Approval Process for Large Hydropower Projects & Analysis of their Stakeholders: A Case Study of the Nu River

JANUARY 2016
ABSTRACT

Due to the high scenic and cultural value of China’s Nu River, hydropower development on the Nu has been a hot topic of public discussion among Chinese conservationists and scientists. A comparison of two large hydropower projects, the Maji Hydropower Station on the Nu River and Dahuaqiao Hydropower Station on the Lancang River, illustrates procedural problems in the current development of large hydro stations, such as illogical approval processes, insufficient disclosure of information and public participation, and ineffective environmental impact analysis. A look into how stakeholders are involved in the decision-making process is also critical to the consideration of development procedures.

In order to ensure sustainable and just development of the Nu River, a few key steps must be taken: A greater understanding of the biodiversity and ecology of the area must be obtained through scientific research; the decision-making process should better reinforce information disclosure and public participation; and a regionally appropriate mode of development should be explored.

ABBREVIATIONS

BEC Beijing Engineering Corporation
CEA China Earthquake Administration
CECPA China Environmental and Cultural Promotion Association
CIECC China International Engineering Consulting Corporation
CREEI China Renewable Energy Engineering Institute
DRC Development and Reform Commission
EIA Environmental Impact Assessment
IWHR China Institute of Water Resources and Hydropower Research
MLR Ministry of Land and Resources
MWR Ministry of Water Resources
NEA National Energy Administration
NDRC National Development and Reform Commission
SAWS State Administration of Work Safety
SEA Strategic Environmental Assessment
WHC World Heritage Committee

Front photo credit: LI Xiaolong
The national government proposes an overall hydropower plan for (a section of) a river, NDRC authorised the plan, CREEI organises project bidding.

CHECC writes reports about the overall hydropower plan and its EIA.

CREEI conducts meeting to review the above reports with provincial DRC.

Provincial government approves the above reports.

Hydropower company writes preliminary feasibility study report.

NDRC agrees to initiate preliminary work.

Hydropower company writes project proposal and feasibility study report.

Departments of the national government approves special reports.

NDRC approves project application report.

Initiation of preliminary work

Initiation of main projects (cutoff, river diversion, river closure)

Project EIA reports including that of “three supplies and one levelling”

Dam location (preliminary) special report

Water and soil conservation plan for “three supplies and one levelling”

Other

EIA report

Land acquisition and reallocation plan

Water and soil conservation report

Seismic safety evaluation report

Assessment report of water exploitation and utilisation

Cultural relics protection report

Letter of consent for water engineering planning

Safety evaluation report

Construction land use pre-qualification report

40-50 special reports in total

Figure 1. Development and construction procedures of a hydropower project
Hydropower stations on the Nu River are the most controversial development projects in the Nu River area. If the construction of large hydro stations proceeds, it will exert tremendous impact on the local ecosystem, involving a number of stakeholders. An analysis of the approval process for large hydro projects and the stakeholders shapes a deeper understanding of how the decision-making process for large hydro development conflicts with conservation efforts.

The Gaoligong Mountain National Nature Reserve and many other scenic areas are located in high-altitude mountainous areas along the Nu River in the Nu Prefecture. These areas are minimally impacted by human activities. However, the Communique of China’s Scenic Area Development (1982-2012), reported that scenic areas in the region are increasingly subjected to impacts from construction projects, stating: “some large infrastructure projects are poorly designed or insufficiently studied, invading the scenic area and damaging its ecosystem and natural/cultural values.” A recent study further confirmed that large hydro projects will have potential long-term negatively impact the biodiversity of forests.

The underwater ecosystem of the River will be most directly affected by hydro development. Once the construction of hydro stations begins, the characteristics of the river flow will change, directly damaging the delimited “National Aquatic Germplasm Resources Reserve for Endemic Fish” in the upper and middle reaches of the Nu River. Since the Reserve was established in 2010 after hydro planning had taken place, it remains to be seen whether it can play a conservation role in the decision-making process of future hydro development.

Maji Hydropower Station is the second of five cascade stations on the middle- and up-stream of the Nu River, and the first power station planned on the Nu River within Yunnan Province. Dahuaqiao Hydropower Station on the Lancang River is a more recent hydro project in the Nu Prefecture. The next section focuses on common problems in the hydro development process in China.

1. A Case Analysis of the approval process of large hydropower stations on the Nu River

1.1 The approval process of large hydropower stations

Generally speaking, the development of a large hydro station must go through a planning phase and an approval phase. The basic procedures at each phase are illustrated in Figure 1.

Hydropower planning:

(1) The general planning for hydro development on river basin is usually commissioned by the National Development and Reform Commission (NDRC) and bidding on the projects is organized by the China Renewable Energy Engineering Institute (CREEI). Planning reports and Environmental Impact Assessment (EIA) reports are usually prepared by institutes such as PowerChina’s Kunming Engineering Corporation Limited.

