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NEED FOR AWARENESS ABOUT THE FEATURES AND BENEFITS OF GREEN BUILDINGS IN ASIAN-SPECIFIC UNDERDEVELOPED NATIONS. A COMPRESSIVE REVIEW

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ABSTRACT:

Because of their lack of infrastructure and resources, developing nations have enormous obstacles when implementing green building practices. Notwithstanding these challenges, the significance of environmental stewardship and sustainability is becoming more widely acknowledged. Green building techniques are being adapted to local contexts with an eye toward things like climate, culture, and resource availability. Non-Government Organizations (NGOs) and international organizations are supporting the adoption of green-building concepts by offering technical help and capacity-building activities. In developing nations, cooperation between the public and private sectors is crucial to removing obstacles and accomplishing sustainable development objectives.

The only way to advance green building and strive towards environmental friendliness, which can lessen the energy demand, especially during the lean season, is to raise awareness of and educate people at all levels of society about the advantages of doing so. To further reduce energy use, designers must use green building materials during the planning and designing stages. To reduce the burden of energy import and support the tenants' quality of life, there is a pressing demand for green buildings.

This article focuses on the concepts of green buildings their applicability and advantages to support the sustainability and self-sufficiency of underdeveloped and developing nations. This paper will not only enrich the research and domain but also help the society of those nations to think of self-sufficiency and sustainability.

Keywords: sustainability construction SC, self-sufficiency SS, green buildings GB, demand, need.

1. INTRODUCTION

Although the term **"green building"** was first used by researchers in the late 1980s, most of the world has been working towards environmentally friendly constructions ever since[1]. The term "green building," is also known as sustainable building, which involves mindfulness toward environmentally friendly by taking by taken care, right from planning, developing, and managing a building to minimize its negative effects on the environment and its resource consumption while simultaneously enhancing the health and well-being of its occupants[2]. The goal of green building principles is to lower energy use and greenhouse gas emissions by making use of energy-efficient building materials, appliances, and systems like HVAC (heating, ventilation, and air conditioning)[3]. reducing water use and advancing sustainable water management by implementing water-saving fixtures, rainwater collection systems, and wastewater recycling technology. using materials that, from extraction to disposal, have the least negative effects on the environment, and are renewable, locally sourced[4], and ecologically friendly. employing techniques to improve indoor air quality produces hygienic and cozy interior spaces[4]. These techniques include using low-emission building materials, appropriate ventilation systems, and natural ventilation[5]. selecting locations to lessen dependency on private automobiles by minimizing environmental effects, protecting natural ecosystems, fostering biodiversity, and facilitating access to services and public transportation. minimizing landfill trash and advancing the concepts of the circular economy by including waste reduction techniques including recycling programs, construction waste management plans, and using repurposed materials. use passive design techniques to minimize the need for mechanical systems and maximize natural resources, such as orientation, shading, natural lighting, and thermal insulation[6].
Although green building has numerous benefits, it is not easy to get certification[7]. The certification purely depends [8]on several variables, including the project's size, location, funding, and the particular certification program being pursued (e.g., LEED, BREEAM, Green Star), obtaining certification for a green building may present numerous challenges[9]. The following are some typical difficulties in obtaining a green building certification [10]:

Cost Factor: The initial outlay required to implement green building elements and pursue certification is sometimes seen as a hurdle, particularly for projects with limited funding[11]. While lower energy and water costs from green building methods may result in long-term cost benefits, certain project stakeholders may find the initial capital investment difficult to bear.
The long process with more complexity: The certification process for green buildings can be complicated, requiring one to navigate several regulations, documentation, and verification steps[12]. Because of this intricacy, project teams comprising architects, engineers, contractors, and sustainability consultants may need to coordinate and possess specific knowledge.
Strong teamwork requirement: It usually takes careful coordination between different project stakeholders to integrate sustainable design concepts, choose suitable materials and systems, and monitor performance indicators throughout the project lifespan to obtain green building certification[13]. Team members must effectively coordinate and communicate with one another to guarantee that sustainability objectives are fulfilled and appropriately documented[14].
Adherence to bylaws: Green construction projects need to fulfill the criteria of the selected certification system in addition to adhering to local building norms and laws[15]. The certification process may become more difficult to understand and unpredictable when

navigating regulatory requirements and making sure that applicable laws and regulations are being followed[16].

