

เกณฑ์การออกแบบที่พักอาศัย สำหรับการท่องเที่ยวเชิงนิเวศ ในทัมลิงตาร์ ประเทศเนปาล

Accommodation design consideration for ecotourism in Tumlingtar, Nepal

ประทีป โปคราเรล¹

Pradip Pokharel

บทคัดย่อ

การท่องเที่ยวเชิงนิเวศมีบทบาทสำคัญมากในการพัฒนาที่ยั่งยืน อีกทั้งยังเป็นการสร้างสภาพแวดล้อมและระบบนิเวศที่ดีให้กับสถานที่ท่องเที่ยวอย่างทัมลิงตาร์ (Tumlingtar) ประเทศเนปาล ธุรกิจการท่องเที่ยวเชิงนิเวศที่ทัมลิงตาร์ ส่วนใหญ่แล้วจะมาจากการปีนเขา การเดินเขา การล่องแก่ง และการชมสถานที่ธรรมชาติอื่นๆ นักท่องเที่ยวที่เดินทางไปเขามะกะลู (Makalu) และอุทยานแห่งชาติ ส่วนใหญ่จะพักที่ทัมลิงตาร์ อย่างน้อย 2-3 วัน ระหว่างการเดินทาง ทัมลิงตาร์เป็นสถานที่ที่เหมาะสมแก่การพักผ่อนและการท่องเที่ยวเชิงนิเวศเป็นอย่างยิ่ง การท่องเที่ยวและที่พักแบบประเพณีนิยมไม่สามารถแก้ปัญหาสังคมและวัฒนธรรม รวมถึงปัญหาสิ่งแวดล้อมที่ทัมลิงตาร์ได้ เช่น การมีโรงแรมขนาดเล็ก 5 แห่ง โดยไร้การวางแผนและออกแบบที่ดี ไม่มีการรักษาสภาพ และไม่มีการลงทุนที่ยั่งยืน จะไม่สามารถตอบสนองความต้องการของนักท่องเที่ยวที่ต้องการเที่ยวในเชิงธรรมชาติได้ อีกทั้งยังไม่สามารถสร้างรายได้และโอกาสให้กับคนพื้นถิ่นด้วย ความหมายที่แท้จริงของการท่องเที่ยวเชิงวัฒนธรรมได้หายไป ส่วนการพัฒนาที่ยั่งยืนก็ไม่สามารถเกิดขึ้นได้ ยิ่งไปกว่านั้น การที่ผู้คนในท้องถิ่นรู้เท่าไม่ถึงการณ์และพยายามหาทางแก้ไขตามแบบของตัวเอง ก็ยิ่งทำให้มันแย่ลง สิ่งที่สำคัญที่สุดคือการทำให้นักตระหนักและให้ความสำคัญกับการพัฒนาที่พักอาศัยที่ยั่งยืน เป็นมิตรต่อสภาพแวดล้อม และดำเนินตามหลักการท่องเที่ยวเชิงนิเวศ จุดมุ่งหมายของงานวิจัยนี้คือการกำหนดปัจจัยทางสังคมและวัฒนธรรม ปัจจัยทางสภาพแวดล้อม และปัจจัยทางเศรษฐกิจ ในการวางแผนและออกแบบที่พักสำหรับการท่องเที่ยวเชิงนิเวศที่ทัมลิงตาร์ ประเทศเนปาล ที่มุ่งเน้นไปยังแนวปฏิบัติที่ต้องใช้ในการวางแผนและออกแบบทางสถาปัตยกรรมของที่พักผ่านกรณีศึกษาที่ การวิเคราะห์พื้นที่ที่สามารถวิเคราะห์โดยใช้ข้อมูล

¹ มหาบัณฑิต คณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยเชียงใหม่

ทางภูมิศาสตร์ ศักยภาพที่จะพัฒนาการท่องเที่ยวเชิงนิเวศ และการวิเคราะห์ SWOT งานวิจัยนี้จะช่วยให้คนพื้นถิ่นของทัมลิงตาร์ตระหนักถึงความสำคัญของการท่องเที่ยวเชิงนิเวศในชุมชน รวมถึงเป็นประโยชน์ต่อผู้เชี่ยวชาญในท้องถิ่น เช่น สถาปนิก นักวางแผน และนักออกแบบ เพื่อเป็นแนวทางในการออกแบบและพัฒนาที่พักในการท่องเที่ยวเชิงนิเวศต่อไป

