探寻湄公河发展之路

Forging a new course for the Mekong

中外对话
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“中外对话”是一个独立的非营利性组织，以伦敦、北京、旧金山为中心开展工作。

“中外对话”的主要业务是其独特的完全双语网站，它通过发表精辟、原创的中外文章、评论和分析，促进世界理解中国崛起带来的全球性生态环境影响，进而共同寻求公平可行的全球环境问题解决之道。

“中外对话”项目第三极（www.thethirdpole.net）旨在深度探讨喜马拉雅流域及其下游国家的水资源问题，鼓励各方积极参与和讨论，借此推动包括湄公河流域在内的跨国家界议题的探讨。。

About chinadialogue

chinadialogue is an independent, not-for-profit organisation based in London, Beijing and Delhi.

Alongside a bi-monthly journal, chinadialogue's primary vehicle is our website (https://www.chinadialogue.net), a unique bilingual platform which promotes a global understanding of the environmental impact of China's rise by publishing informed articles, commentaries and analysis by writers from inside and outside of China. We aim to inform, educate, and contribute to building a global consensus on fair and workable solutions.

chinadialogue's sister project, www.thethirdpole.net, aims to support in-depth and original coverage of all aspects of water issues in the Himalayan watershed and downstream countries to stimulate informed debate and to promote cooperation on transboundary issues, including in the Lancang-Mekong basin.

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中国与湄公河：不确定的未来

编者按

湄公河是东南亚最长的河流，几乎有一半流淌在中国境内。这条大河发源于青藏高原，一路蜿蜒，经过中国云南，再到缅甸、老挝、泰国、柬埔寨，最后经越南汇入南海。

湄公河流经的国家，个个都有自己宏伟的水电计划。澜沧江（湄公河上游中国境内河段）已经投入运营或在建的巨型水坝就有6座，还有更多的水坝正在筹备中。而东南亚湄公河下游干流上则计划建11座水坝。这些水坝对湄公河丰富的生物多样性和鱼类种群产生的累积效应，已经引起了科学家、社会人士和邻国政府的恐慌。湄公河下游地区有6000万人口，80％的人依这条河流为生。

湄公河地区正处于迅速变革时期。沿岸各国竞相发展经济、推进能源、贸易发展及基础设施建设，湄公河在水力发电、运输方面将起到重要作用，为发展提供支持。

在这次特别报道中，“中外对话”将探讨湄公河沿岸发展过程中面临的环境挑战。

报道的第一部分探讨了中国到2030年水电装机容量翻番的新计划。这一计划主要通过在澜沧江和中国西南地区其他河流建设水坝来实现；另外还管窥了水电站在云南地区引发的政治冲突。

第二部分，特约记者孟斯报道了有关湄公河沿岸大坝移民安置问题。

第三部分则聚焦于湄公河下游的开发：老挝不顾其邻国和国际社会的抗议，仍计划推进其有争议的筑坝计划；这一部分还探讨了气候变化将如何加剧环境污染、盐碱化及洪水泛滥，给湄公河三角洲的农民造成困扰。

China and the Mekong: an uncertain future

Editor's note

The Mekong is Southeast Asia's longest river, but almost half of its course is in China. From its source in Tibet, the river snakes its way though China's southwestern Yunnan province, Myanmar, Laos, Thailand and Cambodia, before spilling out into the South China Sea in Vietnam.

Each of these countries has its own ambitious hydropower plans. Six massive dams are already in operation or under construction in China on the upper Mekong (known as the Lancang), with many more in the pipeline. Eleven dams are proposed along the mainstream of the Lower Mekong in Southeast Asia. The cumulative effects of these dams on the Mekong's rich biodiversity and fish population have alarmed scientists, campaigners and neighbouring governments. The lower Mekong region is home to 60 million people, up to 80% of whom depend upon the river for their livelihood.

The Mekong region is going through a rapid period of change as countries vie to develop their economies and forge energy, trade and infrastructure links. The Mekong river will play a crucial role as hydro powerhouse and transport channel to support this growth.

In this special report, *chinadialogue* explores the environmental challenges of development along the Mekong.

Part 1 examines the implications of China's new plans to double hydropower capacity by 2030, mainly by building dams on the Mekong and other rivers in southwest china; and provides a glimpse into the political conflict over hydropower in Yunnan province.

In Part 2, Meng Si reports on the resettlement rights of villagers displaced by dams along the Mekong River.

Part 3 examines developments downstream: Laos' plans to forge ahead with its own controversial dam plans despite protest from its neighbours and the international community; and how climate change will exacerbate pollution, salinity and flooding problems for farmers in the Mekong delta.

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湄公河流域大坝一览图（部分汉化）

截止至2013年5月

Map Description:
The map shows every known commissioned, under construction, and planned dam in the basin. 'Unknown' dams are mainly dams and reservoirs constructed for use in irrigation and/or water supply, the names of which are currently unknown.

Data Sources :
Citations for the data sources contributing to the location of the dams in this map may be found at our website - http://mekong.waterandfood.org/archives/2648
Background relief data is courtesy of Natural Earth and SRTM data from the JPL of NASA
River basin boundary and river vector data is courtesy of the IWMI
All other administrative and physiographic data courtesy of NOAA's National Geophysical Data Center's Global Self-consistent, Hierarchical, High-resolution Geography Database

Acknowledgements:
CPWF-Mekong gratefully acknowledges the financial support of AusAID in the production of this map.
This map has been rendered by GeoSys (Lao) Co., Ltd,
Hom 7, 136/09, Ban Sokpaluang, Sisattanak District, Vientiane Capital, Lao PDR.

Disclaimer:
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Ho Chi Minh

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图例说明

大坝状态
- 已批准
- 修建中
- 已提交修建申请
- 已取消
- 状态未知（或为灌溉用地）

- 主流
- 支流
- 河流和水库
- 湄公河流域边界线

城市
- 国家首都
- 主要城市

边境

0 50 100 200 300 400 500
Kilometers

1:10,000,000

Datum : World Geodetic System 1984
Coordinate System : Universal Tranverse Mercator Zone 48 North

Cartographic Design by : GEO-SYS
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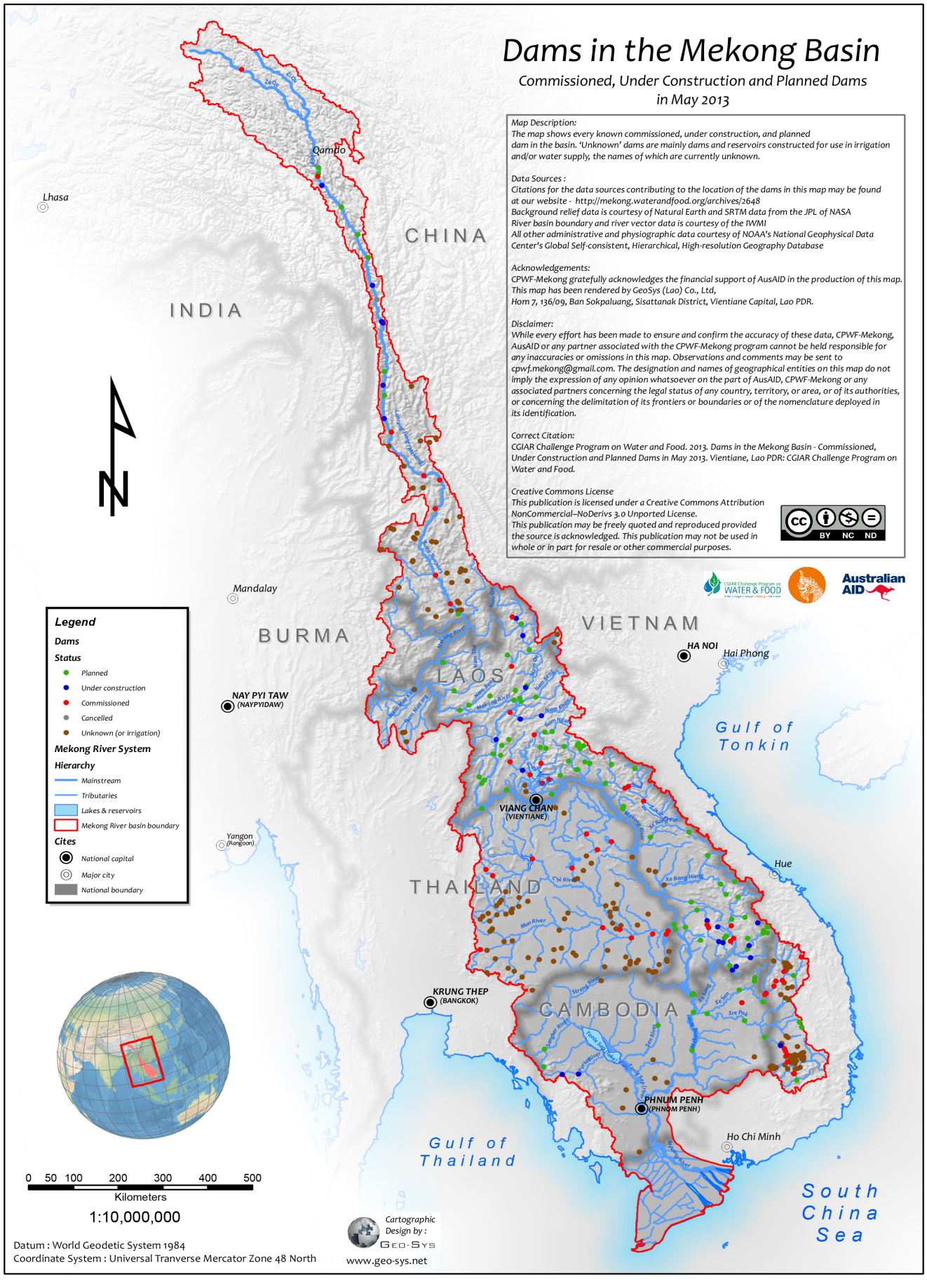
Dams in the Mekong Basin

Commissioned, Under Construction and Planned Dams in May 2013



中国重塑湄公河流域

Part 1:China reshapes the Mekong

中国为大型水坝工程开绿灯

中国将重启西南地区多个备受争议的大坝工程，所涉河流均发源于青藏高原。

贝丝 · 沃尔克

中国明确表示将重新启动西南部地区水电大坝工程，所涉河流均发源于青藏高原。此番消息一出，立即引起印度及其它下游邻国的恐慌。

在中国国务院2013年二月发布的2011-2015年能源行业规划中，明确表明将在怒江（萨尔温江）、澜沧江（湄公河）、以及雅鲁藏布江（布拉马普特拉河）流域"积极推动水电发展"。这些河流不仅全部位于云南和西藏的生态敏感地区和地震带，而且还是国际共享河流。

过去十年，有关在生态敏感地区和地震风险区修建大坝的问题上，中国政府一直秉承谨慎的态度。然而，这些计划的出台却标志着中国政府的政策将会发生预期中的重大转变。

中国批准在雅鲁藏布江中游建设三座新大坝的消息引发了印度媒体的担忧。

温家宝总理任期内搁置了一些项目。2006年至2010年间，重点项目中实际开工的数量仅为三分之一。然而，在能源需求、大坝承建方和电力企业的不断游说下，及实现“十二五”期间的低碳目标等各方面因素的影响下，大坝建设重新浮出水面。根据该计划，到2015年，全国将开工建设水电1.2亿千瓦。

中国批准在雅鲁藏布江（印度称布拉马普特拉河）中游建设三座新大坝的消息引发了印度媒体的担忧。他们担心大坝会对下游流量造成影响。目前，雅鲁藏布江上首个大型水电站——装机容量为51万千瓦的藏木大坝已经动工。

很快，中国外交部发言人洪磊就在周三召开的记者会上对中方开发雅鲁藏布江的立场进行了澄清。据新华社消息，洪磊表示，“中方对跨境河流开发利用一向持负责任态度，任何新项目（在开工之前）都会经过科学规划和论证。”

印度官方也呼吁人们保持冷静。然而，政府内部也有声音呼吁应尽快在阿萨姆邦和阿鲁纳恰尔邦的布拉马普特拉河段上修建大坝。这种声音同样引起孟加拉国不安。

雅鲁藏布江转了一个大弯穿过世界最深的峡谷后进入印度。目前中国正在考虑在这里修建一座4800万千瓦的水电大坝（规模是三峡大坝的两倍还多），但是，这很有可能在相关的基础设施以及超高压输电线路建成后才会开始施工。然而，值得注意的是，这个即将成为中国的“大拐弯”的大坝项目，尽管更具争议却很少被提及。

能源规划中还提及了将在澜沧江（湄公河）上兴建的九个水利工程，它们将对在东南亚居住的六千万居民赖以生存的水流、渔业、农业产生连锁效应。

在中国内部，注意力都集中在是否应重启在云南省怒江上兴建大坝这一系列备受争议的计划。得益于中国环保人士迄今所取得的最伟大的胜利之一，这些计划已经被搁置了八年之久。

《南华早报》引述了知名环保组织自然之友的总干事李波的评论：“这真的非常令人震惊。在过去的一年中，确实有迹象表明巨型水坝计划在被搁置多年之后有卷土重来之势，但是我还是对这背后的决策过程如此缺乏透明度感到震惊。”

对于国务院的水利项目，我们并不感到意外（没有一个项目是全新的）。但是，随着地方政府利用新的电力资源去开发当地丰富的矿产资源，这一声明将加速中国西南部地区及西藏更多受到水利发展驱动的行业的发展与繁荣。

在中国脆弱的东南地区建造大坝现在看起来似乎已成定局，但是，生态、地质、政治方面的棘手问题不会就此消失。

随着“48%的大坝坐落在地震灾害高发危险区”这一信息的披露，最近几个月，中国国内有关在中国西南部地震多发地区建造大坝是否安全这一问题的争论日趋激烈。

此外，这些计划的披露对中国与下游亚洲国家之间的外交关系并无裨益。就跨境河流的开发事宜，中国并没有同其邻国签署任何正式协议，也不想启动起草协议的复杂流程，或提供任何善意的数据。

贝丝·沃尔克，中外对话第三极项目编辑

China gives green light to new era of mega-dams

China will resurrect series of controversial hydropower dams in south-west China on rivers originating on the Tibetan Plateau

Beth Walker

China has confirmed it will resurrect a series of controversial hydropower dams in south-west China on rivers originating on the Tibetan Plateau, causing ripples of consternation from India and other downstream neighbours.

