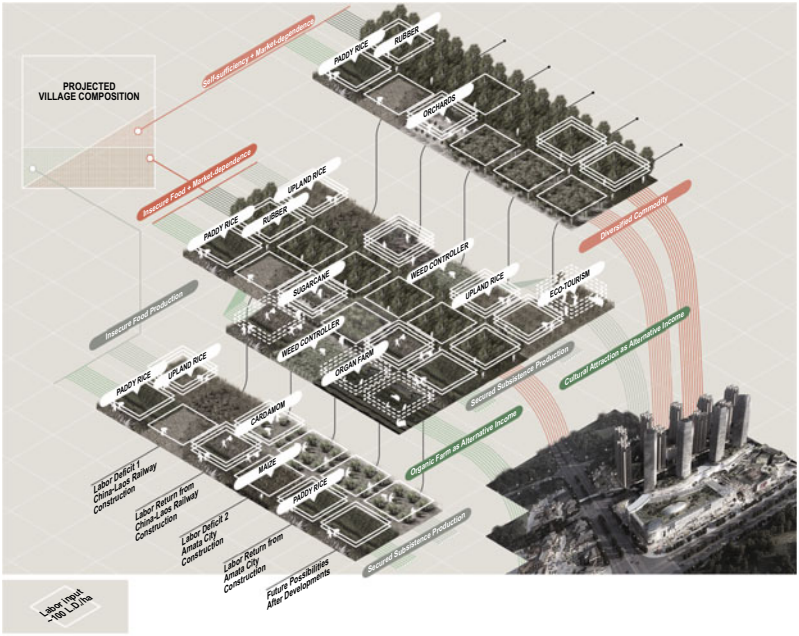


Fig. 13 Three general scenarios and strategies for resiliency against labor shortages, depopulation, decreasing subsistence, and cash crop market fluctuations

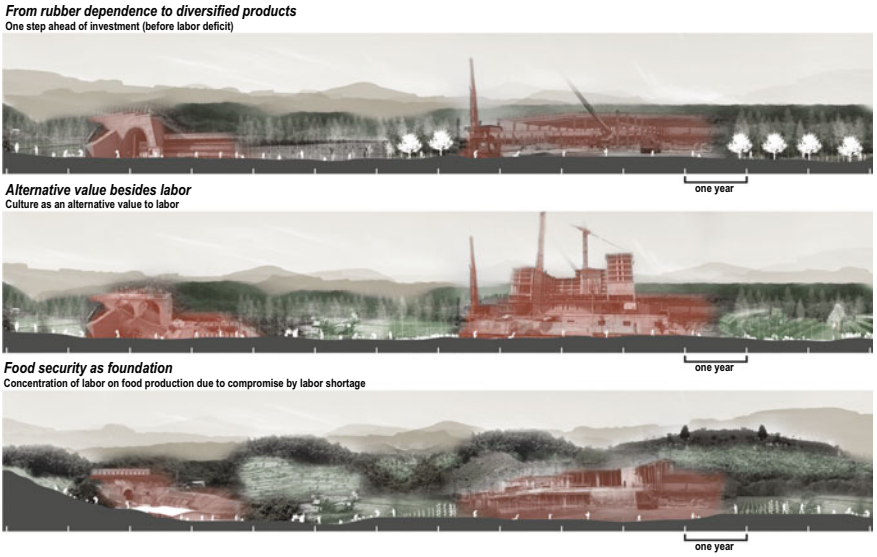


Fig. 14 Parallel trajectories of development at three sites highlighting key principles of diversification, food security, and alternative value systems

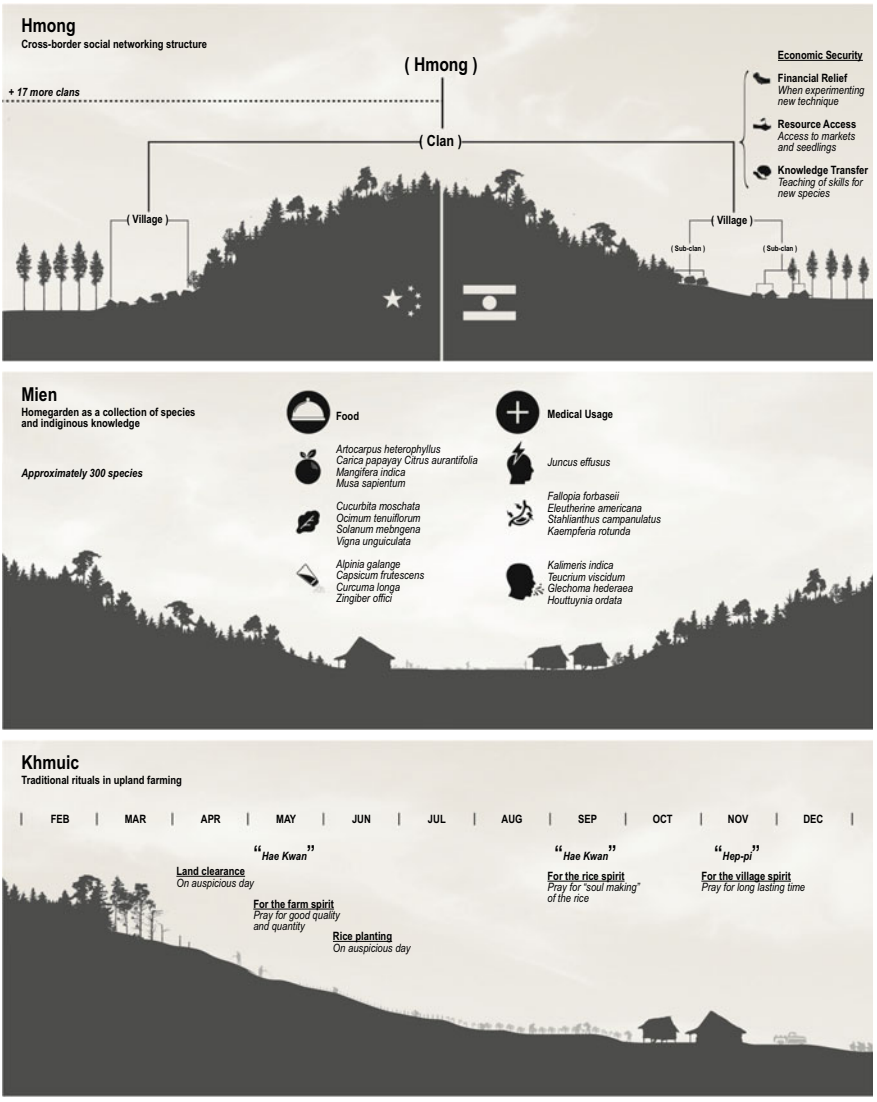


Fig. 15 Unique opportunities in Hmong, Mien, and Khmuic ethnic groups' agricultural practices

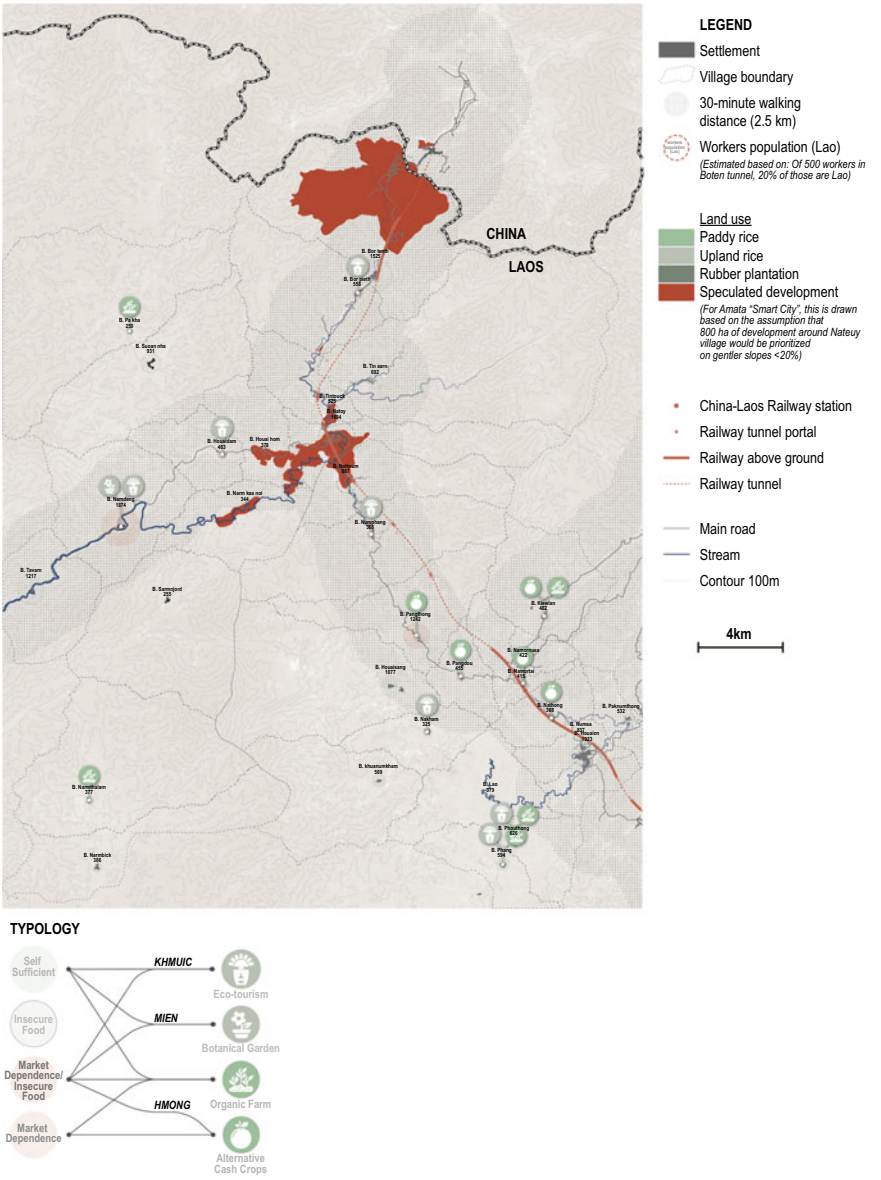


Fig. 16 Typological distribution of land uses and communities as a function of food security, market dependence, ethnic identity and practices, and potential alternative development strategies

3 Water Risk and Responsibility: A Political-Chemical Land Genealogy for the Muang Sing Valley, Laos

An irrigation dam was recently constructed in northwestern Laos's Nam Ha National Protected Area along Route 17, which connects Luang Namtha's provincial capital with Muang Sing in the Golden Triangle region. During our field visit in March 2019, local civil society groups speculated that the dam was funded by a Vietnamese loan, which would be paid back through selling its water to cash crop producers in the Muang Sing valley that, given the proliferation of rubber and other cash crops since the early 2000s (Liu et al., 2016), has experienced a significant decrease in surface water flow and groundwater levels (Fig. 17). Due to its sedimentary composition, groundwater storage in the Muang Sing valley may be relatively low at 1,200 mm (Viossanges et al., 2018). Decades of cash crop expansion required more water, adding additional stress especially in the dry season. Many cash crop plantations are joint-ventures or operate under various forms of foreign-invested contract farming, predominantly with Chinese companies. Once paid off, this new supply of irrigation water has the prospect of becoming a public good to support small- and medium-scale rice farmers in the region, many of whom were resettled from the uploads during bans on shifting cultivation and opium eradication in the 1990s and 2000s (Fig. 18). Since resettlement, communities have experienced intensified water use, increased competition for land and resources, increase economic division, and decreased trust among landholders. Regardless of how much veracity that narrative holds, we consider it a useful trigger to think about environmental sustainability, water equity, and food security in the Muang Sing valley.

In January 2017, 2 years before our visit, a national ban on new banana plantations was issued in Laos due the pervasive ongoing chemical use and subsequent health impacts on workers and nearby communities (Radio Free Asia, 2019a). Years of using these chemicals, some illegal even under Laos's relatively nascent environmental regulations, have left them accumulated in the soil and spread throughout the hydrological system. Heavy metals from fertilizers resist degradation and are persistent in the soil. Panama disease can survive up to 30 years in the soil (Stover, 1990). Production of the commercially viable Cavendish banana, accounting for around half of the global market, often requires high inputs of fertilizers, herbicides and pesticides (Goh & Marshall, 2017).

Soon after the ban was implemented, the fungal epidemic Panama disease began spreading in February 2017 through Cavendish banana plantations in Luang Namtha Province (Chittarath et al., 2018). Our visit to an experimental banana plantation, owned by a Lao landholder but contracted out to a Chinese company testing the viability of commercially alternative species, sets the context for this strategic proposal—*Water risk and responsibility: A political-chemical land genealogy for the Muang Sing Valley, Laos*—that organizes a series of remediation strategies to improve water quality and quantity, mainly due to high inputs of herbicides, pesticides and fertilizers, and promote water equity in access, distribution and management.

Without detailed surveys of the valley's hydrological regime, we speculated on the local hydrology using free globally available elevation models and satellite imagery to model natural rivers, streams, and non-perennial washes and artificial irrigation canals (Fig. 19) and the proximate effects of a series of typical plantations within the valley as sources of nonpoint-source pollution (Figs. 20 and 21). Similarly, without a household or landowner survey, we assumed a range of possible ownership configurations (e.g., large- and smallholders, independent vs. contract farming) and land genealogies (i.e., crop history and pollution accumulation) based on land patterns deduced from remotely sensed imagery (Fig. 22). These yielded an array of potential producer-production typologies that were further categorized considering biophysical aspects, stakeholders' capabilities and their capacity for risk tolerance and management. The Asian Development Bank's (ADB, 2019) projects for establishing community watershed management in north-central Laos were used as reference. Water users' risks are described in 13 categories across economic, political, natural, agricultural and social considerations drawn from ADB's irrigation subsector guidance notes and criteria from the Lao Ministry of Agriculture and Forestry guidelines (Fig. 23; ADB, 2017; UNDP Lao PDR, 2012).

Four common producer-production typologies were selected to develop our strategic planning proposal, taking into account stakeholder risks and capabilities and considering their spatial proximity to other plantations, costs, capacities, and social choice (Figs. 24, 25 and 26). Proposed remediation techniques included physical, chemical and biological applications to be deployed in-situ to ensure land remains at least partly productive during implementation. These four typologies are:

Typology A: Where the plantation is foreign investment in rubber, the emphasis is on preventing chemical run-off and mitigating high water consumption. Such foreign investors generally have higher risk tolerance, more financial resources, and a larger capacity for change. They require the least technical assistance yet likely greater regulation and incentive. We propose that an independently monitored management plan should be required for agricultural pollution mitigation and remediation. Technologically, this could involve installing permeable reactive subsurface barriers between plantations and water courses to stop contaminant plumes (Typology A components of Figs. 27, 28, 29 and 30).

Typology B: Smallholders who independently grow bananas have the lowest risk tolerance and least capability for change, requiring the most technical assistance in both financial terms and technology transfer. Crop diversification, including fast-growing beans and cassava, is promoted to make livelihoods more resilient to uncertainties. These households may provide labor in return for communal irrigation water access rights. Technologically, soil chemical immobilization is recommended to limit contamination in the short term (Typology B components of Figs. 27, 28, 29 and 30).

Typology C: Smallholders alternating wet rice cultivation with contract farming have both low risk tolerance and low resilience to change. Poor irrigation water quality, nutrient loss from their paddy production systems, and contamination from contract farming have resulted in lower rice yields year-on-year. We recommend that foreign investment provide access to technologies, such as fertilizers, while

smallholders provide the manpower for operation and maintenance of the remediation strategy. Between harvesting and planting cycles, chelate- and microbe-assisted phytoremediation, which translocate metals from the roots to the foliage, are effective for efficient remediation of low- to moderately contaminated soils. Wide adoption of these strategies across the valley can lead to overall increased soil productivity and reduce nonpoint source pollution (Typology C components of Figs. 27, 28, 29 and 30).

Typology D: Large-holder banana plantations implemented through contract farming have high risk tolerance and larger capabilities. High concentrations of pollutants in these contaminated soils require longer, more intensive remediation. Chemical oxidation offers efficiency although this makes the first stage of implementation costly. Such remediation should be mandated, otherwise incentives are needed to encourage alterative cash crops and diversification, with domestic market access prioritized. Technologically, these large-holders should install permeable reactive subsurface barriers between plantations and water courses to stop contaminant plumes (Typology D components of Figs. 27, 28, 29 and 30).

Remediation is both a costly and complex process to optimize across the Muang Sing valley. While this proposal makes several assumptions about the agro-economics of land and water use, it does so to draw attention to the great diversity of economic situations and site-specific risks to agricultural pollution and disease. Landholder and investor participation will likely require incentives. While foreign investors are likely least willing to participate, more independent smallholders would likely need both subsidies and technical knowledge transfer by local experts. Those engaged in contract farming may be less inclined to act given the slow but steady accumulation of contaminants in the soil. This proposal offers a detailed framework for coordinating and mitigating these complexities and for the establish sustainable long-term cooperation of diverse interests.

The design proposal “Water risk and responsibility: A political-chemical land genealogy for the Muang Sing Valley, Laos” and accompanying illustrations were developed by Vanessa Wong Nok Yiu and Sally Song Ziqi during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong.*

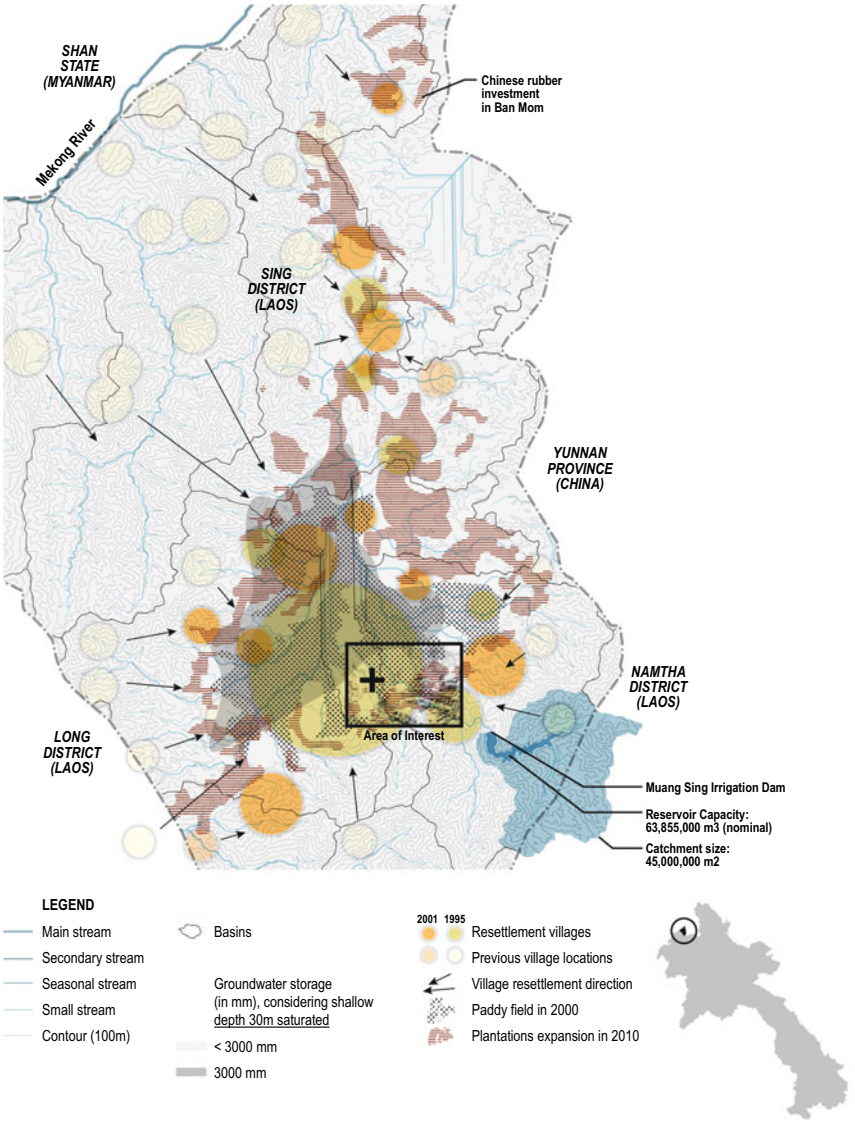


Fig. 17 Various land reallocation policies in Muang Sing in the 1990s and 2000s, many part of foreign aid-supported opium substitution programs, resettled large numbers of villages from upland areas, where they had practiced shifting agriculture, to the valley with paddy rice production. Since the early 2000s, largely Chinese foreign investment has proliferated cash crops and tree plantations throughout the valley, stressing water resources necessitating the construction of a large irrigation dam in the adjacent Nam Ha National Protected Area

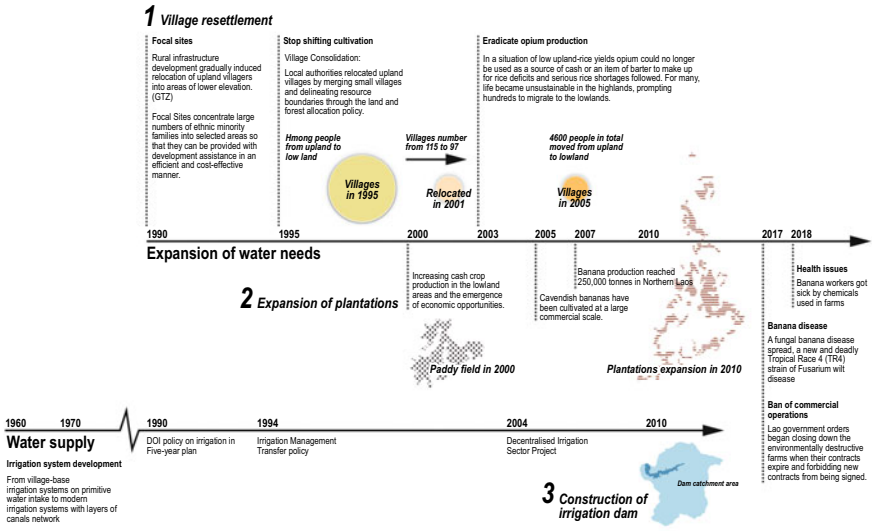


Fig. 18 Timeline comparing key events in village resettlement programs, expansion of plantations, and agricultural water supply

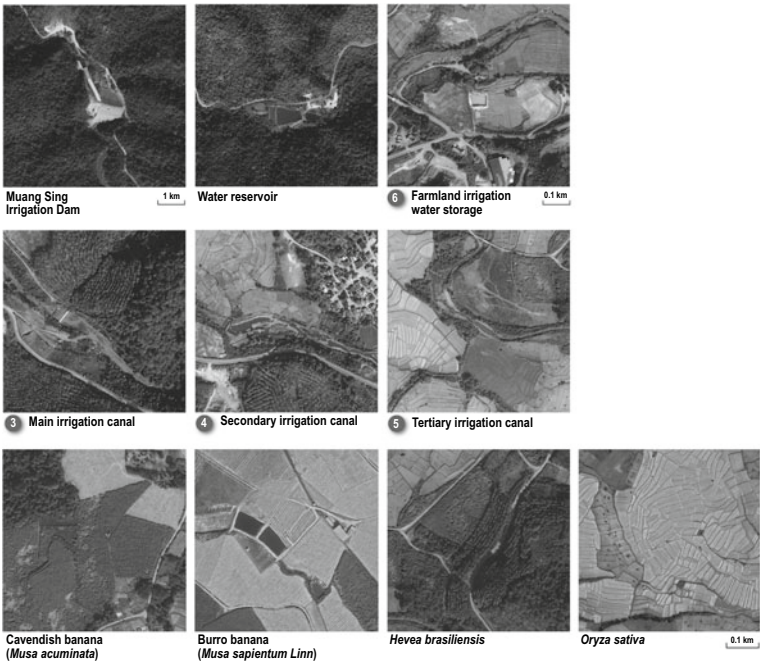


Fig. 19 Key agricultural irrigation infrastructure components and irrigated crop species within the Muang Sing Valley

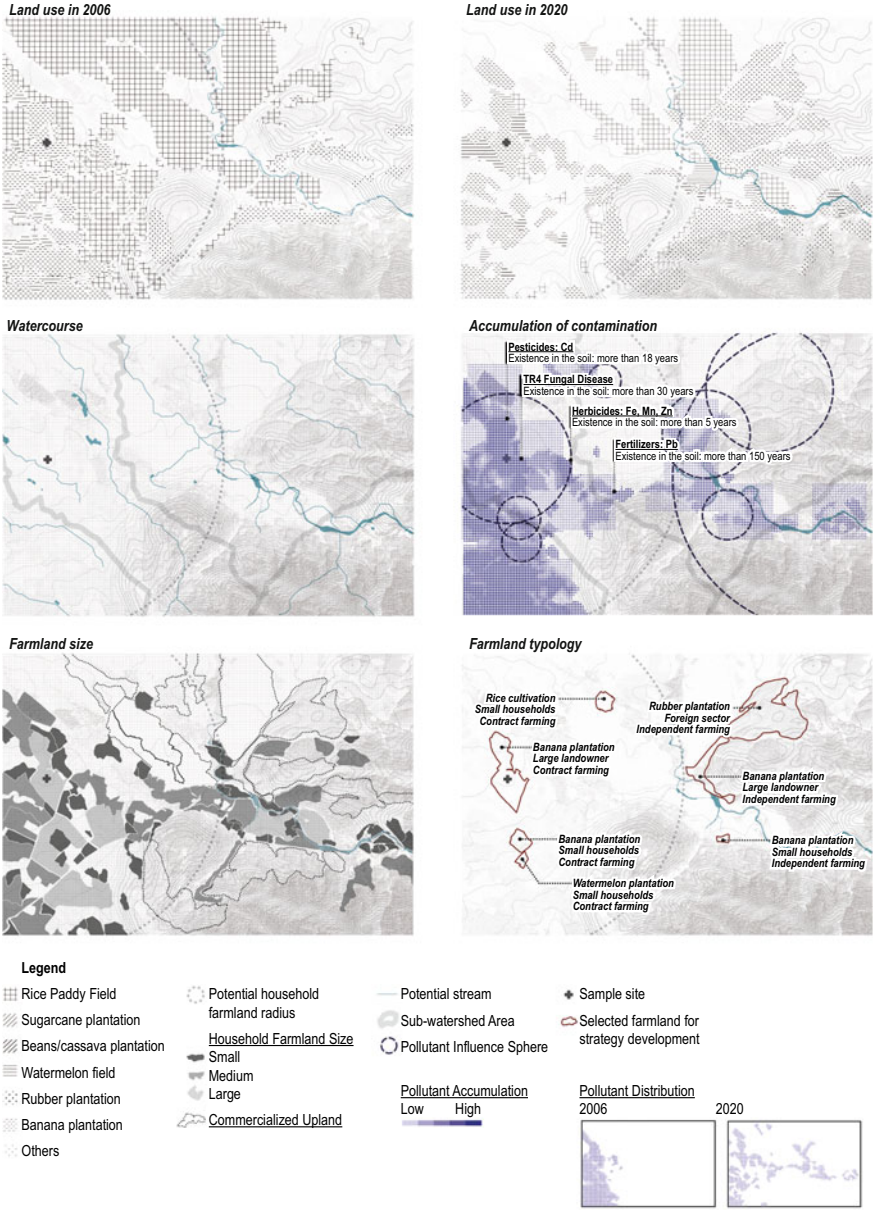


Fig. 20 Agricultural land use change, accumulation of contaminants from agricultural production, large- and smallholder land patterns, and identified producer-production typologies

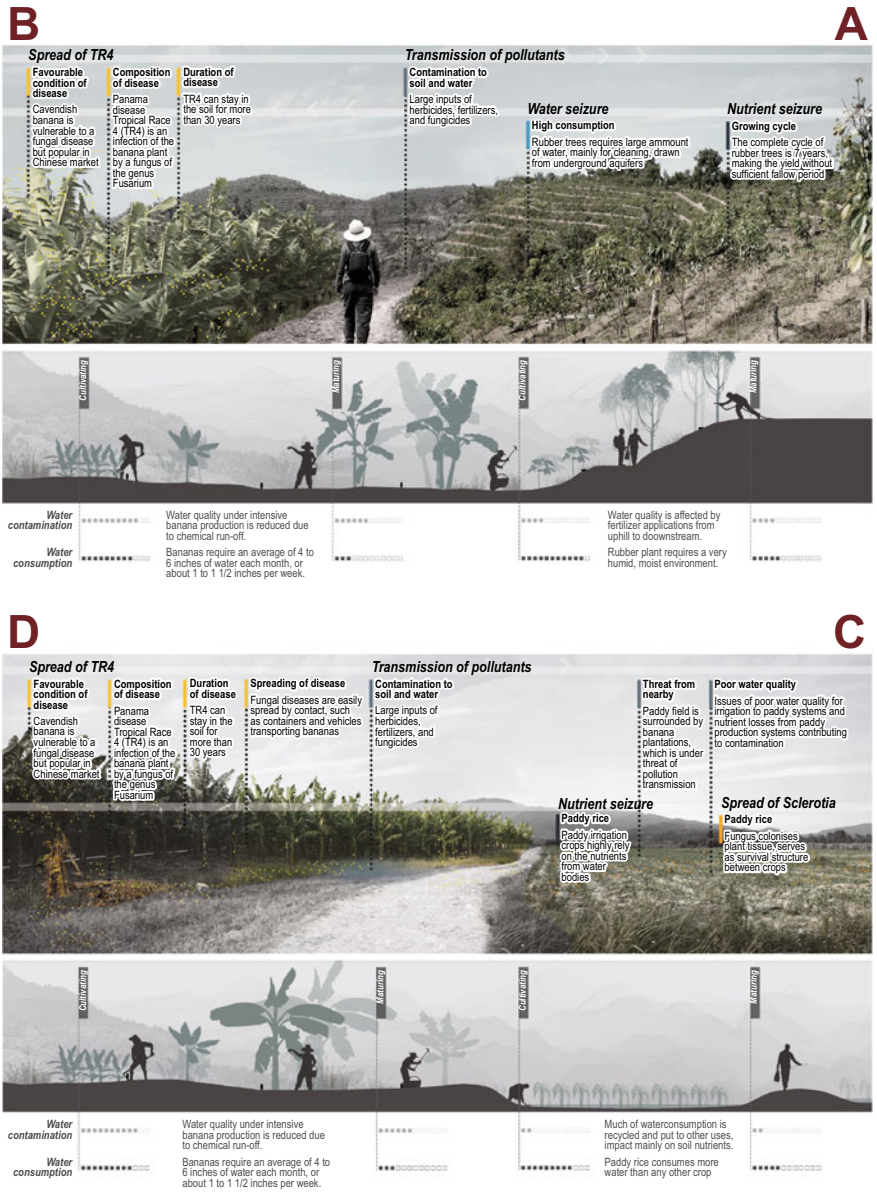


Fig. 21 Main sources, types and relative significance of high water consumption and agricultural pollution transmission and accumulation between banana plantations, rubber plantations, and paddy rice

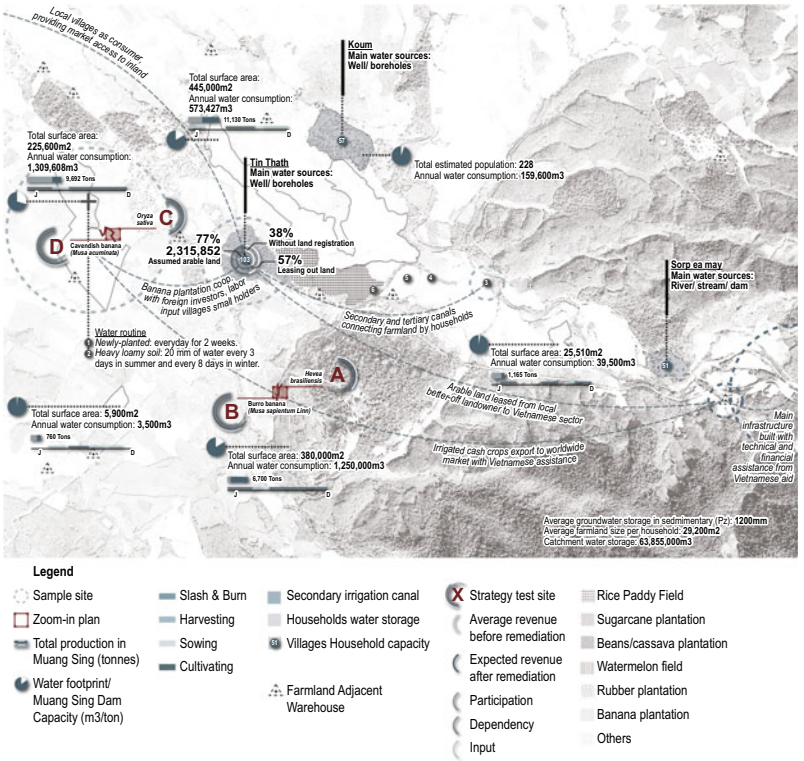


Fig. 22 Agricultural water provision and consumption across key producer-production types

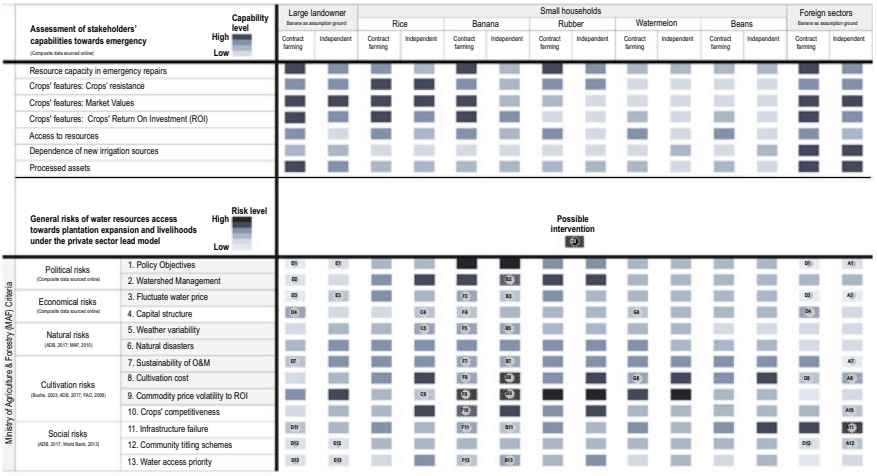


Fig. 23 Large- and smallholder water users' capabilities across the dominant cash crops grown in the Muang Sing Valley and their associated risks, as described by 13 categories of political, economic, natural, cultivation and social risks

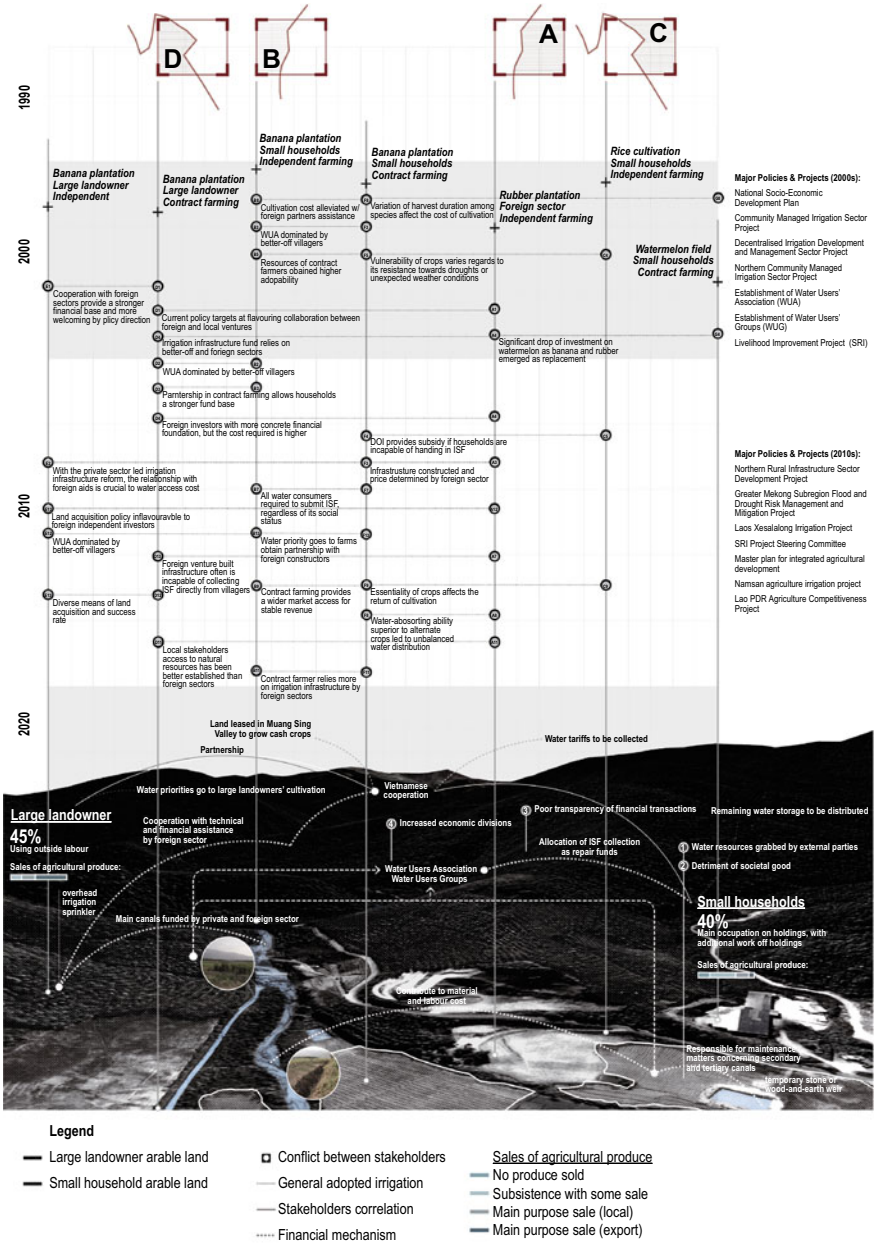


Fig. 24 Major agro-economic policies and projects and the different land genealogies of key producer-production types