คำสำคัญ: ทัมลิงตาร์ การท่องเที่ยวเชิงนิเวศ ที่พัก การวิเคราะห์พื้นที่

Abstract

Ecotourism plays an important role in sustainable development, promoting good environment and ecology of places like Tumlingtar, Nepal. Ecotourism business in Tumlingtar relies mostly on activities like mountain climbing, trekking, rafting and visiting natural sites. Tourist travelling to Makalu Mountain and National Park would stay at Tumlingtar for at least 2 to 3 days, while going and returning from the trip. It is a good place to stay or in other word an ecotourism accommodation in Tumlingtar. It was found that conventional tourism and accommodation practice failed to solve socio cultural and environmental issues of Tumlingtar. For instance, presence of only 5 small hotels, without good planning and design, good maintenance and no sustainable efforts failed to fulfill the demand of eco tourists as well failed to generate enough income and opportunities for local people. The true meaning of ecotourism was lost and sustainable development was just a paradox. People were and are unaware of these issues and are trying to find their own solutions following conventional footsteps, which is making the situation worst. The main necessity here is to make them aware and give them technical ideas of developing accommodation, which is sustainable, environment friendly and follows the idea of ecotourism. The objective of this study was to determine socio-cultural, environmental and economic factors for planning and designing accommodation for ecotourism in Tumlingtar, Nepal. This study focuses on guidelines that need to be considered for architectural planning and design of accommodation through the understanding of detailed site analysis. Site analysis can be done through analyzing geographic information, its potential for ecotourism and SWOT analysis. Because of this study, local people of Tumlingtar will be aware of importance of ecotourism in their place and the professional community like architects, planners and designers will find this study as a guiding tool to design and develop accommodation for ecotourism.

Keywords: Tumlingtar, ecotourism, accommodation, site analysis

INTRODUCTION

1. Background of the study

In Nepal, the main form of tourism aside from the attractions of Kathmandu and other historical cities are natural tourism, adventure tourism and ecotourism. Among these types of tourism, ecotourism has grown recently (Nepal Tourism Board, 2003). The International Ecotourism Society (1991) defined ecotourism is about uniting conservation, communities, and sustainable travel. Fennell (1999) noted that ecotourism is a sustainable form of natural resource-based tourism that highlights primarily experiencing and learning about nature, and which is ethically managed to be low-effect, non-consumptive, and locally oriented in control, benefits and scale. Ecotourism entails the sustainable preservation of a naturally endowed region. From wildlife viewing, to wilderness camps, hiking vacations and white-water rafting, Nepal's ecotourism industry is flourishing. Tumlingtar is a small eastern city of Nepal located in Sankhuwasabha district surrounded by Sabha River on east, Arun River on south-west direction and connected to Khandbari on north direction. The indigenous tribe of Tumlingtar is Kumal. Their traditional profession is pot-making though only a few are still practicing this now. The other tribes living in Tumlingtar are Bahun, Chettri, Magar, Rai, Tamang and Majhi. The total family number of Tumlingtar is about 600 distributed throughout total area of 2 square kilometers.

Tumlingtar is the place, which connects Sankhuwasabha district by airplane as well as road. Most of the tourist travel to Makalu Barun National park for trekking and mountaineering via Tumlingtar. It is the starting point of trekking trail to Makalu Mountain and contains many natural and cultural attractions, which provides opportunity for ecotourism. Tourists want to stay in Tumlingtar for at least two to three days before and after trekking. This demands more accommodation facilities such as hotels, lodges, homestays and campsites with quality services and amenities. Ecotourism accommodation is a small scale and locally owned however, some larger scale developments have adopted a sustainable attitude are working to rehabilitate their site or the surrounding land. Beeton (1998) defined accommodation, which is sustainable and green should tend to reflect character of the region by utilizing historic buildings or precincts, focusing on farm stays in rural farming districts, wilderness lodges near national parks, seaside cottages in fishing villages and so on. There are no any eco lodges or eco resorts in Tumlingtar therefore five good quality small hotels are considered as ecotourism accommodation for analysis namely Arun hotel, Makalu hotel, Kanchanjungha hotel, Urbashi resort and Katuwal hotel (see table 1). The numbers of accommodation facilities cannot be increased without considering quality of services and their impacts on environment. Existing five small scale hotels cannot accompany the total numbers of tourist in high season, so the place need more accommodations.

2. Study Area: Tumlingtar, Nepal

Tumlingtar can be accessed from two ways. First is by airplane from Kathmandu (45 minutes) and Biratnagar (35 minutes) and second is a motorway from Dharan, it takes eight hours to reach. Convenient among them is airplane but during bad weather people travel mostly from motorway. Tumlingtar lies on Hile to Makalu Base Camp trekking route. Being a mountainous district, it is very common to find narrow, muddy and unpaved road all over the districts. This same road connects Nepal to China through the place called Keemathanka, where people exchange goods, foods and clothes. Tumlingtar is mainly divided into two big flat terrains which are 50 meters from each other but the elevation of lower one is 285 meters from ground level (Arun River seen from first picture in figure 1). As being surrounded by two big rivers on three sides its shape of Tumlingtar resembles like peninsula. As being the part of World's deepest valley Arun Valley 457 meters from mean sea level the climate is warm and humid (See third picture from figure 1). Maximum temperature is 30C during June and July and minimum is 9C during December and January. Maximum rainfall can be experienced in July about 400 mm and minimum in January. Being humid throughout the year with around 80% relative humidity, sky condition is unclear and experience more rainfall. There is no any snowfall in the valley and wind is 5 kilometers per hour average throughout the year (Pokharel, 2014).

