SCIENTIFIC RATIONALITY IN VAASTU PURUSHA MANDALA: A CASE STUDY OF DESH AND KONKAN ARCHITECTURE

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Abstract. 'Vaastu Shastra', an ancient Indian knowledge is considered an integral part of Indian architecture. The term Vaastu-Shastra combines the words Vaastu and Shastra, which means science or technology for designing and constructing the dwellings. The Vaastu Shastra has five fundamental principles; *Diknirnaya* – Site Orientation, *Vaastu Purusha Mandala* – Site Planning, *Maana* – building proportions; *Aayadi* – Building dimensions; *Chanda* – Architectural aesthetics. Vaastu Purusha Mandala, used for site planning is one of the principles based on context, cardinal orientation, and sustainability. This paper builds on the understanding of Vaastu Purusha Mandala with the help of two case studies from different regions in Maharashtra, India, which have different social, cultural, ecological, and topographical contexts. The architectural spatial configuration created by Vaastu Purusha Mandala presents two unique solutions suitable for respective region. From the analysis of two case studies, it can be concluded that there is scientific rationality behind Vaastu Purusha Mandala and can stay relevant in the contemporary context.

1. Introduction

The *Vaastu Shastra* is a collection of texts mentioned in both *Puranas* and *Buddhist Brahmana*. The texts give detailed guidelines regarding architecture, sculpture, and urban planning. Although theory and practice coexisted in architecture, traditional books such as "*Matsyapurana, Mayamatam, Manasaram, Viswakarmiyam,* and *Kasyapam* were regarded the foundation for developing the principal base" (Ananth, 2017; Piplani & Brar, 2020). These books look at elemental energy patterns from the standpoints of theory, philosophy, application, and comprehension. *Vaastu Shastra* is based on "cosmological, cultural, geological, and geographical concepts" (Singh & Sharma, 2019). Its ancient coequals; Feng-Shui (Hong *et al.*, 2007; Lu, 2000) and Geomancy (Yoon, 2021), are well known to the western world. According to Sir Cunningham and Dr. Havell, *Vaastu Shastra* emerged between 6000 and 3000 BCE (Moossavi, 2016). The great cities of Ayodhya, Harappa, Mohenjo-Daro and Lanka were built on *Vaastu Shastra* principles (Ananth, 2017; Kulkurni, 2004; Sthapati, 2001). This paper builds upon the understanding of the *Vaastu Purusha Mandala* and how these principles are applied in Maharashtra houses from two different regions.

1.1 Methodology

This study is based on a literature review and case-study method. For the case study, two houses from the Maharashtra region are taken, which are designed according to *Vaastu Shastra*. Maharashtra is India's second-largest state and the world's third-largest national subdivision in terms of population. It is geographically divided into five regions Nagpur Division; *Vidarbha*, Aurangabad Division; *Marathwada*, Nashik *Division; Khandesh*, Pune Division; *Desh*, and *Konkan* Division. The two selected regions are *Desh* and *Konkan* which have different climatic, topographical, social, cultural parameters. *Desh* region has a hot semi-arid climate, and the Konkan region has a hot and humid climate. The researcher considers the design attributes and principles of Vaastu Shastra used in Maharashtra architecture; where in *Desh* houses it is introvert and in *Konkan* houses it is extrovert in design approach, and in spatial planning based on socio-cultural context.

2. Literature Review

2.1 Attributes of Vaastu Shastra

Vaastu Shastra design process is "based on a thorough understanding of the main three design attributes, which include functionality *(Bhogadyam)*, aesthetics *(Sukha Darsham)*, and cognitive principles that evoke a feeling *(Ramya)*" (Ananth, 2017). *Bhogadyam* - Functionality: Functionality is an essential aspect of architecture. Architecture must satisfy the purpose for which it is built. *Sukha Darsham* - Aesthetics: Architecture must be aesthetically pleasing and must positively affect the viewer. The proportions, rhythm, hierarchy, ornamentation, colour, and materiality are the main principles of traditional Indian architecture. *Ramya – Ramya* is the cognitive properties that evoke emotions, the "emotional response to the manifested form" (Ananth, 2017). The designed architectural product must be "capable of evoking a feeling of health and well-being" (Ananth, 2017) in the user.

2.2 The Fundamental Five Principles of Vaastu Shastra

The fundamental principles of Vaastu Shastra are *Diknirnaya*; Site Orientation, *Vaastu Purusha Mandala*; Site Planning, *Maana*; Proportions of building, *Aayadi*; Building dimensions and proportions; *Chanda*; Aesthetics (Minu, 2009; Patra, 2009) Even though all five principles are equally important and interwoven, the current study concentrates on *Vaastu Purusha Mandala*.

