


# When land, water and green-grabbing cumulate: Hydropower expansion, livelihood resource reallocation and legitimisation in southwest China

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**Abstract:** *Hundreds of hydropower dam projects, of all sizes, have been initiated in Yunnan Province, China, since the late 1990s. This paper frames hydropower-driven resource reallocations as resource grabs that combine aspects of land, water and green-grabbing, investigating how two dams built along the Red River have impacted local communities and how corporate and governmental stakeholders have viewed local livelihood changes and considered compensation mechanisms. This research documents how hydropower expansion triggers changes in both land and water availability, in turn depriving riverside communities of a wide range of intersecting livelihood benefits. Villagers were compensated for some losses, but in ways that failed to address how impacts accumulated over time and how hydrologic changes would impact overall livelihood activities. Financial compensation and specific environmental and modernisation agendas legitimised resource reallocations together with the provincial, national and global development campaigns driving them. Considering how different actors experience, frame and address the impacts of hydropower development through a resource-grabbing lens elucidates the compartmentalised approaches of distant hydropower actors as well as scholars. This study answers recent calls to mobilise the scholarship on resource-grabbing in the service of shedding light on the socio-political projects driving resource reallocations and their livelihood impacts.*

**Keywords:** *ethnic minorities, farmer livelihoods, hydropower, resource grabbing, southwest China*

## Introduction

Power relations oversee the political and discursive practices that shape how land and water are utilised, by whom and for whose benefit (Loftus, 2009; Baghel and Nüsser, 2010). While these resources are interwoven, inseparable core livelihood assets for rural dwellers, private and governmental stakeholders often compartmentalise their approaches to land and water management (Baird and Barney, 2017). Scholars of resource grabs, control and rushes can also replicate this divide as they focus on the actors, subjects, discourses and market and legal instruments governing access to water and land (Dell'Angelo *et al.*, 2017b; Peluso and Lund, 2011). Growing from an initial focus on land resources and international land investments for food security, this literature now addresses a wider range of land enclosure and resource reallocation processes, including those that target water – *water grabbing* – and environmental services – *green grabbing* (Borras *et al.*, 2012; Fairhead *et al.*, 2012;

Franco *et al.*, 2013; Schoenberger *et al.*, 2017). Yet the connections between various resource-grabbing processes have received little attention.

Hydropower expansion is well suited to unpacking these connections: hydroelectric dam construction and reservoir creation reshuffle riparian communities' access to water and land simultaneously for the sake of securing 'green' and 'clean' energy supplies. This case study focuses on Handai ethnic minority settlements in a section of the upper Red River watershed in southwest China's Yunnan Province. In this setting, hydropower development has driven successive and cumulative land and water reallocations: the Nansha dam was completed with a 150 MW capacity upstream of the case study villages in 2008, while the Madushan dam (288 MW) was completed downstream three years later. 'Green' discourses were at play in both cases, as Chinese policies frame hydropower as a 'clean' alternative to coal-fired thermal plants (Harlan, 2018), and the Red River dams participate in the Clean

Development Mechanism (CDM), a global greenhouse gas (GHG) emission offset regime. Both dams rank among the most powerful of some 600 China-based hydropower schemes participating in the CDM. The case study thereby attests to the magnitude of resource reallocations that vehicles such as the CDM legitimise through specific discourses and technological *partis pris* (Ptak, 2019; United Nations Framework Convention on Climate Change, 2019).

Engaging with scholarship focusing on land, water and green grabbing, I highlight how land and water resource reallocation patterns are typically addressed individually and selectively, despite close similarities in how they impact local customary resource users and how distant stakeholders legitimise these impacts. I detail my ethnographic research methods and the context where my case study is set. My results demonstrate how successive hydropower developments have reshuffled locals' capacity to benefit from water- and land-centred livelihood functions. I investigate the policy discourses and practices that legitimise certain consequences while ignoring others. I conclude that hydropower expansion fosters instances of resource reallocation that blur the lines between land, water and green grabbing; this complicates riparian populations' attempts to question – not to mention critique – how state actors govern the impacts of these reallocations on local livelihoods.