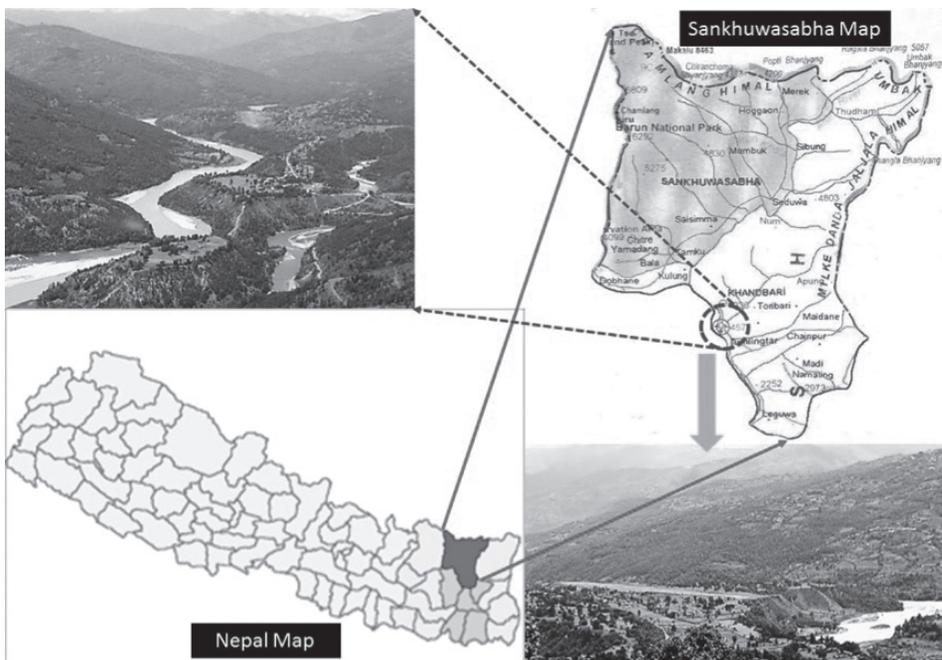


Figure 1 Areal views of Tumlingtar in map of Nepal and map of Sankhuwasabha

Tourists come to Tumlingtar mainly for trekking and climbing Makalu Mountain 8463 meters. Ten years ago, in Tumlingtar, there were only three small hotels (8-10 bedrooms) for accommodation but now, there are five hotels (existing three hotels and two added). The number of bedrooms in new accommodations are 15 and 8 respectively.

Table 1 Accommodations in Tumlingtar, establishment date and number of bedrooms
(Data retrieved from field survey by author in October 2013)

Name of accommodation	Date of establishment	Number of bedrooms
Makalu hotel	1985	8-10
Kanchanjungha hotel	1986	8-10
Arun hotel	1990	8-10
Urbashi resort	2012	15
Katuwal hotel	2013	8

3. Previous studies

3.1 Vincent Fischer-Zernin & Steven Schipani (2005): Designing and operating an ecolodge in the Lao PDR: Suggestion for local and international investors

This paper suggests guidelines for designing ecolodge in Lao PDR and its operation for local and international investors. This paper defines ecolodge as a small hotel or guest-house that incorporates local architectural, cultural and natural characteristics, promotes environmental conservation, and produces social and economic benefits for local communities. This paper suggests construction materials for accommodation should be local, such as bamboo, rattan, wood and locally made bricks or stone. The use of energy should be minimized, this means avoiding air conditioning and other electric devices that use too much electricity. Solar energy to meet some power needs, such as lighting and hot water should be installed. This study also suggests strategies for construction and operations such as use comfort and safe design elements with proper functions, select natural and forest setting site nearby mountain and river, use wood, bamboo and cheap natural and local building materials, provide double room bungalows, dormitories, tree house or multi room building like a guest house for group of people, construct restaurants nearby scenic views and use local materials, combine natural local materials with Lao style for interior decoration, use plenty of water, plants and trees for gardening and landscaping. Local products should be used and chemicals in daily operations should be minimized. Waste should be minimized and managed, this means not using things that make a lot of waste, such as

disposable water bottles, canned foods, or foods wrapped in plastic. When possible, items like glass and plastics should be reused and recycled. Negative impacts on nearby villages should be minimized by providing information to tourists on cultural do's and don'ts. Conservation of nature should be supported, this means giving information to guests about nature tourism of the area.

