

Thayer Scudder was concerned. It was May 2015, and in approximately half a year, the Resettlement Implementation Period was scheduled to end, concluding the responsibility of the Nam Theun 2 (NT2) hydroelectric power project for restoring the livelihoods of resettled indigenous communities in the uplands of central Laos. As the lead member of the influential International Environmental and Social Panel of Experts for NT2 (POE), one of three academics from the US and New Zealand, he shared the duty of determining whether binding provisions of the Concession Agreement on environmental and social mitigation had been complied with by the Nam Theun 2 Power Company. The POE, was not convinced that resettlers' livelihoods had been sustainably restored or were even, in some cases, legal. Lao PDR government agencies poised to take over the responsibilities of the project holder were unprepared and in disarray as no clear source of funding was in sight for the activities they were going to be held responsible for. Some irrigation systems remained uncompleted. Certain ethnic minorities displaced by the project remained in less than ideal situations. Many of the village level committees established during project implementation remained inexperienced and lacked training, while businesses supposedly providing sustainable resettler livelihoods were non-performing. Scudder's POE consulted with project stakeholders to come up with an equitable set of recommendations that would not only comply with contract provisions but also fulfill standards that seek to protect vulnerable populations and the environment. (McDowell et al. 2015)

Lao PDR

Lao Deputy Prime Minister Somsavat Lengsavad on September 17, 2015 heaped praise on the project as, "the most powerful in Laos and which is considered worldwide as a model of social and environmental responsibility." He added "We are convinced that a controlled exploitation of hydropower constitutes one of the less harmful ways, regarding climate change for instance, to produce the energy that the world needs." (Lengsavad, 2015) Lengsavad served as chair of the NT2 Steering Committee, an underutilized oversight body for the project. According to his vision, building and operating Nam Theun 2 is the lynchpin of a nationalist project that seeks to both modernize and enrich the state by harnessing the energies of natural systems and subduing them in massive engineering works. Some attention is being paid to mitigating and controlling impacts, but the key here is to subvert nature's raw power and turn it into state power and revenues to allow the state to better govern its territory and keep its citizens under control.

Mountainous and land-locked, Laos is one of the poorest countries in Southeast Asia, with official poverty levels at 23.2% as of 2013 and a majority rural and agricultural population of almost 6.8 million as of 2014. Per capita GNI has been pegged at US \$1,450 as of 2013. Two-thirds of the country is mountainous, with a mere 10.1% of its land under cultivation in 2013. Maternal mortality remains high at 220 per 100,000 live births; infant mortality is also elevated at 54 per 1,000 live births; under-five mortality is very high at 71 per 1,000 live births. Up to 27% of children under five are underweight, while 22% of the population is unable to afford the prescribed minimum level of dietary energy consumption. The literacy rate of 15-24 year olds is at 90.2%. Only 73.3% of students entering first grade is able to complete primary education. Its Gini index of income or consumption inequality was pegged at 37.9 in 2012. Its Human Development Index as of 2013 was 0.57. (ADB 2015; Smits 2012; UNDP 2014; WB 2015a and b) The major trade partners of Laos are Thailand, Viet Nam, China, and the EU. China, Viet Nam, Thailand, Korea, and Japan are its main sources of foreign investment. (Smits 2012)

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NT2 and its revenues are part of the Government of Lao PDR's (GoL) strategy to halve poverty by 2015 and to graduate from its status as a least developed country by 2020. From 2010 onwards, the GoL intends to use NT2 revenues to finance poverty reduction by providing public goods, services, and infrastructure in rural areas to jumpstart economic growth. (ADB 2004)

As of 2008, electricity exports of Laos comprised 9.7% of its total exports. Its National Export Strategy intends for Laos to become the battery of the Association of South East Asian Nations (ASEAN), producing electricity cheaper than its neighbors. Watershed protection and reforestation was to be prioritized to protect the water sources for hydroelectric dams, and the dams are expected to bring downstream benefits such as irrigation water. Hydropower investments shall be encouraged under various arrangements. Cheaper electricity could also reduce transportation costs, and, by extension, service costs. (Lao PDR 2010)

Thailand and Viet Nam are the major clients for Lao hydropower. Laos has signed Memoranda of Understanding to supply electricity to Thailand (7,000 MW) in 1993 and 1996, Viet Nam (5,000 MW) in 1998 and 2006, and Cambodia (1,500 MW) in 1999 till 2020. (Laspho 2012 for years of signing; Smits 2012) Prior to the 2010 opening of the Nam Theun 2 dam, however, Laos was importing more electricity from Thailand and Viet Nam than it was exporting, at a higher import tariff. (Smits 2012)

Hydropower benefits to Lao included dollar-denominated revenues, royalties, taxes, and area development projects. At the same time, however, social and environmental impacts include "involuntary resettlement, flooding of reservoirs, changing of flood regimes, loss of fisheries, emission of greenhouse gases from reservoirs, and disruption of livelihoods and ecosystems in general." (Smits 2012, 115)

Project site

The Nakai Nam Theun National Protected Area (NNT NPA) covered 3,500 square kilometers of mostly mountains and forest, spread out over five main river valleys (Nam Xot, Nam Theun, Nam Noy, Nam Pheo, and Nam One), each with divergent settlement patterns. In each river valley, there were some type I-III Vietic-speaking hunter-gatherers who are marginalized by other ethnic groups in consolidated villages. (ADB October 2010)

The NNT NPA features a variety of habitat types, including pine forest in the Nakai Plateau, dry evergreen forest in mountainous areas 600-1000+ m in altitude, upper mountain forest above 1800 m, wet evergreen forest on the border with Viet Nam containing endemic Annamite species, and cultivation, shrub and secondary, and bamboo forest around villages below 600 m. Dry evergreen forest is the most common habitat type in the whole protected area.

