Vedic Principles for Urban Settlements (Towns) in Ancient India

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Abstract

Harappa & Mohan De Jaro civilization (2500 BCE- approximately 4520 years back) gives evidence of thought on town planning in India. The town planning of these cities shows an alignment of roads, drainage system, distance in between two buildings, location of open spaces, location of community spaces, common bath, and its drain system, etc.[1] Great epic of "Ramayana" and "Mahabharata" in Hinduism also have details of town planning in ancient times. The Ramayana period is about 9344 (Dec 4, 7323 BCE) [2] years ago and The Mahabharata Period is about 7582 (16 Oct to 2 Nov 5561 BCE) [3]. The time between both is 1762 years. The epics have depictions of cities like Ayodhya, Mathura, Mithila, Prayag, Chitrakut, Lanka, and much more. India has a rich cultural heritage along with art, architecture, and historical settlements. Due to rapid urbanization and increasing population demands of buildings are high and for that fulfilment of demands, town planning norms are very flexible. Vedic principles of Vastu Shastra are rarely followed in today's context. These Vedic or Vastu principles are more environmentally friendly and have more green architecture values.

The planning of Harappa and Mohan De Jaro is so perfect that it may take a thousand years for a development journey. Sindhu river bank is a perfect location to start a planned human settlement, as fertile land and abundant source of water required for agriculture and human need.[4]

Keywords

Urban settlements, Vedic architecture, Vastu Shastra, urban design, Towns, ancient India, Ramayana, Mahabharata, Harappa, Mohan De Jaro.

Introduction

Considering the world scenario the Indian subcontinent fertile land with drinking water potential is available more. This richness of availability of ample food and drinking water flourished various varieties in fruits, vegetables, crops, flowers, birds, animals, and other flora and fauna. This win-win situation is the main attraction of human settlements in India for having their history thousands of years back, it's also mentioned in Indian spiritual texts like Vedas and Puranas that show the history of Hindu

civilization before 10000 BCE. This large historical timespan played a good role in the development Of Cultural, architecture, town planning, and various settlements based on observations, studies, and experiments.

In ancient times Rishi - Muni knew how to lay roads, how to propose road width for highways, Subway, military action, etc. Ancient experts also studied various psychological, economic, political, environmental, and climatic issues regarding human settlements. They developed their tools for measurements.

Archaeological Survey of India in British ruling time discovered cities like Harappa and Mohenjo-Daro in Indus valley civilization having a period between 1700 BCE and 600 BC. Planning of Harappa and Mohan De Jaro[5] is not a product of one day. Therefore In the spiritual texts, Hinduism has reference of planned human settlements a thousand years back to Harappa and Mohan De Jaro timeline.

In Hindu treatises, Principles of Architecture and Town Planning are called "Vastu Shastra" i.e. "Science of Planning of Buildings and Towns". This Vastu Shastra is related to all types of buildings, towns, Sports, Palaces, Gardens, and Caves. Cities like Bhubaneswar, Thanjavur, Kanchipuram, Srirangam, Varanasi, Madurai, etc. developed during 500 A.D. to 1700 A.D. These all cities are products of Hindu Vedic principles of Vastu Shastra and the concept of Cosmos.[6] The similarity between all ancient cities is that they are in "Concentric form" which shows Hindu philosophy of cosmic centre. The planning pattern inside the fortified wall is grid form and all the population is divided by its status and their work.

About 3000 cities and towns in India have a historical background and settlement history of thousands of years. Britishers, French and Portuguese also laid towns for administration and military purposes. These towns are influenced by their culture and architecture and a new attraction for natives in India...

The ancient towns show the spiritual taste of India, physical expressions, self-image, and richness. Other factors like religious habits, symbolic representation, topography, geography, restricted availability of materials, and behaviour patterns are also important for historical settlements. Most of the historical cities are transformed into major economic hubs and cultural centres in India. Vedic settlements are changing after Islamic rule in India. In the Islamic ruling pattern, the city planning concept changed dramatically. After Islamic ruling, the British ruled on India, and again concepts and principles of planning changed as suitable for British lifestyle and architecture. We found a fusion of Vedic architecture, Islamic architecture, British architecture, French architecture, and Portuguese architecture in various towns planning in India. Vedic architecture sites are found abundant in south India. Physical evidence of town planning in India was found from 7000 BCE.

