INTERPRETING SOCIAL AND CULTURAL SUSTAINABILITY FOR HOUSING

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ABSTRACT

The foundation of sustainable development is on three dimensions: economic, social, and environmental. Over the years, the impact of built cultural heritage also recognizes as an essential dimension in sustainable development. India has developed a well-recognized policy database and reforms to cater to the need for sustainability. Existing policies and guidelines primarily focus on environmental and economic conditions. Being deeply rooted in culture and traditions, India has a strong inclination towards social and cultural values. The paper talks about the role of social and cultural sustainability for housing in India. The article reviews the housing and energy sector's policy landscape and other reforms that drive them, with an extensive literature review on these indicators. The paper suggests social and cultural indicators that integrate into the current housing needs and are part of policy and assessment methods.

KEY WORDS

Sustainable development; Social sustainability; Cultural sustainability; Sustainability Indicators; Residential sector.

1. INTRODUCTION

Urbanization in India results in an increase in towns and cities and the rising population in urban areas. According to census 2011, 37.7% of India's 121 crore people live in urban areas, rising continuously (CHANDRAMOULI, 2011). The increasing population in urban areas requires more buildings to work, live, and interact with, leading to increased facilities, resulting in a projected rise in electricity demand (SHANDILYA & GHORPADE, 2019). India's urban population grew from 290 million in 2001 to 378 million in 2011 and will reach 590 million by 2030 (Census of India, 2019). In 2017, approximately 272 million households were estimated in India, increasing to 328 and 386 million in 2027 and 2037. The residential sector floor area anticipates rising to 21.9 billion m2 in the next ten years from 15.3 billion m2 in017 (GBPN, 2014). The contribution of the building sector to India's Gross Domestic Product (GDP) was 8.04% in 2014-15, and it is estimated to rise to 16.74% by 2025 (PLANNING COMMISSION, 2011). An increase of 400% in the aggregate floor area of buildings and 20 billion m2 of new building floor area will grow by 2030 (KUMAR, 2011). However, the inadequate construction details and lack of energy efficiency measures provide a high potential for energy savings, both in demand and consumption. It is necessary for India now to develop energy-efficiency strategies focused on the residential sector to limit the current trend of unsustainable increasing energy demand. The sectoral coverage of India's climate policies is diverse, and targets for climate action focus on specific areas essential for long-term, low-carbon growth.

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With limited resources, sustainable development assists in determining a suitable answer to many settlements such as physical, cultural, environmental, and economic advancements. Vernacular architecture embodies the heart of sustainability because it is constructed with local materials and processes, resulting in minimal waste. The vernacular architecture reflects the culture and its relevance in the local and regional landscape. Sustainability improves the quality of life by integrating the three significant aspects: environment, and social and economic features of any built environment, thus becoming a part of both tangible and intangible cultural identities (TAHA, 2005). Architects are currently focused on vernacular structures to make them more energy-efficient and sustainable. With advancement and urbanization, there is still room for adopting vernacular heritage. The first notion that comes to mind while discussing Sustainable Development is environmental protection. India has been seeking to improve energy efficiency through mandatory building codes, standards, and voluntary rating programs for buildings and products. Green building rating or certification methods focus on the entire project rather than one product. Rating systems are certification system that assigns a score or credit based on how well a structure meets specific environmental goals and regulations. The terms "rating systems" and "certification systems" are often interchanged. (VIERRA, 2019). To construct environmentally responsible and resource-efficient projects across the life cycle of a building, green building rating and certification systems necessitate an integrated design approach. Green rating systems offer advice on how to establish a green design rating system for a building. The green rating systems that provide green level certification procedures are green performance type systems (K.C.DING, 2008). The primary purpose of any green building assessment tool is to evaluate different aspects of sustainable practices during the planning, construction, and operation of a building and incorporate the best methods to reduce the effect of the building on the environment.

Structures developed by people whose architectural decisions are influenced by their culture's traditions refer to as vernacular architecture. The tremendous range of climate, topography, and culture found around the world influences vernacular architecture. Environment, building materials, and cultural expectations in a given region have influenced how vernacular buildings have changed over time. Understanding and using characteristics present in traditional vernacular architecture to new structures have benefits. Vernacular Architecture has always been a method of building locally in response to a region's cultural, social, and microclimate. With the advent of better equipment and the expertise of local craftspeople, it has progressed. Vernacular architecture isn't static; it responds to the changing culture and environment around it. It is a regional native that contributes to a community's and environment's long-term viability. There is a need to analyze vernacular's position in changing attitude to the built environment. (DAYARATNE, 2018) (OLIVER, 1997) (OLIVER, 2010) (RAPOPORT, 1969). Burnskill (1988) suggests a classification system for vernacular structures based on their intended use. Domestic arrangements, such as private residences, rest houses, and leisure houses, are designed for living purposes (BRUNSKILL, 1988). Traditional design concepts focus on space's function, energy efficiency, human comfort, aesthetics, and economic feasibility, all while considering and adapting to the local environment and culture (FORUZANMEHR, 2008).

