Nepal, Hydropower and Geopolitics: Balancing Interests in the Tibetan Plateau

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Key Points

- Less than one per cent of Nepal’s enormous hydropower potential is currently utilised.

- Large-scale hydropower projects could generate enough power to satisfy domestic demand and enable the Nepalese Government to export surplus electricity, creating significant opportunities for economic growth in Nepal.

- As the Nepalese hydropower sector opens to foreign investment, an interesting power play is occurring between India and China, with each country vying for financial control of the proposed developments.

- The potential for poorly planned or executed hydropower projects is high, however, especially given the foreign investment currently being invested in the sector.

- A strategy for development that will cause minimal environmental damage in Nepal is essential if hydropower development is to be sustainable in the longer term.

Summary

The Himalayan river basins in the Tibetan Plateau Region provide a key source of water to the populations of China, India, Nepal and Bangladesh. Water availability in this region is expected to decline significantly in the near future, threatening the water security of the riparian states. Further, all four states suffer from an energy deficit that hinders economic development.
Nepal, endowed with perennial rivers and mountainous topography, has enormous scope to generate hydroelectricity, but only one per cent of that potential has been realised. The country’s hydropower could potentially supply electricity for both domestic and regional consumption. The financial gains for Nepal, if predicted energy generation is realised, is expected to lead to broader water development outcomes, including increased irrigation efficiencies and the construction of much needed infrastructure. In this way, energy and water security, both in Nepal and in the wider Himalayan region, are closely interrelated.

Nepal is dependent on foreign investment for hydropower development. Both China and India have negotiated with the Nepalese Government to invest in large-scale hydropower projects. While this investment is positive for the Nepalese economy, China’s and India’s investment interests have wider geopolitical implications for the region. Economic development in both China and India requires more energy than either country can produce domestically. Competition over access to the Nepalese energy sector has the potential to create conflict between the two powers as they compete for regional hegemony.

The rapid development of hydropower projects, without sufficient risk mitigation, also threatens Nepal’s natural environment and long-term water security. Nepal has already been affected by climate change: glacial melt and seismic activity have created a high degree of topographical instability. The development of large infrastructure, if not properly maintained, risks further destabilising the landscape.

Analysis

Nepal is a land-locked sovereign state located in the Himalayas, bordered to the north by the People’s Republic of China, and to the south, west and east by India. The country suffers from chronic poverty and underdevelopment. Having emerged from a ten year civil crisis in 2006, Nepal was classified as a “least developed country” by the UN Development Programme’s 2013 Human Development Report and is the sixteenth-poorest country in the world. Ethnic and religious diversity within the country, as well as an entrenched caste system, create barriers to development and 55 per cent of Nepal’s population currently lives below the poverty line.
The national economy is largely dependent on subsistence agriculture, which employs approximately 80 per cent of the population. Rapid urbanisation and population growth have increased competition for water between domestic, industrial and agricultural consumers and much of the peri-urban population lacks access to safe drinking water. Nepal also suffers from an energy deficit, which affects all sectors negatively, from industry to health and services. Approximately 40 per cent of Nepalese families have access to electricity and 17 per cent of this is supplied by community- or privately-owned systems. The Nepalese Government needs to address both water and energy security as pre-requisites to development.

Accessing Water in Nepal

Nepal’s extensive water resources may provide a solution to the country’s energy deficit and economic stagnation. Nepal is the world’s second-richest country in terms of water resources, with approximately 2.27 per cent of the world’s total water reserves. These resources largely comprise perennial rivers, as well as glaciers, snow melt from the Himalayas, rainfall and groundwater. Combined with Nepal’s mountainous topography, this provides ideal conditions for hydropower project development.

The development of Nepal’s hydropower sector is not a question of if but, rather, when and by whom. A number of studies suggest that the total capacity of viable hydropower in the country is as much as 43,000 megawatts (MW). The maximum domestic demand, meanwhile, is projected at less than 7,000 MW in a high growth scenario over the next 25 years. This creates considerable potential for the export of hydro-energy.

There are currently eight large-scale hydroelectric power operations in Nepal:

- The Babai River Project;
- The Bhote Koshi Power Plan;
- The Chililime Hydropower Plant;
- The Kalingandaki Hydroelectric Power Plant;
• The Khopasi Hydro Power Station;
• The Nepal Upper Trishuli Hydro Electric Project;
• The West Rapti River Plan;
• And the West Seti Dam Project.

Despite their scale, these projects generate only a fraction of Nepal’s energy potential.

Hydropower provides several key advantages as an energy source. It is regarded as a ‘clean’, non-polluting energy source and some argue it places less strain on the environment than more traditional energy generators. This is particularly important in South Asia, where expanding populations and rising energy consumption already strain natural resources. Hydropower infrastructure also has a long operating life and, after initial construction, the cost of generating power and the operation and maintenance of plants is relatively low. Importantly, the water used for hydropower is non-consumptive. After being exploited for electricity generation, it can be used for other purposes such as irrigation and domestic consumption. If Nepal is able to create the requisite infrastructure, the development of hydro-schemes could improve domestic water security as well as generate wealth.