2.3 Vaastu Purusha Mandala

Vaastu Shastra is a scientific treatise written in the Hindu mythological language. where Brahma is the supreme creator of the cosmos who created the cosmic man '*Vaastu Purusha*' while creating life in the universe. He had an insatiable appetite and began devouring whatever caught his attention and grew so large in a short time that his shadow caused a permanent eclipse over the planet. It took 45 gods, including Brahma, to pin the Vaastu Purusha face down on the earth, before this creature annihilate the universe. While Brahma held him in the middle, the other gods grabbed its limbs, hands, and other bodily parts. His head is pointing to the north-east, and legs are pointing to the south-west (Minu, 2009; Pinaki, 2020). Out of 45 gods holding down *Vaastu Purusha*, 32 gods in the peripheral sides and 13 gods in the interior sides. These 45 gods represents the 45 energy fields and have certain inherent qualities. "The function of the rooms placed in each area

of the house is in accordance with the nature of the god ruling that particular area" (Lakshminarayanan, 2011) (Figure 1). According to the *Vaastu Purusha Mandala*, the house is designed around a square which is divided into smaller squares. Every square represented a deity's residence. *Brahma* is the lord of the central space. "The north is associated with the lord of wealth, *Kubera*; the south with the lord of death, *Yama*; the east with the lord of light, the Sun; *Surya*, and the west with the lord of the wind, *Varuna"* (Figure 1) (Chakrabarti, 1999; Lakshminarayanan, 2011; Patra, 2009). If the functional distribution deviated from these rules, a particular deity was enraged, disrupting the mental or physical well-being of the occupant. Ignoring these was not only regarded as damaging to one's success and well-being, but it was also detrimental at times. As a result, there are numerous myths associated with the *Vaastu Shastra*'s rules (Dengle, 1998).

Figure 1. Cosmology and orientation along with tentative rooms according to Vaastu Purusha Mandala principles (Source: Authors)

2.4 Cosmology and Orientation:

In architecture, orientation is a reciprocation to the cardinal directions: East, West, North, and South, in the specific geographical location. Vaastu shastra also follows sun-path and wind directions. Other aspects are cultural context, the immeasurable and measurable characteristics of human behaviour in a community are also under the umbrella of culture.

Culture is concerned with social, moral, religious and economic aspirations.

Thus, one has to comply with the methods used by society through times to study, discard, and modify its life aims and priorities. When the field of culture is examined, the legends, myths, rituals, and ways of life that "take shape due to one's response to natural

forces, climatic changes, soil and water characteristics, and inner spiritual beliefs all come under scrutiny" (Dengle, 1998). In this context, the case studies undertaken are also assessed and analysed how the residential architecture from Maharashtra respond to *Vaastu Purusha Mandala*.

2.5 Formation of Vaastu Purusha Mandala

A *Vaastu Purusha Mandala* helps in designing functional, aesthetic, climate responsive and sustainable buildings. Vaastu Shastra is based on "logic and reasoning" (Lakshminarayanan, 2011; Sachdev, 2012). It can be utilised as a design tool suited to modern design because of its multidimensional properties (Piplani & Brar, 2020). "There are two basic types of Vaastu Purusha Mandala; one with 8 x 8 = 64 squares, and 9 x 9 = 81 squares" (Sthapati, 2001); which are known as padas. Pada theory states that any physical space can be "perceived through its interactions with primary energies. The eight directions and sky above and earth below are supposed to influence growth and prosperity" (Ananth, 2017). This Pada theory can be understood in zoning as public, semi-public, semi-private, and private (Figure 2).

	Brahma pada (the first belt around the central energy point)	: 2 X 2 = 4 padas
	Deivika pada (the second concentric belt)	: 12 padas
	Manusha pada (the third concentric belt)	: 20 padas
	Paisachika pada (the fourth concentric belt)	: 28 padas
		64 padas

	Brahma pada (the first belt around the central energy point)	: 3 X 3 = 9 padas
	Deivika pada (the second concentric belt)	: 16 padas
	Manusha pada (the third concentric belt)	: 24 padas
	Paisachika pada (the fourth concentric belt)	: 32 padas
		81 padas

Vaastu Mandala 8 X 8 = 64   Vaastu Mandala 9 X 9 = 81

Figure 2. Formation of Vaastu Purusha Mandala (Source: Authors)

1. The *Brahma Pada* is the central area of the complete form, which includes the central energy point. During the design process, the *Brahma Pada* is "has very high concentration of energy of the total form" (Ananth, 2017). It can be considered as private zone.
2. The *Deivika Pada* is the first concentric space around the central Brahma pada. In this space, the energies are considered to be relatively high. It can be considered as semi-private zone, so areas such as dining, family rooms are recommended.

3. The *Manusha pada* is the second concentric zone, and it contains energy conducive to human activity. It can be considered as semi-public zone.
4. The *Paisaacha Pada* is the final concentric space with storage areas, outer verandah, external walls, outer walkways, and activity areas such as guest bedrooms and workrooms, consisting of public zone.

3. Residential Architecture of Maharashtra

Vaastu Shastra principles are indistinguishable in all sources, but the adaptation differs from region to region. Adaptation is based on the physical form variables; climate, geography, building material availability, and cultural needs. Two case studies are compared and analysed to demonstrate how *Vaastu Purusha Mandala* guidelines and adaptation of climate, geography, building material availability, and cultural needs present two solutions appropriate for each region.

4. Architecture of *Wadas* in Pune Division of Maharashtra

The residential typology of *Wada* architecture has its origins in the *Puranas* of the Vedic period. *Puranas* contain prescriptions and guidelines for various caste-based solutions and for men of social and political standing. *Vaastu Shastra* principles are detailed instructions on choosing a site, examining the soil for building a house, selecting construction materials, and where and how the functional planning should be done. Although *Matsyapurana*, still shows that "the term describing the typology of the houses was in use in Indian society for at least a thousand years before the rise of the *Peshwas* and the *Wada* architecture in and around Pune" (Dengle, 1998) which also implies that for over a thousand years, *Vaastu Shastras'* house typology has been regarded as a guideline for building houses. Pune was founded in 937 BC by the *Rashtrakuta* dynasty which had many emperors. The *Maratha* dynasty's rule over this region had the most significant impact and transformation (Gupta, 2013). They introduced *Wada* architecture type as "the smallest unit of a neighbourhood planning system defining the residential areas" (Sachdeva, 2020). Wada is an introvert design consisting of rooms and verandas around a courtyard or courtyards that ensures abundant light and ventilation without compromising privacy. It has thick outer walls with a smaller number of small openings to control the interior atmosphere and ensure thermal comfort.

