

Title:

Micro Hydro Power Plants in Andean Bolivian communities: impacts on development and environment

Authors:

Andrés Hueso González

Group of Studies on Development, Cooperation and Ethics
Universidad Politécnica de Valencia

Alejandra Boni Aristizábal, PhD.

Group of Studies on Development, Cooperation and Ethics
Universidad Politécnica de Valencia

Rafael Monterde Díaz, PhD,

Group of Studies on Development, Cooperation and Ethics
Universidad Politécnica de Valencia

Contact information:

E-mail: anhuegon@etsii.upv.es

Direction:

ETSII-UPV

Camino de Vera s/nº

46022, Valencia, Spain

Phone number: +34 656 632 331

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Objectives:

Analyze the effects of micro hydro power development aid projects in Andean Bolivian communities under the lens of the capability approach, paying especial attention to

equality issues.

Analyze the environmental effects and the sustainability of the projects.

Main contributions:

This paper is an interesting example of the potentialities of the capability approach as evaluative space for energy-based projects.

It is an example of “best practice project”, showing how renewable energy can help improving people's life in a clean and sustainable way.

Important references:

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Digest

This paper's **main purpose** is to use the potentiality of the capability approach for analysing the impacts of micro hydro power development aid projects in Andean Bolivian communities. As secondary purposes, this paper aims to analyse environmental effects and sustainability of the projects and to draw an outline between energy and Human Development.

Thus, the paper has five sections.

First, we analyse the role played by access to energy services in Human Development, concentered in the contribution to the achievement of the Millennium Development Goals (MDGs). Although the access to energy services is not included in the MDGs, it is considered to be "a prerequisite to the achievement of all eight MDGs" (UNDP, 2005) because of its influence in the areas of health, education, culture, communication and productivity.

Second, we present the context of the projects and the study.

The projects were designed by the Hydrology and Hydraulics Institute (IHH) of the Universidad Mayor de San Andrés (UMSA) in La Paz (Bolivia) and

implemented in small rural communities isolated from the national electricity grid in La Paz. Funding came from the Small Grants Program of the Global Environment Facility (SGP/GEF) embodied in the United Nations Programme for the Development of Bolivia (UNDP) and, to a lesser extent, from the governmental National Program for Climate Change. There was always co-funding from local institutions, and the members of the community contributed with their work and some materials to the projects. The projects consist of the implementation of micro or pico hydro power plants (from 1 to 70 kW) in the communities, which range from 5 to 250 families. The plants generate electricity for household access in the community and for communal uses: public lighting, school's equipment, medical equipment, meetings, etc.

From the 9 communities involved in the study, 8 of them are in the subtropical Bolivian *Yungas*, the transitional regions between the highlands and the lowlands, belonging the last one to the highlands. The inhabitants of these communities are Quechua and Aymara indigenous people, which live from agriculture, mainly cultivating coca,

whose leaf is used by chewing or as herbal tea by Andean cultures for medicinal and ceremonial purposes.

The impact assessment was committed by the Bolivian Social Grants Program. The study consisted mainly of qualitative field trips made by the researcher that visited the communities in order to analyze the impacts of the different projects. The data collection methods were mostly qualitative, like informal and semi-structured interviews with key stake-holders

In the **third section**, we reexamine the impact assessment through the lens of the capability approach. This approach, sees development "as a process of expanding the real freedoms that people enjoy". The functionings are defined as the various things a person may value doing or being, while a person's capabilities refer "to the alternative combinations of functionings that are feasible for her to achieve" (Sen, 1999), that is, her real freedom to choose the things to do and the ways of being she has reason to value. We revisit the projects' effects analysing how they contributed to the expansion of people's capabilities and the functionings they achieved.

For this analysis, we use Robeyns work on the operationalization of the capability approach. She distinguishes between means (endowments) that enable the expansion of capabilities (one side goods and services and on

the other social institutions) and conversion factors; material and non-material, internal and external circumstances that shape people's opportunities.

A final remark is made on the issue of equality, especially referred to indigenous people and women.

In the **fourth section**, we analyse the impact of the projects on the environment and their sustainability.

The use of small renewable energy plants like these micro hydro power plants have mainly positive effects in both the close and the global environment. The most remarkable aspect is the reduction of the emissions of carbon dioxide equivalent.

The sustainability of the projects is analysed in its economical, institutional, technical and environmental dimension. The appropriation of the projects by the communities and the fact that the technology was adapted to the local context contributed to guaranteeing the sustainability in all the dimensions.

Finally, we summarise the conclusions we arrived to in the former section and highlight two main lessons learnt with the research.

On the one hand, the potential of the capability approach for evaluating energy-based projects.

On the other hand, the fact that this projects are an example of how renewable energy can contribute to Sustainable Human Development.