SUSTAINABLE DEVELOPMENT: TRADITIONAL WISDOM WITH SPECIAL REFERENCE TO TRIBAL COMMUNITIES

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ABSTRACT

Sustainable living has its genesis in comfortable, cost-effective and resource efficient spaces, created by using nature based solutions. Each era is known to be credited with distinct challenges to human living. We need to learn how communities in that particular era overcame those challenges. With fast advancement in science and rapidly changing technologies we are becoming essentially mechanical, creating building options with large footprints expanding both horizontally and vertically. In the process buildings are becoming major consumers of energy and resources besides generators of waste, asking for more and more energy to be produced and consumed. There is an urgent need to pause, stop for a moment, think and integrate all our traditional wisdom and good practices for a creating a sustainable built environment. Corona, a smallest virus has made mankind helpless and handicapped for months together. It has taught us, for sure some good healthy behavioral practices and positive lessons that can make our lives more sustainable. Sustainability has its genesis in adopting nature based solutions for planning and designing built environment. This research paper deals with making a case for adopting good practices, based on traditional wisdom with special focus on tribal communities ,that can lead to creating sensible and sustainable options for human living.

Keywords-Sustainability, Good Practices, Traditional Wisdom, Tribal Knowledge

INTRODUCTION

As per the World Commission on Environment and Development "Sustainability is in meeting the needs of the present without compromising the ability of future generations to meet their own needs". (Sustainable website) Good sustainable practices deals with the efficient use of all resources, reducing impact on buildings and environment thus human health.

(Prakriti)The Good Practice of Reuse Reduce and recycle is the need of the day. (Archsd) Good building practices are primarily focused on developing sustainable sites, increasing water and energy efficiency, reducing waste and emissions, using eco-friendly building materials, save the forests and environment, use of local skills, energy efficient methods, conserving water, heating naturally with Sun, growing our food etc. (Environment and Architecture)

As concrete jungles become the norm in metro cities, we are facing the problems of Urban Sprawl, degrading natural resources, environment degradation. In the name of economic growth Unsustainable development continues to thrive in the country.

TRADITIONAL WISDOM

Good practices and techniques inspired from traditional aesthetics and vernacular traditions to work out their practical adaptations for contemporary sustainability need to be adopted in order to give back to nature. People need to come closer to their natural surroundings and feel responsible for Mother Earth. There are several natural materials such as mud, straws, earth, lime, reclaimed wood, etc., which are more cost efficient and need a much higher level of knowledge and skill in their application. (Daily Hunt) Need is of Good practices of adopting sustainable materials and techniques, minimizing dependence on concrete, steel - cement design, use of vernacular features , rain water harvesting, and organic hydroponic gardens. "Sustainable practices mostly today are just techno-fixes." As quoted by (Himalyan Hemp) Earth-based houses, which are mostly built with mud, have the least ecological footprint. These structures are built using local building techniques of the region. (Story, 2018) Green roof usage and Solar Panels can decrease the temperatures and improve air quality.Solar panels can save on energy and reduce cost factor.Cob an ancient building material that is actually mixture of straw and wet earth and rolled into loaf sized cobs, similar to clay can be used to make

houses. Houses should be built in tune with the nature and environment, unlike what is happening today where concrete structures are the norm in most areas. (Indigeneous wisdom)

INDIA THE LAND OF DIVERSITY

Varied cultural and ecological landscapes are embedded in rich Indian traditional wisdom. It is being increasingly realized that the ancient civilizations may have economic systems and practices that was based on living in harmony with nature. (Research Gate)Hence, there is a growing clamor to learn from the wisdom of the ancients and incorporate their ideas and practices or in other words learn from the philosophies that have stood the test of time (Kakoty). During the last few years, we are witness to severe climatic conditions resulting in unprecedented droughts or devastating floods, tornadoes, landslides along with major earthquakes, Tsunamis and Covid -19. Are these natural calamities or manmade? Since time immemorial, tribal communities of India live in various eco-geo climatic regions comprising hills, forests, rivers and natural wealth. They coped up with the environment and developed an intimate relationship with the natural surroundings through indigenous knowledge and wisdom. (Cleaner Production) Nature became the part and parcel of their life and livelihood which is manifested through their cultural traditions, religion, beliefs and practices, and world view expressive through their oral traditions of stories, legends, myths, and songs and also through their art forms. They even protect the environment considering it as their responsibility towards their ancestors because they believe that their ancestors live in nature and reside in natural object. They had developed a stake in conserving, and in some cases, enhancing the biodiversity. (Environment conservation)They were aware that biological diversity was a crucial factor in generating the ecological services and natural resources on which they were dependent. (Indigenous knowledge for biodiversity conservation) The knowledge base is often implied with indefinite and intimate relationship with the belief system. (ISSN 2347-5463).