(2) CREEI and provincial development and reform commission (DRCs) hold review and consultation meetings on planning reports and EIA reports, which are then approved by the provincial government. The DRC must submit planning reports to the State Council for approval.

Site Preparation:

Hydro companies are responsible for pre-feasibility studies and are not allowed to begin site preparation work, the so-called “three supplies and one leveling” (water, electricity and road supplies and land leveling) until the pre-feasibility study report has been approved by the NDRC. The pre-feasibility study must produce an EIA report of the “three supplies and one leveling” - water, electricity, roads, and land leveling - a water and soil conservation report, a site selection subject report, and a construction diversion subject report. The EIA report of the “three supplies and one leveling” must be reviewed and approved by national or local environmental authorities.

Project approval:

(1) Before site preparation begins, hydro companies must prepare a project proposal that includes a feasibility study report. The report must contain 40-50 subject reports that require approval from different...
organizations, including government departments and consulting companies at both national and local levels. According to reporters from 21st Century Business Herald, feasibility study subject reports should be submitted to technical and research institutes such as CREEI and China International Engineering Consulting Corporation (CIECC); local government authorities including the Development and Reform Commission, Environmental Protection Bureau, Forestry Department, Water Resources Department, Land and Resources Department, Resettlement Office, the Cultural Heritage Administration, the Earthquake Administration; and national organizations such as the Ministry of Environmental Protection (MEP), the NDRC, the National Energy Administration (NEA), China Earthquake Administration (CEA), State Administration of Work Safety (SAWS), Ministry of Land and Resources (MLR), Ministry of Water Resources (MWR) and State Grid Corporation of China (or local branches). The most critical reports in this process include: The approval of the hydro planning by the NDRC, the approval of the resettlement plan by the provincial government, the approval of land use by the MLR, the approval of the EIA report by the MEP, the approval of site preparation work by the NDRC, the assessment of the project proposal by CIECC and the approval of the hydro project by the NDRC.

(2) When the whole project approval process is completed and all project files have been approved by the NDRC, the main construction work can begin.

1.2 Case Analyses: Maji Hydropower Station on the Nu River and Dahuaqiao Hydropower Station on the Lancang River

To present a clearer picture of the development process and procedures for hydro stations in China, Figure 2 summarizes publicly available information on the development process of the Maji and Dahuaqiao projects, major relevant events that occurred during the approval process and the stakeholders that were involved.

1.3 Problems in the large hydropower project approval process

A look at Figure 1 will indicate several problems in the decision-making and development processes of large hydro projects.

Unreasonable approval process: complicated and illogical procedures

The approval of site preparation and the main approval of a large hydro project are usually separate. To shorten the project cycle, the Chinese government issued a Notice on Strengthening Environmental Protection for Hydropower Projects in 2005, which permits hydro companies to compile EIA reports for the “three supplies and one leveling” projects before the EIA report of the main project has been approved. However, it is irresponsible to begin construction before comprehensive research on the project has been completed. Staff from the China Institute of Water Resources and Hydropower Research (IWHR) and the MEP wrote that the EIA for the planning of major water conservancy and hydro projects should be enhanced and that overall project planning and assessment should be conducted to rule out projects that might bring serious environmental impacts and postpone site preparation work. In practice many site preparation projects, such as cofferdams, diversion tunnels and even river closure, are often completed before the main project has been approved at the national level.

At present, construction prior to approval is due to discrepancy in the understanding of the scope and content of the “three supplies and one leveling” between various departments. In 2012, the MEP’s Notice on Further Strengthening Environmental Protection Work in Hydropower Development redefined cofferdam (including staged cofferdams) and river diversion works as part of the main project instead of the site preparation project. However, in documents such as Specifications for Construction Planning of Water Resources Engineering and Specifications for Construction Planning of Water Resources and Hydropower Engineering, cofferdam and diversion tunnel projects continue to be listed as part of the site preparation. In the “Three Supplies and One Leveling” Project Impact Report for Dahuaqiao Hydropower Station on the Lancang River in Yunnan Province published in 2010, cofferdam and diversion tunnel projects were still included in the site preparation project. In the EIA for Lawa Hydropower Station approved by the MEP in July 2015, dam abutment


2. 21世纪经济报道. 2014. 《能源项目审批全链条调查：大型水电审批多达10年》. http://finance.qq.com/a/20140726/002213.htm
excavation and diversion tunnel works were excluded from the “three supplies and one leveling” project.\(^5\) Even though the scope of the site preparation project is narrowing, the EIA approval process is still separate from the approval of the main project. This approval process should be more restructured so that the hydro planning EIA for the river basin would help eliminate projects that have potentially negative environmental impacts.