Time Span	Years	Important Towns (Settlements)
Neolithic Period	7000 BCE - 3300 BCE	Bhirrana, Mehrgarh, Allah Dino, Amri, Kunal, Loteshwar, Sothi-Siswal, RakhiGarhi, Ayodhya
Indus Valley (Pre Vedic) Town Planning	3300 BCE - 1300 BCE	Harappa, Mohan De Jero, Dholavira, Bhirrana, Baracot, Banwali, BAror, Bet Dwarka, Daimabad, FArmana, Ganeveriwal, Gola Dhoro, Kanjetar, Kaj, Kali Bangan, Karanpura, Khirasara, Kerala na Dhoro, Kotbala, Kot diji, Kotadalabhadli, Kuntasi, Lakhan da Joro, Lothal, Manda, Mitathal, Nausharo, Pabumath, Pirshaha Jurio, Soktha Koh, Tigrana
Vedic Period Town Planning	2000 BCE - 400 BCE	Hulas, JOgankhera, Pirak, Rangpur, Rojdi, Rupnagar, Sinauli, Shikrapur, Shortugai, Surkotoda, Sutkagandor, Vejalka, Varanasi, Madurai, Ujjain, Patna, Kannauj, Jagannath Puri, Vrundawan, Pratishthan, Nashik, Poona, Vaishali
Pre Medieval Town Planning	400 BCE - 600 CE	Gwalior,Patliputra, Vidisha, Somnath, Kanchipuram, Madurai, Tirupati, Tirumalai, Thanjavur, Rajrajeshwar, Surat, Hampi, Masulipattanam, Pushkar, Baroda
Medieval Town Planning	600 CE - 1800 CE	Feroz Shah Palace, Rupnagar, Thanjavur, Banaras, Mathura, Manykheta (Malkhed)

Urban Settlements before Vedic Period (Before 1500 BCE)

Vedic principles for town planning are the product of settlements in the Neolithic period (7000 to 3300 BCE). Major towns found in the Neolithic period are, Bhirrana, Mehrgarh, Allah Dino, Amri, Kunal, Loteshwar, Sothi-Siswal, RakhiGarhi, Ayodhya, etc.

Bhirrana (Bhirdana, Birhana) is located in the Haryana state of India in the Fatehabad district. Its Pre- Indus valley Civilization site dates from the 8th to 7th millennium BCE. In the Bhirrana site, archaeologists found four cultural periods. Period IA: Hakra Ware Culture, Period IB: Early Harappan Culture, Period IIA: Early Mature Harappan Culture, and Period IIB: Mature Harappan Period.

Period IA: Hakra Ware Culture (7000 to 6000 BCE) - Settlement pattern is in the form of subterranean dwelling pits, cut into the natural soil. The Walls and floors are plastered with the fine yellowish alluvium of Saraswati valley. Artefacts found are copper bangle, copper arrowhead, bangles of terracotta, beads of carnelian, lapis lazuli and steatite, bone point, stone saddle. Pottery found is very rich including Mud wares, Brown of buff wares, Bichrome wares, Black on Red, and Plain red wares. Industrial units are in existence to manufacture the above products.

Here we note the use of various building materials (Soil from Saraswati Valley), Dwelling patterns under the ground level, Industrial units are part of the city. Food production is in its primary stage.