The 2011-15 energy sector blueprint, released by China's State Council in February, confirmed plans to "actively push forward with hydropower development" in the Nu (Salween), Lancang (Mekong) and Yarlung Zangbo (Brahmaputra) river basins – all in ecologically sensitive and seismically active regions of Yunnan province and Tibet; and all along internationally shared rivers.

These plans mark a much anticipated step change in government policy, away from the more cautious approach to dam building in ecologically and seismically sensitive

Approval of three more dams on the middle reaches of the Yarlung Zangbo River has triggered concerns in India.

regions of the past decade.

Wen Jiabao's tenure as Chinese premier saw a number of projects shelved. Only a third of schemes identified as a priority actually went ahead between 2006 and 2010. But the combination of China's energy needs, intensive lobbying by major dam builders and electricity companies and ambitious plans to meet low-carbon intensity goals in the 12th Five-Year Plan have opened the way for a fresh round of dam building. Some 120 gigawatts of new hydropower will begin construction by 2015 nationwide, according to the plan.

Approval of three dam projects on the middle reaches of the Yarlung Zangbo River (known as the Brahmaputra once it reaches India), has triggered concerns in Indian media about possible impact on downstream flows. Construction of the 510-megawatt Zangmu dam, the river's first large-scale hydropower station, is already under way.

Foreign ministry spokesman Hong Lei quickly moved to clarify China's stance on exploiting the Yarlung Zangbo: "The Chinese side always takes a responsible attitude towards the exploitation of cross-border rivers and every new project will be planned and reasoned in a scientific way (before being started)," he said, according to Xinhua.

Indian officials have also urged calm. But within government, there are advocates of urgent damming of the waters of the Brahmaputra in Assam and Arunachal Pradesh (where 168 mega-dams are slated), which in turn makes Bangladesh uneasy.

Notable is the lack of mention of the more contentious dam slated for the "great bend" in China, before the Yarlung Zangbo swings round into India and through the world's deepest canyon. Here, a massive 48,000-megawatt dam (over twice the size of the Three Gorges dam) is under active consideration but is likely to be built only after related infrastructure and ultra-high voltage power transmission lines are complete.

The energy blueprint also mentions nine hydro projects on the Lancang (upper Mekong), which will have knock on effects for water flow, fisheries and agriculture for the 60 million people living in Southeast Asia.

Within China, attention has focused on the revival of controversial plans to dam the Nu River in Yunnan province, eight years after these were suspended due to environmental concerns in one of the biggest triumphs to date of China's green activists.

"This is really shocking," said Li Bo, a director at Friends of Nature, a leading environmental group quoted in the *South China Morning Post*. "There were signs during the past year that mega dams were staging a comeback after being put on hold for years, but I'm still shocked by the lack of transparency in the decision-making process behind this."

The State Council's hydro plans should not come as a surprise (none of the projects are new) – but the announcement will hasten a broader hydro-fuelled industrial development boom in southwest China and Tibet as local government use new power sources to exploit the area's rich mineral resources.

Dams on China's fragile south-west region now seem a foregone conclusion, but thorny problems of ecology, geology and politics will not go away.

Within China, rows over the safety of large dam cascades in earthquake-prone south-west China have heated up in recent months following revelations that 48% lie in zones of high seismic hazard.

And news of these plans will do little for China's diplomatic relations with downstream Asian countries. China has no formal agreements with its neighbours on the use of trans-boundary rivers and has shown little enthusiasm for engaging in the complex process of drawing these up, or offering up any good-will data.

Beth Walker is editor of thethirdpole.net

中国未能与湄公河沿岸国家建立互信关系

中国官员和开发商不断推进湄公河梯级堤坝开发项目，此举无益与下游国家建立互信关系。

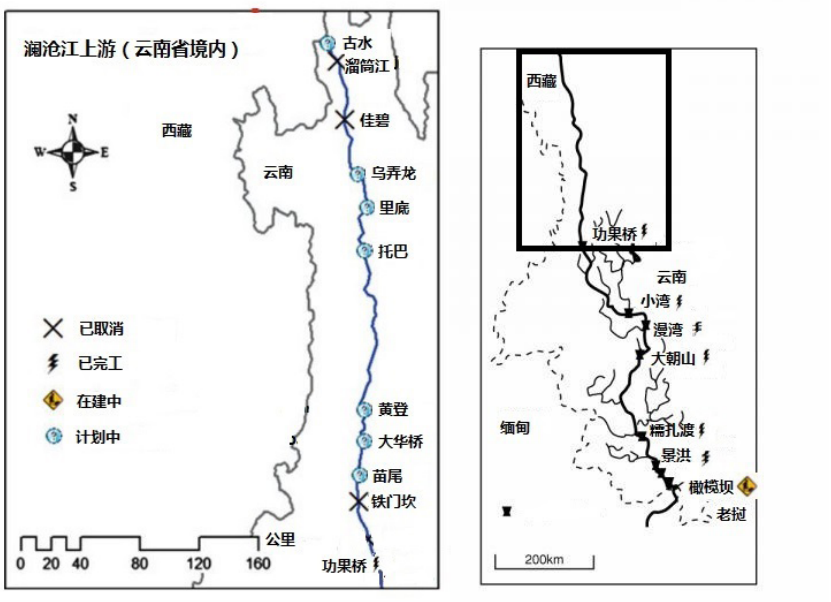
达林·玛吉

近日，中国拟在跨境河流修建大型堤坝式电站，受到国际媒体广泛关注。其中，开发利用澜沧江（湄公河上游河段）、怒江（萨尔温江上游河段）水能资源更是被视为中国单方面行动，忽视了缅甸、泰国、老挝、柬埔寨、越南等下游国家的利益，可能对社会和生态环境造成负面影响。1995年，中国最大的电力公司华能建成1350兆瓦的漫湾水电站，这是澜沧江-湄公河干流的第一座堤坝式电站，开启了包含8个堤坝的梯级开发项目，旨在将电能输送至广东等地。

2004年3月，时任总理温家宝叫停第二大水电梯级项目（项目位于云南省西南部与澜沧江大致平行的怒江之上），遏制了开发势头。此举赢得中国及海外环保人士称赞。当时中国第二大电力公司华电计划在怒江修建13座堤坝式电站，总装机容量超过21000兆瓦，与三峡大坝相当。温家宝称华电违反了实施不久的环境影响评价法，观察者认为这意味着中国环保机构影响力日益增强。然而，选址、移民新村建设等前期工作业已展开，预计习近平执政期间，至少4项工程将得到政府许可。

同时，澜沧江水电站建设也进展迅速。原计划在中下游（云南中部向南至中老边界）修建8座堤坝，其中6座已动工甚至完成。过去十年中，由于媒体已将注意力转至怒江，澜沧江水电站二期工程又悄然启动。这些水电站所在地区道路、输电设施落后，当地居民大多是边缘化的少数民族，主要以务农、采矿为生，用电需求远小于水电站的发电量。然而，与下游水电站一样，这些项目也是扶贫关键，有助于使欠发达的边远地区与东部发达的工业城市协调发展。

澜沧江上的水电站一直向上游延伸至西藏的扎曲地区，在那里，这些大型工程项目对当地社会和生态造成的不确定性影响更为重大。相关水电建设的信息公开非常有限，即便是公开的信息其可信度也值得商榷。



截止至2013沧江上的大坝工程一览图。

对中国水电规划者而言，原因显而易见：水电发展，则整体经济发达。水电开发程度较高的欧美就是例证。中国水能资源蕴藏量居世界首位，约500千兆瓦，其高层领导人中很多都有水电工程专业背景。未来要想实现经济快速、可持续发展，需电力稳定充足，而中国还有一多半的水能资源尚未得到开发。此外，水电是低碳能源，这使其开发的可能性进一步增加。

虽然云南西南部距用电大省千里之遥，但当地官员认为，修建大型水电站的原因也很明显。云南地处山区，水量充沛（至少雨季如此），蕴藏的水能究竟有多少仍是未知数。目前西南大部分地区电网基础设施相对落后，电压较低不适于远距离传输大量电能，但南方电网公司已买下当地网络进行升级整合，上述局面将很快得到改善。对澜沧江、怒江以及金沙江（长江上游河段）上规划或已投入运行的兆瓦级电站而言，更重要的是建设超高伏直流输电线，使之比现在的电路更安全、电能损失更少。

不安的邻国

那么，澜沧江水电站对中国与下游国家的关系又有何影响？澜沧江流域约有6000万人口，其中多数靠澜沧江及其支流维持生计。下游国家担心，中国建设堤坝式电站会影响澜沧江流量、泥沙输运、鱼群迁徙及生态环境。

对流量的担心并非毫无根据，澜沧江流域夏季风盛行时虽雨量充沛，旱季却几无降水。梯级水库总蓄水量约600亿立方米，相当于湄公河年平均径流量的13%。位于下游的小湾和糯扎渡电站的配套水库最大，库容超过总量的一半。目前，小湾电站已竣工，糯扎渡电站大坝预计2017年合龙，下游居民担心中国可能会在雨季将水“入库”以在旱季有控制地放水。2010年初，湄公河下游国家遭遇大面积持续干旱，很多人指责中国利用刚竣工的小湾坝蓄水，加剧了下游旱情。中国官员及大坝开发商邀请下游国家官员参观大坝，承诺提供水文资料、增加透明度，但至今未予以兑现。

担心泥沙输运受阻同样有一定依据。泥沙原本会输运至下游，形成河岸、岛屿，通过洪水作用为洼地提供营养物质，如今却被堤坝阻隔，在水库内沉积。河水流经水库失去大量泥沙后，将更有可能冲刷河岸、侵蚀沿河生境、甚至改变地形。柬埔寨洞里萨河-湖生态系统拥有独特的水文环境，水稻、鱼类产量极高，河水中的泥沙是湖底沃土的重要来源，如今却可能被拦在澜沧江堤坝之中。不过，关键在于这部分泥沙所占比例，因为河流经过缅甸、老挝、泰国、越南和柬埔寨也会裹挟一定泥沙送入洞里萨湖。

中国并未加入缺乏影响力的湄公河委员会；中国曾承诺公开更多水文资料，但又指出跨境河流数据涉及国家安全问题；中国坚称有权对境内河流进行开发，这些都无益于与邻国建立互信关系，让人相信其领导人和电站开发商会考虑流域内其他国家的利益（尽管中国经常如此宣称）。遗憾的是，世界上很多跨境河流都面临这种情况。澜沧江-湄公河是世界重要水系，只有在泥沙沉积、径流量、水文资料共享等方面加强科学合作，才能建立互信、消除猜疑、为合作管理水系奠定基础。虽然这还有很长一段路要走，但它将为解决怒江、雅鲁藏布江等其他河流的相关问题提供范例。

澜沧江上的小湾水电站于2010年完工，是世界上最高的大坝之一。

达林·玛吉，美国霍巴特和威廉史密斯学院环境研究所副教授

China fails to build trust with Mekong neighbours

As China pushes ahead with a fresh cascade of dams on the Mekong River, politicians and dam builders have done little to build confidence downstream

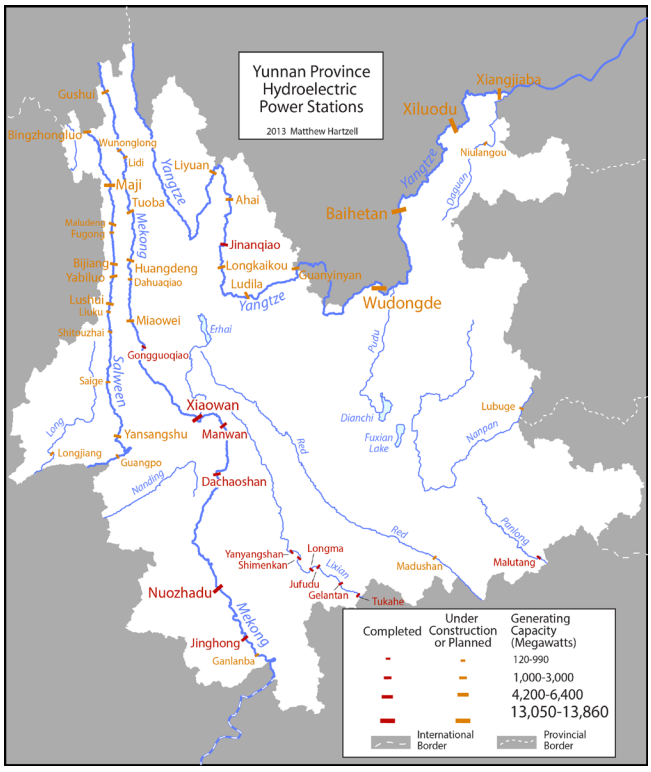
Darrin Magee

Chinese plans to develop hydroelectric dam projects on transboundary rivers continue to attract controversy. Proposals to harness the power of the Lancang (upper Mekong) and Nu (upper Salween) rivers, in particular, have been framed as unilateral Chinese development schemes that ignore the concerns of downstream countries – Myanmar, Thailand, Laos, Cambodia and Vietnam – and with the potential for widespread social and ecological damage.

The completion of the 1350-megawatt Manwan dam in 1995, the first on the mainstream of the Lancang-Mekong, paved the way for China's largest power company, Huaneng, to pursue its plans for an eight-dam cascade on the Lancang designed to export power as far away as Guangdong province in the far south-east.

However, the situation seemed to change in early 2004, when then-premier Wen Jiabao called a halt to a second major hydroelectric cascade on the nearby Nu River, which runs roughly parallel to the Lancang through south-west China's Yunnan province. Environmental activists in China and overseas applauded the decision. Huadian, China's second largest power company, had planned a series of 13 dams with a combined generating capacity of more than 21,000 megawatts for the Nu (roughly the equivalent of the Three Gorges Dam).

