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Understanding the importance of ecotourism by supporting eco-design principles

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Abstract: ***Ecotourism is a form of tourism which involves delicate and relatively undisturbed natural areas, intended as a small-scale alternative to standard mass tourism.***
A walk through the forest or trail is not ecotourism unless that particular walk benefits that environment and the people who are involved. Ecotourism can be termed as 'responsible tourism' and 'green tourism', which focuses upon the responsibility of nature and its green development.[1]
This paper studies the concept of eco-tourism and its various aspects which also involves eco-friendly materials. Its purpose is to educate the travellers, to provide funds for ecological conservation, to directly benefit the economic development. The results show that there is a need for eco-design and use of eco-friendly approach, which demands continuous efforts on Tourism Ministry state government, host community and tourists to support and promote Eco-tourism. The purpose of this study is to look at ways in which ecotourism and sustainable development can be evaluated and suggest ways to improve current ecotourism practices. Ecotourism definitions require that the indigenous host community receives the benefits and despite its small-scale and seasonal character, it has the potential to deliver economic benefits on multiple levels.
Keywords: Ecotourism, eco-friendly materials, environment, eco-design, Sustainable development.

I. INTRODUCTION

Ecotourism is a brand-new approach in tourism. Ecotourism may be a preserving trip natural areas to understand the cultural and explanation of the environment, taking care to not disturb the integrity of the ecosystem, while creating economic opportunities which is advantageous for conservation and protection of natural resources to the local people. [4] In short, ecotourism is categorized as tourism program that is nature based, oriented towards sustainability, where education and interpretation and communication are major constituent through which local people are benefited.
All this together is often called ecotourism where a traveller satisfies these constituents, then it becomes ecotourism venture. Ecotourism helps in sustainable community development by providing the alternate source of livelihood to local people. Its aim is to conserve resources and maintain sustainable use of resources, which develops an ecological experience to travellers by conserving the environment and gaining the economic benefit.
Ecotourism helps in involving people for the conservation of the ecology and biodiversity of the realm that it reciprocally provides the economic incentives to the local people.
Eco-tourism contributes to conservation of biodiversity, sustaining the well-being of local people, involves responsible action on the part of tourist and therefore the tourism industry, promoting tourism enterprises, low consumption of natural resources, stressing upon local participation, ownership, and business opportunities for the rural people which specifically includes the educational experiences.[2] Indians have been worshiping and conserving the nature since ages. The growth of ecotourism in India is naturally the most impactful mass gathering. Also, the Indian government has set up the Ministry of Tourism and Culture to promote ecotourism in India.

A. Research Problem

Most people spend 90% of their time in a closed environment, in addition to using toxic compounds in some building materials, which may be the cause of spread of many common diseases.[15] Eco-design is constructing eco-friendly buildings which do not impact on the surrounding environment significantly, which has always been the goal of Architecture, but the construction materials used, the use of modern technology, energy consumption, and resulting pollution, in our current era, have contradicted goal in more than one way.

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B. Importance of Research

The World Ecotourism Summit in collaboration with UNEP was organized to motivate researchers, specialists and stakeholders in countries and governments to conduct further research and studies in the field of ecotourism, with the aim of managing, planning and using modern techniques to spread long-term environmental awareness, exchange experiences and acquire skills in order to find a mechanism to control the sources of degradation.[2] It aims to deliver the philosophy of sustainable development relating to ecology and tourism in conserving the environment by use of eco-design principles.

C. Objectives

The objective is to review, develop and style the ecotourism facilities in an environmentally sensitive manner, using local or recycled materials.[15] The design serving the environment which is consistent with the nature and cultural background of the place, supporting the clean energy. Such a design method is called "Eco-design" which takes into consideration of ecosystem criteria for design and its integration with nature.