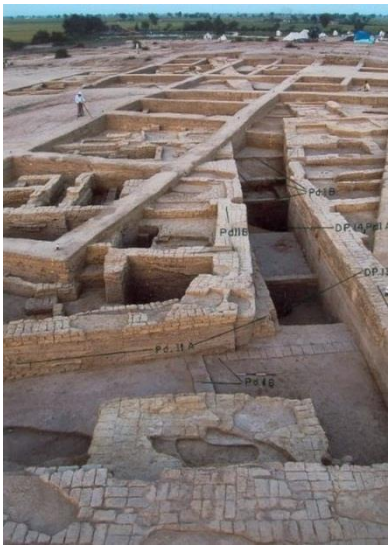

Figure 1

Period IB: Early Harappan Culture (6000 to 4500 BCE) - This is also known as transitional ira as various developments start for culture and society. This is also a food-producing Ira. The settlement is open-air, with no fortification. Mud bricks of buff color (ratio 3:2; 1) used for construction. Artefacts of this period include bull figurines, wheels, sling balls, seals made of shell bone objects, etc.

Here we note that some more industries appeared. Construction material used is mud bricks and here the town planning is having basic material as mud bricks and now the culture is going towards planned cities. Seals are showing the power of various rights. This shows that city planning is taking form as per power in society. Seals also represent that robbery was in its pick and to control that seals give the power to use rights. It also means that security for industries and powerful persons is a basic need of society.

Period IIA: Early Mature Harappan Culture (4500 to 3000 BCE) - This period is of importance in ancient town planning in India. In this period of transformation, the city layout is fast and based on some logic

and rules and regulations. Towns have two major parts, Citadel, and lower town. Structures are aligned with true East. The streets, lanes are oriented in the same fashion. Artefacts are showing the presence of more industries.

Here we note that the orientation of structures is started. Citadel is of importance, a lower town divided into various sectors as per hierarchy in the society.

Period IIB: Mature Harappan Period (3000 to 1800 BCE). - The last period of this site is the well-developed characters of Harappan City. Burnt bricks are used for the drain system. Massive fortification and grid plan system appears.

Here we note that the security and safety of towns are important. A drainage system indicates ample use of water; it also indicates the availability of sources of water supply. Other important findings are multi-room dwelling units with the kitchen as a separate room, courtyard planning, and proportion of length, width, and height of rooms.

Mehrgarh - Another site is Mehrgarh now situated in Pakistan. Farming and herding are found in this ancient city and one more space is included in dwelling units and city planning. It is having eight periods and City planning principles are found as,

Mehrgarh Period I (7000 - 5500 BCE) - This period is Neolithic and aceramic (without the use of pottery). Farming and herding are found. Society is divided into two parts based on their work culture, one is a farmer, and the second one is a herdsman (cowboy). Dwelling units found are having building materials like mud bricks and thatch roofs. Multi-room dwelling units are also found.

Mehrgarh Period II (5500 - 4800 BCE) & Period III (4800 - 3500 BCE) - This period is ceramic Neolithic, using pottery and later chalcolithic. Manufacturing activities increased with advanced technologies. Female figurines are found with decorative ornaments and various hairstyles, it is a symbol of prosperity and a cool and calm lifestyle. They are having a good source of food and basic facilities and thinking about trades in the latter period II. In period III superimposing and shifting of smaller villages towards city areas found, indicates an increase in population and having the guarantee of employment in cities.

Figure 2

Here we found that as the size of the city increases local authority needs, safety, security, infrastructural facilities, and good transportation was the basic need of settlement. Various scholars formed rules and regulations for city planning over several centuries.

Mehrgarh Period IV, V, VI (3500 - 3000 BCE) - Various figurines of females found with abundant breasts and hips suggest ample fertility and procreation.

Mehrgarh Period VII and VIII (2600 - 2000 BCE) – In This period New settlements were promoted with new facilities. Probably the expanded cities were uncontrolled due to various reasons and one of them might be related to city activities and city planning problems.

Here we found that the concept of Goddess is socially accepted and new settlements were established. There are basic rules and regulations for people for approach, ventilation, safety and security, drainage system, industrial units, worship places, citadels, etc.

