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Making ecotourism greener and more energy responsible in Kerala

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This study aims to give an insight into the ways and means to encourage ecotourism in most energy responsible manner. It gives emphasizes on the need for energy efficiency and its impacts on environment. Various guidelines for sustaining ecotourism are provided throughout the course of the discussion in the paper wherever found necessary. It is aimed at greener ecotourism making the same more sustainable. Some of the

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Environment plays a vital role in tourism. Increase in tourism demand could be mainly attributed to the presence of natural scenic attractions in the destinations that tourists choose to travel. Unsustainable practices by the developers of tourism, for attracting tourists to these nature related destinations, resulted in severe environmental degradation. Tourists not only consume but also create wastes which the environment are forced to assimilate due to destructive human activity. It not only diminishes, the value of the site but also causes destruction of natural resources through pollution related to air, water, noise and site, species destruction to name a few (Hundole, 2002).

Nature related tourism or Ecotourism showed its rapid growth only after 1990's. Ten percent of the international arrivals are related to ecotourism indicating the presence of rapidly increasing environment conscious tourists globally (Wurzinger et. al., 2006). It was only after 1990's that environment protection became a major issue, forcing many of the international organizations such as United Nations Environment Programme (UNEP), World Tourism Organization (WTO), and various other National bodies to take up tourism, energy use and climate change as a topic of discussion (Lim et. al., 2003). Even though ecotourism encourages conservation, still it does have its share of harmful effects on nature, culture and local people.

As a first step towards preserving nature, various governments of different countries aim to stimulate innovation in energy efficiency, thus achieving environmental objective at the same time increasing tourist inflow. According to European Commission (Commission of European Communities, 2005), energy saving is without doubt the quickest and the most effective manner for reducing green house gas emission, as well as improving air quality particularly in densely populated areas.

Towards energy efficiency

It is widely believed that non-renewable source of energy like oil reserves are only enough to cover today's needs for about 40 years (Commission of European Communities, 2005). To sustain energy demand of the present day world, governments of various countries have resorted to renewable sources of energy like direct solar energy (wind, wave, hydro and biomass), geothermal energy and gravitational energy. Tourism or Ecotourism could be considered as energy intensive industry where fuel consumption and pollution is very high as compared to other industries. Hence, measures to improve energy efficiency in tourism operation in the most cost-effective manner are the need of the hour. Measures such as shifting from electricity to gas for cooking and heating, replacing electric hot water system, efficient lighting (long life and fluorescent globes), appliances, design and construction of energy efficient buildings (exposure to sun/passive solar systems including natural ventilation), consideration of alternative forms of transport have been recently considered to minimize its adverse effects due to the method, if any. Tree top shelters in Wayanad in the deep woods have only wooden ladders and simple pulley based lifting mechanism to commemorate the living in the past era. Many options like electrical elevators were considered by the state department of tourism and have been found to be abandoned which has resulted in the above design. This is to protect the elephants which can get electrocuted due to power lines drawn through the deep woods.

To promote the concept of energy conservation among local people in Kerala, conventional systems for providing electricity such as biogas programmes has been provided by the state government in a subsidized form and has been very successful. According to the Kerala's Renewable Energy Policy, it is stated that the use of renewable energy equipments and materials like Compact Fluorescent Lamps (CFL), batteries and the like would be made available by ANERT (The Agency for Non Conventional Energy and Rural Technology) are exempted from Entry tax/ Octroi (http://education.vsnl.com/anert/REpolicy.pdf). The solution to unnecessary use of energy involves all management actions, and the use of devices and constructive solution, that help optimize its consumption (Brataisida, 2002).

Impacts of ecotourism on environment

The goal of ecotourism is to leave the environment undisturbed by choosing low impact activities, so as to minimize its damage to the ecosystem thus preventing depletion of animal and plant species (Liu, 1994). Ecotourism if not implemented in its complete sense, also has its share of responsibility for creating adverse environmental and socio-cultural impacts in the nature related destinations. Most tourists choose to maintain their relatively high patterns of consumption (and waste generation) when they reach a destination which could pose serious problems for developing countries and regions that lack appropriate ways and means for protecting their natural resources and local ecosystem from the pressures of mass tourism (Neto, 2002). The main environmental impacts of tourism are:

a) pressure on natural resources;
b) pollution and waste generation;
c) permanent damage to the ecosystem.