Although an exhaustive survey was not conducted, there are at least 51 species (20 amphibians, 31 reptiles) of reptiles and amphibians in the Nakai Plateau in 2008. Nine of these are threatened. An additional five turtle species have been reported but not confirmed. Turtles are hunted for food or trade, and the demand for certain species is quite high. The protected area is one of the most important areas for birds in Lao PDR and Indochina, with a total of 430 species

confirmed, of which several are globally significant in conservation value. It has also been surveyed for large mammals using camera traps and transect walks, and found to be of national and global significance for several mammal species. Some of the last mammals to be discovered were found in the NPA, endemic to the Annamite mountain range. These include the large antlered muntjac and saola. A relatively large population of endangered Asian elephants was resident on the Plateau, with a 2007 survey estimating 130 individuals. The tiger was last confirmed in the NPA in 2009 based on its tracks; if still occurring, only a few individuals likely remain. At least nine primate species reside in the area. In the protected area, several species of animals and trees are severely threatened by overharvesting for local consumption or trade. Newly-described and vulnerable species in the NNT NPA are enumerated in Tables 1 and 2, respectively, in Annex A to this case. Rosewood and agarwood are both considered very valuable and logged for trade. Some species are used in traditional medicine in Viet Nam or China. The long border with Viet Nam makes wildlife vulnerable to poaching by Vietnamese. They are primarily hunted using snares. (NT2 WMPA 2015)

A number of fish surveys by fish taxonomist Maurice Kottelat were conducted in between 1996 and 2002, yielding the identification of 71 species, a large proportion of which had not been previously recorded in Lao waters. Of these, eleven species were previously unknown to science. (Sioudom 2013)

Nam Theun 2

NT2 is a transbasin hydroelectric power project on the Nam Theun, a tributary of the Mekong River, located mostly in Khammouane province in central Lao PDR. The 39 meter high main dam creates a 450 km² reservoir when full on the Nakai Plateau and has a storage capacity of 3,910 million m³. From the reservoir, the water drops 350 meters to a power station at the base of the Nakai Plateau near the town of Gnommalath. From the power station, the water heads to a regulating pond before flowing to the Xe Bang Fai via a 27 km-long channel. The power station has a generating capacity of 1,080 MW (1,070 MW net). Electricity generated for export to Thailand is delivered using a 138 km-long, 500 kV transmission line that crossed the border near the city of Savannakhet. Electricity generated for Lao PDR travels via a 70km-long, 115 kV transmission line to the Thakhek substation. Project components included the Nakai dam and reservoir, flow diversion elements, the power station, downstream hydraulic control and conveyance elements, transmission, and ancillary works. Flow diversion elements included the headrace channel, intake structures, and underground works. Downstream elements included the tailrace channel, the regulating pond and the regulating dam, the Nam Kathang release, the downstream channel, and the aeration weir. Ancillary works included an estimated 56 km of new roads and upgrades to more than 100 km of existing roads, an operator's village called Residence Nam Theun, materials sources, spoil disposal areas, and construction work camps. (NTPC 2005b)

Project cost was estimated at US \$1.45 billion, including a US \$1.25 billion base project cost and an additional US \$200 million for contingencies. US \$1 billion in debt financing was provided by multilateral and bilateral agencies, export credit agencies, and a consortium of 14 international private commercial banks (nine international and seven Thai lenders). Debt

guarantees from the Asian Development Bank, and the World Bank Group's International Development Association (IDA) and Multilateral Investment Guarantee Agency (MIGA) covering about \$186 million of the debt financing was a key contribution to move the project forward. (MIGA 2006; WB no date)

Structured as a Build-Own-Operate-Transfer (BOOT) project, it was implemented by Nam Theun 2 Power Company Limited (NTPC), a Lao limited liability company established in 2002. NTPC shareholders included Électricité de France (EDFI), Italian-Thai Development Public Company Limited (ITD), Electricity Generating Public Company of Thailand (EGCO), and the Nam Theun 2 Power Investment Company (NTPI). NTPI was incorporated by Lao's state-owned power company Electricité du Lao to invest in NTPC on its behalf and represent it on the board of directors. (MIGA 2006)

Project impacts and mitigation measures

Briefly described below are the environmental and social impacts forecast in the design of the project, as well as the mitigation measures and compensation programs put in place by project holders.

Key impacts of the project on affected areas and communities include the following:

- In the Nakai Plateau, approximately 6,300 persons comprising 1,310 households in 17 villages were resettled to make way for the creation of the Nakai reservoir (more than 600 persons in excess of 2004 estimates), 15 of these villages being fully relocated.
- Plateau communities would be impacted by the construction of the Nakai dam, headrace channel, intake structure, the relocated section of Road 8B, and some tunnel works.
- In both the Nakai Plateau and the Xe Bang Fai (XBF) communities, large groups of construction workers could create public health problems, such as HIV/AIDS, that may be brought on by high risk behaviors of construction workers, truck drivers, bar hostesses, and sex industry workers.
- Traffic-related and other accidents could increase during project construction
- Downstream of the Nakai dam, environmental changes will result from the significantly reduced flows of the Nam Theun.
- In XBF communities, changes in water quality would have an impact on the domestic water supply and the health of communities that acquire their water supply directly from the river.
- In XBF communities, changes in water quality, hydraulics, and river morphology will likely result in fishery losses estimated at 33-37%, equivalent to 400-500 tons/year for the first year, which translates to cash income losses of up to 5% for the whole downstream area.

