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1 The Geometric Construction of Traditional Settlement Space in the Ancient Village of Tenganan Dauh Tukad Karangasem Bali

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Abstract: The spatial arrangement of the Tenganan Dauh Tukad (TDT) settlement is perceived as the acculturation of Bali Aga (Old Bali) and Java Hindu Kingdom of Majapahit traditions. Accordingly, this study identifies the concepts, values, and philosophy behind residential space arrangement. Thus, this study enacted an interpretative approach. Data analysis was performed qualitatively in residential settings, i.e., culture, behavior, and spatial. This study demonstrated that the geometric construction of residential space in the TDT was formed in three manners. First, it blended the existing philosophy of harmony between the macrocosm and microcosm concepts. Second, the spatial arrangement of the TDT settlement adhered to the inward-oriented concept, with the village road as the central axis of village orientation. Third, cultural acculturation between the Bali Aga and Majapahit caused alterations in the settlement's spatial orientation. This article contributes as a reference in creating traditional residential spaces that must consider socio-cultural aspects dynamically.

Keywords: spatial order; traditional settlement; geometric construction; Tenganan Dauh Tukad traditional village Bali

1. Introduction

The spatial order of settlement in the traditional community is established by the community's belief system regarding rituals. The objective is to achieve a spatial order harmonizing with nature and the environment. The conception of harmonious living is preserved primarily through rituals (Triguna, 2018). The spaces created are deemed valuable and meaningful considering their respective necessities, ways of life, and perspectives on the environment they inhabit. The spaces shaped are utilized to accommodate daily

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activities (supportive environment). They are customarily cultural spaces that facilitate human life cycles (rites of passage), such as birth ceremonies, puberty or adolescence, marriage, death, and various other events in life (Sasongko, 2005). Accordingly, traditional settlements manifest the cultural systems and values that evolve in the community. The value system is later inherited from generation to generation, shaping the cultural identity (Agusintadewi, 2017).

Two principal organizational systems emerge in traditional settlements: geometric and cosmological arrangements. Geometric arrangements correspond to ritual aspects, while cosmological arrangements are associated with the universe's creation sources (Antariksa, 2018). Subsequently, local culture is invoked to elucidate the meaning of the organization or geometric space in a settlement in the context of place and space (Sasongko, 2005).

Correspondingly, traditional Balinese communities organize their settlements by honoring nature and its creator. The spatial arrangement of their settlements is typically related to geometric shapes, which are linked to the direction of human cultural orientation toward their environment. For example, the *kaja-kangin* (northeast) direction is sacred, while the *kelod-kauh* (southwest) direction is profane. Moreover, it is also reported that aspects of belief or religion include symbolic and cosmological aspects that can affect the shape, geometry of the plan, spatial arrangement, residential orientation, and the prevailing conditions surrounding the residential environment (Agusintadewi, 2003).

Traditional settlements in Bali are commonly distinguished into two types, i.e., Bali Aga (Old Bali) and Bali Dataran (Java Hindu Kingdom of Majapahit descendants) settlements. The Bali Aga community is regarded as the first to arrive in Bali, typically settling in Bali's mountain villages and remaining relatively unaffected by Majapahit traditions. Meanwhile, the Bali Dataran community is viewed as a new group bringing in the Majapahit influence, predominantly residing in the urban areas of Bali (Reuter, 2005). Bali Aga settlements are localized in mountainous areas with a linear settlement structure stretching from north to south. The concept of linear settlement spatial arrangement leads to open space in the center of the settlement (Parimin, 1986). The spatial structure of the settlement is orientalized to the dichotomous sacred-profane space axis locally called *luan-teben* (upstream and downstream). The spatial arrangement of Bali Aga settlements is characterized by a stepped stone structure with a lower height heading south. The settlement's spatial arrangement is then adjusted with the degree of sanctity, where the north is a place for sacred objects, i.e., temples and holy places. The southern part, a place that is considered profane, is then placed as the cemetery and garbage dumps.

Contrary to the Bali Aga type, the Bali Dataran settlement is influenced by the Majapahit tradition, located in the plains, the most urbanized area in the

present Bali. The settlement structure is grid-shaped, with the village center between the north-south and west-east road crossing. These two roads' crossing points are designated as the village center, where virtually all public activities are organized. The spatial organization of village settlements for Bali Dataran is considerably more complex (Putra, 2021). There is a division of the area in terms of its sacredness into nine zones, locally known as the *Sanga Mandala* concept. As sacred areas, the Pura Desa and Pura Puseh or *puri* occupy the *kaja kangin* (northeast) zone, *bale banjar* occupies the *kaja kauh* (northwest) zone, the village square occupies the *kelod kangin* (southeast) zone and the *kelod kauh* (southwest) zone is reserved as the village center. The village cemetery is placed outside the village in the *kelod* or *kauh* direction, a low-value zone (*nista*). The layout of housing and service buildings is harmonized with natural conditions and local customs. The area around the intersection is a common area that doubles as a social facility (Budihardjo, 1985; Dwijendra, 2003; Putra, 2021).

