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The temporally cumulative effects of hydropower development in northern Laos: Insights from the Nam Ou Basin

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ABSTRACT

Projects like hydropower schemes often lead to ruptures in the fabric of life, especially among rural communities reliant on natural resources for their livelihoods and well-being. But livelihoods are shaped by longer pathways of change, and a focus on singular projects can sometimes hide the cumulative effects of successive interventions. Drawing on a study of the lower reaches of the Nam Ou Basin in the Pak Ou and Nam Bak districts of Luang Prabang province in Laos, this paper explores how the social outcomes of a major hydropower project emerge from and are contingent upon long-term changes in livelihoods that can be dated back to the 1970s. The Nam Ou River Cascade Hydropower Project is only the most recent of a historical accumulation of extractive development projects and their cascading effects on a particular place and its inhabitants. The paper critically engages with how time and event, era and moment are employed in understanding the scale and nature of social and environmental transformations in places like the Nam Ou Basin.

1. Introduction

The 21st century has seen a surge of new hydropower projects across the Global South, driven by the growing influence of quasi-state actors and expert groups with the aims and the means to extract value from previously out-of-reach areas (Ahlers et al., 2017; Miller et al., 2020; Boelens et al., 2019). As hydropower infrastructures (re)enter the development agenda and become part of regional renewable energy transitions, there is equally a renewed need and interest in understanding their social impacts in the context of significant changes that have taken place in host regions since the turn of the century. The Mekong Basin reflects many of these trends, having undergone notable transformations in rural life and livelihoods on the one hand and becoming a hotspot of new hydropower projects on the other. According to a 2024 survey, there were 54 new dams under construction and 331 new projects planned across the basin (Ang et al., 2024). The vast majority of these new projects are located and proposed in Laos and Cambodia (ibid).

To understand the social implications of the ongoing ‘hydropower boom’, a steadily growing body of inter-disciplinary research

demonstrates the costs of constructing and operating large dams in the basin, highlighting the *trans*-local effects on rural economies and livelihoods both in and away from locations of dam construction and operation. Researchers working on this theme have noted the negative impacts of degrading mobile resources, such as migratory fish and mobile sediments, on local communities and national economies (Delang and Toro, 2011; Grundy-Warr and Lin, 2020; Lamb and Fung, 2022). Relatedly, scholars have exemplified the spillover effects of hydropower development on land-connected natural resources that have long sustained the basin’s food security (Keskinen et al., 2015; Baird and Barney, 2017). Locally, the arrival of large dams has instigated a series of ‘ruptures’ (Miller et al., 2021; Mahanty et al., 2024) – episodes of dramatic change in the social and environmental fabric of the basin – that have resulted in the (re)production of new and old forms of power imbalances (Soukhaphon, 2024) and set in motion a cascade of environmental impacts across space and time (Soukhaphon et al., 2021; Baird, 2024).

Yet, as we show in this paper, hydropower development is only the most recent event in the historical accumulation of development interventions in the Mekong Basin. Livelihoods dependent on the river have been a part of longer and broader processes of change that

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prefigure how actors and institutions perceived and engaged with the impacts of new dams. This temporal dimension of livelihoods, especially in the context of agrarian transformations in the Mekong Basin, has been well documented in the context of Laos, upon which this paper focuses. There exists a rich tradition of research that traces the social and economic history of the country, bringing our attention to the ways contemporary livelihoods have been shaped through a series of successive, state- and international aid-led development interventions in upland areas (Bouahom et al., 2004; Rigg, 2005; Suhardiman & Scurrah, 2021). This paper draws upon these insights and brings them into conversation with the inter-disciplinary discussion on the social impacts of large dams in the Mekong Basin outlined earlier.

While our focus is on Laos, it is important to note that it does not stand alone as a country where livelihoods have been buffeted by a cascade of interventions and where marginal groups, often in rural areas, have found their livelihoods compromised in the interests of national development. Informed by a long tradition of research on rural and agrarian change in the Mekong Basin, we show how interventions like hydropower dams can act to occlude longer histories of intervention. In this way, we move beyond a 'before' and 'after' the dam binary, to set the temporalities of rural livelihoods within a much longer time frame of threat and degradation, as well as opportunity and improvement. Using a case in northern Laos, a region where past development interventions have resulted in a unique bricolage of livelihood strategies (Suhardiman et al. 2022; Suhardiman and Scurrah, 2021), we demonstrate how investigations into the social impacts of Mekong dams need to be situated in time as much as in space in order to understand how local histories become implicated in the present. Just as vulnerability to climate change does not 'fall from the sky' (Ribot, 2014), so the effects of dams speak to longer histories of marginalisation.

The empirical focus of this paper is on the Nam Ou River Cascade Hydropower Project (the Cascade Project) – a whole basin hydropower project in northern Laos, development of which unfolded in two phases (2012–2016 and 2016–2021). Livelihoods and local economies across the Nam Ou Basin have since been transformed significantly (IFC, 2017). Researchers and activists have documented significant losses in aquatic resources and production lands across the basin, exacerbated by inadequate compensation measures offered by the Cascade Project (Saimok, 2019; Phetsada and Mizuno, 2019; Eyler, 2020). In this paper, we similarly attend to the impacts of the Cascade Project on river-dependent communities. Rather than quantifying these impacts, however, we bring attention to the basin residents' experiences of the project's arrival in the context of their livelihood histories. We suggest that the construction and operation of the Cascade Project have generated what we describe as temporally cumulative effects – social outcomes that emerge as a result of dam-induced changes in the environment and community interacting with rural change 'already under way' (Vicol, 2018). In so doing, this paper offers further empirical evidence to critical discussions on the limits of impact assessments that focus on singular projects, and how the impacts of hydropower projects should be better understood as a process of rupture, or when the arrival of such projects serves as an additional, yet significant force of change situated within the dynamic historical context of affected ecologies and communities.

We start the paper with the methodological and theoretical discussions informing the study. We then turn to the Nam Ou Basin and outline the commonly shared yet locally unique histories of agrarian and livelihood transformations across the Pak Ou and the Nam Bak districts of Luang Prabang province in northern Laos. This contextual discussion is followed by a section summarising the formally recognised social impacts of the Cascade Project. Juxtaposing this, we elaborate on the temporally cumulative effects of the project basin using ethnographic vignettes from two affected villages – Ban Hat Pha Ot and Ban Bokkham. These vignettes exemplify that in northern Laos, the present-day links to the past in complex ways, and local histories of livelihood transformation frame and outline the social outcomes of more recent projects. We elaborate further on the value of taking a temporally sensitive

analysis of hydropower impacts in the discussion and conclusion sections of the paper.

