

Amreeta Regmi. 2004. *Democratising Microhydel: Structure, Systems and Agents in Adaptive Technology in the Hills of Nepal*. Wageningen University Water Resources Series. Hyderabad: Orient Longman Pvt. Ltd.

Water resources have been prioritised differently in different time periods in ongoing development debates in Nepal. In the late seventies water as a resource was seen as blue gold – a source of enormous potential revenue for Nepal – if hydroelectricity could be generated and sold abroad. By the nineties this notion was being challenged, as in the protest against Arun III. Instead, micro-hydel, as an alternative to macro-hydro, began to dominate plans and policies in Nepal. In this context of current debates over macro vs. micro in the electrification in Nepal, *Democratising Microhydel* by Amreeta Regmi raises relevant issues and concerns. The book investigates the interplay of structures (policy, institutions, and governance), systems (the designed physical system in its environment) and agents (people and knowledge) in shaping the design functions and adaptive properties of micro-hydel technology and the possibilities for technological democracy in micro hydro energy system and hydropower policies in Nepal. She goes beyond seeing electricity as energy and development. Rather, she raises fundamental issues of power, identity, need, and local governance that shape and reshape the technology and vice versa.

Regmi's book is the outcome of Ph.D. research on microhydel systems in the Kabrepalanchowk district of central Nepal. The research is based on systematic inquiry through multiple case studies. Three of the systems studied are in the micro-hydel energy system (MHES) category for supplying local communities and one is in the medium category that also supplies electricity into the national grid. The book is organized into nine chapters. The first and second chapters introduce and review hydroelectricity policies and the actors involved. The third chapter puts the research in the context of conflicts in the country at the time of the research. Chapters four, five, and six are empirical chapters with cases of hydel systems in Pinthali, Katunje Besi, and Kusha Devi respectively. Chapter seven examines the socio-political dynamics that shape the technology. Chapter eight analyzes the extent to which transformative units and evolutionary systems have come into being to make MHES work for their users. The last chapter concludes that hydel technology in rural Nepal does not only mean illumination and development, but is also tied up in matters of identity, power, control, and democracy.

The author conceptualises community micro hydel technology as an adaptive socio-technical system of water control for energy generation. The technology is seen as possessing adaptive properties such that it can be transformed from hydraulic ensemble into units with capacities to serve agricultural water needs and power supply. The democratisation of technology is understood as a focus of interaction within the process of governance, implementation, performance, and resource control. The understanding of domains of actions, structures, systems, and agents is conceptualised as distinct from, yet interactive with, cognitive forces with reciprocal interfaces influencing each domain.

The review of hydroelectricity policies and agents/actors in chapter two reveals that the macro level focus has remained on strengthening bilateral collaborations with an intention of selling power to India. The micro policies interface with macro policies for rural electrification through non-grid systems. Some non-grid MHES projects with defined capacities failed to produce additional demand for electricity in rural areas. The review is descriptive and interesting, tracing hydro policy in Nepal from the first civil code of 1854, to second-generation promotion of microhydel in 2000.

The third chapter of the book, “Rural politics and social transformation: from Sangrila to friends from jungle” effectively documents the ideological struggle for a Nepali identity by describing the genesis of the Maoist movement in the country and its effect on technological emancipation. The chapter concludes that agents need to recognise the political world in which they act and understand that struggle and identity has an impact on technology.

Chapter four, “Creative technology and proactive processes: the cross flow MHES at Pinthali” presents a success story where structure and agents interfaced effectively within themselves and together to steer the evolution of MHES. The Pinthali design enabled participants to fulfil basic needs, gave people the capacity to effectively manage within their given agro-ecological setting, and fostered social interaction and space for people to build knowledge and accountable governance.

In contrast, chapter five, “Technology trial and prototype testing: the propeller MHES at Katunje Besi,” describes the case of a 8kW propeller turbine installed and implemented under a research and development program by the Rural Energy Development Program. The system failed to address community needs and was very poor in process management. The writer argues that the lack of aesthetics or designer’s appreciation in the overall design of this prototype indicates that contact with the community

during the initial stages was minimal, and that insufficient consideration of the community's operation and maintenance needs were made. Chapter six, "Experimental design in a struggling community: Pico power pack in Nayagaon, Kusha Devi" examines the materialisation and functionality of design and the various networks within which the design process is embedded. The design introduced florescent lights to users with the goal of conserving energy. However, in practice community members could not replace the lights (that were immediately damaged by power fluctuations) because they were too expensive. Chapter eight, "Technology transfer and transformation: Panauti small hydel system and Francis wheel turbines" presents an interface between farmers' desire for irrigation water and the state's interest in supplying power to the national grid. Of the four case studies, one presents a harmonised interface of structure, agents, and systems, whereas the other three cases show the complexities of the interface and the resulting poor outcomes.

Regmi argues that technology designs often sustain patterns of authoritarianism by ignoring local people's aspirations and needs. For systems to work and evolve, MHES need an understanding of accountability that moves beyond operational and financial domains to include socio-political accountability in the design of process. Technological democracy is shaped by organisations, institutions, and policies where technology acts as a mechanism of control or liberation. When technology is democratic and practical for users, operated in their interests, and with their representation, then relevant choices become available without restriction. On other hand, coalition movements and efforts should not focus on the choice between large and small, but rather seek alternative links and focus on developing the overlap between macro and micro policy links.

Overall the book is well structured and articulated. The concept of "democratising technology" provides an opportunity to look at technology from a wider perspective. The book is a reference source for policy makers, implementers, and students. The review of structures, systems, and agents involved in rural electrification in Nepal, along with case studies that bring field realities down to earth, make this a complete book. The book offers interesting evidence and analysis, though by limiting its focus to Kabrepalanchowk district (a neighbouring district to the capital) the book's findings are less generalizeable, especially in terms of socio-political consequences. The findings might be hard for pro-MHES groups to use seeing that of the four case studies presented only one is a success. The book has not looked into macro hydropower, which

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I think is beyond it's scope. The writer concludes that there is a need to look for alternative links that focus on developing overlaps between macro and micro policy.

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