Tenganan Dauh Tukad is a traditional settlement community in Bali featuring Bali Aga characteristics. When considering the structure and settlement pattern, Tenganan Dauh Tukad aligns with a stepped settlement structure with higher leveling in the northern part of the village. This pattern resembles other Bali Aga villages, i.e., Penglipuran, Bayung Gede, and Sekardadi in Bangli Regency. Tenganan Dauh Tukad is an integrated settlement complex with Tenganan Pegringsingan. The highlight is that although these two villages are nearby, the Tenganan Pegringsingan continues to enforce strict rules as a Bali Aga community. Conversely, the Tenganan Dauh Tukad community has been dynamically incorporating the traditions and culture of Bali Aga and Bali Dataran, which Majapahit traditions have influenced.

Throughout its history, Tenganan Dauh Tukad experienced cultural acculturation with Majapahit traditions caused by the invasion and subjugation of Bali Aga territories by the Gelgel Kingdom as an affiliate of the Majapahit Kingdom (Parimatha, 2006). The series of events allegedly contributed to the structure of beliefs, social values, and the spatial arrangement of settlements. Tenganan Dauh Tukad is currently a Bali Aga community experiencing a cultural mixture between Majapahit and Bali Aga traditions, leading to the unique spatial arrangement of its settlements due to cultural acculturation between Bali Aga and Bali Majapahit. An example of the influence of the Majapahit tradition is the establishment of Pura Dalem Majapahit in Tenganan Dauh Tukad as solid evidence of the hegemony of Majapahit power in Bali represented by the Gelgel kingdom at that time and the altered spatial order of existing settlements (Sri & Dauh, 2021).

Drawing from the elaboration, the novelty of this study is conceptualized in light of the context of cultural acculturation between Bali Aga and Bali

Dataran in the settlement of Tenganan Dauh Tukad, where the traditions and culture remain partly influenced by the Bali Aga tradition. Meanwhile, some are assimilated into the Majapahit tradition typically observed in Bali Dataran settlements. With some modifications, the process of acculturation and assimilation of the Balinese Aga and Majapahit cultures is then presumed to have created new traditions and values, i.e., in the community's belief system, ceremony implementation, the daily life system and up to the orientation and concept of the spatial arrangement of the settlement.

This study attempts to scrutinize geometric constructions of basic concepts, value systems, and philosophies that underpin the present spatial arrangement of settlements in Tenganan Dauh Tukad. The cultural alteration of the Bali Aga community affected by the Majapahit tradition also implicates the spatial arrangement of their settlements.

2. Literature Review

The existing studies on the spatial pattern of traditional Balinese Aga villages are utilized as references in this study. A study conducted by Arimbawa dan Santhyasa (2010) reveals that the basic concept of the spatial arrangement of the Penglipuran settlement in Bali is rooted in the pragmatic exploration of the life-death duology. The symbolic concept is grounded in the *Rwa Bhineda*, which is subsequently interpreted into the dualistic concept of the earth axis (*kaja-kelod* or mountain-sea) and the religious axis (*kangin-kauh* or sunrise-sunset). The crossover between the earth axis and the religious axis practically generates a territory division called the *Panca Mandala* concept, which divides the village space into five spatial segments adhering to the level of sanctity.

Agusintadewi's study (2017) on Bali Aga settlements in Sekardadi, Bangli Regency, demonstrates three spatial values by elevation. The spatial pattern of the settlement complies with the concept of *Tri Hita Karana* (*parahyangan*, *palemahan*, and *pawongan*), *Tri Mandala* (*utama*, *madya*, and *nista*), and *hulu-teben* (high-low). This concept manifests respect for the ancestors, with Mount Batur located to the north or *kaja* as the center of the village's orientation. In Kesiman, Denpasar studies spatial patterns in Bali Dataran settlements at a different locus Santhyasa (2007). This study is geographically focused on a traditional village in the urban area of Denpasar. Philosophically, the layout of the spatial order of the Bali Dataran village is believed to reflect the influence of Majapahit culture. This study indicates that the spatial arrangement of Kesiman is patterned after the *catuspatha* or *nyatur desa*, with the village intersection or *pampatan* as the village's orientation point. The spatial arrangement of Kesiman is primarily derived from the concept of *sanga mandala* with nine different spatial values.