Lack of expertise and materials: In certain places, especially those where sustainability programs are less common, it may be difficult to find competent people with experience in green building methods and certification criteria[8], [17]. The implementation and certification of green construction projects may face obstacles due to a lack of funding or a scarcity of skilled personnel[18].

Performance and management: To make sure that sustainability objectives are met and sustained over time, green building certification programs usually demand continual performance monitoring and verification[19]. It can be difficult to set up trustworthy measurement and verification procedures and tracking systems, especially when dealing with complicated building systems and technology[20].

The challenges faced by underdeveloped Nations in the Implementation of Green buildings

The initial cost of green building materials and technologies is typically higher than that of regular construction materials. In developing countries when resources are scarce and budgets are tight, this may be expensive[21]. It's also possible that a large number of individuals in developing countries are unaware of the advantages of green building techniques or do not have access to the information and training needed to apply them successfully[22].

Another reason is certain materials and technology are frequently needed for green building, which may not be easily accessible in developing countries[23]. These materials can be costly to import, and in places with poor transportation options, it might not be possible[24]. Adoption of green construction approaches may be hampered by thoughtless or nonexistent laws, rules, and policies of environmental standards and building codes. Sustainability projects could not be given top priority by governments because of other urgent socioeconomic issues[25]. Further, the willingness of people and communities to adopt green construction practices can be influenced by differences in cultural norms and societal views regarding sustainability[26].

It can be difficult to transfer green construction innovations from developed to undeveloped countries because of variations in climate, topography, and resource availability[27]. The implementation and upkeep of sustainable construction projects may be challenging in developing countries due to a lack of workforce training and experienced specialists knowledgeable in green building methods. One of the main obstacles is that financial institutions may be reluctant to engage in relatively new and unproven technology and practices, and obtaining financing for green building projects can be challenging. The green building approaches have long-term benefits, but sometimes the emphasis is on short-term issues like infrastructure development and housing shortages.

2. General Concept of Green Building

2.1 Use of non-convention energy

Solar energy: The sun is the most abundant source of energy on the planet[28]. Photovoltaic cells, which convert sunlight into electricity, can be used to generate electricity. Solar energy can also be used to heat water and heat a building [4], [29].

Wind energy: Wind turbines generate wind energy by converting the kinetic energy of the wind into electricity [30]. Wind energy is a clean, renewable energy source that is used for both on-grid and off-grid applications [31].

Geothermal energy: Geothermal energy is heat energy generated and stored in the core of the Earth [32]. It can be used to generate electricity or for direct heating and cooling by drilling deep wells and using the steam generated [33].

Hydro energy: Hydro energy is produced by harnessing the power of flowing water from a high level to a lower level[29]. It is used in hydroelectric power plants to generate electricity [34]

2.1.1 Biomass energy: Biomass energy is created by converting organic materials such as wood, crop residues, and animal waste into electricity[35]. It is used for heating, cooking, and generating electricity [36].

2.2 Minimal energy use/Optimize water use

2.2.1 Energy-saving appliances: Using energy-saving appliances can drastically reduce energy consumption[37]. Look for appliances with an ENERGY STAR rating, which indicates that they meet strict energy efficiency guidelines[28], [38]. The study was conducted in Malaysia on energy saving during covid-19 pandemic and after covid and was found different sections of society shifted to low-energy consumption appliances [39]

2.2.2 Optimum use of natural light: Making the most of natural light in your home can help you save energy, which is mostly done through building orientation[40]. Skylights, light-colored walls, flooring, and strategically placed windows can help achieve this saving of energy[41]. The other option and future researchers can focus on flooring materials that can transmit light, which can reduce the burden on the environment [42]

2.2.3 Rainwater harvesting: Collecting rainwater can provide a non-potable water source[43]. With the growth of the population in world, it is pivotal to look for alternatives to meet the demand for water, especially in megacities [44]. Further, it helps in reducing the risk of flooding in low areas [45].