Wen claimed that Huadian had failed to comply with the country's recently-implemented environmental impact assessment law, a move observers saw as a sign of the growing strength of China's environmental regulatory apparatus. Yet preliminary work for some of the Nu dams,



Status of hydroelectric dams on the Lancang in Yunnan (2013).

including site testing and construction of resettlement villages, has crept forward, and it is expected that at least four of the projects will be given official license to proceed under Xi Jinping's administration.

At the same time, development on the Lancang has proceeded apace. Six dams of the eight originally planned for the lower and middle stretches of the river, from central Yunnan south to the Lao border, are either finished or underway.

And with the media spotlight trained on the Nu, work on a second series of Lancang dams has continued over the past decade. These dams are being built in areas where roads and power transmission infrastructure are poor, where local populations, many of whom are ethnic minorities, are often marginalised, and where local electricity demand simply does not require the quantity of power that dams of this scale will provide. Yet like those on the lower reaches of the river, they are all billed as key to rural poverty alleviation and integration of remote and relatively undeveloped areas into the industrial and urban engines in eastern China.

The upper Lancang cascade also includes a number of dams within the Tibetan Autonomous Region on the Zaqu (as the Lancang is known there), where the social and ecological uncertainties associated with a project of such scale may be even greater. Very little information is publicly available about these dams, and what information exists is unreliable.

For Chinese hydropower planners, the logic is simple: high levels of hydropower development correlate with high levels of overall economic development. Europe and the US, each with very high levels of hydropower exploitation, are seen as proof of this. China holds the world's greatest hydropower potential, estimated at over 500 gigawatts, and a host of its top leaders have backgrounds in hydropower engineering. Unreliable or insufficient electricity has no place in a future dependent on rapid and sustained economic development, and more than half of China's hydroelectric potential remains untapped. The case for hydropower is further strengthened by its reputation as a low-carbon energy source.

For local officials in southwest China's Yunnan province, the logic of constructing large-scale hydropower, thousands of kilometres away from key load centres, is also clear. Yunnan is home to roughly a quarter of the country's hydropower potential thanks to its steep mountains and voluminous rivers (at least during the rainy season). And though the power grid infrastructure across much of the southwest is relatively frail and operates at low voltages

The Xiaowan dam on the Lancang River was completed in 2010 and is one of the tallest dams in the world.

unsuitable for long-distance transfer of large quantities of electrical energy, this is changing rapidly.

China Southern Grid is buying up local grids, upgrading and integrating them.

More important for the mega-scale dams operating on and envisioned for the Lancang, Nu, and Jinsha (upper Yangtze) is the development of ultra-high-voltage direct current power lines capable of transmitting power over long distances more safely and with fewer power losses than existing lines.

Nervous neighbours

So what does Lancang hydropower development mean for China's relations with its downstream neighbours? The area drained by the river is home to 60 million people, many of whom depend directly on the river and its associated waterways for their livelihoods. Downstream leaders and communities worry about the impacts Chinese dams might have on water availability, sediment transport, fish migration and river ecosystems.

Concerns about water availability are not unfounded in a region where summer monsoons bring torrential rains but where the dry season can see precious little precipitation. The volume of the entire cascade's reservoirs, roughly 60 billion cubic metres, is approximately equivalent to 13% of the Mekong's mean annual discharge. The dams with the two largest reservoirs, Xiaowan and Nuozhadu on the lower reach, occupy more than half that capacity. With Xiaowan complete and Nuozhadu expected to fill in 2017, downstream users fear China might "bank" water in large reservoirs during the rainy season for more controlled release during the dry season.

In early 2010, as the lower Mekong countries suffered under a widespread and persistent drought, many accused the Chinese of exacerbating the situation by filling the reservoir on the recently completed Xiaowan dam. Chinese officials and dam developers responded by inviting downstream officials to visit the dam site, and by promising greater transparency and data sharing, a promise as yet unfulfilled. Concerns over sediment trapping also have some basis. Dams trap silt that would otherwise be transported downstream, retaining in their reservoirs finely ground material that would normally contribute to beaches and islands in the river and provide vital nutrients to lowlands during floods. Having lost much of its sediment in the reservoir, water exiting a dam is more likely to scour river banks, erode river habitat and potentially cause landscape instability.

Cambodia, home to the hydrologically unique and exceedingly productive (in terms of rice and fish) Tonle Sap lake-river system, has reason to suspect that some of the silt responsible for the lake's rich soils will be trapped behind the Lancang dams. The key question, however, is how much, since Myanmar, Laos, Thailand, Vietnam, and Cambodia also contribute sediment to the river upstream of the lake system.

China's lack of membership in the (admittedly weak) Mekong River Commission; its conviction that daily flow data on transboundary rivers are a matter of national secrecy (despite promises to increase data sharing); and its insistence on the absolute right to pursue development on waters within its sovereign territory do little to build trust and inspire confidence that Chinese dam developers or political leaders have regional interests in mind, despite occasional claims to the contrary. Unfortunately, such is the case with many of the world's transboundary rivers.

Increasing scientific collaboration, including data sharing on issues such as the sedimentation and flow volumes would go a long way towards building trust, reducing uncertainty, and establishing the basis for cooperative management of the Lancang-Mekong, one of the world's most important river systems. Such collaboration could then serve as a model for other rivers in the region such as the Nu and Brahmaputra.

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中国需改变对湄公河地区地缘经济战略

中国必须促进湄公河流域的可持续发展，而非简单地把碳足迹向下游转移。

布莱恩·艾勒

今年底，一座横跨湄公河（中国称为澜沧江）的多车道大桥即将落成，届时来自中泰两国的小汽车和装满货物的集装箱卡车将源源驶过。这座桥将连接泰国的清莱府与老挝的博胶省，有效连接起北起中国北京、上海，南起新加坡、科伦坡和曼谷的高速公路网络。

这座桥的投资中泰政府各占一半，但其规划和修建分别经历了十年和两年的漫长岁月，且中间充满争议。原因就是泰国因中、老、泰三国间的收益分配不均而迟迟不肯投资。泰国方面的NGO“爱清孔”还

中国在湄公河沿岸大举投资兴建桥梁和管道。

称这座大桥将不可避免地影响到金三角地区的当地经济，损害湄公河的渔业。

这座金三角大桥凸显了来自中国的种种挑战。中国的新领导集体为了平衡其逐渐放缓和波动的经济，实现国内稳定，正在努力保持与邻国和平友好的经济关系。

中国的地区战略

GMS商务理事会主席许宁宁说："2012年，中国与湄公河其他四国（缅甸、老挝、泰国、柬埔寨）的贸易和对外投资增长速度已经超过了对所有东盟国家贸易和投资的增速。随着湄公河次区域合作及双赢投资机遇的增加，这一增长率更高的势头将继续保持。"过去三年中，中国的湄公河流域省份云南和广西的经济增长率高达12-15%，为中国地方最高，可以说，中国的经济崛起也帮助湄公河流域国家提高了增长速度。

上世纪90年代初，冷战的结束为中国制定与湄公河地区的经济合作战略提供了良好的环境。曾经壁垒森严、不可逾越的边境变得模糊、开放，鼓励着中国与东南亚国家边界两侧的商人们向地方和各国政府要求更好的环境，以便在整个地区更便利地进行贸易和人员往来。中国政府的回应就是二十年来国家主导的促进地区公私合作的贸易自由化和投资政策。

中国对湄公河四国的经济合作战略非常契合其目前发展所需的大战略。刘金鑫，一位来自中国国家级研究机构的政策分析家和物流专家说："美国在金融和信息技术上引领世界，这两个都是高价值的服务导向型产业。中国则不同。作为'世界工厂'，中国生产的商品驱动了其不断壮大的中产阶级的发展及为全世界出口市场的服务。为了生存下去，中国这个'工厂'需要能源和原材料的输入。"

刘金鑫强调了中国在亚洲修建的多条战略性油气管道，尤其是从缅甸印度洋沿岸港口皎漂到云南昆明的中石油管道项目，以及扩展到老挝和缅甸的水力电网。他说："我们之所以建立这个网络，是因为这是我们唯一的稳定保障。只有保持与所有邻国的和平友好关系，才能保证这些可靠的输入。"

但是，这种建立在地缘经济合作基础上的方式对中国及其湄公河邻国来说，是不是一个可持续的长远战略呢？贯穿缅甸的中石油管道也是一个检验地区对中国地缘经济战略态度的试验场。因为不仅缅甸政府有能力随时掐断这条管道给中国带来的战略性能源流，作为管道起点的皎漂港的所有权主要掌握在一家日本公司手里。中国国内的民族主义者们会指责中国政府不仅被日本而且被缅甸所绑架，这样一来就会威胁到中国的地缘经济策略方式。

我有一位同行在一个专门促进中国与湄公河国家合作的政府机构工作，去年有一次我跟他聊天时，他对合作的现状深表失望。他说："无论在基础设施发展，还是对中国不公平的贸易促进上，我们已经给了这些国家太多太多的帮助。但是他们依然得寸进尺地要占便宜，或者威胁说撕毁与我们的协议。"

自从缅甸的民主化转型及中国投资的密松水电站项目中止以来，中缅关系在过去几年中逐渐变冷。中越关系也随着越南对某些中国商品设立贸易限制而陷入困境。在今年昆明举办的各次地区贸易活动上，越南的部长级代表团均未参加。

中国向湄公河国家出口"增长第一"模式

中国以多种方式，将其国家主导的"增长高于一切"发展模式出口到湄公河地区。该地区的欠发达国家的确从中国资助的基础设施项目中得到了经济实惠，比如连接老挝北部和首都万象耗资72亿美元的高速公路，以及老挝和柬埔寨境内湄公河干流上的水电工程。

只有在老挝和柬埔寨付清对中国堆积如山的债务之后，这些项目才可能实现利益的公平分配。通过在云南境内澜沧江（湄公河上游）上修建的八座水电站，中国已经向老挝表示可以对下游国家关于这些上游大坝负面影响的呼声置之不理。

对于中国的湄公河邻居来说，他们所面临的不仅仅是环境危机。水电发展商在中国国内可以轻而易举地绕开环境法律，拿出误导性的环境影响评估报告。昆明理工大学的保育生物学家及环境评估技术专家周德群博士表示，这些违规的操作都被搬到了中国在老挝投资的水

电项目上。

“中国正在将自己的商业行为和忽视法律的做法出口到湄公河地区。我们在国外的富商们没有兴趣或者技术能力来促进可持续的商业实践，也不会考虑到其行为的法律语境。”

水力发电威胁食品安全

老挝计划在湄公河干流上建11座水电站，在其支流上建70多座，用于向中泰两国出口电力。这将在该国的能源收入与自然资源（即渔业）的损失之间导致一场零和游戏。世界鱼类研究所的湄公河渔业专家埃里克·巴兰指出，湄公河是世界上最大的内陆渔场，其产量占世界淡水总渔获量的近十分之一。老挝和柬埔寨60%的人口日常蛋白质摄入完全依赖湄公河及其支流的鱼类。但老挝境内的多座湄公河大坝将切断110多种鱼类的自然迁徙路径，这意味着高达80万吨的渔获量损失，相当于湄公河总渔获量的42%。这将给老挝和柬埔寨带来潜在的食品安全威胁，也是地区性地缘经济战略产生问题之处。

此外，中国自身的水电发展以及从东南亚进口水电，是通过可再生能源投资减少其碳足迹的举措。但是，为了替代湄公河渔业造成的蛋白质缺失，老挝和柬埔寨将被迫进行碳密集型的工业化牲畜养殖，这样一来中国就只是把其碳足迹转移到下游而已。

今年三月在泰国清莱举行的一次湄公河地区食品安全研讨会上，泰国前参议员克拉萨·楚哈万说：“目前湄公河地区处于食品安全状态下，我们必须做的是在高速发展期间始终维持这一安全，并且为了这一地区的未来做出明智和可持续的决策。”

国家主导战略扼杀可持续解决之道

对中国国家主导的地缘经济战略一个主要的批评观点是，尽管它促进了国家在经济纽带加紧的基础上的安全和相互依存，但却没能进一步密切中国与地区错综复杂的利益相关方之间的联系。关键利益相关方被排除在政策探讨之外，产生了不公平竞争，不仅带来资源配置上的失误，还剥夺了那些能为地区挑战提供可持续解决方式的个人和机构的公民权利。

于晓刚博士是颇有影响力的中国NGO“云南省大众流域管理研究及推广中心”（“绿色流域”）主任，他说：“NGO的一个核心使命就是确保工程开发商用心对其社会和环境影响进行评估，并在建设开始前进行赔偿。NGO应该进行可靠准确的调查，发现政策落实中的不到位。我们应该把政府看作一个合作伙伴，认识到只有事实证据才能说服决策者。”

中国是可以做到这一点的，办法就是促进更广泛利益相关方的行动，向湄公河邻国展示其在法治上的最佳实践，尤其是在基础设施发展项目的环境和社会影响评估方面。如果无法实现这些改变，中国的地区战略和湄公河地区的可持续性就会面临挑战。

布莱恩·艾勒，美国国际教育研究所昆明中心地区发展项目主任，他是中国与东南亚经济关系的专家，他的博文发布在www.eastbysoutheast.com网站

China needs to change its energy strategy in the Mekong region

China needs to promote sustainable practices in the Mekong region, rather than simply shifting its carbon footprint downstream

Brian Eyler

At the end of 2013 cars and container trucks loaded with goods from China and Thailand were finally able to drive across a multi-lane bridge spanning the Mekong River (known as the Lancang in China). The bridge will connect Chiang Rai province in Thailand to Bokeo province in Laos, effectively linking China's highways stretching south from Beijing and Shanghai to those coming north from Singapore, Kuala Lumpur and Bangkok.