## Unpacking land, water and green grabs

Land-grabbing scholarship conceptualises a wide range of transactions involving national, international, governmental and corporate actors purchasing or obtaining long-term concessions over large land areas (Zoomers, 2010; Borras *et al.*, 2011; Borras *et al.*, 2012; Schoenberger *et al.*, 2017). Such transactions often lead to agricultural intensification and the expansion of export-oriented food or cash crop schemes. Governmental and corporate stakeholders involved in land grabbing typically posit 'modern' and 'productivist' agrarian developments as desirable outcomes for 'degraded', 'wasted', or 'underutilised' land resources and their customary users (Borras *et al.*, 2011; Borras *et al.*, 2012; Dao, 2015; Alonso-Fradejas *et al.*, 2016). Besides experimenting with emerging or booming agrarian commodity markets, land acquirers sometimes aim

to speculate on the land itself without getting involved in agrarian decisions after land ownership transactions are complete (Hall *et al.*, 2011; Cotula, 2012). In other instances, land grabs have direct consequences for the individuals who previously had access to targeted areas. Impacts may include people being expelled from their land, driven to compete for jobs with migrant agrarian workers, hired as wage labourers or pressured into contract farming agreements (Murray Li, 2011; Borras *et al.*, 2012). Land grabs partake in capital accumulation processes that fail to account for the complex and diverse livelihood functions of land for customary users.

Land acquisition agreements are often premised on guarantees of access to irrigation water, and/or that the new owners' water withdrawal needs will be prioritised over those of other users (Franco *et al.*, 2013). Water grabs occur when 'powerful actors are able to take control of, or reallocate to their own benefits, water resources already used by local communities or feeding aquatic ecosystems on which their livelihoods are based' (Mehta *et al.*, 2012: 197). Scholars have posited mining and hydropower among activities driving water grabs (Mehta *et al.*, 2012; Birkenholtz, 2016). Dell'Angelo *et al.* (2017a) argue that all land grabs drive water grabs, though this relationship has received scant scholarly attention. The ways that water reallocations reshape land access regimes have likewise received little attention within the resource grabbing scholarship (though see Baird and Barney, 2017; Murton *et al.*, 2016).

Green grabs encompass changes to resource control that are promoted for the sake of specific environmental outcomes (Borras *et al.*, 2011; Fairhead *et al.*, 2012). These include conservation-driven resource reallocations built on visions of nature and environmental services that differ from those of the people inhabiting or utilising targeted territories and resources (Hall *et al.*, 2011; Fairhead *et al.*, 2012; Hall, 2013). Global carbon markets have emerged as another driver of green grabs. Reforestation and afforestation programmes such as REDD+, though creating exclusion at the local scale, are framed as desirable because they contribute to global efforts to reduce GHG emissions (Cotula, 2012). Carbon offsetting mechanisms such as the CDM frame hydroelectric dams as 'green', 'clean', 'sustainable' technologies contributing to reducing GHG emissions, while the local social

and environmental consequences they drive are often overlooked, ignored and/or legitimised through various discourses and practices (Newell and Bumpus, 2012; Smits and Middleton, 2014; Rousseau, 2017).

Bringing such scholarship together yields a potent framework for contrasting how local impacts of hydropower schemes actually play out versus how such processes are framed. This approach answers recent calls for new strategies to probe the multifaceted ways in which development projects perpetuate a land/water divide and fail to account for how these resources are deeply embedded within local livelihoods (Baird and Barney, 2017; Dell'Angelo *et al.*, 2017a). Research on the impacts of hydropower expansion has long focused on resettlement (Baird and Barney, 2017), notably following the lead of former World Bank Senior Advisor Cernea (1997) in questioning dominant resettlement models and their outcomes. Yet this scholarship seldom highlights the long-term impacts of hydropower development on non-resettled populations, and even less work has probed how populations experience the cumulative impacts of upstream and downstream dams. I argue that resource-grabbing scholarship can reconnect the complex and evolving water and land resource reallocations that such development processes drive.

#### *Different types of grabs and the common ground between them*

The actors that benefit from resource reallocations rely upon a wide range of discursive and governance strategies that legitimise grabbing processes while ignoring and/or justifying negative livelihood impacts (Hall *et al.*, 2011). Common justifications for changes in who controls land, water and other natural resources include the optimisation of resource management and enhanced economic and environmental benefits (World Bank, 2010; Murray Li, 2011, 2014; Fairhead *et al.*, 2012). Resource grabbing thereby often accompanies capitalist expansion initiatives that promote the privatisation, commodification and/or monetisation of natural resources, including the enclosure of public and common assets (Dell'Angelo *et al.*, 2017b).

