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Food Security and Social Welfare: The Effects of Hydropower Dams on the Lower Mekong River in Laos

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Abstract

Winding 4,800 milometers down into the South China Sea, the Mekong River connects China, Myanmar, Thailand, Laos, Vietnam, and Cambodia, making up an area known as the Greater Mekong Sub region. The Mekong River is home to 1,100 different species of fish but due to the recent surge in building hydroelectric dams on the river, these species, along with the livelihood of 300 million inhabitants are in grave danger. In Thailand, Laos, Vietnam and Cambodia, 80% of the local population relies on the daily productivity of the river. The new changes brought forth by the dams will alter fish migration patterns as well as the amount of available soil nutrients and will ultimately have devastating effects on fisheries in the area as well as agricultural production. This paper will focus on the likely destruction which will be created by the 11 newly proposed dams, and how this change in the environmental norms will negatively effect the food production in some of the world's most food rich countries

1. Introduction

Winding down 2,700 miles from the Tibetan Plateau, the Mekong River touches the boarders of six countries as well as the lives of over sixty million inhabitants living in the river basin. Ending in the South China Sea, the Mekong River forms a labyrinth between Yunnan Province in China, Myanmar, Cambodia, Thailand, Vietnam and Laos. With such thriving habitats in the area surrounding the river, more than 1,000 new plant and animal species have been discovered from 1997 to 2009, averaging two new species revealed a week[1]. This river, the 12th largest in the world, has such a rich level of biodiversity that it is comparable to that of the Amazon.

Such a rich amount of biodiversity greatly provides itself to the people living closely to the Mekong. For more than 4,000 years people have remained in the Greater Mekong Region. Currently, more than 300 million people inhabit the land surrounding the river and are composed of 100 different ethnic groups[2]. Of these, 80 percent rely on some aspect of the river for their main source of food as well as livelihood. Residents of the Lower Mekong Basin (LMB) typically comprise those who have been left out of economic benefits provided by their governments. They often lack access to clean water and sanitary waste disposal systems, and in terms of per capita income, are some of the poorest in the world[3].

In order to compact these high rates of poverty, the governments of countries in the Greater Mekong Sub regions (GMS), especially those in the Lower Mekong Basin, decided one of the best routes to development would be through the implantation of hydropower dams on the Mekong River. The dams would be able to bring in foreign direst investment, and gain enough income to alleviate poverty in the region. Plans for damming up the Mekong River have been proposed as early as the 1950s, but due to war and unstable politics in the region, the plans could never be followed through with[4]. Chinese backed hydropower dams on the Mekong first sprung up in the 1990s, with the building of dams on the Upper portions of the Mekong. Beginning the race to hydropower production, China currently has five dams built on the Mekong, with several more in the works.

The negative externalities associated with China's hydropower dams built on the Mekong funnel straight into the Lower Mekong Basin. Even though these drastic effects can visibly be seen and accounted for, Laos and Cambodia have come up with their own plans to build hydroelectric dams on the Mekong. Assuming that the positive factors associated with energy production will out way the negatives, these two countries have not adequately assessed the true cost of hydropower production on the Mekong River.

The upfront benefits of building a hydroelectric dam are quite immense. From the income generated from the sales of electricity, to investing in a more renewable source of energy, damming up the Mekong River seems like a prosperous route to development. By taking a deeper look, the persisting negatives quickly become apparent. More often is the case that the benefits occurring in one country have alarmingly negative consequences on another. To settle all disputes regarding which may arise in the development of the Mekong River the Mekong River Commission was created.

Established in 1995, the Mekong River Commission (MRC) was put into place with a mission "To promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being[5]". Cambodia, Laos, Thailand and Vietnam, four countries located in the Lower Mekong Basin, make up the MRC advisory board and work together to insure that the vision of the MRC is fulfilled[6]. Although ideological differences differ on how to maintain the Mekong, at one point in time, all countries could agree on the importance of cooperating in order to sustain an economically prosperous, socially just, and environmentally sound Mekong River Basin[7]. In the past three years the MRC has come under much scrutiny for not fulfilling its stated intentions. Most of these critiques stem from the six development scenarios for 2015-2030, titled *Basin Development Plan 2*[8]. In the MRCs foreseen plan for the future production of dams on the Mekong, they suggest building 16-78 hydropower dams on the Mekong's tributaries, and another eleven dams on the river's mainstream[3]. Nine of these dams will be located in Laos, and the remaining two in Cambodia. The Mekong River Commission has been scrutinized for picking and choosing which information they relay to the general public, while also basing crucial decisions on the endorsement of both regional and national sectors who want to maximize hydropower to its fullest potential[9].