Pressure on natural resources

Developmental activities such as hotel, airport and road construction could lead to sand mining, beach erosion and land degradation (Neto, 2002). Activities like snorkeling, scuba-diving and spot fishing has already threatened coral reefs and resulted in the extinction of rare species of fishes in places like Malaysia and Thailand. Destructive practices like clearance of mangroves in the Vemaband Kayal, Kumarakom, Kerala was done by Kerala Tourism Development Corporation to provide tourists to get direct view of the lake from the hotel. Such practices will increase coastal vulnerability to storm surges, decrease stock fish and drastically reduce the movement of rare species of migratory birds to these areas (Liu, 1994). Loggers in collaboration with those who are responsible for safeguarding the Sunderbans are gradually turning the largest mangrove forest in the world into a large swamp (Afroze, 2002). These are some examples that indicate destructive human activities, creating increasing pressure on natural resources. Intense tourism development in nature related destination could put natural resources such as land, freshwater and atmosphere at risk and threaten ecologically fragile regions such as coastal areas and coral reefs.

Pollution and Waste generation

Today tourism has been facing serious problems like pollution of air, water, sights, noise (due to motor traffic), untreated water discharge, solid waste disposal, littering by crowds and the like. Improper disposal of solid and liquid waste, relatively high levels of energy consumption in hotels through

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houses with biodegradable material is an excellent example of sustainability in ecotourism and tourism, as well. Such constructions save a lot of energy as no burnt bricks or artificial materials are used.

waste had an adverse impact on the tourism industry itself, resulting in the drastic decrease of tourists to the beach (Jayaraman, 2005). Dirty water, air pollution, poor management of solid garbage, collecting of firewood and electronic generation are worrying problems for Mongolian tourism sector (Gould, 1999). Thus disposal of such untreated wastes directly to the environment in nature related destination would not only reduce the availability of natural resources such as freshwater, but will also discourage tourists from visiting such destination.

After having conducted a personal tour in the year 2005, the first author of this paper could conclude that though Periyar tiger reserve is considered as a premier ecotourism destination of Kerala, it is still having lot of problems related to pollution which exists within the sanctuary. For example excess of noise pollution due to temple pooja in Sabarimala has forced elephants and other animals to remain deep inside the forest and the animals prefer to come outside only when there are no or minimum human activity in the region. The Motor boat ride, conducted by the forest department to showcase some of the rare species of animals and birds of the sanctuary, has increased pollution in the Periyar river. Large spilling of diesel directly on the river water has already killed some of the rare species of fishes. Above all the noise created by the motor boat literally drives away animals and birds from the river as experienced by the first author while taking a boat tour provided by the forest department. This shows the negligence on the part of government, as no authentic steps have been taken till date by the forest officials to curb this problem. Paddle boats or electric boats can solve this problem to a great extent. Also it is a very good example of pollution, created by ecotourism projects, in nature related destinations with silent support from the government.

Damage to ecosystems

Tourists unmindfully or without caring throw away their left over food scraps and drinks, leave behind synthetic articles or tin containers, cause damage to the local environment and eventually the earth (Afroze, 2002). Throwing of plastics and other materials by tourists while visiting Sabarimala, and disposal of untreated solid and liquid wastes directly to the backwaters in Alappuzha, has already caused severe damage to the fragile ecosystem, which shows lack of proper planning, while implementing ecotourism projects in Kerala. In the name of expedition, adventure tourists in Himalayas have been throwing plastic tins and bottles thus destroying natural ecosystem of the mountains and is now known as the "highest junkyard in the world" (www.ehponline.org). One of the serious environmental problems in developing countries is deforestation for fuel and tourist activities like skiing, snow boarding and trekking in mountainous regions thus affecting the fragile ecosystems (Neto, 2002).

In the name of tourism development, unwise construction of hotels, indiscriminate clearance of nature vegetation to create facilities for tourists could cause irreversible damage to the ecosystem. Sometimes government is also responsible for it, for example construction of Hotel Samudra, directly on Kovalam beach by violating the state's policy such as Coastal Regulation Zone (CRZ) and deforestation of Mangroves in Kumarakom by Kerala Tourism Development Corporation (KTDC) to provide tourists with lake facing rooms (Jayaraman, 2005).