An emphasis on selective scientific evidence and particular environmental discourses promotes and legitimises particular grabbing scenarios. For

instance, climate change alleviation programmes emphasise non-fossil fuel energy projects that foster green grabs. Discourses on land scarcity-driven food security threats advocate for land grabs, while arguments framing water as either a scarce or an abundant resource respectively support water reallocations aiming to secure water supply or to avoid water 'underutilisation' (Baghel and Nüsser, 2010; World Bank, 2010; Benjaminsen and Bryceson, 2012; Cotula, 2012; Fairhead *et al.*, 2012; Hertzog *et al.*, 2012; Murray Li, 2014; Allouche *et al.*, 2015). Flower (2009) relatedly highlights how Chinese state discourses posit that communities in resource-rich areas must undergo livelihood trade-offs for the sake of national development. Flagship infrastructure projects driving resource reallocations such as the Three Gorges dam partake in country-wide nation-building campaigns. The nation-building agendas surrounding smaller projects such as the Red River dams instead target local 'marginal' populations, including ethnic minorities whose customary resource utilisation patterns differ from the 'modern' ones that state authorities and campaigns typically promote.

Governance strategies that legitimise resource reallocations and the ensuing livelihood consequences include pre-emptive legal and policy reforms that invalidate potential post-resource reallocation claims from customary users (Benjaminsen and Bryceson, 2012; Fairhead *et al.*, 2012). The incomplete implementation of existing legal and policy guidelines aimed at safeguarding local populations against the socio-environmental impacts of resource reallocations also enables resource grabs (Mehta *et al.*, 2012; Franco *et al.*, 2013). Formal resource ownership or tenure regimes can contribute to legitimising resource grabbing processes, although informal regimes can spare resource acquirers from having to secure contracts with high numbers of customary resource users. Force can also be used to exercise control over access to resources, although the threat of force often suffices for ensuring that particular resource reallocations proceed (Hall *et al.*, 2011; Franco *et al.*, 2014).

This case study demonstrates how corporate and governmental actors legitimised the Red River dams by framing them as environmentally sound contributors to national development, including in the environmental impact assessments (EIAs) I mention below. Likewise, some of

the impacts of the dams were assessed and compensated for, but at rates entirely set by these powerful actors. Financial compensation was distributed before impacts occurred, and the dams' design did not create lasting local benefits.

## Methods and research context

I have collected ethnographic data on the livelihood consequences of hydropower expansion over repeated ethnographic field visits to Handai settlements located along the Red River, in southwestern China's Yunnan Province. I have visited the area regularly since 2009, for one week to two months at a time. Over the last decade, I observed how the unexpected consequences of dam projects unfolded, enabling me to refine my interpretations longitudinally. I obtained the data cited below with the help of a Handai research assistant and through participant observation, conversational interviews and multiple livelihood surveys. I undertook this research across four villages, home to some 1800 individuals in total. Although sandwiched between the Madushan dam downstream and the Nansha dam upstream, reservoir creation has not driven resettlement processes in these specific locales (Fig. 1).

Yunnan Province (population 47 million) contains six water basins with a potential hydropower capacity amounting to a fifth of the Chinese national total of 542 gigawatts (GW) (Liu *et al.*, 2018). China surpassed its objective to double its hydropower generation capacity to 290 GW over the 2007–20 period; Yunnan's rivers have been central to this effort, with their installed capacity rising from 4 GW in the late 1990s to 61 GW two decades later (Information Office of the State Council of the People's Republic of China, 2012; Liu *et al.*, 2018). Five electricity conglomerates created after the former State Power Monopoly was dismantled in 2004 along with their subsidiaries<sup>1</sup> and the China Three Gorges Corporation dominate the Chinese hydropower sector. However, the Nansha (150 MW) and Madushan (288 MW) dams, which are medium-sized by Chinese standards, are owned by the independent power producer Honghe Guangyuan Hydropower Development, controlled by three Eastern China-based public utility groups.

Ethnic minorities comprise one-third of Yunnan's population, with higher proportions living in rural areas that experience most of the consequences of hydropower expansion. My desire to probe how the impacts from the little researched Red River dams manifest for riparian populations has brought me to work with Handai lowlanders, by far the most important group along the section of the river where the dams were built.<sup>2</sup> Although self-identifying as Handai, these individuals are officially subsumed under the Dai ethnic minority, as their dialect is akin to other Dai languages, they are settled along lowland waterways, and their customary agrarian systems are centred on wet rice farming (pers. comm., November 2011). This is because Chinese ethnic minority policy emphasises standard criteria that ignore ethnic minority societies' specific cultural characteristics, such as the food, clothing and animist rites and beliefs that Handai informants consider fundamental to their identity.

The qualitative and quantitative features of water that sustain specific river- and land-based livelihood functions likewise received little government attention when the Nansha and Madushan dams were developed. In certifying that these dams met its standards, the CDM participated in legitimising the reallocation of these resources and turned it into a 'green' grab.