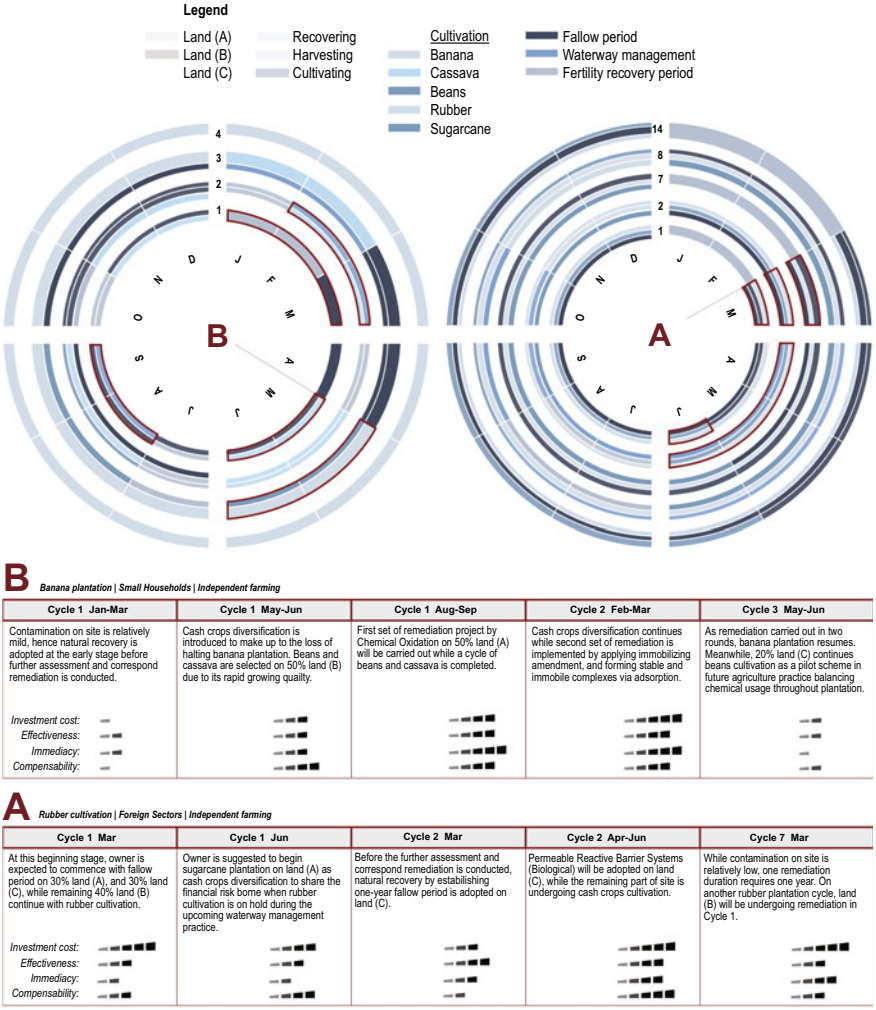
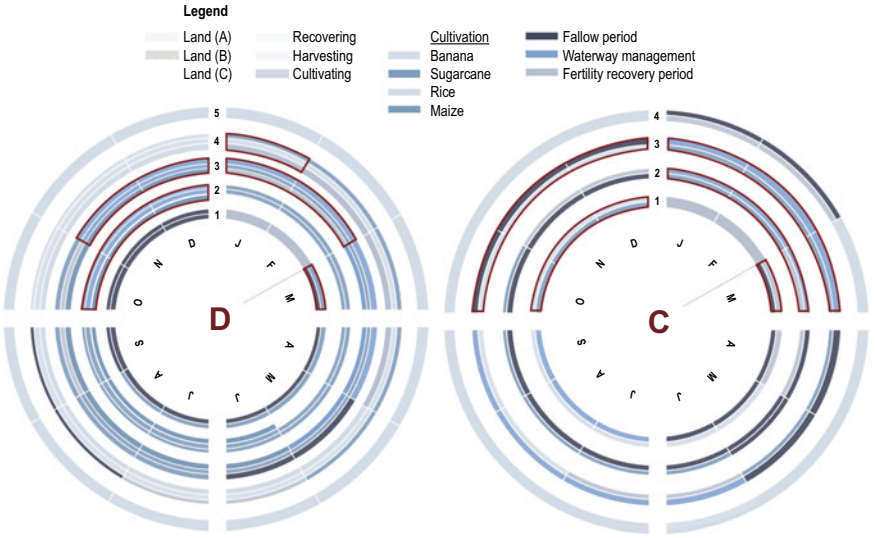


Fig. 25 Cash crop planting cycles, comparing relative investment cost, effectiveness, immediacy, and compensability for: (A) Foreign-operated rubber plantations; and (B) Smallholder banana plantations



D *Banana plantation | Large landowner | Contract farming*

Cycle 1 Mar	Cycle 2 Oct-Dec	Cycle 3 Jan-Feb	Cycle 3 Nov-Dec	Cycle 4 Jan
At this beginning stage, owner is expected to conduct cash crops diversification. Identifying 80% land (A) for fallow period, while the other 20% land (B) carry on with sugarcane cultivation.	As the sugarcane cultivation is stabilizing, the owner is more capable of sparing effort on conducting waterway management practices, in this case, chemical oxidation for stage one remediation.	Alongside with the remediation introduced, the owner is recommended to continue with tradition fallow practices for soil and groundwater recovery on land (B) while land (A) is undergoing stage one remediation.	As contamination level is relatively high in this site, stage two of remediation will be carried out as a long-term solution by installing biological in-situ techniques and permeable reactive barrier systems.	While remediation construction is being completed consecutively, the site requires a period to fallow and ready to begin another cycle for banana plantation.
Investment cost:				
Effectiveness:				
Immediacy:				
Compensability:				

C *Rice cultivation | Small households | Contract farming*

Cycle 1 Mar	Cycle 1 Oct-Dec	Cycle 2 Jan-Mar	Cycle 3 Jan-Mar	Cycle 3 Oct-Dec
At this beginning stage, owner is expected to continue with original cultivation of paddy rice production on 60% land (B) while the remaining 40% land (A) will carry on with traditional fallow period.	After natural recovery, cash crops diversification of maize on land (A) will being before the implementation of waterway management practices by phytoextraction technology.	Stage one of remediation project will be conducted on land (B) with chelate-assisted phytoextraction, which is effective for low-to-moderately contaminated soils and groundwater contamination risk.	While land (A) is adopting cash crops diversification to balance financial burden, land (B) is to carry out stage two of the project through microbial-assisted phytoextraction as a prevention for future contamination.	As the remediation construction stabilizes, land (A) is to begin the resumption of rice cultivation and land (B) will do so after fallow period by natural recovery.
Investment cost:				
Effectiveness:				
Immediacy:				
Compensability:				

Fig. 26 Cash crop planting cycles, comparing relative investment cost, effectiveness, immediacy, and compensability for: (C) Smallholder paddy rice alternating with cash crop contract farming; and (D) Large landowner cultivating bananas via contract farming

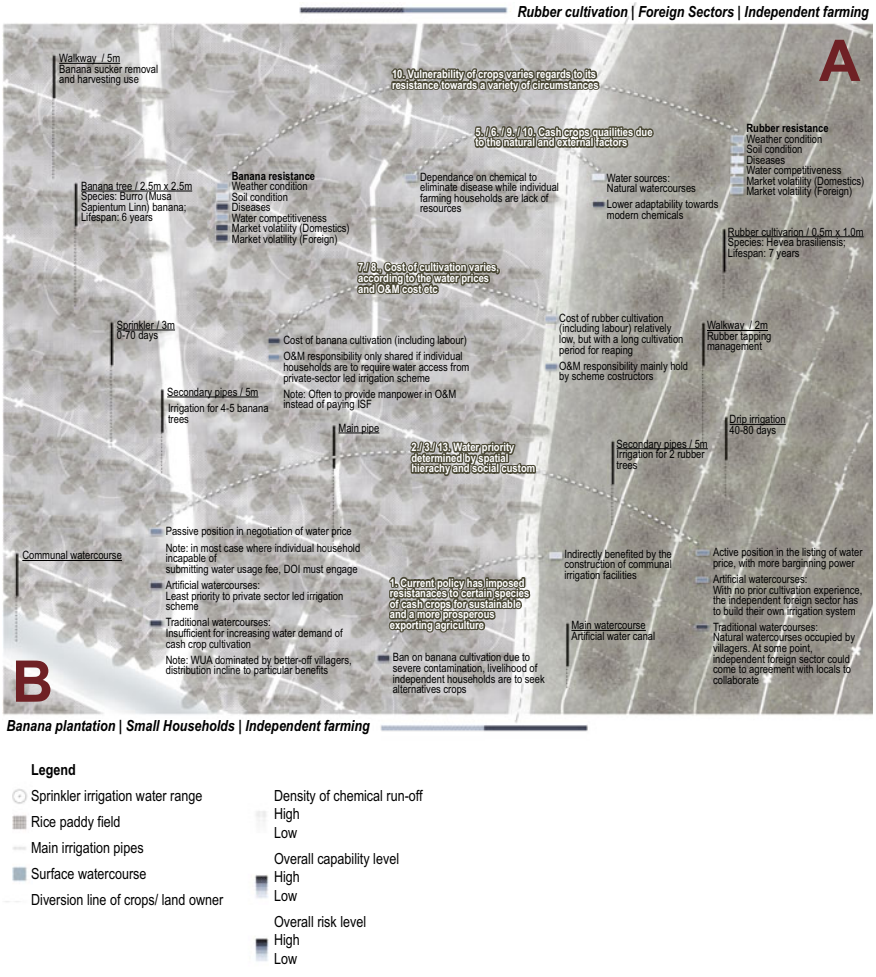


Fig. 27 Spatial synthesis of key factors in water usage and agricultural productivity for: (A) Foreign-operated rubber plantations; and (B) Smallholder banana plantations

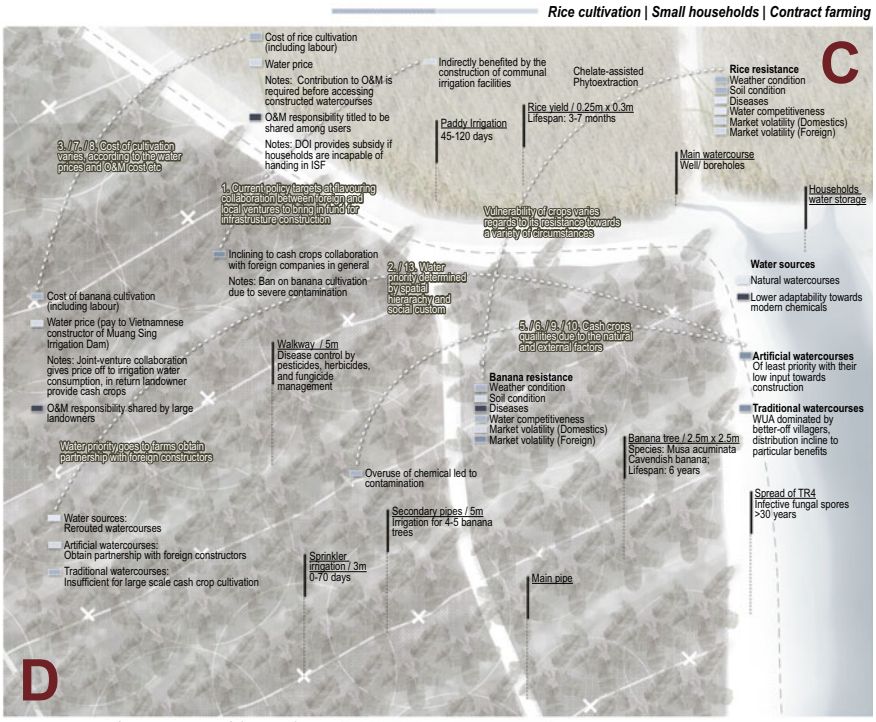


Fig. 28 Spatial synthesis of key factors in water usage and agricultural productivity for: (C) Smallholder paddy rice alternating with cash crop contract farming; and (D) Large landowner cultivating bananas via contract farming

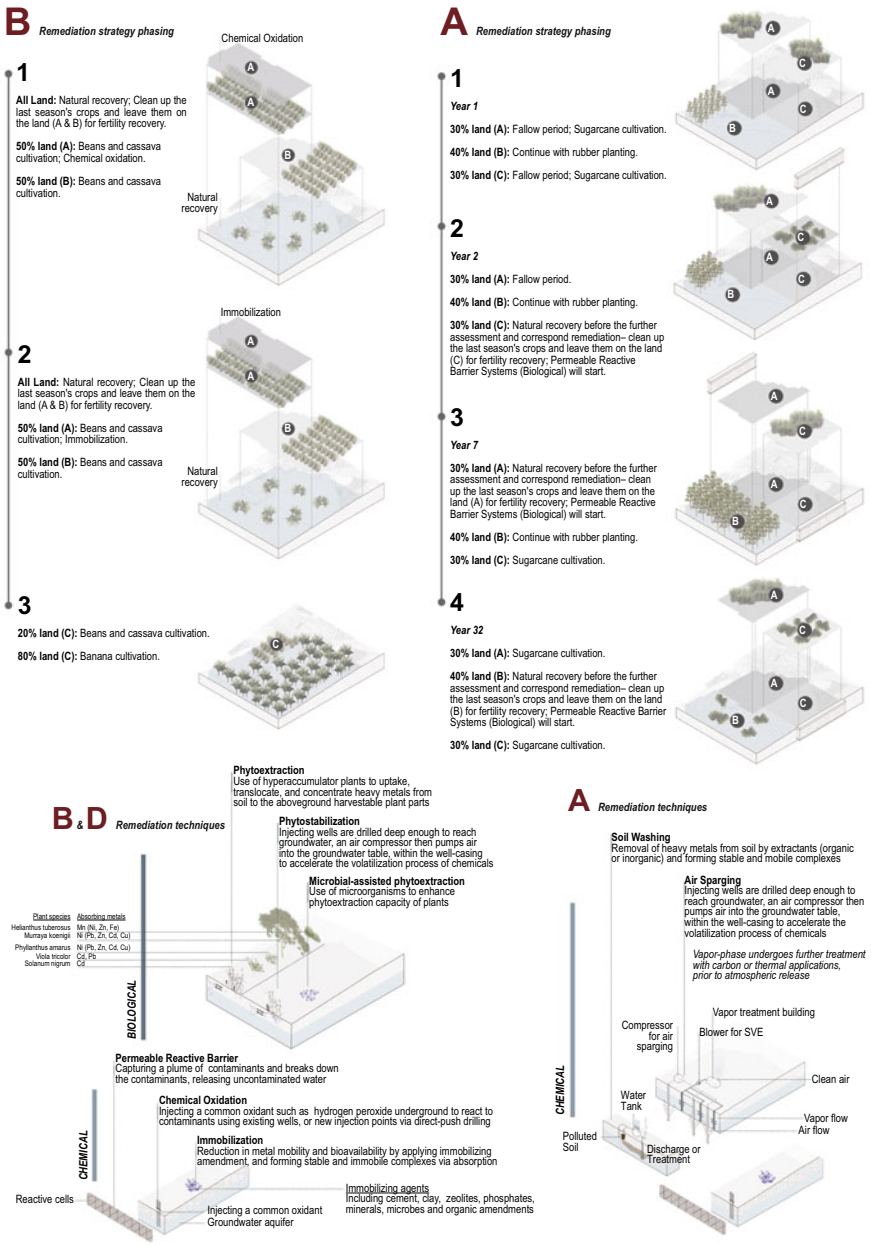


Fig. 29 Land remediation techniques and phasing strategy for: (A) Foreign-operated rubber plantations; and (B) Smallholder banana plantations

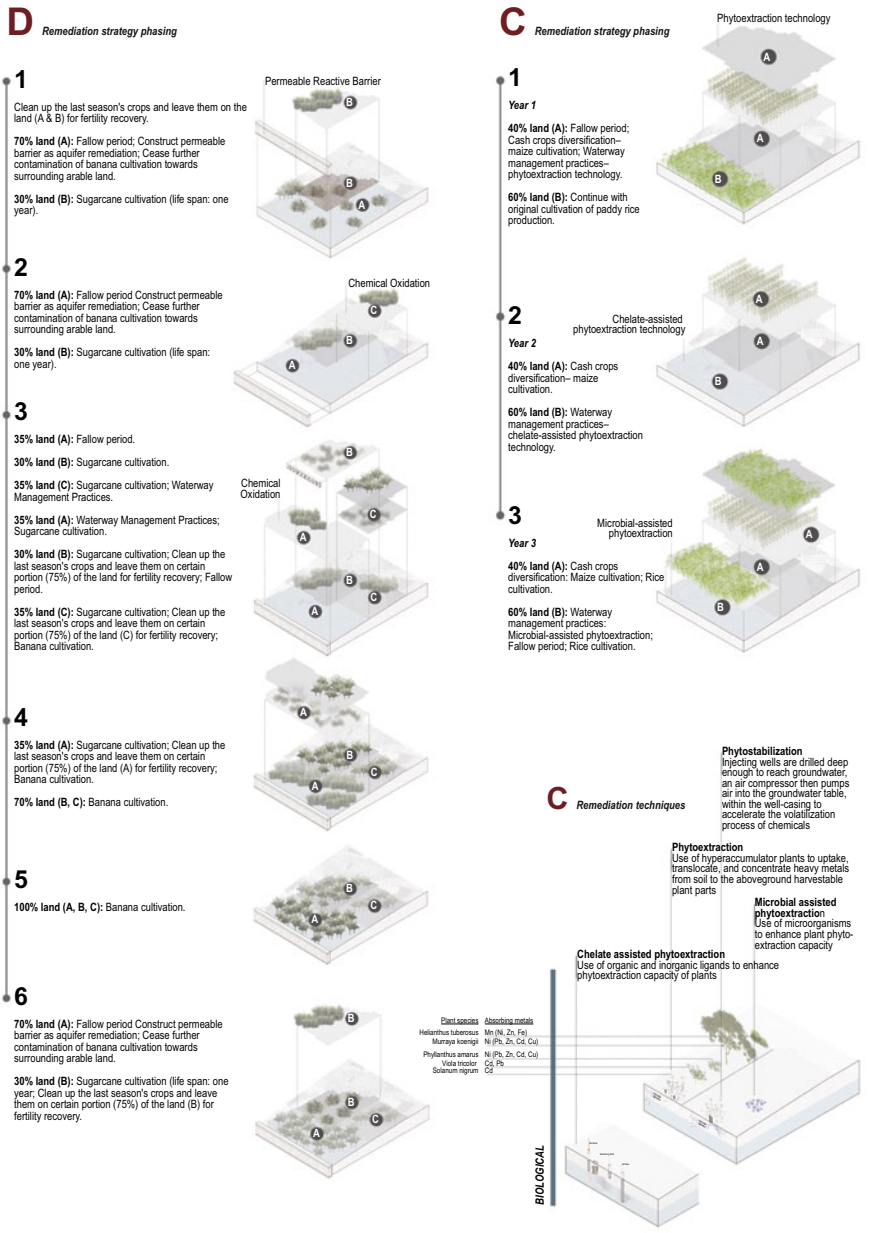


Fig. 30 Land remediation techniques and phasing strategy for: (C) Smallholder paddy rice alternating with cash crop contract farming; and (D) Large landowner cultivating bananas via contract farming

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Chapter 7
Chinese Mass Nature Tourism and Ecotourism

1 Introduction

Building on the discourses of the "politics of land-use planning" and "frontier resourcification" examined in Chap. 4, this chapter features two strategic planning proposals that engage the ideological and practical frictions between Chinese mass nature tourism and ecotourism.

Mass nature tourism is a model employed by China's southwestern frontier provinces such as Yunnan since the early 2000s (Zinda, 2014). Conceived and implemented as part of the Chinese central government's long-term Great Western Development Strategy launched in 2000 that aims to raise economic standards in western China, mass nature tourism is a development tool for some of the most remote frontier regions characterized by "adverse" natural conditions, "underdeveloped" infrastructure and a largely "impoverished" population (State Council of the People's Republic of China, 2000). Mass nature tourism is driven by an economic ideology that appropriates an "impoverished" region and its population as resources for development in the name of poverty alleviation, with tourism zoning carried out based on the suitability of land for natural and cultural commodification.

In recent years, the Chinese model of mass nature tourism has been introduced, in parallel with other types of economic development, into northern Laos, notably within the country's newly established Special Economic Zones (SEZ) (Figs. 1, 2, 3 and 4). For example, Chinese and Lao mainstream media are promoting Boten and Luang Prabang, two of Laos's major tourist attractions and key stations on the China-Laos Railway, as examples of the "international modern new town with outstanding natural and cultural landscape" (Investvine, 2019; Lao National Television, 2016; Ta Kung Pao, 2019). A ten-fold increase in tourist numbers is projected on completion of the China-Laos Railway.[1] The new town or SEZ plans of Boten and Luang Prabang both set out a spatial order maximizing the commodification of nature and

[1] Authors' conversation in March 2018 with members of Luang Prabang's network of hospitality management.

A. S. Kelly and X. Lu, *Critical Landscape Planning during the Belt and Road Initiative*, https://doi.org/10.1007/978-981-16-4067-4_7

culture, where tourism and resort zones include existing natural rivers and local ethnic villages as well as newly constructed artificial lakes and cultural demonstration villages (Architectural Design & Research Institute of SCUT, 2016; Planning & Design Center of Haicheng Group, 2018).

These large-scale tourism programs being rapidly implemented in Laos may arguably prove economically viable but unavoidably raise ethical, cultural and environmental questions that call for urgent attention (See, for example, Hall & Ringer, 2000; Travers, 2008; Kyophilavong et al., 2018). The two strategic planning proposals included in this chapter are: *Negotiating with ethno-ecology: Landscape management strategies for northern Laos's ecotourism boom*; and *Living heritage: Redefining protections for urban expansion in Luang Prabang*. Focusing on Boten and Luang Prabang respectively, these two proposals challenge an economic-driven and object-based mass nature tourism model and investigate the possibility of a site-, culture-, and landscape-sensitive ecotourism approach. Both proposals begin with an analysis of the spatial and temporal patterns of key landscape systems such as the watershed, food-shed, waste-shed and viewshed that are crucial for enabling the establishment of tourism programs and for sustaining the local livelihoods and cultural practices that are indispensable assets of authentic cultural landscape experiences. Based on these analyses, both projects identify site-specific tourism development capacities, guiding the scale and speed of development to minimize conflict between local communities and tourism, while maximizing tourism-related ecological and social benefits.

Fig. 1 The deserted Golden Boten City (GBC), a former casino boomtown on the China-Laos border, has experienced rapid transformation since 2016. This photograph was taken from the older quarter of the GBC, once home to several restaurants serving exotic and endangered wildlife, toward the Boten Special Economic Zone's "twin-towers" in the newly established central business district. Photo by Xiaoxuan Lu (March, 2019)

Fig. 2 Speed of construction within the Boten Special Economic Zone has accelerated since the inauguration of the Lao section of the Yunnan-Singapore railway, commonly called the China-Laos Railway. This photograph captured the ongoing construction and large-scale leveling of the landscape throughout the zone. Photo by Xiaoxuan Lu (March, 2019)

Fig. 3 Hot-air ballooning is increasingly popular in Vang Vieng, a small town on the Nam Song river surrounded by some of Laos's most iconic karst limestone mountains, located approximately halfway between Vientiane and Luang Prabang. Anticipating the opening of the railway, the current Lao tourism boom not only generates revenue and employment but unprecedented pressure on both urban and natural environments and local livelihoods. Photo by Xiaoxuan Lu (March, 2018)

Fig. 4 According to its main developer, Haicheng Group, the Boten Special Economic Zone will become a China-ASEAN tourist hub with sufficient capacity to cater to an expected 25 million people once the China-Laos Railway is completed in 2021. This photograph shows the 1:1,000 panorama model on display at the Boten Exhibition Center, marked with the locations of the newly planned "Ancient Lao City," "Boten Lake," and "Boten Central Buddhist temple." Photo by Brian Cheang (March, 2019)

2 Negotiating with Ethno-Ecology: Landscape Management Strategies for Northern Laos's Ecotourism Boom

Considering the rapid growth of ecotourism in northern Laos and the often-negative impacts of tourism development on indigenous communities, this project deploys ethno-ecology as a tool to negotiate with tourism developers for the protection and territorial integrity of cultural landscapes. Without critical awareness, the tourism planning process often reduces indigenous peoples to primitive caricatures and replaces local culture with homogenized cultural representations (Salazar, 2009). In response to mainstream practices in the region, this project advocates for an understanding of local knowledge via ethno-ecology, advancing alternative metrics of cultural and ecological value and mechanisms for landscape management.

Ethno-ecology is defined as the organizational and cognitive relationships that each local culture has with its non-human environment (Prado & Murrieta, 2015). While ethno-ecology suggests a value system to be protected, it is also an adaptive system capable of determining the capacity of the landscape to accommodate new people and new programs, even including the substantial pressures for mass tourism development in southwestern China and northern Laos. Nuanced and bespoke calculations of local "livelihood-sheds," such as viewshed and foodshed, are used in this project to understand, illustrate, and advocate for the spatiotemporal patterns of

humans in their environment. Two villages in southwestern China and two villages in northern Laos are deployed as testing grounds for exemplifying the diversity of the ethno-ecology in the China-Laos border region and the impacts induced by tourism development (Figs. 5, 6 and 7).

In southwestern China, Mandan village of the Dai people and Qingkou village of the Hani people have confronted tourism development over the past several decades and reveal the processes of exclusion and fragmentation embedded in mainstream tourism planning (See, for example, iSkytree Tourism Planning, 2013; Sina, 2015; Guipu, 2016; Liu & Ye, 2019). Despite focusing on different aspects of ethno-ecology, both cases exhibit the intertwining of local spiritual and agricultural practices in generating the cultural landscape. Tourism planning here has greatly oversimplified each village's cultural realms and excluded large swaths of their cultural territories because of object-oriented and profit-driven rationales (Figs. 8, 9, 10, 11, 12 and 13).

Insights drawn from these two ecotourism villages in southwestern China are then translated to Boten and Nalan villages in northern Laos, both under tourism development pressures from Chinese and Thai capital.[2] Such translation helps predict potential damages to the integrity of cultural landscapes and helps devise landscape-oriented and culture-driven means of negotiation with investors and tourism planners. In the case of Boten village, now within the rapidly developing Boten Special Economic Zone, its historical salt production system is a renowned local tradition and highlight in the current tourism plan (Planning & Design Center of Haicheng Group, 2018). This village is strategically selected for its potential in calculating and visualizing Boten's cultural territory and ideal tourism capacity (Figs. 14, 15, 16, 17, 18 and 19). In the case of Nalan village, its system of rice and rice wine production is a cultural practice strategically chosen here for the quantification and visualization of a cultural territory closely tied to the practice of shifting cultivation. Nalan partially falls within the Nam Ha National Protected Area, and shifting cultivation is one of the most misunderstood and controversial forms of land use (Figs. 20, 21, 22, 23 and 24) (Ducourtieux et al., 2005).

Indigenous practices and tourism development are not necessarily exclusive to one another. An adaptive landscape that caters to traditional practices and tourism programs can allow visitors to experience authenticity while securing the dignity and strengthening local people to shape and maintain their cultural landscapes.

The design proposal "Negotiating with ethno-ecology: Landscape management strategies for northern Laos's ecotourism boom" and accompanying illustrations were developed by Yani Zhang Mengting and William Wei Gongqi during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong*.

[2] Author's conversation in March 2019 with manager of Boten Special Economic Zone Planning Exhibition Center.

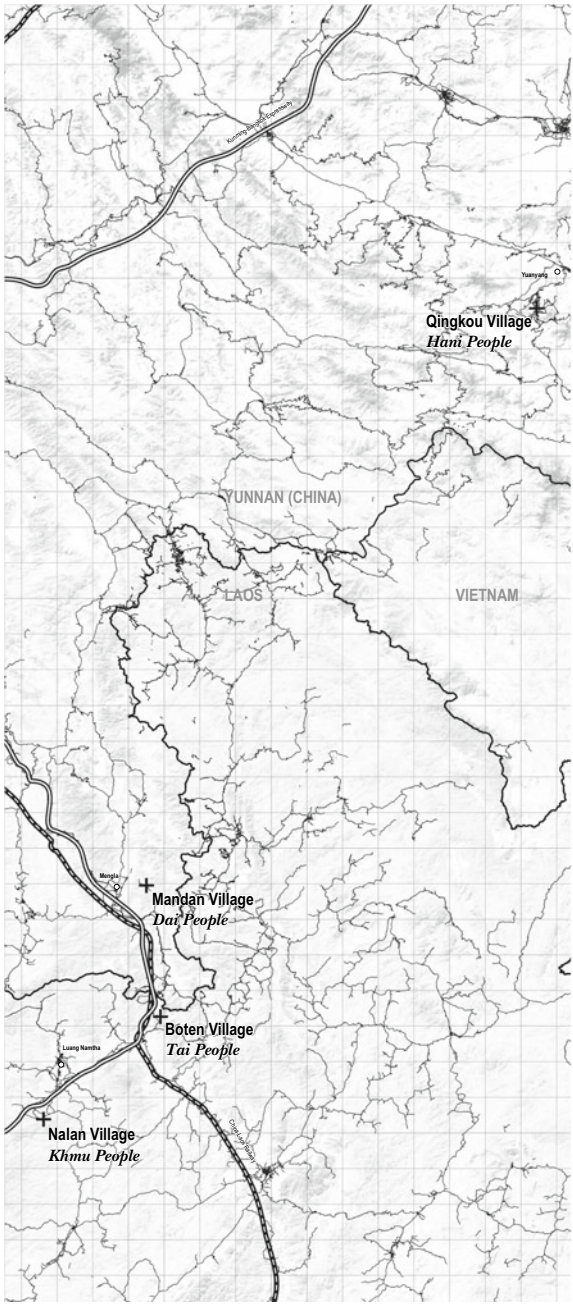


Fig. 5 Two villages in southwestern China and two villages in northern Laos are deployed as testing grounds for exemplifying the diversity of the ethno-ecology in the China-Laos border region and the impacts induced by tourism development

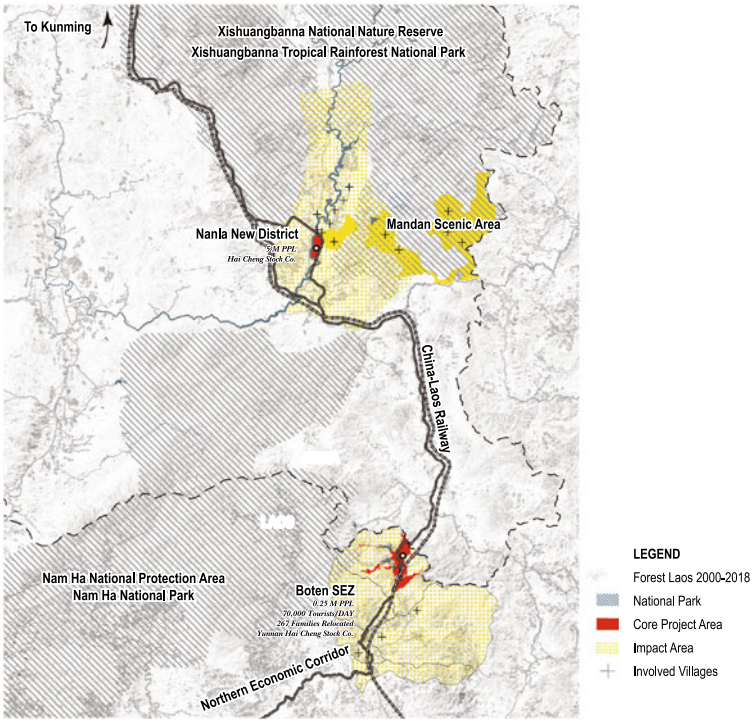


Fig. 6 Mandan village and Boten village are both situated within development enclaves in the China-Laos borderlands, namely Mengla-Mohan Key Development and Opening Up Experimental Zones in China and Boten Beautiful Land Special Economic Zone in Laos

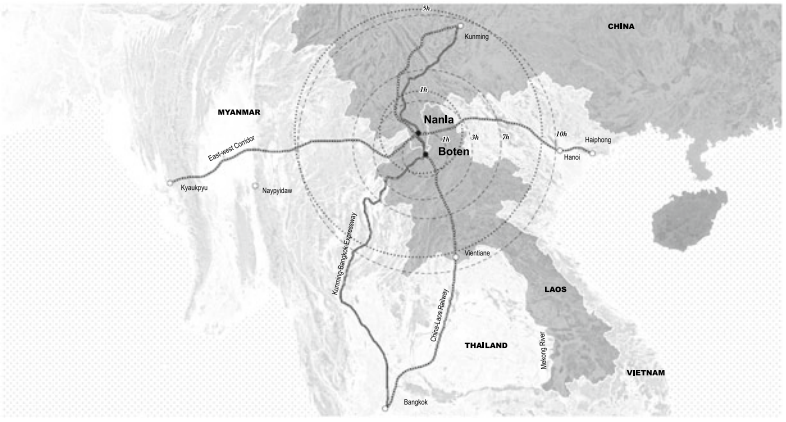


Fig. 7 Mengla and Boten are branded as the "Golden Crossroads of Five-Country Collaboration," and this map represents an imagined geography of the China-Laos-Myanmar-Thailand-Vietnam economic regional affiliation promoted by the BRI

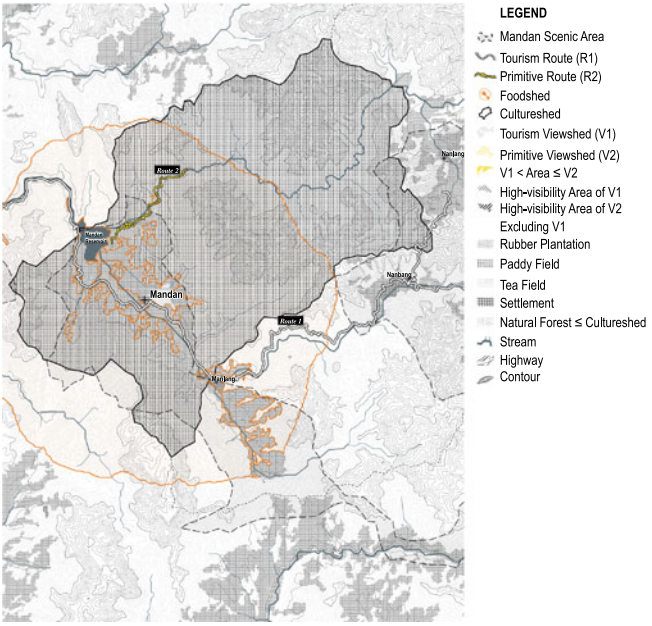


Fig. 8 Focusing on fengshui woodlands, this detailed calculation of local "livelihood-sheds" reveals that the cultural territory of Dai people at Mandan village is significantly larger than the area that falls within the boundary delineated by the tourism planner

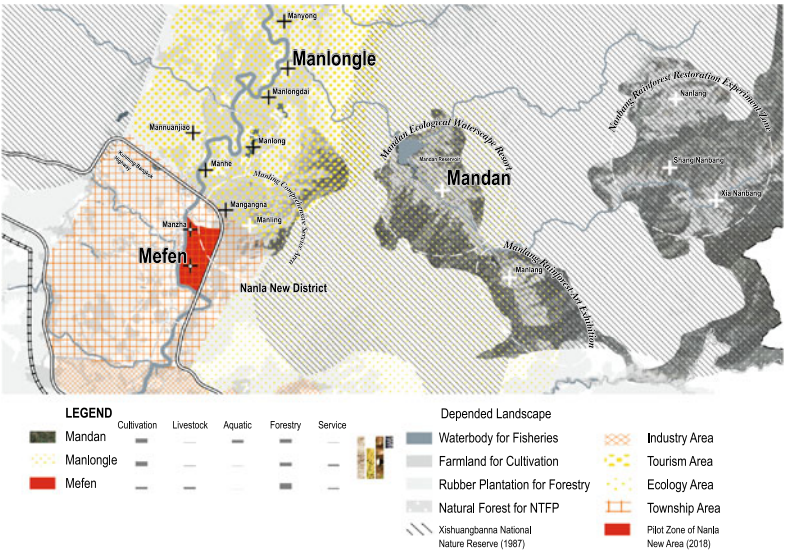


Fig. 9 The exclusion and fragmentation of cultural territory of Dai people at Mandan village offers a glimpse of the rapidly transforming regional landscape within Nanla New Town established on the east bank of the Nanla River