As required in the 1995 Mekong River Agreement, countries aspiring to develop a hydropower dam on the Mekong River must first have a Strategic Environmental Assessment (SEA) conducted. The MRC will only then discuss whether or not they feel it is appropriate to allow construction, according to the conclusions from the SEA. In order to help facilitate research on the highly contested construction of the eleven dams on the Lower Mekong Basin, the MRC hired the International Centre for Environmental Management to conduct a SEA[10]. Finalized in October 2010, sixteen months of research concluded that there was not enough evidence or knowledge available to conclude responsible decisions about the proposed mainstreams dams[11]. This conclusion was reached due to two reasons: first, little knowledge is known about the complex, vast ecological system that makes up the Mekong River; it is too large and interconnected in order to come up with a sound conclusion. Secondly, the river's contribution to other cultural and environmental values could not be converted into economic terms, making a conclusion nearly impossible[6] . As a result of the findings from the Strategic Environment Assessment, it was suggested that the MRC ensure that any decision to build a mainstream dam should be halted for a period of ten years, with reviews every three years[7] . As stated in the MRC's disclaimer in response to the SEA, the views, conclusions, and recommendations contained in the document are not to be taken to represent the views of the MRC[7]. The Mekong River Commission may choose to adhere to the suggested recommendations, or they may choose to bypass them and approve the building of none, one or even all of the eleven specified dams.

Even with the recent critiques given to the MRC, it can be noted that through the committee, citizens of the Lower Mekong Basin are now more aware of their interests in energy, ecology and food security[2]. They have taken the critiques noted in the SEA and are able to see for themselves the negatives and positives associated with the creation of a dam in their backyard.

2. Why Build a Hydropower Dam on the Mekong?

The Government's comprised of those in the Lower Mekong Basin have decided to dam up the Mekong River for many reasons, though the number one reason entails lifting their countries out of poverty. When looking at the Lao People's Democratic Republic, the least developed country in the LMB, the country sees hydropower as the most profitable way to lift the country out of the category of a least developed country by 2020[12]. With a majority of the funding coming from foreign direct investment, Laos will then be able to use the income generated from the sales of electricity to kick start the failing economy and put monetary funds back into the country. In fact, the SEA conducted states that it is likely that both Lao PDR and Cambodia, the two countries in which the eleven proposed

dams on the Lower Mekong will be constructed, will see economic growth through exports as well as additional inputs such as labor, construction materials, and improvements in river navigation[6]. Investment in hospitals, infrastructure, and education will be implemented with the funds generated from electricity sales, allowing an increase in the wellbeing of citizens. Many villagers see the creation of hydropower dams on the Mekong as a move toward modernity. The current state of living will not suffice, and the villagers are more than aware of this. The government of Laos has conduct workshops with locals to ensure that the dam will bring no negative consequences to the area. For these villagers, the ideas of long-term jobs, improved infrastructure and a better future for their children are now within reach. The government of Laos feels that investment in hydropower is the best option for eradicating poverty, while also benefiting from the newly created electricity[8].

If the government of Lao PDR is in fact aiming to improve the status of the country from that of least developed to a developed, then they have a great challenge in store. There is truth in the government's argument of wanting to provide electricity to more Laotians. Only fifteen percent of Lao's citizens had access to electricity in 1995; today 71% have electricity in their homes[13]. With the production of hydropower, this number will continue to grow, specifically in the number of rural homes that have access to electricity. If all proposed dams built on the LMB mainstream go ahead with construction, they will be able to supply six to eight percent of the projected power demand in the region[14]. Although this advancement in development is a positive for the country, the remaining statistics on development remain at a stand still. Hosting a population of 6.6 million, 1/3 of which survive on less than one dollar a day, the country must also focus on development paths in other sectors other than the desire to become the "Battery of Asia"[15]/[16]. Although the country has been graciously blessed with abundant natural resources, including the greatest potential for hydropower, Laos should first focus on the unsustainable issues occurring within its own population[17]. Issues such as this include assisting the 40% of children facing stunted growth due to malnutrition and abundance of low literacy rates throughout the country[8].