2. THEORETICAL FOUNDATION

2.1. Introduction to Sustainability

The concept of sustainable development was first introduced in 1987 by the Brundtland Commission, formally known as the World Commission on Environment and Development (WCED), as part of the report 'Our Common Future' (BRUNDTLAND, 1987). In this report, sustainable development states as "development that meets the present needs without compromising the ability of future generations to meet their own needs" (BRUNDTLAND, 1987). Culture presents a feature of social sustainability in the policy field and occasionally even a part or dimension. During the UNESCO Decade of Culture and Development (1988–1997), the interrelationship between culture and development was discussed, resulting in the WCCD Report 'Our Creative Diversity (PÉREZ DE CUÉLLAR, 1995). While the social indicator, with the ecological and economic, is well-established parts of the sustainable development concept (BRUNDTLAND,

1987), there is an ongoing debate about the need to include a fourth, the cultural dimension (SAASTAMOINEN, 2005) (UNESCO, 2010) (CULTURE21, 2011) (KAI M. A,. CHAN, 2012) (TERRY C., DANIEL, 2012). Hawkes in 2001 stated that while presenting the case for culture as the fourth pillar of sustainability, the researchers argue that cultural vitality is as essential in sustainable development as social equality and equates cultural variety to biodiversity (HAWKES, JON & JON, 2001).

2.2. Social and Cultural Sustainability

According to the dictionary, the term social defines human society, the interaction of individuals and groups, or the welfare of human beings as community members (MERRIAM-WEBSTER, 2021). Social sustainability was initially introduced as a part of the sustainable development concept in the Brundtland Report (BRUNDTLAND, 1987). During the 1992 Rio Conference, social sustainability is defined as the right to a decent living, inter or intragenerational, worldwide social justice, and local engagement in SD processes. As well, social sustainability is defined as follows: "a method for developing long-term, successful locations that promote well-being by determining what people require from their homes and workplaces. The design of the environment and social world combines in social sustainability. Infrastructure for social and cultural life, social amenities, citizen involvement methods, and room for people and places to evolve are all needed." - Social Life (TRUST, 2016).

According to the United Nations Global Compact, social sustainability should be a crucial aspect of any business because it affects interactions with stakeholders. Social sustainability is a proactive approach to controlling and detecting the effects of a company's operations on employees, value chain workers, customers, and local communities (UNGC, 2021). According to Nobel Laureate Amartya Sen, social sustainability comprises five dimensions: quality of life, equality, diversity, social cohesion, democracy, and governance. Human well-being, happiness, and quality of life are among the most recent additions (COLANTONIO, 2007). Bostrom and Davidson suggest social sustainability, arguing that any endeavor to establish socially sustainable societies must first define the "type of society... we want to sustain" (BOSTRÖM, 2012) (DAVIDSON, 2009). Jabareen connects urban planning and design principles, including compactness, mixed-use, density, sustainable transportation, and greening, to social sustainability results (JABAREEN, 2016). Physical characteristics related to sustainability are listed by Dempsey *et al*. They include urbanity, an appealing public realm, adequate housing, local environmental quality and amenities, accessibility, sustainable urban design, and walkable neighborhoods (DEMPSEY, 2011). Most of these characteristics are fundamental and quantitative, making them easy to assess for effective planning. According to Vallance and others, we should comprehend social sustainability processes and structures as they unfold and continue via the three methods of 'development sustainability,' 'bridge sustainability,' and 'bridge sustainability.' It guarantees that structures are adjusted to meet changing needs and maintenance sustainability, ensuring that systems are functional and operational (S VALLANCE, 2011). The sustainability of a community refers to the ability of society, or its expression as the local community, to maintain and reproduce itself at an acceptable level of functioning in terms of social organization. (COLEMAN, 1988).

Similarly, culture defines as the set of shared attitudes, values, goals, and practices that characterizes an institution or organization and the characteristic features of everyday existence (such as diversions or a way of life) shared by people in a place or time (MERRIAM-WEBSTER, 2021). Cultural sustainability refers to a development approach that preserves all forms of cultural assets, including minority languages and traditional practices, artworks, artifacts, and historic structures and sites (UNESCO, 2021). Development initiatives that are sensitive to a place's cultural context and unique characteristics promote a human-centered approach to development are more effective and are more likely to provide long-term, inclusive, and equitable outcomes (UNESCO, 2012).