Energy consumption in Kerala

India after independence has witnessed a phenomenal increase in energy consumption. Majority of population in India, around 71 percent of them use thermal energy, 25 percent use hydro and rest is nuclear and wind (Unnithan, 2003). As far as Kerala is concerned, till recently the state has been depending solely on hydro power for electricity. Other forms of energy like (http://education.vsnl.com /anert/) for bringing out policies and procedures for efficient energy use from time to time in Kerala.

Kerala Initiatives

Owing to the increasing demand for energy both by tourists and local people alike, government of Kerala has come up with various initiatives which could be considered as an important step towards energy conservation. Improved energy policies of the state, more dependence on renewable sources of energy and spreading of awareness among people to use electrical power conservatively are some of the measures taken in these lines.

Energy policy

Setting out an energy policy for the state by the state government is appreciable as it shows the seriousness towards making the state more energy efficient. The policy proposes to generate energy from municipal waste, agro waste, industrial waste, sewage and other biomass, small hydel units, solar photo voltaic cells, wind, tide and geothermal (www.keralagov.in/annual/profile/ene.htm). According to Kerala state energy policy, the state government supports spreading of various renewable energy technologies to the local population. Also the state government has made it mandatory for lodges and hotels having more than 10 or more rooms to use energy conservation devices like fluorescent and Compact Fluorescent Lamps (CFL), solar water heating systems and the like. Energy efficient devices like improved community stoves locally known as “chulhas”, gas fires have also been made mandatory for the hotels and lodges.

Renewable energy

The state has already set up renewable energy devices in some districts with the cooperation of local Panchayats. Wind energy generation at Ramakkal Medu in Idukki district is an authentic example to justify this. Tidal energy centre at Vizhinjam, Thiruvanathapuram district is another such example.

Zero waste Kovalam project, Kovalam Beach, Trivandrum

The project was envisaged, in an attempt towards implementing zero waste concepts at the beach destination, which houses fishing community. Here the community has been successful in achieving one hundred percent diversions of biodegradable wastes from wayside dumping and burning in all its implemented areas and recovered eighty percent of biodegradable wastes and ninety percent of non degradable discards (Government of India, 2005a). The biogas so obtained is used for cooking and electricity generation. Along with this, community has been promoting paper bags, coconut shell utensils, plates made of palm sheath, cloth bags so as to reduce pollution in the beach.

Installation of waste to energy plant, Pathanpuram, Kollam

In order to recover energy from solid waste, Pathnapauram grama panchayat in Kollam district has come up with an innovative concept of establishing waste to energy plant in meat and fish market (Government of India, 2005b). The treatment plant comprises of gas holder and a fermentation chamber in which biodegradable organic matter and other cellulose waste materials can be treated anaerobically which produces methane gas and organic manure. Methane gas, a renewable energy is used for cooking, lighting, running diesel engines and generation of electricity. The methane gas is converted to electricity using dual fuel engine that uses eighty percent of methane and twenty percent of diesel, which is used for lighting 20 Compact Fluorescent Lamps (CFL) within the market.

Guidelines for efficient energy use for greener ecotourism in

tourism as well as low priced transportation of goods.

Policy initiatives

The state government should come up with a policy where in it becomes mandatory for tour operators and car rental companies to come up with an alternative source of energy such as bio fuel and hydrogen as done in Europe. Car labeling system should be made mandatory in the state so that information regarding fuel consumption along with carbon dioxide (CO_2) emission is made available to the tourists (Commission of the European Communities, 2005). Emission tax cut scheme could be implemented on per tone of carbon dioxide (CO_2) equivalent emission as done by the New Zealand government (www.landcareresearch.co.nz).

Air transportation

Kerala with the help of Government of India could develop systems like single wide system for air traffic control as done in Europe, under the "Single Sky Initiative" which has helped them saving (around 6 to 12 percent) of kerosene aviation fuel and reducing air congestion around Europe's airport (Commission of the European Communities, 2005). The airports within the state could be extended to accommodate efficient modern aircraft, operating under high load factors which will reduce frequent movement of flights, along with fuel consumption, air and noise pollution. Charter flights and helicopters should be promoted so as to help tourist reach destinations in less time, and will also help in reducing traffic congestion and fuel consumption.