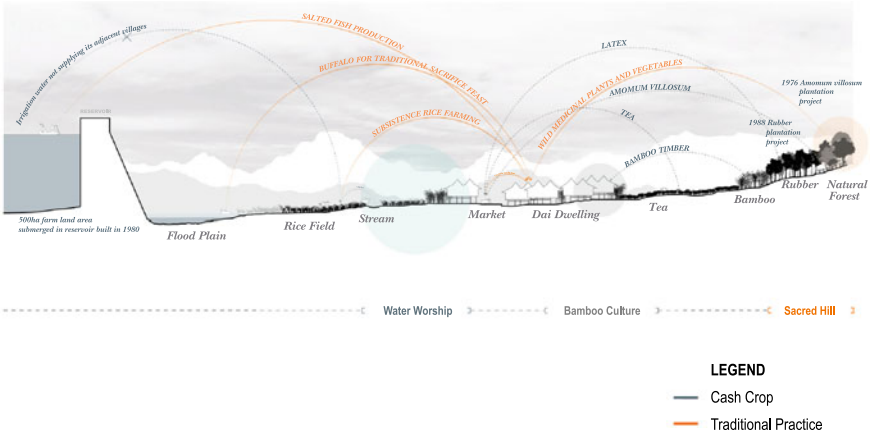


Fig. 10 The intertwining of local spiritual and agricultural practices in generating the cultural landscape at Mandan village of the Dai people

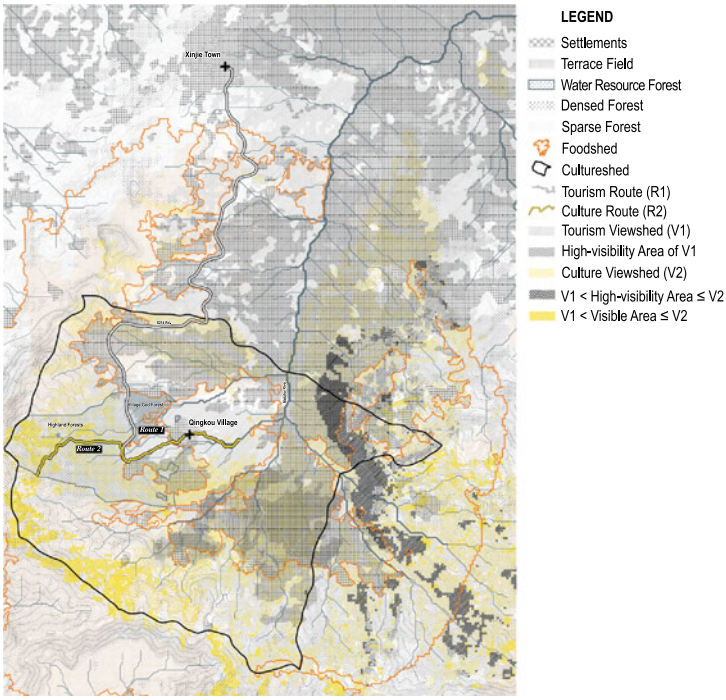


Fig. 11 Focusing on spiritual and agricultural use of water, this detailed calculation of local "livelihood-sheds" reveals that the cultural territory of Hani people at Qingkou village is significantly larger than the area that falls within the boundary delineated by the tourism planner

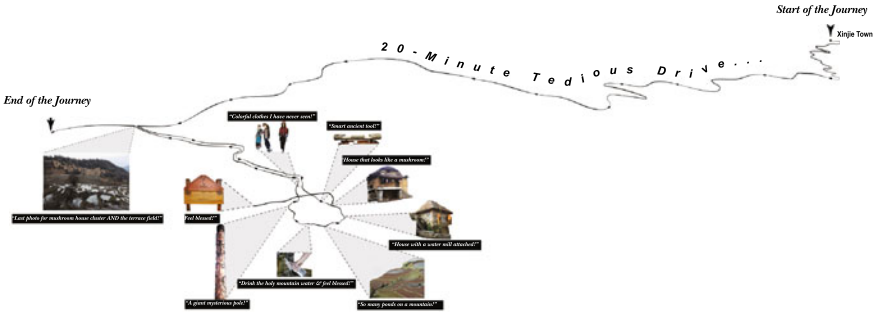


Fig. 12 Mainstream tourism planning has greatly oversimplified Qingkou village's cultural realm and excluded large swaths of the cultural territory or Hani people because of object-oriented and profit-driven rationales

Fig. 13 The intertwining of local spiritual and agricultural practices in generating the cultural landscape at Qingkou village of the Hani people

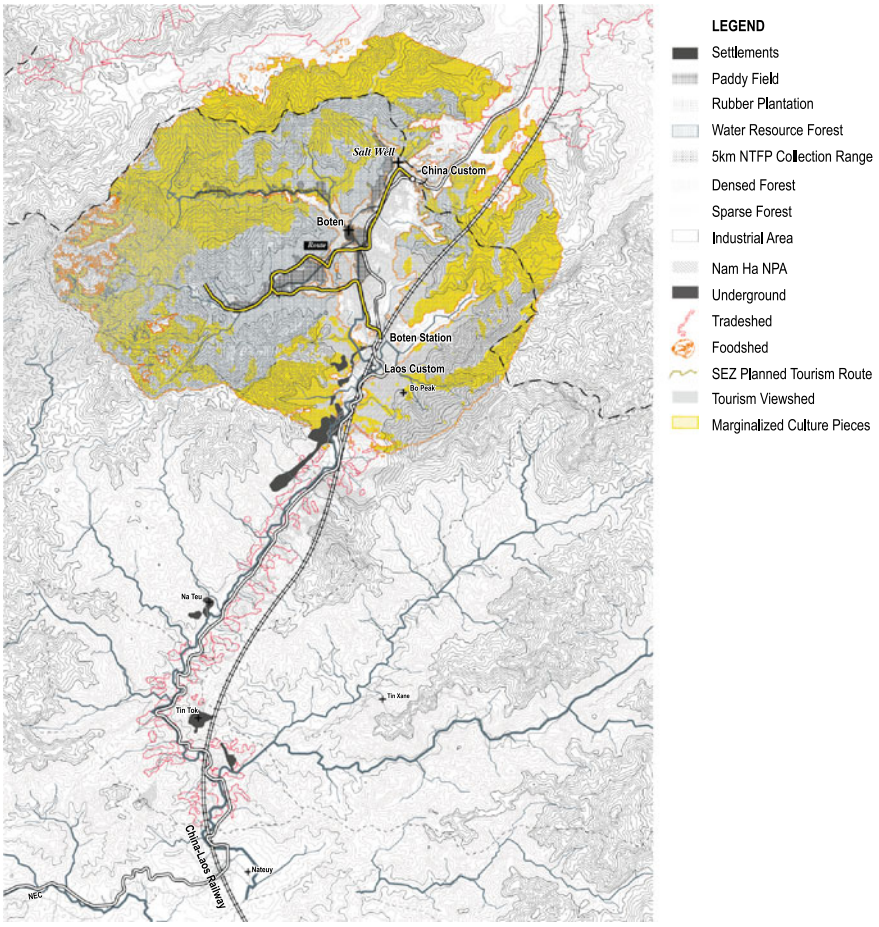
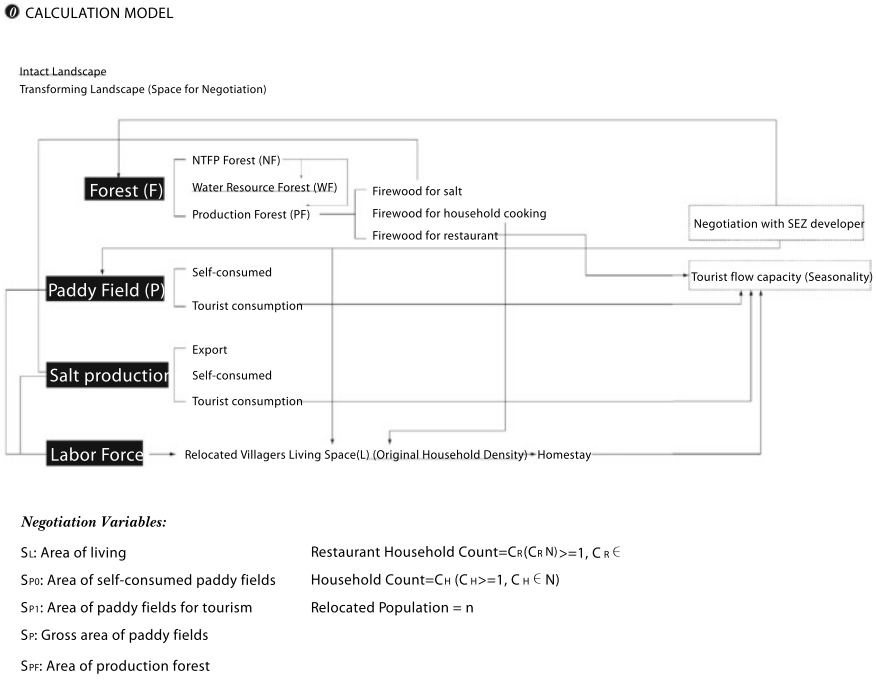


Fig. 14 Insights drawn from two ecotourism villages in southwestern China are translated to Boten village within the rapidly developing Boten SEZ in Laos to predict mainstream tourism planning's potential damages to the integrity of cultural landscapes and to devise landscape-oriented and culture-driven means of negotiation with investors and tourism planners



Negotiation Variables:

S_L: Area of living

S_{P0}: Area of self-consumed paddy fields

S_{P1}: Area of paddy fields for tourism

S_P: Gross area of paddy fields

S_{PF}: Area of production forest

Restaurant Household Count=$C_R(C_R N)>=1, C_R \in$

Household Count=C_H ($C_H>=1, C_H \in N$)

Relocated Population = n

Fig. 15 Calculation of tourism capacity and inevitable landscape consumption in culture tourism

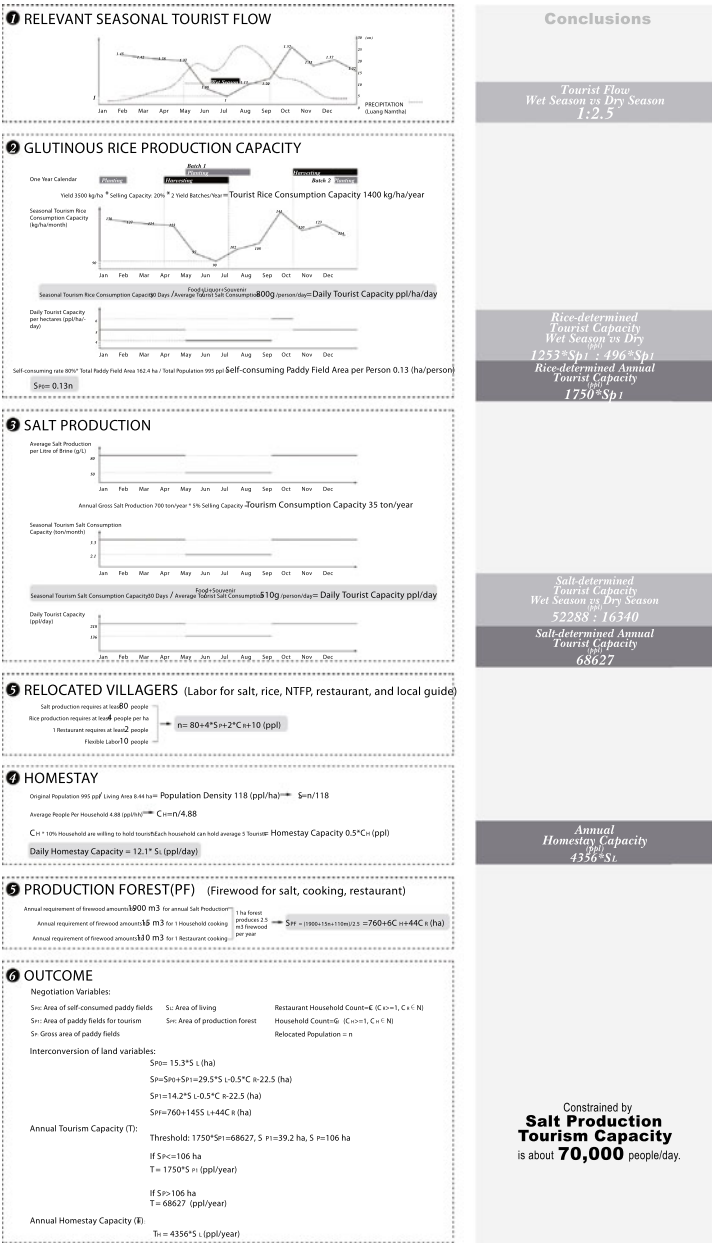


Fig. 16 Given that salt production is a renowned local tradition and is highlighted in the current tourism plan, it is strategically chosen here for the quantification and visualization of Boten's cultural territory and ideal tourism capacity

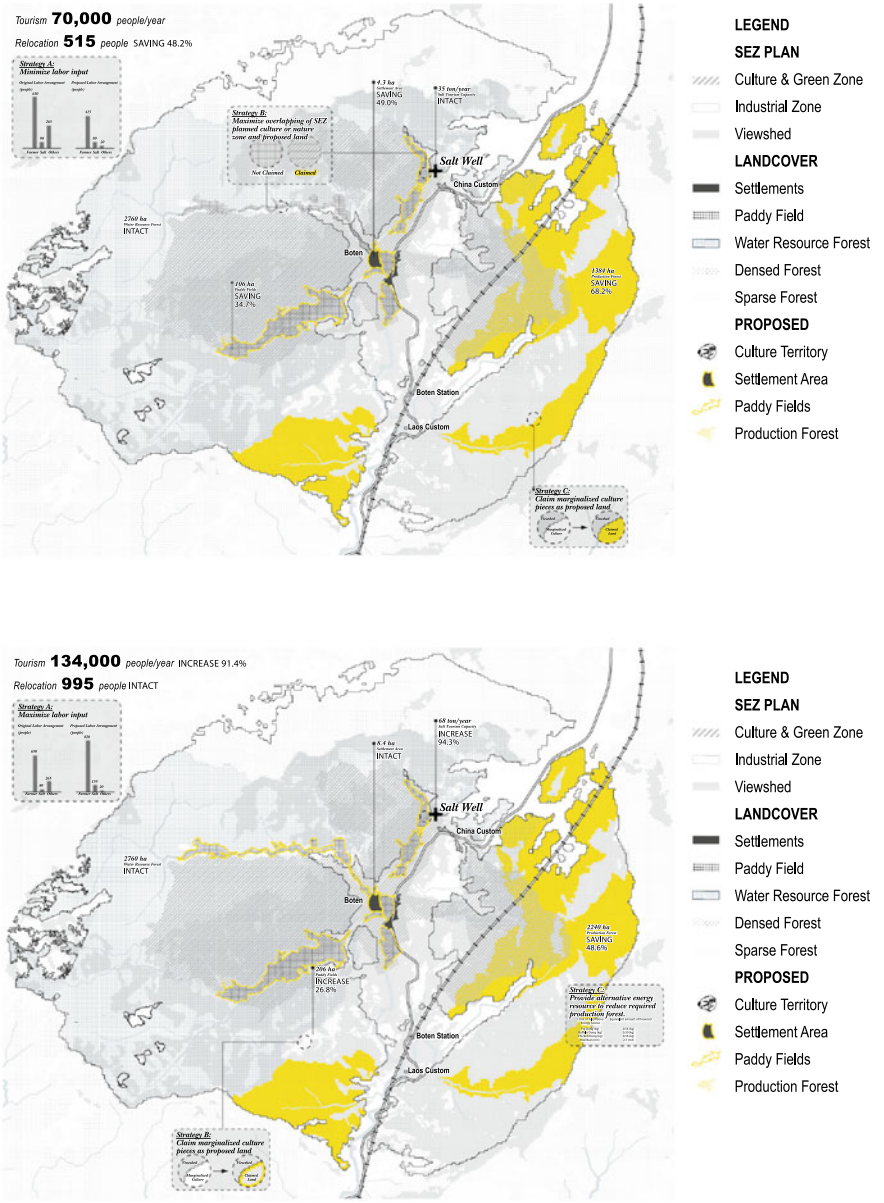


Fig. 17 Through quantification and visualization, two schemes are developed for Boten village to negotiate with tourism developers for the protection and territorial integrity of cultural landscapes

Fig. 18 Experiencing a highly dynamic cultural landscape characterized by complex human-nature relationships

Fig. 19 Experiencing a landscape-oriented and culture-driven salt production system at Boten village

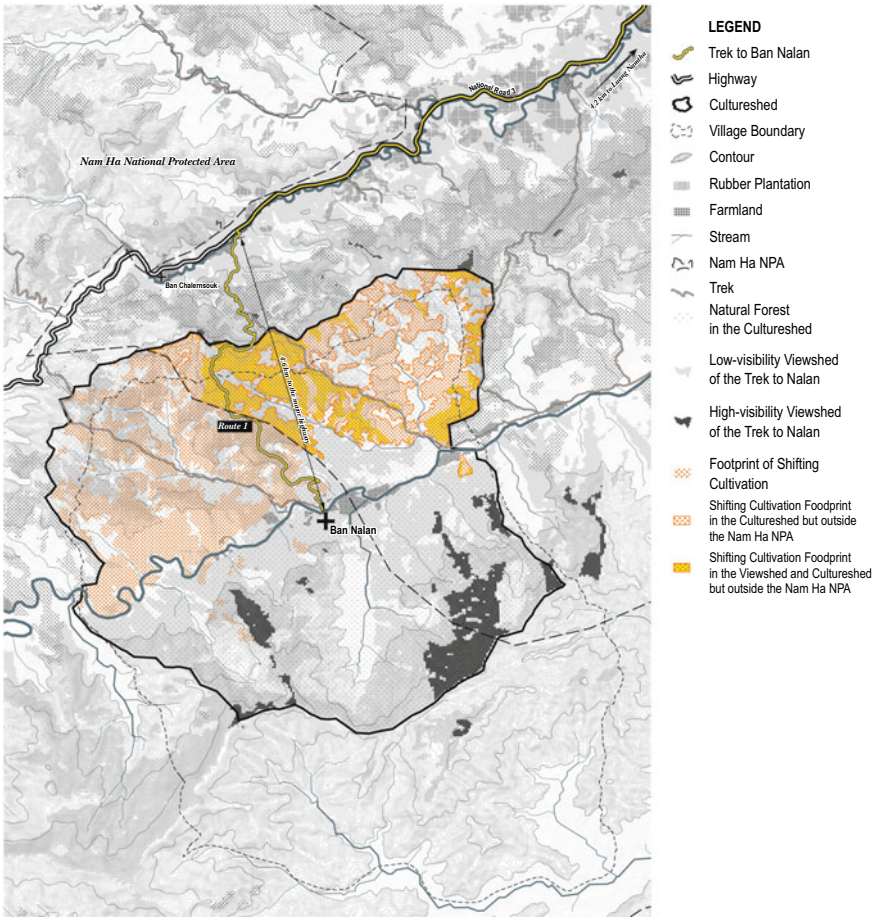


Fig. 20 Insights drawn from two ecotourism villages in southwestern China are translated to Nalan village, which partially falls within the Nam Ha National Protected Area, to predict mainstream tourism planning's potential damages to the integrity of cultural landscapes and to devise landscape-oriented and culture-driven means of negotiation with investors and tourism planners

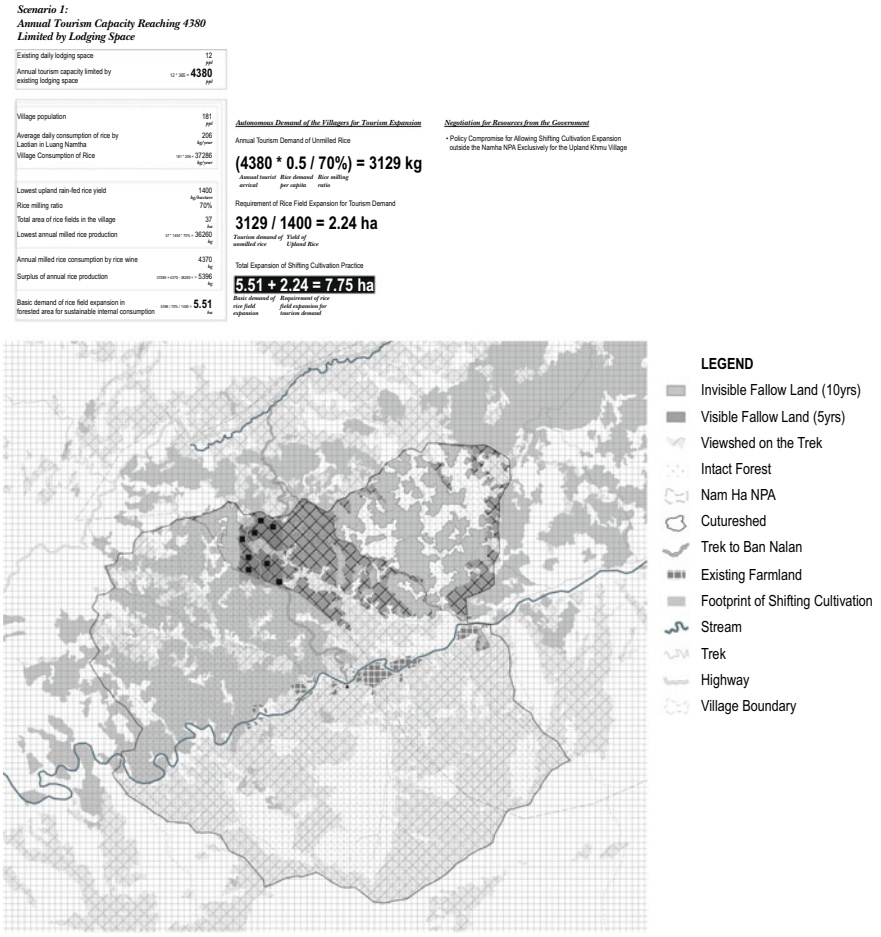


Fig. 21 Given that rice and rice wine production are important cultural practices for Khmu people and are highlighted in existing ecotourism programs, they are strategically chosen here for the quantification and visualization of Nalan's cultural territory and ideal tourism capacity

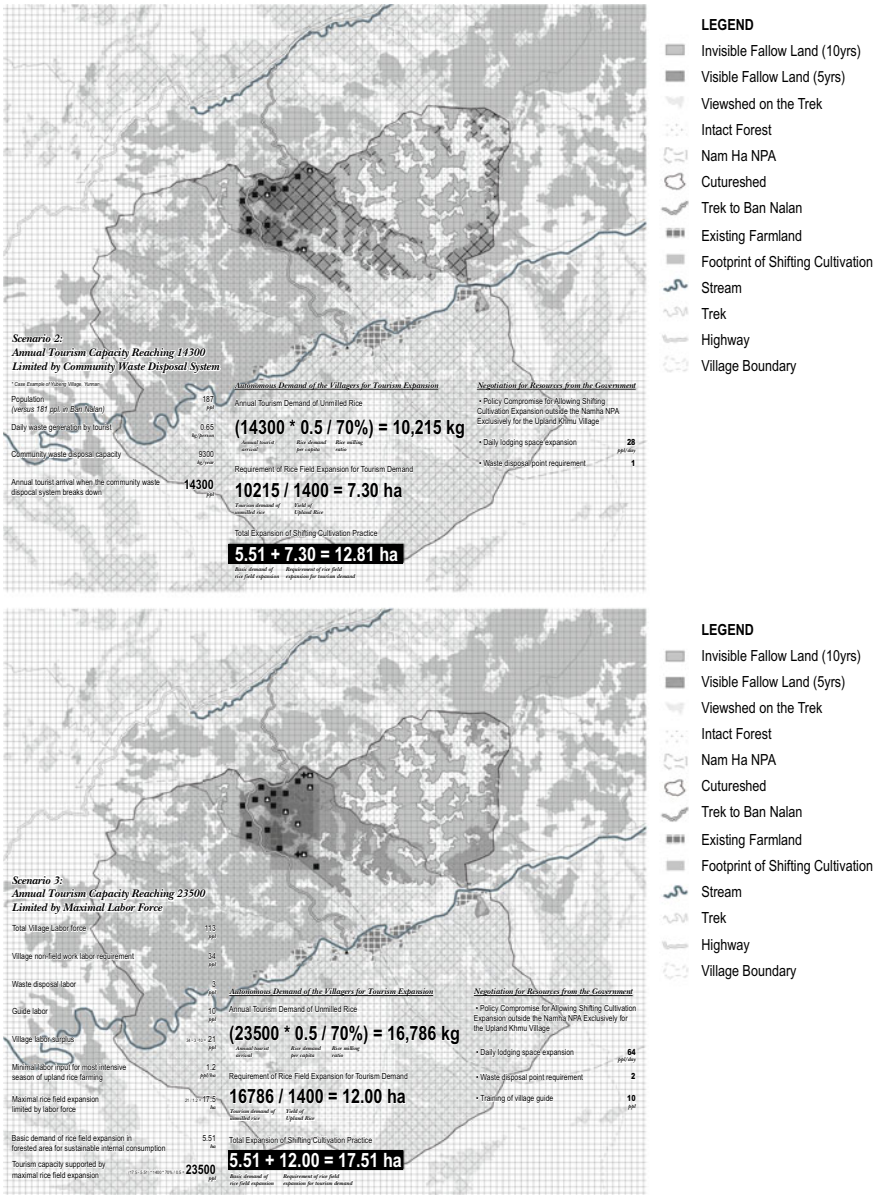


Fig. 22 Through quantification and visualization, three scenarios are developed for Nalan village to negotiate with tourism developers for the protection and territorial integrity of cultural landscapes

Fig. 23 Experiencing the dynamics of a shifting cultivation landscape, one of the most misunderstood and controversial forms of land use

Fig. 24 Experiencing a landscape-oriented and culture-driven rice and rice wine production system at Nalan village in Laos

3 Living Heritage: Redefining Protections for Urban Expansion in Luang Prabang

Anticipating the boom in urbanization in Luang Prabang that follows the opening of the China-Laos Railway, this strategic proposal foregrounds the insufficiency of a predominantly architecture-focused cultural heritage protection mechanism instituted by UNESCO and explores the potential for a landscape-oriented framework that defines and protects essential cultural landscapes in the region.

Situated in a valley at the confluence of the Mekong and Nam Khan rivers in north central Laos, Luang Prabang was an ancient royal capital and the current cultural center of the country (Reeves & Long, 2011). As Luang Prabang town experienced increasing social and environmental pressures from the growing influx of tourists since its designation as a UNESCO World Heritage site in 1995, the town and its expansive landscape are currently undergoing unprecedented changes induced by simultaneous rural–urban transformation and regional infrastructure expansion (Figs. 25 and 26). In addition to the expected ten-fold increase in the number of tourists visiting Luang Prabang once the China-Laos Railway begins operation at the end of 2021,[3] the pace of urbanization and deforestation is accelerating, especially along the railway. Considering the cultural significance of Luang Prabang, the importance of forest resources to local communities and the rapid urbanization of the region, immediate intervention is needed to protect the region's heritage, secure local livelihoods and curtail or redirect speculative development toward sustainable ends.

This proposal redefines regional landscape values and reflects on the spatial implications of this valuing system. UNESCO appraises Luang Prabang as a heritage site that "reflects the exceptional fusion of Lao traditional architecture and nineteenth and twentieth century European colonial style buildings" (UNESCO, 1995), and its protection measures are spatially reflected in two boundaries defining the core and buffer zone of the inscribed heritage property (Figs. 27 and 28). An exercise combining land use and viewshed analyses in the buffer zone and along the railway helps identify possible extents of vernacular landscapes with cultural and ecological value. These analyses reveal contradictions embedded in the UNESCO-delineated buffer zone. The current defined zone can abruptly exclude new capital-driven construction along with village use of forest resources that have cultural and livelihood significance. Consequently, this zone is not capable, either spatially or in land use management, of regulating land conversion and speculative development of Luang Prabang (Figs. 29 and 30) (UNESCO, 2013). Given that substantial land speculation is occurring and will expand further along the China-Laos Railway, which passes through a dozen local villages heavily dependent on agriculture, this project overlays predicted unregulated areas of urban expansion and viewsheds along the railway to identify strategic spaces for intervention.

[3] Authors' conversation in March 2018 with members of Luang Prabang's network of hospitality management.

The location of new railway stations, existing highways and terrain are key factors in predicting urban expansion areas (Fig. 31). Taking advantage of the mainstream narrative of offering visitors an "authentic experience" of Luang Prabang's cultural landscape, this proposal identifies areas of urban expansion within the viewshed along the railway that may degrade such experiences, which are regarded as crucial assets in the tourism industry (Figs. 32, 33, 34 and 35). Guided by this spatial framework, four multiscalar landscape strategies, namely reforestation, buffer planting, development regulation and alternative buffer zone demarcation, are proposed to mediate the socioenvironmental impacts of previous development projects, minimize potential spatial conflicts between the local and nonlocal use of resources, and mitigate foreseeable land speculation (Fig. 36). In addition, three landscape typologies are proposed to guide the spacing of new plantings and selection of plant species with cultural and livelihood significance (Figs. 37, 38 and 39).

While UNESCO's significant contributions to the protection of cultural heritage across the globe are undeniable, in the context of unprecedented socioenvironmental challenges faced by cultural heritage, such as that of Luang Prabang, a landscape framework characterized by a three-dimensional systematic analysis of a cultural territory is necessary, especially one shaped by cultural practices and with a critical definition of cultural landscape heritage that is alive and dynamic.

The design proposal "Living heritage: Redefining protections for urban expansion in Luang Prabang" and accompanying illustrations were developed by Haylie Shum Hiu Lam during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong.*

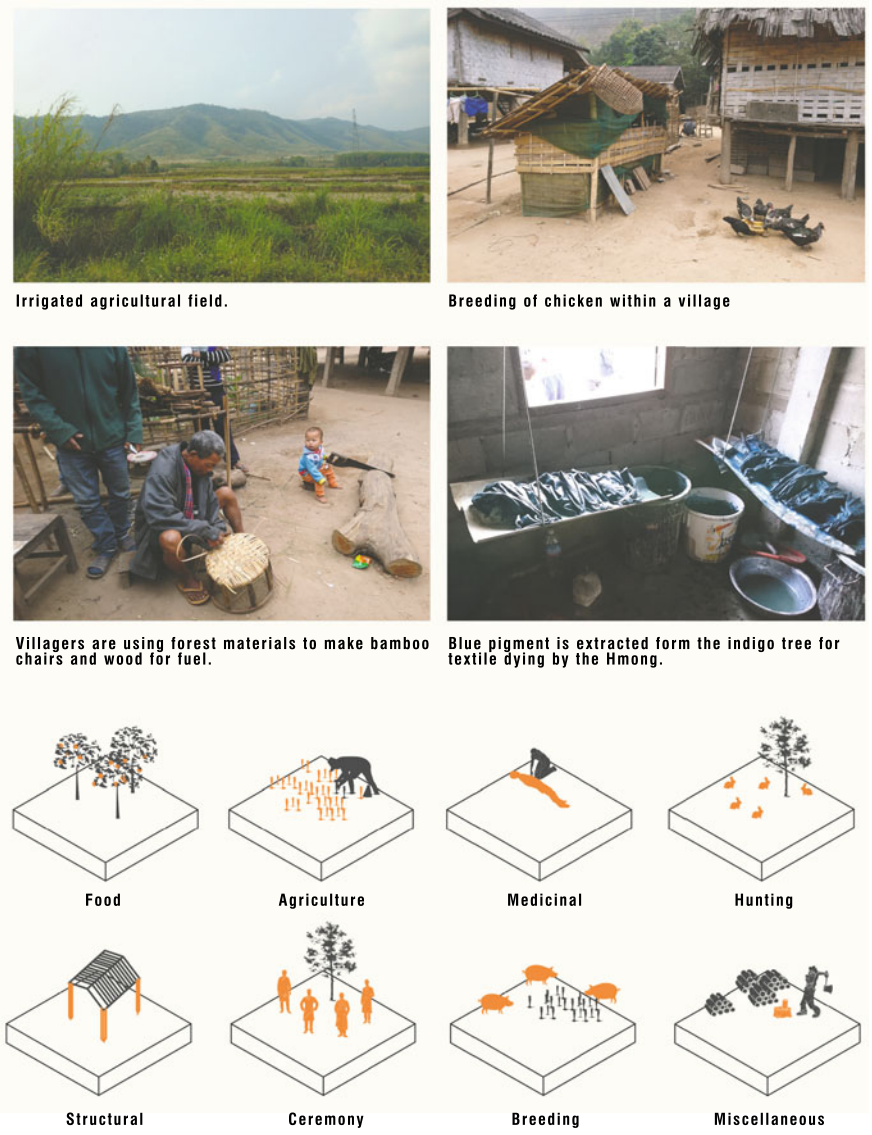


Fig. 25 Landscapes have always been a vital part of Lao culture. Two-fifths of Laos is forested, and the country's forests have provided a vast variety of landscape uses, including food, agriculture, medicinal, building and spiritual uses

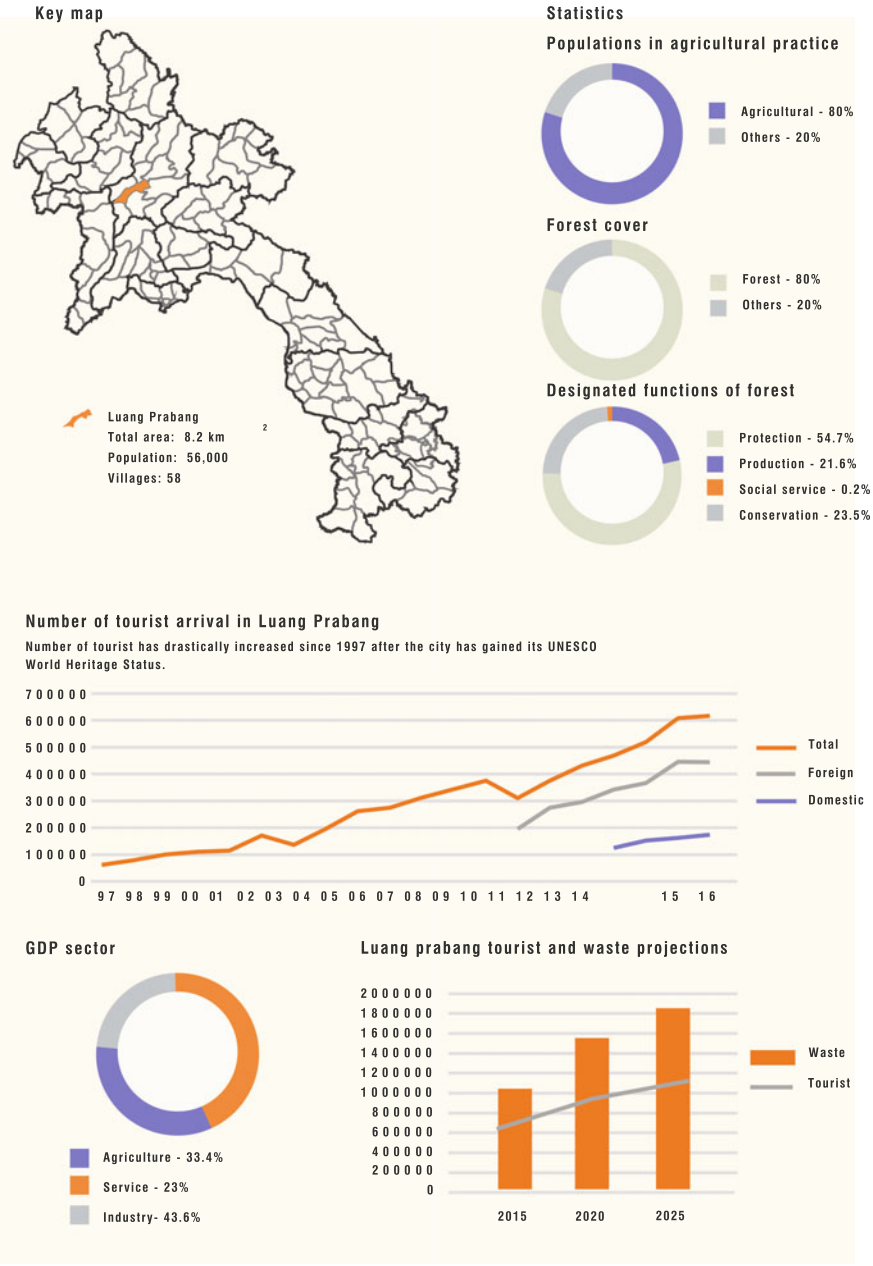


Fig. 26 Luang Prabang has experienced a growing influx of tourists since its designation as an UNESCO World Heritage Site in 1995. The town and its extensive landscape are currently undergoing unprecedented changes induced by simultaneous rural–urban transformation and regional infrastructure expansion

