Hydropower Development, Ecotourism and Green Economy in the Context of Nepal

Anup K.C.
Environmentalist

Abstract

A Green Economy is the economy which results in improved human wellbeing, social equity and reducing environmental risks and ecological scarcities. Hydropower as a renewable, efficient, and reliable source of energy enhances ecotourism and green economy. Ecotourism as a component of green economy, focuses on wildlife conservation, environmental protection, poverty alleviation and capitalist development. Electricity from hydropower can be used in lighting, power supply for electronic appliances, water heating, cooking, refrigeration, space heating and cooling and water pumping in ecotourism sector. Hydropower development can help to shift country towards green economy by enhancing environmental, social and economic benefits.

Green Economy

Sustainable development helps in achieving balance between economic, social and ecological requirements by meeting the needs of current generations without jeopardizing possibilities of future generations to meet their needs (Cerovic et al. 2014). A Green Economy is the economy which results in improved human wellbeing, social equity and reducing environmental risks and ecological scarcities. It is characterized by increased investments in economic sectors that build on and enhance the earth's natural capital or reduce ecological scarcities and environmental risks. It helps in economic growth through sustainable pathway, valuing the ecosystem services and biodiversity issues, addressing the strategic uncertainties like adverse climatic and environmental changes and effectiveness of policy instruments. In the global scenario, green sectors include renewable energy, low-carbon transport and energy efficient buildings, clean technologies, improved waste management, improved freshwater provision, sustainable agriculture, forestry, and fisheries (Sukhdev et al. 2010).

Some initiatives on green economy have taken place in Nepal, mainly in the forms of dialogues and seminars. For any economy to go green in the context of Nepal, it is necessary that the private sector comes on board, understands and accepts the necessity of going green and pursues strategies necessary to become green (GoN 2011). Many people felt that Nepal has already realized importance of green economy since it has been engaged in sustainable agriculture and biodiversity conservation. Hydropower and ecotourism are also the sustainable green economy sectors recognized by United Nation Environmental Programme (UNEP) as one of the success stories of sustainable and green economy in the world (Sukhdev et al. 2010).

Hydropower Development

Hydropower is a renewable, efficient, and reliable source of energy depending on water availability that does not directly emit greenhouse gases or other air pollutants (Mulumba et al. 2012). Low cost, low emissions and ability to meet peak electricity demand have made it one of the most valuable renewable energy sources. The share of hydropower in total energy consumption of the world is increasing year by year due to its renewable nature and development of new technologies for efficient hydropower generation (C2ES 2015, K.C. 2015).

Nepal is one of the Himalayan countries with a high hydropower potential due to its drainage area of 147181 sq km and runoff of 5479 m^3/s (CBS 2014). Theoretical hydropower potential of the country in terms of electrical energy is 727,000 GWh and 145,900 GWh per year, respectively based

on average and 95% exceedance flow. In terms of megawatts, the potential is estimated at 83,000 MW, of which about 43,000 MW is considered to be technically and economically viable. Till the date, Nepal has been able to develop only 787.087 MW of hydropower (NEA 2015).

Ecotourism

Ecotourism is one of the fastest growing segments of the tourism industry which focuses on wildlife conservation, environmental protection, poverty alleviation and capitalist development (Duffy 2008). It is a strategy to create sustainable economic development with conservation objectives by balancing the conflicting goals of economic development and biodiversity conservation (Cusack and Dixon 2006, Cao et al. 2014). Having a goal of biodiversity conservation, poverty reduction and business viability (Hawkins 2004), it helps in conservation and community development through local economic benefits (Stem et al. 2003, K.C. et al. 2015). Ecotourism neoliberalise nature by maintaining the relation between states policy, local markets, communities, NGOs and the private sector for environmental management (Duffy 2008). In relation to tourism experience, it manages entire ecosystems or the biological diversity to supply real experiences of natural environments (Tyler and Dangerfield 1999).

Ecotourism as a component of green economy contributes greatly to Gross Domestic Product (GDP) for government and private organizations (Amati 2013). It is an alternative form of tourism that is consistently gaining grounds on a global scale as a part of green economy (Das and Syiemlieh 2009). Developing countries like Nepal benefits from ecotourism through employment opportunities to the unskilled workforce and by providing unique and natural environments, cultures and opportunities for adventure holidays (UNEP 2013). It is attracting entrepreneurs and organizations in the countryside and the remote protected areas (Nepal 1997, K.C. et al. 2015).

