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Hydropower, social priorities and the rural–urban development divide: The case of large dams in Cambodia

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HIGHLIGHTS

- We assess social priorities linked to the impacts of a large dam in Cambodia.
- We examine differences between local actors in the prioritization of the impacts.
- Findings show divergences between national and local priorities of dam construction.
- Distribution of cost and benefit is spatially unequal between rural and urban areas.

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ABSTRACT

Hydropower investment is a priority in many developing countries, as a means to increase electrification rates and promote national development. However, neglect of dam-affected people's needs, can make them vulnerable to the multifaceted impacts of such projects. Using the case of Cambodia's first large dam, the Kamchay dam, this paper reveals social priorities of affected communities and institutional actors linked to environmental and social implications of large hydropower projects using a preference ranking method. Qualitative research revealed concerns among dam-affected communities which included energy access, livelihood changes, environmental impacts, access to natural resources and compensation. Results also reveal divergence between national and local priorities, which in turn brings about an unequal distribution of costs and benefits of the Kamchay Dam between urban and rural areas. The paper provides recommendations to policy-makers, NGOs and international organizations regarding governance issues, consultation processes and mitigation measures.

1. Introduction

This paper aims to analyse the local perceptions of the social and environmental impacts of large dams post-construction by affected community members and institutional actors and to discuss how the impacts of the dams are distributed between the national and local scales, as well as rural and urban areas.

The resurgent interest in large dams as a means to reduce energy poverty, especially in developing countries, and to mitigate global climate change (International Rivers, 2013; World Bank, 2013, 2009), has revived interest in their social and environmental implications and the way they should be managed (Skinner and Haas, 2014; Urban and Siciliano, 2014). Recently, new large hydropower projects have been planned all over the world, but particularly in developing countries. South-East Asia has become the world's top investment region for large dams (International Rivers, 2013). In Southeast Asia, 72 new projects have been planned in Laos, 10 in Sarawak Malaysia, more than 50 in Cambodia and at least 6 projects in Myanmar and at the border of Thailand–Myanmar (International Rivers, 2015; ODC, 2014). Access to modern energy services is particularly poor in Southeast Asia compared to most other parts of the world, with Cambodia and Myanmar having the lowest rural electrification rates (IEA, 2013). Hydropower development is therefore a key energy priority in most Southeast Asian countries (Suhardiman et al., 2011). Cambodia is one of the countries that has large hydropower potential and is actively exploiting it by attracting foreign investment from Chinese and other dam-builders (International Rivers, 2013). The focus of this paper is the 194-megawatt Kamchay Dam, which is the first large dam ever built in Cambodia and the only one that has been fully operational since 2011. It is also the first dam funded

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and built by Chinese dam-builders. Being the first large hydropower project in Cambodia, the Kamchay Dam is an important test case that provides insights into post-project impacts and how they have been perceived by the local populations and institutional actors.

Nevertheless, large hydropower dams have also been controversial in terms of their social and environmental sustainability. In terms of the biophysical aspects, the main impacts refer to fragmentation of river systems, but also fragmentation of the vegetation, impacts on soil and water quality, impacts on species composition and aquatic biota, and changes to geomorphology (Bakken et al., 2014; Brown et al., 2009; Burke et al., 2009; McCallum, 2008). Regarding social impacts the most critical are displacement, resettlement and migration, changes in livelihood strategies, poor compensation, impacts on culture and social relations, impacts on community health and gender relations, and loss of land and water access (Brown et al., 2009; Lerer and Scudder, 1999; McDonald-Wilmsen and Webber, 2010; Jackson and Sleigh, 2000; Tilt et al., 2009; Tullos et al., 2013; Urban et al., 2013; WCD, 2000; Majid Cooke et al., 2014). Moreover, many of the proposed new projects have resulted in opposition from affected indigenous communities, which can spill over into conflict (Costa, 2014; Fleury and Almeida, 2013; Swain and Chee, 2004). These tensions arise mainly because hydropower projects in developing countries are often planned to increase energy access in urban areas, with poor consideration of their local impacts (Magee, 2006; Pearse-Smith, 2014; Duflo and Pande, 2007; Ansar et al., 2014; Sovacool et al., 2014). Magee (2006) described this phenomenon as the "powershed", given that large hydropower dams produce most benefits in urban centres far away from the dam itself.