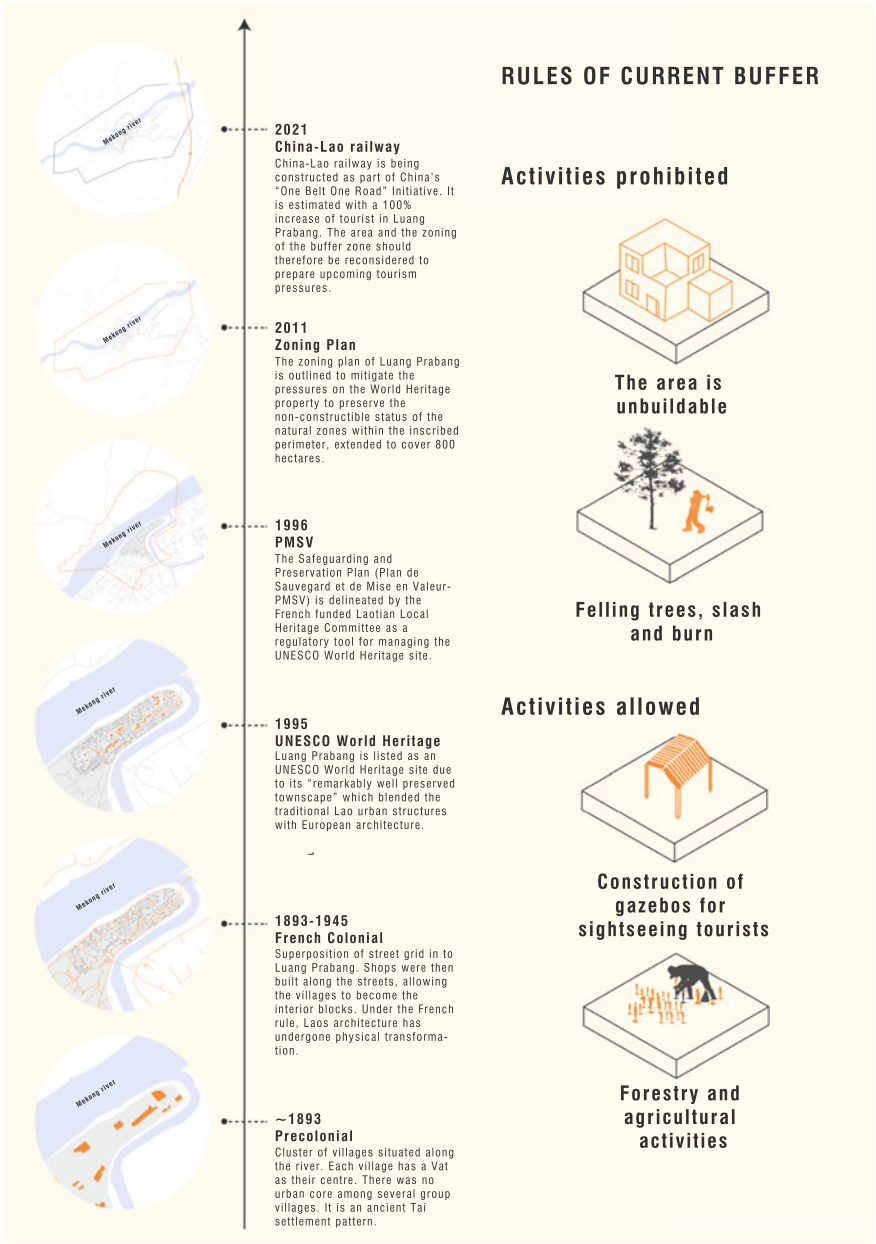


Fig. 27 Historical timeline of Luang Prabang and the current regulations managing the World Heritage Site's buffer zone

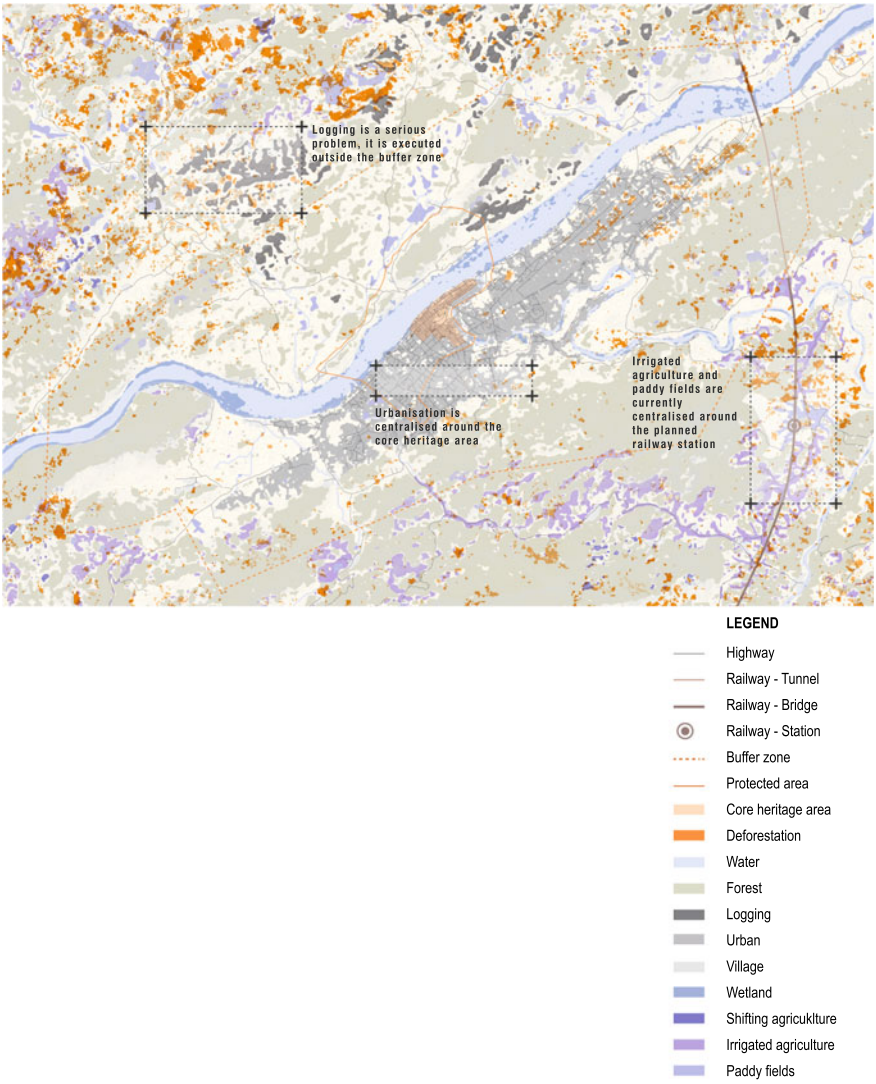


Fig. 28 Context map of Luang Prabang showing the boundaries of the core and buffer zones and major challenges currently faced by the town and its landscape

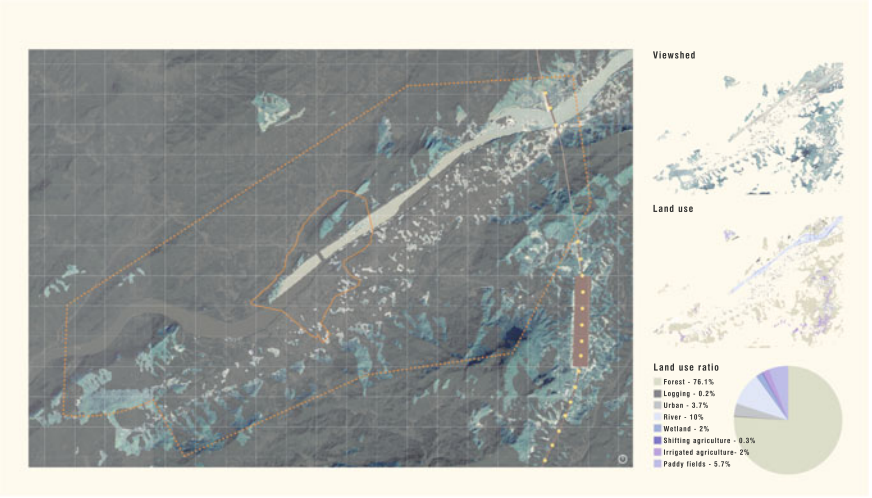


Fig. 29 Land use and viewshed analyses for areas along the China-Laos Railway

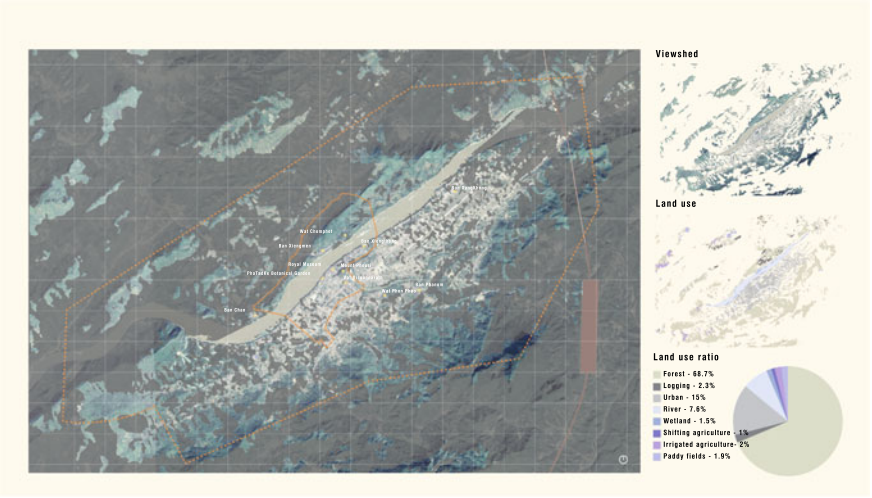


Fig. 30 Land use and viewshed analyses for areas within the buffer zone

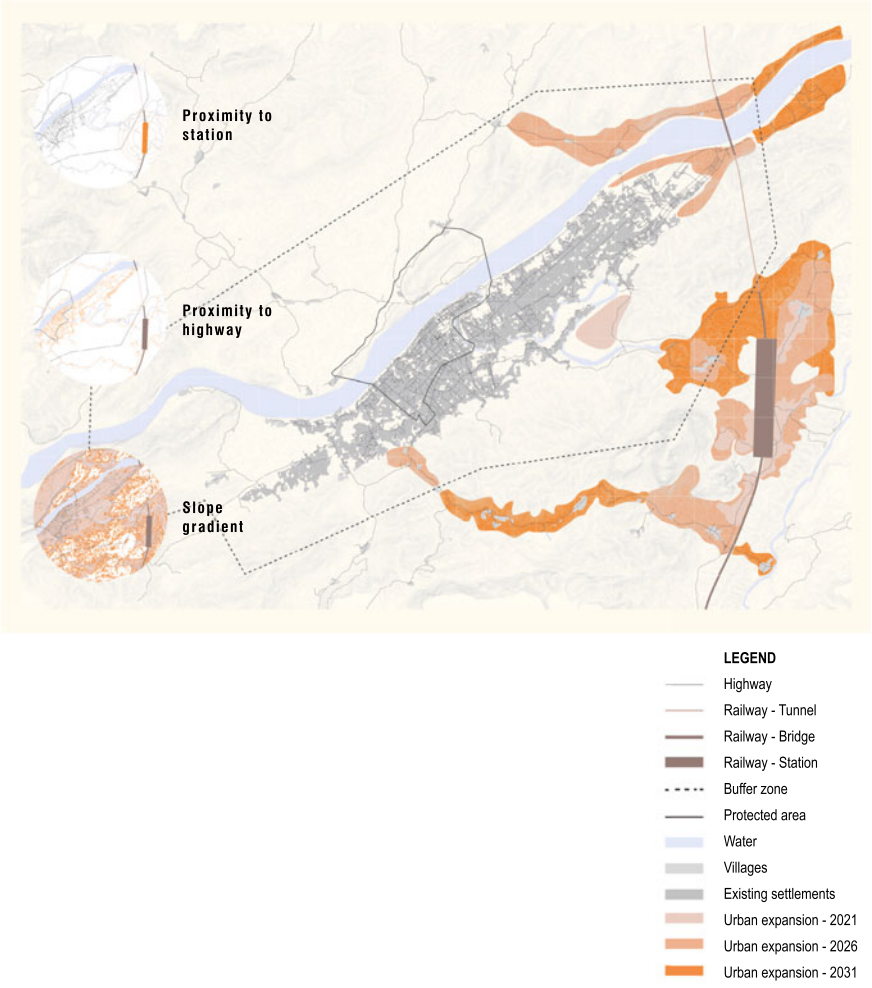


Fig. 31 Map showing the three phases of urban expansion, which are predicted based on proximity to railway stations, proximity to existing highways and slope gradient

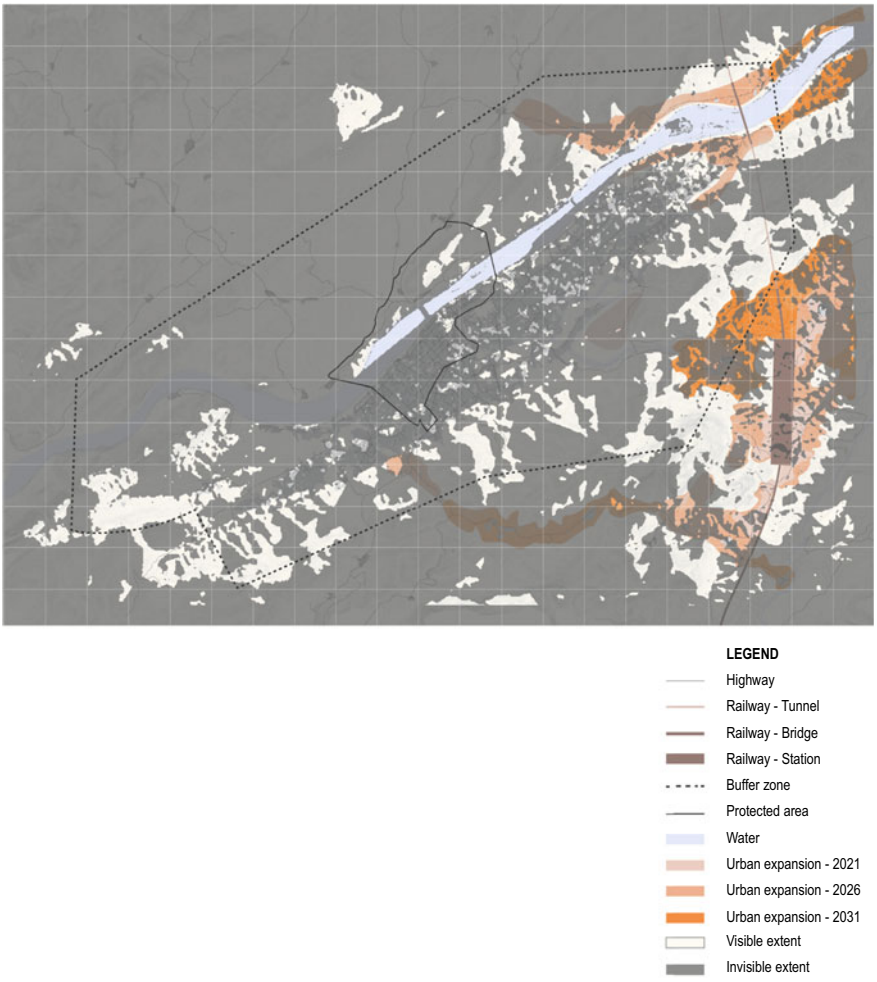


Fig. 32 The predicted area of urban expansion indicates a 25% increase in urban area within the viewshed along the railway by 2031

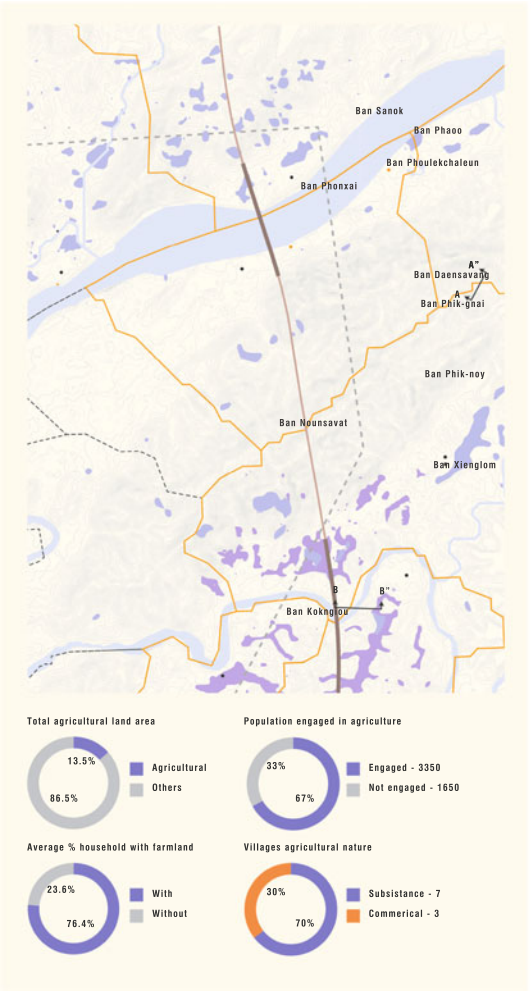


Fig. 33 Statistics of villages affected by the predicted urban expansion. Ten villages are currently situated along the railway within the study are, encompassing 5,000 people and 638 hectares of agricultural land

Fig. 34 Landscape section cut, illustrative view, and statistics of Ban Daensavang village

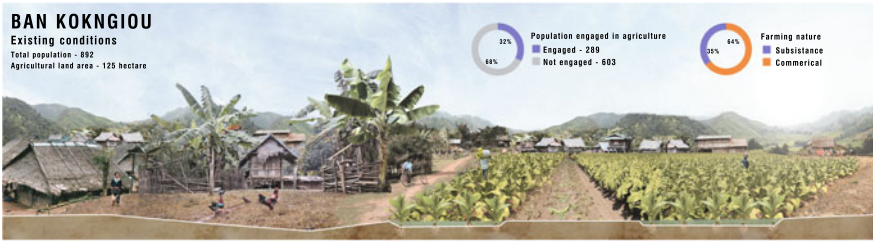


Fig. 35 Landscape section cut, illustrative view, and statistics of Ban Kokngiou village

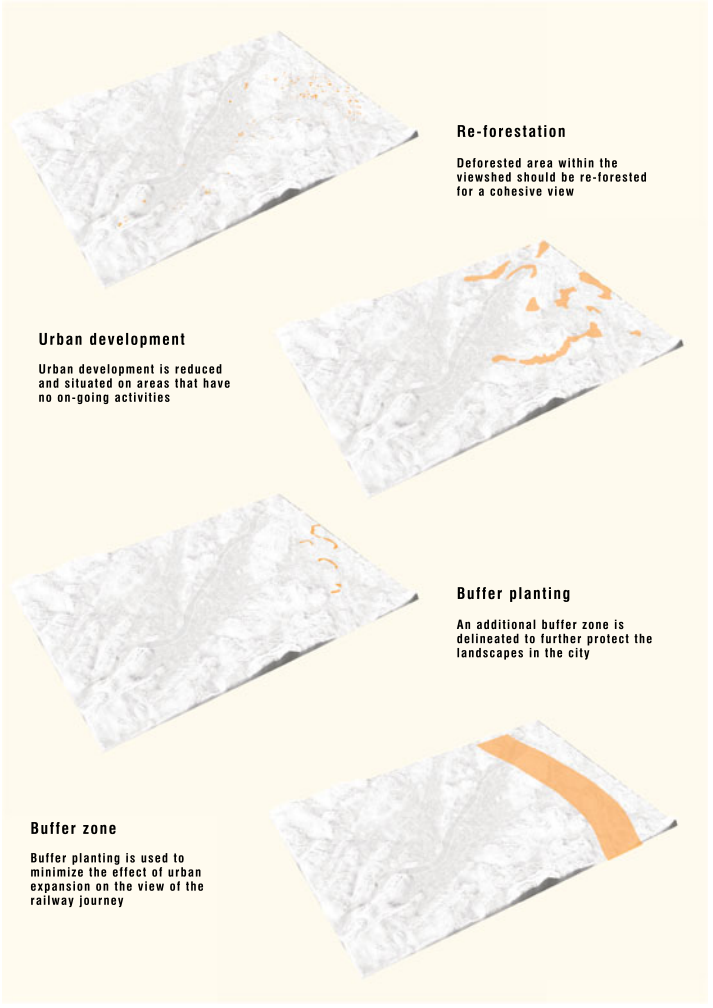


Fig. 36 Four multiscale landscape strategies are proposed to mediate the socioenvironmental impacts of previous development projects, minimize potential conflicts between local and nonlocal use of resources and mitigate foreseeable land speculation

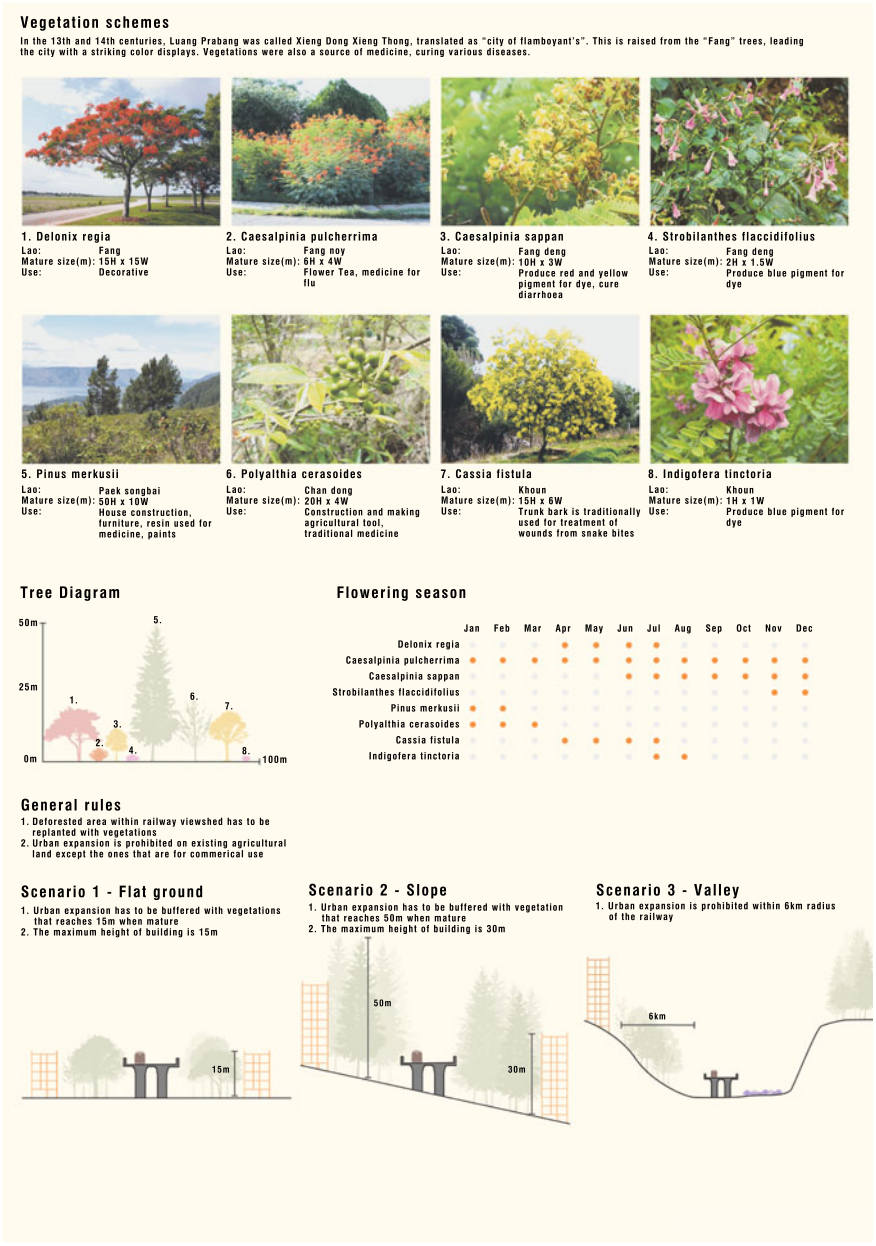


Fig. 37 Three landscape typologies are proposed to guide the spacing of new plantings and selection of plant species with cultural and livelihood significance

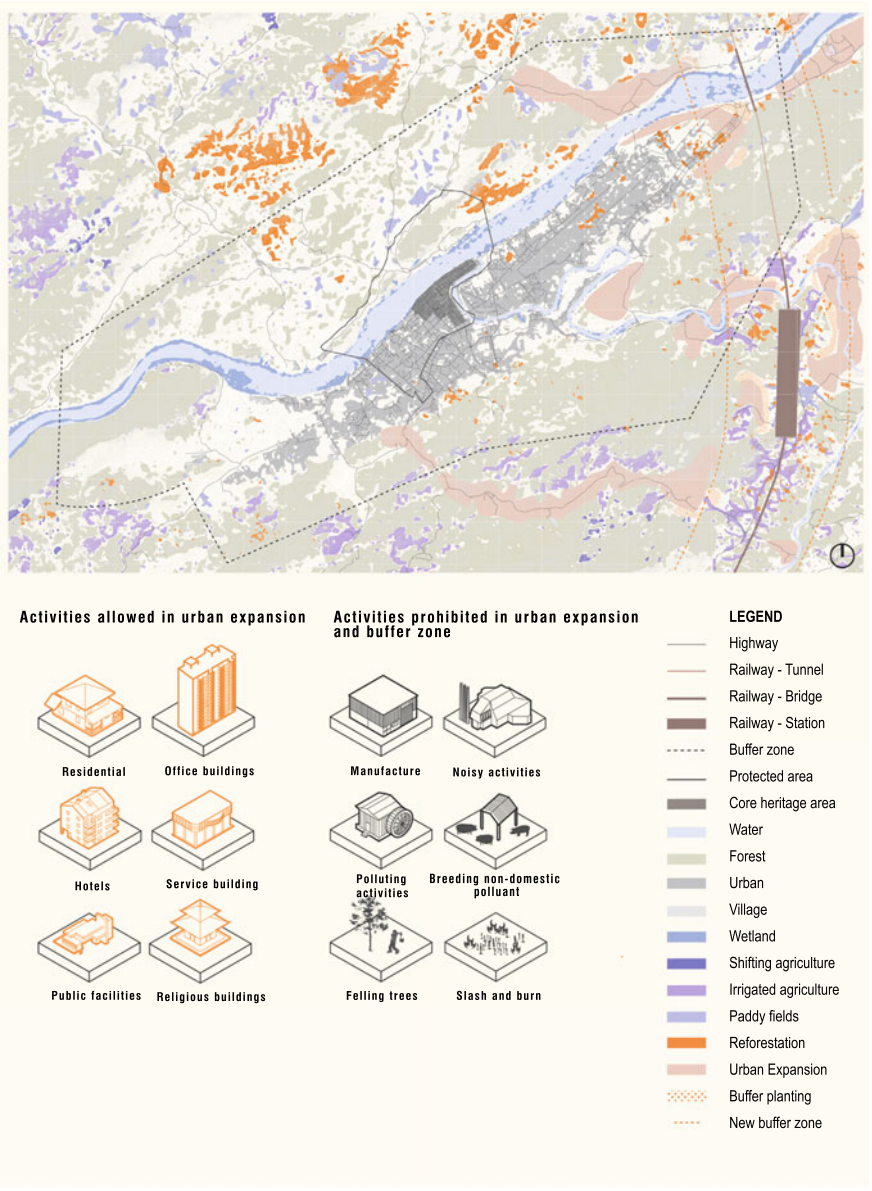


Fig. 38 Activities allowed and prohibited within the predicted area of urban expansion

Fig. 39 Experiencing Luang Prabang's cultural landscape along the China-Laos Railway

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Chapter 8
Northern Scientific Knowledge and Indigenous Knowledge

1 Introduction

Drawing from discourses of the "politics of land-use planning" and "sustainable development paradigm" examined in Chap. 4, this chapter features three strategic planning proposals focused on the ideological and practical frictions between Northern scientific knowledge and indigenous knowledge.

Northern scientific knowledge has enabled and legitimized various territorialization projects since the establishment of the Lao PDR through the environmentally deterministic classification and representation of diverse peoples and their landscapes (Goldman, 2001). These territorialization projects fall into three main paradigms of land governance in Laos. Firstly, nationwide agro-ecological assessments were carried out in the 1970s to identify "land development potential." Secondly, land zoning, land-use classification and land reallocation programs since the early 1990s facilitated a "rationalization" of land use in the name of "sustainable development." Thirdly, a National Land Titling Program was initiated in the late 1990s to identify "unutilized" or "underutilized" land suitable for large-scale concessions driven by the national strategy dubbed "Turning Land into Capital" (Lestrelin et al., 2012).

Over the past decade, the application of Northern scientific knowledge has diversified and expanded along with Laos's increasing integration into the socio-economic geography of the China-Indochina Peninsula Economic Corridor (Figs. 1, 2, 3 and 4).[1] In addition to the construction of large-scale infrastructure projects intended to improve physical connectivity across national borders, novel scientific programs and knowledge exchange networks are being established or strengthened to facilitate transnational research initiatives. Laos, as one of the most ecologically diverse yet least explored centers of biodiversity in Indochina, is becoming a scientific frontier

[1] The China-Indochina Peninsula Economic Corridor is an imagined socio-economic geography that links China with the Indochina Peninsula. It is expected to boost China's cooperation with the ASEAN countries.

A. S. Kelly and X. Lu, *Critical Landscape Planning during the Belt and Road Initiative*, https://doi.org/10.1007/978-981-16-4067-4_8

for research into biodiversity and ecosystem services. Unlike World Bank-funded green-neoliberal development that dominated Laos in the 1990s and 2000s, some China-funded projects are furthering the green neoliberal valuation of ecosystems, and their "services" to humans, in monetary terms and these ecosystems' conservation by means of market dynamics (See, for example, d'Amato et al., 2016; Jiang, 2017; He, 2020).

These ecosystem territories inevitably overlap with the country's indigenous territories and their natural resource-dependent communities. The population of Laos is overwhelmingly rural, with its "ethnic minorities," as the Laos government does not use the term indigenous, constituting about 40% of the total population and heavily reliant on mixed subsistence and semi-subsistence agriculture (Hodgdon, 2010). With this in mind, this chapter features three strategic planning proposals: *Scientific stewardship: Indigenous and ecosystem territories across the China-Indochina Peninsula Economic Corridor*; *Empowering a labor transition during enclosure and securitization of Luang Prabang's natural heritage*; and *Clean versus organic: Strategic agricultural enterprises for Vientiane under rural–urban migration.* These three proposals foreground Laos's remarkable human diversity and local communities' valuable traditional ecological knowledge and practices. These planning proposals are situated in a diverse range of socio-ecological contexts, namely: northwestern Laos's Nam Ha National Protected Area; a protected forest outside of Luang Prabang city; and agricultural land within the capital Vientiane. Collectively, they focus on agrarian populations influenced by old or new forms of land enclosure, investigating possible scenarios that may lead to more equal power relationships between the scientific and indigenous knowledge regimes. These projects acknowledge indigenous communities' synthesized knowledge systems, intimate knowledge of seasonal cycles and ecological processes, and management of bio-cultural diversity as critical national assets supporting social and ecological resilience and advocate for their recognition and safeguarding.

Fig. 1 Sun bears rescued from the bear trade in Laos at the newly opened Luang Prabang Wildlife Sanctuary. The facility, which is not open to the public and includes a wildlife hospital, complements a largely tourism-funded sister project near Luang Prabang's most popular waterfall. Photo by Brian Cheang (March, 2019)

Fig. 2 Laos's first wildlife sanctuary opened in 2019 in Luang Prabang on the site of a former coffee plantation. The 24+ ha facility rehabilitates animals captured from the illegal wildlife trade, including the largest ever seizure of red pandas from Boten Special Economic Zone on the China-Laos border. Photo by Xiaoxuan Lu (March, 2019)

Fig. 3 In Vientiane, Panyanivej Organic Farm's director walks towards a new highway that bisects the property, formerly promoting integrated rice-based farming systems before the site's hydrology was disrupted. Photo by Angel Wong Wing Yin (March, 2019)

Fig. 4 A highway, crossing largely disused farmland, under construction in Vientiane linking the capital's airport to a planned station on the China-Laos Railway. Panyanivej Organic Farm, a social enterprise formerly part of the Participatory Development Training Centre (PADETC), Laos's oldest but politically accosted civil society organization focused on sustainable development, is bisected by the highway yet continues operation. Photo by Xiaoxuan Lu (March, 2019)

2 Scientific Stewardship: Indigenous and Ecosystem Territories Across the China-Indochina Peninsula Economic Corridor

Given the increasing transnational flow of knowledge and expertise along the China-Indochina Peninsula Economic Corridor (CICPEC), an imagined socio-economic geography initiated in 2010 and subsequently incorporated into the Belt and Road Initiative, this project focuses specifically on the interaction between scientific and traditional ecological knowledge and posits possible scenarios that could secure local communities' customary land rights while enabling their equal participation in the ongoing re-territorialization along CICPEC, particularly in Laos.

The current socio-ecological landscape of the Lao PDR has been shaped by various forms of territorialization projects since the establishment of the country in 1975. Through land-use planning, specific socioenvironmental perspectives and values are and have been projected onto the territory, consequently legitimizing the inclusion of certain forms of activities and the exclusion of others within these plans' demarcated boundaries (Lestrelin et al., 2012). In addition to earlier forms of territorial enclosure, such as protected areas and economic concessions that have effectively excluded local communities from their customary land, the establishment of experimental plots for scientific research emerged recently, fueled by global research trends in studying ecosystem dynamics and services. Focusing on the Chinese Academy of Science (CAS) and Chinese Academy of Forestry (CAF), two "scientific giants" in the field of ecology rapidly expanding their projects across CICPEC, this proposal reveals the conflicts embedded in their existing projects and provides alternative visions on the creation, operation and management of future scientific projects (Fig. 5).

This proposal first critically analyzes two existing projects, one by CAS in Yunnan and the other by CAF in northern Laos, with particular emphasis on these projects' participatory components. Although preexisting local uses of forest land (e.g., for hunting and mushroom foraging) are strictly forbidden within CAS's experimental plot at the Bubeng Field Station in Mengla, Yunnan, local villagers are periodically hired by CAS as consultants given their incomparable ecological knowledge about the site, where subsistence practices had long been carried out, for locating and installing scientific devices such as camera traps (Fig. 6).[2] For a community forest project at NamKaeNoy Village in Luang Namtha, the zoning plan and planting plan created by CAF, in collaboration with the provincial planning institute, helped attract and secure funding for the project. However, as will all community forest programs, the project's implementation and effectiveness for conservation are contingent on the participation of the local communities who are expected to perform the majority

[2] Authors' conversation in March 2019 with researchers at the Bubeng Field Station.

of the planting and maintenance work, in this case on northern Laos's challenging terrain (Fig. 7).[3]

Based on insights drawn from these two case studies, this strategic planning proposal constructs a set of alternative scenarios characterized by more inclusive and equal forms of community participation on sites where indigenous and ecosystem territories overlap. Although CAS and CAF have not yet implemented projects collaboratively in Laos, this work speculates on the establishment of joint experimental plots by CAS and CAF, given their common interest in ecosystem services as well as their similar regional geographic interests as revealed in their plans for research site expansion along CICPEC (Fig. 8) (See, for example, APFNet, 2012; Xishuangbanna Tropical Botanical Garden, 2018). Two types of scientific research, one focusing on leaf litter decomposition and the other on medicinal plant species and which involve community forest programs as their key components, are hypothesized in scenarios on sites within the Nam Ha National Protected Area in northern Laos bordering Yunnan (Figs. 9, 10 and 11). In both scenarios, formal land tenure protections may be granted to villagers to increase their incentive for participating in community forest programs. Moreover, the site selection criteria are not only limited to those that help maximize scientific research outputs but also include factors that contribute to the capacity building of villages within or adjacent to the project areas. Furthermore, the viable operation and management of the experimental plots depend equally on the protection and mobilization of indigenous knowledge of local flora and fauna and the introduction and utilization of scientific knowledge that turn collected data into research output to draw the funding that sustains the project (Figs. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 and 22).

The unprecedented scale and speed of transnationalization and re-territorialization along CICPEC initiated by science institutions makes necessary the meaningful inclusion of the knowledge of indigenous populations who have long practiced ecological stewardship of the region. This proposal envisions the emergence of a more complementary scientific stewardship that facilitates a bidirectional dependency and benefit-sharing capable of sustaining local practices, increasing local community sovereignty, facilitating access to education, healthcare and diversified economies, and enforcing or requiring layers of cultural meaning in natural science projects.

The design proposal "Scientific stewardship: Indigenous and ecosystem territories across the China-Indochina Peninsula Economic Corridor" and accompanying illustrations were developed by Michelle Chan Syl Yeng and Sammi Wong Wae Ki during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong*.

[3] Authors' conversation in March 2019 with the village head and manager of the NamKaeNoy community forest project.