4.1 Architecture of House in Desh region of Maharashtra

4.1.1 Architectural Elements
Wada consists of architectural elements such as central courtyard which is raised on its plinth, verandah, terrace, staircase, water tank *(pushkarni or haud)*, well, fountain *(karanje)*, basil plant shrine *(tulsi vrindavan)*. The permutations and combinations of these elements determine *Wadas* scale. (Dengle, 1998; Dhepe & Valsson, 2017; Gupta, 2013).

4.1.2 Wada design strategies
The Maharashtrian house is architecturally moderate in size. *Wadas* are built with a single, double, and sometimes, triple courtyards considering social status and family size etc. Women had less privacy in single courtyard houses than in double or triple-

courtyard houses; since public areas meetings and transactions took place in one of the rooms facing the courtyard. The separation between public and private areas naturally narrower if it is a single courtyard. If it is double or triple courtyard houses, the rest of the house remains hidden giving privacy to the rest of the inner spaces. The outer courts are treated as semi-public zones, the rear courts are used as semi-private zones for cow sheds and servants' quarters. The middle court is used for the private zone used for domestic purposes. This planning created layers of separation in terms of private, semi-private, semi-public and public zones The *Wadas'* geometric form and combination of elements gave rise to an architecture of simplicity of form and articulation of space. With the courtyards' several uses, the space is abundant in light creating healthy and lively spaces. Women used courtyards for festivities and gatherings, drying grains and spices. *Wada* was not just a block, despite its simplicity, it also created a sense of depth. The public spaces are created by a colonnade of wooden posts and beams surrounding the courtyard with rooms around it which amounts to the semi-public place. Typical *Wada* lacks a facade in as in western architectural terms, celebrating entry. The entrance is narrow, flushing with the walls, pragmatic and does not give the sense of arrival. The wealthy and powerful has elaborate balconies which give street views. The *Wadas* in Nagpur Division; *Vidarbha*, Aurangabad Division; *Marathwada*, Nashik Division; *Khandesh*, and Pune Division; *Desh* appear much more introvert, as compared to houses in *Konkan* region. It also suggests a close-knit family. According to (Dhepe & Valsson, 2017), the Marathas adopted the introvert planform to protect their culture and religion from tyrants; *mostly Mughals*. The patriarch could see everything because his office was in the front courtyard. The double courtyard houses imply that women could live in a separate world from men also. The rear entrance separates it from the front section of the Wada, where the patriarch carried out business with outsiders. In the Hindu religion, there was no requirement for collective worship; smaller shrines at the household level were well suited to the individual way of worship and life.

4.1.3 Ornamentation

Artisans decorated doorways, *meghadambari*, and the ornamental balcony and its brackets were also beautifully carved. Decorative, artistic treatments were given to "stone columns, capitals, and bases, multifoiled arches in stone and wood, and woodwork for posts and beams, joists, and ceiling" (Dengle, 1998) (Figure 3).

4.1.4 Structural Details

The *Wadas* had timber frames and sturdy mud, brick, or stone walls. The *diwankhana* ceiling had beautiful woodwork, while the entryway and *diwankhana* walls had legendary motifs. Fired clay pot tile on sloping roofing was prevalent. The first storey had mud flooring over wooden boards supported by joist or stone slabs, supported by beams, and plastered with mud, cow dung, or stone slabs. Stone was often utilised for courtyard flooring and plinth. There were either stone slabs or mud floors. The glare was lessened since two-story walls surrounded the courtyards. The courtyard windows are thin and tall, with double-leaf shutters divided into two parts. The lower section opened from the floor, while the upper part opened at eye level, but preventing the horizon from vision (Figure 4; Figure 5). The house-form reflected its structural system, and its three-dimensionality reflected in the plan. The *Wada* architecture of Maharashtra, with its functionality, structuralism, ecological and material approach without over-ornamentation, in a sense, seems to hold the values of Modernism and Critical