Vastu Shastra (Architecture) In the Vedic Period (1500 BCE - 500 BCE)

The first written reference of "Vastu Shastra" (Architecture) is found in the ancient spiritual treatise, "Rugveda". In this treatise word, "Vastoshpati" is nothing but Vastu + Sthapati (Building + person who establishes).

One Shloka (Verse) in Rigveda is requesting Bhagavan (God) to provide protection, happiness, and prosperity to peoples in their life and after death also. The Shloka (Verse) is,

“Vastoshpati Prati Jati Hachasman Tvavesho Atbhivo Bhavatah,

Yat Tvameh Prati Nitro Jushsvshan No Bhav Dvipad Sha Chatushpade.'

Its meaning is,

“Oh Deva (God) of various structures (Houses, Forts, Palaces, Gardens, Temples), we all are your devotees. We are praying to keep us from disease, provide us wealth and prosperity, keep us safe, and secure all the animals (Chatushpada - Four Legs) and people (Dvipada - Two Legs) living at home.

The date of "Rigveda" is before 1500 BCE, and it is one of the oldest treatises found in India. It's a collection of various verses found before the Vedic period. We can conclude that the art of architecture in India was in existence before the Vedic period. Cities like JognaKhera, Pirak, Rangpur, Rupnagar, Sinauli, Shikarpur, Shortugai, Surkotada, Vejalaka, Varanasi, Madurai, Patliputra, Dholavira, Kannauj, Brahmagiri, etc were well established in vedic period (1500 BCE - 500 BCE). We will see some Architectural / Urban Planning details from the above examples.

Pirak (1800 BCE - 800 BCE) - Pirak site (On the east bank of river Nari) is a great example of Indus Valley Civilization and changes in town planning as its period starts before Vedic culture and ends in post-Vedic culture. The Historical importance of this site is due to very early ironwork and iron artefacts. In this culture, ironwork develops step by step. Various artefacts like "wheeled camel figures,

items made of iron, and different seals were found. Constructed canals alongside the settlements prove a well-planned irrigation system was developed with developed cultivation patterns.

Architecture and material culture are found in three periods. The first period was during 1700 BCE and the material used was un-burnt bricks with a large platform. Decorated pottery indicates the stability of life, camel and horse terracotta figurines show transportation methods. The second period was during 1300 BCE and figurines of human figures including riders were also found. Numerous tools of copper and bronze were found, and the presence of iron pieces was found. The third period starts from 1000 BCE - 800 BCE and the number of iron products increased.

Rangpur (Gujarat) (3000 BCE - 800 BCE) - This ancient archaeological site is in Gujarat state. Different types of pottery give "Rangpur Culture" identification to this subculture. Archaeologist S.R.Rao divided this culture period into four parts. The first period is 3000 BCE less pottery. Second period is the Harappan Period (2000 BCE - 1100 BCE). The Third Period is the Transition phase of Harappan (1100 BCE - 1000 BCE). The fourth period is the Lustrous Red Ware Period (1000 BCE - 800 BCE).

Architectural importance is that Wood (Acacia) is used for construction, tools, and furniture. Artifacts found are, dishes with a beaded rim and grooved shoulder, painted and redware high necked jars, shell working, axes carnelian, and earthenware. Cultivation was found in advance and for various crops.

Surkotada (2100 BCE - 1700 BCE) - Gujarat, India. It is a fortified Indus Valley Civilization in 3.5 acres of land. Period IA (2100 BCE- 1900 BCE) includes Citadel with mud bricks and mud lumps and fortification walls. Uncoursed rubble masonry work was also used for fortification. The base of the fortification wall is 7 m and the height is 4.5 m. Inner fortifications for residential areas are with 3.5 m wall thickness. Citadel had two entrances, one on the south and another on the east side. Well, sanitary arrangements were found for drain and soakage jars. Period IB (1900 BCE 1800 BCE) this period was defined separately as new peoples came to settle here. New mud brickwork was added to the inside of the fortification wall. Widespread fires disturb settlement but a continuation of living is found. Period IC (1800 BCE - 1700 BCE) indicates new construction on old plinths. Dressed stone masonry work is found and it gives direction to stone carving for decoration of palaces and carving sculptures of gods and goddesses.