TRIBAL COMMUNITIES RESOURCES

In India there are altogether 4573 communities inhabited in various eco - geographic regions and among them 573 are tribal communities. (Nath) These tribal communities live close in the vicinity of forest and have managed and conserved the biodiversity of their localities since time immemorial. There are 45,000 species that are ethno botanically important. (Dr.Ajit Kumar) Of these 7500 species are in medicinal use for indigenous health practices. Tribals use about 3900 plant species as food , 525 species are used for fiber, 400 species are used as fodder, 300 species are used in preparation and extraction of chemicals which are used as naturally occurring insecticides and extraction of gum, resins, dyes and perfumes. (wisdom) In addition to these a number of plants are used as timber, building material and about 700 species are culturally important from moral, religious, and social point of view. (Sacred grooves)

Indian sub - continent is one of the twelve mega centers of biodiversity representing two of the eighteen hotspots of biological diversity. (Heritage) When the massive Tsunami of December 26th, 2004 ravaged Asia, one of the hardest hit regions was the remote chain of some 500 islands known collectively as the Andaman and Nicobar. Inhabited by hunter gatherer tribes that have little contact with the outside world, anthropologists initially feared the tribes could have been completely wiped out. But, soon it was known that they used their ancient knowledge of nature to escape the Tsunami. (Science direct) One of the tribes that lives there are the Onge. They are estimated to have lived in the islands for 30000–50000 years. Numbering some one hundred individuals, they are on the verge of extinction. However, in the Tsunami, they suffered no casualties as their folklore speaks of large waves that follow earthquakes, so all of them retreated to the high grounds. All across the world Tribal communities and indigenous religions are acknowledged wealth of ancient knowledge and wisdom. Thus, such living knowledge systems could be an important source of guidance for modern man in his quest to good practices for sustainability.

When a particular bird sings a song, tribals know it is time to go turtle hunting on the beach instead of fishing in the sea. In Ladakh area the tribal houses are made of sun-dried mud brick with mud plaster and low roof. (The Morung Express Nagaland)Small sized door and windows facing the north side are other features of ecofriendly architecture. Ecological sustainability is ensured in Kampong by protecting the forests and mountains for the inhabitants. Even Adivasi women's knowledge is very important for forest conservation, as these women know exactly which type of product to collect depending on the season and the time of the day in order not

to overexploit the forest. (Magni Giorgia) Intergenerational good practices are the custodians of indigenous knowledge and, consequently, the most valuable source of transmission.

VIBRANT NATURE

Nature has always been very vibrant, giving and resilient to a very large extent. (S) It has a great influence on the social and cultural conditions as well as the life of a society or community as a part of the environmental aggregate. We take pride in strong cultural bondage between the environment, nature and human beings. (Conservation of Environment) Religion is one of the ancient ways of protecting and nurturing nature. This is evident in the tradition of worshiping of sun, wind, land, trees, plants, and water which forms the very basis of human survival. Likewise, respect to and conservation of wildlife like bird, lion, peacock, and snake form an integral part of our cultural ethos expressed through ancient scriptures and oral traditions in the form of myths, legends and stories.

The key parameter of sustainability is the good practices depicting social and cultural relevance. The environment is shaped by the values and cultural believes of the community. (ITUJFA)

ARCHAEOLOGICAL EVIDENCE

The conservation of environment by human is not a recent development. In the early periods of human history, environment strongly determined the lives and activities of the people. (Pushpagandhan)

They lived with nature and natural resources. (Bhattacharya)The ancient people developed many effective measures to safeguard their ecosystem and environment which reflect sustainable development in true sense. The oldest visual image of the human fascination, love, and reverence for nature in India is found in the 10,000-year old cave paintings at Bhimbetka in Central India depicting birds, animals, and human beings living in harmony. (Bhimbetka)

THE PREHISTORIC INDUS VALLEY CIVILIZATION

Flourished in the basins of the Indus River, one of the major rivers of Asia and the Ghaggar Hakra River provides evidence of human interest in wildlife, as seen in seals depicting images of rhino, elephant, bull, etc. (Rethinking future) The civilization had several characteristics of the city planning and social structure showed environmental awareness. The people of Indus lived in multi-storied Buildings made of baked bricks. The large roads paved with baked bricks, well laid drainages, aqueducts, private and public baths, other sanitary features of the civic and domestic life as revealed from the excavations, depicted a highly developed sense of health and sanitation existed in the pre Vedic period of the Indian civilization. There are nice bathrooms built in such a way as to have definite slope towards the street side from which a channel leads all the water into street pipes, which are connected with the street drains. In some places the pipes leading from bathrooms on the upper stories are connected with these channels so that the perfect and elaborate system of drainage leading from the houses and connecting the channels to the street drain which takes away the wastewater to the end of the street. (Bhimbetka)