Fig. 5 Timeline showing the formation of relations between Laos and two Chinese "scientific giants," namely the Chinese Academy of Science and Chinese Academy of Forestry, within the context of land-use planning and policies in Laos

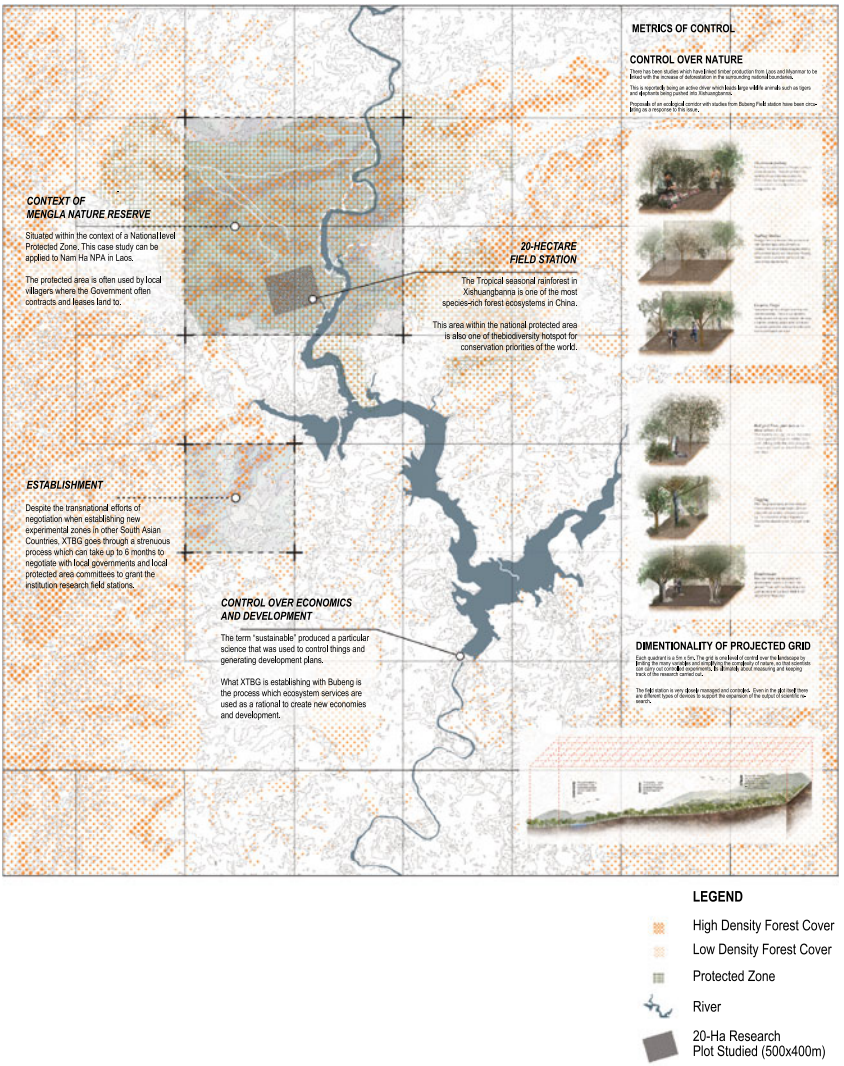


Fig. 6 At the Bubeng Field Station experimental forest research plot of Chinese Academy of Science in Mengla, Yunnan, local villagers are periodically hired as consultants given their incomparable ecological knowledge about the site for locating and installing scientific devices such as camera traps

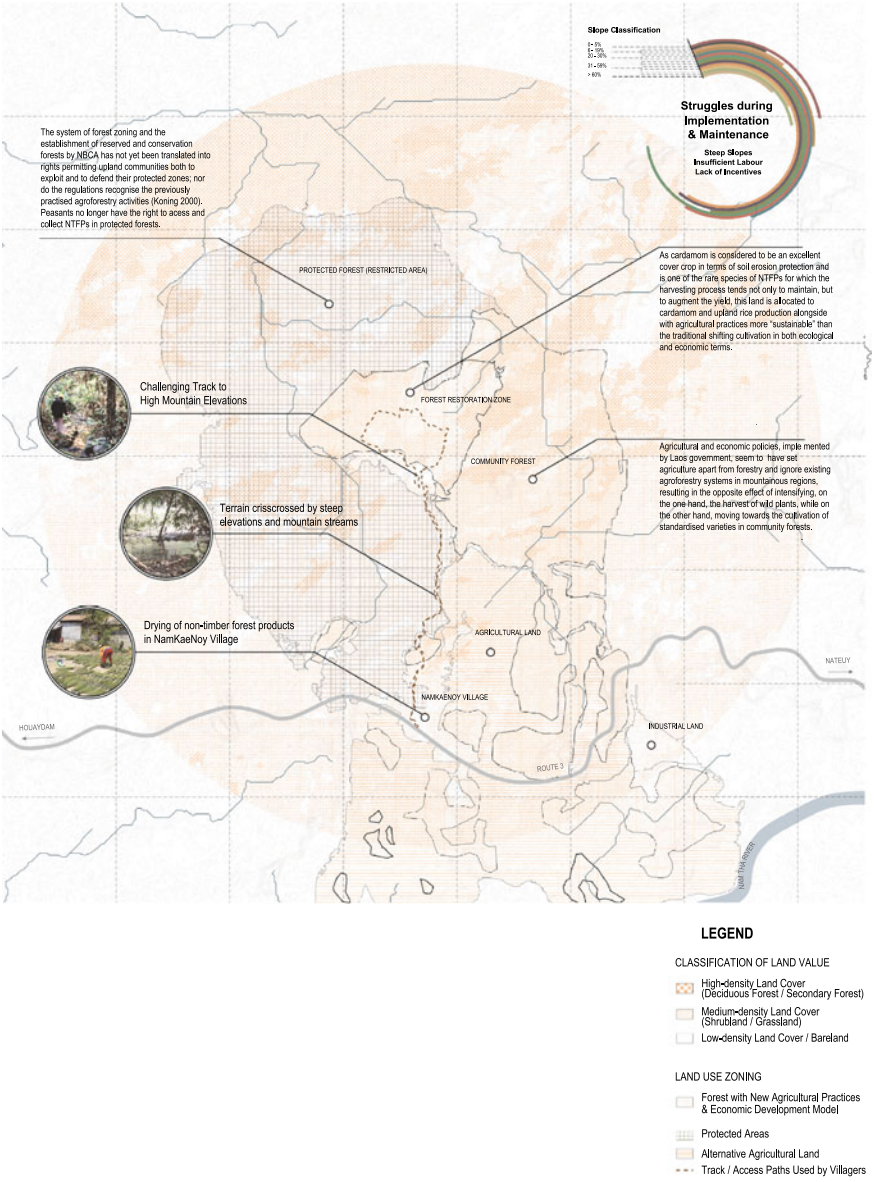


Fig. 7 At the NamKaeNoy village community forest in Luang Namtha in northern Laos (an initiative of Chinese Academy of Forestry in collaboration with the Provincial Planning Institute), the community forest's implementation and conservation effectives are contingent on the participation of the village

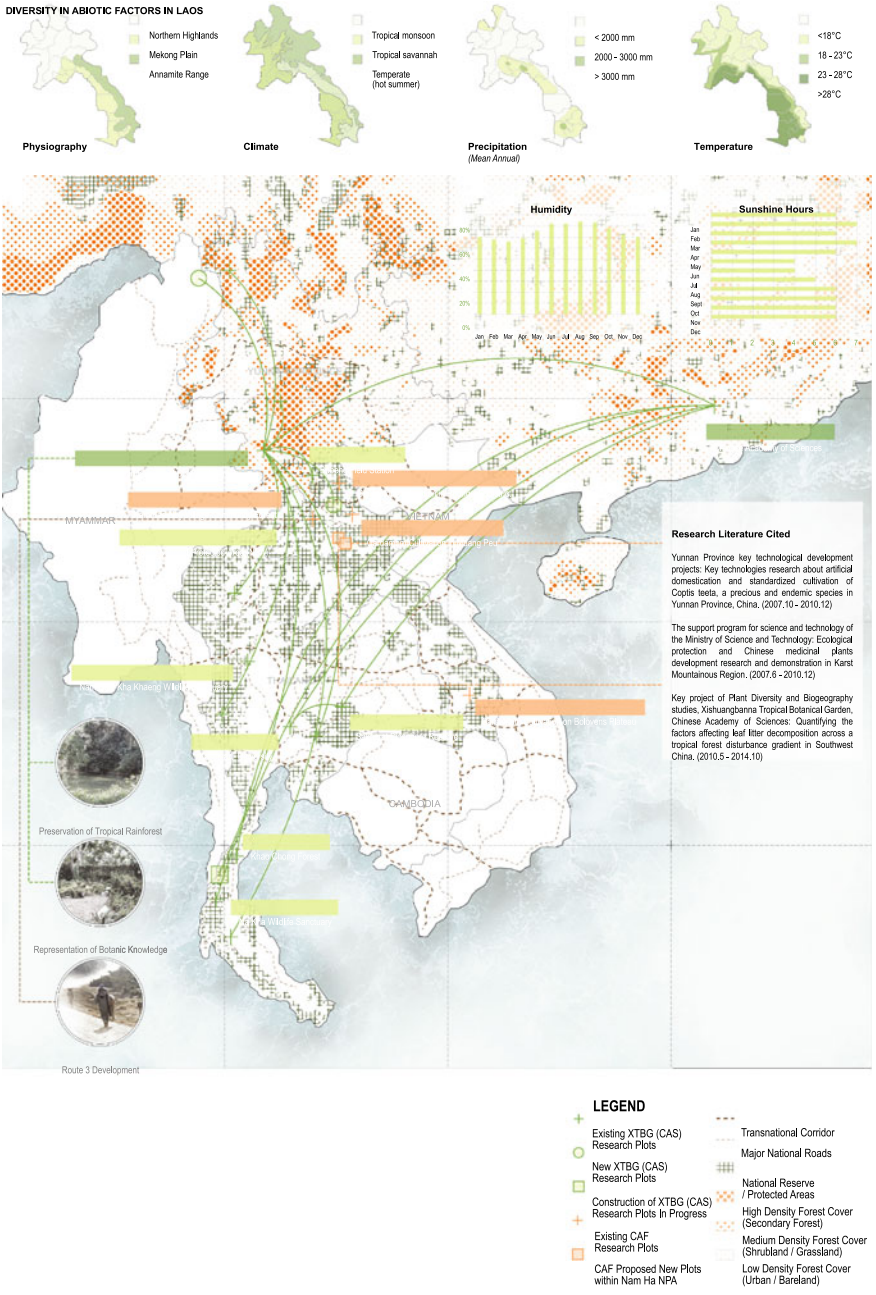


Fig. 8 Transnational flow of knowledge and expertise along the Indochina Peninsula. This strategic planning proposal establishes joint experimental plots by the Chinese Academy of Science and Chinese Academy of Forestry, given their common interest in ecosystem services and their similar regional geographic interest as revealed in their plans for research site expansion

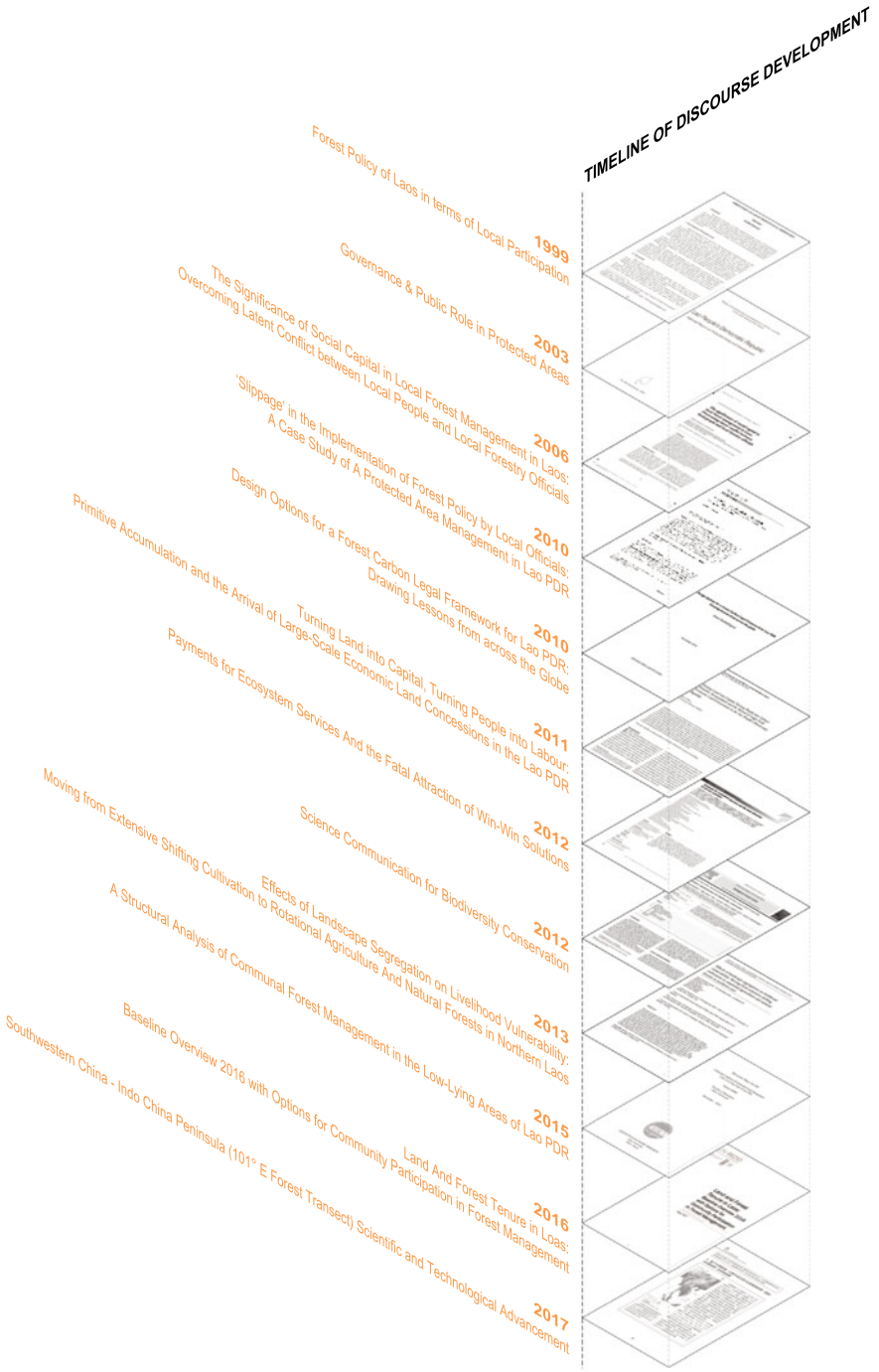


Fig. 9 Discourse assembly based on a collection of critical literature on environmental governance and forest management in Laos

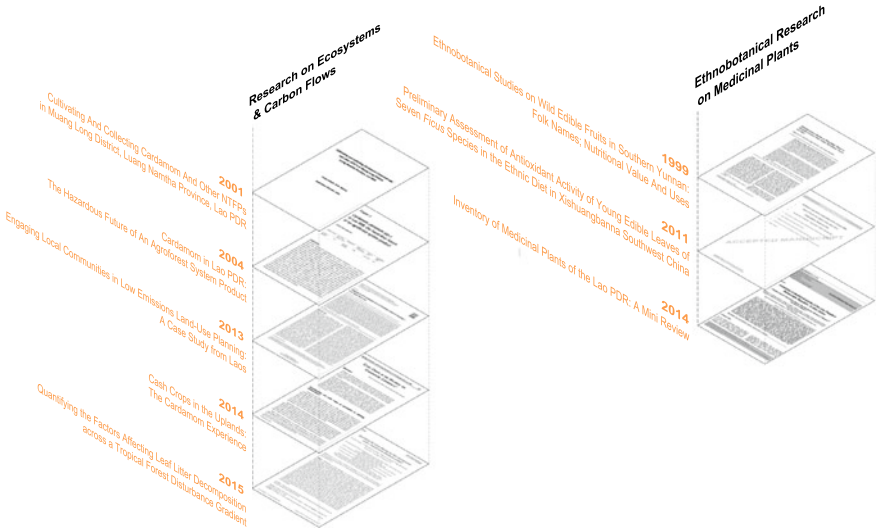


Fig. 10 Examples of existing research on ecosystems and carbon flows and ethnobotanical research on medicinal plants, the respective focus of two scenarios explored in this strategic planning proposal

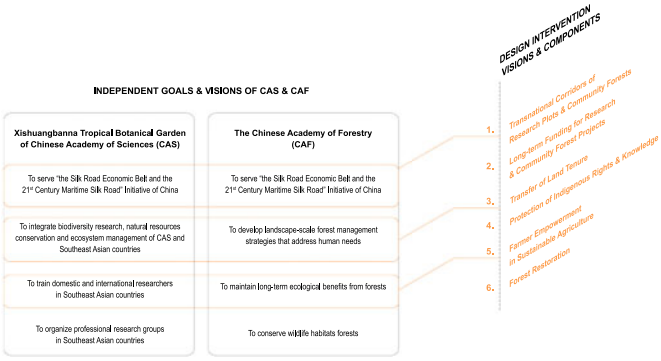


Fig. 11 Visions and components of the proposed landscape design and planning intervention, identified through a comparative analysis of the respective goals and visions of the Chinese Academy of Science and Chinese Academy of Forestry

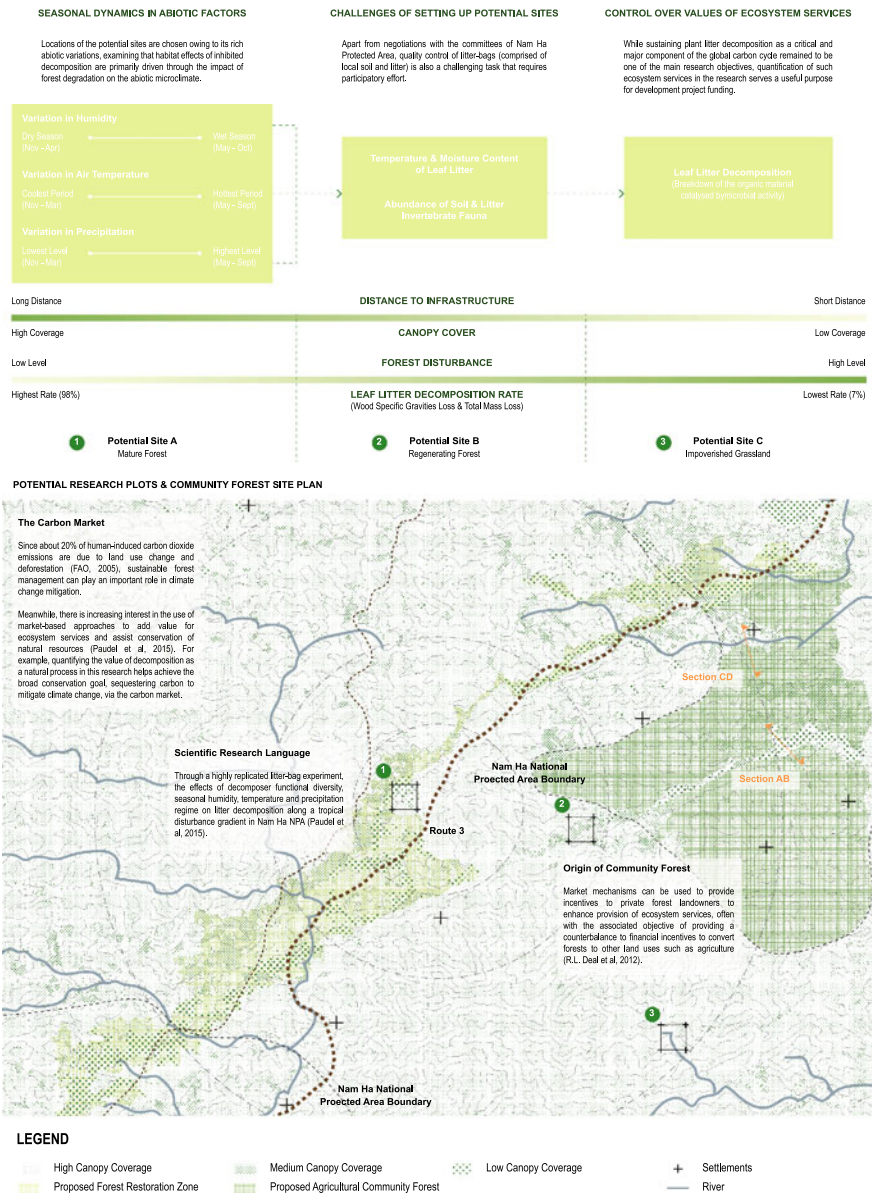


Fig. 12 Scenario One explores the establishment of joint experimental plots by the Chinese Academy of Science and Chinese Academy of Forestry within Laos's Nam Ha National Protected Area, where the scientific research on leaf litter decomposition is implemented

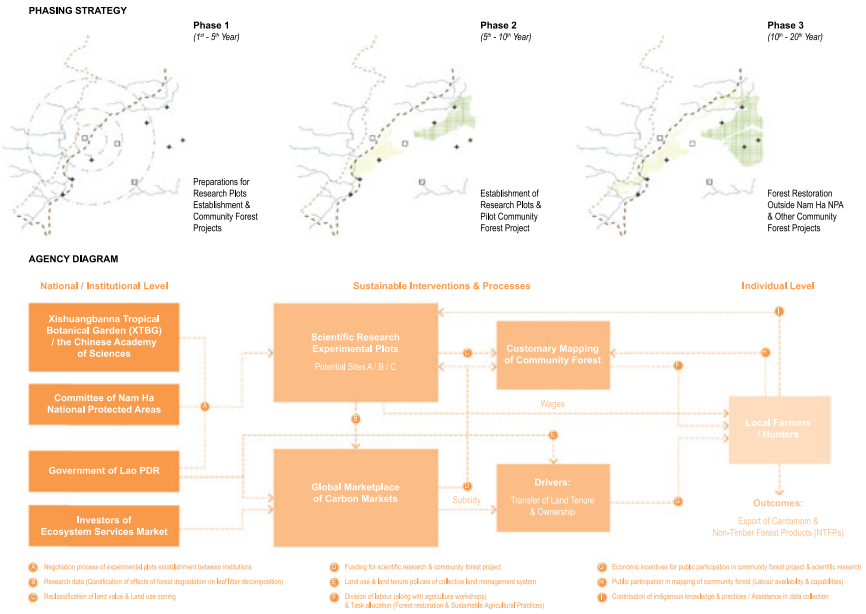


Fig. 13 Roles of different agencies and individuals involved in the establishment and management of the experimental forest plots

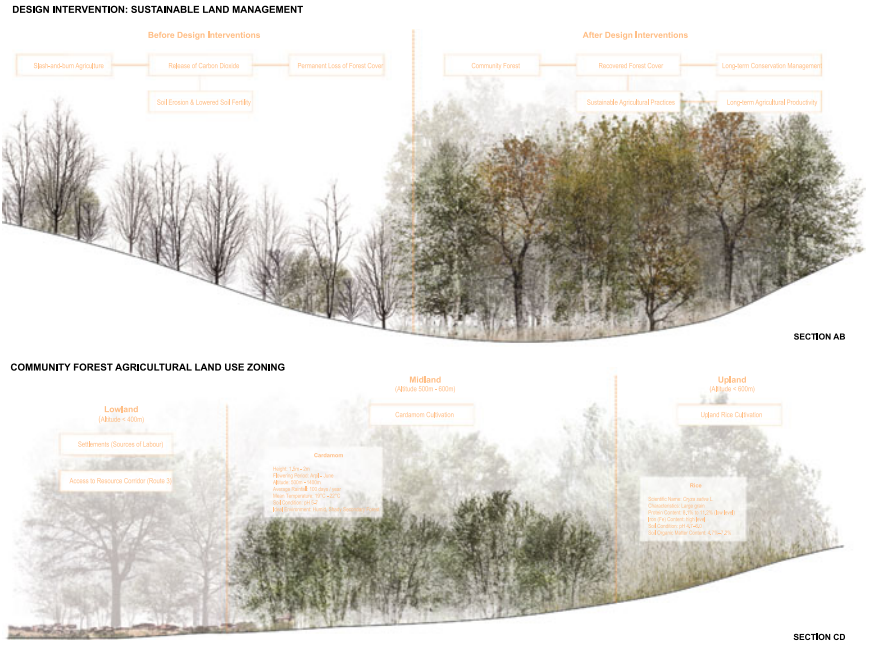


Fig. 14 Community forestry as a critical component of these new cultural-technological experimental forest plots

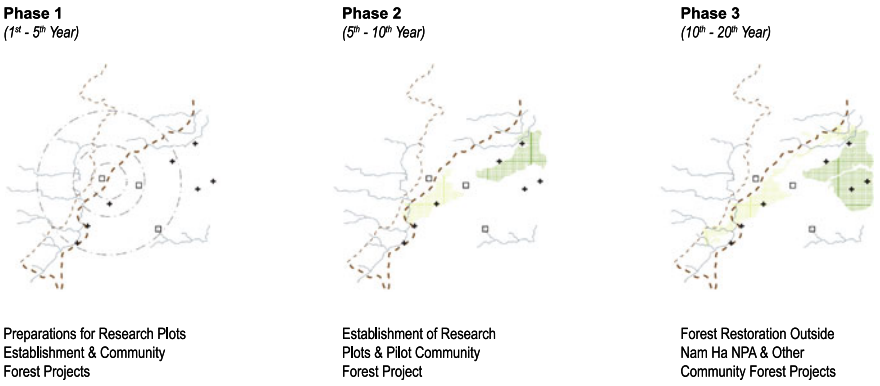


Fig. 15 Proposed phasing strategy showing the implementation of experimental forest plots over the next 20 years

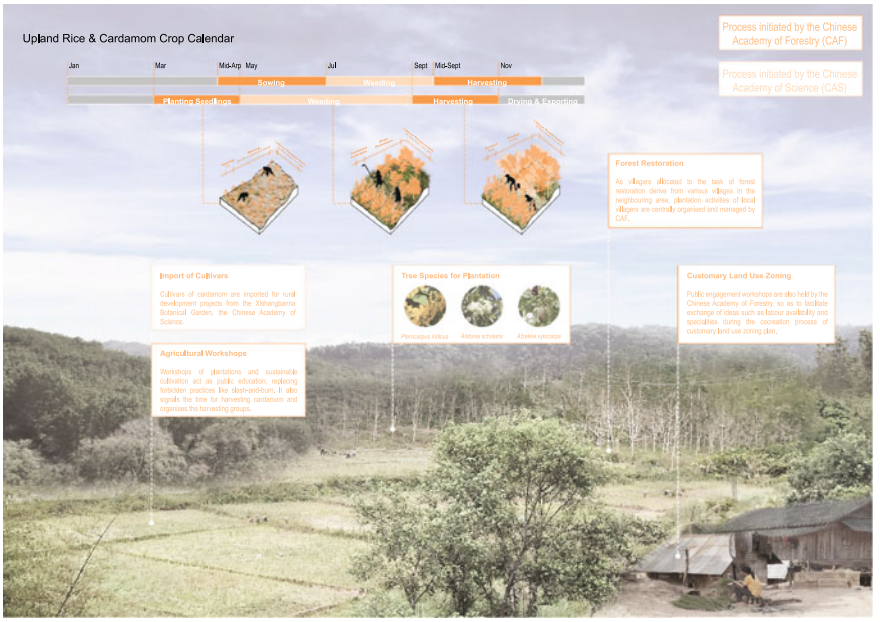


Fig. 16 Proposed community forest project conducted in Phase One of experimental forest plot implementation

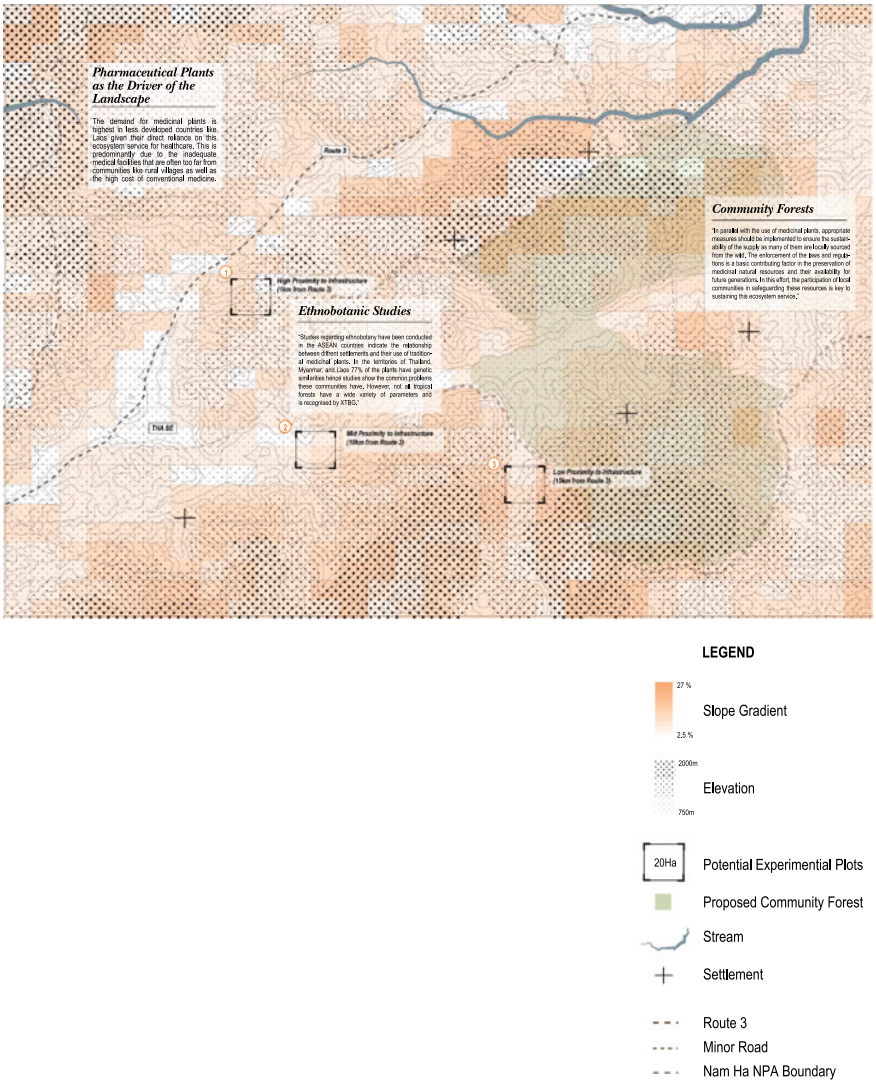


Fig. 17 Scenario Two explores the establishment of joint experimental forest plots by Chinese Academy of Science and Chinese Academy of Forestry within Laos's Nam Ha National Protected Area, where the scientific research on medicinal plant species is implemented

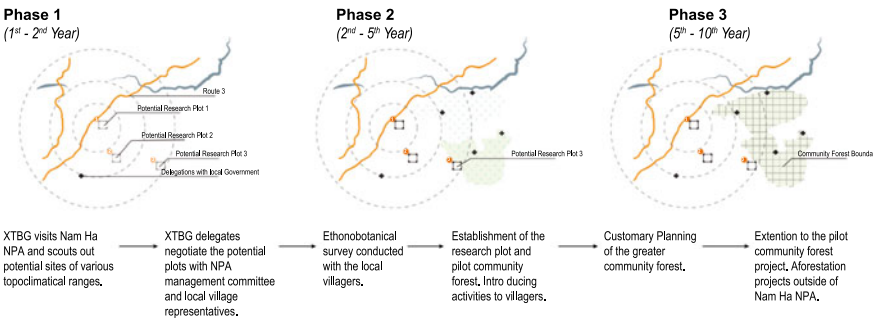


Fig. 18 Phasing strategy showing the implementation of experimental forest plots over the next 10 years

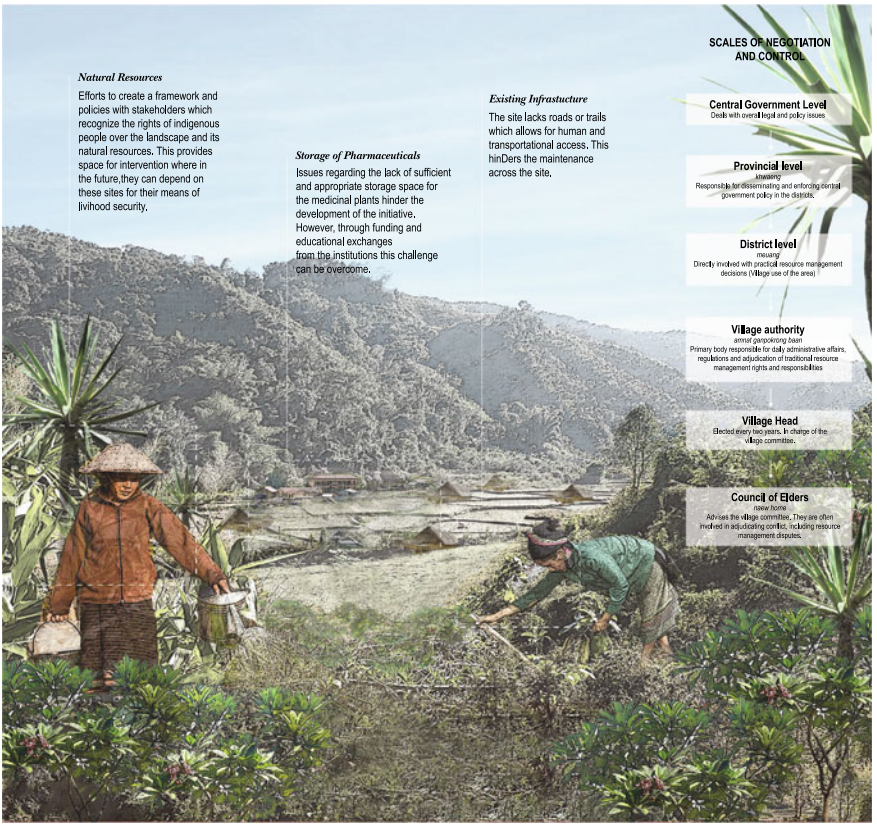


Fig. 19 Negotiation at various levels and scales are required prior to proposal implementation

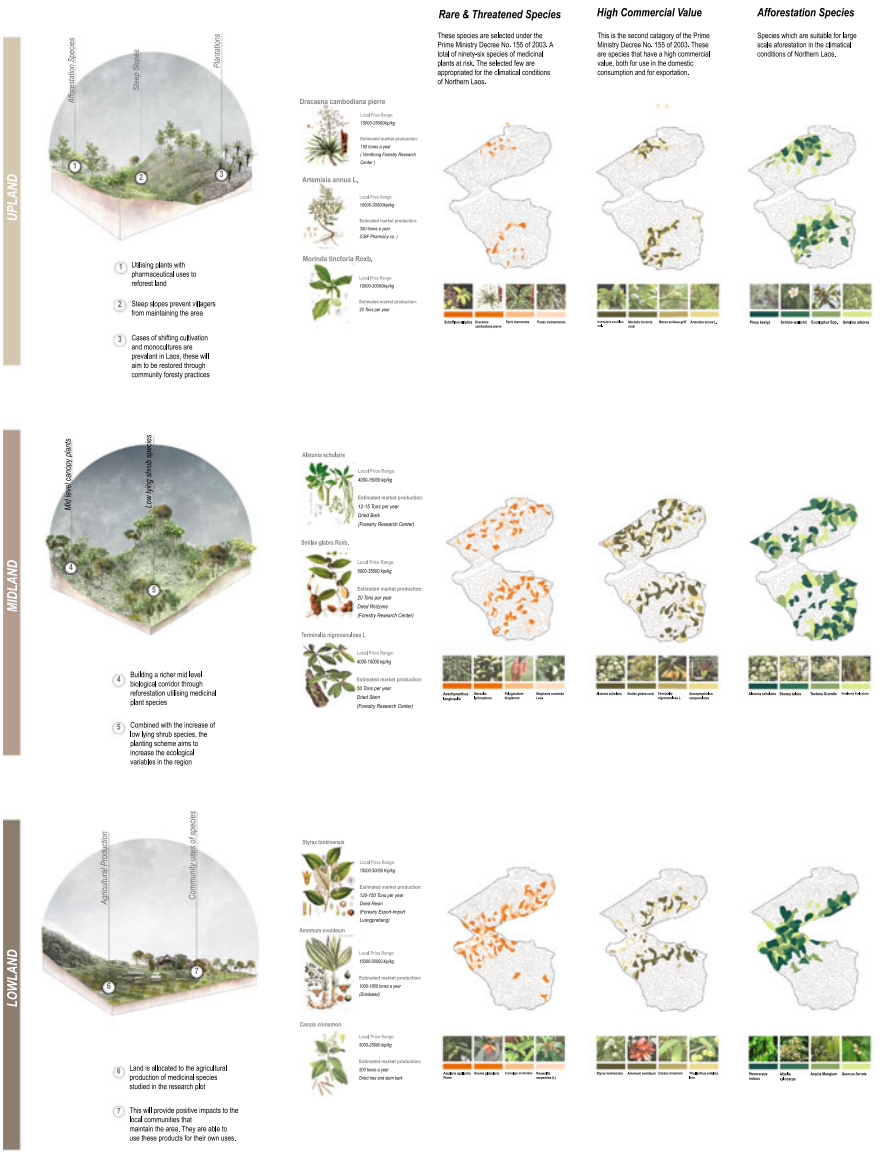


Fig. 20 According to the Lao government's classification of pharmaceutical species, the planting scheme of medicinal species is developed and refined by sampling those species that are ecologically fit for the Nam Ha National Protected Area

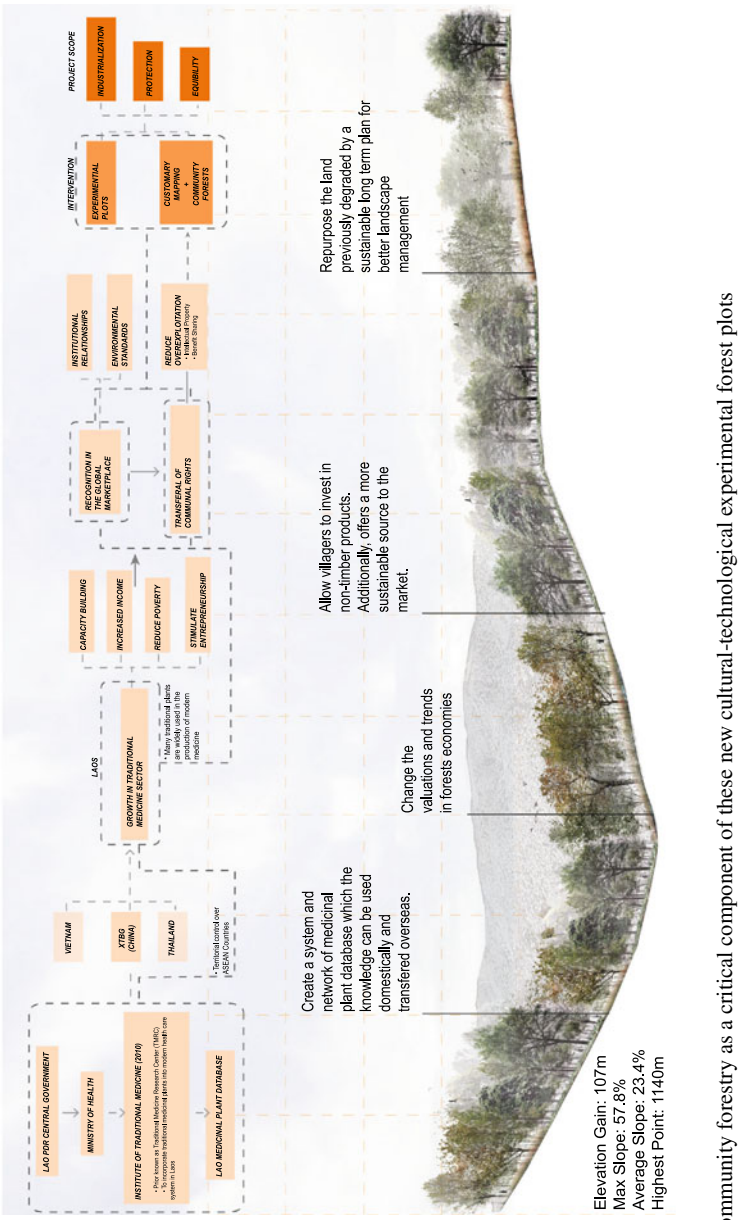


Fig. 21 Community forestry as a critical component of these new cultural-technological experimental forest plots

Fig. 22 The viable operation and management of these experimental forest plots depend equally on the protection and mobilization of indigenous knowledge of local flora and fauna and the introduction and utilization of scientific knowledge that transform collected data into research output that draws funding for sustaining the project

3 Empowering a Labor Transition During Enclosure and Securitization of Luang Prabang's Natural Heritage

In response to the rapid expansion of various forms of commodification and enclosure of natural heritage in Luang Prabang, this proposal foregrounds issues related to the integration of local populations into the wage-labor economy and explores an alternative model of conservation and development that empowers, with emancipatory and social-choice principles, a labor transition with socioecological benefits. The study and proposal area encompasses villages in close proximity to the Luang Prabang Wildlife Sanctuary (LPWLS) and situated between the planned Luang Prabang Special Economic Zone (LPSEZ) and a 34,000-ha protected forest.