2. Methods and materials

The empirical research that informs the arguments developed in this paper was built through a process of patchworking, i.e., weaving together materials and insights gathered from one area over an extended period of time (Günel and Watanabe, 2024). Insights into the agrarian transformations in the Nam Ou Basin build on prior ethnographic research by Rigg (Bouahom et al., 2004; Rigg et al., 2004; Rigg, 2005) and Suhardiman (Suhardiman and Rigg, 2022; Suhardiman et al., 2019; Keovilignavong and Suhardiman, 2020), undertaken between 2000 and 2020. The empirical discussions of the events following the construction and operation of the Cascade Project draw upon research by Taij, undertaken between 2018 and 2021. Building on our earlier research and connecting this with more recent ethnographic research in the Nam Ou Basin, we present our research findings as empirical 'snapshots' of livelihood transformations over some two decades. Here, we (re)connect and (re)construct timelines of long-term livelihood change of the two focus villages we call Ban Hat Pha Pt and Ban Bokkham. In this way, we situate the social implications of the Cascade Project in these two villages within the broader context of hydropower development in the Mekong Basin and present a spatial mosaic and temporal pathway of how agrarian structure and processes are transformed by external and internal drivers of change in the basin.

In her research on customary land tenure systems in northern Laos, Suhardiman with Natalia Scurrah (2021) showed how local villagers were forced to adapt their upland rice cultivation practices when the government introduced land use planning programs to classify and delineate farmers' farmland from forest lands. Similarly, large-scale agricultural plantations for rubber cultivation also resulted in massive land-grabbing of farmers' farmland, if not expropriating villagers' food security altogether (Keovilignavong and Suhardiman, 2020). This shows how local communities living in the area had subsequently been forced to adapt to external changes across spatiotemporal scales, spatially in the context of hydropower dam planning, land use planning, and agricultural land concession, and temporally in how these spatial changes accumulated and interacted over time.

Rigg's work (with Bounthong Bouahom and Linkham Douangsanvanh, 2004) showed how livelihoods in rural Laos at the turn of the century, not least in the settlements that we explore in this paper, were becoming spatially, sectorally and inter-generationally complex even before the advent of the hydropower scheme that we focus on here. The land resource was being squeezed, and with it, land-based livelihoods. While there was some scope for *in situ* intensification within farming and engagement with various non-farm activities, more prevalent was meeting livelihood needs off-farm, through non-traditional activities. A paper written on the basis of this earlier research noted that "a snap shot survey such as this one can only tentatively comment upon livelihood transitions" but nonetheless identified "an important change underway in the means by which poverty and prosperity are reproduced in the study areas." (Bouahom et al., 2004:617). We are now in a position to take another 'snapshot' of a place that has changed, and *been* changed, in ways that we simply did not – and could not – have imagined at the time of the original fieldwork.

Long-term understanding of the agrarian transformations in the two study districts was then further enriched through ethnographically informed field research conducted by Taij in person and remotely in Ban Bokkham (Nam Bak district) and Ban Hat Pha Ot (Pak Ou district) between 2018 and 2021. This research traced changes in the residents' livelihood practices since the construction of the Nam Ou Dam 2 in 2016 near Ban Bokkham and the Nam Ou Dam 1 in 2019, downstream of Ban Hat Pha Ot. Data collection included two focus group discussions supplemented with community resource mapping exercises (FGD), eight semi-structured interviews with community leaders and key informants

at the provincial and district level (KI), and 32 semi-structured resident interviews (RI, conducted in-person and PRI, conducted by phone). Semi-structured interviews were also conducted with Pak Ou and Nam Bak district-level officials from the Agricultural and Forestry Office (DAFO), following an introductory discussion with a senior official at the Luang Prabang Provincial Agricultural and Forestry Office (PAFO). The interviews were translated from Lao to English, and the transcripts were categorised and coded for emergent topics and themes.

These three discrete periods of fieldwork enable us to connect the dots of livelihood change in the Nam Ou Basin, and in particular in these two villages. It also permits us to situate policies enacted from the end of the war in the mid-1970s in upland areas of Laos against contemporary conditions. Communities experienced a series of resettlement programs from 1975 to the 1980s, in an effort made by the government of Lao PDR to bring remote villages closer to services, on the one hand, and gain oversight of villages in unsecured areas, on the other (Evrard and Goudineau, 2004; Baird and Shoemaker, 2007). This large-scale population shift, coupled with the introduction of market-oriented economic reforms in 1986, marked a turning point in how people made a living across rural Laos. Our engagement with the residents of dam-affected villages exemplified this; community leaders described the period between the late 1970s and 1980s as a pivotal time that informed their decisions in the building of their livelihoods and communities in the Nam Ou Valley. Taking on these remarks, we treat the post-war livelihood histories of affected villages, including the visions for a better life that mapped them, as an important local context upon which the impacts of the Cascade Project materialised.

3. The time and event of hydropower development

The main argument we develop in this paper is that the rapid growth of hydropower dams in the Mekong Basin occurs not just in a particular place and time. Just as livelihoods are *trans*-local (Tappe and Nguyen, 2019; Rigg, 2019), so they are also *trans*-temporal (Natarajan et al., 2022). We define *trans*-local and *trans*-temporal livelihoods as activities and strategies that move beyond a specific local or spatial context and/or a particular time frame. They comprise practices that take shape and emerge at particular times but can only be fully understood when seen as part of historical livelihood trajectories embedded in historical socio-economic and political changes that occur due to both internal and external changes.

The above point resonates with critical perspectives emerging around the ‘sustainable livelihoods approach’ (SLA) in the development studies literature outlined below. We take this on board in our ethnographically informed investigation of large dams and their cumulative social effects in northern Laos. Oriented by Nam Ou residents’ narration of the Cascade Project in the context of their livelihood histories, we underline the value of distinguishing between the time and event of hydropower development when it comes to investigating how the arrival of these projects was experienced with other compounding stresses and opportunities. A key implication of this conceptual shift for ongoing scholarly discussions on Mekong dams and their social impacts is a framework to develop a more nuanced understanding of the effects of such infrastructures on livelihood transformations already underway across the basin.

