



Analysis

Equity-based Natural Resource Allocation for Infrastructure Development: Evidence From Large Hydropower Dams in Africa and Asia



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ABSTRACT

Large hydropower infrastructure development is a key energy priority in low and middle income countries as a means to increase energy access and promote national development. Nevertheless hydropower dams can also negatively impact people's livelihoods by reducing access to local natural resources such as land, water and food. This paper analyses equity-based resource allocation from an ecological economics perspective, by looking at local resource use competition between different uses (food, energy, livelihoods) and users (villagers, urban settlers, local government and dam builders) in selected case studies in Asia and Africa. It also illustrates from a political ecology approach divergences between national priorities of energy production and growth and local development needs.

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1. Introduction

In the pursuit of climate change mitigation and energy access hydro-power is experiencing a new renaissance (World Bank, 2013). 1.3 billion people world-wide do not have access to electricity and 2.7 billion people rely on traditional biomass for basic needs such as cooking and heating. At the global level, Sub-Saharan Africa and developing Asia account collectively for 97% of the total population without access to electricity (IEA, 2014). The need to ensure “access to affordable, reliable, sustainable and modern energy” (United Nations, 2015) is therefore recognised as critical in Africa and Asia to the achievement of the Sustainable Development Goals (SDGs). To increase energy access in the last years, new large hydropower projects have been planned all over the world and Southeast Asia and Africa are the most targeted continents. Africa holds about 12% of the world's hydropower potential. Yet Africa produces only about 3% of the global hydropower and exploits less than 10% of its technical capacity, the lowest proportion of any of the world's regions (Appleyard, 2014). Therefore, many large hydropower dams are being built or considered in Africa (International Rivers, 2015a). On the same direction, Southeast Asian countries plan to construct 61 gigawatts (GW) of new hydroelectric generating capacity through 2020 (Mayes, 2015). As a result, 72 new projects have been planned in Laos, 10 in Sarawak, Malaysia and at least 60 new projects are under consideration in Burma and in Cambodia (International Rivers, 2015b).

Despite the importance of hydropower dams for improving energy access in energy poor countries, the interrelationship between the population and the environment are severely affected by the construction of large infrastructure projects such as dams (WCD, 2000; Tilt et al., 2009; Lahiri-Dutt, 2012; Tullos et al., 2013; Buechler et al., 2016). This paper aims to discuss the ecological economics of large dams' development in Africa and Asia, particularly in terms of distribution of natural resource access and local resource use between alternative uses (food, energy, livelihoods) and different users (villagers, urban settlers, local government and dam builders). The analysis is referred to selected case studies, namely Kamchay dam in Cambodia, Bakun dam in Malaysia and Bui dam in Ghana.

Reduced access to natural resources for indigenous communities after dam construction such as land, water, forests often negatively impacts their livelihoods, since natural resources represent for the majority of those people the main capital asset on which their livelihoods depend (Swiderska et al., 2008). Therefore, the ecological and the economic dimensions are strictly interlinked with regard to resource access for affected communities. Moreover, the severity of the impacts depends to some extent on the governance of these impacts in terms of how equity-based principles, such as principles of distributive justice (fairness in the distribution of access to natural resources) and procedural justice (fairness of procedures in terms of opportunities for participation in the decision making process of affected communities) (Marques et al., 2015; Urban et al., 2015) are taken into account by the local government and dam builders in the decision making process of large dams. A political ecology approach is therefore relevant to understand how divergence between national priorities of energy

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production and local development needs can result in the poor implementation of social safeguards processes and therefore the unequal distribution over access to resources (Bryant and Bailey, 1997; Blaikie, 1985; Peet and Watts, 2004; Tan-Mullins, 2007).