Regionalism. Hence, *Wada* architecture very well follows the Vaastu Shastras design principles, i.e., functionality (*Bhogadyam*), aesthetics (*Sukha Darsham*), and cognitive principles that evoke a feeling (*Ramya*) and goes beyond that. It gives holistic performing architectural design with spatial, functional, social and psychological, environmental, sustainable, technological, and economic aspects.
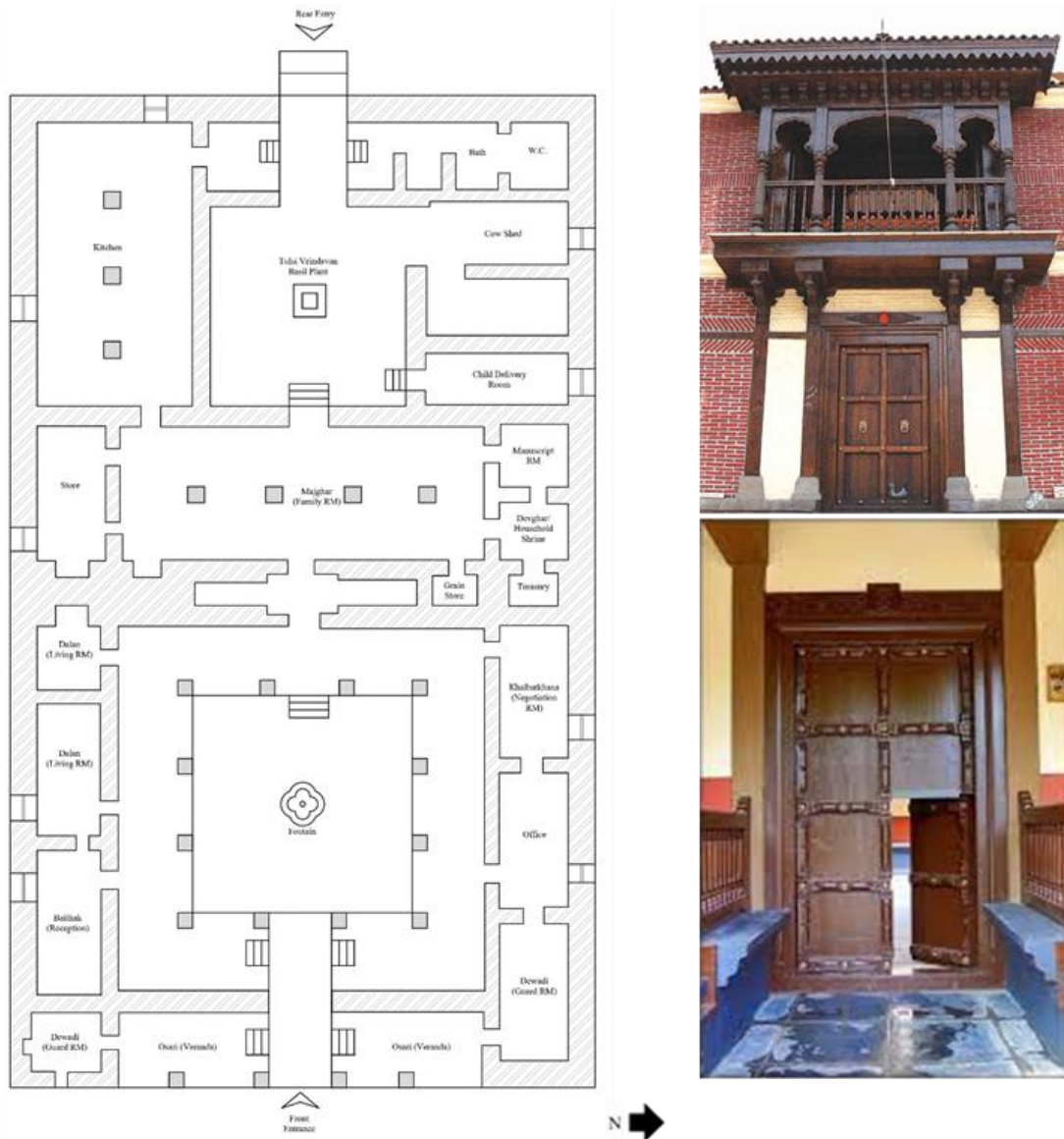

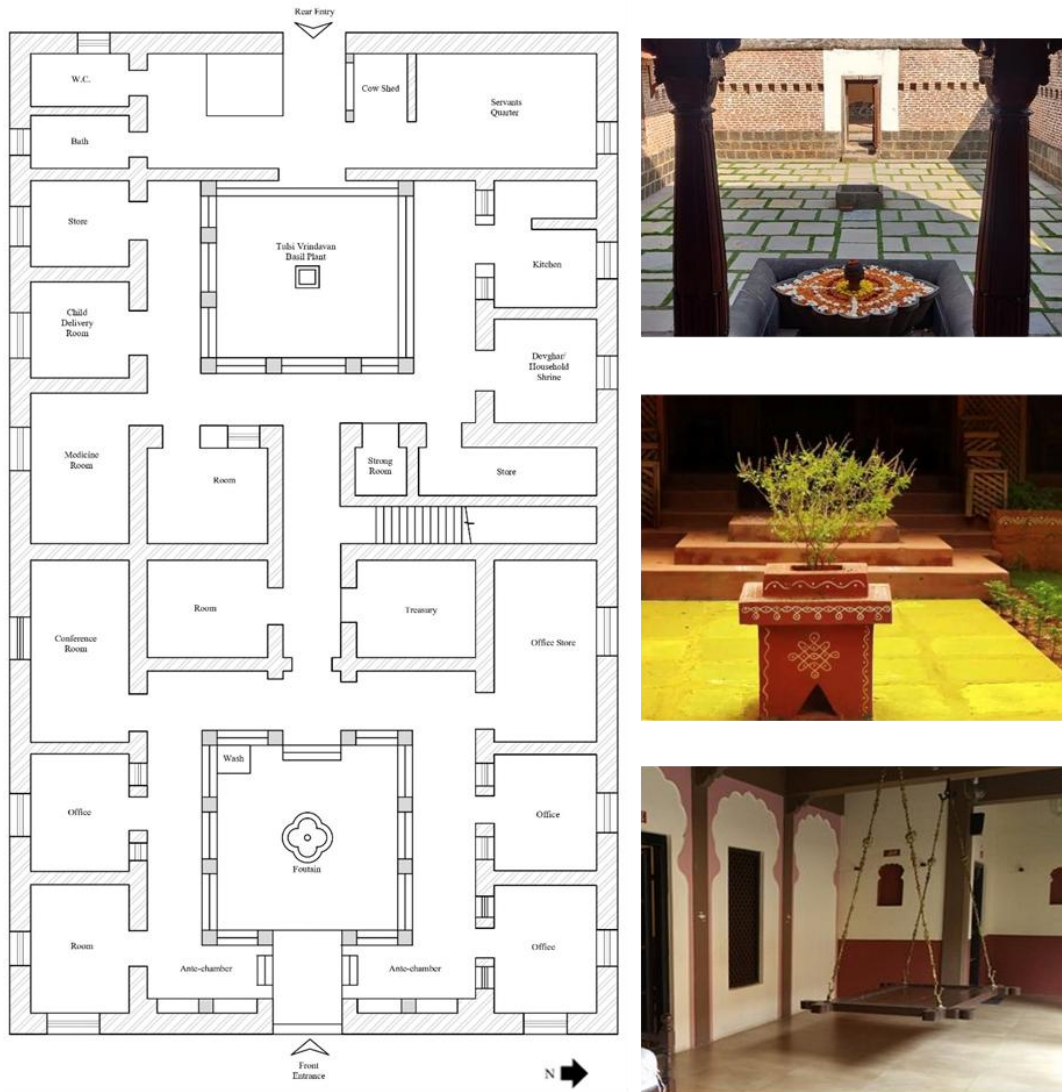**Figure 3.** Typical Plan I, Entrance, and Main Door (Source: Authors)