The literature on cultural indicators can be outlined at least as far back as the early 1970s (LEIF H., GOUIEDO,2003). Culture contributes to inclusive economic development, as cultural heritage, cultural and creative industries, sustainable cultural tourism, and cultural infrastructure are income generation and employment creation sources, including the

community level. Hence, it helps improve living conditions, foster community-based economic growth, and empower individuals (UNESCO, 2015). Culture is who we are and what shapes our identity. No development can be sustainable without including culture. (UNESCO, 2015) Culture is what makes us who we are and forms our identities. There can be no long-term progress without culture. The United Nations General Assembly adopted the "2030 Agenda for Sustainable Development" in September 2015, including 17 bold, universal goals to transform our world (UNESCO, 2015). Most of the Sustainable Development Goals (SDGs) recognize the role of culture, including those focusing on quality education, sustainable cities, the environment, economic growth, sustainable consumption and production patterns, peaceful and inclusive societies, gender equality, and food security, according to UNESCO (2015). From cultural heritage to cultural and creative industries, culture is both an enabler and a driver of sustainable development's economic, social, and environmental dimensions. Cultural Sustainability encourages full involvement in cultural life while having the most negligible impact on the environment. "Cultural sustainability is primarily concerned with the continuity of cultural values linking all of the past, present, and future," writes Al-Hagla (AL-HAGLA, KHALID, 2005).

Culture is the source of our advancement and innovation, and it must be carefully nourished to thrive" as per the Culture and Development Commission of the United Nations. Individuals express their potential to fulfill themselves through culture, so it is an essential component of development (UNESCO, 2010). Development initiatives that are sensitive to a place's cultural context and unique characteristics promote a human-centered approach to development are more effective and are more likely to provide long-term, inclusive, and equitable outcomes (UNESCO, 2012). Since culture itself is intrinsic to realizing human aspirations, it is argued that cultural diversity will be an essential factor in promoting economic, social, and cultural development (UNESCO, 2010) . The culture of a community significantly shapes debate and action. Local culture also presents unique options for locally based economic and other development. Local understandings and interpretations of a community's history reflect past events that feed into and are partially driven by the demands, sentiments, and interests of those present. This makes it crucial for community development practitioners to consider the importance of culture to improve local well-being (UNESCO, 2010). There is a risk that vernacular traditions that help define a people and place cultural make-up will vanish. The issue in preserving these rich skills and cultures will be to package this knowledge, so that modern designers and builders know vernacular traditions (ZHIQIANG ZHAI, 2010).

3. METHOD AND DEVELOPMENT STRATEGY

The methodology chapter is divided into two major sections, starting from an intense literature review covering two essential topics: building standards and sustainability, which form the entire paper's foundation and are showcased in figure 1. The first section focuses on India's policy outlook for housing and energy developed by the central government of India and other related reforms that drive these policies. The second section highlights the understanding of social and cultural indicators of sustainability through these policy documents, reports, and other literature reviews. The base of social and cultural sustainability has been discussed in previous chapters.

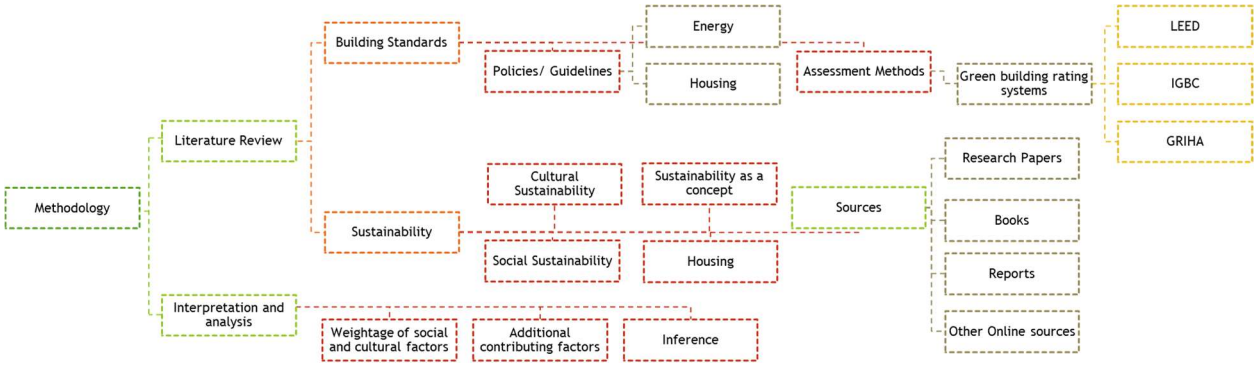

Figure 1: *Methodology chart.*

3.1. Outlook of India's policy landscape

The Ministry of Housing and Urban Affairs is entrusted with the broad policy formulation, administration, and monitoring of the various housing and urban development schemes. Urban development is a State subject, and the Constitution (Seventy-fourth) amendment Act, 1992 has delegated many functions to urban local bodies (MOHUA, 18-19). However, the Government of India plays a coordinating and monitoring role and supports various urban housing programs, urban livelihood missions, and overall urban development through Central and Centrally Sponsored Schemes. The Ministry facilitates resolving multiple issues relevant to the urban sector through appropriate policy guidelines, subordinate legislation, and sectoral program.