The timelines above show that the progress of a hydro project is not based on document reviews and approvals. Huadian Nuijiang (the Nu River) Hydropower Company was established before hydro planning on the Nu River was even approved. The progress of the project was inconsistent with document approvals. For instance, the feasibility study of the Maji project has been ongoing even though it is unclear whether the pre-feasibility study has been approved. The pre-feasibility study report was completed in 2008 and the outline for survey, design and research work for the feasibility study was completed in 2011, but the progress of the feasibility study is unclear. Similarly, the pre-feasibility study report for the Dahuaqiao project was approved in 2010, yet few subject reports of the feasibility study had already been reviewed and approved back in 2009. Presumably, once a hydro project is planned and a company assigned, the company will naturally identify the project as “feasible”. Therefore, all of the study and approval procedures merely serve as red tape. It is unlikely that companies would allow the feasibility study report to reject their development projects.

If we take a closer look at the approval information for Dahuaqiao’s feasibility study, we find that the three most important documents - the water and soil conservation report, the EIA report and the land acquisition and resettlement report - were all approved in 2013, raising suspicions that they were produced to catch up with the planned schedule. Also, the pre-feasibility study report of the Dahuaqiao project was officially approved one and a half years after it was reviewed, but it is not clear whether the site preparation work began after the report was reviewed or after it was approved.

Lack of information disclosure and public participation

A comparison of available information about the decision-making processes of the two projects reveals that information on Dahuaqiao is more available and complete while the controversial projects on the Nu River are far less traceable by the public.

Although the EIA for the hydro planning of the middle- and downstream stream of the Nu River passed during a review meeting in 2004, neither its final approval nor any change to the original planning had been publicized at the time of writing. Then in September 2007 the NDRC listed the Nu River as one of the priority areas for hydro development by 2020 in its Mid- and Long-Term Development Plan for Renewable Energy. The Maji Project, along with Yabiluo, Liuku and Saige were also listed as key projects in the NEA’s 12th Five-year Plan for Hydropower Development and 12th Five-year Plan for Renewable Energy. On January 1, 2013, the State Council announced the 12th Five-year Plan for Energy Development, calling for an in-depth discussion and orderly launch of the “one reservoir, four cascade stations” proposal that included Maji, Yabiluo, Liuku and Saige. On December 31, 2013, the Yunnan Provincial Government confirmed in the Yunnan’s 12th Five-year Plan for Energy Development the construction of the “one reservoir and four cascade stations.”

According to Article 5 of The Law of the People’s Republic of China on Environmental Impact Assessment (2002), “the State shall encourage relevant units, experts and the public to participate in environmental impact assessments by proper means.” However, participation currently only take place after the project design has been finalized - too late in the process for public participation to have much effect.\(^6\) According to Article 17 of the Interim Procedures for Public Participation in Environmental Impact Assessment, “the construction unit or the EIA agency it commissions shall give serious consideration to public opinion and shall include its feedback on whether public opinion is adopted into the EIA report”. Article 56 of the new environmental law that took effect in 2015 stipulates, “The developer or its entrusted affiliation which conducts EIA of a construction project shall explain relevant situations to the potentially-affected communities when preparing the environmental impact report, and will solicit public opinions. The department that is responsible for the examination and approval of environmental impact assessment documents for the construction project shall make public the full text of the envi-
Maji hydropower project on the Nu River

Location: mid- and down-stream of the Nu River mainstream, downstream of Libuxia, Maji, Fugong County

Profile:
• 3rd dam of the “2 reservoirs, 13 cascade power stations” proposal in the Hydropower Planning Report for the Mid- and Down-stream of the Nu River Mainstream
• Project Area: 106,100 km²
• Full Supply Level (FSL): 1,575m; Storage at FSL: 4,707 million m³; Live Storage: 3,194 million m³; adjustable annually
• Height: 280 m
• Proposed Total Capacity: 4,200MW

Dahuaqiao hydropower project on the Lancang River

Location: upstream of the Lancang River, upstream of Yingpan, Lanping County

Profile:
• 6th dam of the 8 cascade power stations planned in the upstream of Lancang River mainstream
• Project Area: 92,600 km²
• Average Annual Discharge: 925 m³/s
• FSL: 1,477 m; Storage at FSL: 293 million m³; Live Storage: 41 million m³; adjustable weekly
• Height: 103 m
• Total Capacity: 920MW

The former State Planning Commission (SPC) decided to develop hydropower on the Nu River; the bidding for its planning was organized by CREEI.

Hydropower Planning Report for the Mid- and Up-stream of the Nu River was completed.