The Strategic Environmental Assessment of the nine dams proposed on the main stream Mekong River in Laos coincides with the idea that producing electricity through hydroelectric means is a more sustainable solution to energy than what is presently in place. Currently, Laos consumes 2.23 billion kWh of electricity. A majority of the energy consumed is dominated by residential households and is provided by wood and charcoal. It is obvious that with the increase in electricity generated from hydropower dams, the need for wood powered mechanisms will decrease, allowing for a more vegetative forest. As it stands now, 93% of rural homes rely on wood sources for cooking[18]. Hydropower implemented on the Mekong will indeed lower the reliance of wood and coal needed for energy throughout the country, but at what cost. Although the government of Laos has great aspirations for hydropower dams on the Mekong, the realities do not necessarily match up. By looking deeper into the negative impacts assessed by the SEA, the choice to dam up the Mekong may be more concise than once realized.

3. Why We Should Change the current Hydropower Strategy

According to the Strategic Environmental Assessment conducted by the International Centre for Environmental Management, there was not enough adequate information available to determine if building nine dams on the lower portion of Laos' Mekong River was a sustainable option. As discussed earlier, this conclusion was drawn upon by various reasons. By looking deeper into the issues brought forth in the SEA, we will be able to navigate through the conclusions that caused the SEA to recommend a ten-year construction hiatus prior to all construction on the Mekong.

The largest raised concern for the development of hydropower dams on the LMB is one of great importance: Food security. In the Lower Mekong Basin, 70% of communities are comprised of rural dwellings, which operate with the ebb and flow of the river[6]. Any change, no matter how big or small occurring on the Mekong, somehow finds its way back to the inhabitants surrounding the river, mainly affecting those in Lao PDR, Vietnam and Cambodia. The SEA projects that if the eleven dams are built in the LMB, the loss of fish would equivalent 550,000-880,000 tons, or 26-42% of the total catch, estimating a total revenue loss of US 500 million dollars[19]. Altering the number of species in the river will without a doubt hinder the protein intake of locals, who rely on the river for 47-80% of their total animal protein[20]. This drastic decline in readily available fish would be due to the loss of fish in the surrounding fisheries, thus caused by the inability for fish to migrate. The Mekong is one of the world's largest centers for migration, estimating a peak migration of three million fish per hour[6]. Due to the creation of dams along the basin, this massive migration route would be disrupted, killing off thousands of fish. Proposed fish ladders have been invented on paper in attempt to by pass this negative externality, but these suggested inventions are not built for the type of fish native to the area, and would be unresponsive. Along with the threat of food security to residents

of the LMB, the extension of 100 species is highly likely, with the guarantee that the already at risk Irrawaddy dolphin and Giant Mekong Catfish will cease to exist.

Along with the loss of available fish protein, gardens along the basin will also be affected. Reservoirs created by the dam will flood riverbanks, forcing farmers to relocate their gardens. If not swept away due to flooding, a depletion of up to 50% in phosphorus and nitrogen levels will leave the once fertile soil, arid and nearly useless[7]. The largest rice producers in the world could suffer negative externalities associated with rising and falling water levels due to the unstable flood pulse of the proposed dams. Known as "the rice bowl" in Vietnam, the Mekong delta accounts for almost 50% of rice production in the area[21]. Altering the production of rice in the LMB will be detrimental to the security of food as well as the economy. Government's of the LMB should take extra precautions to ensure the fertility of the area remains at optimal functionality.

In the conclusion of the SEA, it was noted that certain criteria could not be assessed due to its inability to connect within environmental and economic terms. Other than the upmost worry of food security, citizens in the LMB fear a new way of life that they will be forced to adapt to. Chinese activist and critic of the proposed dams on the Mekong, Yu Xiaogang has played a major role in the assessment of hydropower dams on the Mekong. Through his work, he has led a frontier in educating both citizens of the LMB and Greater Mekong Sub region (GMS) on their rights. A majority of residents surrounding the Mekong make up minorities classes, and are unaware of their legal rights, including education, economic and human. Yu has led a campaign in which he believes educating locals is the first step in gaining power over the construction of hydropower dams. Through his work, he has noted the importance of not only Strategic Environmental Assessments, but also the need for Social Impact Assessments (SIA). Through SIAs, calculations on personal livelihood and wellbeing will be able to be better analyzed, something the SEA was unable to accomplish. The importance of noting the invisible impacts, which occur during the damming of the Mekong, cannot be ignored, according to Yu[22]. Although the governments of Laos, Thailand, Vietnam, Cambodia and Yunnan Province in China are slow to conduct SIA's, local NGO's are picking up the slack and taking part in completing them. When you have a government that thinks that more development will solve development problems, it is hard to get anywhere, states Yu[16]. This is where SIA's come in to play.