Funded by equal investment from the Chinese and Thai government, the completion of the bridge, which took ten years of planning and two years to build, is not without controversy. For many years Thailand held back investment due to an uneven distribution of benefits between China, Laos and Thailand. Also on the Thai side, the NGO Rak Chiang Khong claim the bridge negatively impacts the local Golden Triangle economy and will ruin Mekong fisheries.

The Golden Triangle Bridge serves to highlight the challenges facing China, as the country's new leadership attempts to balance its slowing and volatile economy and deliver domestic stability by maintaining peaceful economic relations with its neighbours.

China's regional strategy

"In 2012 China's growth in trade and outward investment with the four other Mekong countries of Myanmar, Laos, Thailand, and Cambodia surpassed its trade and investment growth in ASEAN countries," says Xu Ningning, chairman of the Greater Mekong Subregion (GMS) Business Council. "Greater growth rates will continue with increases in regional cooperation and win-win investment opportunities."

For the past three years China's GMS provinces of Yunnan and Guangxi have posted growth rates of 12-15%, the highest of China's localities, and arguably China's economic rise has also helped deliver high growth rates among Mekong countries.

The end of the Cold War in the 1990s created a favourable environment for China to develop its economic cooperation strategies toward the Mekong region. The blurring and opening of once inviolable borders encouraged traders on both sides of the China-Southeast Asia frontier to appeal to local and national governments for better conditions for trade and migration. The Chinese government responded with twenty years of state-led trade liberalisation and investment policies to promote regional cooperation in state and private sectors.

China's economic cooperation strategies towards its four Mekong neighbours has dovetailed nicely into a strategy that fits China's current development needs. Liu Jinxin, a policy analyst and logistics expert says, "Unlike the US which leads the world in finance and IT, both high-value service-oriented industries, China is the world's factory, producing goods to drive the growth of its growing middle class and serving export markets around the world. To

survive, the Chinese 'factory' needs inputs like energy and raw materials."

Liu Jinxin highlights the Chinese built strategic oil and natural gas pipelines cutting through Asia, particularly the PetroChina pipeline project from Myanmar's Indian Ocean coastline to Kunming in China's Yunnan province, as well as a hydropower energy grid extending into Laos and Myanmar.

"We've created this network because it's our only guarantee for stability. The robust flow of these inputs can only be guaranteed by maintaining peaceful relations with all of our neighbours."

But is an approach based on geo-economic cooperation a sustainable long term strategy for both China and its Mekong neighbours? The PetroChina pipeline cutting through Burma serves as a test of the region's commitment to China's geo-economic strategies. Not only does the Myanmar government have the power to choke a strategic energy flow to China, but a Japanese firm holds majority ownership of the Burmese port on the Indian Ocean end of the pipeline. Nationalist sentiments inside China could accuse the Chinese government of being held hostage not just by Japan but by Myanmar, thus threatening the stability guaranteed by China's geo-economic approach.

During a conversation last year a colleague who works for a Chinese government institution promoting cooperation between China and Mekong countries threw his hands into the air in frustration over the current state of affairs. "We've given these countries so much in terms of infrastructure development and uneven trade promotion, but they continue to want to take advantage of us or threaten to walk away from our agreements."

China has heavily invested in bridges and pipelines throughout the Mekong region.

China-Myanmar relations have cooled in recent years with Myanmar's transition to democracy and the suspension of a Chinese-backed project. Vietnam-China relations have also followed suit with Vietnam slapping trade restrictions on certain Chinese goods. This year Vietnamese ministerial level delegations were conspicuously absent from Kunming's regional trade fairs.

China exports "growth first" model to the Mekong

In many ways China has exported its state-led, growth-at-any-cost development model to the Mekong region. Less developed countries stand to benefit economically from Chinese-backed infrastructure development projects like the US $7.2 billion high-speed railway from northern Laos to Vientiane and hydropower projects on the main stem of the Mekong in Laos and Cambodia.

However an even distribution of those benefits is unlikely and can only be realised once Laos and Cambodia pay off their colossal debts to China. China's construction of eight hydropower projects on the upper Mekong River in Yunnan province has shown Laos that it can ignore protests from downstream countries about the negative effects of its dams.

This isn't the only environmental risk for China's Mekong neighbours. In China hydropower developers can easily skirt environmental laws and produce misleading environmental impact assessments. Dr Zhou Dequn, a conservation biologist at Kunming's University of Science and Technology argues that these kinds of malpractice have also occurred on Chinese-funded hydropower projects in Laos.

"China is exporting its business behaviours and ignorance of rule of law practices to the Mekong region. Our wealthy businessmen abroad do not have the interest or technical capacity to promote sustainable practices, nor do they consider the legal context of their actions,"

Hydropower threatens food security

Laos' plans to develop eleven dams on the mainstream of

the Mekong and more than seventy on its tributaries for energy export to China and Thailand. Whilst this will boost its energy resource portfolio, it risks jeopardising its natural resources, especially fisheries.

Eric Baran from the World Fish Institute claims that the Mekong is the world's largest inland fishery with nearly 10% of the world's entire freshwater fish catch. 60% of the population of Laos and Cambodia relies on caught fish for 100% of their daily protein intake. Mekong dams in Laos could cut off the natural migratory patterns of more than 110 fish species and translate into the loss of up to 800,000 tons of caught fish (42% of the Mekong's fish catch) every year, creating a potential food security dilemma in Laos and Cambodia.

Moreover, China's importing of hydropower from Southeast Asia is part of a push to reduce its carbon footprint by investing in renewable energy. However, to replace the loss of protein from Mekong fisheries, Laos and Cambodia will be forced to invest in industrial, carbon intense livestock raising; thus China's carbon footprint will simply have been sent downstream.

This March at a workshop on food security in the Mekong region in Chiang Rai, former Thai senator Kraisak Choonhavan said, "What we have to do is maintain food security throughout these periods of rapid development and make wise and sustainable decisions about the future of this region."

State-led strategies stifles sustainable solutions

A major criticism of China's state-led geo-economic strategy is that while it advocates security and interdependence between countries based on deepening economic ties, it fails to promote connections among the complex nexus of stakeholders in both China and the region at large. The exclusion of key stakeholders in policy discussions creates an uneven playing field that not only misallocates resources and leads to inefficiency, but also disenfranchises individuals and institutions who can provide sustainable solutions to regional challenges.

"A core mission of NGOs should be to ensure that project developers take care to evaluate social and environmental impacts and award compensation before construction begins," says Dr Yu Xiaogang, director of Green Watershed, an influential Chinese NGO that assesses the impact of hydropower projects on local communities.

"NGOs should conduct solid and accurate investigations and identify gaps in policy implementation. We should regard the government as a partner and realise policy makers are convinced only by factual evidence."

If China wishes to improve its deteriorating reputation in the region it will need to revise its geo-economic strategy. One element of this should be to promote the actions of a wider range of stakeholders. China should also demonstrate rule of law best practices to its Mekong neighbours, particularly when conducting social and environmental impact assessments of infrastructure development projects. Without these changes, China's regional strategies and the sustainability of the Mekong region are at serious risk.

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云南弃水：水电跃进之后的尴尬

中国的水电开发在云南攻城略地，却很快面临新增电力资源带来的利益争夺，陷入弃水的窘境。

胡学萃

业内人士表示，我国一些大型水电站弃水量带来的浪费可谓触目惊心。在云南，利益的缠绕与纠结让240亿度电随水而弃。

装机容量为200万千瓦的阿海水电站，一度曾因送出工程久拖不决，下闸蓄水一年都未能实现投产发电。按照该电站多年平均发电量计算，相当于白白流失了约89亿度的电量。

除了阿海，金沙江中游梨园、龙开口、鲁地拉、观音岩，以及澜沧江苗尾以上水电站都将面临同样的问题。

按照中电联的预测，今年汛期云南弃水装机将达到700万千瓦。按照目前中国国内火电厂平均供电煤耗300克/度的标准计算，相当于燃烧840万吨标准煤，排放二氧化碳220亿吨。

另外根据云南省电力负荷测算，到2015年，云南将有一多半水电装机面临空置发不了电的尴尬局面。

“最近这两三年内的弃水，是现在就可以看得到的，如果现在还不开始建通道，可以想见未来十到二十年会弃水到什么程度。”一位参与输电方案设计的人士对记者说。

云南的不甘

记者从业内人士处获悉，造成弃水的主要原因，是云南在全省电力消纳能力明显不足的情况下，执意将电量留在本省发展工业。换句话说，就是不甘心以较低的价格，让云南水电资源服务于其他地区的电力供应。

一切的根源，是围绕新增电力的利益纠葛。

按照原本的规划，云南水电项目发出的电力，将按照“点对网”方式输送出去，也就是特定电源点发出的电力通过南方电网的特高压直流工程送往特定目标地区，比如：糯扎渡和溪洛渡电站发电送往广东（“两渡直流”）、金沙江中游电站发电送往广西（“金中直流”）、锦屏一级和锦屏二级电站发电送往苏南、向家坝电站发电送往上海等。

这样一来，云南省无法在输电这部分的税收中分得一杯羹，因此更希望以“网对网”的方式，所有电源点都先接入云南电网，再由云南电网与南方电网对接进行电量调配。一位电价研究专家对记者表示：“如果云南电网向电站买电，然后再卖给南方电网，是可以加价的，加价的部分有所得税。”

> 根据云南省电力负荷测算，到2015年，云南将有一多半水电装机面临空置发不了电的尴尬局面。

据计算，上述560亿元的水电项目电费收入中，仅17%的增值税这一项，云南省在这10年中可以到手的税收收入就高达95.2亿元。这还不包括水电站在建设期间征收的建安税、印花税、个人所得税、房屋租赁税、耕地占用税以及在建成后征收的教育和地方附加。

位于云南的小湾电站。

“不顾大局”还是干预市场?

对个中争议的解读，有一种观点认为云南“不顾大局”。

云南希望的“网对网”方式，较之原先规划的“点对网”方式，存在投资增加和重大安全隐患。一位参与输电设计的业内人士对记者说：“（电力）从云南主网穿越，少量还是可以的，大量穿越就要命了。打个喷嚏，就可以把云南电网搞垮。就好比把金沙江、澜沧江、怒江的水送上海，你要求先到滇池里走一圈，不翻江倒海才怪。”

而另一种观点基本肯定云南主张资源利益的合理性。

有业内人士称，在目前的电价形成机制下，云南水电外送广东、广西是由国家发改委价格司专门批复的“西电东送”送出电价，上网电价低得可怜；而上云南省网之后“网对网”送电，对云南省更有利可图。因此，“这就好比农民种茄子，物价部门就规定了你的茄子只能卖5毛钱一斤，而且还必须卖给张三；如果市场行情有变呢？茄子明明可以卖7毛钱一斤，李四、王五都能出这个价，为什么只能卖给张三？”

一位不愿透露姓名的业内人士向记者表示：“博弈的背后，实际上是中央有关部门以行政手段干预地方经济发展，你凭什么要求别人发出来的电一定要卖到广西去？”

为鼓励水电在省内消纳，云南省物价局曾于6月2日下发《通知》说，在2013年6月1日—2013年10月31日，云南电网公司收购水电企业丰水期富余电量的电价，按省物价局核定的丰水期上网电价的80%执行。

记者从另外一些渠道获悉，云南省也正在为消纳的事到处奔走。但前景不明。例如，在丽江投建铝型项目的计划因对环境产生的潜在威胁而在当地掀起了反对声浪。

一位不愿具名的业内人士对记者表示，未来十到二十年内，中国水电的重头戏就在云南和四川，仅云南省就有近1亿千瓦。“不往外送，自己又消纳不了，那就等着弃水吧，这可是严重的国有资产流失。贪污和浪费都是极大的犯罪，谁来追究这个责任?改革势在必行。”

本文刊载于 《中国能源报》的报道《“云电外送”博弈真相》和《云南弃水触目惊心，地方利益作怪须改革》

胡学萃，《中国能源报》记者

The battle over Yunnan's hydropower

Hydropower has run rampant in Yunnan province south-west China, but up to half its capacity could be idle by 2015 in a dispute over who gets the surplus power

Hu Xuecui

Some of China's biggest hydropower dams are left idle, according to an industry insider. In Yunnan province, south-west China, a huge amount of potential energy is being wasted due to a dispute over electricity prices.

The 2 gigawatt (GW) Ahai dam, in Yulong county, Yunnan, was idle for a year due to delays in hooking it up to the electricity grid. Given the average annual production of the dam, this is equivalent to the loss of 8.9 billion kilowatt hours (kWh).

Many more are facing similar problems; the Liyuan, Longkaikou, Ludila and Guanyinyan dams on the Jinsha, as well as the dams upstream of Miaowei on the Lancang. According to the China Electricity Council, 7GW of hydropower capacity will be idle during the high-water season this year. Replacing that loss would require burning 8.4 million tonnes of coal.

The result of this is that Yunnan is predicted to be in the embarrassing situation of having half of its hydropower capacity idle by 2015.

Yunnan is predicted to be in the embarrassing situation of having half of its hydropower capacity idle by 2015

"You can already see what things have been like these last two or three years," said one participant in the designing of proposals for electricity transmission. "If you don't open up routes now, you can imagine how much will be wasted in the next decade or two."

Yunnan holds on to its power

At the root of the problem is a dispute over how to use the new electricity.

The original plans would have seen Yunnan's hydroelectricity exported on a "point-to-grid" basis – the power from a particular facility would be transported via the China Southern Power Grid to a particular area. Power from Nuozhadu and Xiluodu was set to be delivered to Guangdong province from the middle reaches of the Jinsha province to Guangxi province, from Jinping 1 and 2 to southern Jiangsu province and from Xiangjiaba to Shanghai, etc.

But that would cut out the provincial grid and, by doing so, remove a layer of taxation payable to the Yunnan government. It would therefore prefer a "grid-to-grid" basis, where power is first fed into the provincial grid before being sold to the regional grid. As one electricity pricing expert explained: "the provincial grid can bump up the price when buying the power from the generators and selling it on to the regional grid, and that profit is taxable."

