

A GREEN CONCERN!

Greenenergy

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Nature and Environment is always of a great concern to humankind.

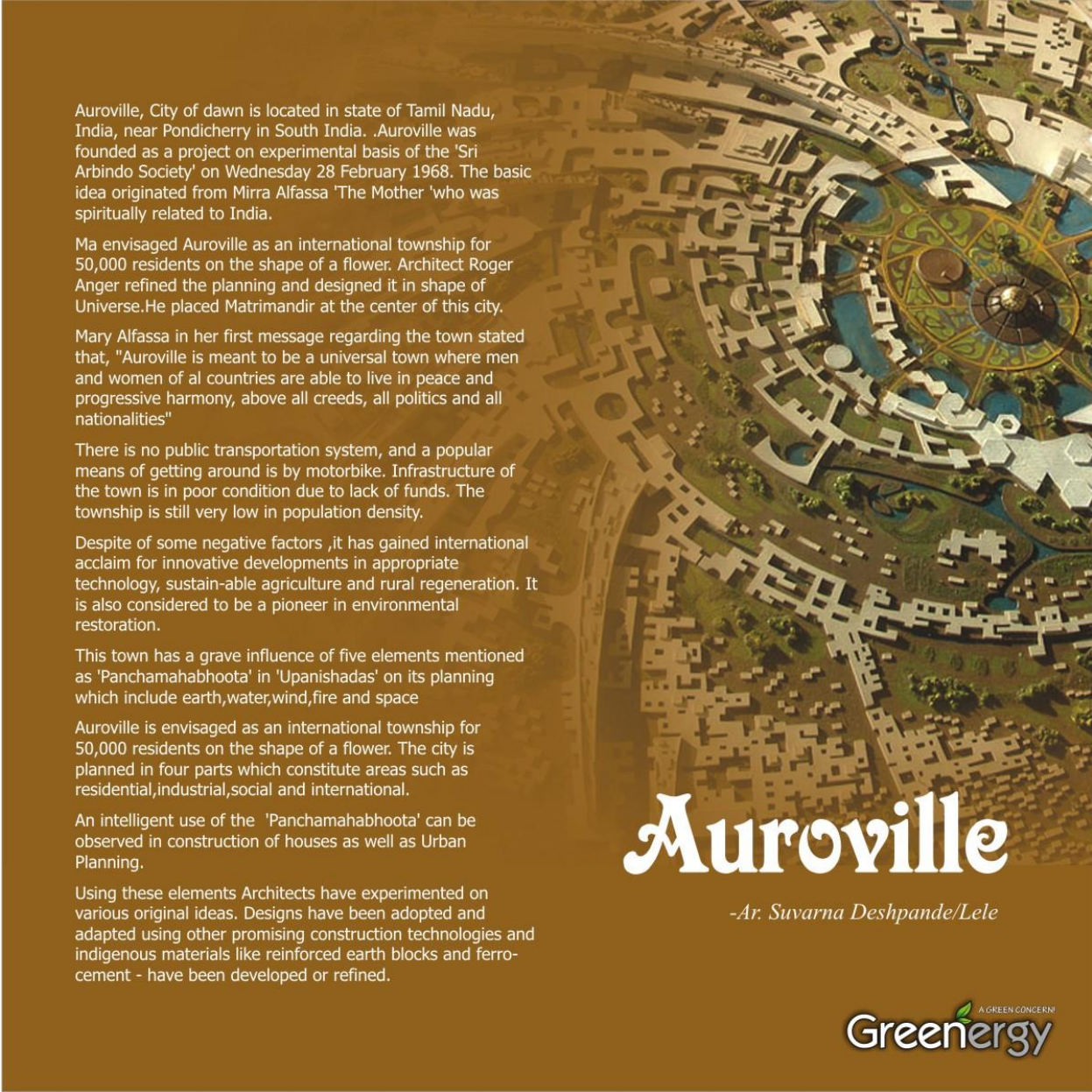
'Greenery' is a small step taken towards this "green" cause by a few like minded people with a goal to aid the Environment in whatever possible way. This publication would handle several issues related to Nature and Environment. We look at the nature as energy provider hence it is utmost necessary to protect it for our generation and future generations as well. Utter negligence and apathy towards can cause nature to take disastrous forms such as Acid Rains, Global warming, Pollution, Floods, Tsunamis, Storms and several others.

This is a small step taken with a hope to create an awakening amongst people and inspire them for working towards Environmental issues and make mother earth a better place to live!!

