
SUSTAINABLE HOUSING DEVELOPMENT WITH RESOURCE

SAVING ELEMENTS

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ABSTRACT

Sustainability and housing development maintain a quality relationship by considering various aspects such as economy, environment, social community, residential development, etc. This paper aims to study the above-mentioned aspects to achieve the goal of sustainable development. On the other hand, the article will also shed light on the role of the planning system and infrastructure services in solving some key issues of sustainable housing development. The study also focuses on many technologies that can be used as sustainability principles that can be applied to generalization and structural design and can further guide the development of sustainable housing.

I. INTRODUCTION

The term "sustainable housing" is frequently used to refer to the pattern as it relates to the housing sector. It used to produce less waste, encourage more reuse and recycling, as well as have reduced life-cycle environmental costs and impacts, higher dependability, require less upkeep, and increase user pleasure. Urbanization's impact on the housing industry has undeniably sped up the pace of sustainable and economic development.

Housing is the industry that is developing the fastest worldwide, with the most design options and cutting-edge technologies changing the standard of living for residents.

Everyone needs a place to live and work. Housing consists of more than just four walls and a roof; it also provides access to necessities like water and sanitation, as well as a sense of security, privacy, and human dignity and a better standard of living. (Ibrahim, 2020)

In the development of sustainable housing the concept of sustainable development in the field of architecture is important and known as sustainable architecture, which is eco friendly and make a better life for developing humanity. the basic goal of sustainable development is to deal with economical, social, and environmental issues.

The sustainable development as the concept in architecture has applied through a very simple context as the technologies used must minimizing the negative impact of building on environment. (Susanti Muvana Nainggolan, 2020)

Technologies in are very help full to make something more valuable for making sustainable spaces.

Housing is a living space refer to architecture and construction field, but from starting to end technology play a wide role.

The use of non-renewable resources on site is reduced thanks to sustainable building, benefiting both the environment and peoples' health. The agenda of social and cultural factors is largely overruled by technical dimensions in this.. (Hagbert, 2015).

Sustainable housing is influenced by climatic conditions that take into account factors specific to various climatic zones. The technologies employed in sustainable housings adhere to green construction regulations, are eco-friendly, and are effective for materials, energy, water, and waste management. (Gibberd, 2020).

Due to the world's rapid population growth and rising need for housing, many different types of housing are being built everywhere. However, safeguarding the environment and human health is of utmost importance. There is significantly less sustainable housing than there is in all housing projects.

II. LITERATURE REVIEW

2.1-DEFINE HOUSING

Housing's basic aim is to protect population from harmful natural and social environment .housing contain basic and non basic functions which serving for household object and personal belongings .

These functions are inextricable part of any cultural housing.

Housing has been provided a wide meaning by world health organization (WHO), which recognize that it covers four interrelated aspects. The structure used , or planned to be use , for human habitation is referred to as a house or dwelling and the group of houses where large population exist in a planned houses society is housing. (O. Golubchikov, 2012).

2.2-REAL-WORLD HOUSING SCENARIO

Housing development are under a lot strain as a result of rapid urbanization. By 2030, approx 3 billion people, or 40 % of world total population will need sufficient housing and access to basic infrastructure and services such as water, energy and sanitation.

From now till 2030 this equate to the need to build 96 , 150 housing unit every day on serviced and registered property .

In developing world bad governance and lack of human resources limit the availability of sustainable housings. (Sminkey, 2016)

2.3-SUSTAINABLE DEVELOPMENT

The Brundtland commission report(1987) setup in an triangulated concept of sustainability, which include economic , environmental and social factors , with sustainable development in center (fig 1).cultural sustainability also called social sustainability, should be culturally week and built on an establish healthy and safe architecture.