The 56 billion yuan [US$9 billion] in spending on the hydropower projects mentioned will provide 9.52 billion yuan [US$1.5 billion] of value-added tax income for Yunnan over ten years. And that does not include the construction taxes, stamp duties, income tax, rental taxes and farmland use taxes during construction, or levies paid for educational and local use after construction.

Who's to blame?

It could be argued that Yunnan is putting its own interests first. Yunnan's preferred "grid-to-grid" method would mean more investment and more risk.

"A small amount of power could pass through the Yunnan grid," explained one insider involved in electricity transmission design, "but large quantities could be a disaster. A single hiccup could bring the whole provincial grid down. It's like you're trying to send all the water from the rivers to Shanghai, but first insisting it passes through Dianchi Lake (one of China's largest freshwater lakes). It'd be a surprise if something didn't go wrong."

But others believe Yunnan is right to look after its own interests.

According to an industry insider, the prices for electricity exported from Yunnan were fixed by the National Reform and Development Commission's pricing department – and are derisory. It would be more profitable to sell the electricity on a grid-to-grid basis.

"It's like a farmer plants aubergines and the pricing authorities tell him he has to sell them to Zhang San, at 0.5 yuan a jin. But then the market changes and he could sell his aubergines to Li Si or Wang Wu for 0.7 yuan a jin. How come he can only sell them to Zhang San?" One anonymous insider said that the problem was down to "central government authorities interfering in local economic development – what right do they have to tell people they have to sell their electricity to Guangxi?"

Industry-drive in Yunnan

This excess energy has led Yunnan to look for ways to use it themselves. The provincial pricing authorities announced that between June and October this year the provincial grid would buy surplus hydropower at 80% of the usual price for the high-water season.

According to other sources, the provincial government is also trying to encourage the development of new industry, but the prospects are dim. For example, recent plans to develop the power-hungry smelting industry in Yunnan have come up against opposition on environmental grounds.

One anonymous insider said that in the next ten to twenty years the bulk of hydropower development will take place in Yunnan and Sichuan – 100GW in Yunnan alone. "You won't export it, you can't use it – waste it then, but it's a state asset you're wasting. Corruption and waste are major crimes. Something will have to change."

This is an edited version of The truth about Yunnan's power exports and Shocking waste of hydropower in Yunnan – local interests need to change, both published in China Energy News.

Hu Xuecui is a China Energy News reporter.

湄公河岸的生活

Part 2:Living along the river

澜沧江移民的命运

澜沧江上为水电站让路的移民们需要的不仅是补偿，还有他们本就该享有的权益。

孟斯

十多年来水电迁移所引发的争议不断，然而这并没有阻碍水电建设的扩张，据中国水利水电建设有限公司网站，澜沧江流域（云南省境内）共规划建设15座电站，总装机容量2560.5万千瓦。

28岁的康良红和他21岁的媳妇，在自家的玉米地里施肥。远远看见他们，只不过是山坡上两个小白点，在缓缓的按“之”字形的路径从上向下移动。走近才看出，两个年轻人各自提着一个肥料袋子，空出的一只手一把一把抓了肥料往地里撒。在这片地里的任意一项工作，在外人看来都像是惊险的杂技——这片地的坡度超过45度。

13年前从平整的河谷地搬来时，康良红也不擅长这种杂技。2000年冬，康良红一家和来自8个村委会的近四千名村民一道，因大朝山水电站建设而被外迁至爱华镇。大朝山水电站建于澜沧江中下游，是澜沧江上最早建成的漫湾水电站的下游梯级电站。

爱华村目前严重缺乏可供饮用及灌溉的水源，而爱华村所在的云南省，当前正经历着百年一遇的旱灾。让移民们费解的是，移民局前后花了两千多万建的引水工程却没一个能用。

无用的引水工程

在一处玉米地里，自然村橄榄箐的组长李仕龙指着并排的一条水沟和一条水管说“水沟是移民搬来前就建成的，移民局告诉我们花了647万，从凤庆镇角安水库引水用于灌溉，为此每年给凤庆10万元。”但用了两年移民局就不再买水，水沟从此被弃置。

“十多年来水电迁移所引发的争议不断，然而这并没有阻碍水电建设的扩张。澜沧江流域（云南省境内）共规划建设15座电站，总装机容量2560.5万千瓦。”

云县移民局一位不愿透露姓名的工作人员解释说，现在计划通过调整产业结构来减少用水量，如种水稻改为种玉米和经济林果。但李仕龙等村民表示，现在全种了玉米，水还是不够。

橄榄箐、瓦瑶坝、红豆箐、回营坝这四个移民点都有相似的问题。这里原本多山地陡坡，森林被砍后，原本的沙质土地暴露出脆弱的生态环境。土地贫而干，种地产量成了大问题。水田几年前都变成了干地。李仕龙家的地新开出来时亩产还有800斤，现在平均仅300-400斤。他说，现在每年都得增加大约800元的肥料花费，才能保证产量跟上年持平。“估计再过十年连玉米也种不下了。”李仕龙说，“而在原来的河谷地上，家家种水稻种一年能吃两年。”

1949年新中国成立至今，中国水利水电移民已达2000万。

此外，移民不仅饮水紧张，饮用水水质也有问题。移民杨文卫说，现在90%的人有患有肾结石，这在老家从未有过。3年前，杨文卫肾结石疼痛被救护车拉走急救。而康良红说，肾结石疼得他踢烂了床板。

只能“闹事”？

除了一年中合计1个月的农忙，剩下的时间，李仕龙是“专业上访户”。从搬到橄榄箐的当年，每年去县城上访十几次，要兑现承诺的土地和实物，要水，要路，催长效补偿费发放……

同行者少则十几人，多则百人、千人。此间，移民局长换了8任，专管移民的副县长换了4任。

当上访已成为习惯，也能有实际效果。有一次在移民局，李仕龙进门时瞥见工作人员往抽屉里塞一个单据，他揪着要看，发现上面写的给移民的开垦费是435元，但移民实际收到是235元。工作人员解释说是工作失误，随后补发了每亩少算的200元。

李仕龙回忆最大规模的一次上访是2003年1月16日，近1000人的移民到云县政府大院反映问题，吃住三天，发生了过激行为，堵了国道，被抓了23人。

据中国水利水电建设有限公司网站，澜沧江流域（云南省境内）共规划建设15座电站，总装机容量2560.5万千瓦。目前，澜沧江中下游的漫湾、大朝山、景洪、小湾电站已建成运行；糯扎渡、功果桥电站已核准建设。

传知行社会经济研究所研究员刘志说：“目前在水电移民方面的规定，常常逼移民只能通过‘闹事’要求解决问题。”如规定“编制移民安置规划大纲应广泛听取移民和移民安置区居民的意见；必要时，应当采取听证的方式。”刘志说：“‘应当’、‘必要时’这种模糊字眼，使项目方和地方政府有很大的机会可以忽略移民在补偿方面的正当要求和权益。最后只有用激烈的方式，才能成为‘必要时’。”

需要补偿，更需要权利

刘志也看到了政府进步。 中国在2006年修订了《大中型水利水电工程建设征地补偿和移民安置条例》，新条例的强制色彩减淡。此外，2012年，国家发改委还发出“先移民后建设”的通知，以“完善移民工作机制，维护移民合法权益，保障工程顺利建设，促进水电持续健康发展”。

补偿标准也在提高。“现在用在移民身上的安置费是过去的10倍。”云南省大众流域管理研究及推广中心的主任于晓刚说。这是云南省政府给出的数字。上世纪80年代漫湾电站最早的移民人均补偿是8千元，而现在是8万元。

但于晓刚认为利益不等于权利。他说：“虽然政策有进步，补偿也有所提高，但在维护移民的权利方面，却没有进步，在有些地方侵权现象更严重。”他从雅砻江考察回来，看到工地上的标语写道：“严厉打击阻工、扰工行为”。他过去从未见过这种强硬的口号明确的贴出来。

于晓刚去看过大朝山移民四五次。李仕龙的那些跟维权有关的书，就是于晓刚给的。中国水电移民90%在农村。农村人相对来说维权意识较弱。

于晓刚说：“老百姓很多不知道

自己有什么权利。中国2007年签署了《联合国原住民权利宣言》，是对国际社会的承诺。云南少数民族地区水电开发尤其应该考虑到原住民权利。水电工程有移民的需要，对村民应该是征询、协商的语气，而不是通知的语气。原住民有知情权和参与权，有权得到完整、准确的信息。也有同意或不同意开发的权利。”他觉得随着水电工程向藏区开展，这个问题将更加突出。

据华能集团官网的消息，澜沧江西藏段目前尚未开发，初步规划按六个梯级开发，从上游到下游分别是侧格、约龙、卡贡、班达、如美、古学，合计约588万千瓦，年发电量约288亿度。预计2015年左右动工兴建，2030年左右可开发完毕。

施国庆在《水利水电移民挑战与应对策略-兼论移民专业建设》中写道：“随着土地管理法、土地承包法、物权法的出台和党中央、国务院惠农政策的出台后，通过新时期广播、电视、报纸、网络等多种媒体的宣传，农民维护自己权益的意识大幅度增强。”

在乌弄龙水电站淹没区的结义村，村民李文忠接到政府通知要求他在6月30日前搬走，但他因为不满意补偿而没有签协议，一直未搬。不到30号的某一天，政府派了四五十人强行让他搬走，接着拆了他的房子。他只好住在在路边搭建的临时板房。

在托巴水电站的淹没区，白济汛村的李玉荣，因为不知道补偿标准而拒绝工作人员到家里进行实物调查。

这些抗争是否能得到法律支持？主要代理拆迁维权案件的秦兵律师团律师徐斌说，只有向政府申请信息公开，得知内部的文件程序，才能说的清楚。然而申请政府信息公开对农民而言非常困难。

政府包干

大朝山水电移民是由政府“包干”的方式承接，即地方政府跟水电公司签协议，公司给出的安置资金是一定的，政府在这个预算里要完成全部移民工作，不能超出。

云南省移民办在1997年《水力发电》杂志上发文，这样总结了大朝山水电站包干移民安置的体会：有限的资金都能用在刀刃上，杜绝了浪费，调动了乡村的积极性，充分发挥了移民资金的效益。但刘志在一篇名为《水库移民的法律困局》的文章中写道：钱在政府手上，地方政府就有很大的支配权。而面对数量庞大的移民，其经费的监督是十分困难的，何况在信息公开等制度很不健全的当代中国，怎么保证移民经费不是腐败的温床?

于晓刚说：“政府也会有自己的利益考量，而且在执行上，政府有公安、武警队伍，往往比企业更强势。”于晓刚以老挝一个水电站为例，电站建在澜沧江出境后的湄公河上，对移民的补偿机制是，水电公司先和当地民众对补偿谈判，达到共识后报给政府批准。

但施国庆认为，政府应该充当谈判的主力。他说，1949年新中国成立至今，中国水利水电移民已达2000万，这一规模在世界上绝无仅有。他认为，这么大规模的人口迁移，不可能一家一户分别谈判补偿和安置方案。

离开橄榄箐的那天，李仕龙带记者去看蓄水池。在一处沙地上，他试图把沙子里露出的一段树枝揪出来此处的8个水池，进出蓄水池的水管不到手腕粗，但却是1300多人搬来时生活用水的唯一来源。因为严重的水土流失，蓄水池常常被上游和两边耕地里冲下来泥沙填满，有时一夜的暴雨就能把头天清空的蓄水池填满泥沙。这时，它们就集体丧失了蓄水的功能，使用水就更加吃紧。虽然移民局给添了一台抽水机，但蓄水池不能用，抽上来的水也没处存。

在一处蓄水池的出水处，李仕龙捡起一个空的农药瓶——水沟两侧的农田里撒了农药，会顺水流入下面敞开的水沟。

李仕龙说，解决大朝山移民的问题，至少要一代人。

孟斯，中外对话特约记者

The fate of people displaced by the Mekong dams

Farmers resettled to make way for dams along the upper Mekong, in Yunnan province, are demanding higher compensation and protection of their rights

Meng Si

From far away Kang Lianghong and his wife look like little white dots, zig-zagging their way down the steep hillside. Move closer and you can see they are carrying bags of fertiliser under one arm, using their other hand to throw handful after handful onto the earth.

Kang wasn't very good at doing this when they were moved here 13 years ago, from the flat of a river valley. In the winter of 2000 he and his wife, along with almost 4,000 people from eight villages, were resettled to the town of Aihua to make way for the Dachaoshan dam. The dam was built on the Lancang river (known as the Mekong outside China), downstream from Manwan, the first dam to be built on the river.

But there are now shortages of water for irrigation and drinking in Aihua. Yunnan province is in the middle of the worst drought for a century. The resettled people are wondering why over 20 million yuan (US$3.3 million) was spent on irrigation schemes that are now useless.

Dried-up irrigation

In one corn field production team head Li Shilong points out a pipe and channel: "They dug that before we moved here, the resettlement bureau said it cost 6.47 million yuan (US$1 million). The water for irrigation was piped in from Fengqing, at a cost of 100,000 yuan (US$16,400) a year." But two years later the bureau stopped paying for the water.

When questioned, a bureau official who was unwilling to give his name explained the plan was to reduce water use by planting corn or commercial forests rather than rice. But as Li and the other villages point out, they're already planting corn, and there still isn't enough water.

Four resettlement areas – Ganlangqing, Wayaoba, Hongdouqing and Huiyingba – suffer similar problems. These are steep hillsides, and once the forests are felled nothing protects the sandy soil from erosion. And the soil is poor and dry, meaning harvests are small. Paddy fields were all drained some years ago. Yields on Li's land have fallen by half and he is spending an extra 800 yuan (US$130) a year on fertiliser. "In another ten years I won't even be able to plant corn, but in the valley we used to live in you could eat for two years off one harvest."

There is also a shortage of drinking water. Yang Wenwei says that 90% of the villagers are suffering from kidney stones. Three years ago he had to be rushed to hospital by ambulance due to the pain. Kang Lianghong says the pain from his kidney stones was so bad he kicked the bed to pieces.

> "China has moved 20 million people to make way for dams and reservoirs since 1949"

No option but protest?