Mekong scholars have extensively discussed and accounted for the negative impacts of large dam projects on local livelihoods and economies in the basin (Intralawan et al., 2017; Baird et al., 2020; Hirsch, 2020). On the topic of differentiated social impacts of large dams, Manorum et al. (2017) highlight how indigenous communities, namely the Brou people living in the Xe Bang Fai River Basin, have been disproportionately affected by degrading riverine resources and the inadequate livelihood restoration programs of the Nam Theun 2 Hydropower Project. In a comparative study of hydropower projects in Laos and Cambodia, Baird and Barney (2017) find that the trans-boundary impacts of large dams have been spatially cumulative, i.e.,

compounded by increasing cross-sectoral pressures on local and trans-boundary land and water commons. Similar observations are made by Phetsada and Mizuno (2019) in the case of the Nam Ou Basin; the Cascade Project has disproportionately negatively impacted the income and food security of ethnic minority households living along the river. As the extant Mekong studies literature makes clear, the proliferation of large dams in the basin has produced varying kinds of challenges and insecurities in how rural communities make a living. Manifold inequalities – ethnic, class, generational, gender – were evident before this era of dam building, and these have sometimes magnified, but sometimes not, such inequalities.

Building upon the above-outlined research, there is now a growing interest among the Mekong studies community in understanding how large dam projects and the environmental changes they cause demarcate the present and future of livelihood transformations across the basin. Focusing on communities resettled by the Theun-Hinboun Expansion project in central Laos, Katus and colleagues (2016) illuminate that while some residents were able to “celebrate and pursue their potential for development” in the context of new livelihood pathways enabled by resettlement, others were not able to adapt to the intensified flows of people, information, and resources arising from resettlement (ibid:14). Suhardiman and Rigg (2021), examining the livelihood implications of the Pak Beng project in northern Laos, suggest that there is a need to situate residents’ (in)ability to adapt to resettlement and other significant livelihood changes within larger-scale processes of hydropower planning that create the conditions, or ‘spectre of change’, within which localised responses to change take place.

The importance of considering geographic differences in understanding the impacts of hydropower development is further highlighted by Soukhaphon (2024) in his research on marginalised communities in hydropower-affected areas in Laos and Cambodia. Similarly, Baird (2024) underlines the spatiality of hydropower impacts as evident in the way fish populations respond to dam designs over time. As emerging research on the Mekong is beginning to suggest, the social impacts of large dams materialise against the backdrop of an existing geography. This may be the unique social and environmental characteristics of an impacted area or, as we emphasise in this research, the localised histories of development and livelihood change that can be traced in and through the lived experience of hydropower development. From a policy perspective, this highlights the need to move beyond structured, technical environmental impact assessments and resettlement action plans as the standard procedures by which hydropower development is planned and monitored.

The shift in how the social impacts of large dams are conceptualised in Laos and the Mekong Basin echoes critical interventions ongoing in the broader SLA literature. Developed through the early to late 1990s, SLA is a multi-disciplinary body of work addressing how rural livelihoods operate, change, and adapt in the Global South (Chambers and Conway, 1991; Scoones, 1998). As the approach became popularised in global development research and practice through the late 1990s and early 2000s, researchers began to question its utility for researching and advocating for rural people and places subjected to environmental and economic transformations driven by actors and forces outside their spheres of influence. In this ‘re-energised’ conceptualisation of SLA, scholars have underlined how livelihoods are multi-scalar, i.e., outlined by broader processes of change in the environment and society (Bebbington, 1999; de Haan and Zoomers, 2005).

In addition to being multi-scalar, livelihoods are dynamic and temporal, i.e., shaped by longer pathways of change and transformation. SLA scholars have long noted how localised experiences of rural development policies and projects need to be situated in time, in the context of “long-run change” to make sense of dramatic reconfigurations in livelihoods that may emerge in response to a recent event (Scoones, 2009:189). More recent discussions on SLA further highlight the importance of widening the temporal frame of research. Vicol (2019), for example, demonstrates how the recent rise of contract farming in

India needs to be understood not as a novel change in agricultural production pathways but as an event contributing to processes of agrarian change ‘already under way’ in participating communities (ibid:135). Likewise, [Natarajan et al. \(2022\)](#) argue that there are multiple temporalities to consider when researching contemporary livelihoods since they are continually in flux and under revision in response to short-term changes such as fluctuations in the market and the environment, and long-term transformations such as structural changes in politics and the economy. They write that this “means we need to understand not just what livelihoods are, but also how they have come to be: through what processes, policies and mechanisms, both short term and longer duration” ([Natarajan et al., 2022:5](#)). Our research here draws upon these conceptual interventions to demonstrate how a *trans*-temporal analysis can help us bring forth the social histories that inform the scale and nature of hydropower-induced livelihood changes in the Mekong Basin.

In the following sections, we focus on two villages in the Nam Ou Basin to illustrate how local histories – slow variables of change and transformation – shape and outline the social outcomes of more recent hydropower projects. We conceptualise the arrival of the Cascade Project as an event that takes place at the “vital junctures [that] emerge from and connect with longer-term histories” ([Holloway et al., 2019:468](#)) of agrarian change in northern Laos. By analytically distinguishing between the time(s) within which hydropower occurs and the time of a hydropower development, we approach the Nam Ou Basin residents’ experiences of living and coping with dam-induced transformations as not only as empirical illustrations of the environmental and social externalities that have been overlooked in the planning and management of the Cascade Project but also as examples of how large dam impacts manifest in the lived experience of affected residents in a temporally cumulative way.

4. River and livelihoods before the arrival of the Cascade Project

The first village we focus on is Ban Hat Pha Ot, located in the Pak Ou district of Luang Prabang province ([Fig. 1](#)). The village is home to 127 households; most Ban Hat Pha Ot residents identify as Lue, an ethnic sub-group of the Lao-Tai speaking group. Ban Hat Pha Ot’s history can be traced to the deep forests of the Pak Ou district, along the Houay Vang – a mountain stream beside which the community first settled. In Rigg’s earlier research (2005), the establishment of the village along the Nam Ou riverbanks is recorded as an event that took place in the late 1950s. However, the riverside village had to be deserted soon after the completion of the new temple due to active fighting between the Royalists (who at the time occupied the village) and the Pathet Lao. The villagers returned to Ban Hat Pha Ot in 1975, after the war ended and the Lao PDR was officially established. This was perhaps why, in Tajj’s research, the villagers described their relocation to the Nam Ou riverbanks as an event that spanned the late 1970s, linking their experience to government-mandated resettlement programs of the time that transformed the social geography of the basin.