The government of India initiated the very first effort for energy conservation with the introduction of the Energy Conservation Act published in the Gazette of India in October 2001. Bureau of Energy Efficiency (BEE) was instituted in 2002 to implement EC Act. Further, the first version of the Energy Conservation Building Code was launched by the Government of India in 2007. EC Act was amended in 2010 with a further update of ECBC in 2017, restricted to commercial buildings. Recent developments such as revision in the National building code (2016), Model building bye-laws (2016), ECBC -R (Eco Niwas Samhita 2018 for the residential sector) are set to potentially increasing the overall impact on energy savings at the city level substantially. The importance of energy and its effects on buildings have been recognized and addressed in fundamental building norms and green building certifications. These have been an integral part of central and state policies and apply to almost all types of buildings. The policies/codes below highlighted the importance of energy efficiency indirectly/indirectly dealing with energy and their role in respective areas.

The governance structure for the state is illustrated in Figure 2 below:

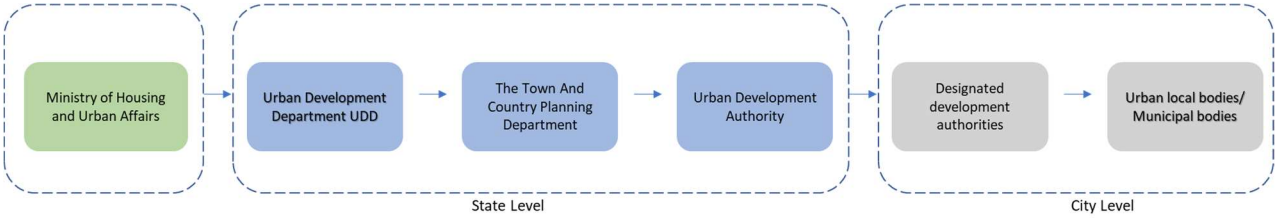

Figure 2: *The governance structure for the housing sector. Source: MoHUA.*

The governance structure of the state under the energy sector is illustrated in Figure 3 below.

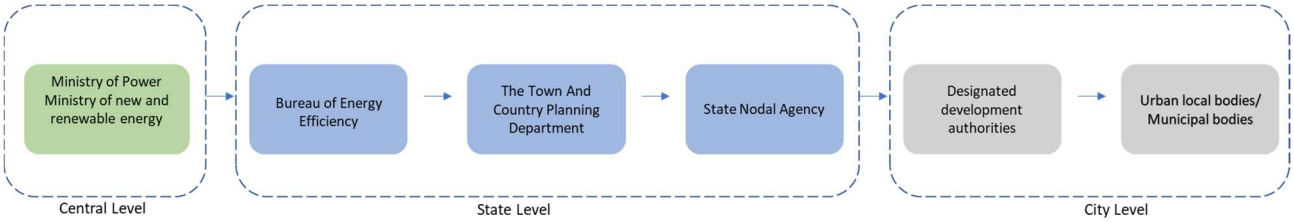

Figure 3: *The governance structure for the energy sector. Source: MoP.*

The Government of India (GoI) develops policies and programs to guide urban planning and energy management. Urban policy, planning, and housing are state subjects according to the Constitution of India. However, the central government has played a proactive role in housing matters by formulating policies and programs, giving directives to the state, and allocating funds under the five-year plans. To meet energy needs and reduce carbon emissions, the Indian government has adopted a two-pronged approach, i.e., focusing on supply and demand. On the generation side, greater use of renewable energy, mainly solar and wind, is being promoted. On the demand side, efforts are being made to improve energy efficiency through various innovative policy measures within the 2001 Energy Conservation Law umbrella. Figure 4 represents the policy landscape for housing and energy.

Figure 4: *Policy landscape of India.Source: MoHUA.*

The government of India has three levels in its governance structure, i.e., central, state and city level, which are merely responsible for the formation and implementation of rules and regulations. The following diagram, Figure 5, explains the roles at each level following the research aim. Also, the study titled "Energy efficiency and building construction in India "concludes with commendations for structural changes in energy and construction policy in India in building construction to minimize energy consumption. The study highlights here as it was one of the first attempts in the research field to develop a comprehensive optimization model for energy accounting in house construction in India (TIWARI, 2001).