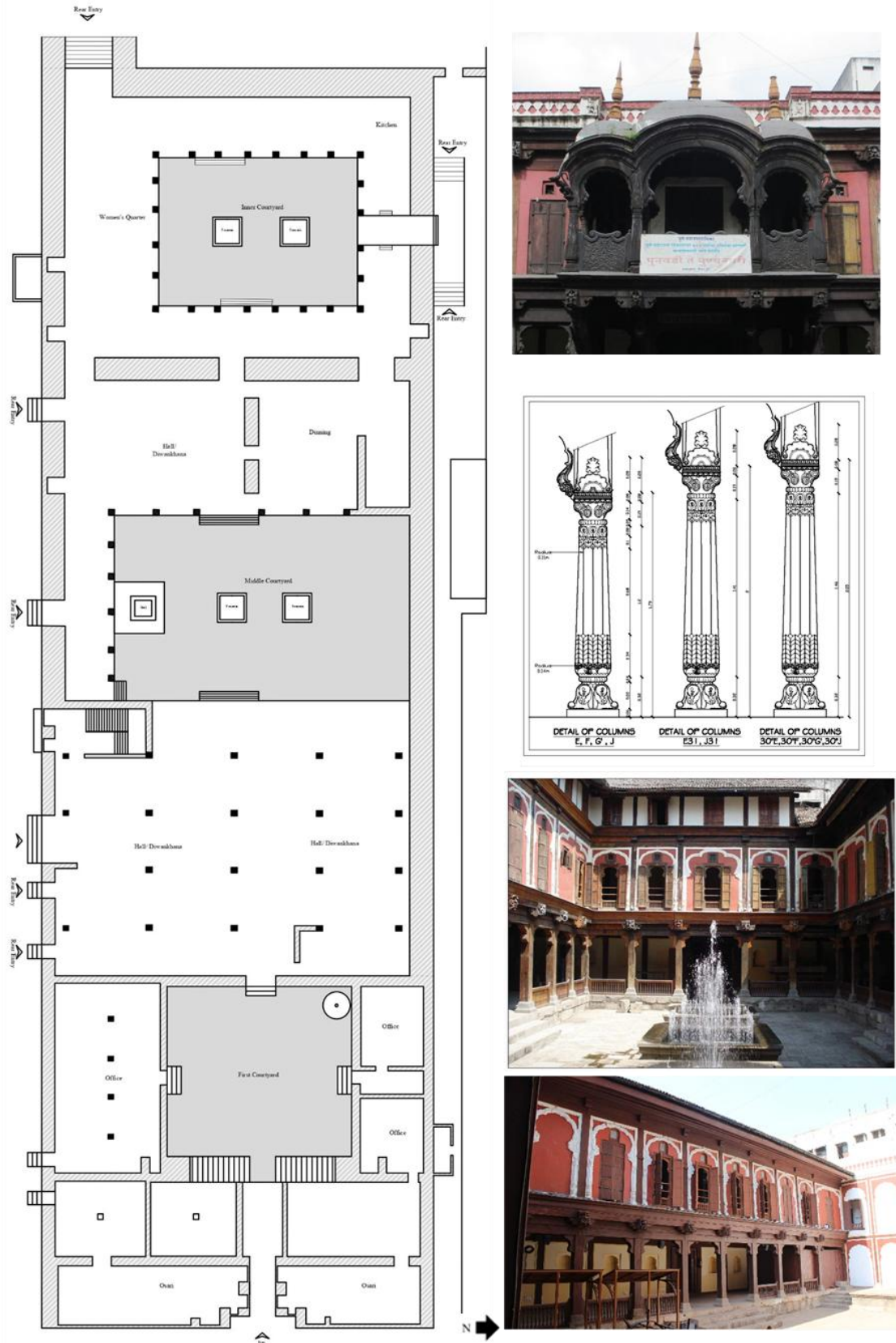**Figure 4**. Typical Plan II, Courtyard, Tulsi Vrindavan/ Basil Plant, and Swing (Source: Authors)