The invisible impacts to which Yu speaks of can come in many different forms. They are harder to spot upfront, and take much more field time to assess. Local ecological knowledge is embedded in citizens of Laos for example, who wake up every day to fish in the Mekong. These people, who physically use the water day in and day out, will know much more about the river than a scientist or impact analysis, critics argue. The fishing communities established among the shores of the Mekong have been there for generations, and have certain connections with the river that are impossible to measure in scientific terms[5]. Nature makes up a vital part of many Laotian's possessions even though it cannot reside in their homes, the place where assessments are often made. Here, nature is not seen as property, which means that it cannot be counted as a loss. Even though both SEAs and SIAs have taken a more effective approach in considering the river and her inhabitant's histories, social associations and cultural practices, they still have a long way to go in insuring her rights[5].

Shifting away from the issues that assessments are unable to calculate, we can focus on those that are most upfront and manageable. The livelihood and wellbeing of 2.1 million inhabitants who live 5km within the Mekong River will directly be affected if the construction of the eleven proposed mainstream dams is conducted. Of these 2.1 million, the SEA calculated that 106,942 people would end up suffering direct impacts, triggered by the loss of their land and homes[7]. On top of this, 2 million plus residents living downstream of the projects are also at risk for indirect impacts from the dams[7]. The relocation of citizens in the immediate areas in which dams are to be built is an issue that is impossible to bypass. For some communities surrounding the Mekong, this will not be the first time they have been forced to move due to the construction of dams. Resulting back to what they know best, the river, communities set up a second time near the Mekong, only to have the threat of another relocation looming over. Researchers have discovered that often villagers end up in worse conditions after forced relocation than previously, even with provided compensation from companies[2]. New plots of land granted are not as fertile as those previously cultivated on, and debts are easier to incur in new, unstable circumstances. This often becomes a cycle of rural inhabitants unable to accumulate to their new surroundings, being forced to move to larger cities, only adding to the number of urban poor. False promises and the hope of a better tomorrow grace displaced inhabitants of the LMB, only adding to more criticisms of hydropower on the Mekong River.

4. Case Study

To help both critics and supporters better understand the implications of damming the Mekong, in depth studies on the Xayaburi dam are being conducted. If completed, the Xayaburi dam will be the first of the eleven proposed dams

on the mainstream of the Lower Mekong Basin. This hydroelectric dam will set the stage for future dams to come, enabling the eight other proposed dams in Laos to start construction, along with the additional two in Cambodia.

5. Funding and Approval

Located on the mainstream section of the Mekong River in Northern Laos, the Xayaburi Dam is located 480 miles downstream of the Jinhong dam, located in China. When completed, it will have a production capacity of 1,285 Megawatts of electricity, making it the third largest energy producer of the eleven proposed dams[23]. The dam is projected to have a length of 2,690 feet long and a height of 107 feet high[18]. Preliminary work on the dam officially started in late 2010 and has come to a stand still numerous times. With a projected completion date of 2019, the Xayaburi Dam will cost US 3.5 billion dollars, if the budget is kept on track. Four Thai banks are providing funding for the dam: Bangkok Bank, Kasikorn Bank, Krung Thai Bank and Siam Commercial Bank. The Thai government owns a majority of the Krung Thai Bank, meaning the Thai cabinet had to approve the bank's involvement in the project before the loan was agreed upon.

These banks have given a total of US 2.67 billion dollars to start up construction, which will be performed by Ch. Karnchang Public Company Limited, another entity based out of Thailand. Once electricity is readily being produced, Laos will sell 95% of the energy generated back to Thailand, specifically the Electricity Generating Authority of Thailand (EGAT) through which a contract has been drawn up[24].

Financing for other small dams on Mekong tributaries have previously been assisted by funding from the World Bank and Asian Development bank, but this controversial project, as well as other proposed dams on the main stream Mekong has forced these organizations to back out. The United States Senate Foreign Relations Committee issued a resolution calling for U.S representatives to suspend funding to the Xayaburi dam[18]. This can be attributed to the strong, vocal voices coming from those opposed to the dam as well as other internal political issues at hand. The United States fears that once Xayaburi is built, the other dams proposed will be built with the help of Chinese investment. This will only contribute to China's growing hand in South East Asia, a political move that the United States is opposed to[25]. This growing threat persuaded the United States to develop the Lower Mekong Initiative (LMI) in 2009. The LMI aids the Mekong River Commission in keeping its members on track with specific development pillars they should adhere to, such as health and education, and not only focusing on natural resource management[19] .