The plan is made up of two squares, one is a residential complex and the second is a citadel at the upper side. Citadel has two bastions on the south wall. This south wall has a main gate with steps and ramps for vehicles. Citadel consists of large rooms with five to nine rooms' houses. Internal access to residential complexes is given through the citadel. Residential houses are smaller than citadel complexes.

In the house all rooms are interconnected, a courtyard, outside platform facing the street, is found. The southern side gate has a straight entrance with two guardrooms.

Late Harappan Culture and various cultures found in this area were developing and adding various elements to the urban planning which led to various improvements in town planning and architecture of Vedic culture. In the Vedic period, Rig-Veda (1500 BCE) gives the first concepts of architecture written in it. Agastya Rishi (Sage), Kasyap Rishi, and Gargya Rishi wrote a treatise on architecture and town planning between 1500 BCE - 1000 BCE. Chanakya Kautilya (Minister of King Chandragupta) wrote principles for town planning in 400 BCE. Various Agamas, Upanishads, Purans, and treatises are based on Architecture (Vastu Shastra) and town planning principles which are based on studying all existing towns and settlements and their problems and solutions on it. The advanced period of Ancient Indian Architecture and Town Planning was between 500 BCE to 1500 BCE.

Table 1 shows various treatises on Vastu Shastra (Architecture / Town Planning) and their period.

Table 1

Sr. No.	Treatise	Author	Time Period
01	Sakal Adhikara	Rishi (Sage) Agastya	1500 BCE
02	Ved	Various Rishis (Sages)	1500 BCE
03	Gargya Sanhita	Rishi Gargya	1400 BCE
04	Sanat Kumara Sanhita	Sanat Kumar	Unknown
05	Upanishad	Various Sages	700 BCE
06	Matsya Purana	Rishi Sut	600 - 300 BCE
07	Agamas	Various Rishis	500 BCE - 1000 CE
08	Arthashastra	Arya Chanakya (Katilya)	400 BCE
09	Bhagvat Geeta	Rishi Valmiki	200 BCE
10	Amsumat	Unknown	190 BCE
11	Vayu Puran	Rishi Vyas	300 CE

12	Brahmand Puran	Rishi Vyas	400 CE
13	Manjushri Mula Kalpa	Bodhisattva Manjushri	500 CE
14	Mayamatam	King Maya	500 CE
15	Ayadi Lakshana	Unknown	500 CE
16	Bruhad Sanhita	Rishi Varahmihir	500 CE
17	Bhavishya Puran	Various Sages	600 CE
18	Agni Puran	Maharshi Vashishtha	700 CE
19	Ling Puran	Rishi Ved Vyas	700 CE
20	Skanda Purana	Various Sages	700 CE
21	Garuda Purana	Rishi Kashyap	700 CE
22	Narada Purana	Rishi Vyas	700 CE
23	Vastu Shastra	Sanat Kumara	1000 CE
24	Samrangan Sutradhar	Raja (King) Bhoj	1100 CE
25	Manasollasa	King Someshwara	1100 CE
26	Aparajita Priccha	BHuvandevacharya	1200 CE
27	Abhilashitartha chintamani	Someshwara	1200 CE
28	Siddhanta Shiromani	Rishi Bhaskar 2nd	1200 CE
29	Vishvakarma Mata	Hemadri	1300 CE
30	Mansara Shilpashastra	Mansar	1300 CE
31	Vastu Rajvallabha	Pandit JIvnath	1400 CE
32	Shilpa Ratnam	Sreekumaran Bhargav	1500 CE

33	Tantra Samuchayam	Chennaas Narayanan Namboothiripad	1500 CE
34	Vastu Mandanam	Mandan Sutradhara	1500 CE
35	Manushyalaya Chandrika	Thirumangalath Neelakandam	1600 CE
36	Astavimasati Tattva	Raghunandana	1600 CE
37	Bavan Baskara	Rishi Bhaskara	2000 CE
38	Vishwakarma Vastu Shastra	Rishi Vishvakarma	Unknown
39	Vishwakarma Prakashika	Rishi Vishvakarma	Unknown

The symmetry of various elements required for the construction of the palace was also taken into consideration. Even the Mayasabha of the Mahabharata was built according to the ancient principles of Vastu Shastra. It is said that it was built as per Vastu Shastra by the great sculpture called Mayan and was square.