Such careful and elaborate civic and domestic sanitary arrangements make us to think that it must be based on and supported by a sound understanding and practice of health science. (Bain)Therefore it is evident that this approach had its astonishing impact and the people accepted these value oriented practices as a way of life and which in course of time became traditions.

Ancient Indian texts and manuscripts reflected the concepts of forest ecology and conservation in a sustainable manner. (ILSHS) Vedas have several references on environmental protection, ecological balance, weather cycles, rainfall phenomena, hydrologic cycle, and related subjects that directly indicate the high level of awareness of the seers and people of that time. (Conservation of Environment) Akbar's efforts in promoting forestation in common property resources, management of water bodies, and his disapproval of killing animals are legendary.

Traditional knowledge system is the mother of all sciences and innovation as the indigenous peoples had close ties with the environment. (Biodiversity) It recognizes that biological diversity is about more than plants, animals and microorganisms and their ecosystems. (Cultural survival)

"*The UN declaration on the rights of indigenous people, endorsed by the UN Human Rights Council recognizes that respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment*."

LITERATURE REVIEW

Meghalaya

People manage their local environment through their traditional belief system. (Conservation of Environment) The Khasi Hills of Meghalaya are characterized by pockets of rich biodiversity that have been protected by the Khasis and form the basis of nature worship practices in that area. (Kalpavriksh)The Khasi people believe that those who disturb the forest will die, and that sacred animals such as the tiger bring about prosperity, happiness and well-being. These beliefs have resulted in the protection and continued regeneration of considerable forest land in the region. For the Meetei/Meitei community of Manipur and Assam, Sacred grove or Umanglai form an integral part of their tradition of nature worship. (Environment Ethics) Several species of plants are protected in these groves, which also offer protection to birds and animals. Fishes, waterfowl and other aquatic animals like snails and insects are very common items in the diet of the Meitei. (Chhibber) However, many of these animals are not eaten during certain periods, probably with the motive of sustainable harvesting and conservation (Singh et al. 1998:320). From the foregoing reviews of the studies by different authors, it reveals that most of the societies have some kind of mechanisms which directly or indirectly help to preserve or conserve the existing environment in which people live in. There are many sacred groves which are protected by respective community for their religious beliefs or economic reasons. The practice of sacred groves is now in danger because of rapid industrialization as well as urbanization processes, developmental activities, over exploitation of resources and increase in human population. Sacred groves of the Oraons located in Shekhala village of Rajasthan are becoming degraded due to change in peoples' attitude towards conservation of biodiversity, introduction of exotic species and concern for more income generation. Therefore, ecological services through sacred groves need to be highlighted

and people should be made to realize that the conservation of groves is crucial for their sustenance. (Kakoty, 2018).

The Sacred Forests Of Meghalaya

With their otherworldly stone megaliths, the sacred forests of Meghalaya are an interesting instance of voluntary community conservation of forests and sustainable way of living by individuals or clans. Tribal bodies and clans or individuals own over 96% of Meghalaya's rich forests in the form of sacred forests. Villagers consider forests to be homes of protector deities of villages and it is a taboo to pick even a blade of grass from these. (Sita) Irrespective of their faith, the villagers still visit these forests for signs and praying to the protector spirit. Due to this unwavering respect for tradition and creative ways to be sustainable, these sacred forests are thriving, and they are home to some rare species of flora and fauna. Whether the locals deliberately attached spiritual significance to protect the forests or it was a happy symbiosis is a topic of debate. (Paul)

The Living Roots - Bridges Of Meghalaya

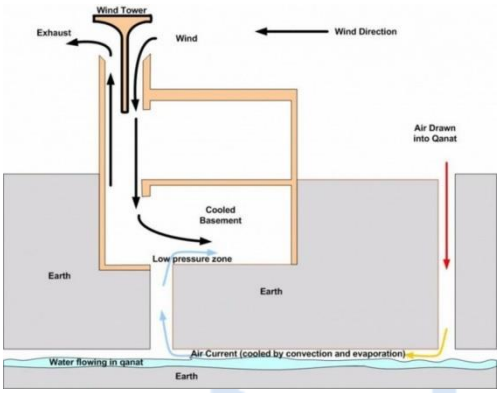
The local people devised an inventive solution for crossing the rain-swollen rivers of monsoon with wisdom drawn from nature. They created "living" bridges with the sturdy roots of a particular type of rubber trees. These trees have a secondary root system originating high up from the trunk. The locals guided these secondary roots through a system of scooping-out betel nut tree trunks to the opposite bank. (Elsevier) Over a period of ten to fifteen years, these take root and create functional and secure bridges that can support the weight of over fifty people at a time. As these bridges are made of mostly natural materials and following sustainable techniques, they cause the least amount of structural damage to the surroundings.