The ongoing politics between the governments and organizations residing in the LMB have played a major role in the construction of the Xayaburi dam. According to the 1995 Agreement, which was signed within the Mekong River Commission, Cambodia, Laos, Thailand and Vietnam must reach a mutual agreement before building any new dams on the shared Mekong River. This agreement was never met between the four countries, and has split opposition down the middle. In strong support of the Xayaburi dam, Thailand and Laos are the two countries that seek prosperous gains. Vietnam and Cambodia on the other hand, will reap the negative externalities that will funnel straight into their back yards. The Laotian government will end up receiving enormous profits, as well as the Thai backed companies that are invested in the dam. The Mekong River Commission is having little input in the deliberation of Xayaburi. The MRC lacks the ability to put an end to construction, as it relies on mutual consensus among its members, and each country lacks the power to veto any decision. When Laos decided to continue with the construction of Xayaburi, there was little that could be done to stop them. It is only under the intended virtues of the MRC that would keep them on track towards a sustainable development path, which considers the opinions of neighboring countries. It seems as though the decision to build the Xayaburi dam is not based on science, but more on politics[2] .

In April of 2011, Cambodia and Vietnam asked the Lao government to conduct additional studies on the trans boundary impacts that Xayaburi will bring forth. In December of the same year, the four governments met under the MRC, and Laos agreed to these terms. Without conducting trans boundary assessments, Laos has continued on schedule with every aspect of construction, even though complaints have been issued; starting in March of 2012, the first signs of actual construction could be noted, with digging in the Mekong Riverbed. On November 7th, 2012 the government of Laos held a groundbreaking ceremony even though construction had been well under way[26].

Going against the will of Vietnam, a fellow communist ally for fifty years, Laos is choosing monetary gains over friendships. Siding with Thailand will provide the developing country with economic stability and a new ally. Others opposing the construction of Xayaburi in Laos are also weary of Thailand's strategic involvement. As a country that already receives more than enough electricity to meet its growing demand, Thailand has utilized all of its own natural resources for the most part. With the construction of Thailand's own hydropower Pak Mun Dam, the

consequences resulted in the declining food security for 200,000 Thais. As a result, Thai citizens are quick to shut down any proposed dam construction that will officially occur in their country. Instead, the Thai government has decided to import electricity from neighboring countries that they can pursue to construct dams. Thailand has been accused for over estimating their electric needs, when in fact they do not even need the energy that Xayaburi will generate.

6. Positive Gains from Xayaburi

With the Xayaburi Dam is complete, the surrounding areas in the LMB will not be as reliant on fossil fuels, making the dam a more sustainable option in generating electricity. The megawatts produced are advocated as being clean, renewable and producing no carbon emmissions[22] . Laos, along with other countries in the LMB see China's damming of the Mekong as an investment that all countries along the river should be able to partake in. They argue that if all countries in the LMB share the Mekong, why should they not all have the same access to resources?

The Laotian Government expects that through the Xayaburi dam, the country will see drastic gains in government revenue and foreign investment that will assist in further economic growth for the country. The country has the ability to gain an annual income equivalent to 18% of its GDP[10]. According to the Ministry of Planning and Investment in Laos, hydropower draws more than half of the foreign direct investment in the country so far, providing enough evidence that the dam will only bring in more FDI[27]. In addition, the dam will provide clean electricity throughout the whole country, leading to more funds in infrastructure both on land and in the Mekong River. The Xayaboury province will also benefit by the 10,000 jobs that will be created with the construction of the dam[28]. These workers will come from the Xayaboury area as well as other provinces in Laos. Along with ample job creation, the government of Laos sees the Xayaburi dam as a potential focal point for tourists. Just like the Three Gorges Dam in China, tourists will flock to see the marvel of Xayaburi. These tourists will in turn implement income into the surrounding area through their spending. More locals will easily be able to set up shops catering to these tourists, in return for more stability in their income. If residents of Xayaboury were never allowed the opportunity to relocate, they would still be living in a remote area, far from the access to better transportation, health care, and education. They would remain in the same job market that they had for many years prior and more than likely still struggle to get by. With the creation of the Xayaburi dam, families are granted new opportunities, which will allow them to generate a larger income and rise out of poverty.