Apart from the one month a year he is busy farming, Li is a "professional petitioner". Since moving to Ganlanqing he has made several trips a year to the county seat to try and get the land, water, roads and compensation which he was promised. He is accompanied by anywhere between a dozen and a thousand people each time. Over this period the resettlement bureau has had eight different heads, while there have been four different deputy county heads in charge of resettlement issues.

If you become a habitual petitioner, you can get results. Once when walking into the resettlement bureau Li saw a member of staff hiding a document in a drawer. Grabbing it, he saw that the resettled villagers should have got 435 yuan (US$70) for new farmland, not the 235 yuan (US$38) they were actually given. The official claimed this was a mistake and handed out the extra money.

Li recalls one time in 2003, when almost one thousand villagers spent three days protesting outside the bureau. Thirty-three people were arrested after things got out of hand and roads were blocked.

Dachaoshan is one of fifteen dams planned on the Lancang river in Yunnan, which in total will generate 25.605 gigawatts(GW) of electricity, according to the Sinohydro website. So far four dams have been built and are in operation, while dams at Nuozhadu and Gongguoqiao are under construction.

According to Liu Zhi, a researcher at the Transition Institute in Beijing, "the current regulations on resettlement mean that people relocated by dams are often only able to resolve issues via protests." The current regulations say the opinions of those already living in the areas they are being moved to "should" be listened to, and "when necessary" hearings should be held. That type of language allows project operators and local governments to ignore legitimate requests for compensation.

Rights are more important than compensation

But Liu has seen some progress from the government. In 2006 China introduced less coercive regulations on resettlement and land requisition for dam projects. In 2012, the National Development and Reform Commission ordered that resettlement should take place before construction starts, to improve the resettlement process and protect their rights and to ensure the projects go ahead smoothly.

Standards for compensation are also improving. "Compensation for resettlement is ten times what it used to be," says Yu Xiaogang, head of Yunnan-based NGO Green Watershed, quoting provincial government figures. When the Manwan dam was built in the 1980s, the average compensation was 8,000 yuan (US$1,313). Today it is 80,000 yuan (US$13,130).

But there is a difference between compensation and rights, argues Yu Xiaogang. "Although policy has progressed and compensation is higher, there's been no improvement on ensuring the rights of relocatees, and in some locations infringement of rights is grave."

Yu has visited people displaced by the Dachaoshan dam four or five times. 90% of people resettled by dams are rural residents who tend to have less awareness of their rights.

Yu says that "the people often don't know what rights they have. In 2007 China signed the UN Declaration on the Rights of Indigenous Peoples, a commitment to international society. Dam projects in ethnic minority areas in Yunnan should pay particular attention to indigenous rights. He thinks this issue will become more prominent as dam building moves into Tibetan areas.

According to Huaneng Power's website, there are plans for a cascade of six dams on the Tibetan stretch of the Lancang: at Cege, Yuelong, Kagong, Banda, Rumei and Guxue, with total capacity of 5.88GW, producing 28.8 billion kWh a year. Construction is expected to start in 2015 and finish in 2030.

Rural resistance

Shi Guoqing, an academic at Hehai University argues in a recent paper that "rural residents are becoming" increasingly well aware of their rights, thanks to new land management, land contracting and property rights laws, policies favourable to rural residents and increased media coverage."

Li Wenzhong received notice to quit his home in the village of Jieyi by this . It will be inundated by the construction

of the Wunonglong dam. But he refused to sign the government's agreement, because he wasn't happy with the compensation offered. The government sent four or five people to remove him by force and demolish his home, leaving him no option but to put up a temporary shack by the roadside.

In the area to be flooded by the Tuoba dam Li Yurong from the village of Baijixun refused to allow assessors into his home, as he did not know what the compensation standards would be.

Could such opposition be given legal support? Xu Bin, a lawyer who represents people who've been resettled, says that access to government documents via freedom of information requests would be needed to answer this. But for these farmers, that's no easy task.

Government resettlement

Resettlement for the Dachaoshan dam was handled by the government – the local government signed a deal with the dam company, which provided a certain level of funds. The government then undertook to resettle the locals within that budget.

Provincial authorities say this method avoids waste and increases efficiency. However academic Liu Zhi argues in a recent article that given the huge size of the task and the lack of transparency, resettlement funds may well be misused.

Yu Xiaogang says that "the government has its own interests to consider, and can rely on the public security and armed police forces – it's much stronger than a company." He pointed to one case in Laos on the Mekong. First the dam company had to agree on compensation with the locals, and then the agreement was submitted to the government for approval.

But Shi Guoqing believes the government needs to take the lead. Shi says that since 1949 China has resettled 20 million people to make way for reservoirs and hydropower projects – more than in any other country. Resettlement on this scale cannot be negotiated household by household.

China has moved 20 million people to make way for dams and reservoirs since 1949 .

Problems linger for displaced in Ganlanqing

The day I left Ganlanqing, Li Shilong took me to see a pond that had been filled up with sand washed down from the fields. Eight similar ponds, fed by pipes less than the width of a man's wrist, were the only source of drinking water for 1,300 people. But soil erosion had led to the ponds silting up – a pond cleared one day might be filled in by an overnight downpour. This meant worsening water shortages.

Li picked up a pesticide bottle from the outlet of one pond – the pesticide spread on the neighbouring fields will be washed into the channel.

Solving the problems of people displaced by the Dachaoshan dam will take at least a generation, he says.

Meng Si is a special correspondent for chinadialogue.

水电站边的“非移民”

云南小河村的“非移民”们十多年前因为水电站建设而被占用了土地，至今仍在等待赔偿。

孟斯

谈起水电站建设对当地人有何影响，人们常常关注土地和房屋被水淹没的移民，尤其关注他们是否得到合适的经济补偿。但有一类人群，他们其实并不在被淹没的区域，但却仍被占用土地，他们因没有移民的身份而少被关注，但水电建设仍对他们的生活产生了深刻的影响。在去漫湾水电站的路上，我无意中停留的小河村，就有这样一个群体。

漫湾水电站位于中国云南省澜沧江中游的漫湾镇，是澜沧江干流水电开发的第一座百万千瓦级的水电站。它是中国最早建设的水电站，始建于1986年，1995年建成。小河自然村位于云南景东彝族自治县漫湾镇安乐村委会，本身并不处于水库的淹没区，但是电站建设占用了小河村的土地。

小河村民因没有移民的身份而少被关注，但水电建设仍对他们的生活产生了深刻的影响。

村民何志春家的耕地，被占用做炸药库。宋庆云家的耕地上，被电站用来拌水泥。宋仕荣家的地先是被电厂占用，后来又被安置给移民。据村民估计，整个小河村60多户人家，被占用的土地有上百亩。

何志春说，最初政府征地时跟村民说的是电厂占地只要7年，从84年到91年。这7年中每年都根据土地年产值给村民补偿。7年后把地还给农民。但是现在只还了大约50亩。其他都没还。对于未归还的土地，何志春说电厂的解释是，电厂和政府的协议是永久占用。但笔者问电厂，电厂表示自己无权给出正式的说法，要问目前电厂所属的华能澜沧江有限公司。

为什么村民要不回土地？因为三十年前政府对村民的征地只有口头协议。“当时觉得应该相信政府嘛。”当时参加征地的集体大会的村民说。这些村民现在大多已六七十岁，没上过学。关于占地的糊涂账，已经成为村民们生活中无奈的一部分。

政府不管

从小河村往山下走不远，在河对面的一片地上，有几座房子。其中唯一一座有人家的，住着何志春的父亲。剩下的是闲置的库房。

何志春把70多岁的父亲安置在电厂拒绝归还给他的土地上。老人已经独自住了两年多，房前屋后种上菜和庄稼。何志春说：“如果电厂的人来要地，我就叫他们去跟政府谈。”这是他的策略，他希望政府出面解决纠纷，但电厂的人来过几次，政府却从未来过。

何志春家被占的地有4-5亩。被电厂占用的7年里，是存放炸药的仓库。7年后电厂没有如期归还，而是被电厂建了猪圈养猪。后来猪也不养了，电厂却依旧雇了村民看守。何志春却趁看守的村民生病回家的空档，把父亲接了进去，住在了看守人原来住着的房子。

何志春说，如果问题一直不解决，以后父亲不能自理生活的话，自己就来接着住。

“何志春说：政府给每家修了沼气，修了一条灌溉沟渠，建了桥，算是补偿，但大家觉得不够。政府不管返还土地的事。”村民盼望政府出面，但是当时跟村民、企业签下协议的区长等一干领导已经离任，现任官员对过去的事不负责。

几年前附近4个县的上千移民去位于漫湾镇的电厂门口闹事，还堵了路。自那以后，小河村的村民没有再去找过政府。

期望政府给解决问题的路子，至今未通。

接受现实

宋庆云没有打官司，也放弃了对政府的期待。也许是因为毕竟电厂已经在7年后如约还了土地，他要不来政府承诺过的复垦费，干脆就不要了，最后还是自己花钱复垦。

宋庆云和几户村民的地在电站建设期间，是搅拌水泥的场地。7年后电站还了地给村民，但是却无法再耕种。宋庆云说：“当初政府承诺给村民复垦，但是现在不管了。”在任的政府官员对过去的口头承诺不负责，村民因此无法讨到复垦费。

从父辈到自己当上小河村副组长，等了二十多年，宋庆云觉得时间太久等不下去了，自费花了2万元复垦土地，这是他在外面打工一年攒下的钱。现在宋庆云不想出去打工，他想在家陪孩子。而因为土地少，家里土地上的活一周只需2-3天就干完了，他觉得复垦荒置的土地，再搞点别的。“外面打工虽然比在家挣的多，但花销也大，还是想回来。”宋庆云说。

但是作为副组长，宋庆云依然希望政府给村里解决问题。“如果不能归还土地，我们希望政府给我们建一个老年人活动室。给每人每个月60元的补偿。不过我们还是更希望归还土地。”

35岁的玉学菊13年前嫁到小河村，电厂占地后，只有守着家里剩下1亩3分地耕种。她的丈夫2005年在水电站打工时在回家的路上遇上车祸，落下残疾。一家三口的重活都落在玉学菊身上。修房子欠下的债、孩子的学费都让着一家三口生活艰难。“现在村里人口越来越多，山上的树越来越少，水也变少，用水一个月都要花费十多块钱。”今年前所未见的干旱，更让玉学菊担心收成。电厂占地时玉学菊的丈夫只有5岁，不知事。因为公婆死得早，即使当年跟政府的口头协议也已不得而知。

笔者打电话到华能澜沧江公司，被告知“没有可以给的电话，有些有的也是对外保密的。”笔者致电景东县移民办主任，主任说：“合适时会告诉你的。”随即挂断了电话。

何志春曾经通过熟识的政府官员得知，漫湾区跟水电站签订的协议是永久征用，而跟村民的承诺是7年。这个明显的矛盾使村民们感到受了骗。但当记者去跟这位官员核实，他说他并不清楚。

村民的诉求不是没有解法。北京律师夏军告诉笔者，根据1986年通过的《中国人民共和国土地管理法》，临时使用土地期限一般不超过2年。因此7年的期限可能是电厂和政府私下签的合同。这种情况下，村民可以向政府申请确权，如果电厂没有法律认可的证明，就能要回村民的地。

随着时间流逝，关于7年协议的事，在老一代村民的记忆里越来越模糊。这个糊涂帐可能要一直糊涂下去。而年轻一代的村民虽然对这个纠纷并无亲历，却难忘父辈留给他们的、伴随他们长大的这个不平的记忆。

非移民受水电建设的影响来自工程本身，也来自移民的迁入。多年前小河村村民曾跟水坝周围的移民一起去电厂门口“闹事”，后来平息了争执，移民得到了一些补偿，但小河村因为不是移民，没有争取到什么利益。目前还没有足够的法律和舆论关注这一类人的处境。

孟斯，中外对话特约记者

Life in the shadow of the Mekong dams

Meng Si spoke to the villagers of Xiaohe on the upper Mekong in Yunnan province who lost their land to a hydropower company decades ago and are still waiting for compensation

Meng Si

On my way to the Manwan dam, I happened to stop at the village of Xiaohe in Yunnan. The Manwan dam was the first major dam built on the Lancang river (known as the Mekong outside China), with work starting in 1986 and completed in 1995. Xiaohe village was not flooded by the reservoir, but its land was used for the construction of a power station.

He Zhichun's field was used to build an explosives store. Song Qingyun's field was used to mix concrete. The 60 households in Xiaohe village lost about 100 *mu* of land (about 7 hectares) in total.

He Zichun said the government told the villagers the power plant company would only need to use the land temporarily, from 1984 to 1991. During those seven years they would be compensated for lost harvests, and then the land would be returned. But in the end only about half the land was returned.

The power company claims the government has given it the land in perpetuity, said He. But when asked the power plant refused to comment, referring the question to its owner, Huaneng Lancang River Company.

The locals can't get their land back because 30 years ago their agreement with the government was never put in writing. "At the time we thought we could trust the government," recalled one villager. Those villagers are now in their sixties and seventies, and are largely uneducated. The confusion over the land just seems like something they can't do anything about.

Not the government's problem

Not far downhill and over the river from Xiaohe lie several buildings. The only one occupied is home to He Zhichun's father – the others are empty storehouses.

He Zhichun has put his father, who is in his seventies, on the land that the power company refuses to return. His father has lived alone there for two years, planting crops around his home. He Zhichun says, "If they come to demand the land back I send them to speak to the government." The company people have come several times, but the government has never sent anyone.

His family lost four or five *mu* (about 0.3 hectares), which the power company used to build stores for explosives. After seven years the company kept the land to farm pigs, and even when they stopped raising pigs they employed a local to keep watch. When the watchman went home sick He Zhichun took his chance and moved his father into the watchman's house.

And if the problem isn't solved, he says he'll move in himself once his father can no longer live alone.

"The government installed methane gas pipes, dug irrigation channels and built a bridge, and called that

compensation," He said. "But we all think that isn't enough. The government doesn't care about us getting our land back." The villagers want the government to get involved, but the officials who signed deals with the company and the villagers have left, and the current officials won't take responsibility.