In such contexts, knowing the priorities of dam-affected populations could help to address people's expectations and plan for unpredicted impacts. It might also help inform locally appropriate mitigation strategies (Diduck et al., 2013; Mirumachi and Torriti, 2012; Skinner et al., 2009). Despite the emphasis on stakeholder involvement in the decision making process of large hydropower projects, especially by international institutions such as the International Hydropower Association (IHA) and the World Commission on Dams (IHA, 2010; WCD, 2000), the implementation of systematic procedures to reveal social priorities is still very unusual in developing countries (UNEP, 2007; Urban and Siciliano, 2014). It has been estimated that environmental and social safeguard processes derived from public consultations have been implemented in only 10–15% of new hydropower projects around the world (Skinner and Haas, 2014). To be effective, safeguard processes should be informed by wide public participation, through which the priorities of different stakeholders, including affected communities are disclosed (Diduck et al., 2013). To this end the article analyses the dam-affected communities' and institutional actors' perceptions of the social and environmental impacts of a large dam project following its construction and to assess the distribution of its impacts between rural and urban areas.

Using the case of the Kamchay dam in Cambodia, the article asks: what are the local perceptions of the post-project social and environmental impacts? How do different stakeholders prioritise those impacts at different levels? Are positive and negative impacts evenly distributed between rural and urban areas? To address these questions the paper is structured as follows. Section 2 gives an overview of the hydropower strategies of the Cambodian government and an introduction to the Kamchay Dam and the case study area. Section 3 explains the research methods used. Section 4 discusses the results of the interviews on the perceived social and environmental impacts and the prioritization exercise carried out with local actors. Section 5 concludes the paper.

2. Case study

2.1. Cambodia's hydropower strategy

In Cambodia the electrification rate in urban areas is high with 97% whereas in rural areas the rate is much lower. In 2013 electricity only reached 68% of rural villages (EAC, 2014; RGC, 2013). In 2011 the energy mix showed a heavy reliance on oil products for electricity production. Oil products accounted for 90% of the total with only 4% coming from hydropower, followed by coal and peat 3%, biofuels 2% and solar PV less than 1%. Fossil fuels are used both for transport and electricity generation. Moreover, between 1990 and 2010 Cambodia saw a decline in energy security (Sovacool et al., 2011).

Therefore, the government substantially increased investment in hydropower since 2011 (Table 1). Moreover, Cambodia plans to build more than 50 new hydropower projects (Clean Energy Info Portal – reegle, 2013; ODC, 2014). As the hydropower sector in Cambodia is still in its infancy, it is unclear if the impacts will be adequately mitigated (McCallum, 2008). In relation to existing hydropower projects in Cambodia, concerns have been raised by civil society and local communities that inadequate attention is being paid to the negative impacts, while public consultation has been lacking (ODC, 2014).

Although the energy production from hydropower has increased substantially in the last few years Cambodia still relies heavily on electricity imports, mainly from neighbouring countries. In 2013, imports of 2282 GWh far exceeded the domestic production of 1770 GWh (EAC, 2014). As a consequence, the cost of electricity is one of the highest in the world (IEA, 2013). According to the National Strategic Development Plan 2009–2013 (NSDP), energy is central to sustainable growth and poverty reduction in the country. Improving the power sector is one of the government's key priorities for ensuring a reliable, secure electricity supply at affordable prices (Government of Cambodia, 2010).

Given these pressures hydropower development represents the main energy priority in the country with the exploitable mid to long-term hydropower potential estimated at 1900 MW. In the

Table 1
Generation facilities and energy produced: classification by generation type.
Source: EAC (2014)

Type of generation	Installed capacity (kW)		Proportion of installed grid capacity in % for 2013	Energy produced, (Million kWh)		Proportion of energy produced in % for 2013
	Year 2012	Year 2013		Year 2012	Year 2013	
Hydropower	225,430	682,100	59.06	517.37	1015.54	57.38
Diesel/heavy fuel oil	321,005	325,323	28.17	856.563	578.99	32.71
Wood, other bio mass	22,500	14,570	1.26	11.747	6.68	0.38
Coal	13,000	133,000	11.52	37.42	168.75	9.53
Total	581,935	1,154,993	100	1,423.1	1769.96	100