2.2.4 Greywater recycling: is the collection and treatment of wastewater from showers, sinks, and washing machines for reuse in irrigation or toilet flushing[46].

2.3 Optimize natural energy use

2.3.1 Energy Efficiency: Nature has evolved to be extremely energy-efficient, and biomimicry can help us learn from her. Green buildings can optimize energy usage and reduce energy waste by mimicking natural processes and systems[47].

2.3.2 Sustainable Materials: Biomimicry can help us discover new sustainable and non-toxic materials. For example, the strong, lightweight, and flexible nature of bamboo stems has inspired the use of bamboo in construction [48].

2.3.3 Improved Indoor Air Quality: Green buildings can use natural ventilation and air purification systems to promote better indoor air quality, which is important for occupant health and well-being[49].

2.3.4 Biophilic Design: Designers can be inspired by biomimicry to create green buildings that incorporate natural patterns, shapes, and colors [9]. Biophilic design has the potential to improve occupant well-being, productivity, and creativity while also promoting environmental sustainability [50].

2.4 Designing and Planning Phase

2.4.1 Design for Environmentally Friendly:

The study of biomimicry seeks out biological and ecological models that might serve as sources of ideas for design and engineering. The potential for biomimicry to support regenerative performance in infrastructure has not been investigated, despite an increase in biomimicry research, and there has been little investigation into the opportunities for biomimicry in infrastructure[51]. Similarly, green buildings too are biomimicry which is energy efficient [52].

2.4.2 Sustainable Innovation:

Biomimetics, which seeks to develop solutions inspired by nature's principles and systems, provides a sustainable approach to innovation. Biomimetics can help to reduce the environmental impact of human technology and create more sustainable products and systems by studying and emulating natural designs[50], [52].

2.4.3 Increased efficiency:

Nature has evolved to be extremely efficient, and biomimetics can assist us in tapping into this efficiency by developing technology that mimics natural systems. Wind turbines, for example, designed to mimic the movement of whale fins or the flapping of bird wings can produce more energy with less waste.

2.4.4 Improved Performance:

Over millions of years, natural systems have evolved to optimize performance, and biomimetics can allow us to benefit from this optimization. The study of bird flight, for example, has inspired the development of more efficient aircraft designs.

2.4.5 Cost Savings:

Biomimetics can also lead to cost savings by encouraging the use of natural materials and processes, which are frequently less expensive and more readily available than synthetic materials. Furthermore, biomimetic solutions can reduce energy and material waste, which can result in long-term cost savings.

2.4.6 Improved Adaptability:

Nature has evolved to adapt to changing environments, and biomimetics can aid in the development of technology that is more adaptable to changing conditions. Biomimetics can help us develop more resilient and adaptable technology by studying how plants and animals respond to environmental stressors. After knowing the overall benefit of green building scientists and researchers work on this area.