- In the XBF, changes in hydrology could increase the rate of erosion and transform river morphology, which would result in the loss of, or damage to, some permanent structures as a result of erosion.
- In the XBF, raising the water level by up to 4 meters will result in the loss of seasonally dry riverbank and riverbed areas used by villagers for vegetable gardens; irrigation, however, is expected to become cheaper and more reliable in these areas.
- In the XBF, the increase in water level will prevent river crossings by traditional means, including temporary bamboo bridges and fording of rapids.
- In Nam Kathang, no significant impacts are expected on river crossing, riverbank gardens, or community flooding.
- In Nam Kathang, adverse water quality conditions in the discharge from the power station will impact the domestic water supply of some communities, and along with impacts on the XBF, could negatively impact fisheries on the Nam Kathang.
- A total of 11,536 hectares of land will be impacted by project construction, which will require acquisition or use of land, necessitating compensation of the current owners for the loss of land, livelihoods, and assets associated with that land (NTPC 2005a).

Mitigation measures

In the NNT NPA, the project shall provide US \$31.5 million in financial assistance and program management for biodiversity conservation and livelihood improvement for communities located within the NPA. The GoL developed the Social and Environmental Management Framework and Operational Plan – or SEMFOP – for environmental protection and livelihood protection and improvement in these communities, with the funds to be administered by the Watershed Management and Protection Authority (WMPA).

In the Nakai Plateau, NTPC prepared the Resettlement Action Plan or RAP for the resettlement of eligible communities and households. The RAP incorporated a number of replacement and livelihood programs and asset compensation activities.

In the XBF, it was deemed important to limit the negative impacts of erosion and adverse water quality. Among the mitigation measures planned and conducted were the following:

- Partial biomass clearance in the reservoir, to mitigate decreases in water quality
- Construction of a large regulating pond to mitigate fluctuating discharges from the power station and the resulting level of the XBF
- Construction of the Downstream Channel instead of using the Nam Kathang, mitigating erosion, water quality declines, and fisheries losses
- Provision of an aeration weir and aeration structures in the downstream channel and Nam Kathang release, respectively, to mitigate depletion of water oxygen
- Riverbank protection at the Nam Phit and XBF junction to mitigate against erosion
- Provision in the PPA to shut down the power plant during overbank flooding, to mitigate wet season flooding

Alternative sources of domestic water were developed in villages dependent on the XBF for household water use. A fisheries replacement program was to be implemented which could include fish ponds and rice fields modified to provide fish refuges. Community infrastructure put at risk by erosion received remedial mitigation, was relocated with project assistance, or compensated. Riverbank gardens were relocated upstream or re-established with NTPC assistance. NTPC also provided boats to affected villages, as alternative modes of crossing the XBF. A regional health program was administered in conjunction with GoL provincial and national health programs, in order to mitigate adverse health effects brought on by the large construction population and to upgrade the health status of local populations.

In the Nam Kathang, the project was to pursue the same mitigation measures outlined for the XBF in providing alternate sources of domestic water and in mitigating adverse health effects. Should surveys reveal that fisheries on the Nam Kathang are also adversely affected; corresponding compensation activities are to be pursued. An aeration structure has been included in the design of the Nam Kathang release from the regulating dam to help improve water quality for downstream communities.

Project Lands cover all areas required for the construction of the Nakai dam, the saddle dams, the power station, the headrace channel, the power conduit intake structure, the substation, the regulating pond, the regulating dam, Residence Nam Theun, quarry areas, work camp areas, corridors for the 500 kV and 115 kV transmission lines, and all roads to be upgraded and constructed. The RAP lists fifty-seven Project Lands as these are defined by the Concession Agreement. A baseline study was conducted to catalogue all land and assets outside the reservoir, including manmade improvements, to be affected by construction. The study mapped the affected lands, assets, and livelihoods and assessed the project's direct and indirect impacts on these. On this basis, the study estimated the current value and/or productivity of these lands, assets, and livelihoods and recommended appropriate compensation. The study accomplished mapping and database development using satellite interpretation, while using a field survey to confirm location, dimensions, and ownership of lands and assets. (NTPC 2005a)

Compensation program

Aviva Imhof, Campaigns Director for International Rivers Network, declared on 1 February 2005 that the "NT2 Power Company owes Nakai villagers for sacrificing their land and resources and enduring a decade of economic stagnation and owes anyone displaced full compensation for lost resources, livelihoods, income, and opportunity." (Imhof 2005) In this, Imhof was giving voice to principles of equity and social justice that are enshrined in legal codes, international covenants, mandatory safeguards imposed by multilateral donors and guarantors, best corporate or industry practices, and contract provisions. Although the villagers themselves, individually and collectively, may have little power or standing in the context of Laos, international NGOs attempt to stand in for the disempowered and serve to amplify their voices and create spaces for airing their legitimate grievances and concerns. Over the past two decades, they have been participating in consultations about NT2, paying monitoring visits to the project site, corresponding with project management about their concerns, promoting adherence to safeguard policies, and advocating fair compensation for affected communities and more effective mitigation measures for social and environmental impacts.

NTPC and the GoL, in consultation with the project affected persons (PAPs), developed a compensation scheme applicable to each Project Land. Affected assets/lands were valued pursuant to guidelines set in the Asset/Land Compensation Agreement. These estimates may represent local market replacement value or the importance of that asset/land to PAP livelihood. NTPC, the Resettlement Management Unit, and the district government prepared an agreed schedule of base asset value. The agreement determined how each PAP was compensated, whether in cash, in kind, or as some form of rehabilitation.