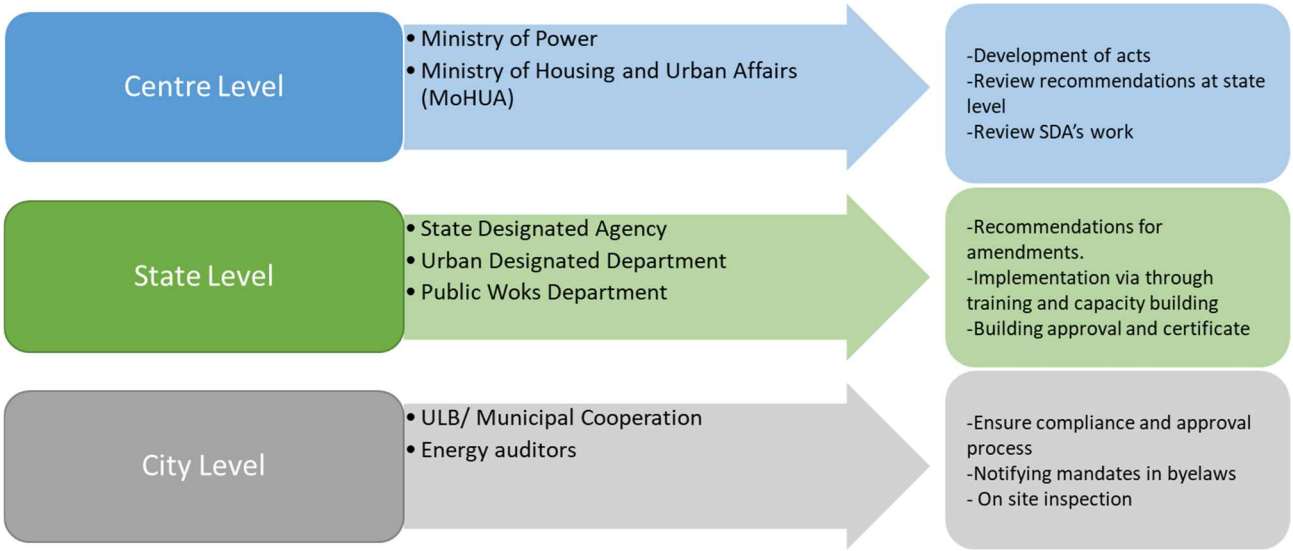

Figure 5: *Governance Structure of India. SOURCE: MoHUA, MoP*

Tables 1, 2, 3 discusses the policies related to energy efficiency and building assessment in detail.

Policy/Scheme	Year	Information	Remarks
National Building Code	2016 (First version in 2005)	NBC is a comprehensive building Code prepared to unify the building regulations by providing guidelines across the country. The provisions of this code intend to serve as a model for the adoption of government departments, state/local bodies, and other construction agencies.	In part 11, 'Approach to sustainability' has provided guidelines for making buildings and built environment energy-efficient and environmentally compatible, which describes several measures for low energy building design and construction. It covers the parameters required for planning, design, construction, operation, and maintenance of the building and those relating to land development from a sustainability point of view.
Energy Conservation Building Code	2017 (First version in 2007)	The purpose of the ECBC is to provide minimum requirements for the energy-efficient design and construction of buildings. The Bureau of Energy Efficiency (BEE) developed the code that sets minimum energy standards for commercial buildings with a connected load of 100kW or contracts demand of 120 KVA and above. Or if the plot area is more than 500 m² or equal (excluding basement) and intended for commercial purposes.	
Approach to Sustainability	2014	The central public works department launched guidelines for Sustainable Habitat. The guidelines are based on reports of the National Mission on Sustainable Habitat by the Ministry of Urban Development and draft code on "Approach to Sustainability" as part of NBC 2005.	The proposed Index is not on an absolute scale. It is merely a set of criteria on which relative judgment occurs between the same product category materials regarding sustainability. The guidelines have four parts:(1) Guidelines on Architectural Design and Layout, (2) CPWD Sustainability index and Guidelines for materials, (3) Guidelines for selection of equipment for Electrical and Mechanical Services for sustainable buildings, (4) Guidelines on reuse and recycling of pre and post-construction waste.
Model Building Bye-Laws	2016	These are legal guidelines developed by TCPO, which uses to regulate building design and construction aspects of buildings to achieve orderly development of an area	It discusses environmental concerns in chapter 10, which incorporates green buildings and sustainability provisions, rainwater harvesting, solar rooftop PV norms, and sustainable building materials. It also mentions green building rating systems. It also discusses requirements for the ECBC prepared by BEE.
Eco-Niwas Samhita (ECBC-R)	2018	Code suggests minimum standards for building envelope designs to design energy-efficient residential buildings. The regulation applies to (a) "Residential Buildings" built on a plot area ≥of 500 m2and (b) Residential part of "Mixed land-use building projects," built on a plot area of ≥500 m2.	