The second village is Ban Bokkham, located along the Nam Bak, a tributary of the Nam Ou ([Fig. 1](#)). Three kilometres separate the village and the confluence where the Nam Bak and the Nam Ou merge. The older residents of Ban Bokkham tell stories of being resettled from highland areas of the present-day Viengkham district to the Nam Bak Valley in the 1980s. In describing their resettlement experience, some recalled receiving land to build new homes along the Nam Bak due to their contribution to the Pathet Lao’s final victory over the Royalists in the northern highlands. Similar to observations made by [Baird and Le Billon \(2012\)](#) and [Dwyer and Vongvisouk \(2017\)](#), memories of the war and past alliances with present district officials seemed to shape the way veterans in Ban Bokkham justified their claims to land and, more recently, expressed dissatisfaction with the Cascade Project. Their claims to revolutionary credentials gave them latitude to express their grievances.

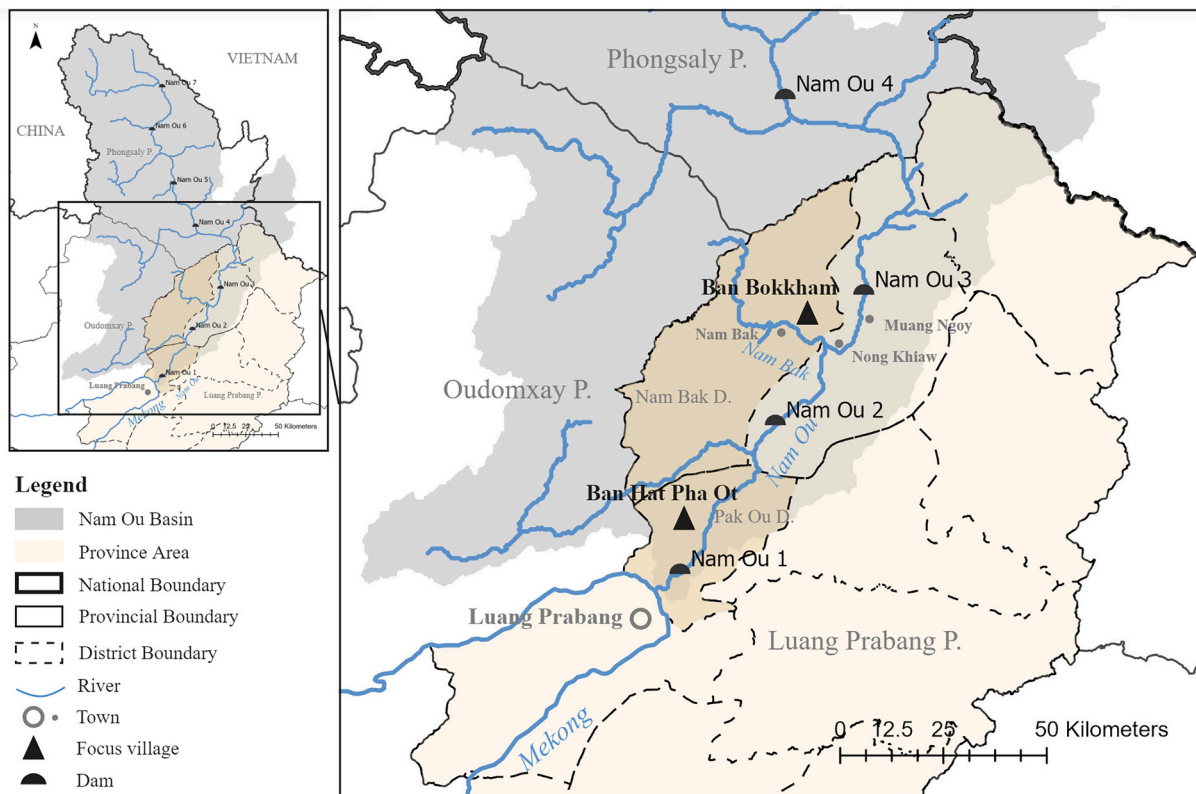


Fig. 1. Map of Pak Ou and Nam Bak districts (Source: Tajj, 2022).

Today, the village is home to 117 households ethnically identifying as either Khmu or Hmong. Unlike the residents of Ban Hat Pha Ot, who relocated within the same district and retained customary claims to nearby uplands, Ban Bokkham residents were resettled to an area where much of the farming land was already claimed. As we elaborate later, the years following resettlement were framed by forest conservation policies that aimed to control wildlife hunting and swidden cultivation practices in upland areas. The growing scarcity of production land stymied newcomers' ability to take advantage of Nam Bak's low-lying topography, as was the supposed purpose of the state-directed resettlement and rural development programs post-1975, embedded in various land use planning programs (Keovilignavong and Suhardiman, 2020).

Despite differences in demographics and settlement history, important similarities can be found in the way livelihood work was transformed across the two villages before the Cascade Project (Table 1). From the 1980s and through the early 2000s and onwards, the residents of Ban Hat Pha Ot and Ban Bokkham had been actively involved in agricultural production and intra-village, intra-provincial, and international trade of rice, vegetables, and forest products. In Ban Hat Pha Ot, through the 1980s, the Lue villagers converted lowlands into rain-fed paddy fields and began experimenting with cash crops (Rigg, 2005). Ban Hat Pha Ot's proximity to a major road, Route 13, meant that the village integrated into emerging markets considerably faster than others; lowlands and forestlands were transformed as a result.

In Ban Bokkham, similar trends were at play. Post-resettlement, villagers had strived to take advantage of emerging markets for agricultural produce and natural products, primarily driven by demands from growing towns in Luang Prabang and Oudomxay provinces and neighbouring countries such as China and Vietnam. The *trans*-localisation of rural livelihoods in the basin was tied to how villagers' everyday lives, including their livelihood assets, options, and strategies, were subjected to change by various national policy programs. These programs included various land use planning programs (Suhardiman and Scurrah, 2021; Suhardiman et al., 2019), the construction of the Laos-China railway project (Suhardiman et al., 2021), and large-scale agricultural land concession as part of the state's agricultural commercialization strategies, to turn land into capital (Kenney-Lazar et al., 2018). At the time of the 2001–2002 fieldwork in Pak Ou district (Bouahom et al., 2004), these processes of livelihood change were in evidence even if some of the projects (such as the Laos-China railway)

were yet to take shape. Land was in 'gravely' short supply, and households were being forced to diversify their livelihoods in various ways.

Aside from trade, seasonal or temporary work outside the village had become a common and perhaps an essential part of the Nam Ou residents' livelihoods. Younger and middle-aged residents regularly travelled outside their villages to work on nearby plantations and construction projects, such as houses and roads. Fewer residents engaged in international labour migration as it required access to social networks and initial capital to arrange documents and travel. In this sense, livelihood transitions in both Ban Hat Pha Ot and Ban Bokkham resonated with broader trends identified in the extant literature, where researchers suggest that rural spaces in Laos have increasingly become entangled with cross-border supply chains and domestic and international labour migration regimes (Cole & Rigg, 2019; Rigg, 2005).