Looking at the literature on the political ecology of state-led infrastructure development (e.g. intensive agriculture, energy projects, extractive projects), various studies highlight the uneven power relations inherent in decision making regarding these projects; usually, the costs and benefits are unequally distributed between the national and local scales and the people most affected are not involved in the planning and construction process (Turhan, 2014; Bebbington, 2009; Dominguez, 2007; Silver, 2015; McCully, 2001; Baghel and Nüsser, 2010; Smits, 2015). In relation to infrastructure development and inequality, economics literature has also showed that government investment on infrastructure can increase wealth inequality over time and generate trade-offs between average welfare produced and its distribution across agents and regions (Chatterjee and Turnovsky, 2012; Bajar and Rajeev, 2015; Calderón and Servén, 2014). However, this literature has generally ignored the effects of infrastructure development on access and affordability of different affected people and on the distribution of natural resources' use. In the case of literature on inequality this is due to the fact that these studies are mainly based on quantitative econometric analyses of time-series and cross-section aggregated macro and microeconomic data to test for the effects of infrastructure development without taking into account different people's experience of distributional issues post-construction (Calderón and Servén, 2014). Moreover, looking explicitly at large dams, despite the increasing literature on the impacts of dams' construction in developing countries, there are still few studies that look explicitly at the questions of distributive and procedural justice and their implications for local development. Most of the studies on large dams focus either on technical/financial issues (Ansar et al., 2014; Sovacool et al., 2014) or socio-ecological aspects (Bakken et al., 2014; Burke et al., 2009; Brown et al., 2009; Lerer and Scudder, 1999; Tilt et al., 2009). Among the few studies on justice principles applied specifically to dams' construction, Sovacool and Dworkin, 2015 call for an energy justice approach applied to the analysis of energy infrastructure implications on local communities and for a better integration of social sciences approaches in the evaluation of large dams; however there are not yet examples of its application to specific projects. Braun, 2015 looks at large dams development and inequality in Lesotho from a feminist political ecology and environmental justice perspective. Moreover, Marques et al., 2015 uses a procedural justice approach to analyse the perceived trust of affected communities and expected outcomes of two dams' projects in Portugal. Nordensvard and Urban, 2015 analyse the nexus between hydropower dams and corporate social responsibility by focusing on Chinese state-owned dam builders and the implementation of social policy and social justice principles to mitigate local impacts. This paper looks from a broader perspective at how and whether both distributive and procedural justice are taken into account in the decision making process of large dams construction in relation to competing uses of different natural resources (i.e. water, energy, land, food, and forest). It provides a systematic and comparative analysis of large dams' impacts by focusing on affected peoples' perception and experience of resource access post-construction. We follow this approach inspired by Jenkins et al. (2016) idea that energy injustice recognition starts with the identification of the concern, questioning who is impacted and how victims are recognised (recognition), how benefits and costs are distributed (distribution), and impacts remediated (procedure).

Moreover, from a political ecology perspective this paper looks at how social mitigation strategies (i.e. compensation, alternative livelihoods provision and consultation processes) are being implemented by the local government and dam builders to secure a balanced natural resource access between competing users and uses.

The rest of the paper is organised as follows. In Section 2 we present the theoretical framework by situating the issue of large dams within

the broader context of procedural and distributive justice from an ecological economics and political ecology perspectives. In this section we also present the methodology used to analyse the impacts of large dams on the access to natural resources and we introduce the case studies. In Section 3 we present and discuss the results of the analysis by distinguishing between people's perceptions and governance issues. Section 4 concludes the paper.

2. Conceptual Framework and Methodology

2.1. Conceptual Framework

From an ecological economics perspective three conditions are considered necessary for sustainable economic activity, there are: appropriate scale, efficient allocation and just distribution of resources in a socio-economic system (Daly, 1992). Appropriate scale refers to the physical volume of products; allocation to the division of the resource flow among different and competing uses and distribution to the division of the resource flow among different beneficiaries (Daly, 1992). In ecological economics intra and intergenerational distributive justice is analysed, from an anthropocentric view, in terms of how changes in the allocation of resources over time and space may frustrate the potential needs satisfaction of human economic agents. Non-anthropocentric distributive justice instead refers to the concern for nature independently from the impacts on human welfare (van den Bergh, 1997; Pelletier, 2010). According to Daly, 1992 when speaking about sustainability, efficient distribution of natural resources is usually not determined by prices, and socially-just distribution is better achieved upon a social decision. Deliberative ecological economics based on the inclusion of different values in the decision making process is well established in the ecological economics literature, together with the idea that environmental preferences are socially constructed through processes of communication and interaction among different social actors (for an overview of this literature the reader is referred to Martínez-Alier and Muradian, 2015). Therefore recognition, participation and legitimacy (i.e. procedural justice) (Paavola and Adger, 2006), play a fundamental role in the decision-making process to achieve sustainable, inclusive and fair environmental governance (O'Neill and Spash, 2000).

Based on the above, this paper looks at procedural justice and intra-generational distributive justice principles in the allocation of natural resources (i.e. water, energy, land) between competing uses and users and how this affect the local population's needs in the case of large dams' construction in remote rural areas in developing countries. The allocation of natural resources between competing uses and users in remote rural communities has important implications for local development (Martinez-Alier, 2002; Martinez-Alier et al., 2010; Haberl, 2015). In rural areas in developing countries natural resources underpin the livelihoods of many among the poorest (Norfolk, 2004). The failures to implement distributive justice, and people-centred interventions through local participation (i.e. procedural justice) (Flint, 2013) result in the development of infrastructures which although promote economic growth at the national level (Calderón and Servén, 2014), often do not serve the needs of poor local communities which are directly affected by those projects (Marques et al., 2015). Unequal distribution caused by the varied forms of appropriation and control over the access to natural resources such as land, water and energy are also at the basis of the political ecology framework (Wolf, 1972, Greenberg and Park, 1994; Bryant and Bailey, 1997, Blaikie, 1985, Peet and Watts, 2004; Tan-Mullins, 2007; Buechler and Hanson, 2015). Bryant and Bailey, 1997 developed three fundamental assumptions when utilizing political ecology research findings to develop better policies and programs for developing countries. First, costs and benefits associated with environmental change are distributed unequally. Second, this unequal distribution inevitably reinforces or reduces existing social and economic inequalities. Third, the unequal distribution of costs and benefits and

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