3.2 Mohamed Elkaftangui, Amira Elnokaly, Yasser Awad and Ahmed Elseragy (2013): Demystifying Cultural and Ecotourism in the Vernacular Architecture of Siwa Oasis, Egypt

The paper puts forward a critical review of sustainable design strategies to enhance cultural ecotourism in the Siwa Oasis. Climatic design of buildings using passive design techniques is recommended to provide comfort to the occupants and at the same time promote and revive the natural beauty and architecture of Siwa oasis. This paper suggests ecodge design process in their first research phase. The process states use the simplest technology appropriate to the functional needs, provide minimal environmental disruption, optimize use and flexibility of spaces, minimize impacts on natural and cultural resources and provide equal access to the full spectrum of people.

In a second research phase, this paper suggests key guidelines for future development of accommodation for ecotourism in which are based on the components like cultural heritage preservation, socio-economic development and rehabilitation and preservation of traditional architecture patrimony. This papers also suggests architectural building requirements in Hot Climate in the case of Siwa. It explains the main building elements related to climatic types. Orientation of the building should be determined by sun and wind. The façade should be least exposed to sun. Natural ventilation method should be adopted following principles of wind escape. Internal courtyard system be adopted in hot zones. To maintain humidity in dry climate fountains should be provide. Roof and wall should have the high thermal resistance and color should be chosen after analyzing absorptivity, reflectivity and emissivity. Sun-dried earth brick should be chosen to protect from heat transfer.

ACCOMMODATION DESIGN ANALYSIS IN TUMLINGTAR, NEPAL

This part explains the analysis of existing situation of accommodation in Tumlingtar by analyzing three aspects, socio-cultural, environmental and economic and summarizing them by using SWOT analysis method. Looking at the previous trend of tourism in Tumlingtar number of international tourist are decreasing. The maximum number tourist arrived was 1828 in 2009 from 1371 in 2008. In 2010 the number decreased by 505 and became 1323. In 2011 the number increased and became 1501. In 2012 and 2013 there was slight changes but in 2014 figure declined to 1083 from 1523 (Nepal Tourism Statistics, 2014).

1. Socio-Cultural Aspects of Accommodation

Tumlingtar is a very small city but holds strong architectural characteristics because of its unique building planning, design, technology and materials. Analyzing the patterns, building in Tumlingtar are planned along the side of main street in row (See picture 1 in figure 2). Being a place for trade, the front of houses is faced towards main street because it makes easier to do shopping and trading. Main street plays play important role in planning here because it connects from one landmark to another landmark. The two temples (Manakamana and Radha Krishna) are the landmarks of the place and street connecting them is a main street. Ground floor of house is used for shop, living room, kitchen, dining, cattle spaces and farming while first floor and second floor are used for living spaces such as family room and bedrooms. Important shops are placed at the nodal point of the streets. School, clinics and airline offices are on the convenient location for users. Sub streets connect one cluster of houses to another cluster and the houses are constructed in a row system (See picture 6 in figure 2). The front of the house is shop and back of the house is used for keeping cattle or farming. Houses are constructed using sun-dried bricks (made from the local clay) with mud mortar, timber post (Saal wood), timber rafters and thatch roofs. Development of new materials like concrete and CGI sheets has changed the traditional construction practice. New constructed buildings and hotel are constructed using RCC frame system with burnt bricks and cement.