Economic sustainability consider low cost overtime while enironment sustainability consider energy resources, waste and water quality. (Stefansson, 2016)

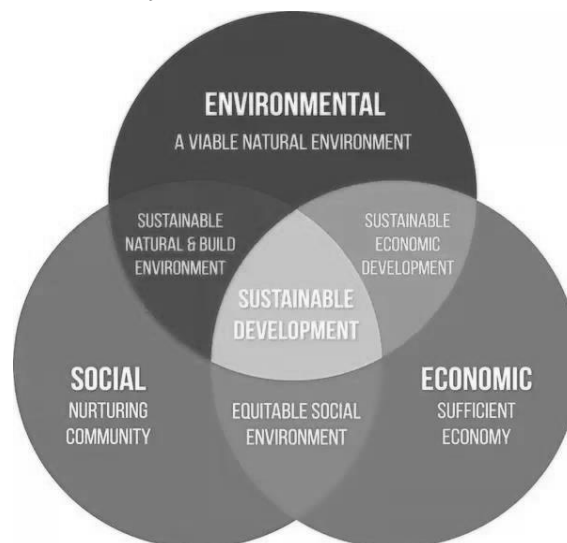


Figure 1: The triangulated definition of Sustainable development.

Source: (Commission, 1987) Brundtland commission report.

In this report , sustainable development is also describe as the development that satisfy the requirement of present generation to fulfill there own demands because the lengthy spam of life of home as physical structure they have effect on current and up coming generation, making housing a essential part of sustainable growth. (Goedknegt, 2012)

2.4- SOCIALLY RESPONSIBLE HOUSING

People's daily lives, as well as their safety, health, and general wellbeing, are impacted by their housing. It is also a part of the social-environmental relationship. Despite the fact that building homes uses a variety of natural resources, generates waste, and pollutes the air and water, the climate frequently affects the structure itself.

Social sustainability in housing is about providing safe, healthy, inclusive, and diverse homes, neighbourhoods, and communities that are well integrated into the larger socio-spatial systems of which housing is a part—both urban and national. The theoretical consideration of the social sustainability of housing in the same book serves as an illustration of the connection between human needs and social sustainability.. (Stefansson, 2016)

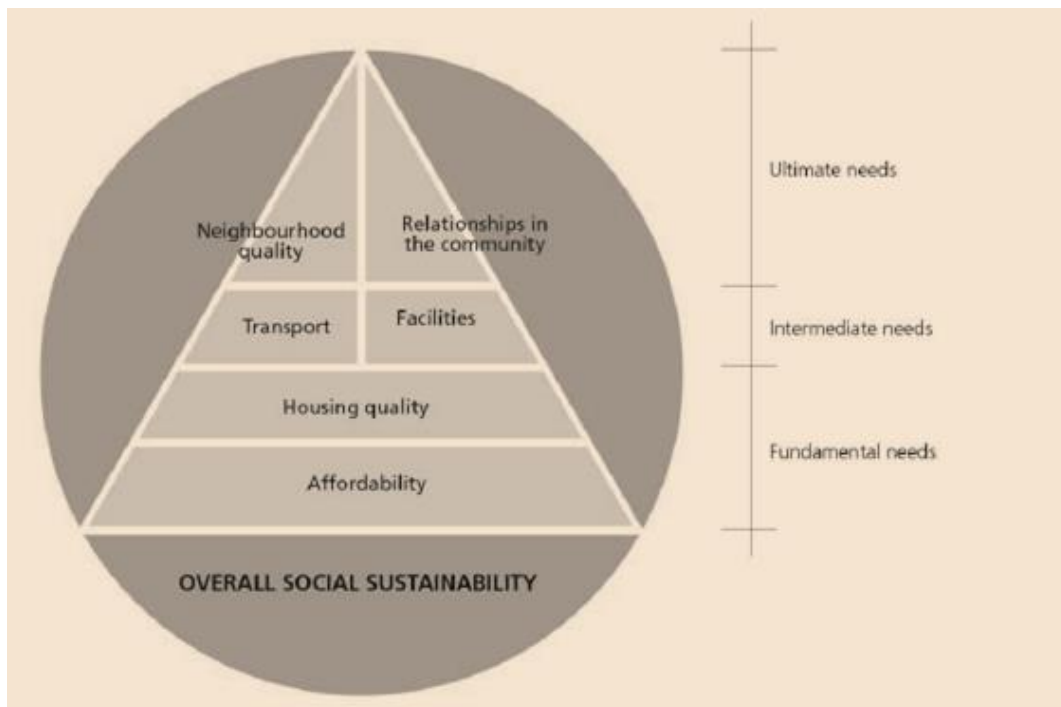


Figure 2: Interrelation between human needs and social sustainability.

Source: Brundtland commission report.