Figure 5. Figure 5:Vishrambaug Wada at Pune, Maharashtra, India and the details of entrance, columns, fountains, and courtyard (Source: Authors)

4.2 Architecture of House in *Konkan* region of Maharashtra

The Konkan region is located in western Maharashtra lies in the west coast of India. The weather is humid and warm, and the monsoon season has heavy rainfall. Small clusters of communities known as '*Wadis*' are strewn across undulating swaths of hilly terrain (Figure 6). The architectural style of Konkan houses reflect their extrovert-attitude. Houses in this region are surrounded by larger open spaces. They prefer a well-protected, dry, and cool room due to their climatic conditions.

Figure 6. Glimpses of Konkan (Source: Author)

In *Konkani* houses, the centre core, i.e., *Brahmasthan* of the house, is known as *majghar*. which is an inner room, served as a multipurpose private zone. The *majghar* is usually dark and cold, with a network of rooms around it. It was an inner core that needed security and heat insulation, where grains are stored (Dengle, 1998). *Konkan* houses have small plots of land where fruit trees are grown and harvesting their crop is the main function of Konkani households. These activities necessitates a large amount of space, workers, and storage. The design of the *konkan* house therefore, depicts agrarian requirements. The surrounding ground is usually terraced to accommodate outdoor activities which are typically carried out by the household, including the servants. Houses are located in such manner that all the terraces could be viewed from there which is surveillance tactics. It is observed that cattle sheds and separate storage rooms are constructed on larger properties (Figure 7; Figure 8). People stay at home during heavy monsoon rains, whereas after it ceased, their houses are mostly used for meals. All other activities are carried out outside the house. They also engage in maritime activities seasonally. Preparations for a season are required, which influence both festivals and daily life. All of these factors point to a house design that values the outdoors as much as the indoors. This concept also applies to the clusters of dwellings since open spaces between and behind the houses are

important and must be considered when positioning and planning individual dwellings which concentric plan complement indoors with outdoors.

4.2.1 Architectural Elements

Angan is the open space next to the house which is built on a terrace. A *mandap* is a temporary pavilion covering the *angan* which may be dismantled after a festival or special event. (Figure 9). Entry to the house is from East side. Toilets are provided outside the main house for reasons of hygiene.
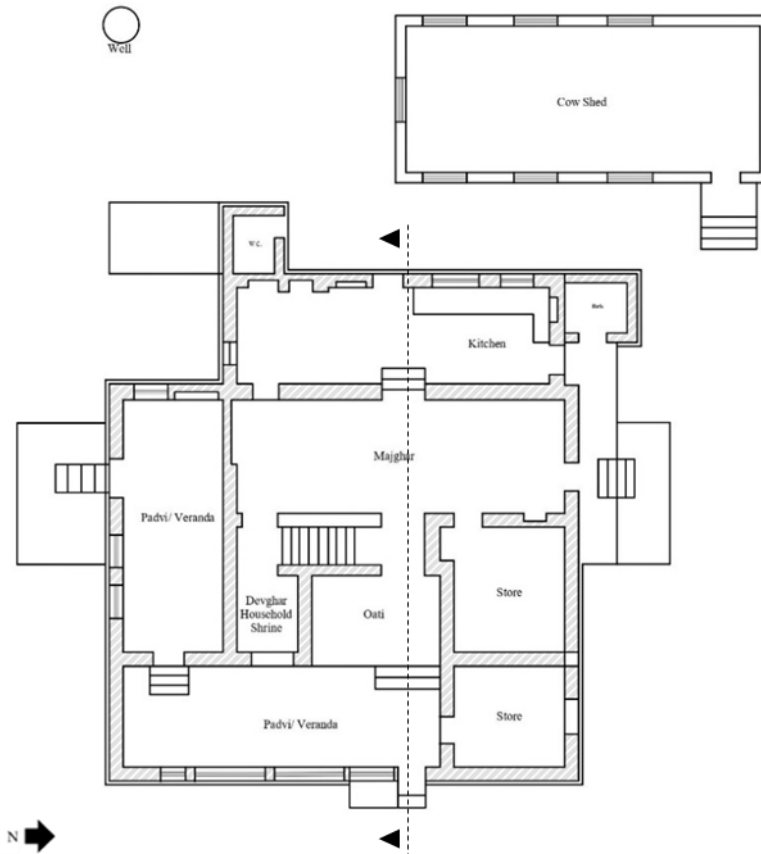

Figure 7. Ground Floor Plan of Paranjape House at Kelashi, Maharashtra, India
(Source: Authors)

Padvi- Veranda: *Padvi* comes after the *angan* which has vertical screen (Figure 9, Figure 10, Figure 12). This screen is an effective passive-cooling device. The screen cuts down the solar radiation on the surface of the walls which is further enhanced by roof overhanging all around the house.