To summarise, livelihoods in Ban Hat Pha Ot and Ban Bokkham have been maintained at the intersection of multiple dynamic, local and extra-local processes: political transitions and geographies, history of agrarian change, emerging regional economies, including the role of the state in pushing rural livelihoods to adapt to externally driven changes. Having set out the historical backdrop of contemporary livelihoods along the Nam Ou, we now turn to focus on individual and community dynamics that have receded or become more pronounced in Ban Hat Pha Ot and Ban Bokkham since the arrival of the Cascade Project.

5. The Mekong 'hydropower boom' arrives in northern Laos

The Nam Ou River Cascade Hydropower Project (the Cascade Project) is a whole-basin seven-dam hydropower scheme developed under a Build-Operate-Transfer (BOT) arrangement between the governments of Laos and China. The project's construction was spread across two phases: Phase I (2012 to 2015), which included the construction of dams 2, 5 and 6, and Phase II (2016 to 2020), which saw the construction of dams 1, 3, 4 and 7. The majority shareholders of the project are the Nam Ou River Basin Hydropower Company Limited and Nam Ou Power Company Limited. The two companies are responsible for the construction, operation, and power sales from the Cascade Project Phases I and II, respectively. Both companies are subsidiaries of PowerChina. The rest of the project's shares are owned by the Électricité du Laos (EDL), a state-owned corporation that owns and operates the Lao PDR's electricity generation, transmission, and distribution systems. The EDL is expected to become the sole owner of the Cascade Project at the end of the 29-year-long concession period.

The construction of the Cascade Project brought significant disruptions to local livelihoods and economies. To coordinate and manage the social impacts of the project, a joint committee¹ was set up in 2012, consisting of representatives from the Cascade Project and provincial and district-level government offices. The process of compensation and resettlement from the individual dams of the Cascade Project was to follow the guidelines established by the Prime Minister's and Luang Prabang Governor's decrees and decisions released in 2012 and 2016² – documents that indicate rates for compensating for lost land and providing livelihood support to resettled households. However,

Table 1
Village histories of Ban Hat Pha Ot and Ban Bokkham.

	Ban Hat Pha Ot (Pak Ou district)	Ban Bokkham (Nam Bak district)
1970s	Intra-district resettlement in the late 1970s	–
1980s	Settlement along the Nam Ou riverbanks, close to the main road	Inter-district resettlement (mainly from Viengkham district) in the early 1980s, leading up to the 1990s
1990s	Increased enforcement of forest conservation laws	Land disputes with the host village Increased dependence on forest work Increased enforcement of forest conservation laws
2000s	Increase in cross-province and border trade of natural products and cash crops Expansion of large-scale land concessions	Increase in cross-province and border trade of natural products and cash crops Purchase of riverbank land from the host village for vegetable cultivation Expansion of large-scale land concessions
2010s	Construction of the Cascade Project Partial resettlement	Construction of the Cascade Project
2020 and onward	Increased interest in livestock production	Increased interest in livestock production

¹ The committee was structured as indicated in the Decree on the Compensation and Resettlement of the Development Project 192/PM, dated July 7, 2005 (Prime Minister's Office, 2005).

² Decree 192/PM (Prime Minister's Office, 2005) stipulates that affected people "who are living in rural or remote areas, who do not have any legal Land Use Certificate or any other acceptable proof indicating land use right to the affected land and assets they occupy shall be compensated for their lost rights to use land and for their other assets at replacement cost and provided additional assistance to ensure that they are not worse-off due to the project". Meanwhile, the Luang Prabang Governor's decision indicated the unit price of compensation for losses that occurred during the Cascade Project (Phetsada and Mizuno, 2019).

according to reports from independent researchers and activists (International Rivers, 2012; Saimok, 2019; Eyler, 2020), the implementation of the resettlement and compensation programmes did not meet the standards stipulated in provincial and national guidelines. The basin residents (this research) commented on the poor construction quality of resettlement villages, inadequate compensation for lost or affected residential and agricultural land, and uneven provision of livelihood support for impacted households (Table 2).

While the Cascade Project's impacts on the riverine environment are comparable across the basin,³ the social implications of these impacts were uneven. The project's arrival in the basin was a moment in time that intertwined with other temporalities of place and livelihoods. To illustrate the cumulative effects of the Cascade Project, i.e. how the past reflected upon the present and how the inherited social and environmental contexts shape present-day development outcomes of the project, the following sub-sections of the paper focus on the lived experiences of the project as recounted by the residents of Ban Hat Pha Ot (Pak Ou district) and Ban Bokkham (Nam Bak district) in Luang Prabang province.

5.1. Case 1: Ban Hat Pha Ot, Pak Ou District

The Nam Ou 1 dam's reservoir was inundated in late November 2019

Table 2
Resettlement and compensation information related to the Cascade Project.

	National and provincial guidelines for resettlement and compensation (Prime Minister's Office, 2005; Phetsada and Mizuno, 2019)	Implementation of the guidelines in Ban Hat Pha Ot and Ban Bokkham
Residential land and house	New houses with land for resettled households	Houses that needed further renovation and repair (compensation of 2.5 – 10 million LAK/house)
Agricultural land and crops	Compensation for production land (with land use certificate) equivalent to the production output of 3 years Compensation for land (without land use certificate) at the rate of 2,000 LAK/m sq. of land Replacement costs for crops and trees (rate per tree, dependent on the age)	Compensation for land with a certificate, the total amount calculated based on the size and productivity of the land (rate of 50–80 million LAK/ha of paddy land) No compensation for land without a certificate (e.g., customary and riverbank lands) Replacement costs for trees and crops are 10–150,000 LAK/tree (depending on tree age) 300,000 LAK/tree for coconut trees, and 20–50,000 LAK/tree for teak trees
Livelihood support	3 years or 6 rounds of livelihood support after resettlement (calculated at the rate of 1,288,000 LAK/family member/round)	1 round of livelihood support (7–12 million LAK/household, depending on the household size) One-off payment of 10 million LAK/household or provision of 2 cattle 2 fruit tree seedlings
Other	Replacement of roads, markets, schools, and temples	Roads, schools, and temples replaced (as of 2021)

³ Phetsada and Mizuno (2019) found that the construction of the Nam Ou Dam 2 resulted in a 25% decrease in average household income and a significant increase in household expenditures due to worsening access to land and food resources. The overall decrease in livelihood security is also observed by IFC (2017), Saimok (2019), International Rivers (2012) and Eyler (2020).

for electricity generation. In preparation for the event, through 2018 and 2019, the majority of Ban Hat Pha Ot residents were resettled into a new village constructed by the dam company. Those residing in locations presumed safe from the expanding reservoir were told to stay in their old villages. By the time the Nam Ou Dam 1 became operational, Ban Hat Pha Ot had become spatially divided into two parts: directly affected and displaced residents who had been moved to a resettlement village uphill, and directly affected residents remaining in their original homes.