2.5- THE DYNAMICS OF SUSTAINABLE HOUSING: CHANGES

Population ageing, migration, habit changes, and climate change all have a substantial impact on architecture and planning. In addition to technological advantages, having well-designed, fairly priced housing brings social advantages as well. Housing is ultimately about people. The ideal approach to address the ageing population from a housing perspective is to concentrate on preventative measures. The majority of older people opt to purchase housing, which is a decision that should be encouraged.. (forum, 2010)

2.5.1 DEMOGRAPHIC CHANGES

Families, family lives, and households have all undergone significant transformation in recent decades. As a result of demographic changes, numerous new types of households have been created. In addition to "typical" nuclear families, there are also a growing number of single-person households, married or unmarried couple households, single-parent families with children, separated parents who invite their children over for the weekend, and so forth. The trend toward smaller households is anticipated to continue in the future as a result of population ageing. (forum, 2010)

2.5.2 ECONOMIC CHANGES

The globalization process has an impact on how we live. Due to the increased mobility of firms, the labor market has grown increasingly globalised. Nowadays, fewer people remain in the same house, neighborhood, or even nation for their whole lives.

Therefore, there is a demand for adaptable housing. In addition, a pattern called "glocalization" has been seen. People are beginning to think globally but act locally as they become more regionally focused. The housing requirements of today show this pattern. The design of a person's home should correspond to their neighborhood's aesthetic. (forum, 2010)

2.5.3 SOCIAL CULTURE CHANGES

Identity and lifestyle are becoming more and more important, especially in marketing. People have many options today, the information society is advancing, and regional disparities in housing demand are growing. These changes unmistakably affect homes and our way of life.

III. TECHNOLOGIES

Sustainability principles that apply to the generalization, design, and use of structures should guide the development of housing. The method aims to improve user experience, decrease impacts on natural resources, and reduce environmental costs brought on by insufficient proactive processes and solutions. (Olotuah, 2010) (Ramandeep Sharma, 2017)

3.1 RENEWABLE ENERGY RESOURCES

Solar energy is the best usable source of energy in future . Photovoltaic (PV) or solar panel mounted on the rooftops of residences and commercial buildings as well as solar collectors that can switch and follow the sun during the day, like mirrors or parabolic dishes, are used to generate solar energy. Buildings with this system have focused lighting. (Ramandeep Sharma, 2017)