A friend in government told He Zhichun that the land had been signed over to the company in perpetuity, rather than the seven years the villagers were told. The villagers feel cheated. However when I questioned He Zhichun's friend he said he was unaware of the situation.

Accepting reality

The power company used Song Qingyun's land for mixing concrete and returned it after seven years, but it couldn't be used as farmland. "The government promised money to restore the land, but now they're not interested." The current officials aren't interested in oral agreements made in the past, so the locals haven't been able to get their money.

Song Qingyun gave up waiting and spent 20,000 yuan(US$3283) on restoring the farmland himself – money he had saved while working away for a year. Now he wants to stay at home with his child. But his small piece of land only provides two or three days of work a week, so he decided to restore the land the power company had used. "You earn more money working elsewhere, but you spend more too, so I opted to come back."

But as deputy village head he still hopes the government will help out. "If we can't have the land back, we'd like them to build an activity centre for the old folk, and monthly compensation of 60 yuan(US$10) a month. But we'd rather have the land."

Yu Xueju married into the village 13 years ago. After the power station took over the land she was left with just 1.3 *mu* (0.8 hectares) to farm. Her husband was left disabled after a traffic accident on his way home from work at the dam, leaving her to do all the heavy work. The family is in debt after building a house, and even paying school fees is a problem. "There are more people in the village, fewer trees on the hills, less water. You spend over 10 yuan (US$1.6) a month on water alone," Yu said.

This year an unprecedented drought left her worried about the harvest. Her husband was only five when the land was taken over and his parents have passed away, so nobody knows what agreements were made.

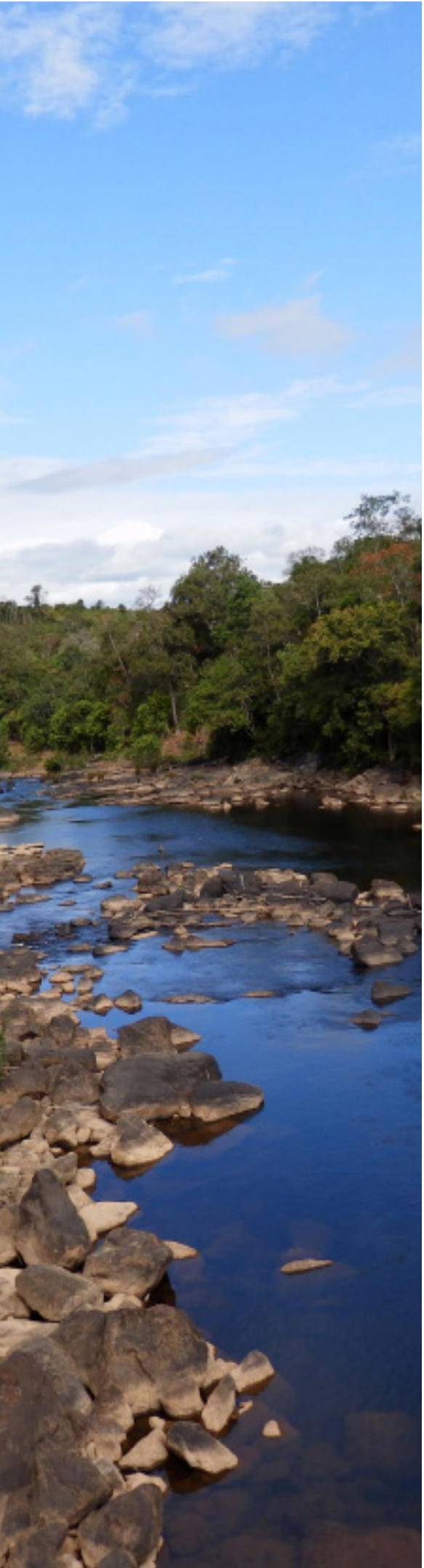
When telephoned, the power company switchboard refused to give out any specific phone numbers. The head of the local government office dealing with dam relocations hung up after saying information would be given "at the right time."

According to Beijing lawyer Xia Jun, there is one possible solution – according to a land management law passed in 1986, temporary assignments of land should not normally last more than two years. Therefore the agreement between the company and the local government may not be official. If the power company does not have legally-recognised proof, it may have to return the land.

But older villagers' recollections of the deal are getting hazier as time goes on, and things may never be cleared up. Younger villagers don't remember the actual events, but have grown up with their parents' stories of injustice.

Years ago the locals of Xiaohe joined with those who had lost their homes to protest outside the power station. But although compensation was paid to people who were relocated, nothing was done for the residents of Xiaohe.

Meng Si is a special correspondent for chinadialogue.



湄公河下游 南亚的发展

Part 3:Downstream development in Southeast Asia

湄公河建坝再惹争议

老挝一意修建栋沙宏坝，标志着湄公河沿岸国家开始降低保护标准，竞相开发湄公河。

菲利普·赫希

在老挝、柬埔寨交界地带，湄公河分支众多，并因断层形成20多米的落差。纵横交错的河流孕育了广阔的西潘顿湿地，意即有“四千座小岛”的湿地。一些支流落差大、水量充沛，形成壮观的瀑布，其中最著名的是孔恩瀑布。一些峡谷中的支流虽水量略小，但落差同样很大。

但胡沙宏河却是个例外。河床地势变化较为和缓，水流过断层带时形成的是急流而非瀑布。因此胡沙宏适宜鱼群通行，成为旱季大量鱼群洄游的唯一通道。甚至在一年中的其他时间，上千上万的鱼也要取道胡沙宏完成季节性洄游。

2013年9月30日，老挝知会湄公河委员会修筑水电站坝的计划。该坝位于胡沙宏河上，并因东岸的岛屿而被命名为栋沙宏坝。施工方为马来西亚美佳第一有限公司。该公司曾在马来西亚沙巴州和中国投资修建火电厂，但从未参与过水电站坝项目，也没有在老挝工作的经验。

栋沙宏坝设计发电能力260兆瓦，与老挝目前计划建设的其他水电站坝相比并不算大，是湄公河干流装机容量最小的水电站坝。

然而，数百种鱼都要通过胡沙宏在生长和产卵地之间进行长距离的季节性洄游，因此渔业专家、环保组织、湄公河沿岸居民都担心拦水建坝会对这些鱼类产生影响。

西潘顿地区是世界上最大的非机械化淡水渔场，任何较大的变化都会影响到该区域以及整个湄公河流域内柬埔寨、老挝、泰国的国民生计和食品供应。

阻碍鱼类洄游

水坝开发商也承认，没有鱼能够通过栋沙宏坝到达上游。不过，他们提出了另一种方案。他们已开始清理、平整附近的两条水道——胡撒达姆和胡沧培克，降低其河床坡度以利于鱼群通行。开发商承诺，施工期间会关注鱼群洄游，保证其采用新的路线。他们还说，会安装比较不伤害鱼类的涡轮机，以减少鱼群通过电站时被卷入致死的情况。

科学家和环保人士都对此持怀疑态度。过去，如此规模的自然鱼道从未能被平行路线成功替代。也没有人研究过鱼群通过新涡轮机的存活率。政府间组织湄公河委员会负责处理与湄公河有关的事宜。该组织指出，至少95%的鱼群洄游时都要改道新的半人工鱼道。科学界普遍认为这很难取得成功。

2007年，34位颇具影响的科学家联名致函老挝政府，警告说单从经济角度来看，栋沙宏坝造成的损失就已远远超过它带来的效益。一份早期栋沙宏坝的环境影响评估报告也指出，在如此重要的鱼类洄游通道上建造水坝并不可取。然而，开发商并未理会这些不利的研究结果，他们另外出具了一份环评报告，声称水道改造成功将给渔业带来极大效益，同时胡撒达姆等河已处于过度开放状态，新水道可以减轻其压力，为渔民提供其他选择。

另外，人们担心水坝还会影响到湄公河短吻海豚的最后一片栖息地。它们生活在瀑布下一个水潭里，离新坝不到2公里。水坝噪声及水流变化都会对它们产生不良影响。此外，短吻海豚以过往的鱼类为食，若水坝影响到鱼类洄游，也就会危及这种淡水哺乳动物的生存。

栋沙宏坝是老挝在湄公河下游的干流上建造的第二座大坝，第一座大坝沙耶武里坝已于2012年11月开工建设（中国已在湄公河干流的上游建造了四座大坝）。然而，与此前不同，老挝政府并未就建设栋沙宏坝与相关国家磋商，这违背了1995年签署的湄公河协议。老挝方面的解释是，栋沙宏坝并未将干流的水全部拦截，因此不属于干流水坝。然而湄公河委员会早些时候的文件已明确指出，栋沙宏坝属于干流工程。

老挝、越南、柬埔寨和泰国签订的湄公河协议规定，所有全年运转的干流工程上马前必须与相关国家磋商。非干流工程则只需知会其他国家，不用正式征得其他国家的同意或是在项目动工前发布通告。栋沙宏坝预计11月动工。

邻国尚未表态

湄公河流经多个国家，老挝的单方面行动会带来什么影响？由于栋沙宏坝非常靠近柬埔寨，遭到柬埔寨国内很多非政府组织的批评。

“中国在湄公河上游大力建设水坝，使下游国家也雄心勃勃地要发展水电”。

但柬埔寨政府尚未做出任何表示。这可能是因为，柬埔寨刚刚结束充满争议的大选，其当务之急是组建新政府。也可能是因为，柬埔寨自身在着手建造塞桑河下游2号坝，大坝将给渔业带来破坏性影响。专家认为湄公河渔业资源可能会因此减少9%。

越南也没有就栋沙宏坝表态。这可能是因为栋沙宏坝对水文、泥沙沉积的影响都非常小。越南的科学家和决策者特别关心这两方面的问题，因为这是三角洲地区农业的基础。尽管整个流域内的渔业资源是一个整体，但迁徙的鱼群对越南而言并不是特别重要。

我曾在“中外对话”撰文指出，中国在湄公河上游大力建设水坝，使下游国家也雄心勃勃地要发展水电。现在的情势与此类似，上游国家单方面采取行动，其他国家也竞相开工建设，可持续、合理管理湄公河的标准不断降低。

在这种情况下，应该由有影响力的组织介入，推动各方就具有跨国界影响的项目进行理智的讨论和决策。就栋沙宏坝来说，讨论结果应该是该坝确属干流工程，应依照相应规则行事。然而，湄公河委员会并不是这样一个有影响力的组织。委员会秘书处还在等待各国政府表态。沙耶武里水坝建设前，磋商程序至少迫使越南和柬埔寨立即做出了反应。而这一次，如果允许老挝政府简单地知会各方就开工建设栋沙宏坝，无异于其他国家放弃权力直接为建坝开了绿灯。

菲利普 · 赫希，澳大利亚湄公河资源中心主任

Laos mutes opposition to controversial Mekong dam

Laos' decision to push ahead with the Don Sahong dam marks the beginning of a race to the bottom between countries that share the Mekong

Philip Hirsch

Just before the Mekong River enters Cambodia from Laos, it splits into many different branches and plunges over the 20 metre great fault line. The resulting maze of braided channels forms the magnificent wetland of Siphandone, or "four thousand islands". Some of the channels are large and steep, forming spectacular waterfalls – notably the popular tourist attraction of the falls at Khone Phapheng. Many smaller channels in-between are equally steep and contained in narrow gorges.

The exception is the Hou Sahong channel: water passing through is much more gradual in its descent, making its way across the fault line in a series of rapids rather than falls. This makes Hou Sahong the most passable for fish. It represents the only passage through which significant numbers of fish migrate during the dry season; even at other times of year it is the channel through which most of the millions of fish undertaking their complex seasonal migrations pass.

On 30 September 2013, the Lao government notified the Mekong River Commission of its intention to plug Hou Sahong with a hydroelectric dam, known as Don Sahong after the island on the eastern bank of the waterway. The dam is to be built by a Malaysian property company, Mega First Corporation Berhad. The company also has two small investments in thermal power in Sabah in Borneo and China, but no experience in building dams or working in Laos.

The Don Sahong dam is designed to generate 260 megawatts of power, which puts it at the smaller end of the scale of the many dams currently being planned in Laos. It is by far the smallest on the Mekong mainstream.

But fisheries experts, environmental groups and communities up and down the Mekong River are alarmed at what the blockage might mean for the hundreds of species of fish that undertake their long-distance seasonal migrations across the falls to complete their spawning and feeding cycles.

The Siphandone area itself is the world's largest artisanal freshwater fishery, so any major impact has severe implications for livelihoods and food security both in the falls area itself and for communities along the Mekong in Cambodia, Laos and Thailand.

Disrupting fish migration

Even the developers accept that no fish will be able to pass upstream through the Don Sahong dam. However, they

> "China's dam boom on the upper Mekong has fuelled hydropower ambitions lower down the river in Southeast Asia."

propose an alternative solution. Work is already underway to clear and level two adjacent channels – Hou Sadam and Hou Xang Pheuak – to make their gradients more amenable to fish passage. The developers promise to study fish movement during construction to ensure that fish can follow these "improved" migration routes. They also promise to install "fish-friendly turbines" to reduce the mortality of fish that get churned through the powerhouse on their way back downstream.

Scientists and environmentalists are sceptical. Never has a natural migratory fishway on this scale been replaced by parallel routes. There are no studies that show the survival rate of fish passing through modified turbines. According to the guidelines laid down by the Mekong River Commission, the intergovernmental body that deals with issues surrounding the river, at least 95% of the natural migration would need to be accommodated by the new semi-artificial fishways. The bulk of world scientific opinion is that this is highly unlikely to succeed.

A letter was sent to the Lao government in 2007, signed by 34 leading scientific experts, warning that in dollar terms alone the Don Sahong dam would be likely to destroy more of value to humans than it creates. An earlier environmental impact assessment (EIA) report for Don Sahong dam also warned against building across such an important fish migration channel. But the developers chose not to use its inconvenient findings, instead coming up with an EIA that promises an even better fishery once the channels are improved and the fishers are provided with alternative livelihoods to take the pressure off heavily exploited channels such as Hou Sadam.