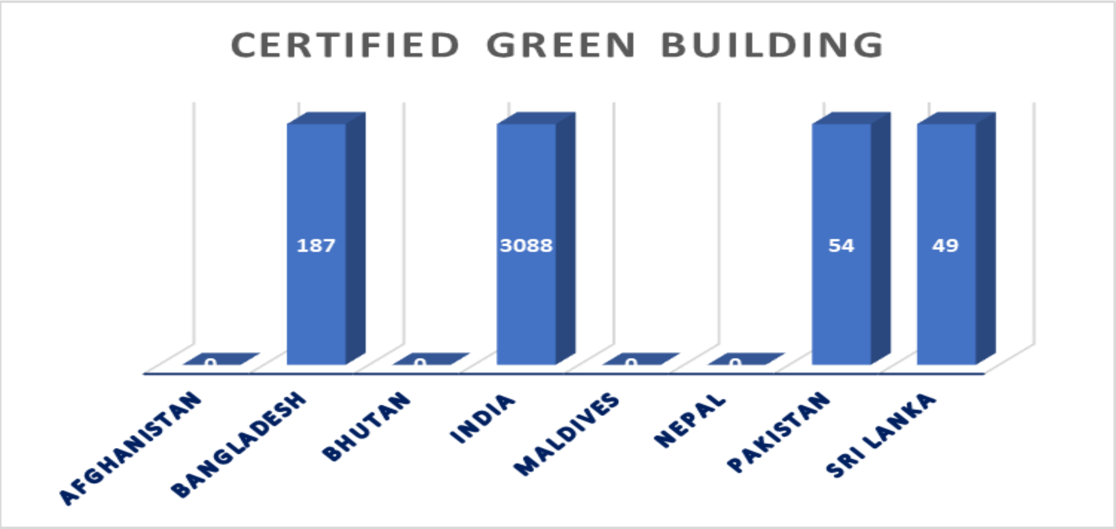
The construction industry is one of the largest contributors to the global economy, but it is also a significant contributor to environmental degradation, including greenhouse gas emissions, waste production, and natural resource depletion. Green building practices can help to mitigate these negative impacts by reducing energy and water consumption, reducing waste, and utilizing sustainable materials and construction methods. A green building is also known as a sustainable building as it is environment friendly in every phase of the building life cycle assessment (Planning, design, construction, operation, maintenance renovation, and demolition) [53]. The studies revealed that 40% of total energy consumption is purely from the building sector (carbon dioxide emission)[54]. The building has a huge impact on the environment, using almost 40% of natural resources extracted in industrialized nations, consuming virtually 70% of electricity and 12% of potable water, and producing between 45% and 65% of the waste disposal in our landfills [55]. Today climate change is one of the most pressing matters globally- recognized contemporaneous issues, which provide sustainable development a top priority on the agendas of governments worldwide. If we do not act today, in the coming years, the global level of energy consumption will keep on increasing based on the economic development and growth of the population. The European Union (EU) leaders are intensifying their focus on the reduction of consumption and greenhouse gas emissions by up to 80 percent of the current levels by 2050 (European Commission, 2011). To materialize this goal, it is crucial to understand what are the main sources of energy consumption and the major worldwide trends in the energy consumption process[56].

During the last three to four decades; global warming, ozone depletion, resource depletion, energy scarcity, ecological toxicity, human toxicity, and acid rain have been frequently experienced. These have attracted researchers around the world to work towards environment-friendly, carbon-neutral, green initiatives, and the Green Building is one of them. It is not possible to totally do away with the effects of the environment, but it is always better to start with something that can contribute towards minimizing environmental impact. Green buildings not only contribute towards sustainable construction and the environment but also brings benefit and advantages to the building owners and the users. The benefit of green building is lower development costs lower operating costs, increased comfort, healthier indoor environment quality, and fewer maintenance costs [55]. As per the studies, more than 35 percent of the buildings in the European Union are over 50 years old, knowing the benefit of green buildings, these old buildings will be replaced by green buildings which will help in reaching information to the world, particularly under develop countries[56]

The concept of green building was first initiated in the late 80s transition has begun to go through the path of sustainability. At the same time, researchers have been trying to introduce new technologies and strategies to set up renewable and sustainable resources and reduce carbon footprint and greenhouse gas emissions. The concept of sustainability has become an inevitable part of the building industry due to its substantial impact on the natural environment[57]. As per the data available for the last five years in Google Scholar of SARRC countries, India is taking the lead in implementing green building, and more and more people are educated on the same looking at the number of research conducted [58].

Table 1: Number of certified green buildings in SARRC countries

Name of Country	Certified Green Building
Afghanistan	0
Bangladesh	187
Bhutan	0
India	3088
Maldives	0
Nepal	0
Pakistan	54
Sri Lanka	49



The graph depicts the green certified buildings. Number of certified green buildings indicates the implementation on the real ground and also the seriousness about green buildings. So, as per the google scholar data available from 2018 to 2022 the countries like Afghanistan, Nepal, Maldives, and Bhutan should learn from India to implement green building construction concepts. A detailed study of the energy efficiency of green buildings has been conducted and found that 44.14 kWh/m2 is saved as compared to conventional buildings in the same location [59]

2.4.7 Waste Minimization and Utilization

Green buildings generate zero waste and whatever waste comes into the building will be converted into a valuable asset that can be sold and boost the economics of the family and nation as a whole.