Nepal is a small country with an area of 147,181 sq. km. having great diversity of topographic and eco-climatic features rich in natural and cultural heritage (Bhusal 2007). It is one of the most adventurous cultural and ecotourism destinations in the world which depends on the quality of the natural environment (Nepal 1997). There are many trekking routes and sites for ecotourists to explore natural beauty throughout Nepal ranging from Kanchenjunga Conservation Area and Illam in the east to Khaptad and Shuklaphanta National Park in the west. Tourism had already been an alternative source of income generation in the villages of Kaski, Tanahu, Syangja, Lamjung and Gorkha districts in western Nepal through rural tourism initiatives (Acharya and Halpenny 2013, K.C. et al. 2015). Having eight out of the 14 high mountains over 8000 m elevation in the world is also making Nepal, a main source of tourist attraction (Musa et al. 2004).

Role of Hydropower Development in Ecotourism

The World Summit on Sustainable Development in Johannesburg 2002 acknowledged tourism as one of the major energy-consuming sectors and requested states to integrate energy efficiency into tourism related polices. It is also dedicated to sustainable tourism, energy conservation, emission control and the special need for effective conservation and management of natural resources (Perera et al. 2003). Most of the energy consumption in the tourism sector is attributable to transport and accommodation, which account for 75% and 21% of sectoral GHG emissions, respectively (UNEP 2011, IRENA 2014). Tourism is responsible for 5-7% of total emissions in Europe according to the European Environment Agency (Perera et al. 2003).

Globally, hotels and resorts use up to 50% of their energy consumption for heating and cooling, followed by water heating and cooking. The use of energy in hotels and resorts, *e.g.,* for heating and cooling, lighting, cooking, cleaning, ranges between 25 and 284 MJ per guest per night. The approach adopted for tourism development largely influences the sustainability of the sector. But, the intensive use of resources, high amounts of waste generation, growing negative impacts on local terrestrial and marine ecosystems and mounting threats to local cultures and traditions represent the main challenges faced by tourism worldwide (UNEP 2011, IRENA 2014).

With current energy sources, carbon emissions are quite high. The mounting environmental debt from fossil fuel energy use is cause for great concern,

which is beginning to drive actions to reduce these environmental impacts. As customers become more aware of these impacts, they demand action to purchase cleaner goods and services (Perera et al. 2003). Use of renewable energy sources in business operations of a hotel and tourist companies represents a reasonable option for protection of human environment, and helps in increasing awareness of general public on the necessity to implement them in business processes (Cerovic et al. 2014).

Renewable energy sources and their use in the hospitality industry and tourism represent the basic guideline for successful sustainable development of business processes, which guarantee business excellence and recognisability of a hotel company on the tourist market. It aims at ensuring the improvement of business, profiling of an ecologically responsible tourist destination, repositioning of the current tourist offer on the international tourist market and achieving competitive advantages and conquest of a specific tourist segment of ecologically-oriented consumers. Except for its ecological and financial advantages, use of renewable energy sources in the hospitality industry and tourism directly contributes to increasing competitive advantages of tourist suppliers (Cerovic et al. 2014).

The renewable energy sources generally used in ecotourism facilities include solar energy, wind energy, hydropower and biomass. But electricity from hydropower can be used in lighting, power supply for electronic appliances, water heating, cooking, refrigeration, space heating and cooling and water pumping. Examples include air conditioning units, fans, air-handlers, lighting fixtures, refrigeration equipment, water pumps, clothes and dish washing machines, toasters, microwave ovens, hair dryers, television sets, stereos, computers and cellular telephones. It is also used with a high-capacity batteries to provide power when the renewable energy source is temporarily unavailable and allow the continuous operation of equipment and appliances (USAID Unspecified).

Apart from this, hydropower reservoir also offers tourism and recreational facilities, habitats for biodiversity and increases in income generation options for example through fisheries (IHA 2011). In the context of Nepal, Kulekhani reservoir in Makwanpur District and Kaligandaki pondage in between Syangja, Gulmi and Parbat District offers cultural, recreational and transport facilities by enhancing ecotourism in the area. Electricity from micro hydro projects is used in different trekking routes and conservation areas of Nepal for enhancing ecotourism.

Hydropower development in Nepal can help to replace traditional energy resources used in ecotourism sector. Electric heaters, induction heaters, boilers and rice cookers can be used for cooking purpose, water heater can be used for providing hot shower facilities, induction heaters can be used for room heating and electric vehicles can be used for transportation facilities in ecotourism industry. Also, electricity can be used for computers, laptops, cell phones, radio, televisions, music system and other communication systems.

Role of Hydropower Development in Green Economy

Hydropower development is not necessarily a zero carbon technology. But, it can save a significant amount of CO emissions that other energy sources are currently generating. The population of Nepal relies highly on traditional energy supplies commonly fuel wood, which produce high CO_2 emissions and its gathering disrupts ecosystem functioning. Hence replacing fuel wood with hydropower can considerably reduce carbon emissions. The carbon emissions resulting from hydropower development during construction and from other sources are negligible. Besides proving resource efficient and low carbon energy, hydropower development fosters social inclusion and royalties support social empowerment (Mathema et al. 2013).