References to Vastu Shastra have been found in the great Indian epic Ramayana also. The construction of the holy city of Ayodhya, the capital of the kingdom of Lord Rama, shared a similarity with the plan written in the great architectural text Manasara. Even the Ramsetu of Ramayana was based on Vastu principles.

In the Matsya Purana, 18 following scholars of Vastu Shastra have been mentioned. They are Bhrugu, Atri, Vashist, Viswakarma, Mayan, Narada, Nagnajit, Visalakshan , Purandaran, Brahma, Kumaraswamy, Nandikesawaran, Sounakar, Bhargavar, Vasudevar, Anirudhar, Sukran and Bruhaspathi.

Buddhist literature also makes numerous mentions of buildings based on Vastu. There is a mention of various viharas, temples, houses, buildings in the various Buddhist texts, based on Vastu. It is said that Lord Buddha used to deliver discourses on architecture and he was very much conscious of the construction of the buildings in order.

Excavations in the ancient cultures at Mohenjo-Daro and Harappa show some specific following in construction and planning. They followed certain basic rules in these cultures and were very much similar and comparable with the Vasthu Shastra of Indian origin.

Vastu Shastra

Treatises on Vastu Shastra are traced from 1500 BCE. Such detailed writing in treatises is not a product of one day. Probably this science of building construction was known to the Indus Valley Peoples from thousand years back of the first treatise found. This history goes back to 5000 BCE and before that. As per the study of the above archeological sites, descriptions given in treatises and writings of other nations visitors in that period, Vastu Shastra in Vedic Period was in its peak period.

In ancient times "Vastu Shastra" was considered as one of the parts of "Shilpa Shastra". In ancient India, a total of 64 arts are considered divinely revealed arts. The term "Vastu" is explained as "a place where immortals and mortals live". The term includes ornaments, furniture, vehicles, architectural details, gateways, drains, water tanks, gardens, buildings, streets, and all types of small and big settlements. Various texts on "Vastu Shastra" were written in the various parts of India in the Sanskrit language. Vastu Vidya (study of Vastu) is considered to be a Upveda, a lesser Veda (Kramrish 1946). There are 3000 golden years in which these architectural principles were written in various texts and in oral traditions as given in table1. Beautiful and great examples are various tall and decorative temples spread in various parts of the world.

In Vastu Shastra, Architect is known as "Sthapati' ('stha' means which is fixed and 'pati' means master) and he is a master builder (Ramraz 1972). His team consists of Sutragrahin (draftsman), Takshaka (Stone/woodcarver), and Vardhakin (expert in joinery). This team is directed by "Sthapaka" who is always "Brahmin" and acts for his client. The Sthapati should be well versed and have ample knowledge of mathematics, astrology, and Vedas. Sthapati was having high status in society as he is the creator of the new world. Whenever there is a need for a new settlement or an old one extended, Sthapati is called and he selects sites for settlement as he knows codified Vastu Shastra. Sthapati marks site designs for requirements and gives the layout for town/city.