For Laos, it sees any an all opposition to the construction of Xayaburi as a threat to development in the country; they believe the creation of hydropower to be the best alternative that will be able to lift Laotians out of poverty. Upon completion, the project will allow Laos to graduate out of the category of "least developed country", while contributing to socio-economic developments in poverty reduction. This will be achieved through receiving twenty percent of profits via royalties and taxes, as well as US 135 million dollars for twenty-nine years on concessions[28]. After twenty-nine years, Laos will retain full ownership of the Xayaburi dam.

7. Negative Consequences of Xayaburi

The biggest threat set to occur in the LMB if the Xayaburi dam is completed will be the loss of aquatic life. The dam will threaten the existence of 41 fish species out of 1,300, a number which until recently was growing daily[2]. This decrease in the number of fish in the LMB can be attributed to a change in habitat as well as migration patterns. Historically known for its size and significance, exports hypothesize that the Giant Mekong Catfish will undoubtedly become extinct. The catfish migrates from Tonle Sap Lake in Cambodia up the Mekong and drops eggs in northern Thailand and Laos. With the completion of Xayaburi, this life cycle will cease to continue, resulting in extension. Other aquatic life, such as *Kai*, a freshwater weed eaten by both fish and humans would decline in great numbers, as is already being seen as a result from upstream damming in China. *Kai* is a valuable contribution from the river for both its nutritious value and ability to be harvested and sold.

Through the number of fish lost, it is estimated that there will be a US 476 million dollar direct loss in fish harvests[2]. Declining fish populations will make the catching and selling of harvests much harder, forcing men and women to spend all day trying to make a catch; the world's largest inland fishery will slowly, over time dissipate.

A decline in aquatic life is not the only source of food that will be destabilized. Cultivation of rice and other crops along the banks of the Mekong in Laos and the countries downstream will also be altered. With the rise in water levels due to man-made flooding of the Mekong, crop land along the bank will be destroyed. Altered sediment flows

provided by the river will change the fertility of the surrounding land, leaving many farmers unable to grow crops. Along with change in soil nutrients, damming any riverbed will turns part of the river into a reservoir, which will result in slow moving water, prone to water borne diseases[10].

Anti-Xayaburi protestors campaign with slogans such as "We can't eat electricity!" but their voices are heard to no avail. Daily activities such as farming, fishing, gold panning, cultivating rice, collecting goods from the forest and growing vegetables will become activities of the past for those living in the LMB. During the dry season for example, when the river runs especially low, villagers can earn up to US 8 dollars a day panning for gold. Daily functions such as this will be destroyed, leaving villagers hopelessly searching for other means of income. To make construction easier in the Xayaboury area, nearby forests are partially being destroyed to make way for transport roads. In doing so, vital resources will be damaged, such as the wild banana flower and rattan[21]. These products are part of the livelihood of the residence surrounding the Mekong, and are not being accounted for in the SIAs.

As with the construction of any dam, relocating nearby residents will be required. With the construction of Xayaburi, 2,100 people would be forcibly displaced, with inadequate compensation[29]. The available information that villagers have access to is very small; they are aware that a dam is going to be built but they do not know many more details than that. There have been local accounts of developers of the dam making visits to villagers and offering compensation. They are making promises to build new homes, hospitals and schools and also to give loans to villagers who require special assistance. These loans will then be used to buy livestock and help start up there new lives else ware. Villagers residing by the river typically support their families with US 500 dollars a year. The developers of Xayaburi have offered a one-time compensation of US 250 dollars per family in the area[2]. Many of the villagers are under the impression that relocating will not be detrimental to their current state of life, but accounts given by other displaced peoples in nearby areas differ.

Accounts of Laotian villagers ending up worse off in their new locations are widespread. Even if adequate monetary compensation is given, the new land acquired is usually not as fertile and valuable as the previously owned lands. The soil on the newly allotted plot is often rocky, farther away from the nourishing sediment provided by the Mekong. Unable to compete with other farmers who are able to reap a better crop, the displaced peoples are forced to find a new means of living. With few skills to fall back on other than farming and fishing, many relocated peoples of the Mekong River find themselves in debt, forced to move to larger cities.

