

Vastu Shastra - The concept of Sustainable Architecture

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Abstract: This paper aims to present the rules and principles of Vastu Shastra; the concept of Sustainable Architecture, which has been laid down by ancient sages for the designing and planning of a residential space in Indian context. The article begins with an attempt to understand the importance of sustainable planning in today's life by listing down the environmental issue which can be reduced by sustainable architecture also it further explain the important role of vastu shastra in the world of sustainable development. The main objective of this research is to study the design principles of vastu shastra used in the planning of architecture which leads to the concept of sustainable development of the society.

Keywords: Environmental issues, Principles of Vastu Shastra, Rules of Vastu Shastra, Sustainable Architecture, Sustainable Development, Vastu Shastra.

1. Introduction

We live in a fast developing world of human settlement and urbanization which leads to the socioecological instability which generate a severe problem of unfavorable climate change and natural disaster. Also the inappropriate human settlement and the aimless use of materials have depilated the natural resources and results to the environmental pollution. Although, the ancient knowledge of vastu shastra plays an important role in controlling human aspirations and ensure the sustainability, which help us to build a healthy inner and outer environment.

A. Sustainable Architecture

"Sustainable architecture" design and construct the buildings in order to limit their harmful impact on environment. The objective of sustainability is to achieve, positive impacts on health, comfort and improved livability for inhabitant.

Sustainable architecture means being able to satisfy consumer's requests, taking the time and natural resources as needed into consideration from the very early stages of the project, entering the context in the most natural way possible, planning ahead by making the space and materials employed completely reusable. -Federica Gerofalo

B. Sustainable Architecture

In the era of modern architecture the built form of Indian cities has no response towards the environmental issues. This situation is moving towards the cries stage of sustainable ecological development also the healthy relationship between

nature, human and buildings is fleeting rapidly. Therefore now a days it became important to understand the fundamentals of human settlement and adopt the ancient system of planning (Vedic Shastra), which can help us to build a harmony between architecture, nature and people, by changing the pattern of designing.



Fig. 1. Concept of sustainability

C. Vastu Shastra

Vastu shastra is an ancient Indian science which developed thousands of years ago by Indian sages, they listed down rules for construction of buildings and temples. The primary objective of Vastu Shastra is to bring perfect balance and harmony between nature, people, their place of living and working to provide peace, prosperity, health and happiness to everyone. It is an intangible part of Indian Architecture, having its roots extended in Indian geology, geography, math and factors influencing a site, such as topography, roads, surrounding, sun's effect, Earth's magnetic field, cardinal directions, Earth's energy field and elements of nature. In order to understand the rules and principles of vastu shastra some schematic diagrams like "vastu Purusha mandala" & "compass rose (cardinal directions)" were developed to facilitate the understanding of designing process. - Ravi, Meenu

2. Relevance of Vastu Shastra in Sustainable Architecture

Vastu Shastra provided guideline for human settlement by building a healthy relationship between human, nature and architecture. It is important to understand the ancient system of development to control the human interest and sustainability. Vastu shastra provides the rules of planning and constructing a

building which is self-sustain and ecologically stable, also it provides guidelines to optimize the benefits of Panchabhutaas.

A. Panchabhutaas in Architecture

“Panchabhutaas” is a Sanskrit word written in Rig Veda, meaning five basic elements of nature. Life on the Earth is only possible because of these 5 basic elements. There is a constant relationship between the elements of nature and the elements of human body. The harmony of these elements is maintained by the principles of Vastu Shastra, which helps to maintain the health, wealth, prosperity for better lifestyle, comfortable and sustainable living and to reduce the impact of building on the environment. Vastu Shastra rest on the fact that the earth is a living organism out of which other living creatures and organic forms emerge and so possess live energy.