- Ensuring that over tourism does not exploit natural environment and local communities.
- Discussion and dialogue with local communities on design character and planned developments.
- Making sure that improvement in infrastructure will benefit local people and not just tourists.
- To reduce carbon footprint by using substitute to protect raw materials and its resources.

D. Scope and Limitations

It will help in Community development by providing the alternate source of livelihood to local community which is more sustainable. Using locally available and reusing waste material is conductive for both environmental and economic conditions. It will encourage patterns of sustainability, which can benefit local communities, protect the environment, and be economically viable. It will encourage creativity and "non-conventional" choices. This research is related to sustainable development where there in human intervention like eco-tourism resorts or eco-village planning and not wildlife sanctuaries or eco sensitive zones.

II. ECOTOURISM AND ITS APPROACH

Ecotourism is to conserve the culture of the realm which benefit the local people by involving the community by being sustainable, making a profit without destroying natural resources and impart the experience that tourists want. The elemental difference between ecotourism and other styles of tourism is, it tries to preserve the initial environment that does not use any techniques to disturb ecological balance and biodiversity of the site which ensures the preservation of the environment and the sustainability of its resources.[12] Basic purposes of ecotourism are to conserve and avail natural resources in a sustainable way and to enable economic and social development of local people. We become more sensitive through ecotourism that creates the interest and awareness among the people including both the locals and tourists. Harvesting our natural resources and without permanently harming them is first step of sustainable development towards ecotourism.

III.ECOTOURISM AT PRESENT AND ITS IMPACT

Ecotourism implies a scientific, aesthetic and philosophical approach, as it is not necessary for tourist to be a scientist or a philosopher.[3] The important point is that the community who practices ecotourism has the opportunity of immersing themselves in nature in a way approach to sustainable need that most people cannot adjust being in their urban existences. This people start acquiring consciousness and knowledge and character of the natural environment, together with its cultural and social aspects, that will advance them in involving in conservation issues. The increasing approach of ecotourism at present is generating a source of relationship between people and nature to balance environmental and economic impacts. Ecotourism is providing financial stability for the preservation and conservation of undistributed natural habitats. See table I.

TABLE I

POSITIVE ENVIRONMENTAL AND ECONOMIC IMPACTS

Environmental Impact	Economic Impact
Creation of natural reserves	Employment opportunities
Justification for park protection	Increased household income
Habitat restoration	Funding for infrastructure
Less intensive resource use option	Funding for protected areas

Environmental Impact	Economic Impact
Creation of natural reserves	Employment opportunities
Environmental education	Revenue sharing
Increased stewardship	Improvement in living standards
Community building	
Promoting conservation	
Ecological Balancing	

IV. SUSTAINABLE ECOTOURISM

Sustainable development by way of ecotourism is a matter of issue in the world. Many countries have established the regional development by this proportions.[11] In this concept, sustainable development may be occurred by the ecotourism and regional development (Fig 1) simultaneously in a locality. Elements of ecotourism development point out on the environmental, economic, and social aspects of development and appropriate balance between the proportions must be entrenched to prolong its long-term sustainability. It will focus on three areas:

- Quality – valuable experience for visitors and increased life quality for host communities through cultural identity, poverty reduction and environmental quality
- Continuity – exploitation is made at the optimum level that allows the preservation and regeneration of the natural resources
- Balance between the needs of tourism industry, environmental protection, and local communities by an equitable distribution of benefits among stake holders.