In the section of the river from the Nakai Dam to the Theun Hinboun headpond, the riparian study conducted in 2004 provided the basis for compensation. In the XBF, where it is not economical to implement riverbank protection and stabilization, losses or damages to permanent structures due to erosion were compensated. (NTPC 2005a)

Rehabilitation program

Sivanxay Phommarath, a resident of Gnommalath district in Khammouane province in Laos, was detained and imprisoned for three months in October and November 2012, respectively, for leading fellow villagers in discussing adequate compensation for lands, homes, and livelihoods to be affected by a road being expanded near NT2. In exchange for her release, she was fined 700,000 kip (US\$88) and warned against future “unlawful” actions. Unlike most of her neighbors who have been offered alternative plots of land and financial compensation and subsequently left, Sivanxay has stood firm and even built a new house close to the road to avoid flooding and improve her livelihood: “I am still confident that this land is mine because I pay property taxes every year. If I am asked to leave again, I will do so as long as I am compensated according to my previous demand.” Sivanxay’s experience in Lao is common, but voices like hers are rarely if ever heard in Lao media and discourse regarding hydropower projects like NT2. How is this paradox explained? (Lipes 2014)

“EGAT is taking its projects to countries like Laos and Myanmar because in those places governments can control resistance from the people. There’s little space for civil society to protest.” was the succinct explanation supplied by the Electricity Generating Authority of Thailand’s (EGAT) PR director to a group of visiting Australian water management masters students on December 2014. (Greenstein 2014)

Meanwhile, on the Thai side of the 500 kV transmission line from NT2, EGAT has displaced 10 families to make way for the line’s construction, in the process violating international human rights covenants acceded to by Thailand and even some ADB safeguard policies. On 19 December 2008, local policemen were directed by EGAT officials to tear down the Sangsawat family home in Roi-Et province, in the process destroying their home and livelihoods. EGAT failed to assist the family in relocation or rehabilitation, while limiting compensation to the appraised value of their house, land, and trees. This forced them onto land they don’t own, soon to be repossessed by the bank. EGAT, by displacing them from their land, cutting down their coconut and eucalyptus trees, and refusing to help them acquire equivalent lands and recover their livelihood, has driven them deeply into debt. EGAT’s actions resulted in the loss of 200

ducks, 50 coconut trees, 100 eucalyptus trees, and many fish and ducks, for which they have not been compensated. In the process, members of the family were threatened and intimidated by police and EGAT officials, ignored by provincial government officials, and even subjected to forgeries of their signatures on compensation documents. Paiboon Sangsawat, family patriarch, has this prayer to the powerful state bureaucracy: “I want EGAT to look back and help us, to feel sympathetic to people like us. What EGAT did was too much. It hurt my family and our property. We want EGAT to feel our suffering.” (Cahn and Steinhardt no date)

NTPC developed the RAP to resettle eligible Nakai communities. Potential resettlement sites were identified within the Nakai Plateau and Gnommalath District. Community consultations had established that PAPs strongly preferred to remain on the Plateau rather than move to lowland areas, with few exceptions. In 2003, more specific sites were identified along the reservoir's southwestern shoreline, where water was available for irrigation and there was convenient access to the drawdown zone, grazing, and forest land. Much of this land was sloped below 15%, suitable for village and farm sites, and was already within village customary use areas.

A pilot village was commenced in 2000, with the three hamlets of Ban Nong Boua, Ban Sailom, and Ban Pamanton selected for resettlement there. Lessons were elicited from the pilot village resettlement concerning topographical and soil surveys, paddy land size and location required by each household, village structure, and irrigation system design and construction.

A health program to benefit the resettled people was also funded by the project to compensate for any adverse health effects. The program adhered to GoL policies and targets and, over the long term, combined health care activities with GoL programs. Special campaigns against AIDS were mounted among rural and town communities, as well as the construction labor force, with local medical staff participation. (NTPC 2005a)

Offset measures

Responding to a letter from Thai NGO Green World Foundation on 12 November 2004, then-Acting Country Director for Lao PDR Denis Robitaille of the World Bank concluded: “...I should note that the World Bank is duty-bound to consider this request for support from one of its poorest member countries. The international community is facing a fundamental choice in Lao PDR: is the country to be entitled to a chance at economic development, carefully managed in a public, transparent way that takes into account the environmental and social realities of the country, or is it to be given support only for the smallest-scale development projects? It has asked to be allowed to draw on international experience to give its people the same opportunities enjoyed by wealthier countries. That is why we are engaged in examining this project, and why we are working with others on these difficult issues – such as the elephants on the Nakai – to find solutions that benefit the people, as well as the elephants, of Laos.” Since Laos is determined to move forward with some tens of hydropower projects on the Mekong and its tributaries, these questions remain pertinent, along with the further questions of whether and how such management of large dam projects could be conducted. (WB Group no date)

A Wildlife Management and Protection Program was put in place to offset project-caused damage or degradation of the various natural habitats in the region, with emphasis on three specific aspects: (1) fish impacts in rivers upstream and downstream of the project; (2) impacts on terrestrial animals in the inundation area; (2a) Asian Elephant management; and (3) wetland conversion and formation. In addition, sections of the Nam Theun and XBF rivers impacted by the project are covered by a monitoring program concerning fish species and aquatic habitat. (NTPC 2005b)

Outcomes

Improved infrastructure and services in resettlement villages

Infrastructure and services provided by the project to resettlement villages include water supply and sanitation systems, roads, school and health centers, electricity, and credit funds. Each village now has a primary school and kindergarten. There are two additional Integrated Community Health Centers (compared to five in May 2005), an ambulance, trained village health volunteers and traditional birth attendants in every village, and monthly MCH clinics. The project constructed 150 km of rural roads and rehabilitated 120 km of rural roads. It should be noted that this is almost 100 km in excess of the 56 km of new roads contemplated in the project's Environmental Assessment & Management Plan and 20 km in excess of the 100 km of rehabilitated rural roads also proposed therein. Improved road access has increased resettlers' options for selling produce and farm animals, while also allowing traders to access the Plateau – particularly the northern villages – to buy fish. Villagers now have improved access to consumer goods not easily available before. The flip side of this, of course, is that wildlife poachers, illegal loggers and harvesters of valuable species like rosewood, and other illicit users of the watershed and reservoir also have acquired improved access to the protected area.