4.2.2 Structural Details of Konkani House

The structural system for *Konkani* house and *Desh* House from Maharashtra are similar. They have basically timber frame-structure with slopping roof. *Konkani* house is essentially a ground-floor structure with an attic above. The walls are made of mud or laterite stone, both of which are locally available (Figure 12; Figure 13).
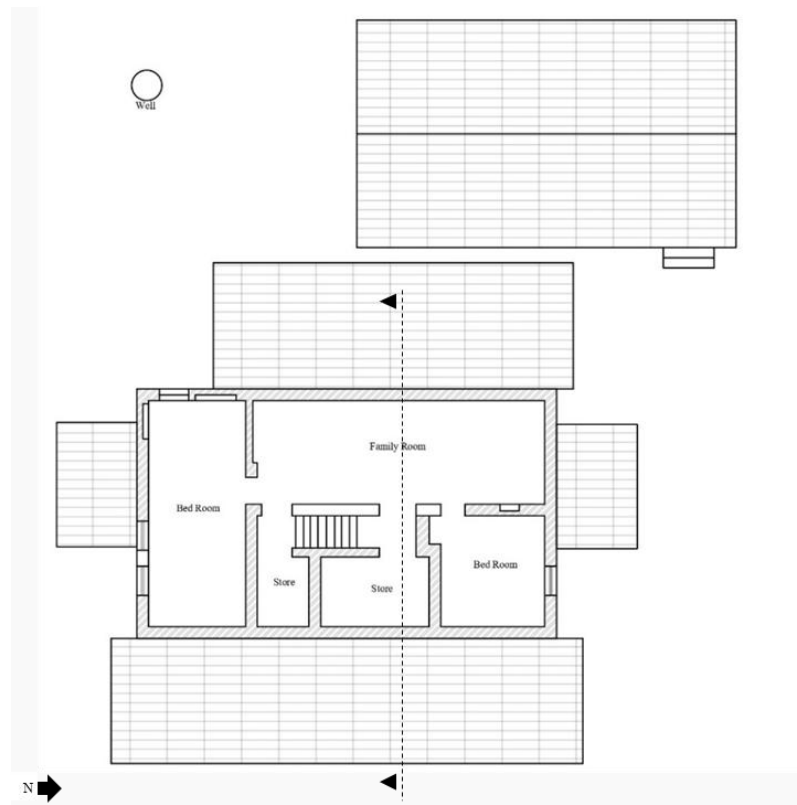
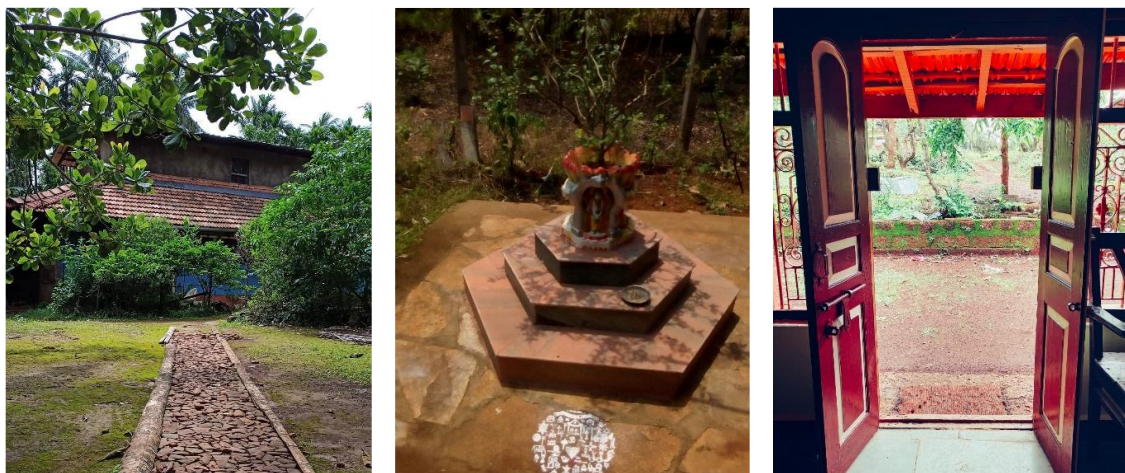**Figure 8**. First Floor Plan of Paranjape House at Kelashi, Maharashtra, India (Source: Authors)