Architect
Pramod Chaugule



Greenery



Auroville, City of dawn is located in state of Tamil Nadu, India, near Pondicherry in South India. Auroville was founded as a project on experimental basis of the 'Sri Arbindo Society' on Wednesday 28 February 1968. The basic idea originated from Mirra Alfassa 'The Mother' who was spiritually related to India.

Ma envisaged Auroville as an international township for 50,000 residents on the shape of a flower. Architect Roger Anger refined the planning and designed it in shape of Universe. He placed Matrimandir at the center of this city.

Mary Alfassa in her first message regarding the town stated that, "Auroville is meant to be a universal town where men and women of all countries are able to live in peace and progressive harmony, above all creeds, all politics and all nationalities"

There is no public transportation system, and a popular means of getting around is by motorbike. Infrastructure of the town is in poor condition due to lack of funds. The township is still very low in population density.

Despite of some negative factors, it has gained international acclaim for innovative developments in appropriate technology, sustain-able agriculture and rural regeneration. It is also considered to be a pioneer in environmental restoration.

This town has a grave influence of five elements mentioned as 'Panchamahabhoota' in 'Upanishadas' on its planning which include earth, water, wind, fire and space

Auroville is envisaged as an international township for 50,000 residents on the shape of a flower. The city is planned in four parts which constitute areas such as residential, industrial, social and international.

An intelligent use of the 'Panchamahabhoota' can be observed in construction of houses as well as Urban Planning.

Using these elements Architects have experimented on various original ideas. Designs have been adopted and adapted using other promising construction technologies and indigenous materials like reinforced earth blocks and ferrocement - have been developed or refined.

Auroville

-Ar. Suvarna Deshpande/Lele

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These experiments reflect in creation of interesting building materials as well as forms. Care has been taken to choose the materials, which are environment friendly, cost effective and sustainable.

Auroville covers various aspects of architecture, which include building materials, building technology, eco-friendly architecture, climate responsive designs, integration with natural surroundings, cost-effective buildings, geomancy and geometry. The spaces are aesthetically designed taking into consideration the requirements of user.

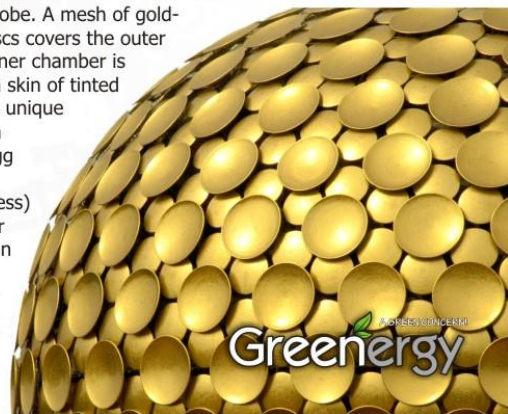
Buildings and infrastructure have also integrated rainwater harvesting systems, domestic waste water treatment plants and renewable energy systems to meet their energy demands.

The houses reflect varied styles ranging from thatched mud houses to apartment complexes, public buildings, cultural pavilions, health centers, schools, workshops, community kitchens, a visitor's center, and the 'Auroville Center for Urban Research', also known as the city hall. Owner funds the residential projects themselves or town provides a loan.

Auroville is the place where most of the houses or buildings have lightest carbon footprints.

Space

Design of the township resembles shape of universe. At the spiritual and geographic center of Auroville is 'Matrimandir'. It is a shiny spherical building clad in circular gold-leaf plates. It is situated in middle of amphitheater where citizens of Auroville go to meditate. Matrimandir consists of four massive concrete columns supporting an inner circular chamber. Height of the dome is 29M The outer edges of the columns form a circle in plan. A space-frame forms the outer skin of the structure and its volume is similar to a flattened globe. A mesh of gold-encased discs covers the outer skin; the inner chamber is lined with a skin of tinted glass. It's a unique symbol of a breaking egg (human consciousness) from matter (earth/ground).



The aesthetic use of the space is truly observed in the structures of International and National Architects as Roger Anger, Andre Habebou, Castelleno Marchese, Satprem Maini, Suhasini Aiyar, Anupama Kundoo to name a few.

The varied forms and sizes of the structures impart interesting meaning to internal and external spaces.

Earth/Soil

The effective use of sand or soil can hardly be found anywhere else as in Auroville'. Earth being an elastic material helps in constructing the structures of different shapes. 'Auroville Earth Institute' and 'Center For Sustainable Architecture' have contributed in use of Earth as a building material in a huge way.