2.4.8 Natural Resource Conservation

The green building's main aim is to reduce the impact on the environment and to promote natural resource conversation, waste reduction, and the use of renewable energy sources. It is found that policies of conservation play a major role in promoting and protecting nature. [60]

2.4.9 LCA Analysis

The life cycle assessment of the building is one of the key elements that green buildings should be looking for, life cycle assessment begins right from the inception of project, the planning and design phase, and during the operation and demolition phase[61]. Therefore, LCA analysis in all product stages, from primary processing and use to disposal, should be the focus of research, development, and innovation pertaining to "green" buildings. These efforts should also integrate knowledge and experience from various disciplines, involving experts from fields like engineering, material science, forestry, environmental science, architecture, marketing, and business[3], [61]. The focus should be on developing new products from renewable resources, utilizing the entire wood value chain, and finding engineering solutions [60]. This life cycle assessment is basically carried out using different tools like eToolLCD and Building Information Modeling (BIM) [62]

Green facades can cover huge portions of a facade, depending on the method. Additionally, a green facade will add greenery to crowded areas. Both indoor and outdoor living conditions are adjusted for living on living walls. The way the plant is transported by each of them differs. The most prevalent, most powerful, and most expensive system is the structural media [63]. The climber canopy's foliage served as a heat sink to absorb heat from the environment and as a shield to protect the building's surface from intense sunlight. Additionally, green wall flora reduced diurnal temperature fluctuations, particularly at the surface of the outside wall [64].

For effective insulation against convective heat transfer from the warm environment to the building shell, the posterior air gap kept a layer of comparatively cool air wedged between the vegetation and the outer wall. The plant and substrate's evapotranspiration contributed to the humidification of the ambient and posterior air. The ambient air provided the least cooling or, on occasion, warmth outside of the climber canopy. By examining the radiation balance of the green wall at various locations along the building envelope, the shading-induced energy savings were calculated. The resulting energy savings could serve as a quantitative measure of the shading effectiveness of various green-wall layouts and provide guidance on how to maximize their energy advantages. Such long-term benefits might be quantified in terms of money and carbon, which could aid in highlighting the many benefits of green walls [65].

Green Roof

A green roof is part of a green building that entails growing flora on a structure's roof. By providing insulation and assisting in reducing energy consumption as well as heat transfer into the rooms, it is a green solution to lessen the building's carbon impact. Additionally, it offers a host of additional advantages like increased air quality, stormwater management, and overall building beauty.

Green Walls

Green walls are acknowledged as a sustainable approach for enhancing the internal and outdoor environments of buildings and are seen as an essential component of the building design. Living walls, modular panels, green facades, the use of green materials such as eco-friendly green bricks, and other designs are all possible for green walls. The plants used as decoration on walls are chosen with care to match the local climate, humidity, and temperature. As a result, there will be a large reduction in the mechanical cooling and heating system.[65] For practitioners managing green wall design and management, useful advice has been drawn from the research findings. On the choice of climber species and green wall specifications, landscape architects can make decisions that are supported by science. Researchers can create novel planter designs to maximize the cooling produced by climbers [6].

Green Ceiling

Green ceiling usually refers to use of modular panels or hanging gardens, green ceilings, sometimes referred to as eco-ceilings, involve adding plants to a building's ceiling space. Additionally, it can provide insulation, enhance air quality, and lessen the impact of urban heat islands. By absorbing sound, they also have acoustic advantages, making them perfect for usage in noisy settings. By releasing oxygen, these plants will improve indoor air quality and comfort which is contributing to the improvement of the building envelope [6]. Convective heat transfer between the foliage and the air and longwave radiation exchange between the canopy and its surroundings accounted for around 30% and 20% of the solar energy absorbed.

Given that the thermal effect ratio of net photosynthesis to transpiration was less than 5.5%, it was possible that most engineering applications would accept an error of less than 2.9% if the thermal effect of net photosynthesis of the climbing plant was not taken into account in the thermal balance calculation.

A VGF can enhance both the indoor and outdoor thermal settings in addition to its apparent cooling and energy-saving impacts [66].