If well managed, hydropower provides many solutions for energy and water management in a green economy. With regard to climate change mitigation, hydropower as a clean, renewable energy source contributes directly to global low carbon energy goals, and therefore to climate change mitigation. Hydropower can enable development and mitigate global environmental problems. A reservoir, as part of hydropower infrastructure, has the advantage of offering multiple services. In addition to offering clean, renewable energy, a hydropower reservoir can enhance water security and management, providing

flood mitigation, storage for irrigation and other purposes, and the stabilisation of downstream flow regimes. Hydropower reservoir offers tourism and recreational facilities, habitats for biodiversity and increases in income generation options for example through fisheries (IHA 2011).

As Nepal is rich in water resource, hydropower development through reservoir and non-reservoir projects can help to shift towards green economy by enhancing environmental, social and economic benefit of the country. It can also help to make country sustainable in energy sector and minimize import of petroleum products like diesel, petrol, kerosene and liquefied petroleum gas.

Challenges and Way Forward

Sustainability in hydropower is complex, involving a broad range of economic, social and environmental aspects, and often requiring trade-offs between these aspects. Reaching consensus continues to be a challenge between government and nongovernmental stakeholders, nationally and internationally at all stages of the development of a project. It is developed and managed in a sustainable manner, it can provide national, regional, and local benefits, and has the potential to play an important role in enabling communities to meet sustainable development objectives. In many countries there is considerable potential for hydropower to contribute to the emergence of a green economy, as it offers much-needed low-carbon electricity for development. A key challenge is the institutional capacity to effectively integrate sustainability into the design, construction and management of hydropower projects, and, prior to the design of a project, to assess alternative options (IHA 2011).

There is a high potential of the hydropower sector to help transform Nepal towards a green economy. Lack of political stability, good governance and law and order issues are important factors to affect progress and economic growth of hydropower.

Hydropower and ecotourism are the potential sectors for the overall development of the country, and ecotourism can be developed greatly by hydropower development. Integrated development of both of these sectors can help in moving the country towards green economy.

References

Acharya, B. P. and E. A. Halpenny. 2013. Homestays as an Alternative Tourism Product for Sustainable Community Development: A Case Study of Women Managed Tourism Product in Rural Nepal. Tourism Planning & Development **10**:367-387.

Amati, C. 2013. We all voted for it: Experiences of Participation in Community-based Ecotourism from the Foothills of Mt Kilimanjaro. Journal of Eastern African Studies **7**:650-670.

Bhusal, N. P. 2007. Chitwan National Park: A Prime Destination of Eco-Tourism in Central Tarai Region, Nepal. The Third Pole **5**:70-75.

C2ES. 2015. Hydropower. Centre for Climate and Energy Solutions, Arlington.

Cao, H., M. Tang, H. Deng, and R. Dong. 2014. Analysis of management effectiveness of natural reserves in Yunnan Province, China. International Journal of Sustainable Development & World Ecology **21**:77-84.

CBS. 2014. ENVIRONMENT STATISTICS OF NEPAL 2013. Government of Nepal National Planning Commission Secretariat Central Bureau of Statistics, Kathmandu.

Cerovic, L., D. Drpić, and V. Milojica. 2014. Renewable Energy Sources in the Function of Sustainable Business in Tourism and Hospitality Industry. TURIZAM **18**:130-139.

Cusack, D. and L. Dixon. 2006. Commimity-Based Ecotourism and Sustainability. Journal of Sustainable Forestry **22**:157-182.

Das, N. and H. J. Syiemlieh. 2009. Ecotourism in Wetland Ecology. Anatolia: An International Journal of Tourism and Hospitality Research **20**:445-450.

Duffy, R. 2008. Neoliberalising Nature: Global Networks and Ecotourism Development in Madagasgar. Journal of Sustainable Tourism **16**:327-344.

GoN. 2011. Nepal Status Paper: United Nations Conference on Sustainable Development 2012 (Rio+20) Synopsis.*in* G. o. Nepal, editor.

Hawkins, D. E. 2004. A Protected Areas Ecotourism Competitive Cluster Approach to Catalyse Biodiversity Conservation and Economic Growth in Bulgaria. Journal of Sustainable Tourism **12**:219-244.

HIDCL. 2015. Nepal Hydropower. Hydroelectricity Investment & Development Company Limited, Kathmandu, Nepal.

IHA. 2011. Hydropower for the green economy: a new approach to capacity building and sustainable resource development. International UN-Water Conference. Water in the Green Economy in Practice: Towards Rio+20. 3-5 October 2011. International Hydropower Association, Zaragoza, Spain.

IPPAN. 2015. Hydropower in Nepal. Independent Power Producers' Association, Nepal, Kathmandu.