Road transportation

Electronic vehicles using alternative sources of energy such as natural gas, fuel cells and hydrogen could be used for coaches moving between two destinations. According to United Nations Environment Programme (UNEP, 2002), tourists could be transported from destination airport to hotel using modern diesel engines or gas powered engines which could accommodate 58 or 60 people at one time and have low seat/mile carbon dioxide emission which will help reduce car traffic more than 25 times. Environment friendly transport like cycles, bullock carts, horse carts could be positively favored by tourists in nature related destinations and are better ways of enjoying scenery than motorized vehicles thus adding up to their ecotourism experience, along with the reduction of fuel consumption (Denman, 2001; Kelkar, 2002).

Express walkways and cycle paths could be constructed within the city as done in Germany with separate traffic rules which will help in the reduction of traffic congestion and save fossil fuels. Regional and local government should encourage public transport systems, shuttle buses to key tourist attractions and remote destinations which will not only provide local people with good infrastructure but will also reduce individual movement of tourists in cars.

Water transportation

As stated earlier, the state has a unique advantage of backwaters that could be linked from Kasargod to Thiruvanatha- puram. Tourists could be motivated to use house boats in backwaters to move from one destination to another. This will be a unique experience for tourists thus reducing traffic congestion along with saving fossil fuel. In these house boats instead of using diesel, solar powered cells could be placed where in solar energy can be utilized for cooking to heating and for running motors. Also this will protect backwaters from getting contaminated.

Water hyacinth (Eicchornia crassipes) that grows in the backwaters of the state could be utilized for biogas production, as done in Maharashtra's Sangli district, where there is an unusual sewage treatment plant that has been functioning for around four decades. It treats domestic sewage using the water obtained from the decomposition of weeds is used for electrifying the village. This concept could be incorporated within the state by running motor boat engines in the house boats or air conditioner. Again country boats using human energy could be utilized to help tourists cover small distances. This could be a unique attraction for tourists, motivating them to visit the state from time to time. It also gives tourists a chance to get closer to nature and experience real Kerala culture.

Tour operators

Transport providers such as motor vehicle companies or car rental companies could change their renting scheme or modernize their fleet to include vehicles that runs on alternative sources of energy. Cycles could be provided by these rental companies for the tourists to move from one place to another. Several attractive schemes like prizes could be announced to tourists who consume least amount of fuel like free pass to a water theme park.

Advertising

Official website of Kerala tourism could promote cycle tours as done by European and Swiss tourism websites (http://veloland.myswitzerland.com/en/welcome.cfm). In this way tourist not only get a chance to enjoy the wilderness of Kerala but can also play a vital role in conserving energy and reducing pollution. The website should also provide separate packages or itineraries along with maps and locations where cycle tours could be conducted to give tourists a unique experience. In this article, authors have proposed express walk ways and cycle paths to promote the thinking of the state government in this direction. The authors have witnessed foreign tourists utilizing bicycles for exploring the city along regular roads. Hence the suggestion for express walk ways and cycle paths.

Accommodation

Policy initiatives, energy conservation and architecture of the building, water conservation and infrastructure have been explained in greater details in the subsequent sections. Construction of buildings according to “Vastu Shastra” following the traditional methods is an ideal example. Beach Orchid an Ecotel, which is a five star hotel at Kollam district, is constructed based on natural lighting and cooling principles as mentioned in “Vastu Shastra”.

Policy initiatives

As in Cyprus, the state government should make it mandatory for all tourist establishments like hotels and home stays to install solar panels in which case regular energy consumption will be less (UNEP, 2002). According to the official website of the state, it has 225-245 sunny days in a year (http://www.kerala.gov.in/knowkerala/generalfeatures.htm). Hence the use of solar energy will be much cheaper than the conventional energy used by the state government.

Energy conservation

Hotels and resorts in Kerala could use solar energy for cooking, heating water and for operating air conditioners as done in Transturing Touring of Pacific Islands and Campi Van Kanzi Resort, Kenya (Beyer et. al., 2005). Community gas stove using coconut shells, husks and the like could be used for cooking food for the tourists. Solar appliances using photovoltaic cells and wind power generator could be used for producing electricity. Vacuum sewer pipes can be used for house boats and island resorts to transport solid and liquid waste to the mainland which can then be converted to biogas for cooking and producing electricity for lighting up rural villages as in Tonga where an island resort using renewable energy helped to electrify 200 villages along with employment in the resort (Bushnell, 1994).