Secure ownership rights to houses and residential plots as well as secure use rights to 0.66 hectare agricultural plots were provided to both household heads and their spouses, benefiting 6,300 people.

Between 2006 and 2013, Nakai resettler children have increased their enrollment in primary school from 60 to 90%, with up to 35% currently attending some form of early childhood education. Both of these are better than the proportion of enrollees in Lao rural areas, at 80% and 2.4%, respectively. Girls have just as good access to education as boys, while more older adults from 15-60 have never attended school or are illiterate, compared to younger adults from 15-25 years of age. Focus has now shifted to secondary school and adult education in resettlement villages.

Food sources have become diversified over time, and resettlers' diets now include more meat and fish proteins. In the transition from a self-sufficient to a market economy, there has been a move from self-produced to purchased food.

Resettler households have each been given access to improved domestic water sources, including rainwater collection tanks and groundwater hand pumps. As of June 2014, the project had provided 333 boreholes with hand pumps and electric pumps installed. Almost all households

now use pour flush latrines. Most community buildings also have their own toilets. Education and training in health and sanitation issues have also been provided. As a result of improvements in hygiene, nutrition, and access to infrastructure and services, health indicators have shown impressive improvements: stunting among under five reduced from 43% to 34% between 2008 and 2013; mortality rate per thousand births among under five down from 120.5 to 37.4 over the same period; and contraceptive use increased to 57%.

Gender policies of the project have alleviated women's daily workloads, including in water collection, vegetable gardening, fishing, small animal husbandry, and small businesses. Easier and increased access to domestic water, sanitation, drainage, and even irrigation facilities has reduced the physical burden on women and children. Joint participation of women and men in village-led institutions managing access to natural resources such as fishing, forestry, agriculture, and livestock associations has been encouraged, but mostly in initial consultations, rather than in resource allocation and action stages. Commonly, however, in instances of divorce or death, resettler households revert to customs of male land and home ownership. Some hamlets have few or no women representatives in the Village Development Committee (VDC), while there are no female headmen in the resettlement villages.

Village Credit Funds established in 2012 in 16 villages have created a microfinance facility for production or emergency loans that 1,310 resettler households are eligible to access. (NTPC 2013; McDowell and Talbot 2014; WB Group and ADB no date)

Loss of livelihoods of resettled villagers

Agricultural interventions, including irrigation systems and gully dams, household gardens, and titled plots have yielded small benefits and garnered low levels of buy-in by the resettlers for a number of reasons. Resettlers have fallen back on the familiar technology of swidden farming, and it is likely that the paucity of professional extension workers has had a negative impact on technology uptake. Infertile soils in the resettlement areas, coupled with the unfamiliarity of intensive cultivation and pumped irrigation, and the insecurity of some plots has resulted in low utilization of farm plots. Given the choice between agroforestry, pasture development, and industrial crop cultivation (e.g., cassava), only agroforestry has been taken up with enthusiasm, currently covering up to 509 hectares. Only 31 of the irrigation systems set up by the NTPC are currently being used, with another 50 systems capable of being repaired.

Raising of large livestock appears to be in the process of transitioning from savings vehicles to sources of income, with people in several villages shifting from buffalo to cattle, which are more prolific producers and reputed to be more disease resistant. Large livestock raising has been growing at about ten percent per annum. Buffalo and cattle are currently pastured on sparse grasses and other vegetation, commonly in degraded forest areas, but to raise productivity, they will require better nutrition. Villagers, however, shall remain averse to investing time and capital in pasture development, more nutritive livestock feeding, and improved care for large animals without education and active support. Although vaccination rates are higher for resettlers' livestock than that of surrounding communities, the risk of epidemic diseases introduced from the watershed, and Khamkeut and Gnommalath Districts remains high. Small stock, including

pigs, goats, ducks, and chickens are also popular among the women.

Fisheries in the reservoir have proven the most stable and successful livelihood pillar in the resettler villages. Fish catch increased rapidly after the reservoir was created, dropping down subsequently and plateauing at the carrying capacity of the reservoir. Although the catch has not been declining, villagers must compete with outsiders illegally fishing in the reservoir. Law enforcement in the reservoir has been quite poor, with the WMPA failing to conduct adequate patrols or cooperate with the resettlers. The WMPA and the Reservoir Fisheries Agency need to develop a more cooperative relationship that will allow them to monitor and patrol reservoir fisheries effectively.

Community forestry has been largely unsuccessful, so far. While NTPC initially delivered on advice, equipment, and finances for operations, it was unable to develop a forest management and development plan. The forest resource has not been adequately assessed. Dividends paid out by the Village Forestry Association (VFA) annually are less than projected by a factor of two, with none paid out from April 2012 to 2014. Taxes and levies assessed on the VFA have been excessive, and refunds promised by the GoL have not yet materialized. Protection and management of the forest, harvesting and utilization of timber, and marketing have all been flawed, with little regeneration or reforestation of degraded forest lands. Encroachments have further diminished forest cover, with up to 700 hectares (4-5% of Village Forestry Development Company Limited or VFDC (formerly VFA) forests) burned off for swidden cultivation in 2013. The NTPC has largely disengaged from the sector without completing its Concession Agreement (CA) commitments. (McDowell and Talbot 2014)

Environmental harm in the protected area

Way back in 2005, Thayer Scudder – involved in project monitoring as the lead member of the POE since at least 1997 – warned that “the Nam Theun 2 project has the potential to be a disaster for the environment of the Nakai Plateau and the Nam Theun watershed, as well as for affected communities from the Viet Nam border to the Mekong River.” Scudder’s assertion here brings our attention to negative externalities that are rarely correctly factored into assessing the true costs of large dam projects like NT2. He was basically warning that unless powerful decision makers within the administration of the project actually stood for the integrity of the environment and the welfare of the affected people, then both could be destroyed in the process. The POE conducts one or two monitoring visits to the project site and project- impacted territories each year, each time providing a status report on environmental and social issues and mitigation efforts, based on findings and feedback gathered during a project site visit and discussions with various stakeholders and participants, along with recommendations to the NTPC, the GoL, and even the international financial institutions (IFIs).