The flooding of the old village temple was a notable event for everyone at Ban Hat Pha Ot, as it was one of the first permanent structures the residents had built after relocating to the Nam Ou Valley. For Mr Boun and Mrs Sa, whose house was located just a few meters from the eastern edge of the new Nam Ou 1 Dam reservoir, the flooding of the village temple was personally felt. Mr Boun is a teacher at the local district school. Ms Sa used to grow vegetables in their riverbank garden for consumption and trading at the local market. From the window of their house, the roof of the inundated temple remained in view; detectable were the remains of the old village centre punctuating the reservoir's shallows (Fig. 2).

Mr Boun expressed that he and several of his neighbours were anxious about the upcoming wet season that would peak in July. The Nam Ou's water level had already been rising, despite it being only February, one of the driest months of the year. He worried that heavy rains could flood their homes and the remaining garden land. To ensure his family's safety, Mr Boun had written multiple letters to offices at the district and provincial levels⁴ to request the resettlement of his family and his neighbours to an upland area, away from the reservoir. However, no support was provided. "They just told us to wait until October and November. [But] when the rain comes [in October and November], this house will be in danger!" he explained in February 2020 (RI02, Ban Hat Pha Ot).

Aside from the risk of further flooding, the division of the village into two sections – a new resettlement village and an at-risk old village centre – was a heated topic of discussion among residents. Villagers underlined how the division had been more than just a spatial split between the new and the old. Ban Hat Pha Ot had also become socially separated. Older residents of the village commented on how the recent changes in social cohesion and dynamics they observed seemed to contradict the government's past efforts to build larger settlements along the mainstream of the Nam Ou Valley. As Mr On, a key community figure, described:

In the past, the government moved or combined small villages from rural areas to build big villages. [This is how Ban Hat Pha Ot was established.] But recently, we have had conflicts. The village is now separated into two groups – one group of people living in the old village and the second group of people living in the new village. I think the reason for this [conflict] is that the government gave villagers unfair options. [The conflict is so bad that] when we have a village meeting and mention the dam project, the discussion becomes loud like thunder! (Mr On, PRI09 in Ban Hat Pha Ot, Sep 2020).

Adding to the residents' dissatisfaction with the way the Ban Hat Pha Ot had to be spatially divided to accommodate the new reservoir was the project's differentiated treatment of villagers. The project offered livelihood support and restoration programs for resettlement in the form of livestock or a lump sum of money. Training sessions were also organised to facilitate the adoption of livestock production in the village. However, those who were not included in the original resettlement plan had been

⁴ According to the Decree on Compensation and Resettlement of People Affected by Development Projects, communications between development projects and affected people are mediated through an inter-provincial or inter-district resettlement and compensation committee (Ministry of Natural Resource and Environment, 2015).



Fig. 2. The old temple of Ban Hat Pha Ot flooded by the Nam Ou Dam 1 reservoir (Source: Tajj, Feb 2020).

repeatedly excluded from livelihood support programs and related meetings with the project. This was the case even though the village residents agreed that the inundation of the reservoir and the ensuing loss of farm land and riverbank gardens impacted everyone's ability to maintain a livelihood. In Mrs Man's words:

Families remaining in the old village do not feel content with the decision that the project made for them. When villagers from the old village try to join meetings organised by the project, the project people discriminate – only resettled families can talk to them. But people who [stil] remain in the old village say their gains and losses from the project are the same as the resettled families. This is why they [residents in the old village] are frustrated. When we collect money every month [for garbage disposal], they oppose it and do not want to pay (Mrs Man, PRI18 in Ban Hat Pha Ot, Sep 2020).

As the above quotes illuminate, Ban Hat Pha Ot residents' unfavourable experience of the project's resettlement and livelihood restoration programs inflated their frustrations with the project and government representatives. The costs of rebuilding their livelihoods and shifting their skillsets toward livestock-oriented production networks were pressing concerns for the residents. Here, we can see how the temporally cumulative effects of hydropower development are closely interlinked with the village's long history of relocation and resettlement. The arrival of the Cascade Project had not only divided villagers into two different groups, envisioning two very different livelihood potentials and trajectories, but it also disrupted, if not ruptured, villagers' inter-household relations manifested from the earlier long-durée social change. Unlike before, when villagers viewed themselves as a group of households coming together based on their place origins and kinship relations, the dam project distinguished them according to their status as affected people: households that needed to be resettled (and receive compensation and livelihood support) and households that could stay in their old village ground (and receive compensation only). In this process of socio-spatial differentiation, networks and dependencies were discounted, rupturing the social and historical fabric of the village.

This administrative act of spatial division and social separation echoes observations made by Soukhaphon (2024) downstream of the Lower Sesan Dam 2 in northeastern Cambodia, offering another illustration of the hidden and indirect impacts that large dam projects can have on river-connected communities. Nonetheless, from Ban Hat Pha

Ot residents' observations, we gathered how they were also puzzled by this new division of the village, as they felt that the Cascade Project was undoing much of the progress that had been made building a larger village and diversifying their livelihoods since relocating to the Nam Ou Valley through the 1950s and 1970s (Bouahom et al., 2004). Additionally, this division reduced communities' ability to act collectively and degraded the social fabric (e.g. kinship relations) that had knitted the communities through the turbulent decades of political change and economic reform since their resettlement.

5.2. Case 2: Ban Bokkham, Nam Bak District

The frictions between development interventions of the past and the present were also apparent in Ban Bokkham. Mrs Sone was an entrepreneur, a farmer, and a Lao Women's Union (LWU) representative in Ban Bokkham. She was among many new farmers in the area who had cultivated commercial vegetables along the Nam Bak riverbanks since the early 2000s. From 2016 onwards, however, the Nam Bak riverbanks had intermittently flooded with backwater caused by the operations of the Nam Ou Dam 2 (Fig. 3).