'Auroville Earth Institute' is conducting regular training in earth construction. The earth unit maintains a construction team and offers consultancy and design for buildings in earth. Satprem Maini, a French Youth was pioneer in using CEBs in many of his constructions. He was also one of the founder members of 'Auroville Earth Institute'.

Compressed Earth Blocks (CEBs) are manufactured in a manual press using a mixture of earth with 3-5% cement.

The advantages of using CEBs for construction are that they can be made on site and the manufacture of them doesn't pollute the environment. A CEB uses between 3-5 times less energy to make than a fired brick. It can be manufactured in various sizes and shapes. Hollow CEB's save 25% of material and help insulation.

Roofs are being constructed out of earth blocks with varied shapes that include flat roofs, domes, vaults and arches. CEB's are also used for construction of walls, floors and foundations.

Water

Water dominates the landscaping of several structures. Its effective use is also seen in rainwater harvesting and recycling.

Many of the bungalows, complexes and Institutes have incorporated water bodies in form of lakes, fountains and swimming pools to beautify the surrounding areas.





Sun(solar and light) Energy -

An effective use of sunlight is made by designing a proper penetration of light through the exactly designed fenestration with a proper size and positioning of openings.

For many years there was no conventional electricity source available hence Aurovillians searched for renewable energy solutions, since establishing the town. They researched extensively on solar based energies. Early houses had solar water heating and cooking facilities installed, and today some



houses run entirely on solar photovoltaic (PV) panels.

Several of the households use solar energy in combination with

other power sources. At present a total of around 250kw of electricity producing solar panels are installed in Auroville.

Photovoltaic panels are used to produce energy used for cooking and heating water. Combination of solar and wind energy is used at several places. It is interesting to note that

Several Auroville work units actively research, develop and maintain a wide range of solar energy products, including cars, water pumping and desalination systems, lanterns, charge controllers and inverters.

Some notable projects run on solar energy include solar kitchen. It prepares food for around 1000 people which include 500 school children, 200 office going people and 300 locally dining people. A huge solar bowl is fitted to assist the

Several National and International Architects to beautify the landscapes have effectively used this element.

One of such example is 'Vikas Community' which uses Rainwater harvesting and recycling efficiently. Water run offs from roofs and slopes is collected in a pond. The water from water ponds collected from rainwater harvesting is recycled which enable to keep the interiors cool.



Planting lawns and trees beautifies the surrounding area of this lake. To purify water naturally a process of 'Anaerobic Digestion' (with the help of plants) is adapted. Many biogas plants are used for water purification and production of manure. Auroville laboratories are working on 'Effective micro organism technology'.

Wonderful use of water body is also seen in Roger Angers Residence. This water body beautifies the structure, which stands as a sculpture as well as it serves as an 'Ant channel' preventing the entry of termites inside the structure.



kitchen. This bowl produces steam, which enables to cook the food for thousands of people at a time.

Light is used to produce interesting effects in the interiors of structure.

Wind

Wind energy has a prominent position in Design of structures. Such an effective use of wind energy is not quiet often found in regular Designs.

Every structure has appropriately positioned doors and windows that enable fresh air flow inside the structure for 24 hours. Clear light and clean air makes the structures very habitable and pleasant to live in.

Wind energy is produced by means of windmills. These windmills are mainly used to draw the water from shallow wells. The water is available at a very low cost and not much of the maintenance of these windmills is required. Nearly 20 different designs of windmills are found all over Auroville.

The region was aired and infertile before the settlement of Auroville town. The cultivation of ten thousand trees helped in preventing soil erosion. The number has gone beyond 2 crores till date. The entire region has become cooler and greener facilitating the vegetation. All the five elements of nature are used in Design concepts.

Auroville has been transformed from a desert into a lush jungle, supporting a thriving, diverse community of people, plants and animals.

The building materials constitute of natural materials such as earth, bamboo, wood, stone and thatch while as Sun, Wind, Water, Earth and Space are incorporated in overall concepts of Urban planning and structural Design.

It facilitates the common man's requirement for sustainable housing, work, education and their spiritual growth. This experiment of 'Auroville' becomes an emblem of success on various National and International level.

In many ways, Auroville is a success story for sustainability.



Panchamahabhootas In Vastushastra

Ar. Smita Kulkarni

INTRODUCTION

Although human beings need shelter, protection and other basic functions, that are similar across the world. Yet we do not find similar identical structures everywhere. The structures differ in design and also in kind of expression that is seen in their art.