## Riverside livelihoods under the influence of hydropower dams

Little ethnographic research has documented the livelihood consequences of dam building in Yunnan. Probing the impacts of dam development along the Lancang River (upper Mekong), Tilt (2014) found that dam development drives off-farm labour, including work migration. Galipeau *et al.* (2013) highlighted how displaced populations achieve higher financial incomes than non-resettled ones due to more frequent work migration and stronger remittance flows. Tilt and Gerkey (2016) found that dams lead to an erosion of social capital within riparian societies, notably in the reduction of village labour and financial exchange. Yos (2011) investigated how dams make it impossible for riparian households to maintain their riverside gardens, depriving them of both supplementary income and food. Further west in the Nu River (upper Salween) watershed,



**Figure 1.** Location of the Nansha and Madushan dams and study area. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

Ptak (2019) documents the unequal distribution of benefits from small-hydropower expansion within and between ethnic minority communities.

The above scholarship demonstrates that the uneven distribution of benefits from dam construction is an outcome of imbalanced power relations that unfold in a top-down fashion in Yunnan. Hydropower expansion is core to the state's renewable energy development objectives, which emphasise energy security and GHG emission reduction (Harlan, 2018). The state has also instrumentalised the CDM as a vehicle to foster these aims and has developed institutions to help actors in the renewable energy sector get the EIAs and project design documents required to obtain international carbon finance money (Rousseau, 2017). Also emanating from the central government are the policies that detail financial compensation to households whose land and houses are flooded by hydropower expansion, although actors in

lower government levels oversee their implementation.

Hydropower is both a vector of 'modernity' in ethnic minority settlements and a core vehicle for achieving provincial and local authorities' socio-economic development objectives. Gross domestic product growth is a key determinant of individual cadres' career trajectories, creating strong incentives for officials to promote and facilitate hydropower development, implement compensation policies in a lenient way and encourage CDM participation. In contrast, there are few incentives to investigate the nuanced ways in which dams impact local livelihoods (see Habich, 2016).

Eager to discuss how the Red River has always stood at the interface of riverine- and land-based livelihood functions, village elders explained that their ancestors grew wet rice along the Red River floodplain for as long as oral histories and folk songs can tell. The land had always been of

prime quality, thanks to a thick layer of red silt deposited by annual floods. During the dry season, when the river turned into a stream narrow enough that 'ants were able to cross it in some places', the riverbed turned green with gardens and grass on which large water buffalo herds would feed (pers. comm., April 2015; Rousseau and Sturgeon, 2019). According to villagers, 'one was sure of catching a yellow catfish (*quanhuang yu*) every time one would cast a line into the river' (pers. comm., December 2011). Local fisherfolk fondly recounted many stories about this migratory species, which could weigh up to 50 kg.<sup>3</sup>

Hydropower development has had profound impacts upon fishing, which customarily provided Handai households with supplementary income and food, as well as farming, which has long remained the core livelihood activity in the case study villages. Handai have traditionally maintained semi-subsistence livelihoods centred on wet rice farming intercropped with landrace corn varieties (mainly used as animal feed), vegetables and tropical fruit. Cash cropping first emerged in the area following decollectivisation and economic reforms in the early 1980s, and has since consistently grown in importance for Handai livelihoods. Agricultural intensification pairs with the Chinese state's agenda to 'modernise' the farming practices of ethnic minority societies. The state is actively committed to driving social change that makes these areas and their ethnic minority populations full-fledged participants in the capitalist economy. Common strategies in this state-led endeavour include promoting the expansion of commercial agriculture, modern agricultural inputs and machinery (Sturgeon, 2005; Turner *et al.*, 2015). Cash crops, including hybrid banana, mango and papaya cultivars, were already increasingly visible in local villagescapes prior to hydropower expansion, and the creation of reservoirs further accelerated this expansion.

#### *Dam in the back yard: Impacts from the upstream Nansha dam*

The construction in 2008 of a CDM-sponsored hydroelectric reservoir along the Red River at Nansha, 20 km upstream from the case-study villages, thoroughly modified customary hydrologic patterns and drove major changes to local livelihood activities. The dam's construction initially led to longer periods of shallow water. Farmers welcomed this at first, as lengthened

low-water periods would allow for increased cultivation on the floodplain. Previously, only greens with a short growing season could be grown close to the low-water line during the winter, and crops needed to be harvested before the water began to rise in the spring. After the dam was built, villagers forecasted that one rice crop could also be grown in these areas. As one villager who used to grow chives along a section of the riverbed that flooded yearly recalled: 'At first, we thought that the Nansha dam would allow us to access more land, and we were happy about this because land scarcity was becoming a growing concern' (pers. comm., October 2016).