Another study on the principles of proportion and geometry in traditional building complexes and settlements is found to be associated with the universe (Eltrapolsi et al., 2022; Chen et al., 2021). In principle, the scale represents nature converted into the size of humans and their environment in harmonization. The result is an ideal and aesthetic settlement pattern that fits the character of its inhabitants. The order of the traditional building environment exhibits high congruence at the individual and city building levels. It is achieved by determining the center point as the epicenter of the geometric axis of space that serves as the axis or reference point in organizing the traditional building and settlement environment.

3. Method and Theory

3.1 Method

This study was exploratory by employing an interpretative paradigm to expose the meaning and reality where the subject of the study is naturally, then interpreting it further according to the researchers' subjective understanding. Data was collected through observation and in-depth interviews using a qualitative methodology with inductive data analysis. The determination of the sample was purposively selected from the figures and parties deemed knowledgeable about the context and location of the study in Tenganan Dauh Tukad.

In-depth interviews were conducted to comprehend and explore the basic concepts, philosophical foundations, value systems, and beliefs adopted by the people of Tenganan Dauh Tukad in arranging their residential environment. Interviews were performed to investigate the historical background of the formation of settlements chronologically from the early Bali Aga to the penetration of Majapahit influences, and the cultural acculturation processes that ensued.

This study performed observations on the object of observation in three contexts. First, the actor is the cultural setting to identify and investigate the beliefs and social system of the community in the study location. Second, activity is the behavioral setting to recognize and map community activities in connection with their settlement culture. Third, the place is a spatial setting or container for socio-cultural interactions, i.e., observing the spatial arrangement of traditional settlements in Tenganan Dauh Tukad as a realization of the two objectives of the study.

The study data was processed and analyzed based on the overall stages and techniques of data collection. The data processing stage began with data reduction by selecting, simplifying data, summarizing, or grouping the types of data emerging from written notes in the field. The data obtained were classified

depending on the formulated study variables, i.e., 1). The cultural setting-belief and social community systems in Tenganan Dauh Tukad, 2). Behavioral setting-traditions or customs, social relations, and kinship in the family, and 3). Spatial setting-spatial order or spatial pattern of settlements.

The variable identification stages (1) and (2) aim to familiarize the conceptual basis, values, and philosophy of spatial culture possessed by the Tenganan Dauh Tukad. Variable (3) is the final goal of the study and is intended to discover the spatial order of settlements formed from variables (1) and (2).

3.2 Theory

Rapoport's (1977) theory of setting the main element of neighborhood formation was employed as the cornerstone of the study's cornerstone. The setting centered on elements relating to interconnected human activities. Human activities are linked to four main things: the actor, the type of activity, the place, and the time of the activity, i.e., the actor, the type of activity, the place, and the time of the activity. Meanwhile, space can be constructed by scaling the individual to a more comprehensive scope, i.e., the residential environment. The linkage between humans and their environment is dynamic. Alterations in human activities are expected to change the spatial order or the significance of the space itself. Human activities in the context of behavior are dictated by their worldview, beliefs, values and norms, and way of life. This aspect is then referred to as the psycho-cultural context, where human activities in the shape of behavior will significantly affect the setting in the form of space or a residential environment.

Furthermore, Rapoport's theory (1977) was elaborated on by Habraken (1978) and Turgut (2001) regarding the spatial culture of settlements. At a more practical level, Habraken (1978) suggests that the principal elements defining the settlement pattern (housing pattern) comprise three aspects. First, the spatial system is linked to the spatial organization. This system involves space, spatial orientation, and spatial relationship patterns. Second, the physical system is concerned with constructing and using materials in constructing a physical building. Third, the stylistic system is associated with features covering the facade, the shape of doors and windows, and other elements inside and outside the building. The model system is derived from Habraken's findings that the order of the settlement is a demonstration of social agreement, where the shape of the physical environment of the settlement is established from the unity of the system. Nevertheless, in this study, the primary focus is confined to the context of the spatial system. As a complement, Turgut's (2001) theory was applied as a systematic framework for the components of settlement culture. Turgut mentions four elements that constitute establishing settlement culture:

cultural, behavioral, spatial, and socio-economic settings. Turgut points out that these four settings comprise a settlement (housing) pattern.