History of a particular culture or region can be analyzed with the study of architecture. Architecture allows us to see and feel the tangible evidence of tastes, customs, knowledge and skills of human beings who lived thousands of years ago.

Vastushastra or the Hindu style of architecture and civil engineering has its scope beyond the "shelter for human" concept. This shelter was literally conceived and embodied like growing a infant in the womb and then raising it with all the sanskaras during construction, occupancy and post occupancy.

According to Bhrigu Samhita, vastushastra is one of the ten branches of shilpashastra and deals with abodes of human beings, their animals, trees and the divinity. It talks of the origin of the earth, the creation of continents, oceans, rivers and countries.

Vastushastra is not one compiled book, but it is found in the form of hymns, treatise in various Puranas including but not confined to Rigveda, Dharmashastra, Khagolshastra, Shilpashastra and Ayurveda.

Upto 6th century AD as many as 25 writers wrote about vastushastra. The most referred to and well compiled texts on vastushastra are

- 1) Mayamatam (Dravidian school)
- 2) Manasara (Dravidian school)
- 3) Samarangana Sutradhara (North Indian school)

PRINCIPLES OF VASTUSHASTRA

If we study the vastushastra in detail, we observe that it is based on 8 main focus areas and addresses or gives guidelines on them. The 8 angas touched in vastushastra are as follows

- 1) Yajamana (client profile, anthropometry and ergonomics)
- 2) Sthapati (characters of a perfect architect, consultant and contractor)
- 3) Bhumi (qualities of a perfect site)
- 4) Vastospati (rituals to announce the commencement and completion of different stages of construction)
- 5) Vastu (perfect materials for different locations, climate and use and also methods of testing of materials)
- 6) Sthapatya (technologies, skills and aesthetics employed)
- 7) Padavinyasa (layout/ orientation of rooms)
- 8) Alankarana (Interior and exterior repairs, modifications and decorations)

Out of the above mentioned angas, the layman is mostly concerned with or rather exposed to or understands the vastospati and the padavinyasa. As a result of this propagation the followers of vastushastra think that it is some sort of astrology which tells us to place rooms in certain location so that we are showered with wealth health and prosperity. On the other hand the modern person from India who has not actually studied the total shastra thinks that it is black magic/ superstition which was followed by the ancient people only due to fear of God.

But only after reading the scope of vastushastra in its eight angas, we understand that it was an elaborate science which touched all the aspects of construction.

Let us understand the principles of Vastushastra with the "panchamahabhootas"

Relationship of Vastushastra and the Panchamahabhoota

The whole universe is made up of five basic elements, the earth, water, fire, air and space.

Our body is also made up of these five basic elements of nature. The pancha-mahabhootas are related to our five

senses of smell, taste, hearing, touch and sight. Vastushastra teaches the individual to live in balance and harmony with the panchamahabhootas.

The panchamahabhuta or "five great elements" are

- 1) kshiti or bhumi (earth),
- 2) ap or jala (water),
- 3) tejas or agni (fire),
- 4) marut or pavan (air or wind),
- 5) byom or shunya or akash (ether or void).

Hindus believe that the Creator used akasha, the most "subtle" element, to create the other four traditional elements; each element created is in turn used to create the next, each less subtle than the last. Hindus believe that all of creation, including the human body, is made up of these five essential elements and that upon death, the human body dissolves into these five elements of nature, there by balancing the cycle of nature set in motion by the Creator.

Each of the five elements is associated with one of the five senses, and acts as the gross medium for the experience of sensations.

According to Hindu thought, the basest element, Earth, was created using all the other elements and thus can be perceived by all five senses - hearing, touch, taste, scent, and sight.

The next higher element, water, has no odor but can be seen, tasted, heard, and felt.

Next comes fire, which can be seen, heard and felt.

Air can be heard and felt.

"Akasha" (ether) is the medium of sound but is inaccessible to all other senses.

This beautiful relation of the five senses with the panchamahabhuta is well translated in the vastushastra too. The same has been elaborated below.

Earth (bhumi / land)

The shastra highlights the importance of the location of the site and the proximity to the water sources.

Vastushastra also suggests some types of plots with preferred orientation of roads adjoining the site.

The slopes on sites and the preferences are also mentioned in

the shastra. For e.g. Site with slope on the east side is prosperous. The scientific reason for this is that the western side remains at a higher level and hence does not block the wind flow.