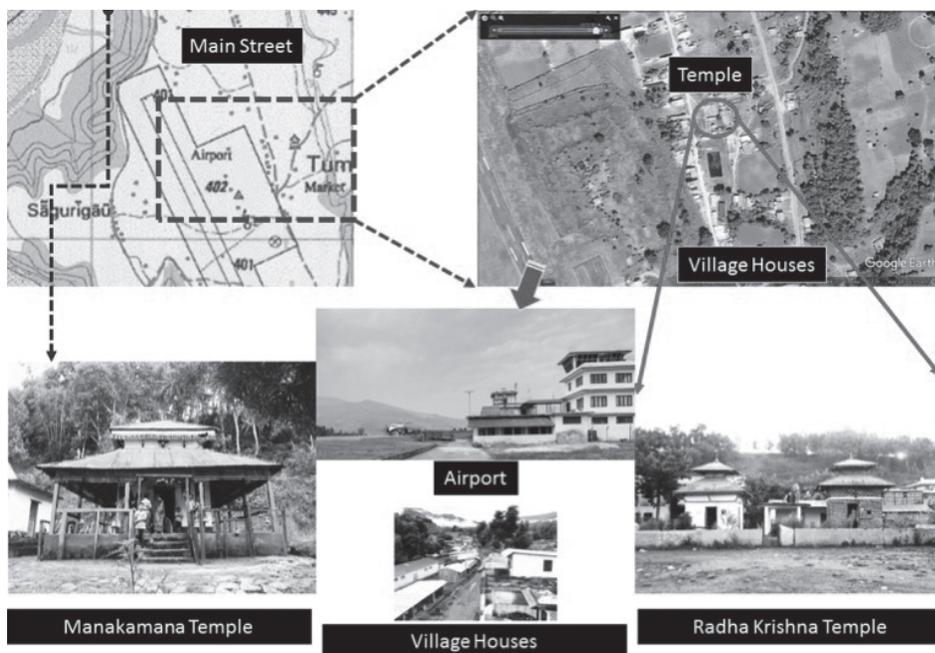


Figure 2 Main street, Temples, Airport and Village houses Tumlingtar, Nepal

Makalu hotel, Kanchanjungha hotel and Arun hotel, were constructed using old technology with sun dried bricks. At the present day Arun hotel stays the same but Makalu hotel and Kanchanjungha hotel are replaced with Reinforced Cement Concrete structure. As new materials and technology are discovered the old hotels are trying to renovate and adapting new techniques. Urbashi resort and Katuwal hotel are the new hotels with new technology. Tourists after earthquake do not want to stay at old hotels, which used load bearing structure with adobe construction method so more scope are driven towards Reinforced Cement Concrete framed and newly constructed hotels. The new practice in accommodation are creating a lot of environmental, socio cultural and economic problems far more than old construction practice. The local architecture and building styles are gradually diminishing and Tumlingtar is losing socio-cultural identity because the vernacular style is being replaced with modern style. Homestay practices were not seen from the past till present as the local people felt it unnecessary and they lack knowledge for establishment and operating it. Mostly homestay was seen on the trekking route of Makalu Barun National Park run by local people (Sherpa) of that place (Department of National Park and Wildlife Conservation, 2015)



Figure 3 The old hotel with load bearing structure and old local materials on left side & the new hotel with RCC framed structure and modern materials on right side

2. Environmental Aspects of Accommodation

Houses in Tumlingtar are mostly faced towards east and west direction to avoid heat from south sun. The ground floor consists of shops, kitchen, dining, store, Goth (animal shed), small yard and vegetable gardens. First and second floor are used for living space and bedrooms. For hotels, they use these same space as bedroom. For praying small room is generally located in ground floor and Tulasi (Holy basil) Math (Small mud shrine) nearby house (See figure 4). Structure system in majority in buildings are load bearing structure with sundried adobe wall door windows are made of timber. Floor is made up of bamboo net and clay supported by timber posts. Roof is made using thatch roof and CGI sheets as they were easily available in market. The roof is two-way slope because the place experience second most high rainfall in Nepal after Pokhara (See figure 5).

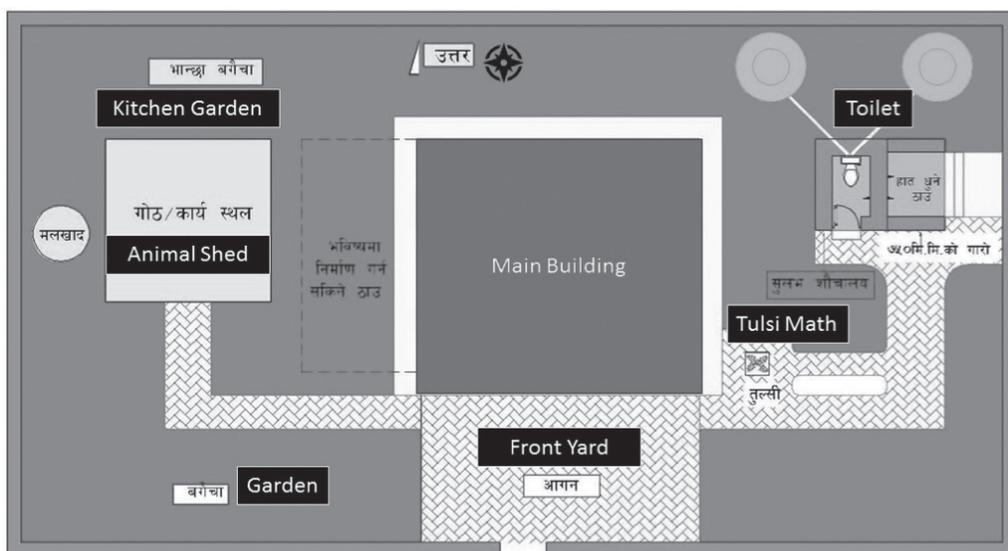


Figure 4 Typical ground floor plan of Village houses in Tumlingtar
(Department of Urban Design and Conservation, 2015: p.4)

Previously houses and hotels were made using local technology and locally available materials. For brick, they used local clay mixed with sand and white lime mortar for painting because it protects clay from breaking into dust. These adobe wall are very good material in warm environment because they are very good insulator of heat and sound. The floor was painted with cow manure and plinth level are painted red with mixture of Red sandstone to give good aesthetics. The new hotels are using modern materials like burnt bricks and cement concrete.