The Company was able to conduct various wildlife and fish surveys and species and habitat inventories, and prepare management plans for local populations of important and endangered species between 2006 and 2009. In 2006 and 2007, the NTPC completed baseline surveys on wildlife, fish and aquatic habitats, and elephants, and prepared a management plan for the transition phase. A required measure for the management of the population of the endangered

Asian elephant was implemented between June 2007 and December 2009. Since 2008, the program has focused on installing mineral licks at the release sites, monitoring human-elephant conflict, and developing an elephant-proof crop management system. Lost wetlands were to be offset by conducting a wetland conversion and formation program to benefit fish, birds, reptiles, and mammals that inhabit swamps and rivers. In 2008, the NTPC completed a baseline inventory and prepared a management and monitoring plan for these particular species. In the same year, it also constructed and planted 30 wetlands. To conserve aquatic habitats and fish diversity, the project was required to monitor critical species and habitats, detect any declining populations, and recommend appropriate mitigation measures. Towards this end, the NTPC conducted a pre-inundation fish survey in 2007 and a post-inundation fish survey in May 2009. The company also has a team tasked with monitoring fish species productivity in the reservoir. (ADB October 2010)

Drowning and stranded animals, especially on islands, were rescued and released under a wildlife rescue program initiated by the NTPC in April 2008 and implemented until March 2009. This program has recovered 268 individuals belonging to 49 species, including 38 large antlered muntjac, and released them in sites within the NNT NPA that are patrolled by the WMPA. (ADB October 2010)

The concession agreement provided for the establishment and operation of the Watershed Management and Protection Authority (WMPA), to address the threats to the NNT NPA. In response, the GoL established the NT2 WMPA in February 2001 by prime ministerial decree and prepared the Social and Environmental Management Framework and Operational Plan to be implemented by the WMPA. The SEMFOP is intended to “ensure the effective long-term protection of the biodiversity and watershed values of the Nam Theun 2 catchment, while at the same time safeguarding the well-being, traditional livelihoods, and culture of its human inhabitants.” (ADB October 2010, p. 83) The NTPC shall also develop a post-impoundment species management plan to be handed over to the WMPA after the start of operations. (ADB October 2010)

Using foot patrols and camera traps, the WMPA has found that large terrestrial forms of wildlife inside the NPA have been grossly and increasingly depleted since 1997 because of intensified poaching and the hundreds of illegal wire snares. A large proportion of resettlers, meanwhile, are engaged in poaching of wildlife and rosewood in the western NPA, using the pretext of caring for their water buffalo. (McDowell et al. 2010) Resettlers freely admit that collecting and selling rosewood earns them much more than the contractual harvesting of their own forests. Aside from the improved access in crossing the reservoir, abandoned roads such as the Thong Kong salvage logging road used during NT2 project construction continue to provide uncontrolled access to the NPA and Village Forestry areas via two-wheeled vehicles. (McDowell et al. 2011) Highly valuable *Aquillaria* and rosewood (*Dalbergia* spp.) trees are commercially and virtually ecologically extinct in many parts of the NPA. Rhinos, tigers, box turtles, and pangolins are extinct or near-extinct in those areas, as well. Terrestrial animals have been depleted by commerce with Viet Nam and China. (McDowell et al. 2012) Over the course of 17 years of careful observations of the watershed, the POE has annually observed fewer terrestrial mammals, arboreal mammals, large birds, and reptiles. (McDowell et al. 2013b)

With its vast area of coverage, few staff, and limited ongoing efforts, the WMPA has been unable to stem the loss of biodiversity in the NPA. Poaching by Vietnamese, residents of the Peripheral Impact Zones (PIZs) and some enclave villages, and, increasingly, the resettlers remains severe. Snare lines are built by poachers by cutting brush and branches to create a long fence with gaps between five and fifteen meters. Wire snares, usually constructed of motorbike or bicycle brake cables, are placed in each gap. These snare lines, some at least three kilometers long, are established along ridge tops or across valleys to capture any terrestrial animal seeking food or water. In 2013, foot patrols in the southern priority zone of the NPA (south of the Nam Pheo River) discovered 18 extensive snare lines and in less than four days, collected 1,575 individual snares. (McDowell et al. 2013b) WMPA staff from one of several ranger stations near the border with Viet Nam reported having collected approximately 1,000 snares in two months, while at the same time being unable to interdict these Vietnamese poachers. South of Ban Nameo, Vietnamese poachers appear to have near complete freedom of movement, with the evidence found of recently occupied poachers' camps for up to 100 persons, more than 100 snares, and even recently used meat drying and smoking structures. This forest and grassland area may be considered the most important and valuable area in the entire watershed for larger mammals, including gaur, large antlered muntjac, sambar, wild pig, and gibbons. Village authorities reported patrols in the area only once every year or two years, while villagers report connivance of village authorities with the Vietnamese poachers. (McDowell et al. 2011) Previous land patrols, supposedly out for 30 days, spent as little as 4 or 5 days in the forest, mostly or entirely on trails. This did not deter poachers or have an impact on poaching activities. (McDowell et al. 2013b)