Huadian Group Corporation and Yunnan provincial government signed an MoU to promote power development in Yunnan.

Huadian Nujiang Hydropower Company was founded.

The NDRC held a review meeting; Yunnan government commissioned Beijing Engineering Corporation (BEC) to submit Introduction of Hydropower Development and Environmental Protection in Mid- and Down-stream of the Nu River (not the EIA for the planning)

Hydropower Planning Report for the Mid- and Up-stream of the Nu River was submitted by the NDRC, but was not approved by the State Council.

Commissioned by the former SPC, CREEI organized the bidding for the hydropower planning of Upper Lancang.

Hydropower Planning Report for Gushui-Miaowei Reach of Upper Lancang was completed.
The NDRC and the former State Environmental Protection Administration (SEPA) held a review meeting for EIA Report of Hydropower Planning for the Mid- and Up-stream of the Nu River, agreeing to put Maji, Yabiluo, Sage and Liuku on the agenda.

Huadian Nujiang Hydropower Company and BEC signed a contract on the survey and design work for the pre-feasibility study of the Maji project.

BEC began survey and design work for the pre-feasibility study.

The site selection subject report was submitted for consultation.


2005 The environmental authorities of Yunnan and Tibet co-held a discussion meeting of the report.

2005.3 According to the comments on the EIA Report of Hydropower Planning for Gushui-Miaowei Reach of Upper Lancang published by the environmental authorities of Yunnan and Tibet, the “one reservoir, seven cascade power stations” proposal was approved.

2006 The planning report and the EIA report were officially approved by the Yunnan and Tibetan provincial governments.

2006.12 The pre-feasibility study report was submitted for consultation, but it is not clear whether it was approved.

2007.3 The environmental authorities of Yunnan and Tibet co-held a discussion meeting of the report.

2007.5 According to the comments on the EIA Report of Hydropower Planning for Gushui-Miaowei Reach of Upper Lancang published by the environmental authorities of Yunnan and Tibet, the “one reservoir, seven cascade power stations” proposal was approved.

2007.12 The planning report and the EIA report were officially approved by the Yunnan and Tibetan provincial governments.

2008 The pre-feasibility report was reviewed by experts from CREEI, Yunnan provincial DRC and Yunnan Energy Administration.
Subject Report on the Comparison and Selection of Site, Dam Type and Hub Layout for Dahuaqiao Project on Lancang River in Yunnan Province was approved.

FSL Subject Report and Subject Report on General Construction Layout Planning were approved.

NDRC’s Approval Letter for Site Preparation Work of Wunonglong and Dahuaqiao Hydropower Projects (No. [2010] 745) granted permission for the site preparation work of the Dahuaqiao project.

Environmental Impact Report for the Site Preparation Projects ("Three Supplies and One Leveling") of Dahuaqiao Hydropower Station on Lancang River in Yunnan Province was disclosed to the public.

Feasibility Study Report for Hydropower Stations on Lancang River in Yunnan Province: Engineering was completed.

Feasibility Study Report for Hydropower Stations on Lancang River in Yunnan Province: Engineering was submitted for consultation and review.

Huaqiang Nujiang Hydropower Company and BEC signed an agreement on the cooperation in the survey and design work for the feasibility study of the Maji Project.

BEC completed the Outline for Survey, Design and Research Work for the Feasibility Study of Maji Project on the Nu River in Yunnan Province.

Outline for Survey, Design and Research Work for the Feasibility Study of Maji Project on the Nu River in Yunnan Province was submitted to CREEI for consultation.
Huadian invited six experts, including Ma Hongqi, a member of the Chinese Academy of Engineering, for technical consultation on the Research Outline for the High Arch Dam and Research Outline for the High Concrete-faced Rockfill Dam (CFRD) as part of the feasibility study of Maji Project.

2011.11

2013 Environmental Impact Report for Dahuaqiao Hydropower Station on Lancang River was approved; Land Acquisition and Resettlement Planning Report for Dahuaqiao Hydropower Station on Lancang River in Yunnan Province was submitted for consultation and review.

2013.4 The MWR approved Water and Soil Conservation Plan for Dahuaqiao Hydropower Station on Lancang River in Yunnan Province in File No. [2013] 120.

2013.12 Feasibility Study Report for Dahuaqiao Hydropower Station on Lancang River in Yunnan Province was reviewed by experts.

2014.5 Comments on Feasibility Study Report for Dahuaqiao Hydropower Station on Lancang River in Yunnan Province were published.

2014.9 Commissioned by the NDRC, CIECC held an assessment meeting and approved the report.

2014.10 Hydrochina held a consultation meeting specifically for river closure and the closure work for the Dahuaqiao project was successfully finished on 29 October.

