The Lancang River, known as the Lancang in China, is the heart and soul of mainland Southeast Asia. While countries in the lower stretch of the river have yet to complete a dam on the mainstream Mekong, China has already built six dams on the Lancang. At least 14 more dams are in the pipeline to be completed in the next five to 10 years. Despite concerns over hydrological impacts, sedimentation, water security and fish migrations, China has yet to share any significant information on how the Lancang dams are affecting its downstream neighbors.

Threats To River Flow

China’s construction of dams threatens the natural flow cycle of the Lancang-Mekong ecosystem and downstream communities that depend on the vital sources of this mighty river. Since the early 1990s, researchers have linked changes in the Mekong River’s hydrology and sediment load to upstream dams in China. As of mid-2013, six mega dams have already been built, and at least 14 more are under construction or being planned in Yunnan and Tibet. These projects will drastically change the river’s natural cycle and block the transport of sediment, affecting ecosystems and the livelihoods of millions living down-
stream. Impacts to water levels and fisheries have already been recorded along the Thai-Lao border.

China’s dam construction has proceeded without consultation with its downstream neighbors or the Mekong River Commission – an intergovernmental agency composed of Laos, Cambodia, Thailand and Vietnam – and without a transparent assessment of the dams’ downstream impacts on the river and its people. Although China has been a “dialogue partner” of the Mekong River Commission since 1996, it was only in 2002 that it began sharing any data regarding dam operations and flow volume, and then only for the lower section of the river at the Jinghong and Manwan dams during the rainy season. Severe droughts in the lower Mekong basin in 1992 and 2010, which were partially attributed to below-average rainfall, also coincided with the filling of new power stations’ reservoirs on the Lancang. The new dams were widely suspected and blamed for exacerbating dry conditions downstream.

Climate change is also expected to increase tensions among the various users of the Lancang River. Water stored in glaciers and snowpack in the Tibetan Plateau is expected to decrease in the long term, while the rate of evaporation in reservoirs will increase. Extreme rainfall events, an increase in intensity and frequency of floods and droughts, and a continued deterioration of water quality are all expected to occur. Uncertainty over the length and severity of floods and droughts will likely have severe impacts on regional economic activities and may lead to China storing more water upstream for its own use. All of these factors could spell disaster for downstream countries that depend on the river’s water and sediment flow for agriculture, navigation, fish migrations and other critical ecosystem services.

**Status of Dams on the Lancang**

The main developer of the Lancang River dams is Hydrolancang – officially known as Yunnan Huaneng Lancang River Hydropower Company – which is owned by the largest electricity generation company in China, Huaneng Corporation. Other main shareholders of the Lancang dams are state-owned investment companies and banks, and Yunnan provincial investment companies. As part of the West-East Electricity Transmission Project, electricity generated from the Lancang dams will be exported to eastern economic hotspots such as the delta areas of the Pearl and Yangtze rivers.

The river’s upper section in Tibet has a cascade of six planned dams. Under China’s 12th Five Year Plan, construction and site preparation for several of the planned dams is set to begin before 2015.

Downstream of the Yunnan-Tibet border, a cascade of seven dams – from Gushui to Miaowei – will all start construction or be completed by the end of 2015. Further downstream, the lower stem consists of seven dams, six of which have already been completed. The first was Manwan Dam and the most recent was Nuozhadu Dam, which began reservoir impoundment in October 2012. Construction on the last dam on the Lancang - Ganlanba Dam – which Hydrolancang claims is mostly for regulating flows for downstream – has not yet started.

A Strategic Environmental Assessment (SEA) of dams on the Lancang River has reportedly been conducted by Hydro China, but has not been made available to the public or downstream governments. It is unknown whether transboundary impacts were considered in the SEA. The Nuozhadu and Jinghong dams are undergoing unofficial assessments under the International Hydropower Association’s Hydropower Sustainability Assessment Protocol. Hydrolancang may also undertake sediment management measures, but at the time of publication, no further information is publicly available.