Figure 5 Views of Ecotourism Island (Pokharel, 2014) showing building materials

Old hotels were less harmful to environment because materials used were local and recyclable. New building and technologies in building are generating more waste. The new construction is structurally strong than older one but surely less sustainable in scenario of Tumlingtar. In terms of using energy both new and old hotels relied completely on electricity. Use of solar and any other alternative energy source was not seen. Waste management is the biggest problem of the place (liquid and solid wastes). There are no any permanent plans for waste management. Firewood has been replaced by liquefied petroleum gas stoves but only in small amount. Most of the people still use firewood for cooking. Motorcycle and bus are the medium of travel in Tumlingtar and they are using fossil fuel for energy source. Bicycle are also famous but not convenient in every place because of terrains.

3. Economic Aspects of Accommodation

Traditional method of construction was quite sustainable than modern technologies. For example, old hotels used sun dried brick from their own land, they made wall using those bricks and mud mortar. They took timber from community forest where they planted another tree in the replacement of cut tree. From their own rice fields, they dried thatch and made roof. Using timber post along with walls they made three storied hotels with around 10 small (3m x 3m sized rooms). Local manpower was used to build hotels and cost of hotels were 3-5 Million NRS. New RCC and burnt brick cost around 25-30 Million NRS.

Comparing one room price at 1990 was 300 NRS and now is 1000 NRS. The labor charge for adobe construction was around 300 NRS per day, which is not changed till now. Long time ago there used to be a rafting station at Arun River to Saptakoshi (Biggest River of Nepal) on the bottom. As the price increased too high tourist abandoned the activity, and business was lost. Pottery business by Kumal, which used to be their identity is now in the verge of extinction. Only two places for making pottery exist nowadays. Not to sell their product but for exhibition so their source of income is no more pottery making. Another example of Arun 3 hydropower project cannot be discarded. Tumlingtar was once concern of the world because of big scale hydropower project funded by World Bank but it was cancelled due to the unstable political conditions of country and lack of management. This cancellation has a great impact over society and their economy.

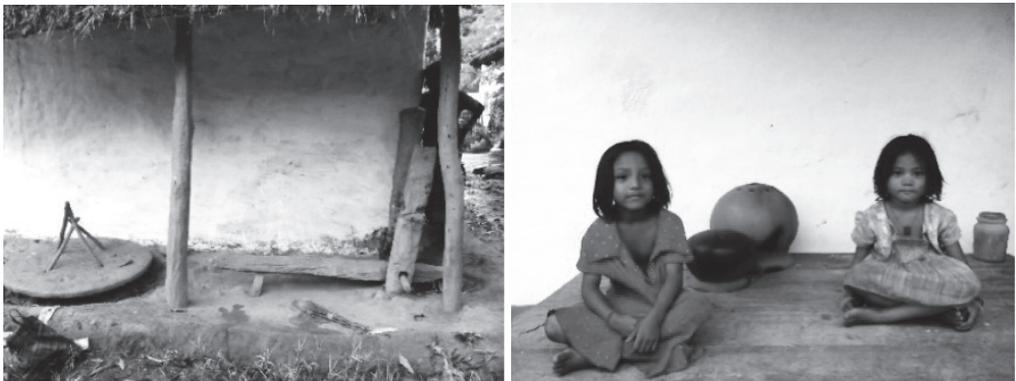


Figure 6 The condition of last pottery mill and their family in Tumlingtar, Nepal

Table 1 Nepal Tourism Statistics NTS 2014

Strengths	Weakness
<p>Scenic beauty coupled with pleasant weather. Surrounded by iconic Himalayan ranges, deepest valley of Nepal.</p> <p>Varieties of landscapes, magnificent river network, wildlife, birds and established trekking routes. Easily accessible through airplane and road.</p> <p>Committed private sectors existing in hotel and accommodation industry.</p> <p>Abundance of land for constructing new accommodation for ecotourism around riverside.</p> <p>Availability of local material for construction like sundried brick, bamboo and thatch.</p> <p>Rich in local culture, food and pottery making.</p>	<p>Lack of proper infrastructures facilities.</p> <p>Poor connectivity and insufficient quality accommodation.</p> <p>Seasonal unemployment and poor standard of living and youth are flying away for foreign employments.</p> <p>Lack of coordinated efforts by district towards sustainable tourism so unplanned construction.</p> <p>Poor design of accommodation, less attractive and low quality services.</p> <p>Drinking water problem and waste.</p> <p>Use of modern materials for construction without caring the image and identity of the place.</p> <p>Unaccounted flow of tourist and lack of destination branding and marketing.</p> <p>Improper planning of hotels.</p>
Opportunities	Threats
<p>Local participating in national and international tourism events and coordinating with foreign operators.</p> <p>Developing self-sustaining model accommodation through social entrepreneurship in less known destinations.</p> <p>Infrastructure development such as school, museums and cultural centers, designing better accommodation with sustainable material and techniques.</p>	<p>lack of tourism related information available and degeneration of natural and cultural heritage of the city.</p> <p>Continuous migration of local inhabitants into neighboring cities.</p> <p>Noise pollution from airplane, soil erosion and deforestation, loss of architectural image and sense of place and complete loss of pottery making business.</p>