Table 1: *Policy outlook at central level for energy. Source: MoP,MoHUA*

Industry Initiatives	Information	Remarks
IGBC	The Indian Green Building Council (IGBC) is a part of the Confederation of Indian Industry (CII). The council offers various services, including developing a new green building rating program and certification services.	Green new/existing buildings, green residential societies, and green residences are included in the IGBC Green Building Rating Systems. It's a voluntary, consensus- based approach that helps buildings become more efficient and environment friendly.
GRIHA	It is a green building design evaluation system developed in 2007 where buildings are evaluated in a three-tier process. GRIHA rating system consists of 34 criteria categorized in four different sections; (1) Site selection and site planning, (2) Conservation and efficient utilization of resources, (3) Building operation and maintenance, and (4) Innovation.	SVAGRIHA is designed as an extension of GRIHA and is specially developed for projects with a floor area of less than 2500 square meters. SVAGRIHA can help plan and evaluate individual apartments, small offices, schools, motels, commercial buildings, etc. The evaluation includes only 14 standards, and the interface consists of a simplified calculator (GRIHA, 2019).
BEE	BEE developed its rating system for the buildings based on a 1 to 5-star scale. They created the Energy Performance Index (EPI). Kwh/m2/year consider rating the building and primarily targets air-conditioned and non-air-conditioned office buildings.	BEE standards and labeling display energy performance labels on high-energy end-use equipment & appliances, and minimum energy performance standards are laid down.
SVAGRIHA	SVAGRIHA is an extension of GRIHA for projects with a built-up area of less than 2500 sq.m. SVAGRIHA can help design and evaluate individual residences, small offices, schools, motels, commercial buildings, etc. The rating comprises only 14 criteria, and the interface includes simplified calculators.	
LEED (Leadership in Energy and Environmental Design)	LEED is rating system used globally. It was the Indian Green Business Center (IGBC), under the Confederation of Indian Industries (CII), that facilitated the LEED rating of the United States Green Building Council (USGBC) (USGBC, 2021). The certification is for all building types and phases, including new construction, interior fit-outs, operations and maintenance, and core and shell, and has also released some country-specific editions. The latest version of LEED, LEED v4.1, raises the bar on building standards to address energy efficiency, water conservation, site selection, material selection, daylighting and waste reduction (USGBC, 2021). We have considered here the version specifically adapted for India. There are four key goals for the LEED v4.1Multifamily Residential rating system: ensure leadership, increase achievability, measure performance and expand the market (USGBC, 2021).	

Table 2: *Initiatives under energy.Source: IGBC, GRIHA, BEE. LEED*

3.2. Understanding Social and Cultural Indicators

This section emphasizes understanding the social and cultural sustainability criteria indicators based on existing policies and scholarly work available. This section highlights the pointers covered over these guidelines and a few recommended by world organizations like United Nations and UNESCO. Since the Brundtland Report and Agenda 21, urban nature has grown for social, cultural, and environmental reasons. Culture, as an ensemble of real vectors of social life, comprises a natural dimension. This dimension must be resurrecting to strengthen and make culture's role in sustainable development more tangible (Agenda 21, 1992),(Brundtland, 1987). Socially sustainable communities are equitable, diversified, interconnected, and democratic, and they promote a high quality of life. Chiu has also focused on the phenomena of social sustainability and presented it in three interrelated perspectives, namely, development-oriented, environmental, and people-oriented (Chiu, Rebecca, L., 2003).

A given landscape defines social and cultural requirements as living space, including tangible aspects like aesthetics, elements, and structure such as historical relics and human habitat, and intangible such as the feeling of home, local culture, and customs. However, these social and cultural components are challenging to describe and quantify, and their integration into planning is lacking. Table 4 showcases information on each indicator based on a review of policies, databases, and scholarly work. The paper uses the latest versions of green building rating systems applicable for India: GRIHA v2019, IGBC v3, and LEED v4.1 for BD+C: New Construction and Major Renovation.