Source Weblink-4

Green Floor

The use of eco-friendly materials like bamboo, cork, recycled rubber, natural linoleum, and reclaimed wood is essentially what the term "green floor" refers to. Due to its insulating qualities, this material can assist save energy expenses and usage [67]

Source: Weblink-5

2.5 The objective of this paper is to spread awareness in the features and benefits of green buildings in Asian-specific underdeveloped nations To promote the green building concept:

Green Buildings aim to minimize energy consumption by using energy-efficient materials and technologies such as solar panels, high-efficiency HVAC systems, LED lighting, and more. This helps in lowering the pressure on fossil fuels, and greenhouse gas emissions, and saves on energy costs. To cut the government expenditure on the import of electricity during the winter months (November to February) [66]

History of Green Buildings and current status in developed, developing, and underdeveloped nations

Aspect	Developed Nations	Developing Nations	Underdeveloped Nations
History	The drive for green buildings grew in the latter half of the 20th century.	Green architecture became popular in the late 20th and early 21st centuries.	Initiatives for green building are relatively new because of resource constraints.
Early Adopters	United States, Canada, Western Europe, Australia and Japan	China, Brazil, India, South Africa, Mexico.	limited early adoption as a result of financial limitations.
Regulations	Green building approaches are encouraged by strict building laws and regulations.	Putting more of an emphasis on integrating green guidelines into building codes.	There are little or no rules, and they are frequently not enforced.
Market penetration	High penetration; a sizeable share of newly constructed structures are green buildings.	Growing number of green building projects; growing market penetration.	restricted adoption; few green buildings as a result of concerns about awareness and expense.
Technology	Access to cutting-edge materials and technologies for green building.	Adoption of green technologies, yet accessibility issues can arise.	restricted access to cutting-edge technologies and dependence on conventional techniques.
Awareness	High degree of awareness and general comprehension of the advantages of green architecture.	Although awareness is rising, regional differences may be significant.	Limited awareness; education and outreach activities are ongoing.
Financial Support	Financial grants, subsidies, and incentives are available for environmentally friendly projects.	Funding is becoming more readily available, however, it might not be as much as in developed countries.	Limited financial backing; unable to obtain funds for environmentally friendly projects.
Capacity Building	Well-established training programs and skilled workforce in green building.	Attempts to increase capacity, however, resource limitations may provide difficulties.	inadequate training programs and a workforce devoid of expertise.

The global economy has experienced rapid growth over the last 100 years. Throughout this process, humans have continued to emit greenhouse gases such as carbon dioxide, causing global warming, the greenhouse effect to worsen, glaciers to melt, and sea levels to rise.

According to the IPCC's Fourth Assessment Report on Climate Change, published in 2007, the global temperature has increased by 0.3-0.6 degrees Celsius over the last 100 years due to the large number of greenhouse gases released by humans, such as carbon dioxide, and sea level has risen by 10%-25 cm. According to the IPCC report, more than 90% of the factors contributing to global temperature rise over the last 50 years have been identified.
The inception of green buildings or sustainable buildings was begun in the late 1980s. Thereon, researchers have been working to develop new green technologies and strategies to use renewable and sustainable resources while reducing carbon footprint and greenhouse gas emissions. Because of its significant impact on the natural environment, the concept of sustainability has become an indispensable part of the building industry[57] World leaders, scientists, and researchers are exploring innovation and different strategies to protect the natural environment, minimize waste generation, and reduce carbon emissions. One major initiative is the universal adoption of the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs), 169 targets, and 231 indicators toward socioeconomic development globally. The construction industry will play a critical role in achieving the SDGs. For example, construction and demolition activities generate large amounts of waste, necessitating the adoption of practices that reduce waste generation and maximize re-use to improve resource efficiency and reduce negative environmental impact [68]
According to the author, the adoption of sustainable construction could significantly aid in the achievement of a number of SDGs, including SDG2 (End Hunger), SDG3 (Good Health & Well-Being), SDG4 (Quality Education), SDG6 (Clean Water & Sanitation), SDG7 (Affordable & Clean Energy), SDG8 (Decent Work & Economic Growth), SDG9 (Industry, Innovation & Infrastructure), SDG10 ((Reduced Inequalities) SDG11 (Sustainable Cities & Communities), and SDG13 (Climate Action)
One of the main objectives of sustainable building is to eliminate if not, reduce the carbon footprint. As per [69] The carbon footprint can be calculated in four ways: the first using life cycle assessment (LCA); the second using the energy used fossil fuel emissions (IPCC); the third using the input and output method; and the fourth using the carbon footprint of Kaya Emission identities. The life cycle method is a bottom-to-top calculation method that calculates the product "from beginning to end". The United Nations Climate Change Committee compiles the IPCC's carbon dioxide emissions, and it fully accounts for greenhouse gas emissions in its calculations. The input-output method, the top-to-bottom calculation method, and the input-output method are all used, but the calculation accuracy is low. [70] Typically, to conventional construction, which emphasizes economy, usefulness, and durability, environmentally friendly building typically embraces social, economic, and environmental factors as its three core dimensions. The social component raises people's standard of living. A higher standard of work for the environment, reducing maintenance and operating expenses, creating jobs, and other issues are all covered by the monetary aspect. The building, design, maintenance/operation, and demolition processes that negatively affect the environment through emissions, waste discharges, land use, and water resource use are all included in the environmental dimensions.