In connection with the settlement culture, the Balinese community refers to the psychoacoustic concept of Hindu-Balinese cosmology as its spatial foundation. Cosmology describes the relationship between space and time to the genesis of the creation of the universe. Specifically, Hindu cosmology centers on the creation of nature, including its contents and development, by positioning God, Ida Sang Hyang Widhi Wasa, as the divine spirit and origin of the universe (Pusparani et al., 2020). In the concept of the Hindu psycho cosmos, the five elements of the creation of the universe are materialized in each soul as a smaller entity, meaning that the elements existing in the universe are embodied in each spirit (Pusparani et al., 2020). In the view of Hindu cosmology, these two realms must be in equilibrium to achieve the religious goal of *moksha* or liberation.

In conjunction with the cosmological knowledge of Balinese Hindus, efforts to synchronize the elements of *Panca Maha Bhuta* (The five elements that constitute the universe and all its contents, i.e., solid, liquid, light, air, and space) are performed through sustaining the equilibrium between the universe or *Bhuana Agung* (macrocosm) and humans or *Bhuana Alit* (microcosm). In the concept and philosophical view of religion, Balinese Hindus consider the five elements of the *Panca Maha Bhuta* equal to the elements that constitute the universe. In the concept and religious philosophical view of the Balinese Hindu community, the simplest way to reconcile is to replicate the reenactment of the creation of the universe by the Gods. The concept is utilized as a pattern, which means that the world must be recreated following the concept of the creation of the universe. In the Bali Aga community, for example, the village settlement environment at the level of residential buildings is regarded as a miniaturized manifestation of the universe (Dyah Maharani, 2021). Accordingly, it has driven the Bali Aga community to transpose the values they embrace into their residential environment. Besides, their orientation toward nature leads to their settlements' behavior and spatial arrangement being significantly adaptive to the surrounding environment.

The Balinese beliefs indicate that humans inhabit a geometrically shaped world and occupy a space at the center. In this position, humans are perceived as requiring an orientation point to ascertain their relative position or location in the universe. The appreciation of a "center of the world" or centrum axis is a human appreciation as an orientation or self-orientation toward the surrounding environment (Agusintadewi, 2003). In megalithic cultures, notably in the Bali Aga community, this self-orientation is integrated into worship rites symbolized by menhirs (a tall upright megalith made by standing stone), step pyramids (*punden berundak*), trees, the moon, mountains, and others (Runa, 2018).

In the general view of the Balinese community, the direction of north-south orientation, sacred-profane, upstream-downstream, is directed to the position of mountains and oceans. The mountain direction is called *kaja* (north), *suci* (sacred), *luan* (main), *utama* (primary), and the ocean direction is called *kelod* (south), *tidak suci* (profane), *teben* (downstream), *nista* (bottom). Because the island of Bali is dissected by mountains from east to west, which divide it into two parts, i.e., south Bali and north Bali, the mountain-ocean guideline causes distinction. The mountainous complex in the middle of the island of Bali leads to the pivot point of the Balinese center, oriented to the center of the Balinese community in south and north Bali. The direction of the *kaja* as a sacred area for the south Bali is in the north, while the *kaja* as a sacred area for the north Bali is in the south (Figure 1).

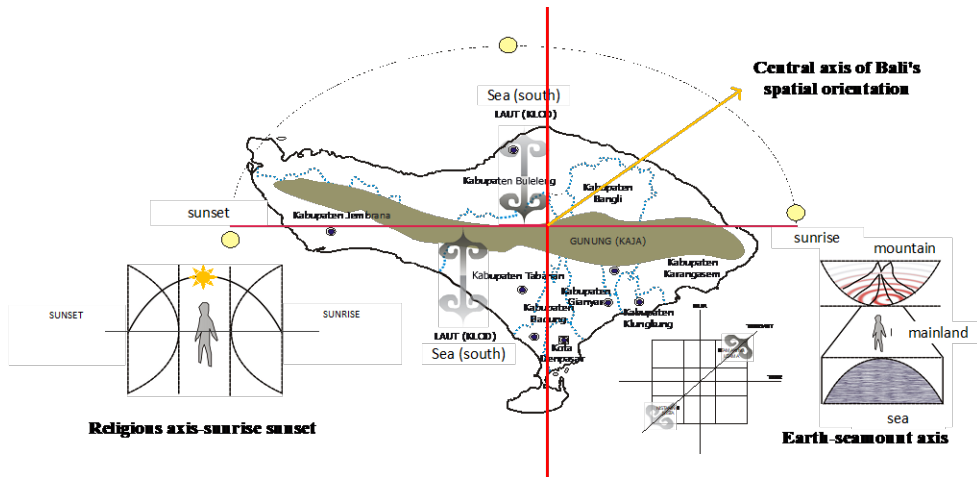


Figure 1. Orientation Point and Centrality of the Balinese Hindu Culture (Source: Authors, 2022)

4. Results and Discussions

4.1 Cultural Setting of Tenganan Dauh Tukad Community

Administratively, Tenganan Dauh Tukad is part of the Desa Dinas Tenganan, Manggis District, Karangasem Regency, Bali. Geographically, the village is located in the eastern region of Bali Province. It is about 17 kilometers from Amlapura, the capital of Karangasem Regency, and about 65 kilometers east of Denpasar. Tenganan Dauh Tukad is a mountain village typology considering its location (Figure 2).