THE DESIGN CONSIDERATIONS FOR ACCOMMODATION

This part explains the design consideration for accommodation in Tumlingtar, Nepal. After analyzing the existing situation of accommodation through three aspects (Socio-cultural, environmental and economic) the strengths, weakness, opportunities and threats are known. With the help of that then compared to the previous studies and design consideration were stated. The first part is related to consideration for planning and management of accommodation referred from first part of the previous study. Under this part there are three factors need to be considered and they are:

1. Preservation of traditional architecture patrimony

Efforts need to be expended to rescue existing examples of traditional housing, and to repair damaged structures. This is not only because of the inherent value of these structures, but as to improve the quality of the life of the residents. The possibilities of technically refining traditional building methods and of using new technologies to adapt and improve traditional building materials need to be explored.

2. Location

The best location for ecotourism accommodations such as ecolodge and ecoresort will be nearby rivers rather than keeping them inside city, where people can enjoy the view of river and mountain.

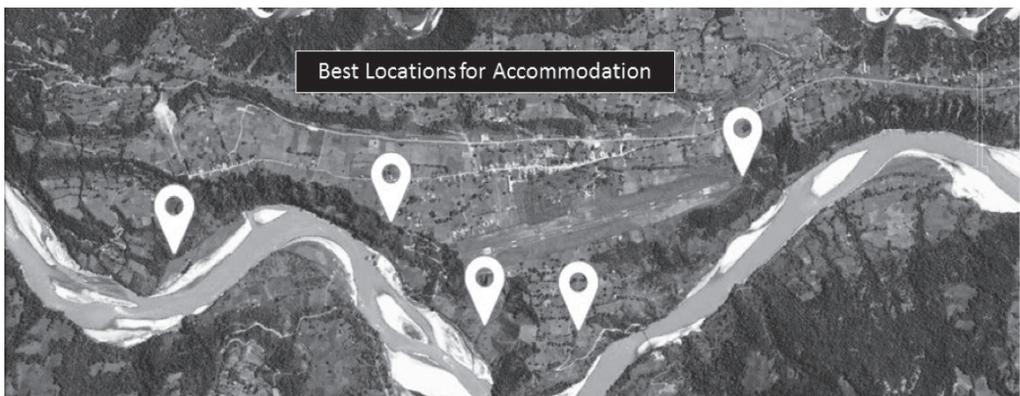


Figure 7 The best location for new accommodation in Tumlingtar from Google Map

3. Accommodation Management

Management covers energy use, transportation and operation of accommodation. For alternative energy, solar panels along with electricity should be used. Use of fuel wood should be minimized and liquefied petroleum gas should be replaced by biogas plants and briquette cooking. For transportation, electric vehicles and bicycling should be used. Rain water harvesting should be done and ramp water pumping system from two rivers should be done for irrigation. The forests, natural and cultural heritage and wildlife should be conserved. Materials free from harmful chemicals should be used. Primary health clinic should be provided. Accommodation should have its own waste management areas and systems. Natural heating and ventilation system should be adopted in building. Accommodation should establish online booking and rating system. Marketing should be done with the help of website and booking Apps. Accommodation should be register to the organization such as The International Ecotourism Society and Nepal Environment and Tourism Initiative Foundation.

The second part is related to consideration for architectural design of accommodation and referred from second part of the previous study. Under this part there are ten factors need to be considered and they are:

1. Building design

Accommodation should be designed in such a way that can reflect the traditional way of social lifestyle of local people. Ground floor can be used as a shop and first floor and second floor can be used for living and bedrooms. In place like Tumlingtar, vernacular architecture, there is a strong relationship between site, climate and the elements of building in the generation of the building form. Traditional materials such as sun dried brick should be used with modern treatment. Local materials such as bamboo, timber, stone and thatch should be used for building construction. Design strategies can be split into two levels, the first relates to general building and environmental control characteristics such as materials, plan shape and section. that can also be dependent on cultural and social values. The second relates to specific aspects of building form such as the plan orientation, landscaping, verandas and courtyards.

2. Structure

The traditional technology for structure already failed during the time of earthquake so the new building should be structurally designed and engineered. For one to three storied buildings structure can be load bearing structure but for building more than three storied should be framed with concrete (Department of Urban and Building Construction, 2015).

Concrete can be used only for structure and wall and roof local materials such as sun dried bricks and timber partition can be used. For load bearing structure, sundried brick or stone masonry tied with concrete or time can be used. For temporary structures, huts and cabin bamboo, timber and thatch roof can be used.