Constraints of implementation of green building in underdeveloped nations
Financial constraint

The impact of financial obstacles has been one of the most significant impediments to the application of ES in building projects, and other researchers have identified it as one of the primary challenges in construction projects[71]. Although it is claimed that the long-term benefits outweigh the inconveniences, the initial increase in investment is said to be focused on environmental and social reimbursement The fear that sustainable structures will be more expensive than standard constructions[72], and the risk of the unexpected is frequently emphasized as a barrier to sustainable building. Though the initial investment is larger, building owners would benefit over time due to sustainable construction practices [70]

Political constraints

Although developing and underdeveloped nations are noted for its green practices, there are few standards in place and no awards for the successful application of sustainable construction practices. The success of sustainable construction is heavily reliant on the government's obligation and the formulation of legislation. SC is related to sustainable design and construction because of its several advantages. Therefore, to encourage citizens and private businesses to join the movement, the government and its agencies should take the lead by implementing environmentally friendly construction and design techniques into all new construction endeavors.

Not availability of Modern Technology

Underdeveloped nations does not have exposure to current technological advances, including funding for research and development into sustainable construction, a dearth of environmentally friendly materials, a lack of instruments for measuring environmental sustainability a lack of sophisticated software, a lack of long-term skills, a labor scarcity, a lack of technical aptitude, and so forth. These obstacles are quantifiable because they directly affect the implementation of sustainable structural practices. Building project designers are not aware of or confident in the issues of sustainable construction design. It is critical that technical information on sustainable construction is made available to design experts in an appropriate format, and that contractors be held accountable for putting the design into action [73].

Inadequate Information and Awareness

Although underdeveloped nations advocate the practice of sustainable construction, it has never been widely adopted, which is one of the reasons experts lack solid understanding and awareness [74]. Ignorance or a lack of information about sustainability might stymie sustainable building efforts. The construction industry is made up of several parties with distinct functions (clients, consultants, and contractors) that must work together to accomplish a project. As a result, raising awareness is critical for the construction industry's long-term viability [74]. Aside from all this, a lack of training among engineers and others involved in the construction process impedes sustainable construction[75].

2. CONCLUSION

Building techniques that are sustainable are essential for developing countries like Afghanistan, Nepal, Bhutan, and Nepal. After careful consideration, it is decided that the government ought to pay for the first stages of the construction of green buildings because they are substantially more expensive to construct initially than conventional ones. As this review research shows, it has also found the importance of green buildings and the components that comprise them. Green buildings require careful consideration of all sustainability and environmental friendliness factors during the design and implementation phase at the site.

Another way to cut down on how much energy is needed to heat and cool rooms in the winter and summer is to utilize plants like wall climbers, which can cut energy use by 20%. Additionally, green buildings improve tenant health and save operating costs. These underdeveloped nations and developing nations should learn and be educated on sustainable construction approaches. The Bhutan under the leadership of the visionary 5th King identified a beautiful place called Gelephu as a mindfulness city that will be developed using the principle of sustainable construction.

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