When viewed from the aspect of geomorphology, Tenganan Dauh Tukad is characterized as a mountainous area with a rocky soil structure. The northern part is elevated toward the south, resulting in a linear village morphology

stretching from north to south. In the east of the village is the Tukad Pandek, a river that becomes the estuary of a water source located in the hills to the west. While the village is characterized as a mountainous village, Tenganan Dauh Tukad is situated close to the southern coastal area of Bali, which is only a distance of 5 kilometers from the Candidasa beach tourism area.

Tenganan Dauh Tukad's settlement was initially identified as a manifestation of culture with prehistoric traditions or Bali Mula, which began far before the Bali Aga and Bali Majapahit cultures arrived in Bali. Bali Mula are the Austronesian descendants from the Megalithic Age. Initially, these megalithic traditions predominantly influenced the Balinese community's worship rites and belief systems. A stone altar was made for worship, i.e., menhirs, stone pillars or monuments, steep pyramid buildings, stone statues, and dolmen or altars for offerings (Wikarman, 1998). Worship is practiced to the spirits of ancestors believed to be protectors. The ancient Balinese or Bali Mula also worshiped nature as an integral part of the universe. Any circumstances in the universe were also believed to affect human life and livelihood. The settlement structure with stone steps and the leveling getting higher to the north in the Tenganan Dauh Tukad settlement was considered a legacy of megalithic civilization (Parimartha, 2006).

The arrival of Rsi Markhandeya in the 7th century allegedly introduced a new belief to Bali, i.e., Hinduism. Rsi Markhandeya and his disciples from Mount Raung became known as *Wong Aga*, established a pasraman, and promoted Hinduism in Bali (Reuter, 2005). The Hindu teachings spread from one area to another, notably in the mountainous areas as the center of the early Balinese settlements. Some followers of Rsi Markhandeya are then believed to have settled in the villages that were traveled and mixed with the Bali Mula. The descendants of the mixing of *Wong Aga* from Mount Raung with the Bali Mula were later known as the Bali Aga people. The community's belief system began to evolve with deities or Gods' worship rites alongside the long-standing worship rites of nature and ancestors (Reuter, 2005; Dharmayudha, 1995; Pitana, 1994).

In the Tenganan Dauh Tukad community, the ritual of worshipping the Gods is then devoted to the worship of Indra under Hindu mythology. Tenganan Dauh Tukad is believed to be a gift from Indra to the *Wong Peneges*, who succeeded in finding Indra's favorite horse. In the performance of their cultural rites, the TDT community includes many ceremonies related to the symbols of the worship of Indra as the God of War. Among the traditions that characterize Indra's sect is *Mekare-Kare* or the Pandan War (Purawati, 2021).