2014.12 The NDRC approved Dahuaqiao Project in File No. [2014] 297 and the main construction project began.

2015.12 The main project went on from excavation to concrete work.

The impoundment is planned in the end of 2018.

Figure 2: Timeline for Maji Dam on the Nu River and Dahuaqiao Dam on the Lancang River
The Chinese government has realized the tremendous environmental challenges brought about by the rapid economic development and is beginning to prioritize environmental protection. The Environmental Protection Law and the Law on Environmental Impact Assessments are first steps in this direction. In addition, China has gained a better understanding of the need for ecological and environmental protection.

In 1997, the MEP published the HJ19-1997 standard (Technical Guideline for Environmental Impact Assessment: Non-polluting Ecological Impact). This applies to the EIA of construction and regional development projects that make use of ocean resources or developing coastal zones. It also applies to projects in various sectors including water conservation, hydro, mining, agriculture, forestry, animal husbandry, transportation, and tourism. It was replaced in April 2011 by the HJ19–2011 standard (Technical Guideline for Environmental Impact Assessment: Ecological Impact)

7. 环保部HJ19-1997号行业标准《环境影响评价技术导则 非污染生态影响》

8. 环保部HJ19-2011号行业标准《环境影响评价技术导则 生态影响》
http://img.zhuzhou.gov.cn/1hbj/201310/201310230900047.pdf

2. Stakeholder analysis for large hydropower development projects on the Nu River

Large hydro projects on the Nu River involve many stakeholders (see Table 1). CHEN Shuisheng, uses hydro developments on the Nu River, to analyze changes in China’s public policy-making model. He divided the stakeholders of hydro development on the Nu River into three categories: policy beneficiaries (the pro-dam group), policy victims (the anti-dam group) and the neutral group. CHEN concludes that social groups and organizations are increasingly concerned about public policies and are therefore becoming important participants in their development.10

Functional government departments

Governments at all levels, from Yunnan Province to Nu Prefecture and smaller counties, are driven by economic benefits and regard hydro development on the Nu River as a strategic move for local development. They all actively seek cooperation with Huadian Group Corporation. They represent important members of the pro-dam group who believe that hydro development on the Nu River will bring considerable tax increases, boost local economy, and help fulfill political goals. ZHANG Zhenzhong, an ex-official from the Nu Prefectural Office Planning Commission, said in an interview that once the cascade power stations on the Nu River are completed, they will contribute 2.7 billion yuan annually to local fiscal revenues and that Nu Prefecture alone would have a one-billion yuan increase in fiscal revenues every year.11

Planning by other departments from the Nu Prefecture also demonstrate the importance attached to hydro development on the Nu River. For example, in the 11th Five-year Plan and Mid- and Long-Term Plans for Forestry Development in Nu Prefecture, the prefectural government proposed “prohibition on the peak, resettlement on the hillside and afforestation in the river valley” along with zoning by ecological function and altitude control for hydro development. For peak areas with an altitude of more than 2,500 m – especially the “Three Parallel Rivers of Yunnan Protected Areas”, the Gaoligong Mountain National Nature Reserve and other provincial protected areas – farming, hunting, logging or animal husbandry is strictly forbidden to maintain the natural and ecological integrity of the landscape. For ecologically vulnerable areas between 2,000 m and 2,500 m and ecologically deteriorated areas lower than 2,000 m, resettlement and reforestation (including afforestation, ecological forest and economic forest plantation) measures should be taken to restore the ecosystem. In these areas, water and soil issues such as sedimentation, debris flow and landslide need to be properly treated. In the river valley area below 1,570 m, hydro development should be prioritized and all parties are to foster hydro as a pillar industry. Through an ecological protection fund and the policy of “energy instead of relief, power instead of firewood,” the protection cost issues and the conflict between development and conservation can be solved, thus achieving a development-protection balance and a doubly beneficial situation with both economic and ecological gains.

When it comes to environmentally sensitive areas, what role can government departments play? In the Simplified EIA Report for Maodinghe II Hydropower Plant in Deqin, Yunnan12, a response letter by the Yunnan Provincial Office for the World Heritage Committee to the Maodinghe project explained that the project site is not located in the “Three Parallel Rivers of Yunnan Protected Areas.” The inclusion of this letter in the EIA indicates that hydro projects must first obtain approval from this provincial committee.

The agricultural authorities in charge of the National Aquatic Germplasm Resources Conservation Area for Endemic Fish in the upstream of the Nu River should have played an important part in the process for EIAs of construction projects. However, agriculture authorities in the Nu Prefecture passed the Subject Report on the Impact of Hydropower Planning on the National Aquatic Germplasm Resources Conservation Area for Endemic Fish on the Nu River submitted by Huadian Nujiang Hydropower Company in October 2013.13 Although the review found that the cascade of power stations on the Nu River would fundamentally alter the environmental features of the protected river, the report was approved on the condition that an allocated river reach be set aside to fulfill its function. The challenges and decisions regarding these development projects leads one to question the influence and effectiveness of agriculture authorities on hydro development.