Designs and categories of settlements

When we want to bring any building or settlement into existence, we have to measure and place the space, this is called "to design" the settlement. Treatises like Manasara and Mayamatam were given a system of measurements for designing settlements, dwelling units, and sculptures in 1100 CE. The length or height is called Mana, breadth is Prana or Pramana and Parimana is the circumference (Acharya 1927). All these measurements are based upon the human body scale. Design patterns found in Vastu Shastra are rectangular, square, round, wheel with spokes, swastika, or a flying bird. The human figure with uplifted arms height is a unit for measurements and a square with this length is a base. All planning was done according to this unit. A Vastu Purush Mandala contains all coded architectural principles and Sthapati planned the settlement, temples, palaces according to it. This scale of the human body is called "Vastu Purush", he is always in position facing downwards. There are various types of mandalas for planning. In

temple architecture, the mandala is divided into four zones. The central part always has a temple complex, near to it is the royal palace then residences of Brahmins and all other castes are located as per their position in society. A clear social hierarchy or working pattern is seen in all temple architecture. Probably it is for minimum pollution in the Temple city/settlements which develop from various small-scale industries or household industries because all caste systems are based on the working pattern of those particular peoples.

Categories or settlement patterns were found similar for villages to larger towns. Villages are called "Gram" and towns are called "Pur", in the Sanskrit language. The hierarchy and the architectural and urban design patterns given similarly in the treatises are much similar in 1500 years history. Kautilya's Arthashastra (400 BCE), Mayamatam (500 BCE), Aparajita Parichha (1200 CE), and Manasara (1300 CE), clearly show principles of architectural planning and rules and regulations are the same for the ancient period. The settlement pattern is known as per, location, required size of settlement, form, and for whom it was built. Manasara texts describe settlement pattern types in eight categories, dandaka, sarvatobhadra, nandyavarta, padmaka, swastika, conch, bow, and chaturmukha. (See fig. 2). Mayamatam also shows eight patterns and five of the above are similar.