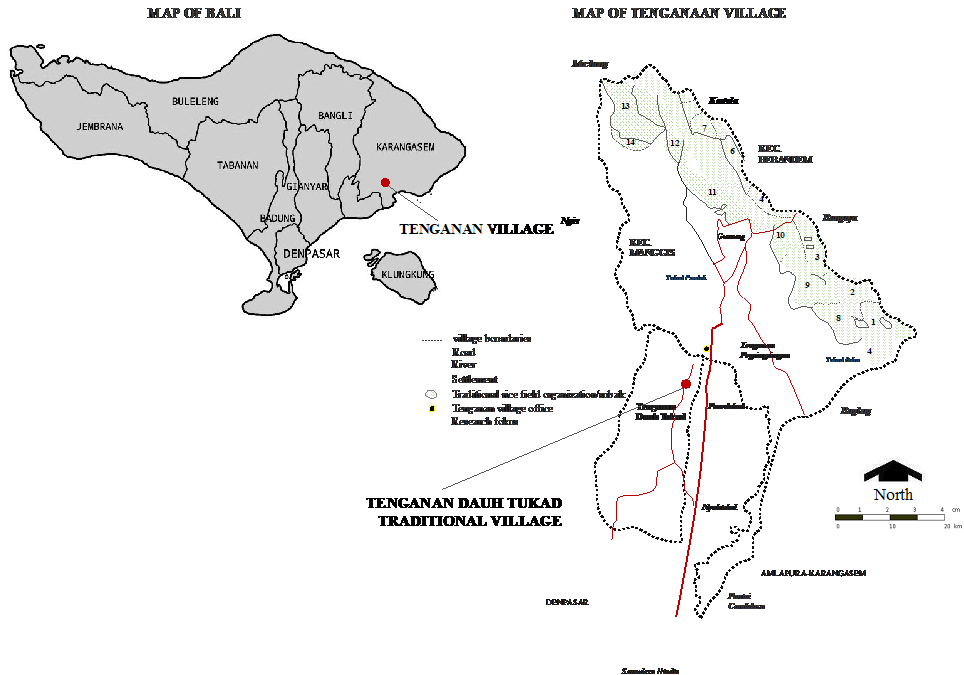


Figure 2. Tenganan Dauh Tukad Territory (Source: Authors, 2024)

The expansive culture and traditions of Majapahit Hinduism in Bali are credited to have evolved after the conquest of Balinese kings by the Majapahit Kingdom. The hegemony of Majapahit’s power and dominance commenced with conquering the Bali Aga tribe, which had inhabited Bali before Majapahit. The Bali Aga tribe is regarded as a challenging tribe to be conquered by Mahapatih Gajah Mada, who aspired to unite the archipelago, including the Bali region (Sidemen, 1983). It affected Bali both culturally and politically. Bali is perceived as a continuation of Hindu-Javanese culture, especially in the Bali Dataran community. The distinctive feature of Majapahit culture dramatically influences the belief system and religion of the Balinese people, especially Hinduism. Moreover, in the social structure of community life, the classification of colors or groups according to the population’s livelihood began to be identified. During Majapahit’s control, Balinese Hindu society was divided into four classes: *brahmana*, *ksatria*, *wesya*, and *sudra* (Maulana & Putra, 2021).

Tenganan Dauh Tukad also experienced a similar circumstance. After the conquest by the Gelgel Kingdom - at that time, an annexation of the Majapahit kingdom - the influence of Majapahit Hinduism is credited to have penetrated through the arrival of followers or messengers from Ida Dalem Gelgel. They were assigned to reestablish the village after the wars. Following the end of the reign of the ruler of the region, the community of Tenganan grew and evolved

more heterogeneously (Parimatha, 2006). Many migrants lived and settled in the village area. At this time, the Tenganan Dauh Tukad community began to mix with residents from the outside. Rites of worship evolved with a more complex belief system, i.e., the belief in three manifestations of God as creator, sustainer, and dissolver, commonly referred to as the *Tri Murti* or trinity. The symbolic manifestation of this trinity worship in the traditional settlements or villages is then characterized by three *kahyangan* temples in each area or village of the traditional village. The practice of ceremonies also began to experience modifications and additions of Majapahit cultural elements, i.e., the rite of cremation, the presence of priests in ceremonies from the *brahmana*, and the performance of other ceremonies similar to those in the Bali Dataran community.

In the practice of tradition, cultural customs, and religion, it is noticeable that the community of Tenganan Dauh Tukad has a blended belief system, i.e., the acculturation of belief in the pre-Hindu Majapahit tradition and the Hindu Majapahit tradition (Figure 3). The pre-Hindu Majapahit tradition is a prehistoric megalithic tradition characterized by Bali Mula beliefs when the community developed from the worship of nature and ancestors transformed to the belief in the worship of Indra as the God of War.

Subsequently, this belief system evolved due to the penetration of the Majapahit influence. The community's belief system evolved with more worship of the trinity of Brahma, Vishnu, and Shiva. Consequently, although it is characterized as a Bali Aga village, Tenganan Dauh Tukad also has three *kahyangan* temples, i.e., Pura Puseh, Pura Desa, Pura Dalem, and Pura Bale Agung, likewise the villages in Bali Dataran that Majapahit Hinduism characterizes. However, in the social system, the Tenganan Dauh Tukad community does not recognize the stratification or layering of society based on color commonly practiced in Bali Dataran. However, if traced, many residents were previously members of a particular caste or *soroh*. Nevertheless, they were united into one class once they settled in the village.