Also if the site is sloping on the NE side then it is not considered as a good site. The reason for this is that the UV rays coming to the other part of the site from NE do not reach the plot.

We find detailed description and prescription of the quality of land (geology) suitable for different geographical zones in the Indian subcontinents. Vastushastra specifies different types of visual tests for land and also testing procedures for checking the strength of the land (soil bearing capacity in today's terminology)

Jal (Water)

Water is linked to our senses of taste, touch, sight and hearing. It is quantitatively the largest of the five elements, as more than 80% of our body and two-third of earth's surface is water.

Most of the ancient civilizations came up close to rivers and water sources and set up their habitats.

When the ultra violet rays in the early morning combine with water, they have a soothing and beneficial effect on the body. It is, therefore, recommended to have a water source in North-East direction.

Vastushastra provides such important information about usage and the placement of water sources like wells, boring, underground water tank, overhead water tank etc, while planning the house. Positions for drainage of water, septic tanks, sewerage, drains etc. are decided carefully to optimize the benefits of water element.

Fire or Agni

The essential character of Fire is to generate heat. However, in Indian mythology there are mentions

of various types of fires. The four important ones are fire of the earth (volcanoes in the earth's crust), fire of the sky (the sun), fire of the stomach (can mean hunger and digestive power as well) and the fire we commonly use.

The principles of vastushastra based on this element refer to the fire of the sky i.e. the sun.

All the orientation principles that these sets of suggestions are mainly based on relative motion of the sun with reference to the earth and all of them are based on the geography of India.

At the NE corner we receive more UV rays in the morning than the infrared in the afternoon. Hence it is a comparatively cooler place ideal for meditating or praying, hence called the gods corner and also semi open sit outs are suggested here. To block North-East by building a toilet there is depriving the building of the most beneficial rays of Sun and has adverse results. The ultra-violet rays normalize the metabolism of the body.


In the SE corner temperature is always more because of its continuous exposure to the sun from morning to evening. Hence the hearth of the home (kitchen) is placed in this corner.

In the NW AND SW corner bedrooms are recommended as these spaces are well ventilated due to the winds from the west side.

Akash

Aakash (Space)Vastu is the only body of thought that gives Space the status of a natural fundamental element. Aakash or the space is infinite and limitless. It is related to our sense of hearing, in a house, space element is related to the centre portion or the brahmasthan. It is important that brahmasthan be kept open and light. Any disturbances in the space element are detrimental to your growth.

It is a well known fact that opposite poles of a magnet attracts each other and same magnetic poles



repel each other. The Vastushastra principle of placing the head in South direction while sleeping is based on earth's magnetic property. Our ancients have found that sleeping with the head towards the South enables one to go with the nature and draws maximum positive energies from the cosmos to keep fit and healthy.

Vayu (Air)

The air on earth is a mixture of various gases like nitrogen, oxygen, helium, hydrogen etc. Oxygen is vital for human beings and nitrogen is essential for the growth of plant life which in turn provides oxygen. Correct percentage of different gases, atmospheric pressure and humidity level is important for life forms on earth. Vastushastra recommends proper placement of doors, windows, ventilators, balconies, height of structure and placement of trees and plants for balancing the Air element within the structure. The pleasant wind flow is more in the south west to the north east or north west and also significantly from west directions. Hence all the sleeping rooms are suggested to be placed with openings on the west in the vastupurushmandala.

Vasturatnavali clearly says that maximum height of buildings should not be more than 100 hasta. This also has a scientific base; if buildings are tall they tend to deflect wind down into previously sheltered area. The resulting increased wind speeds near the ground are annoying and at times dangerous to the pedestrians.

Conclusion

Based on the above general pattern of rules we see, the recommendations made by vastushastra for orientations are based on the basic assumption that land is abundant, population is not exploding with high densities and the natural resources are not over utilized and abused. Climate and geography with the user were the key factors for laying all the guidelines. The house planning was done after a meticulous layout of the town planning hence achieving perfect plots as required.

Today as vastushastra is neglected as an orthodox system; our planners and engineers forget that what they call as eco friendly architecture/ sustainable architecture/ green architecture is not a new concept but was very much present in India in the form of Vastushastra.

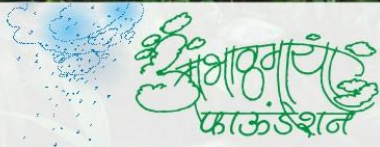
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