**Social Impacts Upstream**

In China, more than 100,000 people have been displaced by dams on the entire Lancang River, most of them are ethnic minorities. Once communities are relocated away from their traditional lands and livelihoods, they often have difficulty adjusting to a new life in an urban environment. Local governments and hydropower companies have frequently failed to provide sufficient compensation and the support required to sustain resettled people’s livelihoods. Rather than alleviating poverty, resettlement has reduced the quality of life for many. For example, Xiaowan Dam, completed in 2010, displaced more than 40,000 people, many of whom continue
to struggle to make a living with reduced access to natural resources and social capital. As the new dams upstream will mostly affect ethnic minorities, social unrest and political instability may increase.

Although China has laws governing Environmental Impact Assessments (EIAs) and policies regarding the social impact of large dams, these policies are seldom implemented according to law. EIAs are more often used as a checklist for hydropower developers, and preparatory work or dam construction often begins before approval of a project EIA as a means to pressure official approval. National and international investigations have also confirmed a number of cases of illegal dam building. In May 2013, China’s National Audit Office confirmed that Huangdeng Dam on the middle stem of the Lancang had started construction without project approval. A June 2013 UNESCO World Heritage Committee State of Conservation Report disclosed that the Lidi and Wunonlong dams on the Lancang River had also started preparatory works before receiving official approval.

Transboundary Impacts

The Lancang dams have and will continue to negatively impact the environment both in China and downstream countries.

The Tibet-Yunnan corridor is a biodiversity hotspot and part of the Three Parallel Rivers of Yunnan Protected Areas, a UNESCO World Heritage Site. The dams would fundamentally change fish habitats and affect the rich aquatic and terrestrial diversity in the region by turning a flowing river system into a series of reservoirs. The Lancang watershed is also known for its complex geology and seismic activity, making dam-induced earthquakes an important safety concern that has thus far been overlooked.

Studies have shown that the Lancang dams would trap half of the sediment load transported from the upper basin to the lower basin. This would have significant impacts downstream because it would reduce nutrients for riverbank and delta agriculture, increase bed and bank erosion leading to food insecurity for downstream countries, sink deltas and worsen storm damages. Studies conducted by Chinese authorities and researchers already show evidence of a significant reduction in suspended sediment concentrations following construction of the Manwan, Dachaoshan and Xiaowan dams.

The Lancang dams would also affect seasonal water availability and flooding in the lower Mekong. A 2012 study measuring hydrological changes at gauging stations in Thailand, Laos and Cambodia showed a reduction in hydrological variability during the wet season and an increase during the dry season.

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### Dams in the Lancang Hydroelectric Cascade within Yunnan

<table>
<thead>
<tr>
<th>DAM NAME</th>
<th>INSTALLED CAPACITY (MW)</th>
<th>DAM HEIGHT (M)</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gushui</td>
<td>2600</td>
<td>220</td>
<td>Under site preparation</td>
</tr>
<tr>
<td>Wunonglong</td>
<td>990</td>
<td>136.5</td>
<td>Under construction</td>
</tr>
<tr>
<td>Lidi</td>
<td>420</td>
<td>74</td>
<td>Under construction</td>
</tr>
<tr>
<td>Tuoba</td>
<td>1400</td>
<td>158</td>
<td>Under site preparation</td>
</tr>
<tr>
<td>Huangdeng</td>
<td>1900</td>
<td>202</td>
<td>Under construction</td>
</tr>
<tr>
<td>Dahuaqiao</td>
<td>900</td>
<td>106</td>
<td>Under site preparation</td>
</tr>
<tr>
<td>Miaowei</td>
<td>1400</td>
<td>139.8</td>
<td>Under construction</td>
</tr>
<tr>
<td>Gongguqiao</td>
<td>900</td>
<td>130</td>
<td>Completed (2012)</td>
</tr>
<tr>
<td>Xiaowan</td>
<td>4200</td>
<td>292</td>
<td>Completed (2010)</td>
</tr>
<tr>
<td>Manwan</td>
<td>1550</td>
<td>126</td>
<td>Completed (2007)</td>
</tr>
<tr>
<td>Dachaoshan</td>
<td>1350</td>
<td>118</td>
<td>Completed (2003)</td>
</tr>
<tr>
<td>Nuozhadu</td>
<td>5850</td>
<td>261.5</td>
<td>Completed (2012)</td>
</tr>
<tr>
<td>Jinghong</td>
<td>1750</td>
<td>118</td>
<td>Completed (2009)</td>
</tr>
<tr>
<td>Ganlanba</td>
<td>155</td>
<td>60.5</td>
<td>Planned</td>
</tr>
</tbody>
</table>