In December 2011, partly as a result of previous POE reports, the WMPA carried out a comprehensive sweep of the Thong Kuang grasslands, the Tong Sek grasslands, the Nam Nyang river valley, and the villages on the upper Nam Pheo, in the process destroying a large number of poachers' camps, including some rebuilt after being destroyed in February 2011. As a result, Vietnamese poachers appear to have shifted to using small, camouflaged, temporary camps. Snares and illegal harvests of rosewood trees continued to be found. (McDowell et al. 2012) Stationary WMPA checkpoints like the one on the Nam Xot have proven largely ineffective at interdicting timber and wildlife poaching in the NPA. (McDowell et al. 2013a)

In 2013, two recently built vehicle tracks were reported to have been constructed to enable illegal logging – one from Ban Navang into the Nam Chae priority protected zone and the other from Ban Thong Noy to Ban Maka or the Viet Nam border. These were neither approved nor interdicted by the WMPA. (McDowell et al. 2013b) In 2014, the POE reported significant illegal timber extraction presumably from the corridor area close to the NT2 dam, with logs removed close to the entrance to the former residence area. On the same monitoring trip, the POE observed a surge in the trade in both live and dead wildlife in the Lak Sao market and along the Thakhek to Vientiane road, including civets, squirrels, flying squirrels, porcupines, small rodents, bamboo rats, mouse deer, and jungle fowl. (McDowell et al. 2014)

Downstream mitigation along the XBF river and Nam Kathang

NT2 downstream areas cover around 150 villages along the XBF and its hinterland impacted by increased water flows and another 38 villages along the Nam Theun (and Nam Kathang) subject to reduced water flows. Water quality of turbinized water released into the XBF has been better than anticipated and meets national water quality standards and recognized criteria for supporting aquatic life. At the same time, the project has changed the characteristics of the water in the XBF in terms of volume, flow rates, pH, temperature, and color. Fish catch impacts have been varied, with poorer households experiencing a slight increase in income from fish sales and others experiencing reduced fish catch. Sand filters have been installed in boreholes where necessary to reduce naturally-occurring iron. Replacement boreholes have also been drilled to address turbidity or salinity issues. Project-related erosion along the banks of the XBF has not so far been significant, with a few exceptions. Nevertheless, infrastructure and cultural assets close to the riverbanks have been moved or are being monitored, in consultation with communities and households. (ADB no date; WB Group and ADB no date)

Compensation and resettlement of PAPs in downstream areas has been capped by the project at \$16 million, whether or not livelihoods have been restored in the downstream areas. Should the NTPC determine that these amounts are insufficient to implement its environmental and social objectives, it is required to draw upon the overrun allowance of \$2.5 million. (ADB October 2010)

In the downstream area, 544 community water points (boreholes with hand pumps) were either constructed or rehabilitated by the project. 3,034 latrines were also provided to 92 riparian and 65 inland villages. However, households in the downstream area have not yet restored their livelihoods as of 2011. Between 2009 and 2014, preliminary analysis of NTPC survey data indicates an increase in per capita consumption in all downstream zones. (NTPC 2013)

The Downstream Program's (DSP) livelihood components were jointly implemented by NTPC and the GoL between the Commercial Operations Date (April 2010) and 31 December 2012, and by the GoL from that point up to April 2015. The IFIs supported the efforts of the GoL to meet its commitments with funding from the Khammouane Development Project (KDP) being coursed through provincial and district agricultural offices that have taken over the livelihood components of the DSP since April 2012. (ADB no date)

A Village Income Restoration Fund (VIRF) was established to provide microfinancing for livelihood efforts in affected communities. In January 2013, the GoL's Rural Development and Poverty Eradication Office accepted responsibility for managing the VIRF. The XBF Agriculture Technical Center has been set up to attend to both research and production of rice seeds, brood-stock fish, fish fingerlings, and fish meat to rice farmers, local fish seed producers, local fish farmers, and local markets, respectively. This XBF Center works closely with the Fish Farmer Schools and Rice Farmer Groups. NTPC has undertaken an assessment of the socioeconomic situation of downstream communities in 2014 and will provide this information soon. (WB Group and ADB no date)

Impacts on poverty reduction in Lao PDR

Power generation targets have been met by NT2 so far, and annual average export to the EGAT has exceeded 5,000 GWh. The average for the three full years of operation as of December 2013 was 5,756 GWh. Annual average sales to Electricité du Laos has also exceeded 200 GWh, with the three-year average as of December 2013 pegged at 363 GWh. (WB 2014)

Based on the CA and the Power Purchase Agreement (PPA), the GoL shall receive three streams of revenue from the project, including taxes, royalties, and dividends. According to financial models, NT2 is estimated to generate \$1.9 billion in revenue for the GoL over the 25-year operating period, with \$1.2 billion in royalties and taxes alone. ADB and World Bank support for NT2 also included a public expenditure management strengthening program intended to capacitate the GoL's effective and efficient use of these three cash flow streams to achieve the goals outlined in its National Growth and Poverty Eradication Strategy (NGPES). (ADB October 2010)

By 2012, health and education budgets have received a boost from NT2 revenues. Priority programs, including teacher training, procurement of textbooks, health services for the poor, and rural electrification, received a nearly threefold increase in budget between 2010 and 2012 – from US\$5.4 million to US\$15 million. (ADB no date) Formal reports on the use of revenues since 2010 and audits thereof have not yet been submitted to the IFIs. As well, while almost all royalty payments received were allocated to eligible activities, dividends and taxes had not been deposited into the NT2 Revenue Account. Audits are supposed to be conducted annually. (ADB no date; WB Group and ADB no date) As of May 2014, 54% of NT2 revenues were reported to have been allocated to and utilized for poverty reduction and environmental management purposes, subject to submission by the GoL's Ministry of Finance and verification by the GoL's State Auditing Office. (WB 2014)