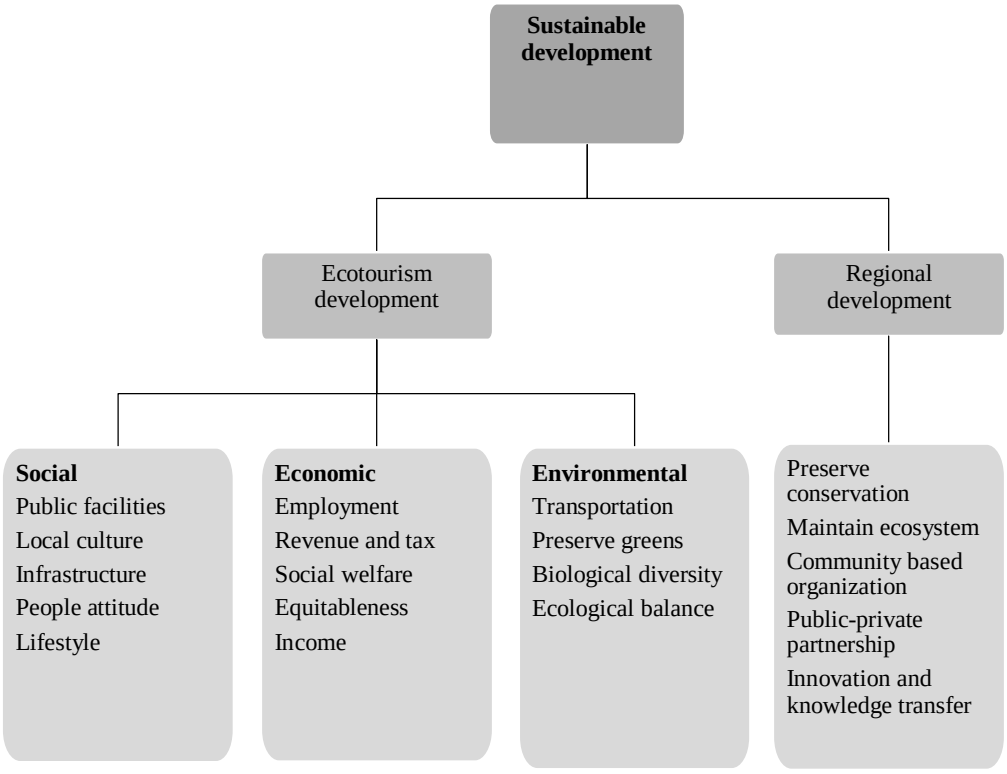


Fig. 1 Sustainable development through ecotourism

The increasing need to involve private sector in development of sustainable tourism is giving shape to understand site selection and evaluation by implementing alternatives which ensures the preservation of the environment and its resources. The use of regional eco-friendly materials with positive environmental reinforcing effects in terms of their impacts on global warming, as they are acceptable for the environmental conditions of the place, can be reused and recycled and have a positive impact on the public health.

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V. PRINCIPLES AND DESIGN CONSIDERATION

Ecotourism is significantly all about bringing nature, conservationists, local communities, and the conductible travel dynamism together to ensure development focused on long-term perseverance rather than short-term profits. The goal is to develop tourist accommodations, activities, training centres and attractions that benefit everyone involved in the local flora/fauna, local people, travel industry stakeholders.[13] With this expedition, the ecotourism industry has communally developed a number of core guiding principles over the past few decades. The basic principles are:

- Building environmental and cultural awareness
- Design and operate low-cost ecotours and facilities
- Provide financial benefits for conservation
- Provide financial benefits for local people
- Support human rights

Considering design methodology, it is important to size and shape the facility which should not exceed the ability of the environment to sustain it at the time of planning a new facility. Minimizing resource degradation and consumption on a global scale is the long-term objective of sustainable design. The architecture of the place should be integrated into the environment in which it is constructed. The designs should surpass the basics of a shade and meet the visitors needs and comfort for the same. Ecological knowledge and local culture of the surrounding can contribute to the proposed designs. Long term community support will increase the facilities of the tourism premises which will directly compliment the principles of ecotourism. It will therefore reduce cultural negative impact. Growth of facilities and infrastructure in and surroundings of the ecotourism destinations will increase the global tourism markets. Emphasizing on sustainability of the project will therefore support its design considerations. Connecting the known pillars of sustainability: the economic, the social, the environmental and the cultural aspects for design consideration, see table II.