Each household member had been granted utilisation contracts for 0.8 *mu* of land during decollectivisation.<sup>4</sup> As an elderly man recalled: '0.8 *mu* per person was quite a lot of land then. We mostly grew rice, there were no rotovators, and we used almost no chemical fertilisers or pesticides' (pers. comm., March 2012). Subsequently, agrarian mechanisation and intensification together with the marketisation of village economies encouraged villagers to try to expand their landholdings. Yet this seldom succeeded; population growth and the local inheritance practice of dividing a deceased household head's land among male heirs led to rapid parcelling of land plots, with per capita landholdings averaging 0.5 *mu* in surveyed villages just before the Nansha dam was built.

Hopes that the Nansha reservoir would result in expanded landholdings were short-lived. The newly created riverside land parcels were flooded when regular reservoir operations began after only two or three growing seasons. Thinking about this moment, an informant recalled, 'This is when we really understood that the river had changed' (pers. comm., November 2016). After dam development, riverine hydrology was no longer driven by climatic processes, and sudden water releases were unpredictable. Households were unable to access information about reservoir operations and became reluctant to grow anything close to the reservoir's high-water shoreline. Meanwhile, land scarcity issues endured.

As sediments were now trapped behind the dam's wall, villagers observed a corresponding drop in the river's silt load. This had two important consequences. First, communities lost access

to the natural fertilisers around which their customary farming regime was centred. In the context of ongoing agricultural intensification, this added further incentives for farmers to utilise greater amounts of fertilisers. Households became preoccupied with farming requiring increasingly important cash and chemical inputs, together with this translating into lowered soil fertility and quality and taste of the crops that they produced (Rousseau, 2017). Villagers also noted that silt-free water drove riverbank erosion, which has steadily eaten away at remaining landholdings. Moreover, the Nansha dam created an insurmountable barrier along yellow catfish migration routes, and catches dropped sharply starting with its construction in the mid-2000s. Yet none of these consequences have been accounted for in any manner by corporate and governmental stakeholders, and villagers received no compensation or support for these losses.

#### *Dam in the front yard: Impacts from the downstream Madushan dam*

Just as villagers started experiencing the consequences of the Nansha dam upstream, the construction of the Madushan dam began some 50 km downstream. Further livelihood changes followed.

The 19 km<sup>2</sup> Madushan reservoir can store up to 500 million m<sup>3</sup> of water, and its creation in the early 2010s led to the flooding of undisclosed amounts of riverside arable land (Guangdong Hydropower Planning and Design Institute, 2011). This exacerbated land scarcity; in some cases, villagers were left with no land whatsoever, while those who could still access some land had to undergo significant livelihood reorganisation to compensate for their losses (Rousseau, 2017).

By 2010, villagers knew flooding was imminent, as local authorities had surveyed areas to be submerged a year or two earlier and had distributed financial compensation for soon-to-be flooded crops.<sup>5</sup> This process drove grievances in the villages, as compensation amounted to only a fraction of what villagers ought to have received according to national guidelines (see Habich, 2016). Households were offered RMB 53 000 (about USD 8000) on average, which represented about five times the average annual household income in that area. Villagers got the

impression that this was the best offer they would get and that resistance would be handled with force, as had happened nearby when the upstream Nansha reservoir was created. Thereby, only isolated and rapidly dispersed protest occurred (Rousseau, 2017).

Changes to the river's water level again occurred without timely warning and resulted in crop failures in floodplain areas. Remembering her mixed feelings at the time, a villager explained: 'We understand that the loss of our land is a sacrifice that we must make for China to become a developed (*fada*) country. Still, they could have warned us about when our land was to be flooded. We needed not to lose our crops as well.' (pers. comm., February 2015). This quote conveys how she and other villagers internalised the government's framing of the dam as a component of a socio-economic modernisation programme that transcends the Red River valley. Yet villagers distinguished between the national project that dams partake in, with its necessary and unavoidable impacts, and the consequences that could have been avoided with greater attention to local livelihoods. In this case, the latter impacts drove the greatest grievances and resentment.

Reservoir pollution was another foreseeable impact for which no alleviation measures were implemented. No riverbank cleaning operations were conducted, and large amounts of waste ended up either underneath the water or floating on its surface. Algae blooms of a previously unseen magnitude surfaced when reservoir water levels were kept low during the warm summer months. Commenting on how these changes affected his daily activities, one informant who maintained fish nets in the reservoir explained: 'The water is more polluted than before the dam was built. When I come out of the water, I now need to take a shower, and even then I get skin rashes. Fish and shrimp do not taste as good as before, and there is no more yellow catfish' (pers. comm., November 2016). This testifies to the gap between global discourses framing the dams as 'clean', and how local conceptions of what constitutes 'clean' water are not taken into account.