3. Orientation

The orientation of buildings would be determined partly by the sun and partly by the wind. The best orientation for the sun would be with the long axis of the building lying east-west, which is a common principle of architecture. But at the same time, it is required that wind flows to the inside of the house using appropriate strategies of cross ventilation to cool it during the summer. If the prevailing wind is northwest, so the house should be oriented northeast to southwest perpendicular to the prevailing wind.

4. Façade

Northern Façade: This facade is least exposed to the sun. An advantage to rooms opening on this facade is that their illumination is always evenly distributed, making them ideally lit places with less overheat in summer.

Southern Façade: Regarding the sun factor, an advantage of southern exposure in the Tropics and Subtropics is that the sun is high over the horizon in summer and can be shaded using a relatively small overhang. In winter, it is low allowing the sunshine to penetrate when it is most desirable.

Eastern & Western Facades: The eastern facade is exposed to the rays of the sun only from sunrise to noon. The walls cool down considerably by evening, making this exposure more suitable for bedrooms than the western exposure.

5. External wall

The design of external walls is of vital importance as they play a major role in shielding the building from heat transmittance during summer and heat loss during winter. Facades receiving sun heat and light during summer should be insulated properly or the building materials used should be highly thermal resistant, double glazing for the windows or any mean of shading devices should be used.

6. Floor

Flooring of the ground level is made of stone mixed with mud or cement mortar. The flooring of the second floor is mainly made of bamboo and mud which should be changed to wood and bamboos.

7. Roof

The roof of the building can be made of bamboo with thatch or wooden rafter and purlins with CG1 sheets but should be proper insulator of heat. No need to make slope design for the snow but can be used to protect from rain

8. Wall and roof color

For the exterior of the wall white color along with grey and red can be used. For the roof if constructed using CGI sheets then light grey or silver color will be appropriate

9. The wind effect

First, differences in wind velocity produce a differential pressure which results in air flowing from the higher to the lower air pressure region. In the second, warm air is less dense than cool air and therefore will rise in an environment of cool air. Strategies like wind escape can be used. This concept can be applied more advantageously in designs for use above the ground. The wind-escape can accelerate effective ventilation and air circulation when used with other devices for air movement such as windows, doors, dormer windows and grills.

10. The humidity factor

Water is abundant in this place and humid throughout the year so water bodies like pond and fountain are not useful but can be used small for decorative purposes.

CONCLUSION

Although, Tumlingtar is a rich tourism destination, however, ecotourism is still in its infancy. One of the parameters to establish a successful eco touristic region is providing comfortable ecotourism accommodation. To set the guidelines concerning the development of comfortable accommodation in Tumlingtar, this paper has provided through a critical review an understanding of the site. There is a greater necessity of ecotourism accommodation in Tumlingtar more than past so along with local people government authorities, private sector and communities should start working together. The traditional construction technique in Tumlingtar Nepal resulted into unique distinguishable architecture style of shelter but at the same time these shelters are not safe due to the weakness of the natural building material used. So along with traditional building materials new techniques should be adapted for construction of accommodation.

References

- Beeton, S. (1998). **Ecotourism: A practical guide of rural communities**. Australia: Land Links Press.
- Department of National Parks and Wildlife Conservation. (2015). **Makalu Barun National Park**. Retrieved October 15, 2016, from http://www.dnpwc.gov.np/protected_areas/details/makalubarunnationalpark.
- Department of Urban Design and Building Construction. (2015). **Earthquake resistance building design in Nepal**, Kathmandu: Department of Urban Design and Building Construction.
- Elkaftangui, M., Elnokaly, A., Awad, Y. & Elseragy, A. (2013). **Demystifying cultural and ecotourism in the vernacular architecture of Siwa Oasis, Egypt**. Retrieved from <http://eprints.lincoln.ac.uk/19586/1/19568%20Paper-V7-Bangkok.pdf>.
- Fennell, D. (1999). **Ecotourism: An introduction**. New York: Taylor & Francis Group.
- Fischer-Zemin, V. & Schipani, S. (2005). **Designing and operating an ecolodge in the LAOS PDR**. Laos: Mekong Tourism Development, Lao National Tourism Administration, Asian Development Bank.
- International Ecotourism Society. (1991). **Ecotourism guidelines for natural tour operators**, USA: Burlington.
- Nepal Tourism Board. (2003). **Ecotourism: Planning and management**. Kathmandu: Nepal Tourism Board.
- Nepal Tourism Statistics. (2014). **Number of tourists in Makalu Barun National Park**. Retrieved October 15, 2016. from http://www.tourism.gov.np/images/download/Nepal_Tourism_Statistics_2014_Integrated.pdf.
- Pokharel, P. (2014). **Ecotourism island at Tumlingtar, Arun Valley, Nepal**. (Bachelor thesis). Biratnagar: Khwopa Engineering College. Purbanchal University.