Social Indicator	Policies/ Reforms:	Cultural Indicator	Policies/ Reforms:
Special requirements for citizens	NBC 2016	Regional priority	LEED v4.1
Socio-economic strategies	GRIHA v.2019	Cultural forms and local practices	UNESCO 2010, 2015, Dessein *et al*. 2015
Resident Well-being	IGBC v3	Culture diversity	UNESCO 2010, 2015
Transportation	LEED v4.1	Culture as a part of community development	UNESCO 2010
Neighborhood development	LEED v4.1	Architecture and Identity	UNESCO 2010, Abel (1993,2000)
Local building regulations	IGBC v3 and LEED v4.1, MBBL 2016, NBC 2016 (climate specific)	Cultural heritage	UNESCO 2010, 2021
Local Materials	MBBL 2016	Climate resilience construction	UNESCO 2012, 2015, Rapoport, 2006
Indoor environment quality	GRIHA v.2019, IGBC v3, LEED v4.1, NBC 2016, Chappells and Shove (2005)	Interconnectedness	UNESCO 2010
Construction management practices	GRIHA v.2019, IGBC v3, LEED v4.1, NBC 2016	Inter-regional impact	UNESCO 2010
Water management	GRIHA v.2019, IGBC v3, LEED v4.1, NBC 2016, MBBL 2016	Cultural landscape	UNESCO 2015
Universal Design	IGBC v3	Cultural access, participation, and consumption	UNESCO 2010
Accessibility	IGBC v3	Quality of life	Jackson, M. R., Herranz, J. (2002)
Signage	NBC 2016		
Safety	GRIHA v.2019		

Table 3: *Understanding social and cultural indicators. SOURCE: (BIS, 2016) (GRIHA, 2019) (IGBC, 2015) (USGBC, 2021) (UNESCO, Culture for Sustainable Development, 2015) (UNESCO, Culture: a driver and an enabler of sustainable development, 2012) (UNESCO, The Power of culture for development, 2010)*

Sustainability is a vital part of both intangible and tangible resources. Socio-cultural factors are merely proposed rather than explicitly stated in most standards. However, the building's architectural characteristics alone do not place it in its proper setting. The housing design should characterize social, aesthetic, and environmental concepts and include all fundamentals for forming an indoor space that would satisfy the lifestyle of people or the community. Dohr and Portillo, Oliver, and Rapport established that the tangible and intangible indicators are inseparable in creating contemporary and vernacular architecture alike and thus are essential for a regional and eco-cultural approach (Rapoport, 1969) (Oliver, 1997). Anthropologists can teach us more about cultures' intangible abstractions, but their distinct social, functionalist, cultural, economic, and other emphases must be acknowledged. Language and religion are cultural characteristics that do not need to be physically manifested (Oliver, 1997).

From the above table, we could analyze a clear picture that social and cultural indicators are not a considerable part of the policy database. A few of them are mentioned on the green building rating systems and are introduced in the recent versions. Culture indicators are only taken up as a concern by UNESCO and some scholars. Green building assessment methods appear to have the same bias toward physical metrics related to energy, environment, and resources. There is not much reference for the socio-cultural aspect of sustainability in these documents; the study has discussed these indicators through other existing literature.

4. RESULTS AND ANALYSIS

The fourth section highlights the interpretation of selected indicators from resources discussed earlier in the paper. To accomplish the required set of social and cultural indicators, we comprehended how these indicators are developed over a period and proceeded with the best possible indicators suited to our scenario. The term social relates to a group of people and community, and culture relates to how people go about certain things that result in perception built up and developed. Through this study, a set of feasible indicators and their interpretation are established, which can be used to create a framework focusing on the socio-cultural aspect of housing and are reflected in Table 4.

S.no.	Social Indicator	Interpretation	Cultural Indicator	Interpretation
1	Local priority	For consideration of local material usage and construction techniques	Visual and Aesthetic	Relevance of the element w.r.t. form, color, and functionality
2	Proximity to amenities	Nearness to the neighborhood, services, public spaces, and transportation	Cultural spaces	Based on ideology or belief of a place
3	Special Provision	Facilitates for elderly, childcare, and disabled people	Hierarchy of spaces	Privacy and space segregation within the area
4	Awareness about sustainability	Knowing and responding towards environmental awareness	Adaptability	Usage and utility of the environment and space
5	Safety	Sense of security within the premises and neighborhood areas	Satisfaction level	Gaging level of satisfaction within the space
6	Resident comfort	The well-being of the people w.r.t. interior environment	Cultural relevance	Understanding and responding to space

Table 4: *Selected social and cultural indicators and their interpretation*

Through this in-depth study, we were able to choose a few representative attributes that could cover the social and cultural aspects as well as contribute to all other minute features of these indicators. The below Figure 6 depicts the

framework developed in case of social and cultural indicators. The small bubble represents the broader attributes of social and cultural aspects and the rectangle statements denotes the qualities of these attributes.