After several unsuccessful attempts to restore her gardens, Mrs Sone decided to give up riverbank gardening altogether. Mrs Sone's de facto ownership of the riverbank land was not recognised by the dam project⁵ and thus was not included in the list of affected assets. The compensation provided by the Cascade Project was limited to the replacement costs for fruit trees and planted crops only, underappreciating the longer-term value that riverbank gardens⁶ offered new settlers. Value, and therefore compensation, was defined by a production boundary that privileged permanent field farming over seasonal plots acquired through customary practices. Since losing her riverbank gardens, Mrs Sone had begun to rent land from neighbouring (predominantly Lao) villages to resume vegetable farming. Her increasing dependence on rental land had stalled progress on a new family home she had begun to construct just before the arrival of the Cascade Project. The still-to-be-completed

⁵ Riverbanks in Laos, by law, cannot be registered, sold, or purchased as private property (Land Law, 2019).

⁶ A similar observation is made in Baird et al. (2015) regarding the underappreciation of riverbank gardens in calculating livelihood compensations of hydropower dam projects.



Fig. 3. The flooded Nam Bak riverbank, as seen from Ban Bokkham (Source: Taij, Feb 2020).

home she showed us, equipped with a spacious living room and an indoor bathroom, signified a significant milestone in her efforts to build a comfortable life since being resettled with her family from the highlands to the Nam Bak Valley in the 1980s.

Placed in a similar situation to Mrs Sone, Ban Bokkham residents were increasingly becoming dependent on the availability of rental land from nearby villages. This was also why, a key figure in the village, Mr Khamson explained, they were anxious about accessing production land in the future. In his words:

We want to move [production] to a new place, but there is no more land [available]. If we continue to cultivate the same [riverbank] land, it will be either too wet or too dry! We cannot live without doing anything, so we decided to rent land from the neighbouring villagers. The Chinese rent land [around here] for 6 million LAK per ha, but we can negotiate with them [neighbouring village] and can get it for 4 million LAK per ha. But [compared to Chinese companies], we lack [agricultural] technology, so we get less output and have little market [demand] (FGD01 in Ban Bokkham, Feb 2020).

The commercial farms and rubber plantations Mr Khamson mentioned in the excerpt above often operated via land concession agreements. The Nam Bak district in particular had undergone a steady increase in such arrangements over the two decades before the fieldwork in 2020, closely tied to the state government's rural development and modernisation agenda of 'Turning Land into Capital'. This had had broadly negative impacts on smallholder agricultural production and wellbeing (Kenney-Lazar et al., 2018).

Ms Sone's and Mr Khamson's livelihood histories, especially their persistent reliance on informal or rental land, exemplified both the challenges and the creative strategies that the residents of Ban Bokkham had undergone and undertaken to cope with state-mandated resettlement. The scheme that created Ban Bokkham was part of the government of Laos' nationwide plan to bring people closer to roads and schools to ensure permanent and sustainable livelihoods for ethnic minority communities (Evrard & Goudineau, 2004). When settlers arrived at the new village, however, they realised that the host village held customary rights to the surrounding low-lying agricultural land in the Nam Bak Valley. Despite this, in the early years following resettlement, Ban Bokkham residents' concerns regarding production land were not as pronounced as they later became. This was because, according to the former *naiban*, the residents could still rely on forest work, such as

hunting and swidden agriculture in the uplands nearby. The community's reliance on forest work continued until the mid-1990s, when restrictions on swidden practices were tightened, and local authorities began to enforce the nationwide ban⁷ on wildlife hunting and trade. In response to increasing pressures on forest work, Hmong residents of the village took advantage of the rubber boom in the uplands (Mr Vue, PRI10 in Ban Bokkham, Sep 2020). In comparison, Khmu residents of Ban Bokkham resorted to acquiring fallow land along the Nam Bak riverbank from the host village. Through the 2000s, many used the Nam Bak riverbank lands to cultivate commercial vegetables such as cabbage, maize, and cucumber for export to neighbouring regional centres of Oudomxay and Luang Prabang provinces.

While the differentiation of livelihood strategies post-resettlement, namely how Hmong communities engaged in rubber plantation while Khmu communities chose to undertake more short-term opportunities, is a pattern found elsewhere in Laos (Baird and Vue, 2017), in Ban Bokkham, the Khmu farmers did not approach riverbank cultivation as an entirely short-term activity. This was perhaps because the expansion of vegetable production in Ban Bokkham and neighbouring villages through the early 2000s was closely linked to rural development policies promoting agricultural intensification at provincial and national levels of planning and development. In Nam Bak district, which had long been regarded as having the highest potential in commercial agriculture development due to its low-lying topography, provincial plans to intensify agriculture manifested in the promotion of vegetable production as a promising sustainable livelihood pathway for smallholders (DAFO, II in Nam Bak, Feb 2020).

In the context of top-down rural development interventions that reshaped land use across the district (Suhardiman and Scurrah, 2021; Suhardiman et al., 2019), riverbank gardens provided much-needed relief for Khmu settlers from increasing restrictions on forest work, on the one hand, and the inaccessibility of long-term production land, on the other. While recalling these changes in their livelihood work, the

⁷ Decree 118/CCM on Wild Animals, Fisheries, Hunting and Fishing (Council of Ministers, 1989) forbids the "hunt or fish species of wildlife classified as restricted, nearly extinct species, expecting animals, animal's breeding newly born baby animals and during the season of fish eggs". Forest conservation policies in Laos have predominantly targeted the customary practices of upland ethnic minorities, with negative implications for land and livelihood security (Evrard & Goudineau, 2004).

residents deemed their switch to riverbank production as a positive turning point in their lives; through vegetable gardening along the Nam Bak riverbanks, they could establish a comfortable life in the village, building larger family homes and sending their children to school.

When the arrival of the Cascade Project was situated within this longer history of dislocation and adaptation, it was evident that riverbank gardening had been a key resource in Ban Bokkham residents' efforts to reconstruct their livelihoods after being resettled into the Nam Bak Valley through the 1980s and 1990s. Consequently, the flooding of the Nam Bak riverbanks, combined with the lack of fair compensation for the losses in land and income, deepened existing differences in livelihood stability and security among village residents and between Ban Bokkham and neighbouring villages. At the same time, and perhaps more importantly for the arguments presented in this paper, the residents saw the arrival of the Cascade Project as an event that ruptured the relative success they had achieved and enjoyed as new settlers and new farmers in the Nam Bak Valley. The next section further elaborates on such temporally cumulative effects of the Cascade Project on rural development and livelihoods as evident from Ban Bokkham and Ban Hat Pha Ot.