10 陈水生. 2015. 从怒江水电站开发看中国公共政策模式变化. 东方早报. 上海经济评论.
12 阿昌族濮部. 2013. 云南省德钦县茂顶河二级水电站环境影响报告书（简本）. 20130112/438432.shtml
<table>
<thead>
<tr>
<th>Category</th>
<th>Name of Unit</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Government</td>
<td>the NDRC</td>
<td>Initiates and determines the approval of river hydropower planning.</td>
</tr>
<tr>
<td></td>
<td>the MEP</td>
<td>Approves the EIA reports.</td>
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<td></td>
<td>the MWR</td>
<td>Approves the water and soil conservation reports.</td>
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<td>the MIL, the Ministry of Agriculture</td>
<td>Approves the resettlement reports.</td>
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<td></td>
<td>the Ministry of Water Resources</td>
<td>Approves the water and soil conservation reports.</td>
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<td></td>
<td>the Ministry of Ecology and Environment, the MEP</td>
<td>Approves the EIA reports.</td>
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<td></td>
<td>the Ministry of Forestry, the MLR, the Ministry of Transport,</td>
<td>Participates in planning and consultation for endangered fish.</td>
</tr>
<tr>
<td>Local Government</td>
<td>Yunnan provincial government</td>
<td>Approves the hydropower planning reports and promotes hydropower development.</td>
</tr>
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<td></td>
<td>Yunnan DRC, Yunnan Energy Administration</td>
<td>Organizes review meetings for subject reports.</td>
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<td></td>
<td>Yunnan Environmental Protection Department</td>
<td>Supports hydropower development in the Nu River area.</td>
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<td></td>
<td>Nujiang Prefecture government</td>
<td>Participates in the task FORCE.</td>
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<td>Design Institutes</td>
<td>CREEI</td>
<td>Organizes the planning and bidding for river hydropower development.</td>
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<td></td>
<td>Powerchina</td>
<td>Surveys and compiles pre-feasibility study and feasibility study reports.</td>
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<tr>
<td>Developers</td>
<td>Huadian Nujiang Hydropower Company</td>
<td>Organizes technical consultation during feasibility study.</td>
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<td></td>
<td>Huadian Group Corporation</td>
<td>Shares in the project.</td>
</tr>
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<td></td>
<td>Yunnan Power Investment Co., Ltd., China Southern Power Grid</td>
<td>Participates in the consultation.</td>
</tr>
<tr>
<td>Experts</td>
<td>Hydro power development and design experts</td>
<td>Research hydropower development and economics.</td>
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<tr>
<td></td>
<td>Ecologists, geologists, etc.</td>
<td>Emphasizes the inappropriateness of hydropower development due to the geological features of the Nu River area.</td>
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<td>Media</td>
<td>the Beijing News, Beijing Youth Daily, CBNweekly, The Paper</td>
<td>Reports on and hydro projects and draws social attention.</td>
</tr>
<tr>
<td>Environmental NGOs</td>
<td>Green Earth Volunteers, Green Watershed, Institute of Public &amp; Environmental Affairs (IPE), Friends of Nature (FoN)</td>
<td>Organizes community surveys, conducts publicity work, and raises public awareness.</td>
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<tr>
<td>Local Communities</td>
<td>Communities in Nujiang Prefecture (the uninformed people and the opponents)</td>
<td>No viable channel to voice their opinions and demands.</td>
</tr>
<tr>
<td>Downstream Countries</td>
<td>Burma, Thailand</td>
<td>Governments are not involved, local civil society is opposed to hydropower projects.</td>
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Table 1. Stakeholders involved in hydropower development on the Nu River
Developers

Huadian Nujiang Hydropower Company’s decision to dam the Nu River is due to economic considerations, and is the result of all hydro and water resources companies vying for development projects on the rivers of Southwest China. Nowadays, due to an oversupply of electricity that cannot yet be exported, Huadian has shown a declining interest in hydro development on the Nu River.

Hydropower design institutes

As the project designer, Beijing Engineering Corporation (BEC) compiles all relevant technical files. BEC also assists in getting approval for the project. As a professional hydro plant designer, BEC is usually an active supporter of hydro projects on the Nu River.

At the national level, CREEI also plays a crucial role in the planning of river hydro development. If the overall planning could take a more holistic approach and assess the ecological, social and cultural impacts on a wider scope, projects that might cause ecological damage or economic loss could be avoided from the very beginning.