E.g.: For special provision: the pointers are senior citizen and child care and signage. The other textual information shown in different colour could be possibly a combination on two aspects like socio-economic or eco-cultural, etc.

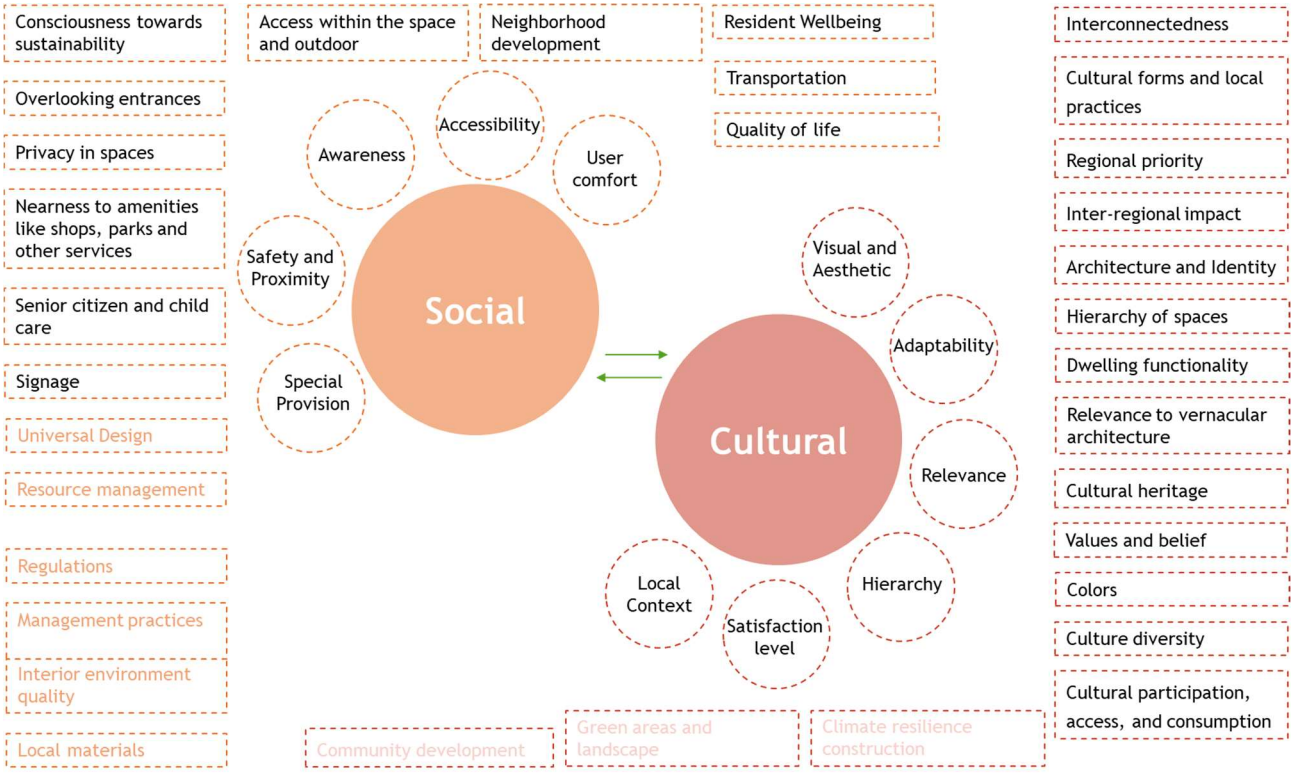

Figure 6: *Represents measurements to achieve sustainability on social and cultural sides.*

5. CONCLUSION

India as a country, so diverse in culture, traditions and has distinctive climate regions. It needs a tailor-made approach or regional tactic to address specific challenges. Material type, availability, practices, architectural styles, dwelling types, belief systems, etc., change with the location change. Hence, local solutions and approaches can sustain more here. In this research, we realize that there are almost no parameters focused on the cultural aspect of sustainability. After holding a robust identity and being well-rooted in the lives of Indian people, it is still neglected. There is a need to add more social, cultural, and socio-economic parameters more suited for Indian typology. This study will contribute in development socio-cultural framework for housing and in identifying tangible and intangible aspects of residential sector. The study can help researchers in understanding the policy outlook for energy and multiple reforms that drive them. It also gives them an understanding on how social and cultural factors are incorporated in existing systems. Need of inter-ministerial policies and multi-disciplinary development programs for the development of a sustainable environment from all dimensions. After the study, we analysed that it is viable to identify, recognize and select social and cultural indicators. We require more local interventions and involvement in sustainable development to identify location-specific requirements targets and take ahead to state-level policies and reforms.

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