6. The temporally cumulative effects of hydropower development in northern Laos

When the Nam Ou residents' accounts are brought together, they illuminate how the arrival of the Cascade Project was a temporally compound event experienced at the juncture of the old and the new, generating cumulative effects on livelihood pathways. Across the two villages, experiences of the Cascade Project and its livelihood impacts – both disruptions and opportunities – were not only localised but also temporally situated in the context of past development interventions, villagers' long history of resettlement, and their long-durée livelihood adaptation strategies and transformation processes.

In Ban Hat Pha Ot, in addition to the environmental impacts of the dams, the project's uneven distribution of livelihood restoration benefits created spatial and social divisions between residents. As more senior residents of the village saw it, the Cascade Project's arrival had undone much of the progress their community had made since being resettled into the Nam Ou Valley as part of the government's past plans to assemble larger settlements and improve livelihoods in upland regions. If the arrival of the project in Ban Hat Pha Ot created new social differences and relations, in Ban Bokkham, it amplified pre-existing differences and relations. Similarly to those in Ban Hat Pha Ot, the residents of Ban Bokkham highlighted the inadequate compensation and livelihood support offered by the developer. At the same time, many linked the unfavourable environmental and social impacts they experienced from the Cascade Project to past difficulties in accessing and securing production land – challenges that defined the residents' livelihood pathways since being resettled from the uplands into the Nam Bak Valley several decades prior. The temporal accumulation of development interventions and their successive effects on livelihood pathways and aspirations charted the residents' sensitivity to the Cascade Project and resulting changes in the Nam Ou Basin.

Related to the above, the Nam Ou residents' experience of state-mandated development programs such as resettlement and agricultural intensification informed their political standpoint regarding the Cascade Project and the national development agenda that it represented. A key issue the residents highlighted in one way or another was the demands of living with the aftermath of hydropower development without adequate compensation and support from the dam company and local administrative offices that promoted the project. Returning to Mrs Sone's experience from Ban Bokkham, for example, we see her views regarding the Cascade Project being shaped by the failures in the project's governance. The inadequate compensation she received for her riverbank gardens undermined her achievements as a new generation farmer taking advantage of agricultural intensification programs

promoted by the local government. This is perhaps why farmers in a similar situation to Mrs Sone saw it as the responsibility of local government offices (such as the DAFO and the PAFO) to support them in their efforts to adapt to the changes and challenges instigated by the construction and operation of the Cascade Project (FGD in Ban Bokkham, February 2020).

The temporally cumulative effects of the Cascade Project, which this research has documented in Pak Ou and Nam Bak districts, have resonances across the Nam Ou Basin. In one of the few in-depth studies conducted on the livelihood impacts of the Cascade Project, Phetsada and Mizuno (2019) observe that the critique of the government's mismanagement of the Cascade Project has been widespread across communities living along Nam Ou Dams 1 and 2. The challenges that Nam Ou residents now face in rebuilding their livelihoods, Phetsada further notes, are affecting their trust in the Party and their belief in the legitimacy of the national development agenda that it upholds. In agreement with such findings, insights from Ban Hat Pha Ot and Ban Bokkham show how it was not necessarily the idea – or principle – of hydropower development that was at issue. Rather, it was the way the Cascade Project amplified and, at times, diluted the achievements of past development interventions, along with the exclusionary governance arrangements that discounted local knowledge and achievements, that drove the basin residents' negative views of the project.

7. Conclusion

As the Mekong Basin goes through a 'hydropower boom', there is renewed interest in understanding the impacts of new dam projects on river-connected rural communities and economies. A growing body of inter-disciplinary research highlights the spatial dynamics of large dam impacts in the Mekong Basin, i.e. the spatially compounding and transformative ways in which large dams affect the lives of communities living near and away from project sites. In this paper, we build upon and contribute to this conversation by demonstrating how a *trans*-temporal analysis can shed new light on our understanding of the social implications of hydropower projects in the basin, especially in relation to how the latter disrupt and rupture villagers' subsequent adaptation strategies, as the latter form an integral part and sometimes a driving force for the villages' long history of livelihood transformation processes.

In the districts of Pak Ou and Nam Bak in northern Laos, the arrival of the Cascade Project was an event that took place on shifting grounds. The social and environmental conditions inherited from a succession of development interventions implemented since the 1970s, including but not limited to state-mandated resettlement of highland communities, forest conservation policies that pushed out customary farming and hunting practices, and agricultural intensification for commercial vegetable production, embedded in various land use planning programs over four decades of 'Development', informed and shaped how the Cascade Project's arrival was experienced and perceived at an individual and community level. At times, in places, and for some residents of the Nam Ou Basin, the arrival of the Cascade Project dominated the timeline and drowned out other histories. But at other moments and for other residents, the reverse was the case – the project's arrival was a recent addition to a succession of events that had shaped how people organised their communities and sustained their livelihoods in relation to the Nam Ou. Understanding these various overlapping livelihood trajectories is key for better understanding how local communities adapt to various forces of change on site and across spatio-temporal scales. Similarly, these livelihood trajectories also reflect how local communities navigated external changes that disrupted and at times ruptured their everyday life and, to a certain extent, their livelihood transformation processes.

This research on local experiences in the Nam Ou Basin after the arrival of the Cascade Project demonstrates the potential of a *trans*-temporal analysis in enriching our understanding of the Mekong 'hydropower boom' and its aftereffects. A key element of our analysis has

been the recognition that the riparian livelihoods of the Mekong have always been 'in flux' (Natarajan et al. 2022) – participants in longer and broader processes of social and agrarian change that have accelerated from the turn of the century. This means that in addition to being spatially compounding, the impacts of large dams can be temporally cumulative. While the Mekong 'hydropower boom' may be taking place at a particular temporal moment, this moment is set in historical time that informs the circumstances under which these projects and the livelihood changes they bring are perceived as positive or negative. Consequently, impact assessments focusing on singular hydropower projects can potentially hide the cumulative effects of successive interventions and broader processes of change. By distinguishing between the time and event of the Mekong 'hydropower boom', we bring together the *what* and *where* of impacts; i.e., the kinds of social impacts large dams cause in and away from project sites, with the *when* of impacts; i.e., the temporally situated ways in which these infrastructures affect the basin residents in situ and over spatio-temporal scales.

While in this paper we have mainly focused on past interventions in relation to the Cascade Project in the Nam Ou Basin, the dams will also – and likely already have – affect future developments. Villagers' experience of the project has denuded their trust of those in authority, will alter decisions as to how farmers manage their land and secure their livelihoods, and may lead to greater resistance and foot dragging when the state in association with private sector investors seeks, once again, to develop the nation at the expense of marginal groups.

CRedit authorship contribution statement

Sumiya Bilegsaikhon Taij: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization. **Diana Suhardiman:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Jonathan Rigg:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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