

Bhutan: Balancing Growth and Environment Conservation through Hydro Power

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Introduction

Economic growth and environmental conservation are like two sides of a coin, one useless without the other. One may not necessarily acknowledge the other on a daily basis but in the long run, it is evident that one cannot be sustained without the other. The health and wealth of both entities are needed for a society and a nation to advance in a sustainable manner. The world has seen time and again the negative aspects of economic growth pursued without considering environmental consequences, and similarly too much emphasis on environmental conservation deprives communities of much needed social and economic development. A dichotomous vision of the conventional framework of environmental conservation on the one hand and economic growth on the other is leading to the waste of resources, as it does not recognize the complementary qualities of the two to realize progress.

I come from a country that acknowledges the importance of balancing economic growth and environmental conservation as a vital step forward. Under the farsighted statesmanship of His Majesty the Fourth King, Bhutan encapsulated this concept in the nation's guiding policy of Gross National Happiness (GNH) in the early 1970s.¹ In a nutshell, GNH is a people-centered holistic development program of social and economic change with a catalog of goals and priorities towards making the notion of good development operational. It is promulgated as the ultimate, overarching goal of policies of development. One distinguishing characteristic is that it is the State's responsibility to ensure that the individual's progress toward happiness is not "impeded by unnecessary suffering, material or mental."²

Rather than measuring economic growth solely in terms of Gross Domestic Product (GDP), GNH looks at environmental, cultural and governance issues related to the development of human societies. GNH at the moment is pursued through four platforms: sustainable and equitable socioeconomic development, cultural preservation, environmental conservation, and good governance.

To illustrate the theme of this topic, I shall deliberate on the generation of hydroelectric energy and environmental conservation in Bhutan. I want to stress that Bhutan has recognized the strong relationship between energy policy and the environment and has consciously adopted a policy to produce very cheap hydropower for economic growth while conserving the environment.

Hydroelectricity in Bhutan

Contrary to the common belief about the harmful impacts of hydroelectric projects around the world, hydroelectric power production in Bhutan has had a minimal environmental and social impact, and high economic benefits. Bhutan's rivers are on steep gradients and the country experiences good rainfalls that allow the run-off to go to the hydroelectric plants. No big reservoirs have been created and therefore no villages or valleys

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¹ The Centre for Bhutan Studies. 1999. *Gross National Happiness: A Set of Discussion Papers*. Available: <http://www.bhutanstudies.org.bt/publications/gnh/gnh.htm>

² The Centre for Bhutan Studies. 2005. Keynote Address by the President of Centre for Bhutan studies during the 2nd International Conference on Gross National Happiness in Canada. 21 June. Available: <http://www.bhutanstudies.org.bt/>

have been submerged and there has been very little resettlement. Water is diverted and run through a hydroelectric plant and back into the river. Almost all the power plants are underground, so even visually one cannot see any real environmental impact on the surface. The dams are eco-friendly since the run-off scheme does not require storage or thermal plants. However, the challenge of such dams is that there is a wide disparity between the lean and monsoon flows of rivers, and they are unable to operate at full capacity at all times.

Bhutan has the potential to harness a total capacity of 34,000 megawatts (MW), out of which only 430 MW is presently harnessed. This is less than 2% of the total potential.³ The scope for growth and development is huge. The revenue generated from hydroelectric power, the majority of which is exported to India, constitutes 35% to 40% of Government revenue.⁴ The Government is able to provide cheap electricity to its citizens, especially those in rural and remote communities.

Hydroelectricity and Environment Conservation

Bhutan is well known for her environmental heritage and conservation, and is one of the biological "hot-spots" with very high levels of biological diversity at the ecosystem, species, and genetic levels.

Bhutan ranks in the top ten percent of countries with the highest species density (species richness per unit area) in the world, and it has the highest fraction of land under protected areas and the highest proportion of forest cover of any Asian country - 72.5% under forest cover, including 26.23% as protected areas and an additional 9% as biological corridors. Bhutan is required by national law to maintain a minimum of 60% forest cover for all times. Bhutan is one of few biologically diverse countries in the world which have the opportunity to maintain its biodiversity largely intact in the coming decades.⁵

Even globally, Bhutan contributes to reducing global warming and climate change.

Bhutan's First National Inventory of Greenhouse Gas Sources and Sinks to the United Nations Framework Convention on Climate Change, with the baseline of 1994, shows that Bhutan sequestered 3,321 kilotonnes [sic] of carbon. Therefore, at the global level, Bhutan remains a net sequester of greenhouse gases (footnote 5).

Recognizing this national and therefore international effort, His Majesty the Fourth King was conferred the J. Paul Getty Conservation Leadership Award on 17 October 2006 by the World Wildlife Fund, one of the world's prestigious awards devoted to conservation.⁶

Nevertheless, a larger question still remains. While Bhutan is generously endowed by Mother Nature, how does this impact the livelihood of Bhutanese people? Environmental governance, like all forms of governance in Bhutan, strives to be people-centered and

³ Royal Government of Bhutan. Ministry of Trade and Industry. *Energy in Bhutan*. Available: http://www.mti.gov.bt/energy/energy_in_Bhutan.htm

⁴ Royal Government of Bhutan. Ministry of Finance. *Budget Report 2006-2007*. Available: <http://www.mof.gov.bt/dba/download/2006-07.pdf>

⁵ Royal Government of Bhutan. National Environment Commission. *Brief State of the Environment*. Available: http://www.nec.gov.bt/about_us.asp

⁶ *Kuensel: The National Newspaper of Bhutan*. 2006. 25 Oct. His Majesty Conferred Conservation Leadership Award. Available: <http://www.kuenselonline.com/modules.php?name=News&file=article&sid=7632>

holistic in approach. The environment is part of every aspect of Bhutanese life: cultural, spiritual, economic and social. Bhutanese people culturally and historically have a close affinity with nature and we hold nature to be sacred. The mountain peaks are not scaled by humans and the glacial lakes are not disturbed because we believe by doing so we not only disturb the natural ecological balance but defile the sanctity of the abiding deity.