Further unpacking the impacts from the disappearance of the prized yellow catfish, another fisherman stated:

Before the Madushan dam was built, only a handful of villagers sold fish because prices were too low. When we caught yellow catfish, we would eat and share it with our friends. By the early 2010s, the price for that fish skyrocketed to about 300 yuan a kilo [\$45], and a single specimen was worth over 1,000 yuan! It is such a shame it's gone. (pers. comm., March 2012)

Indeed, the fish that are now sold at a high price in local restaurants as *handai fengwei* (Handai taste) are all caught downstream from the Madushan dam. This contributes to villagers feeling that the dams have deprived them of potentially profitable opportunities, leaving them with only the undesirable consequences of land flooding, water pollution and changes in sediment load and river ecology. While most villagers spent the limited financial compensation they received within a few years, dam impacts continue to accumulate and there is no hope that these will ever be compensated further. State authorities' push to legitimise such resource reallocations and consequences drastically contrasted with local experiences.

#### *Legitimising dam impacts*

Although Handai farmers first experienced adverse livelihood impacts during the construction of the upstream Nansha dam, they received no support to cope with the consequences of this first project. Interviewees confirmed that state authorities did not investigate the impacts of the dam in their villages prior to, during or after construction. Likewise, neither CDM documentation nor publicly available portions of the Nansha EIA mention downstream livelihood impacts (CDM, 2009). This approach exemplifies what Ritcher *et al.* (2010) document as the often-ignored downstream impacts of dam projects.

Yet the government was not entirely ignorant of downstream impacts; the EIAs drafted for both the Nansha and Madushan dams provided information about the minimum water release that ought to be guaranteed. Hydrologists acknowledge such 'minimum environmental flow' requirements as a way to alleviate dams' socio-environmental consequences (Hirji and Davis, 2009). An informant with close ties to Vietnam's Department of Water Resources Management argued that this strategy also served to address Vietnamese concerns regarding transnational

water allocation (pers. comm., March 2015). Minimum downstream flow values were set at 26.1 m<sup>3</sup>/s for the Nansha dam and 30.2 m<sup>3</sup>/s for the Madushan dam, in line with the lowest recorded historical<sup>6</sup> water discharge of 28.7 m<sup>3</sup>/s in Manhao, just downstream from the Madushan dam (He *et al.*, 2007; CDM, 2009; CDM, 2011). Yet the above Vietnamese informant reckoned that there was no way to ensure that China genuinely implemented environmental flow guidelines and raised doubts about their enforcement (pers. comm., March 2015).

As the experiences of Handai farmers testify, minimum water discharge guidelines address only one dimension of the Red River's customary hydrological regime. Enforcing water releases that better replicate the natural variations of the Red River could be an efficient approach to sustaining the river's livelihood and ecosystem functions. This would involve ensuring much higher water releases during the flood season, when historical water discharge peaked at 4620 m<sup>3</sup>/s in Manhao (He *et al.*, 2007). Likewise, maximum discharge values would be required for the dry season. In addition, no measures whatsoever have been introduced to address sedimentation levels, which are central to floodplain farming and preventing riverbank erosion.

Another discursive strategy employed in the EIA for the Nansha dam was framing this 85-meter-tall structure as a 'run-of-river' project (CDM, 2009). Neither the Chinese government nor the CDM governing body provide clear thresholds for this categorisation, for which there is no scientific consensus (Csiki and Rhoads, 2010), but it is a common strategy for promoting hydropower schemes as 'green', 'clean' or 'sustainable' (Erlewein, 2014). This classification did not prevent the disappearance of riparian households' livelihood benefits. Furthermore, CDM paperwork does not consider the 107.5-m-tall Madushan dam a 'run-of-river' scheme. Therefore, any potential positive impact allegedly derived from Nansha dam's 'run-of-river' design is nullified when released water reaches the reservoir from the 'non-run-of-river' Madushan dam.

Finally, although legal guidelines define financial compensation packages for villagers who lose access to their land for development projects like hydropower dams, such payments do not account for the overall complexity of land- and non-land-based consequences villagers experience. Such



payments nonetheless legitimise these consequences; by accepting them, villagers are formally 'enrolled' in the state project (Murray Li, 2014: 599). Yet these individuals are not given much of a choice, and many impacts remain unforeseen until too late.

### Connecting the dots between grabbing processes

Ralph Litzinger argues that while Yunnan Province's ethnic minorities generally welcome development projects because of the concrete livelihood benefits they trigger – including access to financial resources, modern houses, consumption goods and education – 'the construction of hydropower dams, however, seems to be an altogether different issue' (Litzinger, 2007: 285–286). The data introduced above testify to this uneasy relationship between riparian villagers and dam projects.