This proposal first critically reflects on the existing models of development enclaves (e.g., special economic zones, industrial zones) and conservation forests (e.g., protected areas, protected forests) in Laos to underscore Luang Prabang's position as one that not only possesses the country's largest SEZs under planning[4] but also as one of Laos's wildlife trade hotspots–a critical site for combatting wildlife trafficking (Figs. 23 and 24) (Davis & Glikman, 2020). Occupying 4,850 ha of land with a concession lease duration of 99 years and located immediately adjacent to the buffer zone of UNESCO's Luang Prabang World Heritage Site property, the LPSEZ is expected to start construction after the completion of the China-Laos Railway in 2021. Despite its promises to generate job opportunities for local people, the SEZ is following similar models of urban development and enclosure that dispossess the local population while simultaneously integrating them with few alternatives into wage-labor markets. In addition, the LPSEZ along with the opening of the China-Laos Railway are expected to exacerbate pressures on local conservation practices. For example, the operators of the LPWLS, which is located three kilometers to the south of the LPSEZ's "S3" zone, are concerned with the limited capacity of their facilities to handle the impacts of rapid development in the region. Established in 2017 as Laos's first wildlife sanctuary and hospital, the 6.6-ha LPWLS houses over 55 rescued sun bears and moon bears as of 2019 and is considering releasing rehabilitated bears into the wild for conservation due to the foreseeable growth of wildlife poaching and trafficking induced by improved transnational connectivity and, correspondingly, the increasing seizures and pressures on the sanctuary's physical capacity.[5]

To tackle these challenges, this proposal identifies the nearby 34,000-ha protected forest, which is fundamentally a "paper park" due to its lack of on-the-ground management, as a potential site for carrying out a bear-releasing scheme. Unfortunately, such a scheme will likely be hindered by an existing contested relationship with adjacent communities who actively use bear parts for traditional medicine (Fig. 25) (Sukanan & Anthony, 2019). Similar to other protected areas in Laos, the establishment of this protected forest must contend with the exclusion of customary

[4] China Economic Information Service (2018). Occupying an area of 4,850 ha, the Luang Prabang Special Economic Zone plans to require an investment of 1.2 billion US dollars and provides a franchised operation period of 99 years.

[5] Authors' conversation in March 2019 with chief executive officer of Free the Bears.

land uses, such as dry-rice cultivation and forest foraging (Goldman, 2005; Lestrelin et al., 2012). Even until today, the boundary between the control use zone and the total protection zone of the protected forest is disputed. Acknowledging these challenges, this proposal offers a bear-releasing scheme as an opportunity to reconfigure the relationship between the LPWLS, protected forest and local communities. This reconfiguration has two main objectives. First, the labor demand associated with forest protection for bear conservation offers local communities alternatives to working for the LPSEZ, particularly under an ongoing labor transition across the region. Second, conserving the protected forest for bear releasing challenges the existing narrowly scoped forest protection model characterized by a top-down, overly securitized approach and advocates an alternative conservation model in Laos that is nature-sensitive and equitable.

In this proposal, local communities from five nearby villages become key players in the implementation of the LPWLS's future bear-releasing scheme at the protected forest (Figs. 26 and 27). Three strategies centered on community engagement are proposed, namely (1) reforestation for buffer zone establishment and bear habitat restoration, (2) patrolling and site-based conservation activities, and (3) ecotourism and related low-impact tourism activities. Levels of community engagement are quantified through the detailed calculation of dynamic labor demand at the LPSEZ and protected forest in relation to seasonality in near and long terms (Figs. 28, 29, 30, 31, 32, 33 and 34). Five scenarios are outlined using these strategies, where each scenario is characterized by different speeds and scales of strategy implementation and consequent bear-releasing capacity (Figs. 35, 36 and 37). In addition to promoting more voluntary, equal forms of labor transition, detailed design interventions such as planting schemes and phasing schemes tackle issues such as human-wildlife conflicts, risks and potential for bear release, and ethical use of state-of-the-art technologies in conservation. Stressing ethical and critical use of such technologies is important given the increasing militarization of such technologies in conservation practices around the world (Adams, 2019).

Ultimately, this proposal strengthens local communities' sense of meaningful involvement and responsibility in conservation while protecting and motivating their rich knowledge of the local landscape. This is incredibly important given ongoing, rapidly advancing neoliberal modes of nature commodification and securitization. The value of Luang Prabang's natural heritage must be planned and defined in excess of the economy-driven SEZ or the ecology-driven protected forest.

The design proposal "Empowering a labor transition during enclosure and securitization of Luang Prabang's natural heritage" and accompanying illustrations were developed by Rachel Ma On Ki and Haven Lee Chi Hang during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong.*

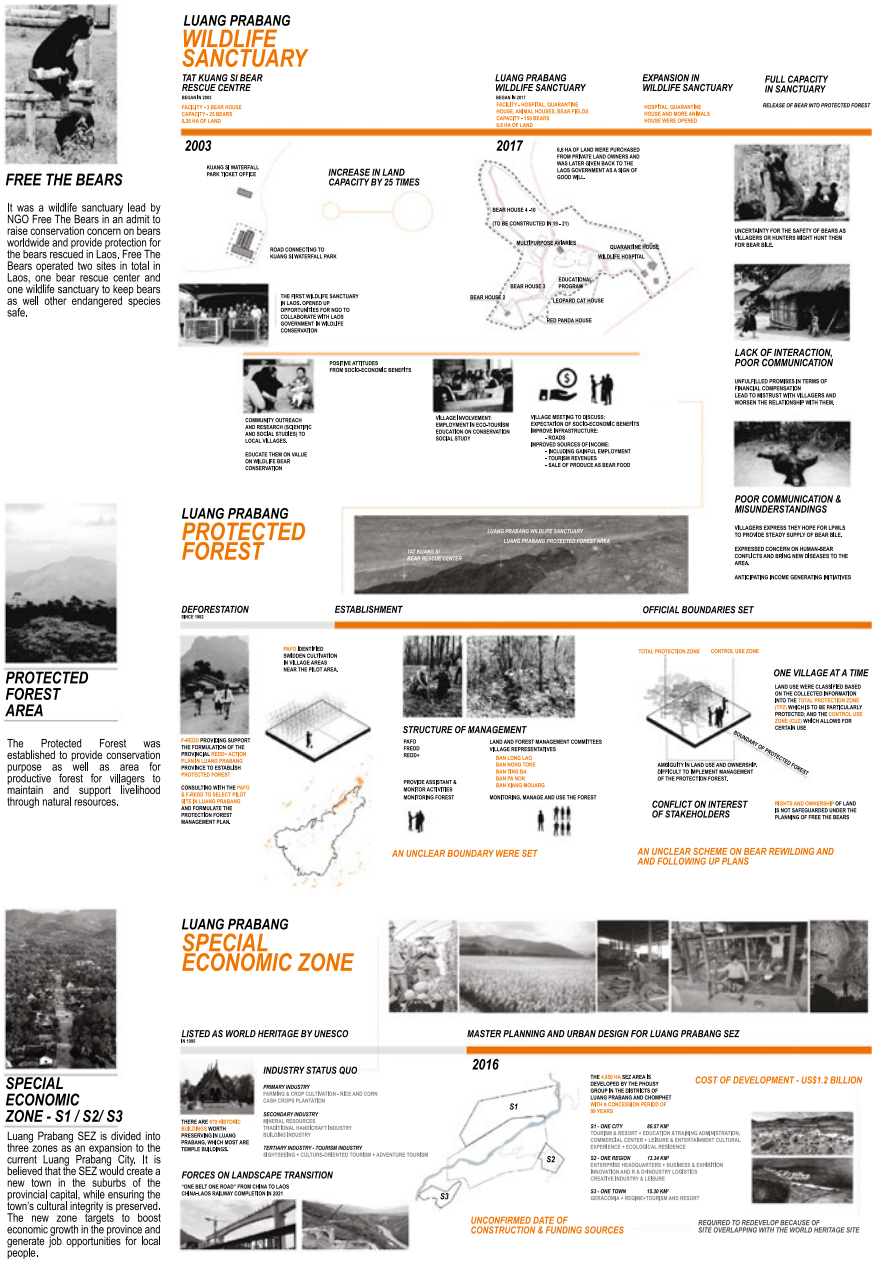


Fig. 23 Encroachment of Luang Prabang Special Economic Zone on a 34,000-ha protected forest outside Luang Prabang town and the limited capacity of Luang Prabang Wildlife Sanctuary to handle new rescued wildlife from the increasing illegal trade

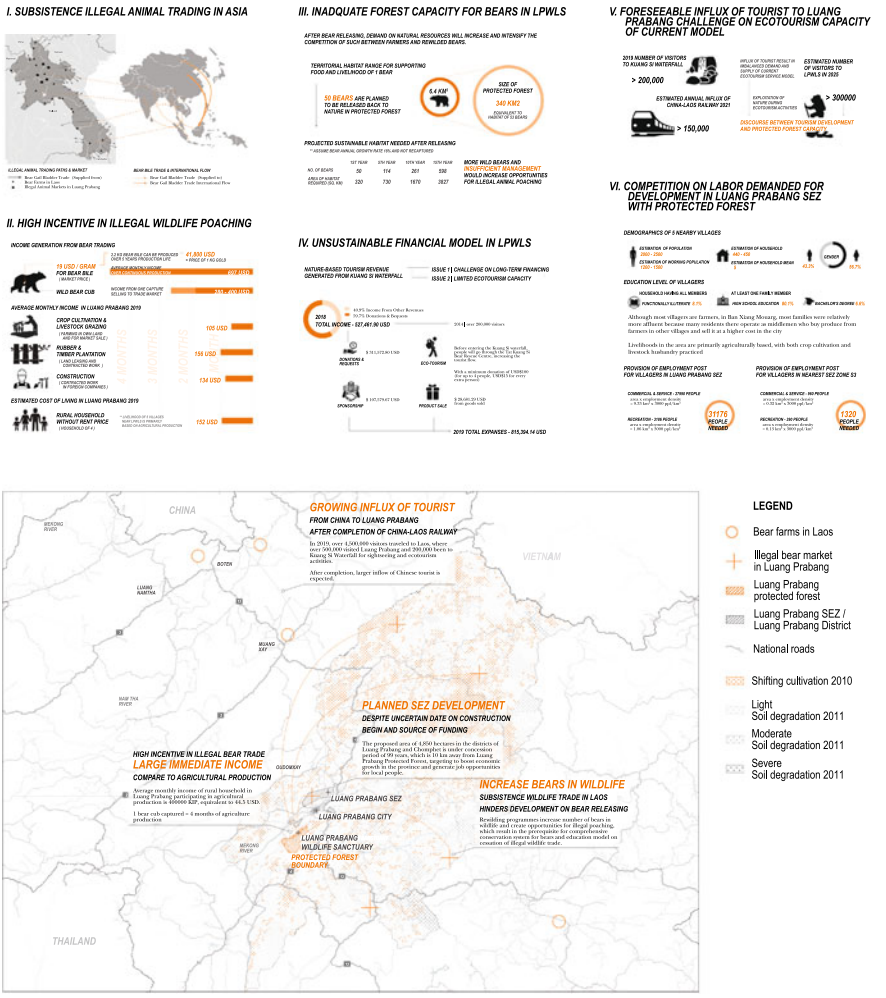


Fig. 24 Regional forces and impacts on a 34,000-ha protected forest outside Luang Prabang town. Luang Prabang possesses one of the country's largest special economic zones, and it has become one of Laos's wildlife trade hotspots and a crucial site for combatting wildlife trafficking

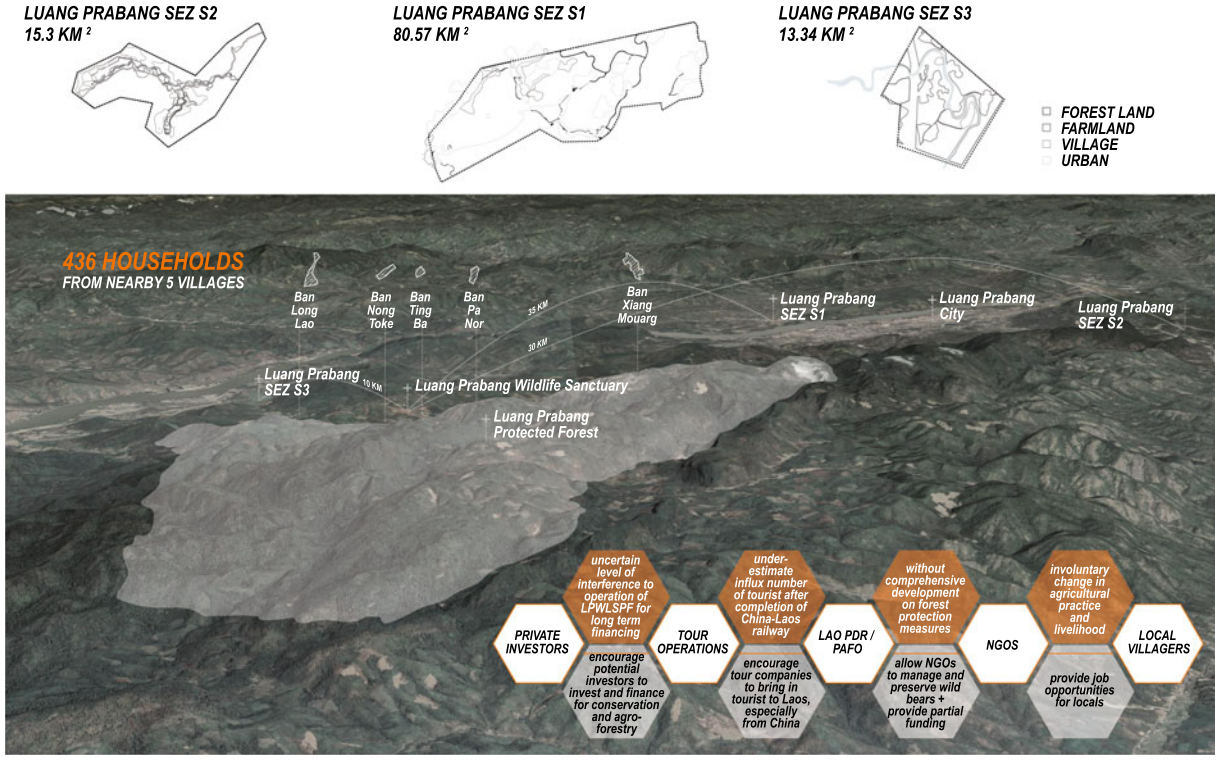


Fig. 25 This strategic planning proposal focuses on five villages located in areas adjacent to the Luang Prabang Wildlife Sanctuary and situated between the planned Luang Prabang Special Economic Zone and a 34,000-ha protected forest

COMPARISON ON LABOUR DEMAND AT SEZ VS PROPOSED AGGROFORESTRY & CONSERVATION MANGEMENT

LUANG PRABANG SEZ PROPOSED LABOUR DEMAND

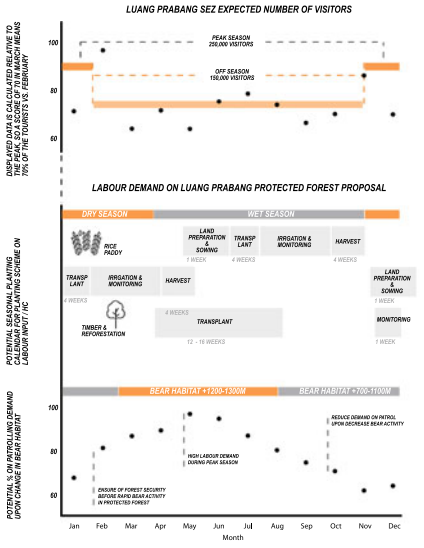
EMPLOYMENT INDUSTRY & CATEGORY	PROPOSED EMPLOYED POPULATION (PEOPLE)
CENTRAL COMMERCIAL AREA	3240
SCIENTIFIC RESEARCH INDUSTRY	1652
LOGISTIC	3091
COMMERCIAL AND SERVICE	27990
HI-TECH INDUSTRY	0
RECREATION LAND	3158
TOTAL	39160

PROTECTED FOREST PROPOSED LABOUR DEMAND

EMPLOYMENT INDUSTRY & CATEGORY ( ) POTENTIAL JOB OPPORTUNITIES IN LATER DEVELOPMENT	PROPOSED EMPLOYED POPULATION (PEOPLE)
CROP CULTIVATION	240
TIMBER PLANTATION	350
BEAR REWILDING SCHEME	70
ECOSYSTEM SERVICES - PATROLLING	30
ECOSYSTEM SERVICES - TECH ASSIST	15
ECOSYSTEM SERVICES - ROUTE CLEARANCE	35
(TOUR GUIDES IN PROTECTED FOREST FOR ECOTOURISM DEVELOPMENT)	20
(PROTECTED FOREST PROMOTION)	15
TOTAL	775

ESTIMATED MONTHLY TOTAL PAYABLE TO EMPLOYED POPULATION IN PROTECTED FOREST — 116,300 USD

SEASONAL DEMAND IN LABOUR AT SEZ VS PROPOSED AGROFORESTRY & CONSERVATION MANAGEMENT



COMPARISON ON ECONOMIC BENEFITS FOR FUTURE LOCAL EMPLOYMENT

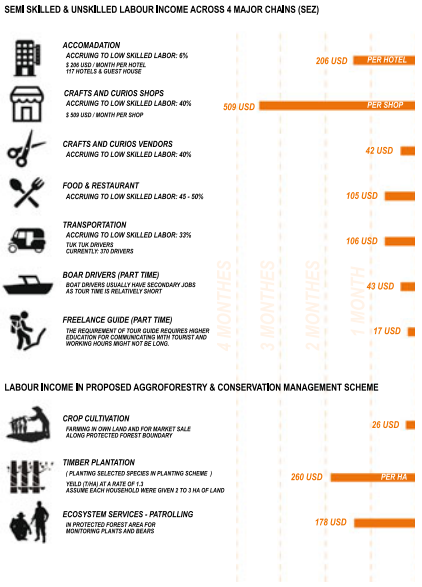


Fig. 26 Comparison of labor demand and financial incentives between Luang Prabang Special Economic Zone and the proposed agroforestry and conservation management scheme for the protected forest

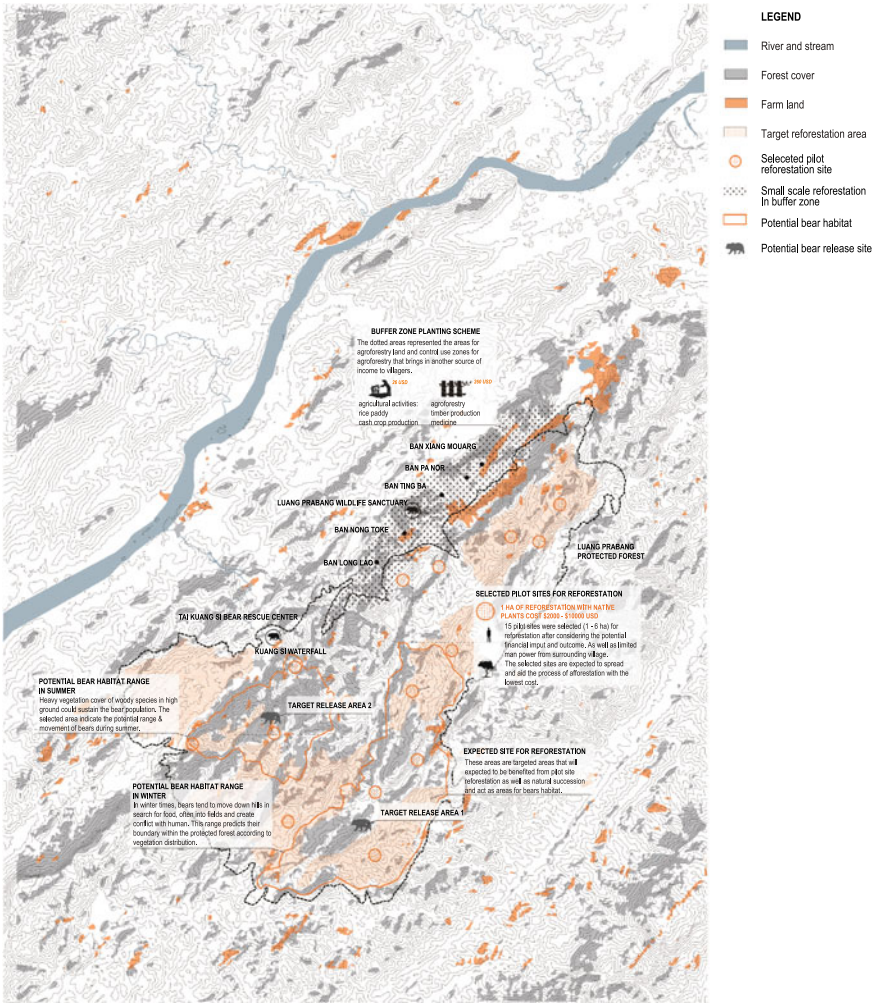


Fig. 27 Reforestation for buffer zone establishment and bear habitat restoration at a 34,000-ha protected forest outside Luang Prabang, which has been selected as a potential site for a bear-releasing scheme

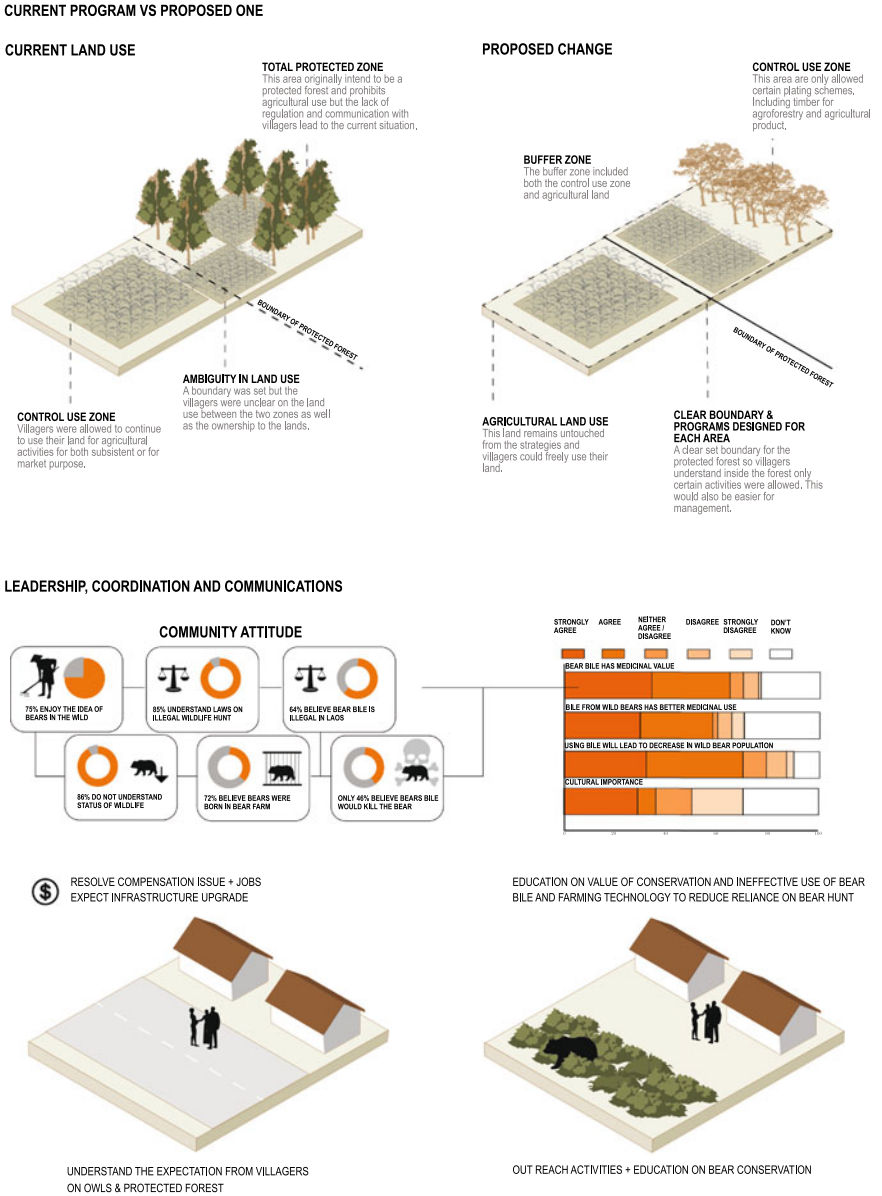


Fig. 28 The successful implementation of the proposed bear-releasing scheme in the protected forest depends strongly on collaboration with local communities and their support for the initiative

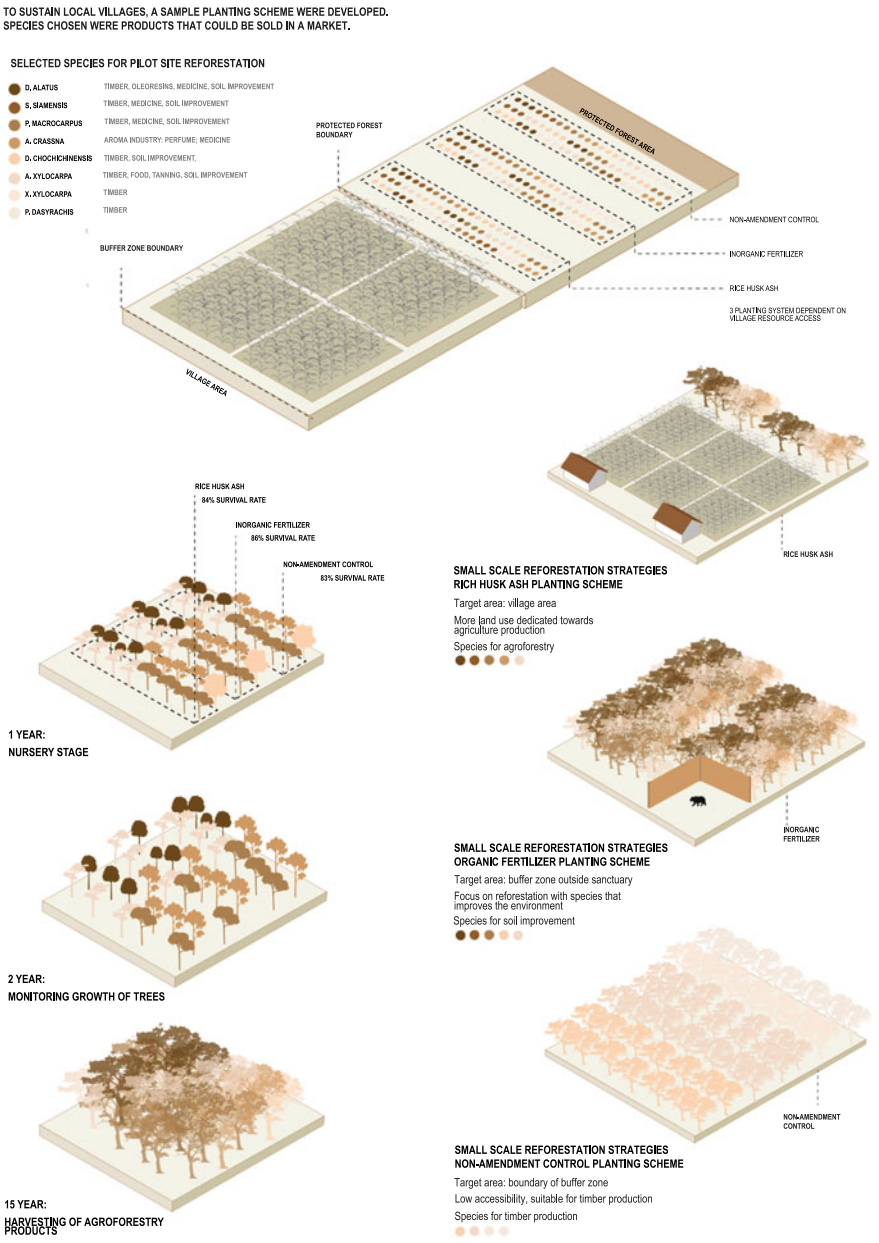


Fig. 29 Planting scheme and implementation scenarios of pilot site reforestation

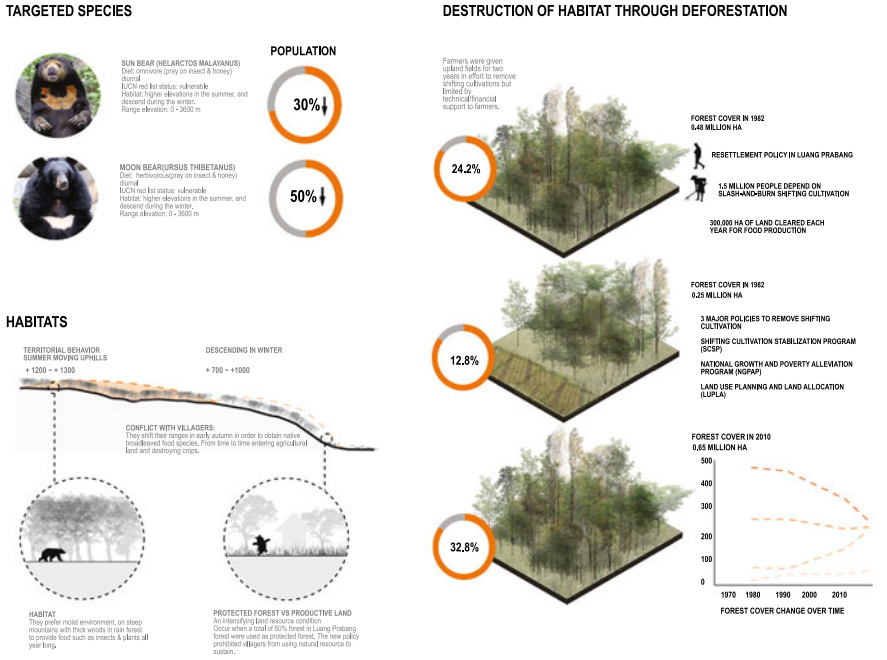


Fig. 30 Bear territory and seasonal migration patterns. Luang Prabang's protected forest is degraded and needs to be reforested in order to establish a buffer zone and restore bear habitat

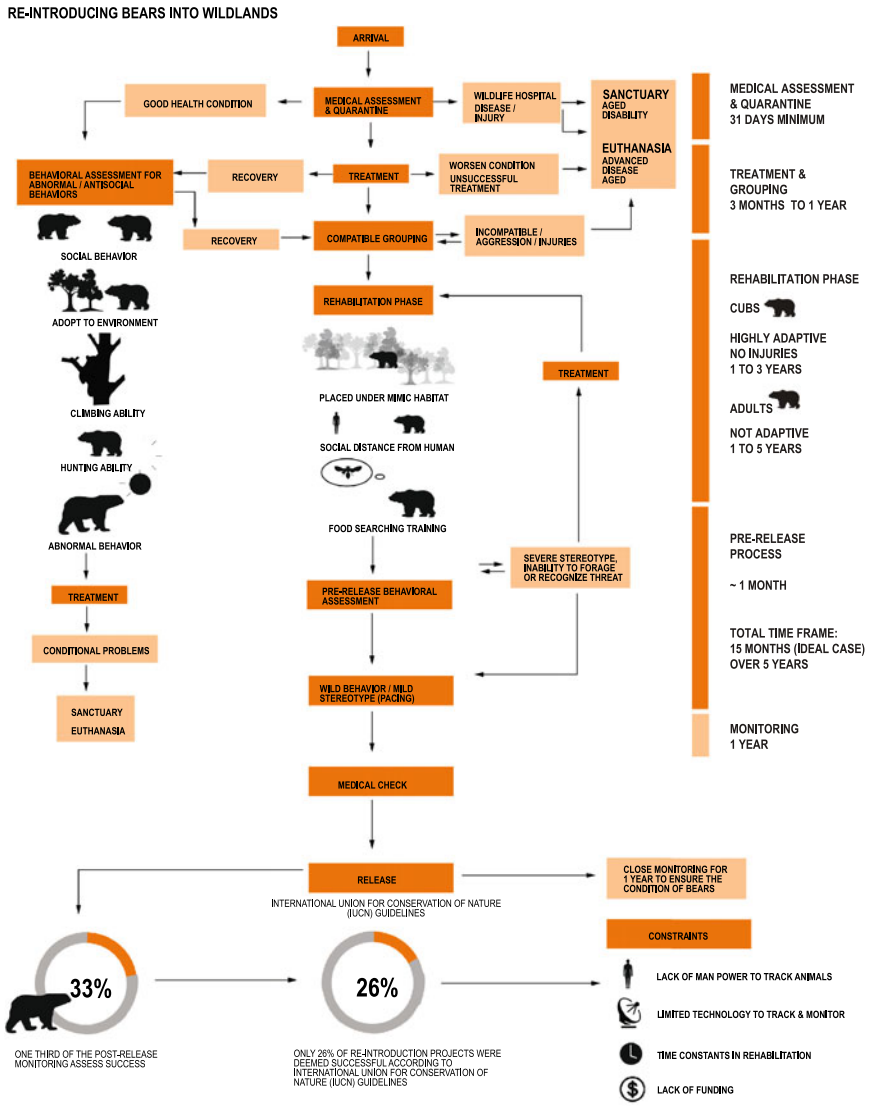


Fig. 31 Procedures and challenges of rehabilitation and reintroduction of captive-reared bears

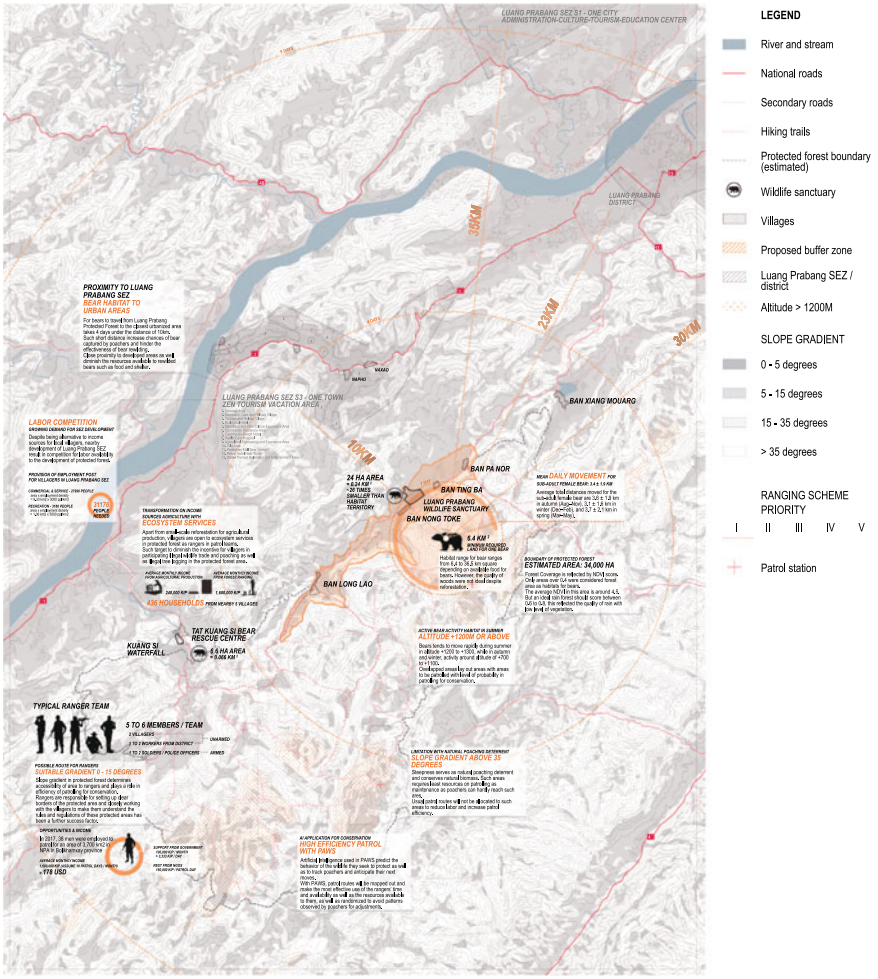


Fig. 32 The successful implementation of the bear-releasing scheme at Luang Prabang's protected forest depends strongly on the participation and patrolling effort of individuals from the local villages