Figure 8. Entry to the House; Vrindavan/Basil Plant; Entrance to House (Source: Authors)
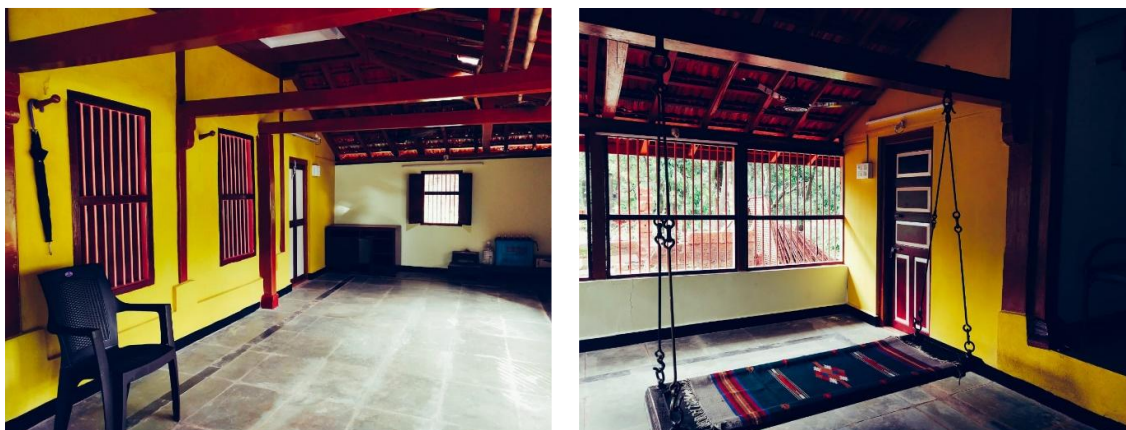
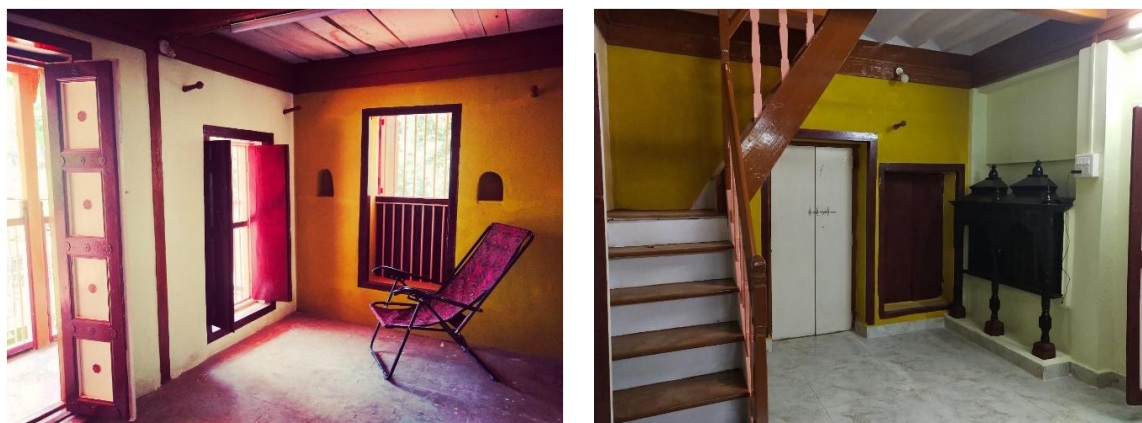**Figure 9**. Padvi – Verandah (Source: Authors)

Figure 10. Multipurpose Hall on First Floor; Staircase and Temple (Source: Authors)

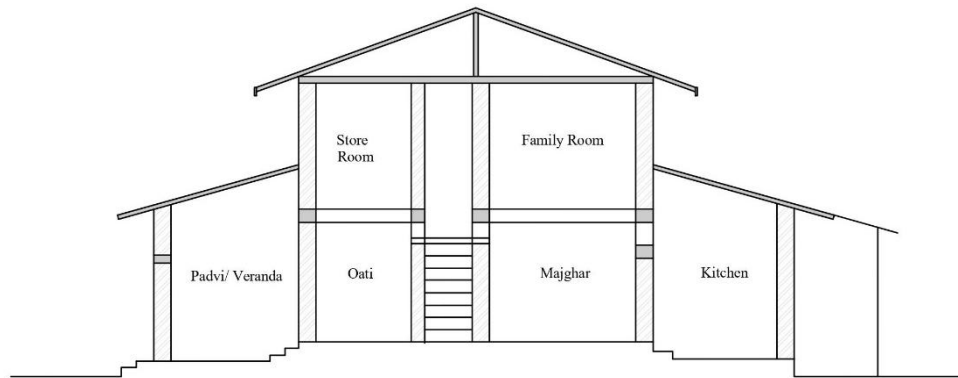**Figure 11.** Front Elevation of Paranjape House (Source: Authors)

Figure 12. Section of Paranjape House (Source: Authors)

5. Discussion and Conclusions

Vaastu Purusha Mandala guides the creation of a perfectly balanced environment that ensures improved health, wealth, and happiness. *Vaastu Purush Mandala* is based on scientific approach that relates to the sun and its' five essential elements (*panchabhutaas*), the earth's magnetic field, the earth's energy field, and the eight directions to create a healthy atmosphere for humans. The primary goal of *Vaastu Shastra* is to ensure that households are exposed to valuable rays of sunlight, even if they are inside the house all the day which takes care of the sterilizing effect of ultraviolet rays, especially in the morning. The approach in terms of construction techniques and use of available building materials in the region for building the house is quite sustainable.

The architectural designs of the houses from the Pune Division and the Konkan have a preference for modular geometry of square or rectangle. The most important part of the house is the centre, which is known as *Brahmasthan*. It is the *kunda* where life begins and where the lord of creation resides. Hence, *Konkani* house has a *majghar* in the centre, whereas the Pune Division- *Desh* house has an open to sky courtyard. Thus, one has a courtyard in the centre, while the other has the *majghar* the most important inner room which are manifestations of *Vaastu Purusha Mandala*. These two houses from different climatic, topographical, and cultural context of *Maharashtra* are the two different expressions of the same principles. These planning principles of *Vaastu Purush Mandala* although seems to be rigid architectural expression, they produce performing architecture best suited to the Indian ethos, social, cultural, sustainable and environmental contexts.

From the analysis, it is evident that *Vaastu Shastra's* principles are quite relevant in contemporary context, if applied with scientific rationality. It is therefore unwise to ignore the wisdom contained in the traditional architecture adequate consideration and research. We need to value the traditional knowledge system without Colonial obsession and western worldview. The study thus proves the relevance of adequately empowered professionals who can convert the concepts of *Vaastu Shastra* into reality rather than conserving the past as nostalgia.

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