A further environmental concern is the impact of the dam on one of the last remaining pods of Mekong Irrawaddy dolphins. They reside in a pool immediately below the falls, less than two kilometres downstream of the dam site. Apart from the noise of construction and the changed water flows from the dam itself, their dependence on fish moving up- and downstream means that any impact on the fishery also spells danger for the survival of these freshwater mammals.

Don Sahong would be the second dam on the mainstream of the lower Mekong to be put under construction by Laos after Xayaburi, where construction started in November 2012. (Six of the eight planned dams on the upper Mekong in China are completed or under construction). However, unlike the Xayaburi dam, Don Sahong has not been offered by the Lao government for prior consultation among signatories to the 1995 Mekong Agreement. The rationale given is that Don Sahong should not be treated as a mainstream dam, because it does not block the entire main-stem of the river. This is despite earlier documents

Experts warn that in dollar terms alone the Don Sahong dam would be likely to destroy more of value to humans than it creates.

produced by the Mekong River Commission that have consistently and unequivocally referred to Don Sahong as a mainstream project.

Under the Mekong Agreement signed by Laos, Vietnam, Cambodia and Thailand, any mainstream project that uses water year-round requires prior consultation. Non-mainstream projects simply require notification, with no formal process for taking account of other countries' concerns and with no requirement to give notice well in advance of project commencement. Construction of the Don Sahong project is set to commence in November.

Neighbours stay silent

What does this unilateral action by the Lao government mean for the Mekong as a transboundary river? Given that Don Sahong is so close to the border with Cambodia, many Cambodian NGOs have been vocal in their reaction. The Cambodian government has said little. In part this may be explained by the preoccupation of forming a new government after contested election results. In part it may also be explained by the fact that Cambodia is embarking on construction of another dam with potentially devastating impacts on fisheries – the Lower Sesan 2, which experts have calculated would singlehandedly destroy 9% of the entire Mekong fishery.

Vietnam has also been quiet on Don Sahong. This may be because the hydrological and sediment effects of Don Sahong are likely to be quite minimal. Vietnamese scientists and decision makers are particularly concerned about these two areas of impact from mainstream dams because of the dependence of delta agriculture on water flows and transport of silt. Migratory fisheries register as less important, despite evidence of the interconnectivity of fisheries along the length of the river.

In an earlier article for *chinadialogue*, I argued that China's dam boom on the upper Mekong was fuelling hydropower ambitions lower down the river. There is a similar situation in the current race to the bottom in standards of sustainable and rational management of the Mekong, whereby each country chooses to go ahead with projects in the wake of upstream countries' unilateral actions. These actions then discourage or delegitimise objections that downstream countries have to prior or concurrent actions taken by upstream neighbours.

A strong river basin organisation would be expected to intervene or facilitate rational discussion and decision-making around projects with potentially significant transboundary impacts. In the case of Don Sahong, this would entail immediate determination that Don Sahong is indeed a mainstream project and should be subject to the rules of prior consultation. However, the Mekong River Commission is not a strong organisation. The leadership of its secretariat waits for governments to take a stance. In the case of the Xayaburi, consultation processes at least forced Vietnam and Cambodia on the spot to react. In the case of Don Sahong, allowing the project to get away with a simple notification means a green light by default.

Philip Hirsch is director of the Australian Mekong Resource Centre.

气候变化将使湄公河三角洲环境恶化

科学家称，越南湄公河三角洲面临污染、盐水入侵、洪涝等灾害，气候变化会使问题雪上加霜。

迈克·艾维斯

越南科学家称气候变化可能会使湄公河三角洲的生态问题更为严重，包括水污染、盐水入侵、水生生物多样性减少、抗洪能力减弱等。

早在2006年，政府间气候变化专门委员会(IPCC)就警告说，湄公河、恒河、尼罗河三角洲特别容易受海平面上升的影响，越南科学家的担心印证了这一警告。

湄公河三角洲位于越南南部，地势较低，稻田、虾塘星罗棋布。这里大约居住着1700万人，出产水稻，GDP占全国的三分之一。

这里也是越南最为贫困的地区之一，当地官员忙于重振经济，环保项目不受重视。

水质和环境中心主任陈明魁指出：“他们取得了一定的进步，但经济危机导致资金是个大问题。”该中心属于政府机构，位于胡志明市，负责监测湄公河三角洲的水质。

大面积水稻种植造成土壤污染

问题的根源是湄公河三角洲大面积种植水稻。这里出产的水稻几乎占全国总产量的一半。

20世纪90年代，为控制湄公河洪水脉冲、推广水稻种植，越南政府开始大规模建设水闸、堤坝等灌溉设施。这使越南成为世界上三大稻米出口国之一，但也改变了湄公河的洪水脉冲，破坏了生态平衡。

例如，芹苴大学的科学家近日发布报告称，湄公河三角洲上游地区的稻田排放污水，造成淡水系统富营养化，使鱼类数量减少。另外，由于三角洲大部分地区土壤偏酸性，在将其改造成稻田的过程中，砷、镉等重金属迁移率增加。

> 水质和环境中心主任陈明魁指出：随着海平面上升、淡水需求量增大，矛盾可能还会升级。

芹苴大学环境和自然资源学院的教授黎安俊说，湄公河三角洲地区的农民过量使用化肥、农药会使这些问题雪上加霜。

他说：“一些本地鱼类会灭绝，生物多样性将会减少，随着气候变化，后果会更为严重。”

日本国际农业研究中心研究员藤井秀人的研究表明，三角洲上游建设堤坝会使三角洲最大城市芹苴面临更大的洪涝风险。

藤井指出，上游堤坝拦蓄河水，一旦堤坝崩溃，就会非常危险。2011年，三角洲地区安江省爆发洪水，冲毁堤坝，给下游造成了严重破坏。

季节性的洪水消退后，又会有盐水入侵。

湄公河是潮汐河，具有洪水脉冲，2-4月的旱季，南海富含盐分的海水会沿支流倒灌。众多灌溉设施及上游省份大量用水会使流向海洋的淡水减少，导致倒灌海水增加。

越南非政府组织“越南河网”高级顾问陶仲杜说，中国、老挝、柬埔寨计划在湄公河上建设水电站，增加了三角洲盐水入侵的风险。

他说：“湄公河三角洲水道密布，盐水入侵会使农业减产。后果非常严重。”

湄公河三角洲大面积种植水稻，这里出产的水稻几乎占全国总产量的一半。

国际资金应对气候变化

最近，一些国家政府和国际机构意识到应对气候变化是越南的一大要务。目前，几个旨在调查三角洲环境问题的严峻程度并给出解决方案的项目正在进行中。

例如，德国和澳大利亚政府在湄公河三角洲推动应对气候变化的设施建设；荷兰政府与当地研究员合作，为该地区制定100年可持续发展规划。2012年，规划初步完成，建议旱季截流湄公河支流以阻止盐水入侵。

最近，克里也宣布，美国将为国际开发署领导的一个项目提供1700万美元的资金，帮助越南人应对气候变化、改善环境问题。

但目前还存在一些困难。比如，湄公河三角洲地区的淡水需求还在增加，越南农业和农村发展部却回绝了科学家的呼吁，拒绝调整其宏伟的农业生产目标。科学家认为该目标不符合现实情况，会破坏生态环境。

河内湄公河开发研究院主任董奉德说，最核心的问题是国有企业控制着越南产值近40亿美元的稻米出口，反对涉及自身利益的改革。

他说：“现在的问题不是粮食安全。农业部门国有企业众多，我想（政府）最好卖掉它们。”

养虾业引发新矛盾

德国和越南科学家1月发布的研究结果表明，湄公河三角洲南部沿海近年兴建了很多虾塘，造成红树林“锐减”。官方媒体称越南出口的虾年产值约28亿美元，但科学家指出红树林面积缩减是个大问题，因为这些树一直是三角洲600千米海岸线上对抗风暴的自然屏障。

陈明魁说，养虾业的发展会使养殖户和种植水稻的农民间矛盾逐渐加深。他说养虾需要混用淡水和海水，如果农民无法获取所需的淡水，矛盾就会爆发。

陈明魁补充说，随着海平面上升、淡水需求量增大，矛盾可能还会升级。

迈克·艾维斯，越南自由撰稿人

Climate change could worsen Mekong Delta woes

Scientists say climate change will have grave impact on Vietnam's Mekong Delta, a region already battling pollution, salinity and flooding

Mike Ives

Vietnamese scientists say climate change will probably exacerbate existing ecological problems in the Mekong delta, such as water pollution, salinity intrusion, loss of aquatic biodiversity and rising susceptibility to flooding.

Their concerns echo a 2006 warning by the Intergovernmental Panel on Climate Change (IPCC) that the Mekong River Delta and two others — the Ganga and the Nile — are particularly susceptible to rising sea levels.

The delta region – a low-lying area in southern Vietnam dotted with paddy fields and shrimp farms – is home to an estimated 17 million Vietnamese, yielding not only rice but also a third of the country's GDP.

It is also among Vietnam's poorest areas, and environmental restoration projects in the region are often a low priority for officials busy trying to kickstart a slumping economy.

"They've made some progress, but because of the economic crisis, investment capital is a serious problem," said Tran Minh Khoi, director of the Center for Water Quality and Environment, a government institute in Ho Chi Minh City that monitors water quality in the Mekong Delta.

Large-scale rice production causes soil pollution

The problems are rooted in the large-scale expansion of rice production in the Mekong Delta, which now produces roughly half of the country's rice.

In the 1990s, the Vietnamese government began the widespread construction of sluice gates, high dikes and other irrigation measures that were designed to control the Mekong River's natural flood pulses for the sake of boosting rice cultivation. While the measures have helped Vietnam become one of the world's top three rice exporters, they have also altered the Mekong's alluvial flood pulse and changed its ecological balance.

For example, rice farming in the upstream regions of the delta discharges effluents that cause eutrophication of freshwater systems and damages fish populations, according to a recent study by a team of scientists from Can Tho University. And because so many of the delta's soils are naturally acidic, converting them to rice fields has increased the mobility of heavy metals like arsenic and cadmium.

Le Anh Tuan, a professor at the university's college of environment and natural resources, said the overuse of fertilisers and pesticides by many Mekong Delta farmers only exacerbates those problems.

"Native fish species will be lost, and biodiversity will be degraded," he said. "And the consequences may be worse with climate change."

The construction of high dikes in the delta's upper reaches has also correlated directly with an increased risk of flooding in Can Tho, one of the delta's largest cities, according to research by Hideto Fujii, a researcher at the Japan International Research Center for Agricultural Sciences.

According to Fujii, upstream dikes store a large amount of water that can be dangerous when dikes break. That was evident in 2011 when heavy floods in the delta province of An Giang broke through dikes and caused damage in downstream areas, he said.

And when seasonal floods subside, fresh danger surfaces in the form of saline intrusion.

Because the Mekong is a tidal river, it has a flood pulse in which saline water from the South China Sea travels up its tributaries during the February-to-April dry season. But the construction of so much irrigation infrastructure, coupled with heavy water use in upstream provinces, has in many cases reduced seaward flows of freshwater — and allowed more saline water to travel in the other direction.

A slew of controversial hydropower dams proposed for stretches of the Mekong River in China, Laos and Cambodia would only heighten the risk of more saline intrusion in the delta, according to Dao Trong Tu, senior advisor to the Vietnam Rivers Network, a Vietnamese NGO.

“In the Mekong Delta we have a very dense canal system, so if water intrudes it impacts agricultural production very much,” he said. “It’s a big impact.”

International funds to tackle climate change

Several governments and international donors have recently identified climate change as a central priority in Vietnam, and there are several ongoing projects aimed at mapping the extent of the delta’s environmental problems and devise solutions.

The German and Australian governments, for instance, are promoting climate-adaptation measures in the Mekong Delta, and the Dutch government has partnered with local researchers to develop a 100-year plan for sustainable growth in the region. The first version of the plan, released in 2012, suggests closing off branches of the Mekong River in the dry season to prevent further saline intrusion.

On a recent trip to the Mekong region in December ,US Secretary of State John Kerry said that the US will give US$17 million for a new American-led project to help Vietnamese communities adapt to climate change and ”reverse” environmental problems. He said the project will be administered by the US Agency for International Development.

“Vietnam is one of the most vulnerable countries in the world when it comes to climate change,” Kerry said. “And

A slew of controversial hydropower dams proposed for stretches of the Mekong River will heighten the risk of more saline intrusion in the delta.

we will see very serious impacts if we don't change course today."

There are considerable obstacles. Though demand for freshwater is increasing across the Mekong Delta, the Ministry of Agriculture and Rural Development has largely resisted calls from Vietnamese scientists to alter its ambitious agricultural production targets, which scientists say are ecologically unsustainable and sorely outdated.

According to Tung Phung Duc, director the Mekong Development Research Institute in Hanoi, a central problem is that state-owned enterprises (SOEs) exert significant control over Vietnam's nearly US$4 billion rice-export industry and are resistant to reforms that would cut into their profits.

"We don't have a problem with food security," he said. "There are a lot of SOEs in the agriculture sector, and I think it's better (for the government) to sell them."

And in the southern reaches of the Mekong Delta, the creation in recent years of coastal shrimp farms has led to "severe losses" of mangrove forests, according to a January study by a team of German and Vietnamese scientists. Shrimp exports from Vietnam are now worth US$2.8 billion per year, according to the state-controlled media, but scientists say the loss of mangroves is problematic because the trees have historically been a natural defense against storms along the delta's 600 kilometre coastline.

And as the shrimp industry grows, conflicts are deepening between shrimp and rice farmers, according to Tran Minh Khoi. He said shrimp farming uses a mix of fresh and brackish water, and the conflicts typically arise when the practice prevents rice farmers from getting the freshwater they require.

The conflicts, Khoi added, are likely to worsen as sea levels rise and demand for freshwater increases.

Mike Ives is a freelance writer based in Vietnam.