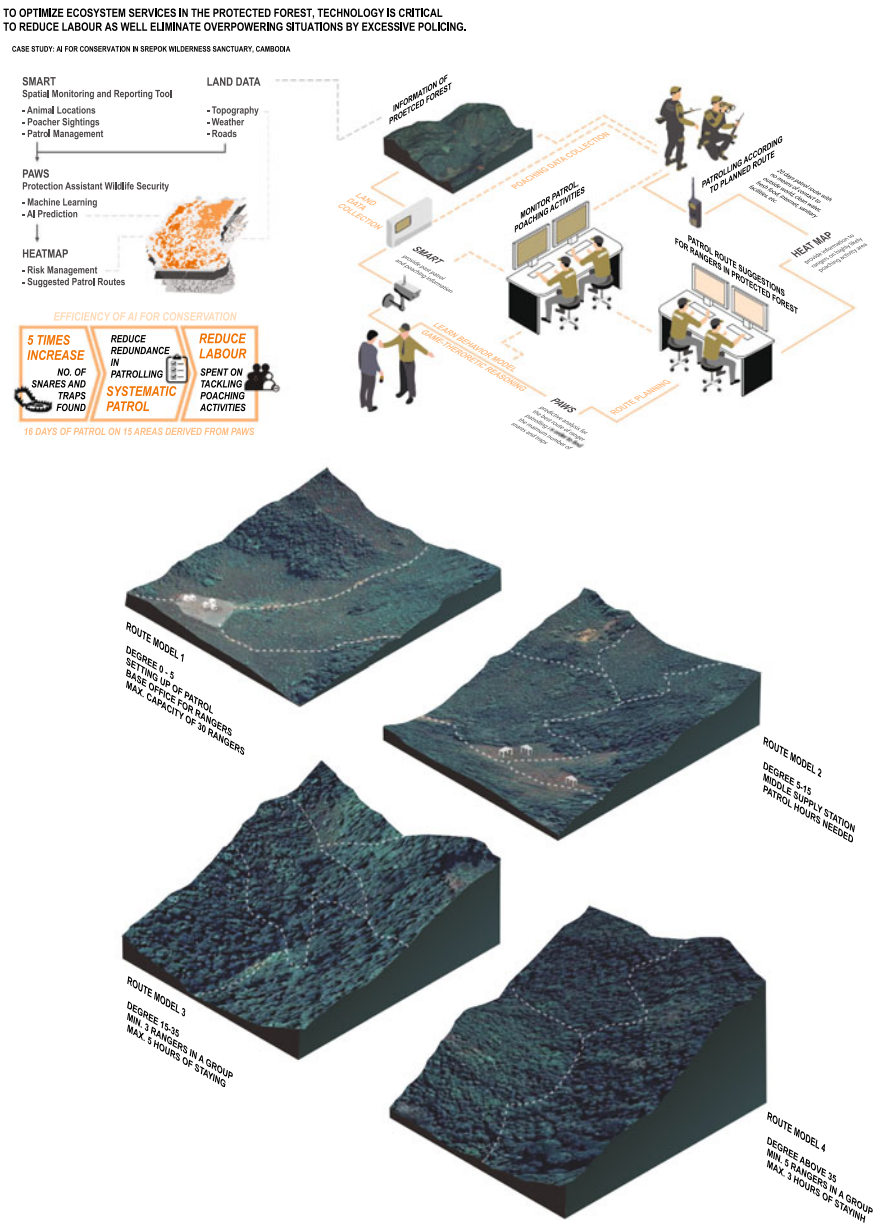


Fig. 33 Patrol route planning and strategic, ethical application of artificial intelligence technology in conservation, which is important given the increasing militarization of such technologies in conservation practices around the world

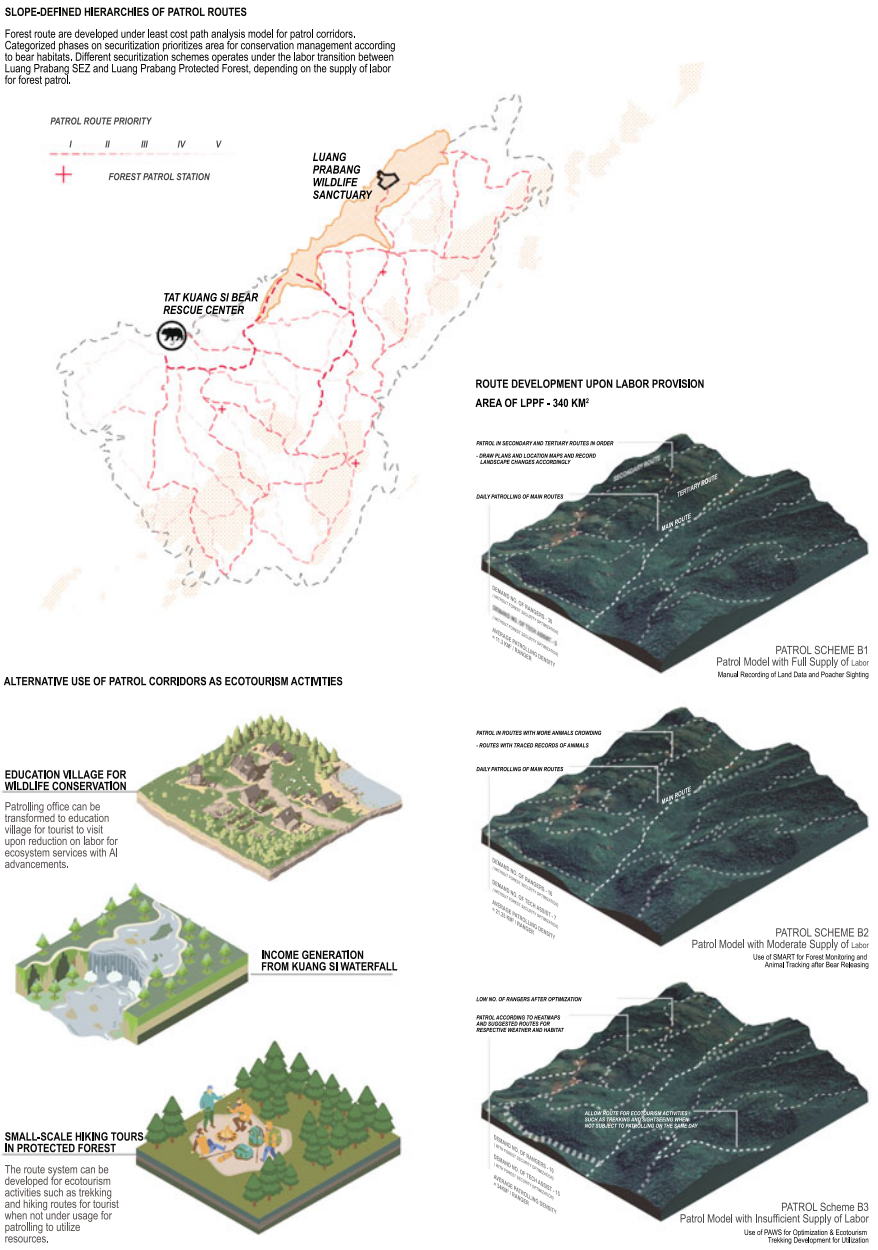


Fig. 34 Three patrol schemes are outlined corresponding to the availability of labor, degree of artificial intelligence utilization, and demand of ecotourism activities at Luang Prabang's protected forest

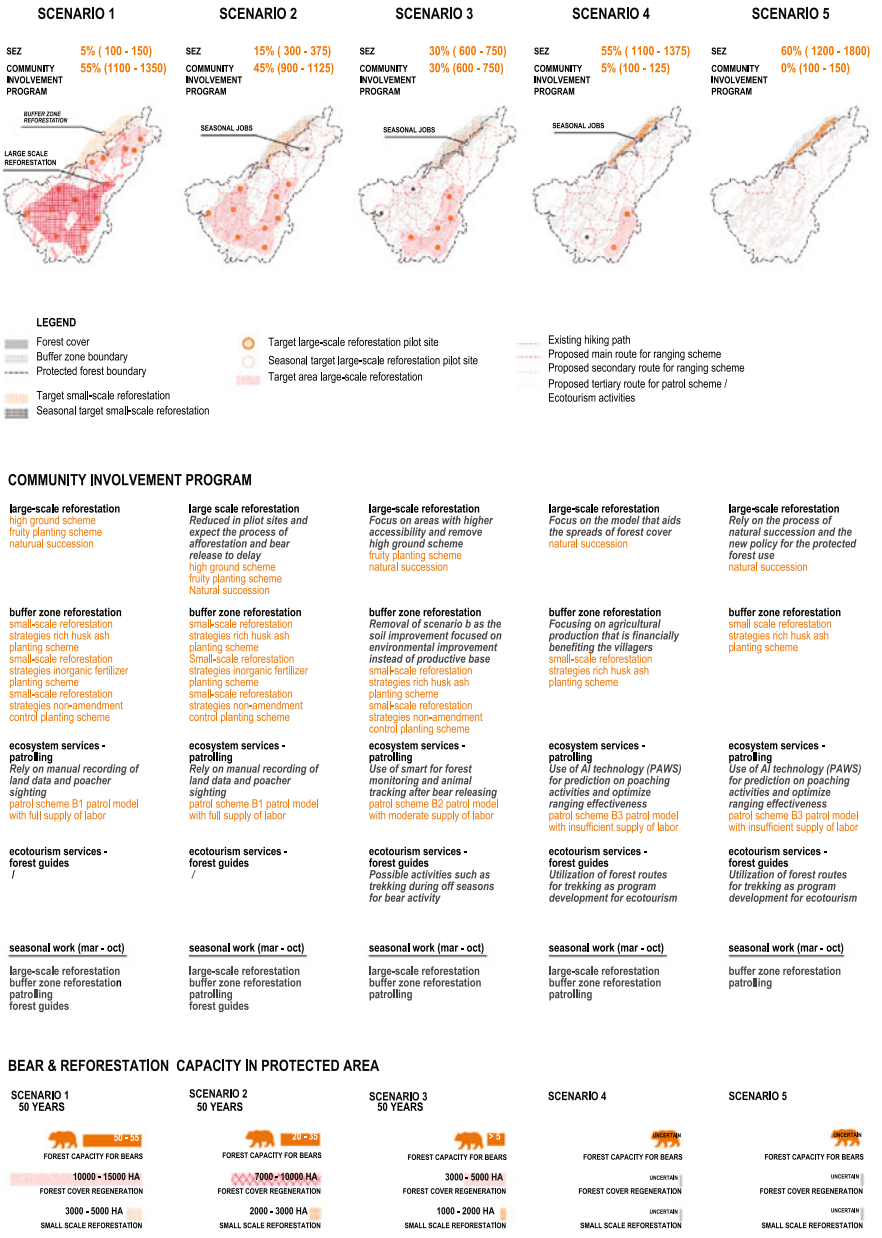


Fig. 35 Five scenarios are outlined to empower a labor transition with socioecological benefits. Each scenario is characterized by different speeds and scales of strategy implementation and consequent bear-releasing capacity at Luang Prabang's protected forest

Fig. 36 In Scenario One (top), 55% of the working population will participate in the scheme, and 15,000 ha of the forest will be regenerated in 50 years. In Scenario Three (middle), only 30% of the working population is assumed to willingly participate in the scheme, and 5,000 ha of the forest will be regenerated in 50 years. In Scenario Five (bottom), most of the villagers may eventually decide to work in the Luang Prabang Special Economic Zone, and none of the working population will participate in the community involvement program for forest regeneration

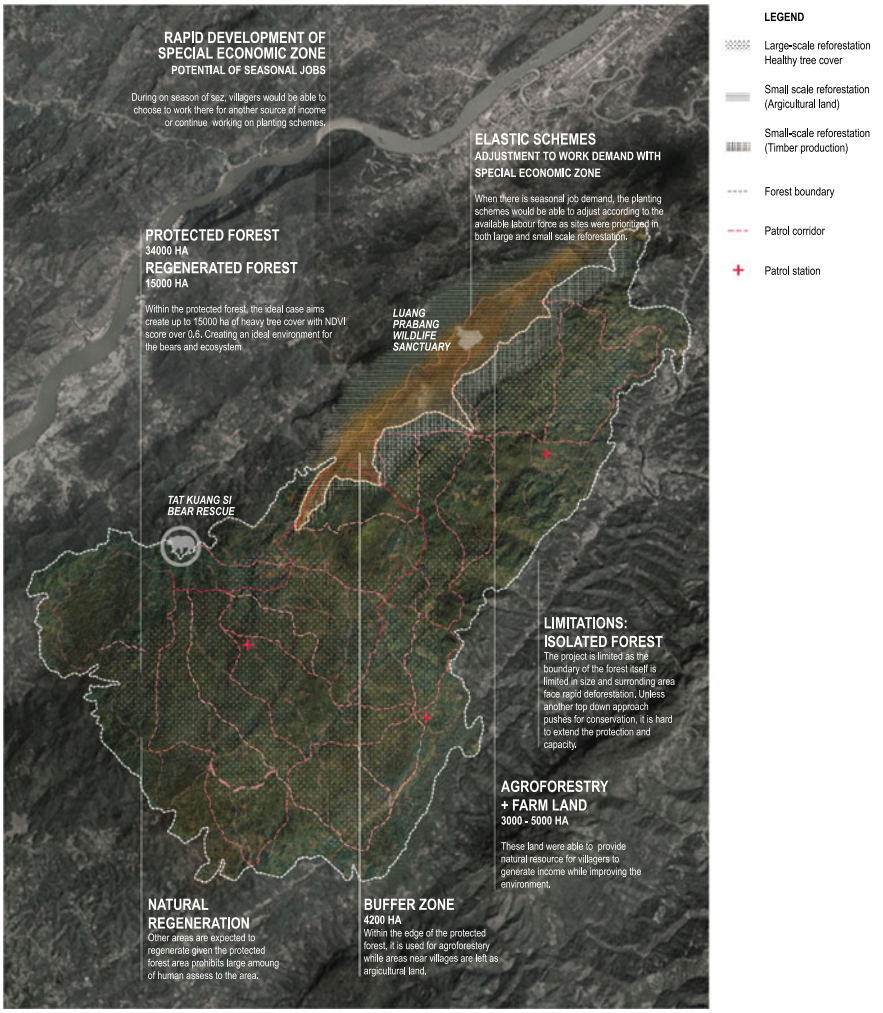


Fig. 37 In the first five to 10 years of proposal implementation, Scenario One is likely to happen given the uncertainty of the construction and opening of the Luang Prabang Special Economic Zone (SEZ). After the first decade of project implementation, Scenario Three is likely to happen, and local communities are expected to participate in the planting and patrolling schemes while seeking seasonal employment opportunities at the SEZ. Ultimately, this project introduces flexible strategies that enhance the communities' freedom of choice

4 Clean Versus Organic: Strategic Agricultural Enterprises for Vientiane Under Rural–Urban Migration

This proposal advocates the establishment of new agricultural enterprises in Vientiane, Laos's national capital, which is undergoing rapid rural–urban transformation and situated at the receiving end of nationwide rural–urban migration of the past two decades. Specifically, this proposal promotes sustainable agricultural practices that are "clean" rather than "organic" within the specific socioeconomic context of Laos (Fig. 38).

The increasingly mainstream organic agricultural practice, which emerged due to the growth of ethical consumerism in developed countries, may not be a suitable model for Laos.[6] Organic agriculture criticizes negative socio-environmental impacts of industrial agriculture and advocates reciprocity and justice (Clarke, 2008). Nevertheless, this practice is tightly associated with capitalist agriculture and often excludes alternative agricultural practices that are otherwise socially, ethically, and environmentally responsible but that remain outside the government certification system, largely for political-economic reasons (Moberg, 2014; Schreer & Padmanabhan, 2019). In Laos, institutional infrastructure supporting organic agriculture has been established since the early 2000s, with a state certification body formed in 2005 (UNCTAD, 2012). In contrast to organic agriculture, this strategic planning proposal promotes clean agriculture based on the following two premises. First, acknowledging that farmers possess irreplaceable and incomparable knowledge about their land and practices, clean agriculture is built on trust and peer-group assessment as an alternative to government certification. Second, understanding that most land in rapidly urbanizing Vientiane has been polluted to various degrees, clean agriculture promotes the improvement of degraded land via agricultural practices rather than mandating organically certified products grown on pollutant-free land (Figs. 39, 40 and 41).

This proposal pays tribute to and draws inspiration from the practice of the Participatory Development Training Centre (PADETC), an indigenous, all-Lao organization founded in 1996 to promote "education for sustainable development" (PADETC, 2012). Through detailed analysis of two of PADETC's development learning centers and networks in Vientiane, namely Panyanivej Eco-Rice Fish Farm and Suanmailao Eco-Forest Learning Center, this proposal recognizes both the value of PADETC's participatory operational frameworks and the ever-intensifying challenges to advocate for sustainable development in Laos. These challenges include the recently constructed highway, which links the Wattay International Airport and Vientiane station of the China-Laos Railway and that bisected Panyanivej Farm and destroyed its primary irrigation source, and the Saysettha Special Economic Zone (SEZ), which expropriated the Suanmailao Eco-Forest within its development zone (Figs. 42 and 43). In addition to the fact that the expansion of development projects has physically impaired and spatially constrained the much-needed programs and facilities of these

[6] Authors' conversation in March 2019 with Shui-Meng Ng, founder of TaiBaan and wife of disappeared sustainable development expert Sombath Somphone.

social enterprises, Vientiane faces increasing social issues related to the influx of young rural–urban migrants from diverse regions of the country who are in search of better employment opportunities.[7]

Given all of these challenges, this proposal foregrounds the importance of securing agricultural land for sustainable practices in rapidly urbanizing Vientiane, on the one hand, and preserving indigenous agricultural and environmental knowledge for rural–urban migrants on the other. While domestic NGOs such as PADETC and other social enterprises try to expand their influence by establishing education centers in various parts of the country, this proposal takes a reversed approach by motivating young migrants in Vientiane to participate in agricultural knowledge production and exchange programs. Specifically, this proposal takes advantage of young migrants' transitional periods, which average between three and 12 months starting from their arrival in the city and securing of employment, offering short-term job opportunities and accommodation.

Agricultural land along the Houay Makhiao River connecting the former That Luang Marsh and the Mekong River is identified as a hypothetical site to set up a network of community-based platforms promoting knowledge exchange and "clean" agricultural practices (Figs. 44, 45 and 46). With the That Luang Marsh, once Vientiane's largest wetland (Gerrard, 2005, p. 5), recently subsumed into That Luang Lake SEZ, this proposal also functions as a strategy to resist further urban expansion along the Houay Makhiao River by transforming the land into a crucial piece of agricultural and educational infrastructure with both local and national significance. Three categories of existing livelihood dependency (i.e., high, medium, and low) on the Houay Makhiao River are identified and three out of the seven villages along the river are selected as sites for scenario-building (Figs. 47, 48, 49, 50, 51, 52, 53, 54 and 55). An operational matrix is suggested that pairs up particular sets of agricultural practices and knowledge with these sites as characterized by levels of land degradation, water pollution and land and water availability.

Recognition the social and ecological impacts from the unprecedented speed and scale of rural–urban transformation in Laos, this proposal promotes a Lao-specific sustainable model that improves food security, knowledge resilience and socio-environmental justice.

The design proposal "Clean versus organic: Strategic agricultural enterprises for Vientiane under rural–urban migration" and accompanying illustrations were developed by Cynthia Chan Sze Wai, Micky Lo Sheung Miu, and Theo Sham Chi Chung during the course *Studio Laos: Strategic Landscape Planning for the Greater Mekong*.

[7] Authors' conversation in March 2018 and 2019 with the director of Panyanivej Eco-Rice Fish Farm.

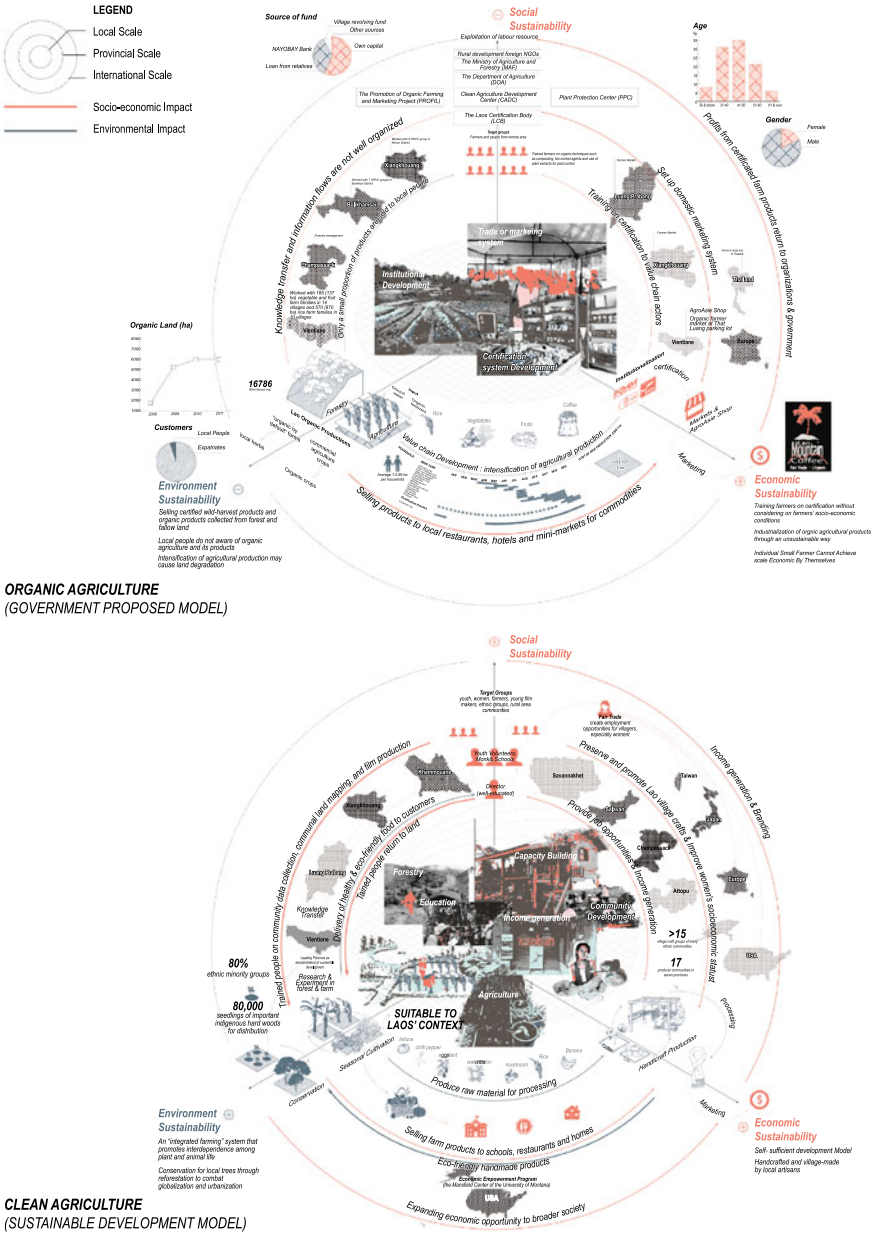


Fig. 38 Comparison of trust-based clean agriculture and certificate-based organic agriculture models. Given the specific socioeconomic context of Laos, this proposal promotes clean agriculture that acknowledges the farmers' irreplaceable and incomparable knowledge about their land and practices and promotes the improvement of degraded land through agricultural activities

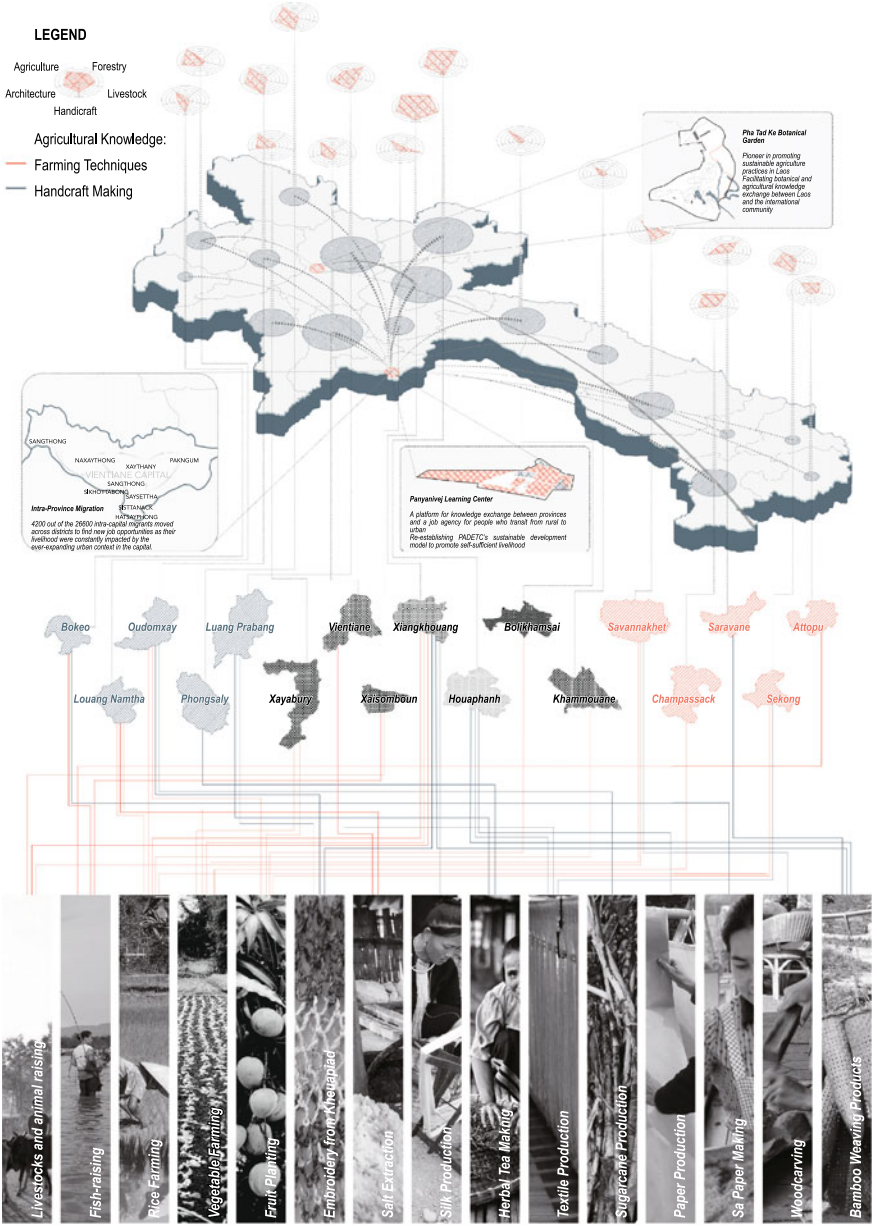


Fig. 39 Rural–urban migrants newly arrived at Vientiane, Laos's national capital, carry region-specific indigenous knowledge, including agricultural, forestry, livestock, handicraft and architectural

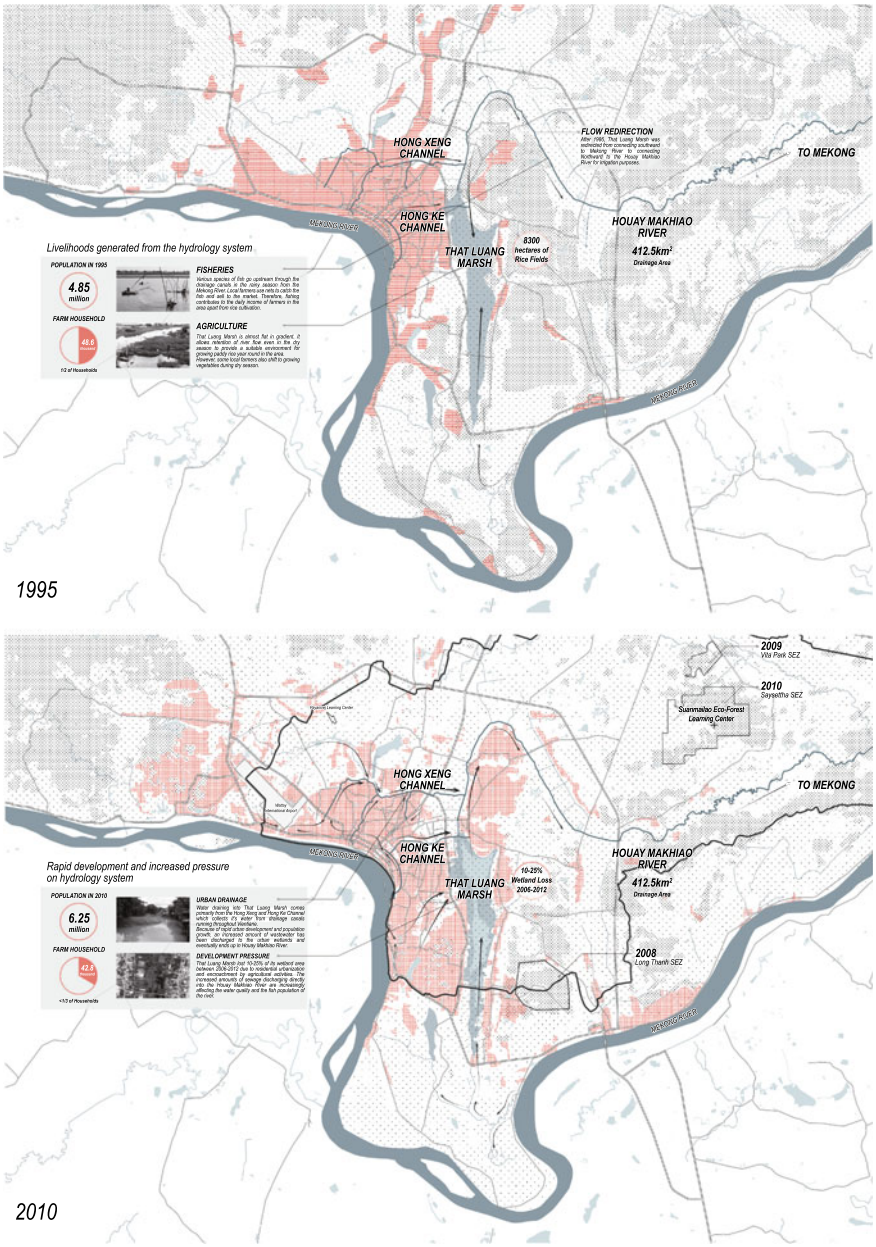


Fig. 40 Hydrological system of Vientiane in 1995 (top) and 2010 (bottom). Rapid urbanization leads to changes in the quantity, type and spatial patterns of land use and radically transforms the hydrological system of Vientiane Prefecture

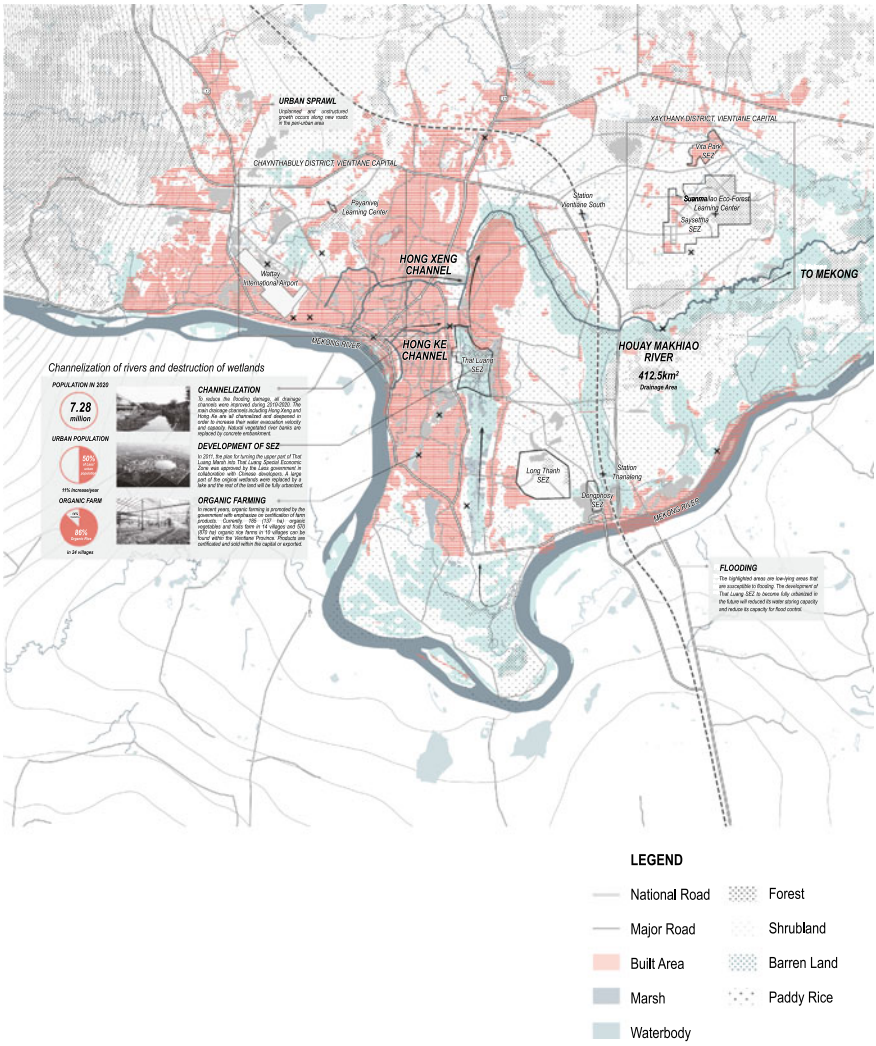


Fig. 41 Hydrological system of Vientiane in 2020. Enclosure and urbanization processes, particularly the establishment of five special economic zones in Vientiane over the past decade, have significantly decreased the availability of agricultural land and the viability of smallholder agricultural practices

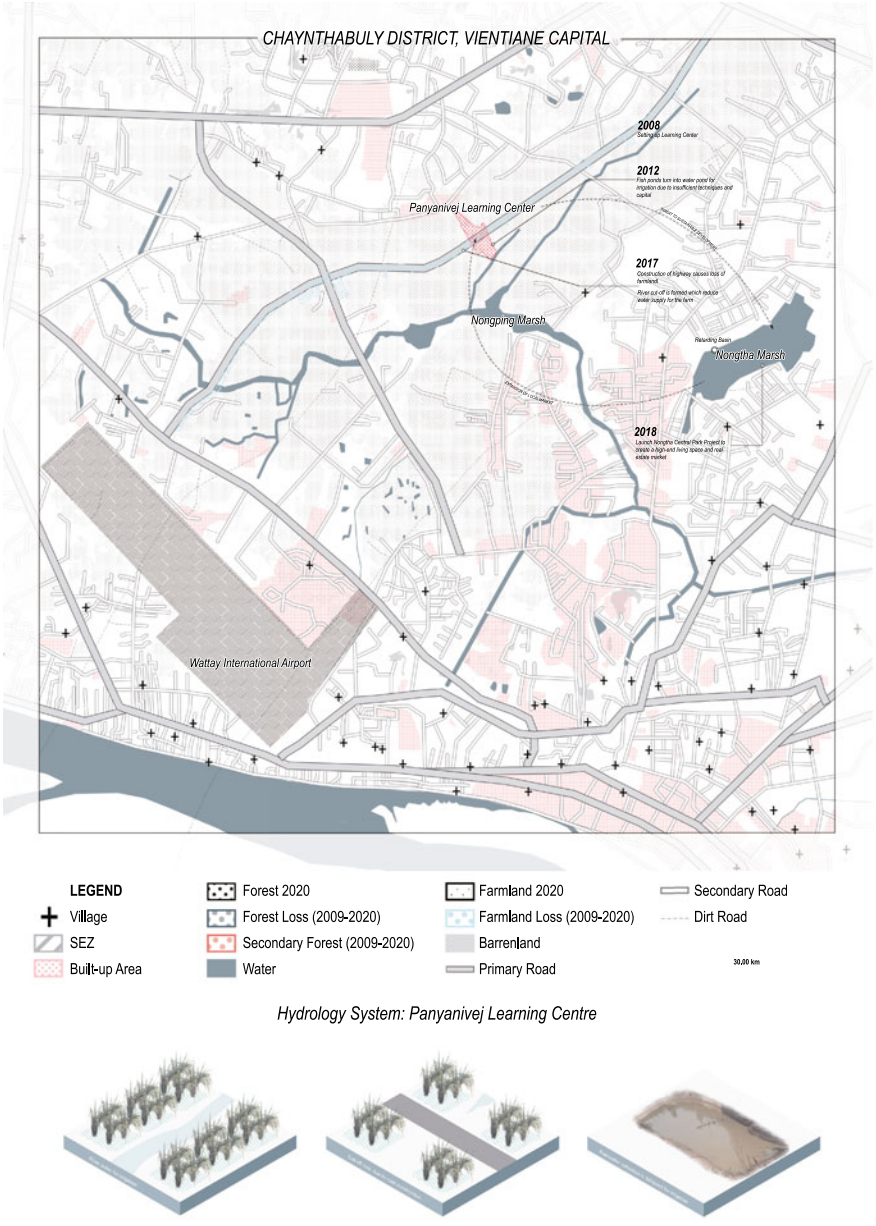


Fig. 42 Case Study One: Panyanivej Learning Centre of the Participatory Development Training Centre (PADETC). The recently constructed highway linking the Wattay International Airport and the Vientiane station of the China-Laos Railway has bisected Panyanivej Farm and destroyed its primary irrigation source