Economically, the environment is the national treasure. At the individual and village level, it is the source of food and materials to build shelter and sustain livelihoods. Bhutan is a mountainous country and prone to landslides and other natural hazards, so the forests are needed to hold and nourish the soil and maintain a healthy water cycle. At a national level, the healthy environment is what has provided Bhutan with its great potential for hydroelectric power generation, which is the main income generating industry of the nation.

For sustainable hydroelectric plants, there is every incentive to protect and invest in the environment. The Himalayas are the youngest mountain range, and there is high silt content, which increases during the rainy season. These silts get washed down into the turbines, wear them out, and fill the dams with sediments. Replacing the turbines and removing the sediments incur additional costs. Hence, it is in the interest of the energy sector to protect the environment of the upstream watershed areas and plant more trees to hold the soil and delay the processes of blockage, wear out, and sedimentation.

To the extent possible, the designs of the hydroelectric plants in Bhutan are environmentally friendly. Definitely there are some negative environmental impacts when building a hydroelectric plant, but realistically the goal is not to have “zero” negative environmental impact, but rather to have environmentally sustainable plants. In the long run, the distributed positive environmental, economic and social impacts will hopefully far outweigh the initial concentrated costs.

Hydroelectricity, Economic Growth and Social Development

The contributions and impact of hydroelectricity on economic and social development can be analyzed at both the micro and macro levels. At a micro, or household, level, access to electricity helps create opportunities for individuals to break the poverty cycle. For this argument, poverty is defined not as how much money and cash one has, but in terms of one's access to a package of “basic needs” such as food, health, education, electricity, clean drinking water, and markets. Access to electricity provides the much-needed infrastructure to facilitate economic growth and social development for households in the poorer sections of society. In rural areas, electricity displaces kerosene oil and fuel wood consumption, which are not only expensive but also more harmful to the environment. The money saved from access to electricity can be invested in something else that is of benefit to the household.

There is also a positive spillover into education and health. Most traditional kitchens in Bhutan are poorly ventilated with no proper chimney and the smoke seeps through the eaves and ceiling. This is obviously a threat to health and a potential fire hazard. With electricity, the rooms and houses are no longer clouded with smoke from the firewood stoves, which is a leading cause of respiratory diseases. In many cases, people have switched from open hearth fire stoves to electrical appliances like rice cookers, which saves so many cubic meters of wood. Furthermore, electrical appliances save human labor time. It used to take several hours to cook a pot of rice, as it involved collecting firewood, making the fire and cooking, but now it takes very little time and attention. The time saved can be invested in something else that is of value to the family.

With electricity, the rooms are no longer dark once the sun goes down. Children can have more study hours in better light that helps not only their academic performance, but also protects their eyesight. The extended hours of light also allow for more opportunities for

cottage industries and jobs like weaving and woodwork, therefore diversifying and increasing household income. Along with the presence of roads, these opportunities provide access to markets, forming a good synergy for households to generate income and improve living standards. Therefore, when the villages have essential infrastructure, villagers are provided with opportunities to do different kinds of work to increase their household income. If we extrapolate this to the bigger national economy, one can argue that the multiplier effects of individual and household economic activities will eventually span out to the whole economy and increase the overall growth rate.

At a macro/national level, the revenue from hydroelectric power is a major source of the Government's budget, as mentioned earlier, and there are plans to harness more hydroelectric power resources. One of the goals of the Government is rural electrification, specifically to provide electricity for at least 80% of households, if not all, by the year 2020.⁷ This is a very challenging and ambitious goal, but it has a strong social equity component because rural households with no access to electricity constitute the majority of the Bhutanese population.

Conclusion

Pursuing an integrated policy of economic development and environmental conservation is essential but not easy. There are both challenges and opportunities. It is the responsibility of the Government and the people to choose the policies that are symbiotic and complementary for growth and conservation. The people and the leaders of Bhutan have realized the benefits of both sectors and have consciously chosen the middle path, along which Bhutan is still walking.

One could argue that from an economic point of view, it may be a risk to "put all eggs in one basket," and not diversify. What will be the consequence of a bad rainy season and low water levels? It is hard to say, but a counterargument could be that since the majority of the revenue generated from hydroelectricity is invested in the social services sector with health and education, roads, agriculture and general public services receiving shares of 30%, 7%, 12% and 21%, respectively (footnote 3), a network of security mechanisms that could possibly alleviate the "threat" in the long run has been created.

I conclude with a quote from Bhutan's Fifth King His Majesty King Jigme Khesar Namgyel Wangchuck:

I believe while the philosophy of GNH is inherently Bhutanese, its ideas may have a positive relevance to other nations, communities or people. In today's world I feel that there must be some convergence amongst nations on the idea of what the primary objective of development progress should, something that GNH seeks to bring out.⁸

⁷ Royal Government of Bhutan. Planning Commission Secretariat. 1999. *Bhutan 2020: A Vision for Peace, Prosperity and Happiness*. Available: <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN005249.pdf>

⁸ *Radio Australia*. 2004. Episode 6 – Gross National Happiness. Available: http://www.radioaustralia.net.au/smartsocieties/episode/window_6.htm