IRENA. 2014. Renewable Energy Opportunities for Island Tourism. The International Renewable Energy Agency (IRENA).

K.C., A. 2015. Climate Change and its impact on hydropower development in Nepal. Vidhyut **26**:25-29.

K.C., A., K. Rijal, and R. P. Sapkota. 2015. Role of ecotourism in environmental conservation and socioeconomic development

in Annapurna conservation area, Nepal. International Journal of Sustainable Development & World Ecology **22**:251-258.

Mathema, A. B., S. Guragain, N. C. Sherpa, and B. B. Adhikari. 2013. Can Hydropower Drive Green Economy for Nepal: A Review. Journal of Environmental Protection **4**:732-740.

Mulumba, J. P. M., T. J. O. Afullo, and N. Ijumba. 2012. Climate Change and Hydropower Challenges In Southern Africa. Rwanda Journal- Mathematical Sciences, Engineering and Technology **27**.

Musa, G., C. M. Hall, and J. E. S. Higham. 2004. Tourism Sustainability and Health Impacts in High Altitude Adventure, Cultural and Ecotourism Destinations: A Case Study of Nepal's Sagarmatha National Park. Journal of Sustainable Tourism **12**:306-331.

NEA. 2015. A Year in Review-Fiscal Year-2014/2015. Nepal Electricity Authority, Kathmandu.

NEF. 2015. Hydropower promise in Nepal. Nepal Energy Forum, Kathmandu.

Nepal, S. K. 1997. Sustainable Tourism, Protected Areas and Livelihood Needs of Local Communities in Developing Countries. International Journal of Sustainable Development & World Ecology **4**:123-135.

Perera, O., S. Hirsch, and P. Fries. 2003. Switched On Renewable Energy Opportunities in the Tourism Industry. United Nations Environment Programme, Paris Cedex 15, France.

Stem, C. J., J. P. Lassoie, D. R. Lee, and D. J. Deshler. 2003. How Eco is Ecotourism? A Comparative Case Study of Ecotourism in Costa Rica. Journal of Sustainable Tourism **11**:322-347.

Sukhdev, P., S. Stone, and N. Nuttall. 2010. Green Economy, Developing Countries Success Stories. United Nation Environment Programme (UNEP).

Tyler, D. and J. M. Dangerfield. 1999. Ecosystem Tourism: A Resource-based Philosophy for Ecotourism. Journal of Sustainable Tourism **7**:146-158.

UNEP. 2011. Towards a Green Economy, Pathways to Sustainable Development and Poverty Eradication. United Nation Environmental Protection (UNEP).

UNEP. 2013. Tourism: Trends, Challenges and Opportunities. Pages 259-291 Green Economy and Trade. United Nations Environment Programme.

USAID. Unspecified. Energy and Sustainable Tourism. United States Agency for International Development (USAID), 1300 Pennsylvania Avenue, NW, Washington, DC 20523.

g]kfn ljBt k|ws/0f

pkbfg sf]if Aoj:yfkg tyf ;+fng sfo{j|w, @)^%

o; sfo{j|w cg';f/ sg}klg sd{rf/Ln]clgjfo{cjsfz kfpg' cuf8L /flhgfdf :jLs[t u/fO{;]faf6 cnu ePdf jf eljiodf k|ws/0fsf] ;]fsf] lgldQ cof]o g7xg[u/L ;]faf6 x6fO{sf] cj:yfdf k|ws/0faf6 yk ePsf]/sd / ;f]sf]Aofhdfo]bxfo cg';f/sf]b/n]pkbfg sf]if /sd eQmfgL kfpg]5 .

q+;+	;]if cj|w	cjsf; k|fKt AolQmn] kfpg] /sd	s}kmot
s_	% blv !) aif{	hDdf ePsf]/sdsf]%) k|tzt / ;f]sf]Aofh	g]|j=k[=sf]tkm{af6 hDdf ePsf]
v_	!) blv !% aif{	hDdf ePsf]/sdsf]&) k|tzt / ;f]sf]Aofh	g]|j=k[=sf]tkm{af6 hDdf ePsf]
u_	!% blv @) aif{	hDdf ePsf]/sdsf]() k|tzt / ;f]sf]Aofh	g]|j=k[=sf]tkm{af6 hDdf ePsf]
3_	@) aif{jf ;f]eGbf al9	hDdf ePsf] /sdsf] !)) k|tzt / ;f]sf] Aofh	g]|j=k[=sf]tkm{af6 hDdf ePsf]

t/ sd{rf/Ln]lghsf]tkm{af6 s66f u/]sf]!) k|tzt /sd / ;f]sf]Aofh, sd{rf/L hg;'s}lsl;daf6 ;]faf6 cnu eP klg !)) k|tzt g}eQmfgL kfpg]5 .