Poverty incidence in Laos has declined in both urban and rural areas, and sharply in the case of the latter. Despite this, it remains much higher in rural areas, especially those lacking road access. The highest rates of poverty incidence were observed in the remote and more sparsely settled northern provinces. With this geographic distribution in mind, NGPES has targeted poverty reduction efforts in 72 priority districts, all primarily rural. (ADB June 2010)

Budgets have been allocated in Laos for health and education programs at the provincial and district levels. It appears that poverty reduction programs have been appropriately targeted towards rural areas with the highest incidence of poverty. Moving forward, future efforts should focus on further reforming the budget process and putting in place monitoring and evaluation systems that can help gauge the overall impacts, in order to document how effectively NT2 project revenues have been utilized to effect poverty reduction. (ADB June 2010; ADB no date)

Mortgaging the Future

Scudder's POE has decided to recommend a two-year extension of the Resettlement Implementation Period to the GoL, in order to allow the NTPC additional time to fully comply with its contractual obligations under the Concession Agreement. It is clear that handing over NTPC's downstream programs to the GoL is premature, considering the latter's dismaying lack of both technical capacity and financial commitment. Deputy Prime Minister Lengsavad is currently promoting and supporting the controversial Xayaburi hydropower project on the Mekong River in Southern Laos, which promises to deliver even more power than NT2 for export to Thailand. IRN has avidly engaged in the controversy concerning this Mekong mainstream hydropower project, which has now agitated not just international civil society, academics, project-hired foreign consultants and hired experts, and Thai courts, but also Lao PDR's neighbors on the Mekong. EGAT has again eagerly jumped in to sign a power purchase agreement with the new hydropower project. Local Lao people to be affected by the project have been provided little information on the potential impacts of the project. NT2 may not quite have changed the paradigm for improving environmental and social standards for large dam projects in developing countries like Lao PDR, as the IFIs had hoped, but surely there are other lessons to be learned here.

Annex A

Table 1. Newly-described species in the protected area (NNT NPA)

Common Name	Scientific Name
Mammals	
Annamite Striped Rabbit	<i>Nesolagus timminsi</i>
Large Antlered Muntjac	<i>Muntiacus Vuquangensis</i>
Saola	<i>Pseudoryx nghetinhensis</i>
Fish	
	<i>Bangana elegans</i>
	<i>Danio fangfangae</i>
	<i>Rhodeus laoensis</i>
	<i>Scaphognathops theunensis</i>
	<i>Nemacheilus arenicolus</i>
	<i>Schistura atra</i>
	<i>Schistura nudidorsum</i>
	<i>Schistura obeini</i>
	<i>Schistura tubularis</i>
	<i>Rhinogobius lineatus</i>
	<i>Tor ater</i>

Table 2. Vulnerable species in the protected area (NNT NPA)

Common Name	Scientific Name	Status
Reptiles and Amphibians		
Indochinese box turtle	<i>Cuora galbinifrons</i>	critically endangered
Keeled box turtle	<i>Cuora mouhotii</i>	endangered
Yellow Tortoise	<i>Indotestudo elongate</i>	endangered
Impressed Tortoise	<i>Manouria impressa</i>	<i>vulnerable</i>
Birds		
White-Winged Duck	<i>Cairina scutulata</i>	endangered
Wood Spine	<i>Gallinago nemoricola</i>	vulnerable
Lesser Fish Eagle	<i>Ichthyophaga humilis</i>	near threatened
Red-Collared Woodpecker	<i>Picus rabieri</i>	near threatened
Pale-Capped Pigeon	<i>Columba punicea</i>	near threatened
Darter	<i>Anhinga melanogaster</i>	near threatened
Crested Argus	<i>Rheinardia ocellata</i>	near threatened
Rufous-Necked Hornbill	<i>Aceros nipalensis</i>	vulnerable
Brown Hornbill	<i>Anorrhinus tickelli</i>	near threatened
Great Hornbill	<i>Buceros bicornis</i>	near threatened

Common Name	Scientific Name	Status
Mammals		
Asian Elephant	Elephas maximus	endangered
Large Antlered Muntjac	Muntiacus Vuquangensis	endangered
Saola	Pseudoryx nghetinhensis	critically endangered
Sambar Deer	Cervus unicolor	vulnerable
Gaur	Bos gaurus	vulnerable
Southern Serow	Naemorhedus sumatraensis	near threatened
Asian Black Bear	Ursus thibetanus	vulnerable
Sun Bear	U. malayanus	vulnerable
Sunda Pangolin	Manis javanica	endangered
Chinese Pangolin	Manis pentadactyla	endangered
Dhole	Cuon alpinus	endangered
Marbled Cat	Pardofelis marmorata	vulnerable
Clouded Leopard	Pardofelis nebulosa	vulnerable
Asiatic Golden Cat	Catopuma temmincki	near threatened
Leopard	Panthera pardus	near threatened
Tiger	Panthera tigris	endangered

Common Name	Scientific Name	Status
Primates		
Pygmy Slow Loris	Nycticebus pyrneus	vulnerable
Bengal Slow Loris	N. bengalensis	vulnerable
Rhesus Macaque	Macaca mulatta	least concern
Assamese Macaque	M. assamensis	near threatened
Pig-Tailed Macaque	M. leonine	vulnerable
Bear Macaque or Stump-Tailed Macaque	M. arctoides	vulnerable
Red-Shanked Douc	Pygathrix nemaeus	endangered
Southern White Cheeked Gibbon	Nomascus siki	endangered
Francois Langurs	Trachypithecus francoisi [spp.]	globally threatened

Common Name	Scientific Name	Status
Trees		
Agarwood	Aquilaria spp.	endangered
Rosewood	Dalbergia spp.	endangered

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