Hydropower expansion has forced Handai farmers to cope with cumulative and unpredictable changes in water availability, seasonal distribution and sediment load. Upstream and downstream dams triggered different sets of resource reallocations, with their impacts evolving over time. The flooding regime and sediment discharge that improved soil fertility are gone, along with wide swathes of land and the most financially and culturally valued fish species. While these impacts pertain to both the terrestrial and aquatic dimensions of Handai livelihoods, previous literature has emphasised hydropower expansion as a process that mainly drives water grabbing (Mehta *et al.*, 2012; Birkenholtz, 2016), with some scholars beginning to unpack how dams drive land-based resource reshufflings and reallocations (e.g. Murton *et al.*, 2016; Baird and Barney, 2017). The present case study highlights further dam-driven consequences and the governance strategies that have legitimised them.

'Modern' technological advancements are common to arguments that legitimise land reallocation of all sorts. Yet hydropower is unique in the sense that reservoir-induced flooding leads to the total disappearance of land-based activities. One could argue that this makes the outcomes of hydropower-driven land grabs even more dramatic than when land is reapportioned to, say, biofuel plantation expansion or urbanisation.

Tania Murray Li rightfully pointed out that '[l]and is not like a mat. You cannot roll it up and take it away. It has presence and location.' (Murray Li, 2014: 589). Yet, land flooding annihilates this presence and location, together with the livelihood and cultural significances that customary users associate with these characteristics. Hydropower-driven exclusion is also distinct in that it is seldom justified on the grounds that land is marginal, idle, or wasted, or that land use practices need to be optimised (Murray Li, 2014). In fact, reservoirs typically destroy fertile flood plains essential to riparian agrarian livelihoods.

Approaching hydropower-driven resource reallocation as land and water grabbing also highlights the complexity of dam development's temporal dimension (see Kirchherr and Charles, 2016). Some consequences occur almost overnight, leaving riparian societies with little time to reorganise their livelihoods in light of a diminished natural capital base of land and customary hydrologic regimes (see Scoones, 1998). Yet the experiences of Handai informants also demonstrate how the impacts of hydropower expansion accumulate and evolve over time, creating additional challenges for communities whose initial coping strategies are sometimes short-lived.

The most common strategy that Handai villagers adopted to cope with short- and medium-term impacts was to intensify their agricultural practices on landholdings that were not flooded. This again echoes land grabbing scholarship highlighting agricultural intensification as a pattern that typically accompanies changes in land ownership and/or control in the context of the ongoing global land rush (World Bank, 2010; Murray Li, 2011, 2014). In other contexts, agricultural intensification occurs as a response to land acquirers' food safety concerns, or as a result of a capitalist agenda underpinning corporate land investments. But with their livelihoods already increasingly centred on commercial agriculture before hydropower expansion, Handai farmers adopted modern agrarian technologies to cope with aggravated land scarcity. Many farmers expressed long-held resistance to such technologies, aware of their negative impacts and the risks that come with greater exposure to market vagaries. Thus, while the motivations that drove Handai agricultural intensification are distinct from what the land grabbing literature

emphasises, a range of scenarios can be shown to ultimately lead to a deeper penetration of capitalist relations within local communities.

Of all the impacts I have documented above, only the flooding caused by the Madushan reservoir was compensated for, based on guidelines that state authorities unilaterally dictated. This approach testifies to the state's framing of land as a permutable asset, in contrast with Handai farmers' vision of land as transcending its financial value or that of the crops grown on it: 'The land shaped who we are. It was a legacy that our ancestors left us and that we should have transmitted to our children. But now it's gone.' (pers. comm., November 2016). As this occurred, land was reallocated to usages deemed more modern, productive and 'green' to the benefit of other actors, exemplifying a land resource grab scenario.

The fact that Handai villagers were only financially compensated for the initial loss of their land in a very limited manner, and received no further support to cope with any of the other financial or socio-environmental consequences that they endured, illuminates the mechanics of water grabbing. The Red River's seasonal water and silt discharge regimes previously provided riparian farmers with important environmental services including fertilisation and prized fish. Yet water fluidity complicates attempts to assess interlinkages between customary livelihood benefits and ecological dynamics or establish causality among them (Mehta *et al.*, 2012; Franco *et al.*, 2013; Franco *et al.*, 2014; Mehta, 2014). Evaluating areas to be flooded and setting compensation standards based on the value of crops grown in the past is a relatively straightforward endeavour. It is much more complex to determine how fish species will fare or to predict how modified sediment discharge will translate into livelihood loss after a dam is completed. Moreover, such procedures are incompatible with how the hydropower sector operates, with its priorities necessarily prevailing over those of local resource users.