Environmental Impacts

Power generation is expected to create a long-term, lucrative export market for Nepal, one which could potentially transform the government’s financial position. The real economic impact of hydropower development, however, needs to be assessed in relation to the long-term environmental and social effects of the projects. Large dams disrupt the natural flow of water, which can destroy natural habitats and affect rivers and silt flows. The ecological, environmental and social implications of hydropower development require detailed studies and thorough investigation. Given the high cost of undertaking such studies and the dire need for power in the region, however, it is unlikely that sufficient risk assessments have in fact been carried out.

It is also likely that the impacts of climate change have not been satisfactorily factored into the design of dams. In the Himalayan region, warming temperatures are expected to create changes in water availability leading to population displacement, agricultural and fishing losses, disease outbreaks and conflict. Floods from glacial lakes and increased evaporation due to rising temperatures could also damage dams and reduce the expected returns on projects. Although Nepal’s per capita water availability is relatively high, the country is by no means water secure, as changing weather patterns, monsoons and poor infrastructure lead much of the peri-urban and rural population to live with either too much water, or too little. Rising temperatures and glacial melt are likely to exacerbate this problem in the future. It is essential that the effects of climate change on the Nepalese environment are taken into account in infrastructural design and development.

Crucially, Nepal’s topography is highly seismic. Detailed studies of technical and economic feasibility are required to identify those areas where hydropower projects may be constructed and to demarcate fragile zones where heavy construction should be avoided.
Risk management is, however, a major challenge for the Nepalese Government, which tends to react to natural disasters rather than working to minimise, or preventing, damage. This year alone monsoon-related disasters have affected over 200,000 people in Nepal and displaced more than 34,000. A landslide that occurred in August was the deadliest in Nepal’s history. A lack of government accountability and community awareness creates further problems for disaster mitigation. The development of hydro-schemes can place extra pressure on the natural environment and increase the risks to communities should earthquakes or landslides occur. The desire to secure investment from India and China in Nepal’s hydropower sector could create an environment where crucial risk mitigation may be overlooked in favour of fast development.

**Financing Energy Development**

The greatest barrier to successful hydropower development in Nepal is the high cost associated with the initial development of projects. As Nepal’s public sector finance is insufficient to initiate large-scale projects, the government needs to attract both domestic and foreign private investment. It has, therefore, called for increased foreign direct investment in its hydropower sector from neighbouring countries in the region, the majority of which is likely to come from China and India.

Both China and India have expressed interest in the Nepalese energy sector as they equally suffer from an energy deficit. Both need to increase energy imports, at least as an interim measure until their own power generation projects begin generation, to meet the demand from their developing populations. China and India present ready markets for Nepalese surplus electricity. Most importantly, both states are in a position to supply the capital required to initiate project development in Nepal.

**Engagement with India**

India has recently increased its engagement with Nepal in order to access investment opportunities in the hydropower sector. India is currently Nepal’s most important trading partner, but Nepal is highly dependent on imports from India. In 2013 Nepal reported a trade deficit with India of 500 billion Nepalese rupees. In particular, Nepal is highly dependent on imported Indian petroleum for power generation: Indian petroleum comprised 19.6 per cent of Nepal’s total imports in 2013.

Approximately 35 per cent of the Indian population still lives without access to electricity, and it is estimated that India needs to add another 135 GW of power generation capacity before 2017. This is a result of the rapid growth experienced by the Indian manufacturing sector and the improvement in the standard of living in India. Particularly in northern India, the country experiences an acute power deficit, which places a huge demand on oil and coal imports. Nepal’s hydroelectric power could play a significant role in boosting India’s economy and building energy security.
India and Nepal have entered into hydropower agreements on several occasions, but attempts to develop Nepal’s hydro-sector have not progressed until now. The Mahakali Treaty between Nepal and India and the Pancheswar Multipurpose Project, which were negotiated in the 1990s, still remain undeveloped. This is beginning to change, however, and the relationship between India and Nepal has evolved in recent years. The visit of Indian Prime Minister Narendra Modi to Kathmandu in August this year marked the first official visit of an Indian head of government to Nepal in 17 years. Since the visit, trade talks on hydropower have increased and an “Agreement on Electric Power Trade, Cross-Border Transmission Interconnection and Grid Connectivity” (Power Trade Agreement), was formally signed on 21 October 2014.

The Power Trade Agreement has been described by the Indian Secretary of Energy, Pradeep Kumar Sinha, as one that ‘will throw up new vistas of co-operation between India and Nepal in the power sector.’ First prepared in 2010, its signing now gives energy producers in Nepal access to the Indian market. This is important for the Nepalese hydropower sector, as few producers would be interested in developing Nepalese electricity without the assurance of Indian demand. Two permanent mechanisms, a Joint Steering Committee and a Joint Working Group, have been formed to monitor existing areas and explore new areas of bilateral co-operation. Significantly, Prime Minister Modi has announced that the Pancheswar Multipurpose Project, which is expected to generate 6,720MW of electricity and irrigate 93,000 hectares of Nepalese land, will re-commence within a year. The signing of the Agreement indicates that further mutual economic co-operation is likely in the near future.