Media, civil society and environmental experts

It is worth noting that media, environmental NGOs, ecologists and other stakeholders played an important part in the decision-making process of hydro development on the Nu River. When the planning of hydro development on the Nu River came out in 2003, it soon received widespread public attention. Dr. HE Daming from Yunnan University raised six questions that formed the theoretical basis for opposition from the MEP and other experts. The dissenting opinions from ecologists and geologists were highly valued by the government. In addition, participation from many environmental NGOs amplified the anti-dam voices. There was strong support on a number of occasions including the 2nd Member Assembly of China Environmental and Cultural Promotion Association, and CECPA. Various media outlets (China Youth Daily, CBN) were opposed to hydro projects and their reporting on the whole story of hydro development on the Nu River exerted tremendous pressure on the government.

Local communities

Local communities in the Nu Prefecture are the most relevant stakeholders affected by hydro development, yet they are also the most neglected. The government believes that hydro development will boost the local economy and therefore benefit local people. However, the opinions of the local people are seldom valued. Minority groups account for 92% of the local population (more than 50% are Lisu minority people) and most of them are poorly educated with insufficient Mandarin language skills to voice their demands, which undermines their influence in the decision-making process of hydro development. These communities are victims of hydro development who suffer from loss of cultural and natural resources that development incurs.

Downstream countries

Other important stakeholders in hydro development on the Nu River are the downstream countries of Burma and Thailand. The Nu River is a trans-boundary river and the downstream countries are concerned about the impact of the cascade power stations on fisheries and flooding. The trans-boundary environmental impact was not assessed in the planning of hydro development on the Nu River. This lack of consideration is a destabilizing factor in China’s relations with its neighboring countries.

Figure 3 shows the stakeholders’ degree of support and influence for hydro development on the Nu River.

The pro-dam group, including the NDRC, hydro companies, the MWR, the Yunnan Provincial Government and the Nu Prefectural Government, are much more influential than the anti-dam group, which includes the MEP, environmental NGOs, and media.

The government’s functional departments at both national and local levels take a neutral or even supportive stance, even if they are supposed to play a supervisory role in the environmental issues of hydro projects.

Ten years ago, environmental NGOs, media and anti-dam experts were successful in stalling the Nu River’s hydro development. They caught the attention of the country’s top decision-makers. As a result, the State Council sent important instructions to postpone projects on the Nu River, warning that “hydro development on the Nu River should be treated with prudence and caution.” After a decade of calmness, the Nu River issue has lost some of its public attention. The positive influence and active role of celebrities, experts and scholars, media, and social organizations are inestimable and should be further enhanced.
Figure 3. Stakeholder analysis for hydropower development on the Nu River
The Chinese government is increasingly aware of the importance of environmental protection. The MEP was promoted from the State Environmental Protection Administration, and is now more powerful and can play a critical role in supervising, approving or disapproving hydro projects on the Nu River.

It is also necessary to amplify the voices of local people. Although many people living along the Nu River are opposed to the projects, their voices are seldom heard or valued by the top decision-makers.

There is no inter-state agreement on hydro development on the Nu River between China and Thailand or Burma. Regardless, NGOs and people in downstream countries have the right to know about how upstream hydro developments might impact them. Their voices can then be heard and addressed by their own governments.

Apart from the above stakeholders, hydro development on the Nu River is also subject to supervision by international treaties, because the Nu River is the core of the “Three Parallel Rivers of Yunnan Protected Areas”, World Heritage Site. In the same year that the “Three Parallel Rivers” was listed as a World Heritage Site, the Yunnan provincial government published its hydro development plan for 13 cascade power stations on the Nu River. The World Heritage Committee (WHC) was very concerned and identified the “Three Parallel Rivers” as a key monitoring and protection project. The WHC sent an expert team to evaluate the impact of hydro plants on the Nu River and concluded that hydro development is one of the main threats for the “Three Parallel Rivers.” For many years since, the WHC has been observing the region. In 2015, the WHC’s state of conservation report indicated that while there is no indication that dams or reservoirs are, or will be, located within the protected area, there continue to be concerns about the constructin of several dams which started prior to the completion of the EIA, and the impacts of dams on scenic landscape values and on landscape connectivity. The WHC urged the Chinese government to submit a Strategic Environmental Assessment (SEA) report as soon as possible. The WHC will play a significant role in the long term monitoring and protecting the Nu River.

Recommendation 1: Strengthen basic scientific research on the Nu River

The “Scientific Outlook on Development” emphasized in the Communist Party’s 18th National Congress shows that scientific research is the very basis for social development. Although several protected or conservation areas have been established in the Nu River region and multiple research projects have been conducted, the findings are inadequate to fully reveal the biodiversity values in the Nu River region. The Nu River Snub-Nosed Monkey, the world’s fifth discovered species of snub-nosed monkey was not discovered until 2010. It is highly likely that there are still undiscovered plants and animals that inhabit the Nu River region. Additionally, a project EIA that is not grounded in sufficient research is not scientific nor persuasive.