The EIAs drafted for the two Red River dams also exemplify green-grabbing processes. The classification of the Nansha dam as a 'run-of-river' project, together with guidelines on the observance of minimum environmental flows, were promoted as preemptive guarantees that the Nansha and Madushan dams would not yield adverse environmental impacts (CDM, 2009, 2011). Yet the EIAs failed to elaborate on how the environmental flow values were adopted or specify the criteria that make the

Nansha dam a 'run-of-river' project. The data supporting these conclusions are not publicly available. In lieu of this, the assessments emphasised the Nansha and Madushan projects' contributions to curtailing GHG emissions, following guidelines and methodologies that allowed the projects to participate in the CDM.

This highlights the disjuncture between how local resource users such as Handai farmers and other actors involved in Yunnan hydropower governance understand environmental benefits and degradation. Whereas farmers valued 'clean' water that did not give them skin rashes, policymakers and corporate actors emphasised the need for 'clean' air with lower levels of GHGs in coastal urban areas. Villagers acknowledged that hydropower dams contribute to achieving multiple policy agendas in distant locales, including environmental ones, and understood that this might bring livelihood changes. In contrast, the distant actors partaking in hydropower governance disregarded most local consequences caused by their 'green' resource reallocation processes, and kept compensation standards to a minimum by presenting the villagers with an offer they could not refuse.

## Conclusion

State-endorsed and CDM-sponsored dam construction drove the reallocation of water resources from Handai villagers to the hydropower sector by modifying the spatio-temporal dimensions of water availability. These changes suited the needs of corporate stakeholders, the CDM's programme to reduce global GHG emissions and the modernisation, development and environmental agendas of various government actors. Hydropower expansion deprived riparian communities of benefits formerly derived from the Red River's customary hydrological regime, a clear instance of water grabbing.

Water releases from the upstream Nansha dam and storage in the downstream Madushan reservoir imperiled the land-based activities of Handai farmers to satisfy the energy demands of eastern China's distant consumers. Land flooding caused the greatest livelihood consequences, although subtler changes have also impacted local livelihoods; for instance, farmers have abandoned land parcels close to the reservoir and now use

more chemical inputs. These changes testify to the wide range of outcomes that land-grabbing processes trigger, and expand on the socio-economic impacts documented by the land grabbing scholarship.

Meanwhile, Chinese environmental policies and global carbon offsetting mechanisms frame hydroelectricity as a green energy alternative and promote hydropower development on the grounds that dams serve specific national and global environmental agendas. Various discursive strategies are mobilised to legitimise these agendas, but the local livelihoods and ecosystems destroyed by dams are overlooked. These outcomes attest to how green grabbing espouses selective and narrow visions of environmental enhancement and sustainability while failing to account for other narratives.

Taken together, this demonstrates that hydropower expansion along the Red River follows a development model that blurs the lines between land, water and green-grabbing processes. However, such interconnections are seldom taken into account by scholars or policymakers. To legitimise hydropower expansion and the social, economic and environmental agendas that underpin it, some anticipated local consequences were addressed and compensated for pre-emptively, but according to criteria set by distant actors alone. The incomplete implementation of these guidelines was not a major obstacle to the legitimisation process.

In some cases, the discourses surrounding hydropower expansion have been potent enough for farmers to internalise and accept the development programmes that foster dam construction. Yet the livelihood impacts that have accumulated over time, along with the lack of help in coping, have made the projects less 'legitimate' to local actors. The 'silo' approach that characterises how the policy and academic spheres approach land and water resources obscures the interconnected impacts of the simultaneous reallocation of these resources. This paper will hopefully fuel emerging debates geared towards overcoming such compartmentalisation and avoiding future detrimental consequences.

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### Notes

- 1 In 2004, the electricity generation assets of the former State Power Monopoly were assigned to the China Huaneng Group, China Datang Corporation, China Huadian Corporation, China Guodian Corporation and China Power Investment Corporation (now State Power Investment Corporation) (see Andrews-Speed, 2012).
- 2 Rare exceptions are women from other ethnic groups who moved there after marrying a Handai villager.
- 3 This migratory catfish species belongs to the *Pseudocheneis* family, and is akin to the Mekong catfish that epitomises the environmental consequences of China's upstream dam development (Wei *et al.*, 2008; Yos, 2011). Despite similar hydropower development along the Red River, the yellow catfish has not received as much attention as its Mekong cousin.
- 4 1 *mu* = 1/15 ha.
- 5 All land remains state property in China. Villagers were thus compensated for the loss of their crops and lost income opportunities rather than for flooded land *per se*.
- 6 Contemporary hydrological data is considered classified information in China.

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