Such innovative steps could be considered in Kerala as well, where today

Area Protect (ACAP), Nepal where the lodge owners are provided with expertise to install back boilers and solar panels (Brandon, 1996).

Architecture

Emphasis should be given to local and durable materials using traditional style of architecture that goes in consonance with local cultures so as to attract more number of tourists and help reduce energy consumption as done in Tanna Beach Resort, Vanuatu (Bushnell, 1994). Eco friendly thatched roofs using low cost and less energy consuming biodegradable materials like bamboo and coconut leaves could be utilized. Traditional materials like mud and clay bricks along with the binding materials such as husks could be used to save energy as it is good enough for single storied buildings. Such houses also known as Jhonpa, are found in the remote villages of Rajasthan which acts as natural air conditioners to resist heat and is available for tourists in Khuri, 40 Km from Jaisalmer so as to give them the unique experience of rural Rajasthan (Choy et. al., 2002). According to Drumn (Drumn et. al., 2004) in areas where temperature is high, buildings should be constructed using maximum exposure to ventilation, separate room, breeze ways, wind scoops, wind turbines and the like to induce ventilation on sites with limited winds. Raised floor also helps in cooling, as done by Couran Cove Island Resort, Queensland where eco cabins have been built on stumps which allow free circulation of air under the buildings and verandas that helps to keep off insects (Lim et. al., 2004). Again in cold areas, buildings should be more compact to minimize air infiltration along with barrier streaking, weather-stripping and air block entries.

Water conservation

Tourists could be provided with iced and purified water using simple gravity flow catchments system which utilizes elevated fiber glass tank with Chlourex. This would not only provide tourists with clean water but will also help in conserving energy by avoiding heavy machines like water coolers which consumes large amounts of electricity. This was successfully implemented by Mr Evans of Don Evans Pathway Hotel in Yap (Bushnell, 1994). The water in swimming pools could be cleaned using Copper silver ionization system rather than usage of chemicals as done in Finica Rosa Resort, Blanca, Costa Rica that will help in the conservation of water (Brandon, 1996).

Infrastructure

Consider using electric or hybrid vehicles to transport supplies from the main road in order to reduce noise, water or air pollution and to conserve energy. At night, for free movement of tourists, rechargeable flash lights could be given as done in Campi Ya Kanzi Resort, Kenya instead of candles which could make nature vulnerable to fire (Brandon, 1996). Wireless microwave towers for communication and by using solar or wind energy instead of electric power helps avoid incidents of animal killing due to electrical shocks from transmission systems as in Periyar wild reserve.

Recreational activities

Paddle boats could be introduced in the backwaters of Kerala rather than motorized boat which could help in reducing fuel consumption and pollution of lake. Again rowing boats could be an added attraction for tourists that accommodate a small family of four which will again help in conserving the fossil fuel and reduce pollution. Innovative activities like using country boats in rivers and backwaters of Kerala could be promoted. Motor boats of Periyar Lake could be replaced by solar or wind powered engines, which will not only conserve energy but will also reduce noise pollution. Battery vehicles or solar powered coaches instead of motorized vehicles could be included while creating activity packages for tourists by the tour operators. Again packages could be changed to simple boat rides, cycle rides, horse and bullock activities could cause adverse ecological impacts and therefore it should be carried out responsibly. Ecotourism can be a valuable means for promoting the socio-economic development of host communities while generating resources for the preservation of natural and cultural assets. Thus it could be concluded that proper planning of ecotourism projects before its implementation will make ecotourism energy responsible and at the same time attracts large number of tourists to the state. None of the proposals made in this article by the authors are impractical and also it has to be noted that the cost benefit analysis of such proposals will only lead to huge savings in the long run. However, no detailed study has been taken up from cost benefit analysis point of view in this paper. Definitely, saving nature for its sustainable contribution to ecotourism is a real must and therefore, even projects which can contribute to improved biodiversity can be taken up at increased costs.

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