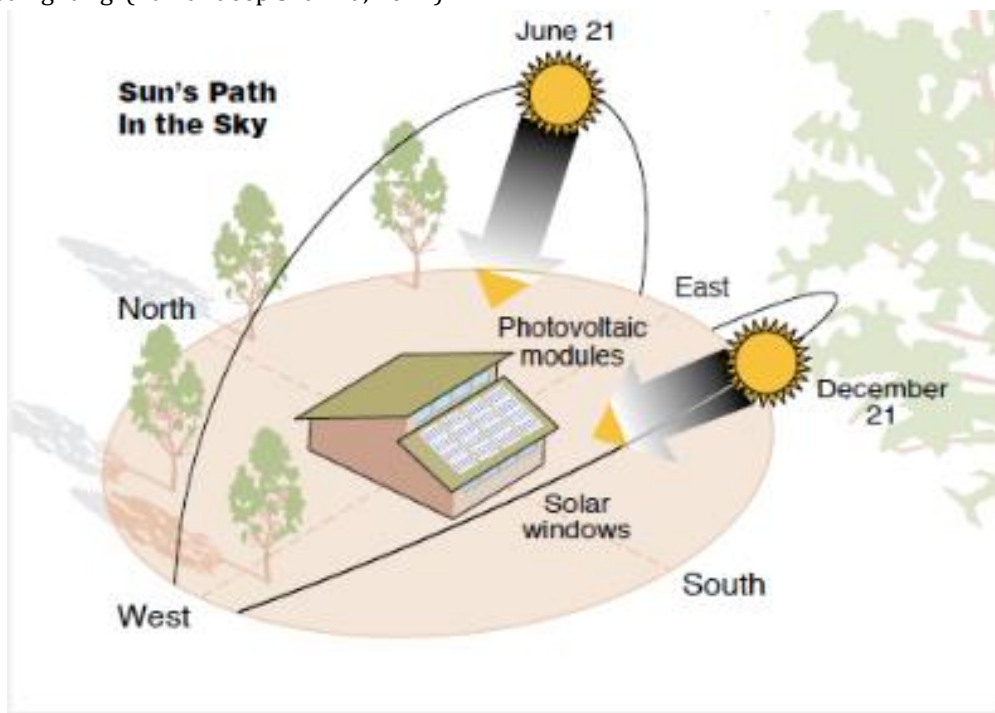


Figure 3: Solar house topography

Solar PV systems can generate power from either direct or indirect sunlight, but it is essential that they are exposed to enough of it. In order to fully absorb the sun's energy, solar panels should be oriented towards the south. The device needs to be put in a spot where it won't be blocked by nearby trees or buildings. (Ramandeep Sharma, 2017)

3.2. DECENTRALIZED WASTE WATER TREATMENT SYSTEM

DEWATS – a brief insight into technical configuration

In typical debates, the next technical treatment step is combined in a modular fashion.

- Primary treatment- space in sedimentation ponds, shelters, septic tank or bio digesters.
- Secondary treatment - in anaerobic the felt reactor, and aerobic filters or an aerobic and facultative pond system.

- Secondary Aerobic/Facultative Treatment -in horizontal gravel filters.
- Post-treatment – in aerobic polishing ponds.

India's leading proponent of decentralized waste water treatment systems is Vigyan Vijay Foundation (VVF). Based on their expertise, standard models of debate plans are a device to quickly plan debate plants for different levels of housing. With the help of the Central for Rural Development and Technology (CRDT) and IIT Delhi, VVF has successfully executed over 14 debate plants in North India. (Ramesh Sakthivel, 2012)

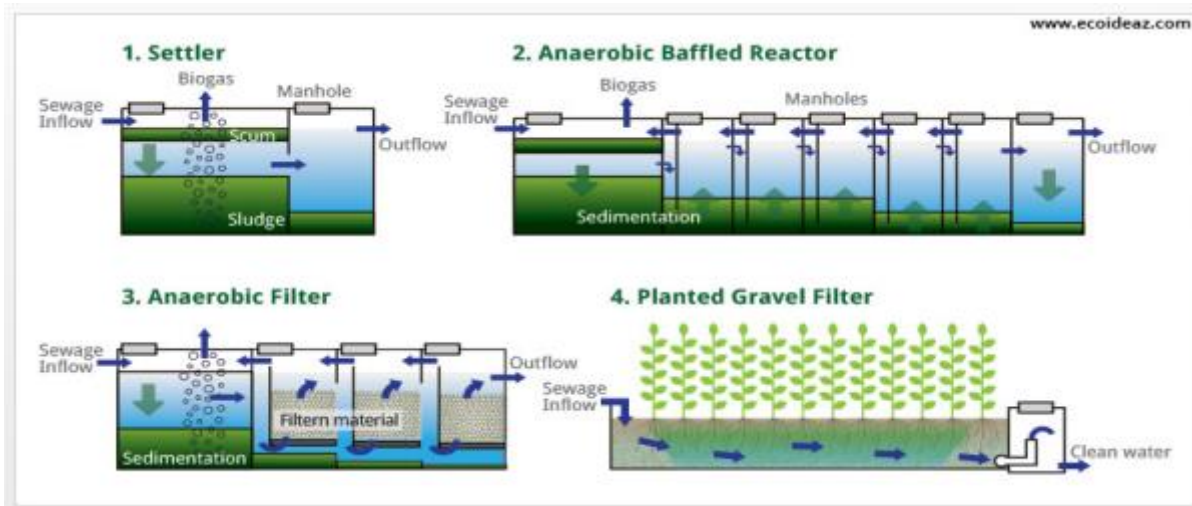


Figure 4: DEWATS Configuration Scheme (DEWATS and Sanitation in DEVELOPING COUNTRY MANUAL)

3.3 URBAN FARMING IN BUILDINGS

In addition to serving as a way of growing food, urban farming contributes to the greening of buildings, which offers natural cooling, shading, and a comfortable environment for the occupants. Finding diverse architectural components that can be used for plant cultivation is the focus of urban farming design decisions. It should be emphasized that vertical building facades can be used for the aforementioned purpose, meaning that horizontal area may not even be employed for urban farming. Urban farms built into vertical structures typically comprise cultivation on the roof, wall, and balcony. (Suparwoko, 2017)