TABLE II
POSITIVE ENVIRONMENTAL AND ECONOMIC IMPACTS

Criteria	Objectives	Implementations
Environmental	-Design, Architecture and Surroundings -Energy -Water -Waste -Environmental and Sustainable Management	-Provide the simplest technologies that incorporates energy conserving strategies. -Integration of sustainable design constraints such as: climatic conditions and topographical features. -Using natural landscaping and indigenous species vegetation. -Preservation of existing trees and Rainwater creeks. -Grey water and sewage treatment and recycling. -Provides careful handling and disposal of solid waste.
Socio-cultural	-Guest Information -Training and Instructions -Farming and plantation	-Provide opportunities for the demonstration of local arts crafts and traditional culture of the region. -Provide awareness for visitors on traditional and natural features and local culture. -Introducing local cuisine and planting its ingredients as part of the landscape design.
Economic	-Design, Architecture and Surroundings -Training and Instructions	-Enhance economic awareness through the most efficient use of local resources and building materials. -Profiting from the site's main positive views and the best use of natural attractions. -Raise the local standard of living by involving the local population in the operations of the ecolodge.

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VI. PRINCIPLES OF ECO DESIGN

Ecotourism with sustainable development in preserved areas must be carefully designed and constructed in order to leave apprehension of unobtrusiveness.[6] During laying out and development of tourism facilities new approach in architecture must be applied, known as ecology design or "eco-design". Ceballos-Lascuráin (1997) defined eco-design as "any design that blends in surrounding ecosystem and minimizing negative influences on the environment". Architects involved in eco-design must revere sensibility towards natural context, which usually signify the objects that full-fill visitor's demands for pleasure, safety and minimal influence on the surroundings. The principles of eco-design are:[7]

- Provide comfortable quarters and outdoor and indoor public spaces which reflect the vernacular design and the community culture.
- Preserve a natural environment that has been meticulously maintained.
- Make proper use of locally sustainable and recyclable construction materials.
- Provide food bought from local farmers
- Use renewable energy resources and water/waste management techniques.
- Present opportunities for interactivity with local residents and guides.

A. Standard for Designing and Constructing Ecotourism Facilities

1) Utilization of alternative technologies like solar energy, wind energy, low energy lightning, roof gardens, A/C and radiators that use HVAC technology.[9]

2) Utilization of water preservation techniques (harvesting rainfall, usage of household waste waters for irrigation, dry-toilets, showers with limited water pressure, tap water aerators etc.).

3) Utilization of ecologically allowable sewer systems that do not pollute underground waters.

4) Usage of floral species which use less water and adapts its growth.

5) Usage of ecologically and local building materials for construction and interiors (stone, mud, bio-brick, recycled plaster, recycled wood & non-toxic paints).

B. Locally Available Materials for Eco Design

In any Eco-design, the architectural style does not compete against the natural landscape and the environment but should be cordially unified with the surrounding. It is also important to take into consideration the vernacular architectural forms since these have arisen from a long progression of adaptation to the natural surrounding as well as being harmonized with the landscape and the environment. Certainly, they offer excellent touristic experience in spectacular natural locations, but Eco-design must also support local communities, by connecting their guests to local cultures on a genuine level. Sustainable building materials are often natural materials with low energy consumption, low maintenance costs & should be easily dismantled and recyclable during demolition.[7] These should be environmentally friendly and reduce environmental hazards without releasing pollutants or other emissions that affect human health and comfort throughout the life cycle. To compare between the locally available building materials like stone and mud, materials formed from dry waste like bio-brick and engineered materials like concrete blocks and fly-ash bricks, see table 3 to 7. It can be clearly understood as per the analysis of the above comparison, the necessity of the respective materials in the urban scenario where eco-design should be promoted more.

C. Material-Stone

Natural stones are truly eco-friendly, sustainable and non-toxic. That is why natural stone is the first choice as a building material for having a green lifestyle. These are long-lasting, recyclable, lower maintenance and maintains consistency.