Also, study on traditional grazing practices in the Tibetan alpine meadows concluded that the light and moderate grazing resulted in sustainable yield to biodiversity. (Shaleh, 2017 april)

Persian Wind Towers

Badgirs traditional name of wind towers, were another type of architectural device widely used in ancient times to keep interiors of a building cool. (Fresh Perspectives)The openings in the wind towers catch air above the ground and direct it to the lower living space, which thereby

receives cooled air (as cool air sinks). A pressure gradient is hence created which directs the hot air upwards in the tower, out through the openings at its top. These towers were also used in water reservoirs in arid regions, where water could be stored at near frigid temperatures during summer months due to evaporative cooling. Commonly used today in the Middle East and in Rajasthan houses. (sustainability in architecture)



Functioning of a Wind Tower ©solaripedia.com

A water reservoir with Wind Towers in Iran©en.wikipedia.org

Every society teaches good practices to its next generation. The reason of for such ignorance is because traditional knowledge and its culture are seen by today's generation as backward. Environmental sustainability is more likely to be meaningful when the modern and developed world integrates traditional wisdom and knowledge. Environmental wisdom is a big umbrella that spreads over the planet, and it reminds us of wise people who took shelter from trees, and but also protect them, and people who drank from the river, but also kept it clean.

RAINWATER HARVESTING

As found in archaeological proofs the water conservation is deep rooted in the science of ancient India. (Conserving water) Near 300 BCE, farming communities in Balochistan and Kutch, India, adopted rainwater harvesting for agriculture and many other uses. Cholas also practiced it. (Rain water harvesting) The Brihadeeswarar temple rain water (located in Balaganpathy Nagar, Thanjavur, India) was collected in Shivaganga tank. (Acemap)The settlement of Dholavira, laid out on a slope between two storm water channels, is a great

example of water engineering. (Asha foundation) Chanakya's Arthashashtra mentions irrigation using water harvesting.

THE STEP WELLS OF NORTHWESTERN AND WESTERN INDIA

Great examples of sustainable techniques of water conservation, they also doubled up as a resting place for weary travellers at night and for people to socialize. The step wells were also intricately carved and exhibit the heights of engineering excellence achieved by our ancestors. Famous step wells of India include the Rani Ki Bhav, a UNESCO World Heritage Site, in Gujarat and the one at Abhaneri en-route to Jaipur from Agra. (Culture Trip) A hidden gem is the one in Delhi on Hailey's Road.

INTEGRATION OF VERNACULAR AND MODERN TRADITIONS

Sustainable environment is Integration of vernacular and modern traditions. Architects like Louis Kahn, Laurie Baker and Yatin Pandya have incorporated the good practices of vernacular traditions in their contemporary buildings. The design philosophy as taken from website reads *"Holistic architecture is experientially engaging, environmentally sustaining, socio-culturally responsive and most importantly contextually appropriate. Context in terms of culture, climate and construction.* (future) In the context of India, history is alive through lived in tradition. We need to create contextually relevant contemporary deigns that inspire from the rich Indian good traditions and yet aspire for its future dreams." (Pandaya)

Le Corbusier and Aalto, aspired to build spiritually reviving environments in which man could live in harmony with nature. (Modernity in Tradition) Aalto believed that the natural energy of light and air should filter into the designed spaces and thus developed a variety of techniques to let natural light into interior spaces. Le Corbusier was well known for his deep concern for "sun, space, and greenery" in his designs. Renzo Piano was inspired from Kanak tribes' vernacular knowledge and he created a link between the high-tech and the vernacular through

a successful fusion of material, form, technology and planning. (Krishna Kumar Dhote). Their combination of social, functional and environmental reveals life full of color, flavor fervor which, instead of imposing on the nature it emanates from it.