- Earth (Bhumi)
- Sky (Aakash)
- Fire (Agni)
- Water (Jal)
- Air (Vayu)

B. Fundamental Principles of Vastu Shastra

The guidelines and rules of Vastu Shastra have been laid down clearly in several ancient texts, but the principles upon which they have been formulated are discussed in the Indian philosophy of Vedas. Which are listed as follows,

1) Examination and Selection of Site - Bhū Pariksha

a) Location of Site:

- A plot with roads on all four sides or with roads on two sides (north and east) is not abutting anybody's property and hence one can derive maximum lighting and ventilation from all sides, this type of site are highly preferable and sustainable because it helps to reduce the wastage of electricity and natural resources. Although the site having roads on the west and south side of the plot will allow more light and heat to enter the house which will increase the use of active strategies to maintain the inner temperature and increase the depletion of natural resource.
- Site located near smelly places like meat shop, laundries, community dustbins, Sewage, etc. are not preferable for residence because of the smell emanating from these places will permeate the house permanently and naturally not create a relaxed atmosphere in the house and the dweller will not feel comfortable while living.
- Such sites where cactus grow or have termites indicates that the soil present on the site is sandy and porous in nature which will not support the foundation effectively, therefore such sites are not preferable for construction, which effectively increase the cost of foundation.
- Sites which have obstructions like hills, tall buildings and towers on the North-East & East are not preferred. In such cases the useful morning sun rays will be blocked however having such obstruction on west and south direction are consider good as the block the hot western rays which

keeps the inner environment of the house cooler and hence the active strategies are not in use.

- The cracks on the plot indicates the dried up clayey soil & too wet soil also indicates clayey soil that do not allow the drainage of water. Also, such soil is not suitable for the building foundation as it will retain moisture and increase the expenditure for water proofing the foundation, therefore such sites are not preferable for construction.

b) Shape of Site:

- The site which are Square and Rectangular in shape are said to be good for residential, because in earlier times, since most houses were designed around a central square courtyard for good cross-ventilation and protection from the hot summer heat, a square site was considered the best, as the site could be used fully, without any wastage of space around it. Although, if the site are triangular, circular, elliptical, Pentagonal, Hexagonal or Octagonal in shape then it could not be used fully and leads to the wastage of land for the construction of the house.
- L shaped site are not good to build a house because It will be difficult to design a square or rectangle shaped house in an L-shaped plot, unless the arms are very wide.
- According to Vastu, if the plot is narrow in the front and wide at the back, like the face of a cow. A square or rectangle shaped house can be designed in this plot with some excess land in the back which can be used for various things like a Kitchen garden, outhouse etc. But if the plot is wide at the front and narrow at the back like the face of a lion, A square or rectangle shaped house cannot be designed in this plot, the excess land in the back which cannot be used for various things like a kitchen garden, outhouse etc. hence, it leads to the depletion of natural resources.

c) Soil Existing on Site:

- The soil which is good for cultivation is also good for building construction. Although, the Black soil, clayey soil, Rocky soil and the soil having lot of worms are not good for construction, because it requires the special kind of treatment which will effectively increase the cost of foundation.

2) Determining the Orientation - Dik Nirnaya

The Orientation of site is determined by the direction that the front of the Site faces. The orientation of site is determined with the help of 8 cardinal direction which are listed as follows:

- East (poorva)
- West (Paschima)
- North (Uttara)
- South (Dakshina)
- North-East (Eeshanya)
- North-West (Vaayavya)
- South-West (Nairuthya)
- South-East (Aagneya)

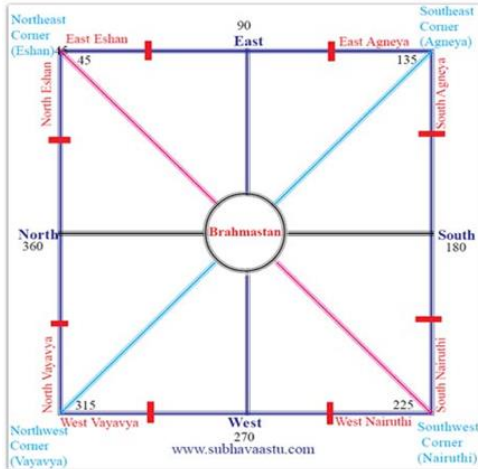


Fig. 2. 8 Cardinal Directions

According to the rules of town planning, in any city or town, there are roads in all four directions and naturally there have to be houses on both sides of the roads to reduce the wastage of land. Also, the city looks aesthetically good if there are houses in all the four directions. Hence, according to Vastu, all plots are considered good, which helps to reduce the wastage of land.