3.3.1 VERTICAL FARMING



Figure 5: Schematic model of Green roof, green wall and green facade

The practice of cultivating in vertically stacked layers, inclined soils, or other structures is known as vertical farming. Indoor farming methods and controlled vertical farming concepts are utilised in current times so that many environmental variables can be managed when producing crops, primarily leafy greens. (Al-Kodmany, 2018)

These facilities make use of fustigation, internal climate control, and artificial lighting systems. In some vertical farms, artificial lighting and metal reflectors are used in place of natural sunlight in a manner akin to greenhouse techniques. These farms are frequently referred to as hydroponic in the business sector since they

don't use soil as the substrate for the plants and instead rely exclusively on water and a floating material like polystyrene or husk as the medium of planting. (Al-Kodmany, 2018)

3.4 RAIN WATER HARVESTING SYSTEM

The technique of gathering rainwater that naturally falls from the sky and using it as a replacement for potable water is known as rainwater harvesting. Rainwater is typically collected in a tank in the basement (or underground), and it is then pumped to a tank at a higher level so that gravity can work in its favor.

Technology that collects and stores rainwater for human use is known as a rainwater harvesting system, also known as a rainwater collecting system or a rainwater catchment system. Simple rain buckets and sophisticated constructions with pumps, tanks, and purifying systems are both examples of rainwater gathering systems.

When pure drinking water is not necessary, rainwater can be used for a variety of uses in homes and larger buildings. This includes running mechanical heating and cooling systems that require water, flushing toilets, washing laundry, and other exterior uses like cleaning. (Vashisth, 2012)

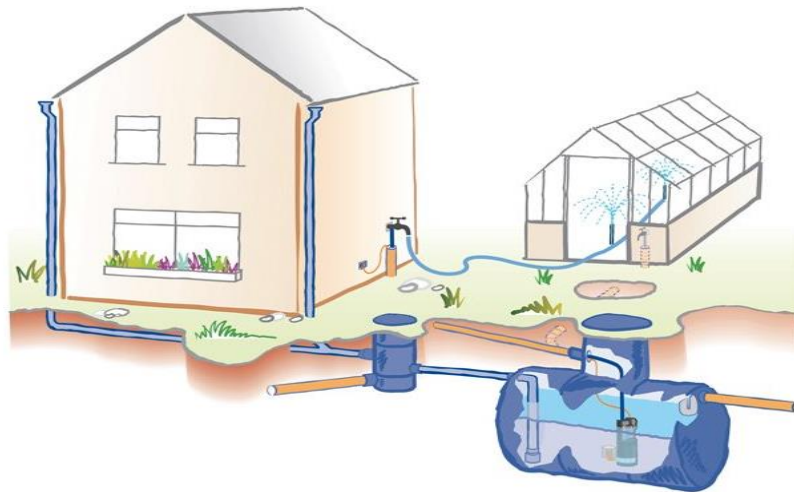


Figure 6: Rain Water Harvesting

IV. CONCLUSION

Four "key objectives" listed in the national strategy must all be met simultaneously:

- Effective environmental protection
- Upkeep of strong and constant rates of economic development and employment
- Social advancement that takes everyone's demands into account; and
- Prudent use of the environment's resources (2005, Nicholas et al).

Planning authorities must ensure that sustainable development is included into all of their development plans. They should be particularly aware of the connections between social inclusion, environmental improvement and preservation, responsible resource use, and economic development. According to the Smart and Sustainable Dwellings (2008), developing housing with smart and sustainable designs is a good practice in home planning, design, construction, renovation, and maintenance. This makes it possible for them to maintain the economy, the environment, and society. The public's need for housing dictates the development's architectural objectives. These show the needs of the people as well as their recommendations for extending the life of homes, lowering prices, and reducing unfavorable social and environmental repercussions. The goal of the private sector is to maintain a consistent supply. This also acts as a model for residential home designs and the building industry. The ability of the occupants to move freely, safety and security, affordability, and low resource use, such as water and electricity, are all crucial considerations when building a sustainable home. This location is acknowledged as a smart home for all stages of a person's life because it can accommodate the family's demands while also taking sustainability into account.

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