India and Nepal have also agreed to develop four large-scale Nepalese hydropower projects, for which the projected total benefit is approximately US$17 billion. The estimate includes such factors as free energy, royalties, tax income and dividends, and is close to Nepal’s annual GDP. The first of these projects to be developed is a US$1.4 billion hydro-scheme on the upper Karnali River, which is due to be completed in 2021. Nepal’s Investment Board has
signed an agreement with Indian infrastructure group GMR for a 900MW dam and tunnel system. Under a “build, operate and transfer” project, Nepal will have a 27 per cent equity share in the project and 12 per cent of generated electricity output for 25 years, at which time ownership of the project will be transferred to it. Such projects create hope for the Nepalese power sector and the wider economy.

**Engagement with China**

China entered Nepal's water and power sector in 2012. Nepalese hydropower is attractive to China for a number of reasons. Like India, China is energy deficient, which creates a barrier to its further development. China is heavily dependent on coal and petroleum to supply energy to its rapidly expanding manufacturing sector, and the growth of China’s middle class has increased power demand for domestic consumption. The Chinese Government, which has expressed its interest in reducing its carbon footprint and coal dependence, has shown a preference for expanding the domestic hydropower sector. As China’s water resources decline, however, this is becoming increasingly unfeasible. Limited domestic resources mean that imported power is required to meet energy demand and Nepal can provide a partial solution.

A visit from Chinese Prime Minister Wen Jiabao to Nepal was followed by the signing of a US$1.6 billion agreement to develop the 760 MW West Seti hydropower project. There has been a steady influx of Chinese investment into Nepal since then. Until recently, China viewed Nepal as a state protected and hugely influenced by India and attempting to increase Chinese influence there was not felt to be viable. Between 2007 and 2011, China’s investment in Nepal doubled across all sectors, including transport, infrastructure and hydroelectricity. China has increased its aid expenditure and infrastructure development in Nepal in recent years, upgrading road networks in the Himalayas and supplying finance to the Nepalese army and police force. This involvement is a form of economic diplomacy: by increasing its engagement in Nepal, China has positioned itself as a ready trading partner as the Nepalese hydroelectricity market develops.

**Geopolitical Dynamics: China and India**

Chinese and Indian investment in Nepal’s hydropower sector will create huge financial changes for the Nepalese Government. It is also strategically significant for the Tibetan Plateau region. Both China and India seek to project their influence in the South Asian region and their ongoing involvement in Nepal can be viewed as a stratagem to achieve this goal.

Nepal is strategically attractive to China not only for its energy potential, but also politically. Influence in Nepal would secure China stronger regional leadership vis-à-vis India. Its shared border with Nepal also gives it immediate access to Nepalese markets. Further, China could potentially exert a greater degree of influence on the Tibetan refugees who reside in Nepal. Conversely, the Modi Government would like a pro-Indian Nepal that helps to reduce Chinese influence in South Asia. Interestingly, Modi has set transport and infrastructural
development as primary areas of co-operation between India and Nepal, areas in which China has also been increasingly active.

Nepal needs to take an assertive position on its water resources while the Sino-Indian competition plays out. The country is in dire need of funds to develop its hydro-sector, but it is essential that Kathmandu continues to take the sustainable future of its water resources into account. The challenge for Nepal, in expanding its engagement with China and India as trading partners, will be to agree to award projects to both in a way that maintains peace between the two powers. If Nepal relinquishes too much control over its hydropower and related resources, it could, in the long term, jeopardise its water and energy security.

It is in the best interests of India and China, furthermore, to strengthen their relationship, regardless of any competition over Nepal. Today, China is India’s largest trading partner and India is China’s seventh-largest export destination. Large Indian companies such as Infosys, TCS, APTECH, Mahindra and Mahindra, Wipro and Suzlon Energy, as well as many Indian banks, are currently active in China. It is essential that the two states work together to overcome their differences and foster long-term energy and water security in the region.

**Conclusion and Recommendations**

Water and power generation are Nepal’s greatest resources and can provide the key to its economic development. China and India, Nepal’s energy-deficient neighbours, can provide the finance required for project development.

There is a concern that Nepal’s development strategy is too focussed on the short term. Energy projects require careful risk assessment and environmental impact management if they are to be developed sustainably. Nepal is vulnerable to influence from neighbouring countries competing to invest in its budding energy sector. Its national infrastructure also needs to be strengthened if hydropower profits are to be fully realised in the long term. To maximise the benefits for Nepalese communities and to reduce the overall cost of energy production, Nepali workers must be trained in construction and other fields. Moreover, since the construction of large-scale water projects in Nepal is often linked with corruption and malpractice, Nepal needs to strengthen its capacity to manage these projects and increase transparency.

Climate change, the depletion of water resources and increasingly erratic monsoons are issues that will affect the region as a whole. In the long term, regional water security requires the prioritisation of a more holistic, integrated approach to basin management. Before this is possible, trust and confidence between Nepal, China and India must be enhanced through co-operation, data sharing, scientific exchanges and trade. The production and trade of hydro-electricity could play a key role in achieving that outcome.
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