3) Building measurement Test -Aayadi Gananam

Aayadi formulae are the mathematical formulas by which we can decide the suitable length, width, height and other dimensions of a building. Aayadi is a group of six formulae Aaya, Vyaya, Yoni, Rksha, Vara and Tithi which are used to determine the dimensional conformance of a building.

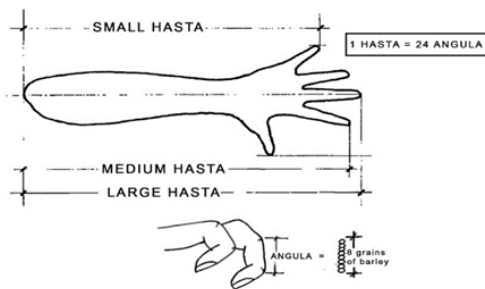


Fig. 3. System of Measurement

The remainder obtained by this formula helps to determine the preferable direction for the orientation of the building. The unit of measurement used in Aayadi is Hasta (that is equals 24 angulas) or Angula. According to the study done by Niranjana Babu "those days the units of measurement were not uniform in different regions. The units of measurement were Angula and Hasta. However, the value of Hasta and Angula were different in different regions due to the different proportion of human body.

Table 1
Aayadi Formulas

Aya	=	Remainder of	$\frac{\text{Length} \times 8}{12}$
Vyaya	=	Remainder of	$\frac{\text{Breadth} \times 9}{10}$
Rksha (Nakshatra)	=	Remainder of	$\frac{\text{Length} \times 8}{27}$
Yoni	=	Remainder of	$\frac{\text{Breadth} \times 3}{8}$
Vara	=	Remainder of	$\frac{\text{Height} \times 9}{7}$
Tithi	=	Remainder of	$\frac{\text{Height} \times 9}{30}$

4) Vastu Purusha Mandala - Padvinyasa

According to Vastu Shastra, Earth is a living organism and the subtle energy is Vastu Purusha. The Vastu Purusha Mandala is a square plan having 9x9 grid, which automatically helps to keep panchabhutaas in harmony, which helps to initiate the planning of a given plot of land. Vastu Purusha Mandala adopts the shape of the site and also adopt the site constraints and parameters of design requirements of hot and arid climate of Rajasthan, wet and humid climate of Kerala, as well as the functional requirements of design and also helps to maintain privacy. Vastu Purusha Mandala have an inbuilt property to rotate Himself like a clock hand in a clockwise direction, this property of Vastu Purusha mandala keeps the earth rotating on

its axis and keeps revolving around the sun and allow the dweller to take benefits of panchabhutaas and helps to decrease the use of active strategies.

"If the house is designed as per the Vastu Purusha Mandala, a perfectly balanced environment which ensures enhanced health, wealth and happiness is created, because the ancient Vastu pundits figured out that when the different rooms were placed according to the Vastu Purusha Mandala, good disposition to the Sun, proper ventilation and lighting and privacy would be ensured." - Dr. Rashmi Jain

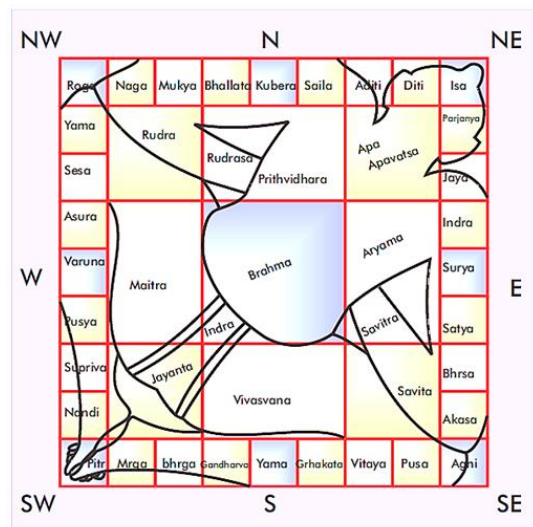


Fig. 4. Vastu Purusha Mandala

Zoning done according to Vastu Purusha Mandala:

Humans perform different activities depending on the time. The ancient Vastu pundits divided the 24 hours into eight parts, representing the eight cardinal directions, according to this the orientation and placement of opening of a room is decided in such a way that at any given time of the day depending on the activity, the inmates were able to get the useful rays and light of the Sun, according to the position of the sun through the day and can reduce the use of active strategies like fan, lights etc. Which helps to make the house sustainable.

- The center most part of the plot or Vastu Purusha Mandala should be kept open as this part has the property of sky element. Therefore, it should be kept open to maintain the flow of fresh air and proper ventilation.
- Having main door and lot of openings in north, east direction will ensure the flow of UV rays of morning sunlight in the house and destroy the bacteria that would have multiplied during the night. Also this used a passive technique to decrease the unnecessary use of electricity.
- The Sun is in the south between 9am to noon and this is the time of working. Therefore, this is the best direction for an office to get the benefits of natural sunlight.
- By noon, the intensity of the heat is high therefore, south and west is an ideal direction for store room, toilets and bathroom which need to be moisture proof. Also the store room, toilet and bathroom act as a buffer space and helps to reduce the effect of heat.
- West get heated up more than the other directions and because of the hot afternoon sun and the re-reflection of its infra-red rays from the ground the house gets heated up. Therefore, trees are planted in west to provide shade and to cool down the effect of heat.
- In India, (being in the northern hemisphere near the equator), there is constant light from North direction through the year. Hence it makes sense to have open spaces in the North direction, so that the light is not obstructed and can penetrate into the House.
- The Sun is in the South-East from 7.30am to 9am and as this is the best time for preparing and cooking food, therefore, the kitchen can be located here. The germicidal UV rays of the Sun will keep the kitchen counter free from germs that spoil the food.
- The South-West tends to get heated up by the sunlight reflected from the West and so it is advisable to have a library or wardrobes on the West wall of the room to reduce the effect of heat.
- Between 3am and 6am, the Sun is in the North-East part of the house and as these hours are ideal for yoga, meditation or prayer, this is the right direction for the Puja/meditation room to get fresh air, light and free

flow of cosmic energy.

5) *Door openings - Dwara Sthana*

The Door & Window placement is an important factor of Vastu Shastra. It not only allows to enter the positive energies, light and air, but it should also block the negative energy to enter the house. The correct placement of doors and windows will allow the follow of positive energy, light and air from outside to inside and from room to room, which helps to maintain the proper light and ventilation in the house. This is the reason for placing the internal doors and windows opposite to each other because this arrangement of openings can ease the flow of air. It is suggested to avoid openings in south and west part of the house because at this time between noon and evening when the sun travels from south to west the intensity of the sun is high. Although it is advisable to give more openings in the north, north-east and east direction to increase the flow of fresh air, natural sunlight and cosmic energy which is good for inner atmosphere of the house.

3. Conclusion

From the above discussion it is clear that vastu shastra plays an important role in sustainable architecture. As the knowledge of vastu shastra is as old as the Veda's. In ancient times the houses were build according to the rules of vastu shastra, therefore the building response positively towards the environment and also the relation between building, humans and nature is in harmony. But the increasing rate of urbanisation and modern architecture have change the positive response of the building towards environment, which leads to the increase in use of active strategies to make comfortable atmosphere in the house. As the use of active strategies have increased, the pollution also got increased respectively and thereby the idea of Sustainable Architecture has been evolved by taking Vastu Shasta as its basic concept to reduce the negative impact of buildings on the environment.

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