CASE STUDY

The Pixel in Melbourne, Australia

Roof top wind turbines and tracking PVs

A futuristic office building demonstrating good sustainable practices of redefining green architecture. (Singh). It's quite a small building actually with a gross floor area of only about 1,000 Square Metres. The innovations and good sustainable practices incorporated can give a new face to sustainable building industry. (Nirman)The building is carbon zero, which means that all the carbon generated annually for running the facility is offset by renewable energy. A new process of carbon neutrality was also introduced, so all the carbon embodied in the materials used in construction is also offset through the use of renewable energy over a period of time. The building is capable of delivering a net carbon benefit to the environment over its full life cycle.

ENERGY SELF SUFFICIENCY

The first source comes from an extensive photovoltaic array on the roof, which is mounted on a tracking device to improve the output by nearly 40%. The second source comes from very efficient 1 kW wind turbines. Both the sources help the building generate more electricity than it actually requires.

USING A UNIQUE CEMENT

Concrete is one of the most carbon-intensive products; fact is that Portland cement itself is responsible for about 6 per cent of greenhouse gas emissions globally. The Pixel uses a different structural concrete, called Pixelcrete, with reduced embodied carbon and an emphasis on recycling. This uses 60 per cent less cement and contains 100 per cent recycled aggregate without compromising on strength or applicability. (Sustainability Victoria)

REINTRODUCING VICTORIAN GRASSLAND SPECIES

Several green spaces have been introduced in the building that filter the grey water and also cool the air temperature before it's circulated through the building. The result is that no grey water waste leaves the site, and the cooling related energy cost is greatly reduced. Victorian grassland species are planted on the roof to help control the building temperature.

RAINWATER HARVESTING AND WATER SELF SUFFICIENCY

After the rainwater falling on the roof is used for irrigating the green spaces, it is captured and stored in large tanks. It's then treated by reverse osmosis to potable water standards and distributed to water fixtures and fittings across the building. All the fixtures used are low flow to save water. The building is completely self-sufficient in its water requirements.

VACUUM TOILET TECHNOLOGY

The introduction of small-scale vacuum toilet technology is one of the highlights of the building. The technology, similar to a more sophisticated airplane toilet technology, reduces water consumption to a bare minimum and contributes towards building's water self-sufficiency.

INDOOR ENVIRONMENT QUALITY

The Pixel ensures an indoor environment quality that is healthy and comfortable for the users through several effective measures. First of these is an under-floor air distribution system fitted with individual occupant control. The indoor space receives 100 per cent outside air; this is 150 per cent above code requirements. The cooling methods adopted on the roof of the building also help control building temperatures to provide a comfortable work environment.

The Pixel offers hope that the buildings in future will not be just resource consumers but rather as resource producers. It has taken a big step towards reassuring that by adopting good practices our structures can be carbon free and completely environment friendly.

CONCLUSION

Globalization has brought a major change in the lifestyle. The patterns of evolution, adapting to the change in traditions, is critical for the continuity of cultures. It is not advised to lose the tradition completely. Adopting the good practices and learning from the past is essential for the sustainability of a community as a whole. The focus of ecological sustainability is to create a balance between man and his environment including both natural and man-made. We need to work befriend nature and not annoy it.

As the needs and values of the society changes, the buildings either adapt themselves to suit the new demands or neglected or get replaced by the modern ones. The world is witnessing the

repercussions of globalization. Consequently, the vernacular form of architecture is rapidly being replaced with new technology. To increase physical sustainability, restore the buildings, cultural character with community partnership and their tradition knowledge. (A|Z ITU Journal of Faculty of Architecture 2016-1) The survival of the past will depend completely on the ability to adapt to the needs of the future. Sustainable development can only be achieved by learning, understanding and appreciating the good practices of past. Local vernacular offers a rich reserve of architectural knowledge not only in the field of design, innovations, and sustainable techniques but also in other theoretical fields. (Urban architectural heritage conservationSustainability and vernacular architecture rethinking). The Great Architect Le Corbusier's "five points of architecture") are inspired by traditional or vernacular forms.

The Indian traditions focus on the harmony and well-being of the large human order based on cooperation and sacrifice for the future generations and preservation of resources; this is currently being emphasized by many scholars as 'sustainability". (Malhotra, 2020) In other words, traditional societies were the real pioneers of sustainable development over time in the perspective of natural and built environment. We need to connect and merge good old practices in our everyday Life.

As Human beings, we need to be determined and owe individual and community responsibility to adopt the good practices for our sustainable development. We need to keep alive the pulse of the Past through good practices.

ABBREVIATIONS

UN – United Nations

UNESCO – United Nations Educational, Scientific and Cultural Organization

BCE – Before the Common Era

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