TABLE III

U VALUE OF LATERITE STONE ASSEMBLY

Materials	Thickness	Thermal conductivity	Total R
Surface 1/fo		0.076	0.076
Plaster	15mm	0.461	0.0325
Laterite stone	300mm	1.20	0.25
Plaster	15mm	0.461	0.0325
Surface 1/fi		0.123	0.123
Total u-value			1.74W/m2

D. Material-Mud

Mud has been the foremost basic building material since the beginning of human existence. Due to abundant availability and lesser use of energy-consuming construction apparatus, mud reduces the consumption of energy. Important advantage of using earth is that the characteristics of recycled soil post-construction remains the same. It is extremely malleable and pliable that offers better insulation properties than steel and concrete structures.

TABLE IV

U VALUE OF MUD WALL ASSEMBLY

Materials	Thickness	Thermal conductivity	Total R
Surface 1/fo		0.076	0.076
Plaster	15mm	0.461	0.0325
Concrete block	200mm	0.27	0.74
Plaster	15mm	0.461	0.0325
Surface 1/fi		0.123	0.123
Total u-value			0.98 w/m2

E. Material-Bio-brick

Bio-bricks as compared to red bricks are not only sustainable but also acts as a carbon sequestration as it embeds more carbon dioxide than it is produced during its life cycle. These bio-bricks are not only used to build load bearing structures, they can be used in low-cost housing with RCC or metal frame structure.

TABLE V

U VALUE OF BIO-BRICK ASSEMBLY

Materials	Thickness	Thermal conductivity	Total R
Surface 1/fo		0.076	0.076
Plaster	15mm	0.461	0.0325
Concrete block	200mm	0.27	0.74
Plaster	15mm	0.461	0.0325
Surface 1/fi		0.123	0.123
Total u-value			0.98 w/m2

F. Material-Red brick

Red bricks have limitations as they are not eco-friendly and not one bit resource efficient. Compressive strength of red bricks is less as compared to stone, mud and other bio bricks. The wastage of red bricks on site is more than 10%. They have more water absorption capacity with respect to other materials. Red bricks particularly have less life expectancy.

TABLE VI

U VALUE OF RED BRICK ASSEMBLY

Materials	Thickness	Thermal conductivity	Total R
Surface 1/fo		0.076	0.076
Plaster	15mm	0.461	0.0325
Brick wall	230mm	1.15	0.20
Plaster	15mm	0.461	0.0325
Surface 1/fi		0.123	0.123
Total u-value			2.15 w/m2

G. Material-Concrete block

Concrete block has short life expectancy as compared to stone and mud blocks. These also have less aesthetic appearance as compared to other blocks.

TABLE VII
U VALUE OF CONCRETE BLOCK ASSEMBLY

Materials	Thickness	Thermal conductivity	Total R
Surface 1/fo		0.076	0.076
Plaster	15mm	0.461	0.0325
Concrete block	200mm	1.4	0.143
Plaster	15mm	0.461	0.0325
Surface 1/fi		0.123	0.123
Total u-value			2.45 w/m2

VII. COMPARATIVE ANALYSIS OF THE MATERIALS

Locally available materials have impact on the development of ecotourism premises. Built structures and outdoor landscape both equally helps in reducing carbon footprint if eco-friendly materials are used. The comparison between the materials clearly signifies that the natural materials in the design of assemblies have less U-value than the red brick and concrete blocks (fig 2). Sustainability is not just about using locally available natural resources but also reusing and recycling of waste generated i.e. dry waste by which bio bricks are made. The necessity to promote this eco-design valuing the parameters of environmental, economic, social and cultural aspects is the present need for the better future.