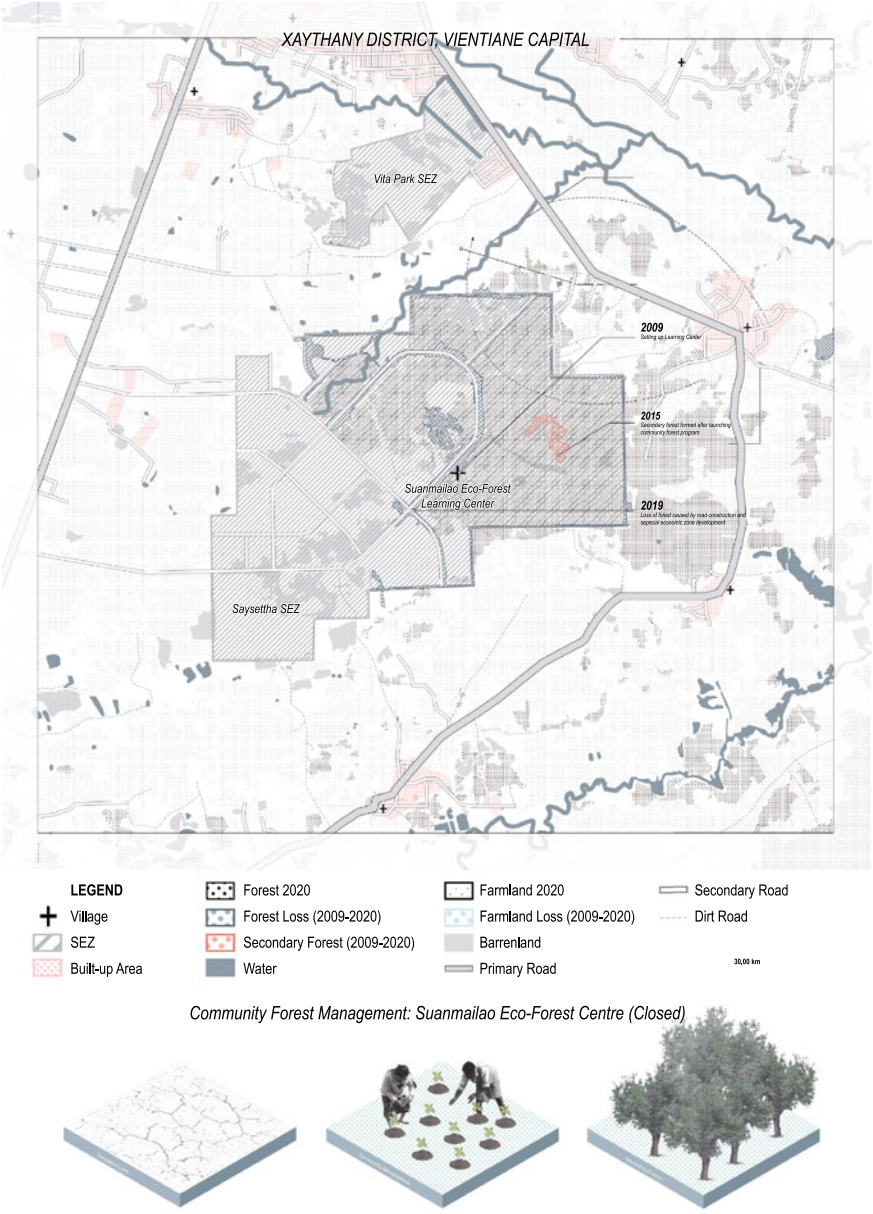


Fig. 43 Case Study Two: Suanmailao Eco-Forest Learning Center of the Participatory Development Training Centre (PADETC). The Saysettha Special Economic Zone has completely expropriated the Suanmailao Eco-Forest within its boundary

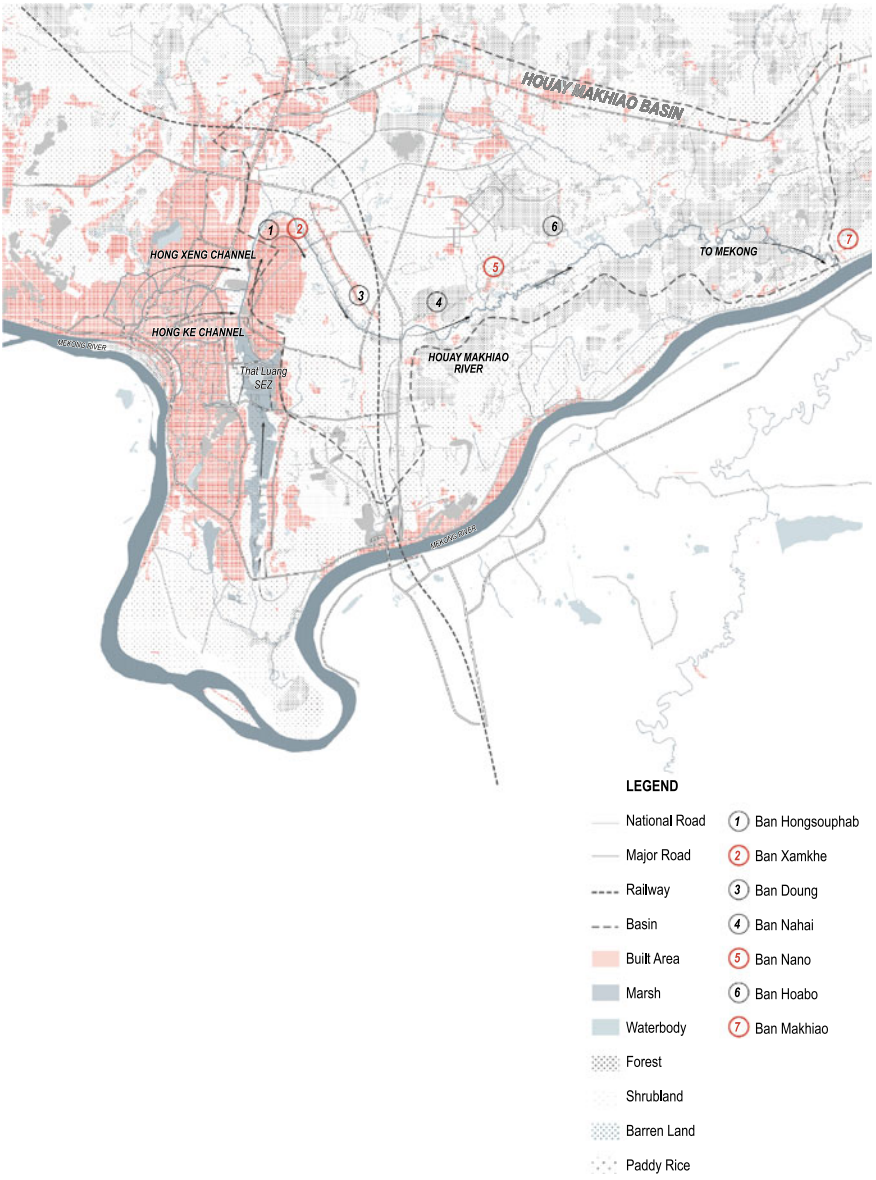


Fig. 44 Proposed sites for the establishment of agricultural enterprises in Vientiane. With the That Luang Marsh (Vientiane's largest wetland) recently subsumed within the That Luang Lake Special Economic Zone, strategic proposal sites have been selected to further counter the urban expansion along Houay Makhiao River by transforming the land into crucial sites of agricultural and educational infrastructure

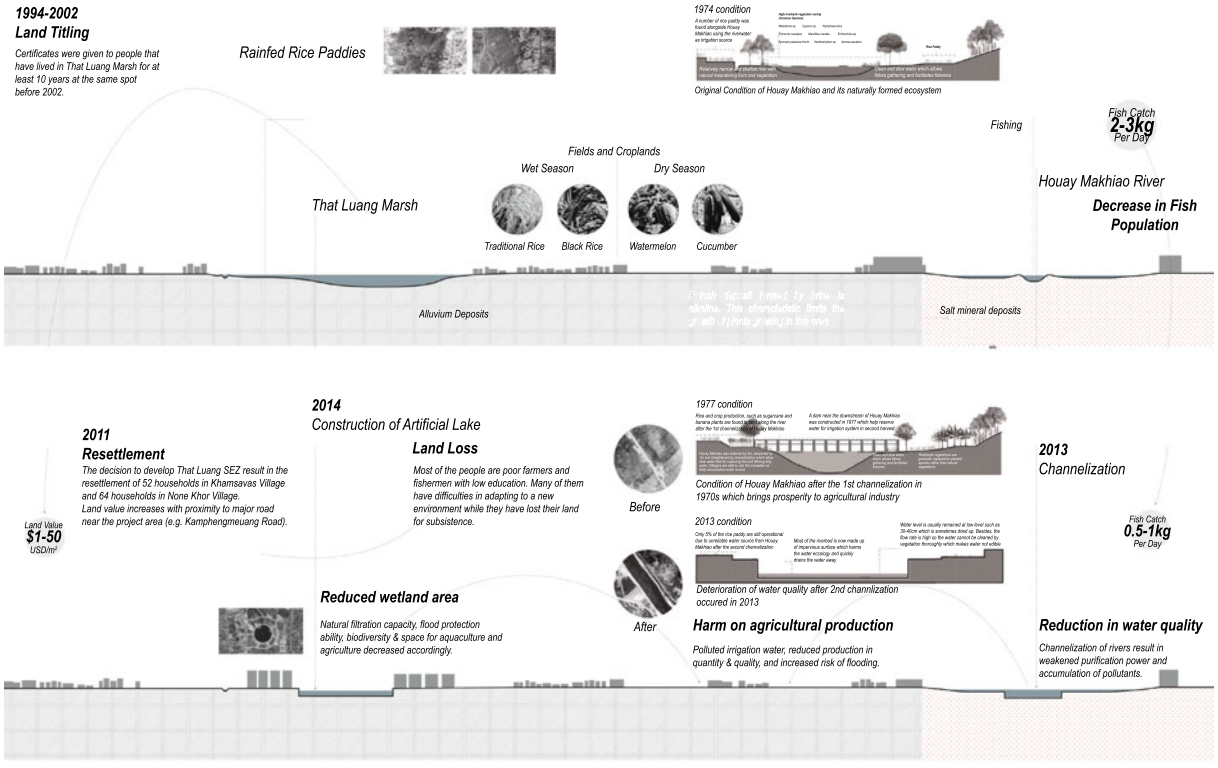


Fig. 45 Comparison of past and current sections of That Luang Marsh and Houay Makhiao River, highlighting major events since 1995 that have transformed the land use and hydrological condition in the basin

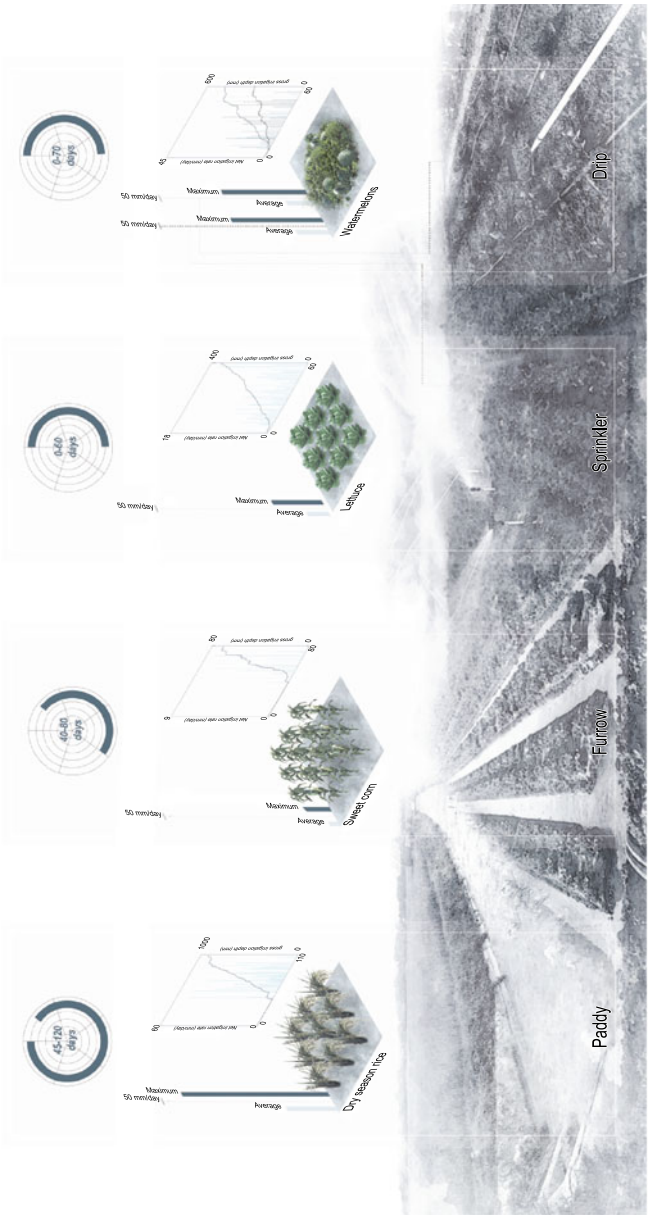


Fig. 46 Comparison of water needs of four major cash crops suitable for the site

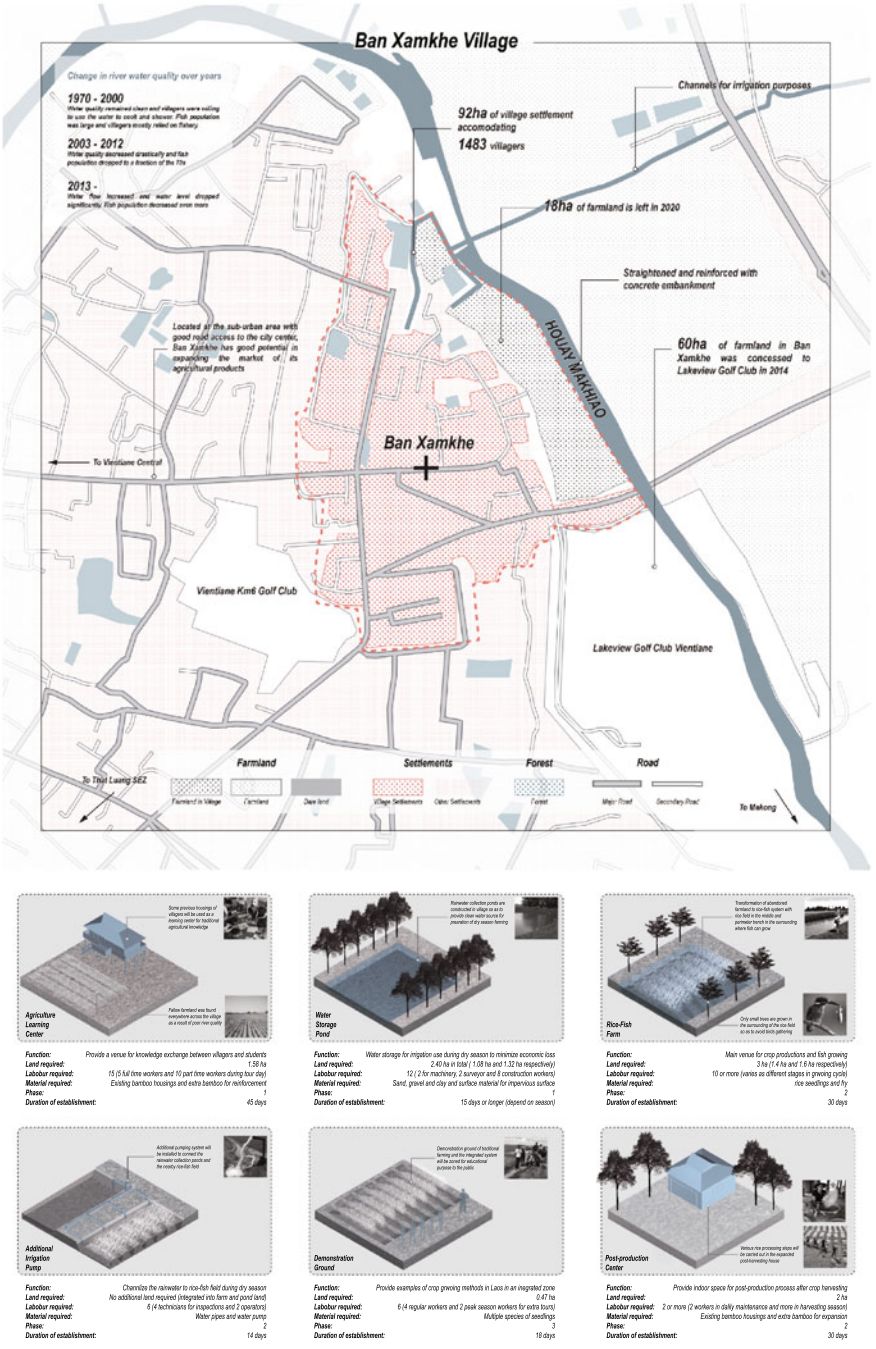


Fig. 47 Site plan of Ban Xamkhe village and proposed development model A: eco-agriculture

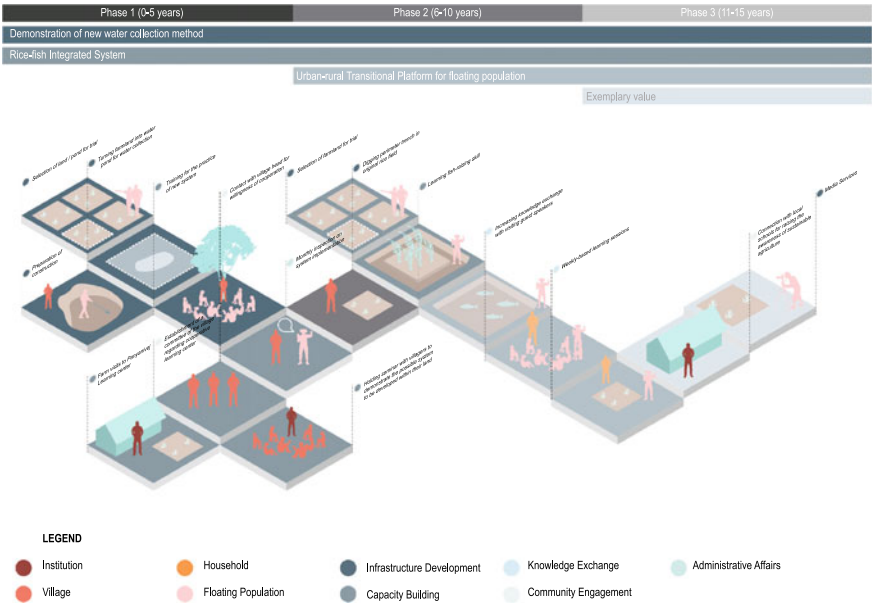


Fig. 48 Development phases of proposed eco-agriculture introduced to Ban Xamhe village

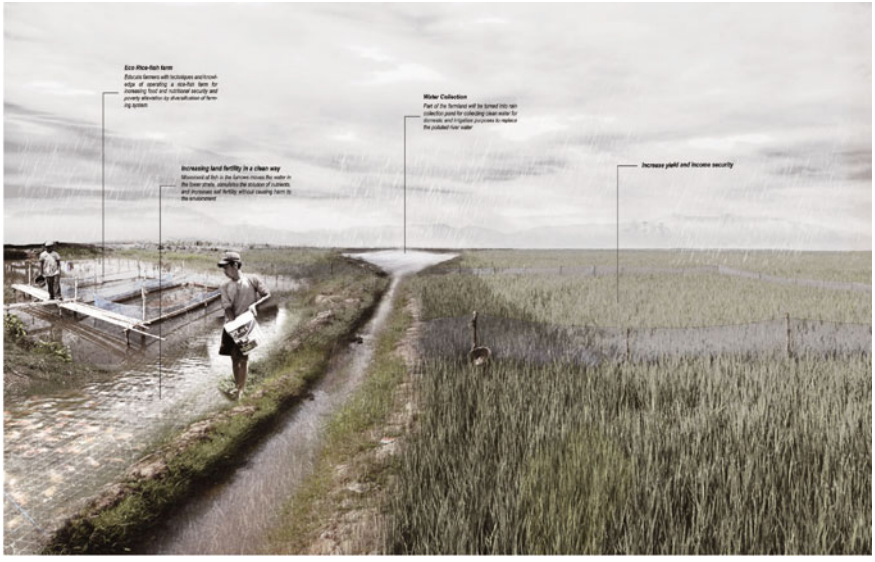


Fig. 49 Illustrative view of eco fish-rice farm at Ban Xamhe village

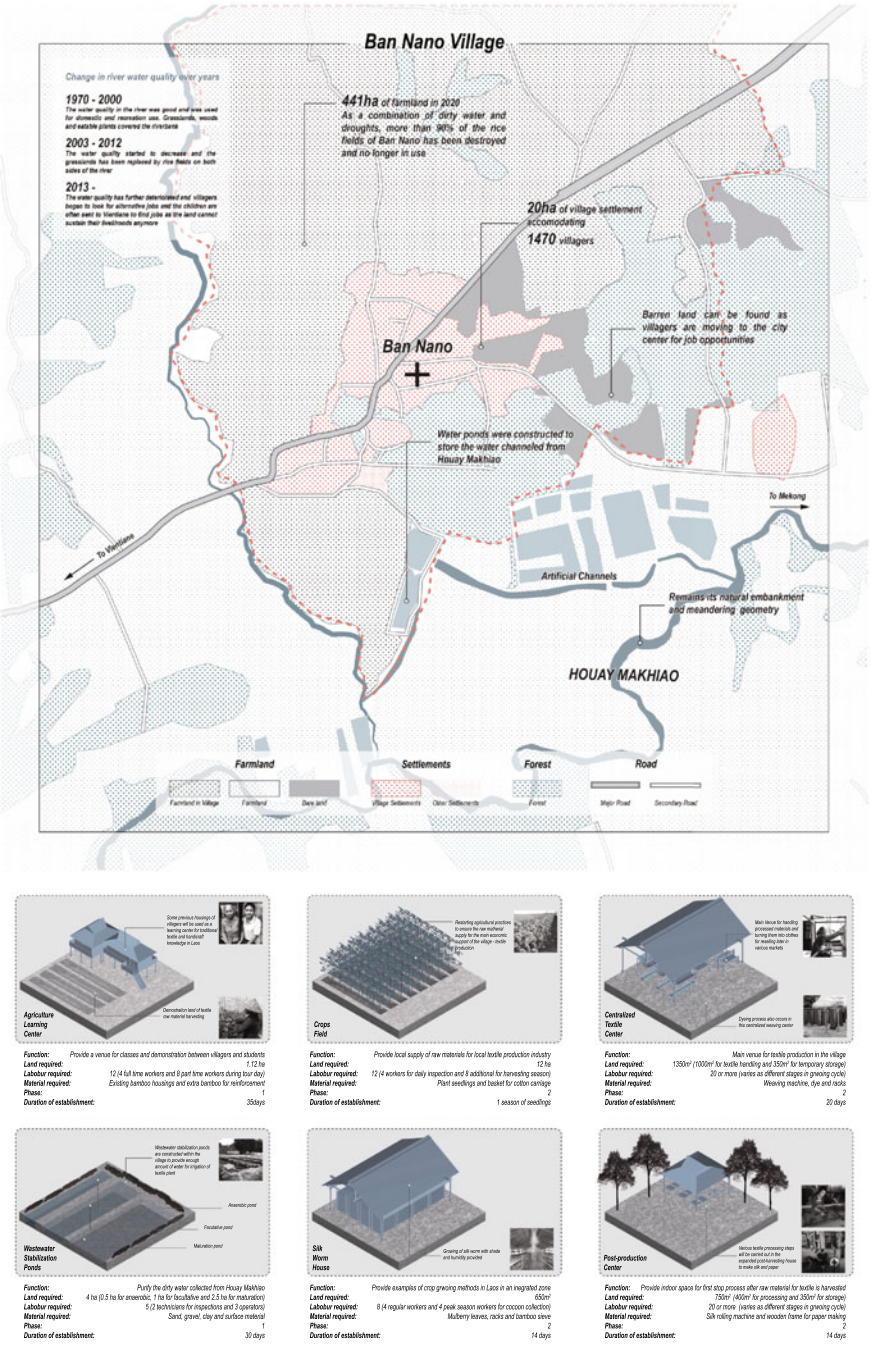


Fig. 50 Site plan of Ban Nano village and proposed development model B: conservation agriculture

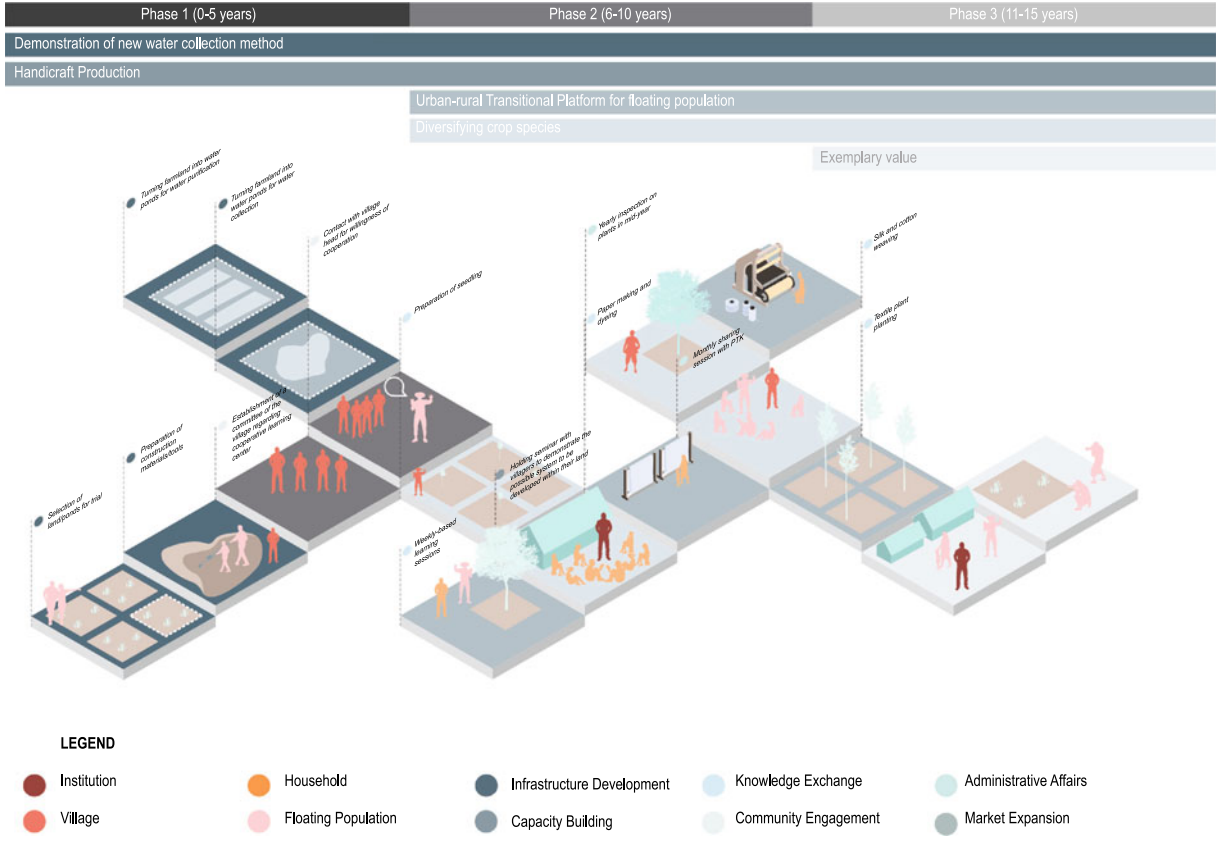


Fig. 51 Development phases of proposed conservation agriculture introduced to Ban Nano village

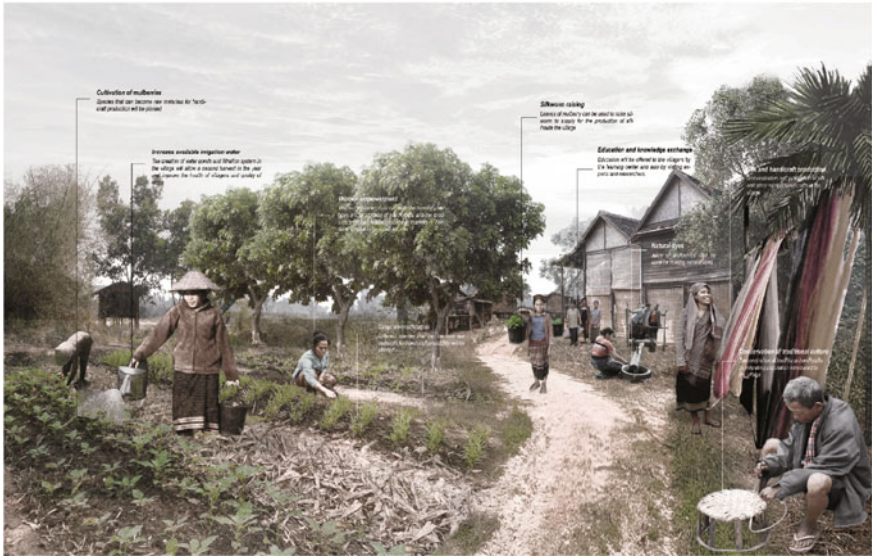


Fig. 52 Illustrative view of conservation farm at Ban Nano village

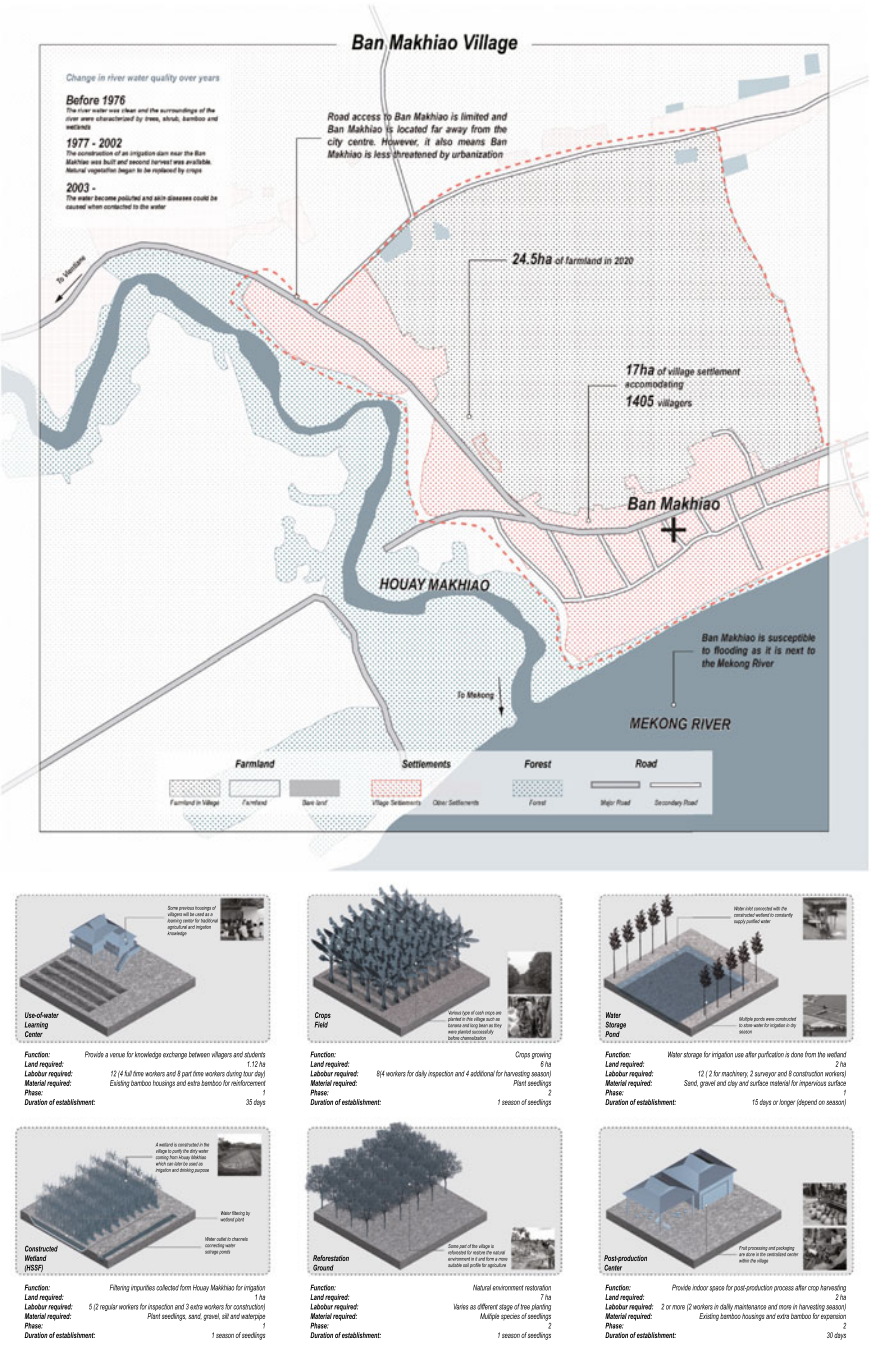


Fig. 53 Site plan of Ban Makhiao village and proposed development model C: self-sufficient agriculture

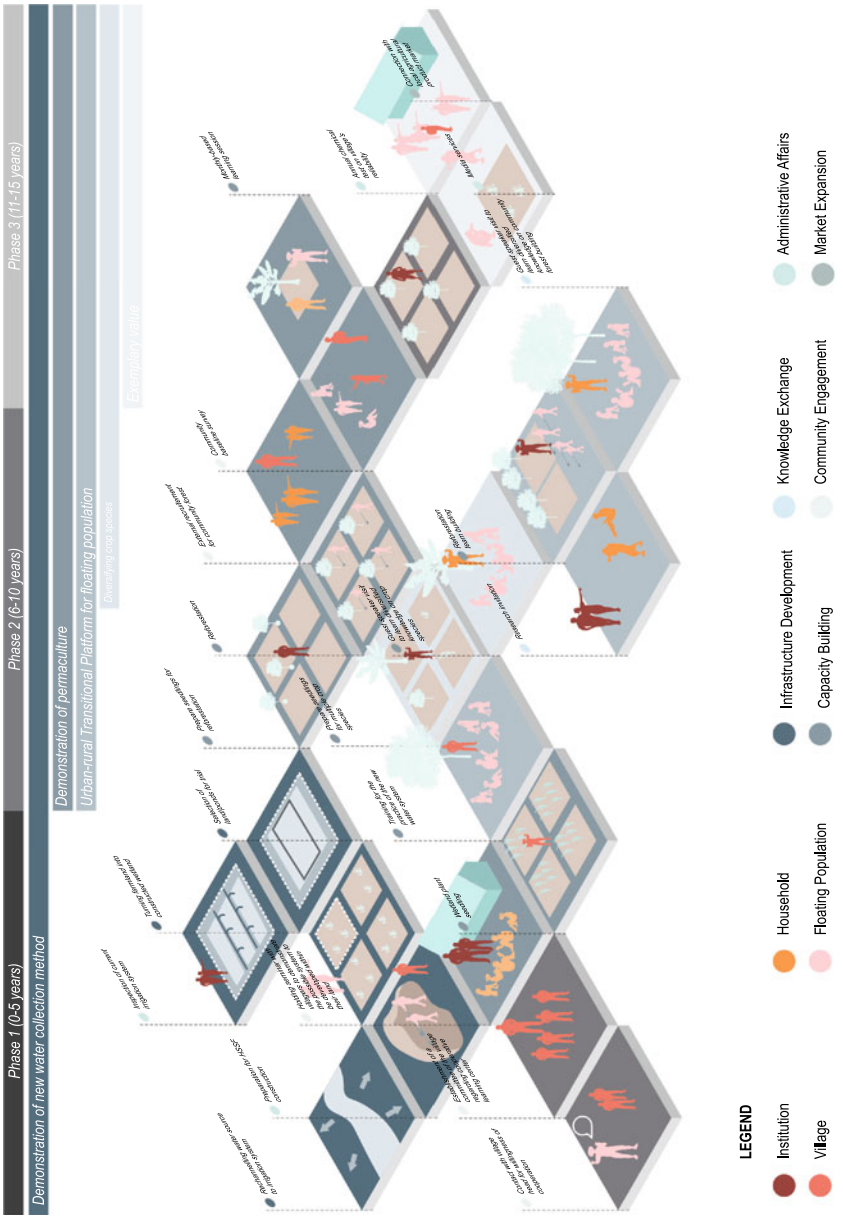


Fig. 54 Development phases of proposed self-sufficient agriculture introduced to Ban Makhiao village

Fig. 55 Illustrative view of self-sufficient farm at Ban Makhiao village

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