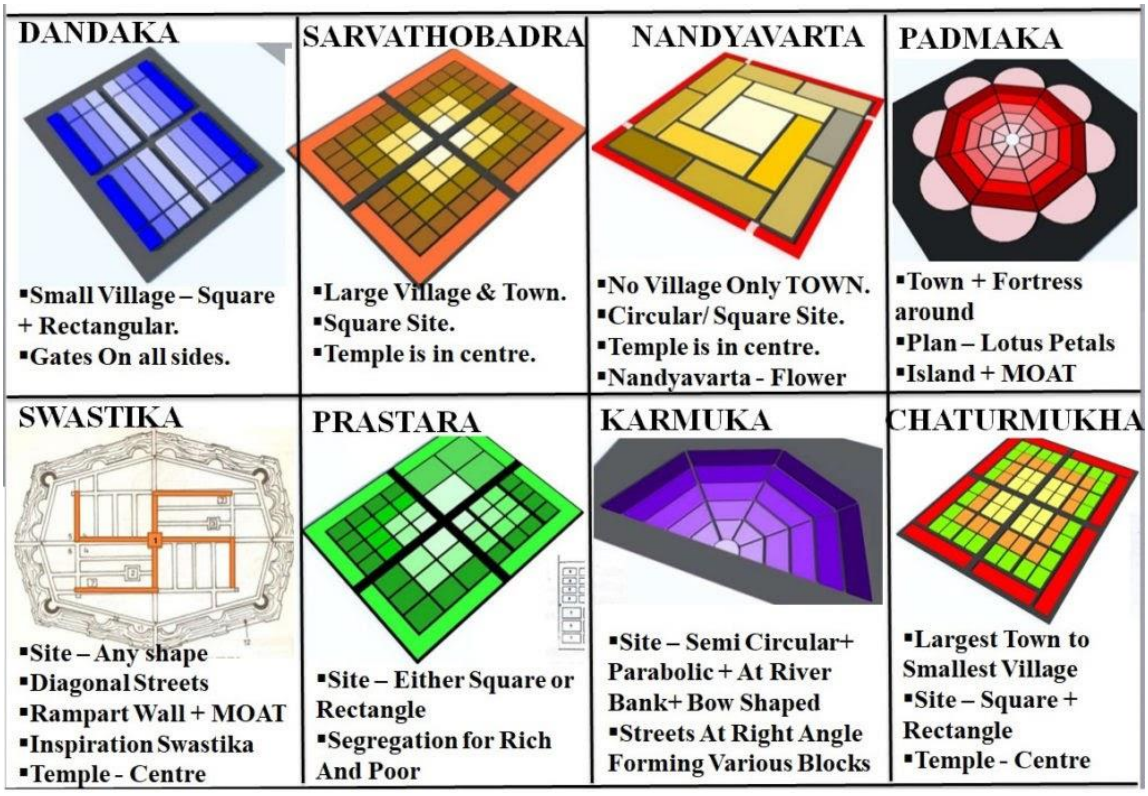

Figure 3

In all settlements, streets are straight and street patterns reflect its type. Streets divide the settlement into various blocks as per social hierarchy and industrial activity type. All the rules and

regulations followed are in code language given in "Vastu Purusha Mandala". The procedure of divisions of the settlement is called "Padvinyas" and it divides the pattern into squares. The central place is kept open space and it is called "Brahma" meaning universal space concept which accommodates everything, life starts from it and ends within it. The width of streets is having various changes as transportation type's change from the horse, bullock cart, camel cart, and elephants. They have flexibility in their norms as per lifestyle changes. The second example of this flexibility is found in door and window openings. Initially, it is smaller and openings are within the inner courtyard because of safety and security. But as the power of kingdoms increases, people relax about safety and security and depend upon military forces. The openings are bigger and windows and doors are also directly opened on the outer main streets.

In 400 BCE Kautilya gives his hierarchy about the settlement, the village is the smallest unit, and a group of ten villages is having one local administration called Sangrahan; twenty Sangrahan is under one district administration called Dronmukh; 40 Dronmukh was under one divisional headquarter called Sthaniya. The population of Sthaniya town was more than five lakhs. Controlling such mega settlements was a challenge to them; to overcome this they advanced town planning concepts, drainage systems, drinking water facilities, and transportation modes. Carbon tests of Mohan jo Daro and Harappa give 2500 BCE, but such advanced town planning concepts required thousands of years of observations and experiments. The latest example of a Vastu Shastra-based city is "Jaipur " which was established in the 18th century by King Sawai Jai Singh under Bengali Architect. It's a "Prasthara " type city and designed in nine squares.

Conclusion

This article is a study on Vedic architectural concepts and principles. The study period starts from 7000 BCE to 1800 CE (Pre-Vedic- Vedic - Post-Vedic Period) and basic concepts are written here with examples of cities and the formation of various principles. The study of various texts (treatises) is interesting as it shows step-by-step modifications in the principles. In the post-Vedic period, it is rigid with the forceful implementation of principles with the help of the spiritual behaviour of society. All the modern architectural principles, methods of proportion, beautification of buildings, types of cities/temples/palaces/houses, methods of measurements are given and proven in it.

The article is an extract of linkages between social life, agricultural development, safety, security, and urban settlements. The Vedic architecture was written on the foundation of trials and experiments in the pre-Vedic period from 10000 BCE. Linguistic reference shows that the Sanskrit language is on its top point and it also symbolizes that Vedic principles for town planning, urban settlements, temple architecture, palace architecture, military settlements were also on its top point. The study also gives

references to cosmology, astrology, plant science, health science for humans and animals are also important parts of ancient Indian "Vastu Shastra".

Epics of "Ramayana" and "Mahabharata" are also full of descriptions of various towns like Ayodhya, Dwarka, Kosla, Mathura, Janakpur, Hastinapur, Indraprastha, Kurukshetra, etc. Many of these cities are in existence today also with changes in them. Treatises like Vedas, Upanishads, Agamas, and Puranas also give various Urban Settlement patterns, descriptions of various towns, history of kingdoms, and their social life pattern.

My conclusion is that, in today's context, the education system should have studied "Vastu Shastra" in education for its details about proportions, details about measurements, details about sculptures, details about use in the green buildings, methods for town planning, etc. In India, the Current educational pattern is imported and later Imposed in education which affects local architecture and the concept of "Green Buildings".

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