There is room to improve the EIAs for development projects in ecologically sensitive areas, especially to quantify the long-term scientific assessments of ecological impact. Hydro projects need long-term monitoring because impacts may only be observed over long periods of time. Past experiences have proved that EIAs for many projects were not comprehensive and that ecological impacts were not noticed until decades after projects were completed.

The capacity of and demand for hydro in Southwestern China should be carefully evaluated to determine the need for hydro development on the Nu River. For example, are the hydro projects on the Lancang and the Jinsha Rivers fully utilized? Do they already produce enough to meet China’s hydro demand? A professor from the Department of Hydraulic Engineering at Tsinghua University stated that the Nu River is not yet fully understood and the Nu River region does not have a shortage of electricity. Many hydro stations have already been planned in southwestern China and could be used more efficiently. The Chinese
government should spend some more time researching and discussing hydro development on the Nu River and should develop hydro projects only when the need is fully evident.

The biological, cultural and geological diversity of the Nu River are irreplaceable. A better understanding of the demands and roles of various stakeholders in the ecological protection of the Nu River, along with an objective and scientific analysis of planned development, will help local governments create more sustainable development plans. Policy-makers should conduct a more systematic stakeholder analysis.

Recommendation 2: Improve the decision-making process

The environmental impact of hydro development on entire river basins is often neglected in the hydro planning phase, causing failures to prepare counter measures in advance. Decision-makers in China should conduct EIAs for the planning of all hydro developments to eliminate destructive projects.

The separate approvals for site preparation and for the main projects of hydro development have long been criticized by environmentalists. The government should abolish site preparation project approval and deny any construction until the entire feasibility study has been completed. This will not only contribute to a more comprehensive assessment of the environmental and social impacts, but will also avoid economic loss caused by project delays or cancelation. For instance, Liuku Hydropower Station was the earliest hydro project built on the mainstream of the Nu River. Its site preparation work began in 2006, and several subject reports were approved soon after. However, the project was halted in 2011, leaving the connection roads from Liuku to Bingzhongluo unfinished. The site preparation projects began without approval and this unreasonable process, causing an economic loss.

Recommendation 3: Enhance information disclosure and public participation

There is not enough information disclosure in the current hydro development process, and the public is not actively participating in development projects that affect them. The law on EIA and the new environmental law both emphasize the importance of information disclosure and public participation. The government should disclose necessary information to encourage more public participation by local people in the decision-making process. In addition, capacity-building for poorly-educated populations in remote areas should be enhanced so that minority groups in the Nu River region can also participate.

Recommendation 4: Explore a localized development mode

Almost all the tributaries of the Nu River have been developed by small hydro, causing the closure or diversion of those tributaries, the alteration of the natural river habitat, and negative effects on the local ecological environment. Moreover, the overdevelopment of small hydro, the oversupply of electricity, and the incompleteness of the power grid have forced the local government to seek other outlets for surplus of electricity, such as development of high-energy-consuming factories. Fugong County has finished building a 15,000-ton potassium perchlorate project and another 60,000-ton project is being planned in Gongshan County. According to environmentalists, these chemical projects are the results of disorderly hydro development in Southwestern China. Many of the owners or managers of these projects are also shareholders in the hydro stations. Those investors have overdeveloped the Nu River but are still making environmentally disastrous mistakes by introducing high-energy consuming and polluting mining projects. The need for a large dam on the Nu River must be scientifically evaluated on the basis of nation-wide demand.

The agricultural economy in the Nu River region has also greatly damaged the local environment. Large-scale cash crop plantations, such as tobacco and tropical fruits, occupy the river valley south of Liuku, and have ruined native habitats. The tsao-ko fruit grown in Gongshan are also beginning to damage undergrowth vegetation. Large-scale cash crops are ecologically and environmentally destructive.

In recent years, eco-tourism has been introduced to the Nu River region. Tourism infrastructure including hotels, restaurants, guest houses and shops, is rapidly emerging. 2nd Red Bull International Kayak competition was held in the Grand Nu River Valley in March 2015. The Nu River was chosen for its strong torrents. Torrents are precious Nu River resources and are worthy of our protection. The government should actively explore an economic development model that is suitable for the Nu River region. We believe that a sustainable approach to development based on the unique natural and cultural resources of the Nu River is possible.
APPROVAL PROCESS FOR LARGE HYDROPOWER PROJECTS AND ANALYSIS OF THEIR STAKEHOLDERS

A CASE STUDY OF THE NU RIVER