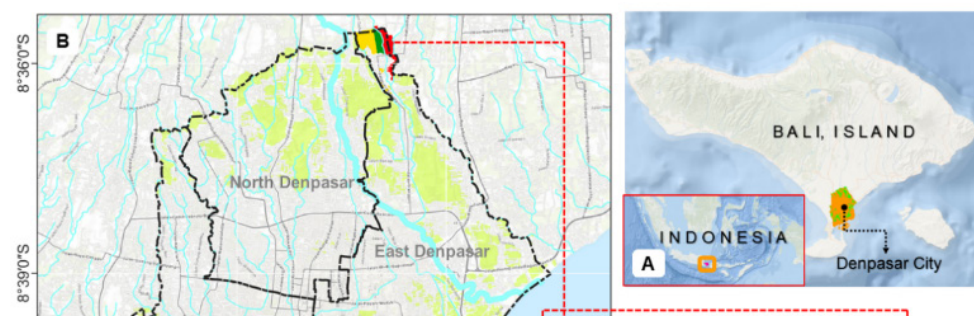


Figure 3. The Evolvement of the Belief System in the Tenganan Dauh Tukad Community (Source: Authors, 2022)

4.2 Behavioral Setting of Tenganan Dauh Tukad Community

Cultural space in Tenganan Dauh Tukad settlements is identified based on *aci-acian* or the pattern of ceremonial activities. The series of ceremonies in Tenganan Dauh Tukad symbolizes the journey of human life from birth to life and the afterlife. This pattern of ceremonial activity is alternatively known as *usaba* (ceremony) and is performed monthly at the turn of the *sasih* (month) in the Tenganan Dauh Tukad community calendar. The first month in the calendar of the Tenganan Dauh Tukad community usually commences in February or March. It is identified as *Sasih Kasa* or the first of the month. The ceremony marks the beginning of human life on earth. This series of *usaba* is a ceremony commemorating the mythological story of the cycle of life from birth as a *rare* (child) to adolescence or adulthood. The culmination of this series of ceremonies is traditionally implemented in *Sasih Karo* (the fifth month), around July, locally known as *Usaba Sambah* or *Mekare-Kare* or more popularized as the Pandan War tradition (Photo 1). *Usaba Sambah* is a story scheme about the life cycle from infancy, puberty, to adulthood. The validation procession culminates in the *Aci Usaba Sambah* where the village youth are deemed to have matured in age and are primed to join the indigenous community.



Photo 1. *Mekare-Kare* or The Pandan War Tradition at Tenganan Dauh Tukad (Photo: Cokorda Putra, 2019)

The *Usaba Sambah* tradition is a series of ceremonies intended to legitimize the age of puberty and encourage young men and women to join the indigenous youth community. The procession is typically termed the *Meteruna* or *Medaha* procession, meaning the transition into adolescence. The series of *Usaba Sambah* then climaxed with the Pandan War ritual or *Mekare-*

Kare as a tribute to the young man who was about to become an adult. It is regarded as a process of internalization, learning, and training for young men to enter adolescence to be considered ready to participate actively in the indigenous community in Tenganan Dauh Tukad (Ngurah et al., 2021). *Aci Usaba Sambah* is typically centered at Pura Bale Agung along with several other core locations that become supporting places, i.e., *bale banjar kaja* (north meeting hall) and *bale banjar kelod* (south meeting hall). Besides, the *rurung*, or the village's main road that stretches linearly from north to south, is also the central place as a passage for the fulfillment of this ritual.

The ceremonial rites can be visualized in the central core spaces, core spaces, supporters, and cultural corridors predominantly utilized in ritual practice. Tenganan Dauh Tukad community is convinced that the circumstances determine human life or period each year, also known as *sasih*. *Sasih* is the year of 12 periods, where changes like the moon in each *pengunyan sasih* lead to seasonal transitions that have consequences for the joys and sorrows of human life. *Pangunyan Sasih* is the arrival of a particular month to another month, resulting in an alteration of the nature of the moon that causes seasonal changes that will also impact the joys and sorrows in this life, including in agriculture and employed by fishermen and others. Consequently, the Tenganan Dauh Tukad community organizes ceremonies or *aci-acian* at each *sasih* cycle, intending to balance or harmonize space, time, and nature with its environment to ensure that the *sasih* influences their lives favorably. It was mentioned that at least the Tenganan Dauh Tukad community organized the *aci-aci* 12 (twelve) times with 52 types of ceremonies in a year (Ardika et al., 2006).

Scrutinizing the stages of the ceremonies in Tenganan Dauh Tukad and their symbolic meanings, it can be concluded that the series of *aci-acian* ceremonies represent the cycle of human life (rites of passage) from birth and life to the afterlife. Every *sasih* turn, rituals, and ceremonies are performed to commemorate each phase of life of the community. In the fifth *aci* phase, the *Aci Usaba Sambah* ceremony is held as the climax of life (*menek kelih* or puberty), and the funeral ceremony in *Sasih Sadha* (The 12th month in the Balinese calendar consists of 35 days). The cycle of life, if studied interpretatively, depicts the philosophy of *Nemu Gelang*, where, in essence, everything in nature undergoes a cycle to achieve equilibrium. Likewise, humans experience a similar cycle of birth, life, and the afterlife.