Residents depending mostly on the Mekong River for its resources are already those at risk of living in poverty. If you take away their resources, they will slip deeper into poverty, unable to provide for themselves and families who have lived on the same land for many generations. In the small village of Pak Yingtai in Laos, the effects from the upstream hydropower dams on the Mekong could already be noticed. On a good day, fifty fish could be caught; enough feed a family and sell in the market. Now in 2012, a good catch is noted as catching a handful of fish or enough to feed the family. Walking around Pak Yingtai you can see the ingenuity of the Lao people. Makeshift fish tanks have been set up in a few back yards with the intent to breed fish, since the river is not able to provide like it once did. Although this village is lucky enough to keep its location, they still have to deal with issues created by dams on the Mekong. If Xayaburi is to go though as planned, they will encounter even more problems in the future.

Although the Lao Peoples Democratic Republic seems to be hiding the actual accounts on construction from both the public and the MRC, it seems as though the Xayaburi dam is ten percent complete[25]. Even with continued pleas from Cambodia and Vietnam, Laos is continuing in its quest to become the "battery of South East Asia".

Transportation roads have been built, giving access to the dam sight, along with temporary housing for construction workers. With the dam still on track to its scheduled completion date of 2019, laborers are working around the clock. To adhere to the MRCs 1995 Mekong Agreement, Laos is stating that they are not conducting any construction that is "permanent". In the 95' Agreement, there is not a distinction between the phrasing of "permanent" and "temporary" construction, which has those opposed of Xayaburi worried. The current phase of "temporary" construction has of course, more negative externalities than have been reported on official assessments. Loose sediment is falling into the river, suffocating fish eggs and changing the fragile ecosystem currently in place[30].

As it stands now, the Xayaburi dam will indeed be completed in 2019. Laos has violated the Mekong River Commission's 1995 Agreement, which agrees for all four countries to reach a mutual consensus prior to any construction of a new dam. They are playing with the fate of their own citizens for the hope of a better future. Only time will tell of the true effects that Xayaburi will have on all residents in the Lower Mekong Basin.

8. Conclusion

Although building hydropower dams on the Mekong River seems like one of the better options available to lower income countries that are in pursuit reaching development goals, the impacts that often follow suite are irreversible. Even though the Mekong River Commission must only rely on its soft power when dealing with Cambodia, Laos, Thailand and Vietnam, it must somehow get all four countries on the same page. Criticized for neglecting human livelihood and ignoring the transparency of itself and its members, the MRC must conduct itself in a more legitimizing, straightforward way. Through joint efforts, the MRC must educate countries of the associated risks of unsustainable water management. Six countries share the Mekong River, and it is the Mekong River Commission's duty to treat them all with equally. By strengthening knowledge networks and shared resources among LMB countries, the Mekong may be able to sustain itself for a much longer period.

Through joint efforts with both community organizers and governments, these goals can be achieved. With assistance from locals residing by the river, their vast knowledge of the Mekong and her tendencies will aid both scientists and developers in the goal of achieving the best outcomes for the river and her people. Progress is slowly coming a reality for countries in the Lower Mekong Basin. With falling poverty rates and an increase in GDP growth from export/import trade, this increasingly important region is catching the world's attention. Although building hydropower dams on the LMB can indeed provide locals with many advantages, such as better access to health care, education, and electricity, separating the gains from the losses comes as a great challenge. Locals will surely benefit from many of the advances in livelihood that they will receive through multiple aspects of hydropower creation, but it may not be enough to offset the negatives. The Lao People's Democratic Republic is seemingly stuck between helping alleviate poverty for its citizens, while also chancing the productivity of one of the worlds most diverse and productive rivers.

With a projected regional increase in food demand by fifty percent by 2050, damming the Mekong and not providing alternative food sources is a grave mistake. There is no doubt that the Greater Mekong Sub region is on its way to substantial growth; with an estimated population of 33 million by 2050, governments in this region cannot be toying with the livelihood of their citizens. If more sustainable options to hydroelectric power on the Mekong cannot be discovered, the implementation of dams on the river will be severely detrimental to the surrounding area and its inhabitants. Electricity and paved roads will not substitute the need for adequate sources of protein. Protestors to the eleven proposed dams will continue to chant, "we need food, not electricity" until their voices are heard and adhered to. With the help of the Mekong River Commission, Cambodia, Laos, Vietnam, Thailand, Myanmar and Yunnan province in China must learn to value the importance of the Mekong River and her resources before it is too late.

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