Meeting Energy Needs Without Sacrificing Rivers

To meet China’s energy demand in its eastern coastal areas, more sustainable and just energy solutions should be considered. Within the China Southern Power Grid – which receives the power generated from the Lancang dams—renewable energy such as wind and solar power has the potential to replace all the new hydropower projects on the Lancang. Currently, China Southern Power Grid’s development targets for energy efficiency and non-hydro renewable energy development does not meet the national mandatory target. Improved demand-side energy efficiency and reducing transmission losses within the West-East Electricity Transfer could also reduce energy needs and further increase the amount of energy available.

Comprehensive River Basin Management

The Chinese government has so far been unwilling to acknowledge the transboundary impacts of hydropower development on the Lancang. Data and findings of the research and investigations commissioned by the Chinese government under these areas remain a closely guarded state secret. This approach is not conducive to the sustainable management of the Lancang-Mekong River and is out of step with evolving international norms on the management of transboundary rivers. To begin a much-needed dialogue with downstream governments on the future of hydropower development on the Mekong River, China should release regular and timely hydrological data from the Lancang dams in both the dry and wet seasons, and HydroChina’s Strategic Environmental Impact Assessment for the Lancang hydropower dams with downstream governments. China should begin to play a responsible and constructive role in the region.

Changes in dam-building plans along the Lancang River have also demonstrated that Hydrolancang can take environmental and social concerns into consideration when planning new dams. For instance, Gushui Dam’s height was reduced due to concerns over inundating a protected area in Tibet. Guonian Dam – originally planned between the Gushui and Wunonglong dams – was canceled because of its potential impacts on the Mingyong Glacier. Mengsong Dam, originally planned as the last dam on the Lancang, was canceled due to concerns over its negative impact on fish migration.

Civil society groups and experts in the Mekong basin and abroad should continue to communicate their concerns to the Chinese government and dam builders, share research on the impacts of the Lancang dams, and advocate for the important values of a flowing Lancang-Mekong River. An open, evidence-based discussion is critical to protect the Mother of Rivers.

Further Information:

Background on the Lancang/Mekong River:
http://www.internationalrivers.org/campaigns/mekong-lancang-river

Interactive map of major dams on the Lancang River:
http://goo.gl/maps/epwHc

Spreadsheet of major dams in China:
http://www.internationalrivers.org/node/7743

Photos of dams on the Lancang:
http://www.flickr.com/photos/internationalrivers/sets/72157621766522052/

International River’s factsheet on Mekong mainstream dams:
http://www.internationalrivers.org/node/2639

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3 Zhao, A. (2013) “How can the electricity structure featuring overdependence on thermal power and large-scale hydropower be changed by developing renewable energy and improving energy efficiency?” International Rivers. In progress.

4 According to Zhao, A. (2013), According to the Mid- and Long-Term Plan for the Development of Renewable Energy, non-hydro renewable energy power generation should occupy 3% of the total electricity output by 2020. To meet that target, CSG would need to increase the total installed capacity of non-hydro renewable energy to at least 20.02 GW.