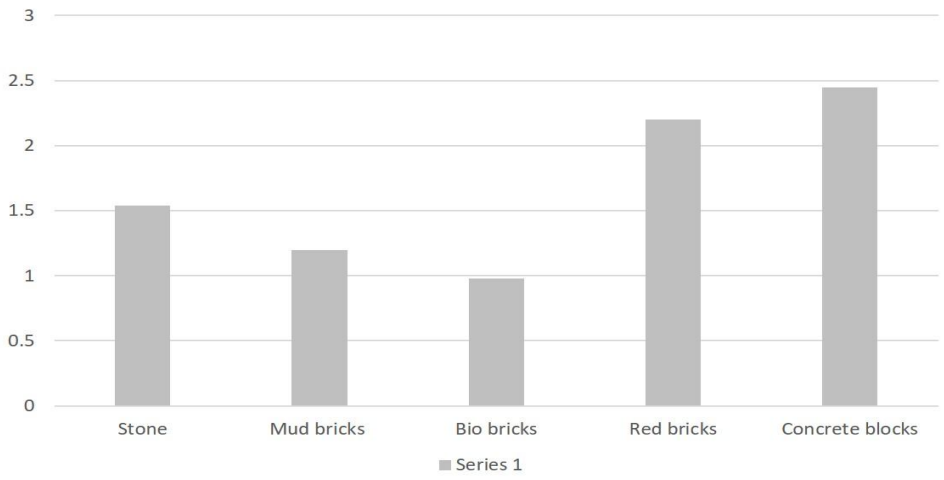


Fig. 2 Comparison of U value of building materials

VIII. RELATIONSHIP BETWEEN ECOTOURISM DEVELOPMENT AND NATURAL MATERIALS

Architecture has been addressing all problems related to environment and has used available resources to meet local needs and revamp them to set out buildings. Continuous comforts are taken into observation by the ecotourism developers, by taking note of the exclusion of materials that have proven to be less effective on the environment and try to find alternatives solutions. Local materials safeguards from climatic conditions. Clay and stone are considered as the best natural building materials that can provide thermal insulation of the building, which helps in reducing the depletion of natural resources & carbon emission. Mud, stone, and bio-bricks (made from dry waste) can be used widely in many eco-developments. Therefore, the research endorses on the importance of using natural materials and balancing between making good use and ensuring progression of the fundamentals of green architecture, which must be used in a sustainable manner. Eco-design for ecotourism development should gain consideration and complement the surrounding environment. There are some criteria for the identification of eco-friendly materials which gives direction in building a sustainable community or eco-friendly premise.

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Those are:

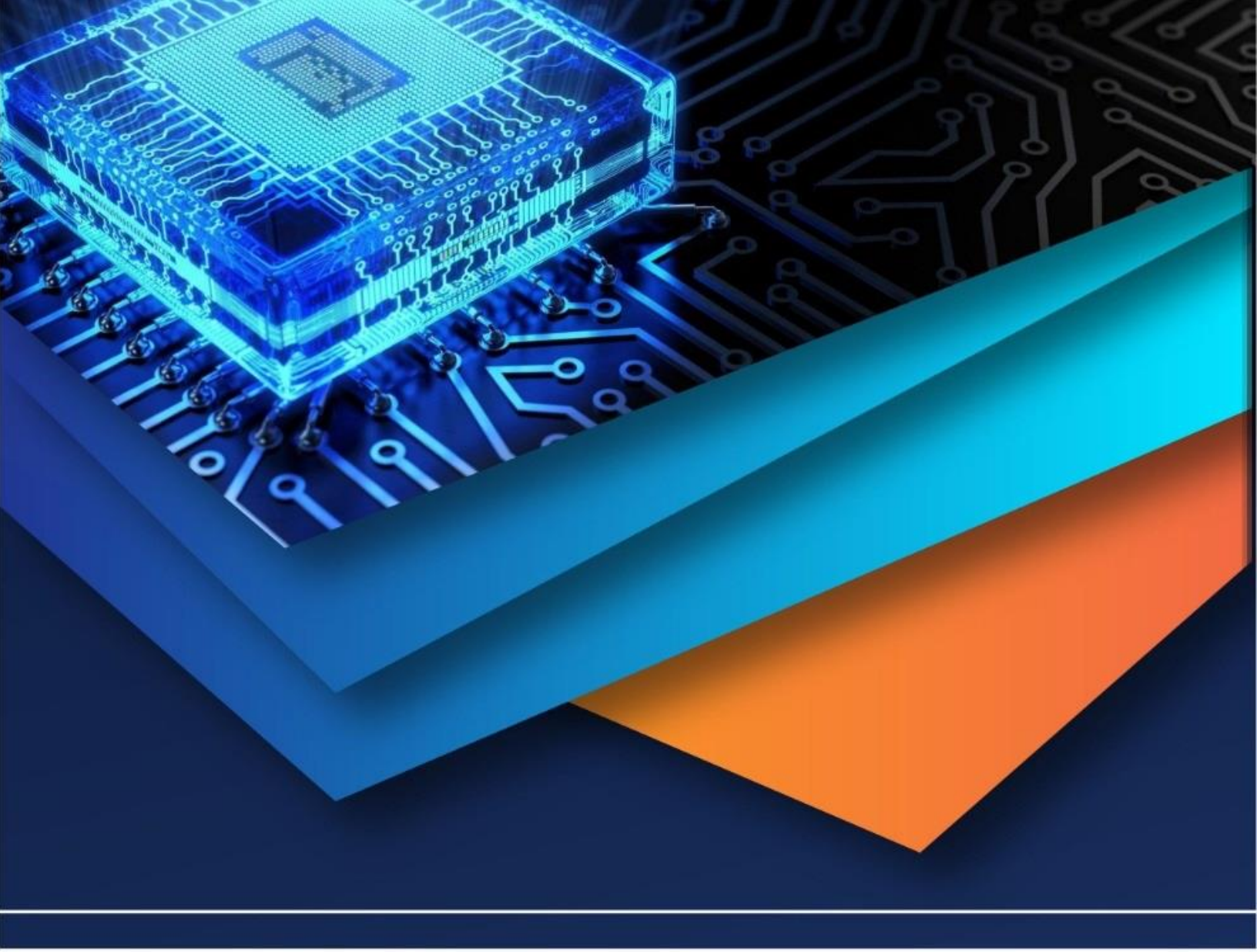
1) Locally availability of materials with its components saves the energy consumption and transportation on site.
2) Reusing of efficient resources like dry waste, manufacturing it, do not produce residue and also reduces greenhouse gases.
3) Recyclability of materials till the end of its life provides high endurance.
4) Non toxic substances have low emission of volatile organic compounds.
5) Eco-friendly materials improve indoor air quality and reduce maintenance over the life of the building.
6) Unlimited flexibility in design reduces the cost of changing or disturbing the development.

IX. CONCLUSION

All Ecological environment is the obligatory condition and base of the ecotourism development. The people engage are in favour of environmental conservation and community participation in environmental management of ecotourism. With respect to the development prospective of ecotourism, multiple facilities have success in including local communities in planning and ensuring equal distribution of economic benefits. Redirection of this industry is important towards community involvement, which will shape the fulfilment of ecotourism's developmental goals. To improve the positive impacts of ecotourism, local people must be part of planning of projects from start so they will be aware of the impacts and be supportive. Differentiating with typical methods of planning and economic development, the practice of eco-design will be of great environmental benefits. Eco-design is purposive in conservation of ecological integrity, and to manage services required by human economy. Developing infrastructure promoting ecotourism and ecolodge with proper amenities, will fix supplemental valorisation of tourism. Developing programmes that includes education and training programmes, through which people participate in eco-tourism. By this local communities will develop and benefit from eco development and heritage preservation. Tourists should take responsibility towards the destination they are visiting by their choice itself as the behaviour and activities performed in that area should maintain the quality and sensitivity of destinations.

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