4.3 Spatial Setting of Traditional Settlements in Tenganan Dauh Tukad

The Tenganan Dauh Tukad community is convinced that human life must be harmonious and balanced. The harmonious concept is attributed to the philosophy that humans, as microcosmos or *Bhuana Alit*, are part of the

universe, macro cosmos, or *Bhuna Agung*. At a practical level, this ideology establishes the conception that humans (as part of the universe) are responsible for synchronizing their lives with the state of their environment. Anything that occurs in the *Bhuna Agung* will significantly contribute to human life as *Bhuna Alit*. As the materialization of the *Bhuana Agung* for its inhabitants and in its existence as *Bhuana Alit*, humans are obliged to harmonize themselves with the *Bhuana Agung*, i.e., their homes, villages, settlements, the earth, and the universe. These settlements are considered ‘living’ and are consequently credited with the ability to protect and bring prosperity to their inhabitants. This ability is ascribed to the metaphysical existence (*niskala*) of the village ancestors, who continuously interact with the villagers’ physical existence (*sekala*) through the implementation of various rituals.

The spatial arrangement of settlements in the Tenganan Dauh Tukad community is vertically derived from an appreciation of the cosmic balance between the realm of the Gods, the realm of humans, and the realm of *butha* or spirits. Horizontally, this concept of balance is presented in harmonious relationships with fellow humans and the surrounding environment. The psycho-cosmic concept is manifested in the spatial arrangement of the settlement as a village *kahyangan* temple with all rituals arising from the interaction between the three worlds or *Tri Loka*, i.e., *Bhur Loka* (lower realm), *Bhuwah Loka* (middle realm), and *Swah Loka* (upper realm). Subsequently, under their belief system, the community of Tenganan Dauh Tukad has been identified as followers of the Indra sect of Hinduism, believing him as the God of War. Indra’s belief system and rites of worship are considered to have an impact on the significance of the village environment, especially the spatial arrangement of its settlements. Several distinctive features of Indra’s worship include worshipping the mountain and the moon. The conception of respecting the mountain shapes the settlement pattern with a linear mountain-sea type. The spatial structure of the village settlement is organized with a stepped concept, with the low part in the south and the north consistently higher.

Further, the concept of moon worship is realized by aligning the sacred elements in the shape of a worship space on the village’s eastern side. The intersection of these two concepts constitutes the imaginary axis of the earth axis, *kaja-keod* (north-south or mountain-sea), and the religious axis, *kangin-kauh* (east-west or sunrise-sunset), establishing the center point of the village as the *pusering jagat* of the village known as *natah desa*. In Hindu cosmology, it is believed that the universe’s creation began from Brahman’s navel. It led to the placement of Pura Bale Agung, or village temple, to symbolize the worship of Brahma as the creator. It subsequently led to the concept of the spatial arrangement of the Tenganan Dauh Tukad settlement with the philosophy

of *mahulu ke tengah*, or oriented to the middle as the orientation focus of the village space.

The Tenganan Dauh Tukad community has projected its self-image into spatial geometry corresponding to its value system. The head becomes the center and central axis of all control of human life. Accordingly, the head becomes the orientation and center of holiness. Consecutively, the value goes down to the body and legs, which also applies to its manifestation in the world surrounding them. Consequently, matters of sacred value are placed in the orientation above or the traditional sense of the Tenganan Dauh Tukad community, which is the direction of orientation north (*kaja*) and east (*kangin*). The remaining matters are placed hierarchically based on their level of sanctity. The feet, for example, are considered profane and will be placed in the south (*kelod*) and west (*kauh*) directions. Thus, the spatial arrangement of settlements in Tenganan Dauh Tukad is simply the concept of *hulu-teben*. The upstream part of the village is in the center, while the lower part is in the south, which also differentiates the spatial structure from other Bali Aga-type villages. The concept of the upstream as a sacred area is typically located in the northern part of the village. However, in the settlement of Tenganan Dauh Tukad, the concept of the upstream is located in the *natah desa* or the middle of the village settlement (Photo 2 and Figure 4).



Photo 2. Pura Bale Agung as *Natah Desa* and the Village Central Axis (Photo: I Komang Gede Santhyasa, 2022)

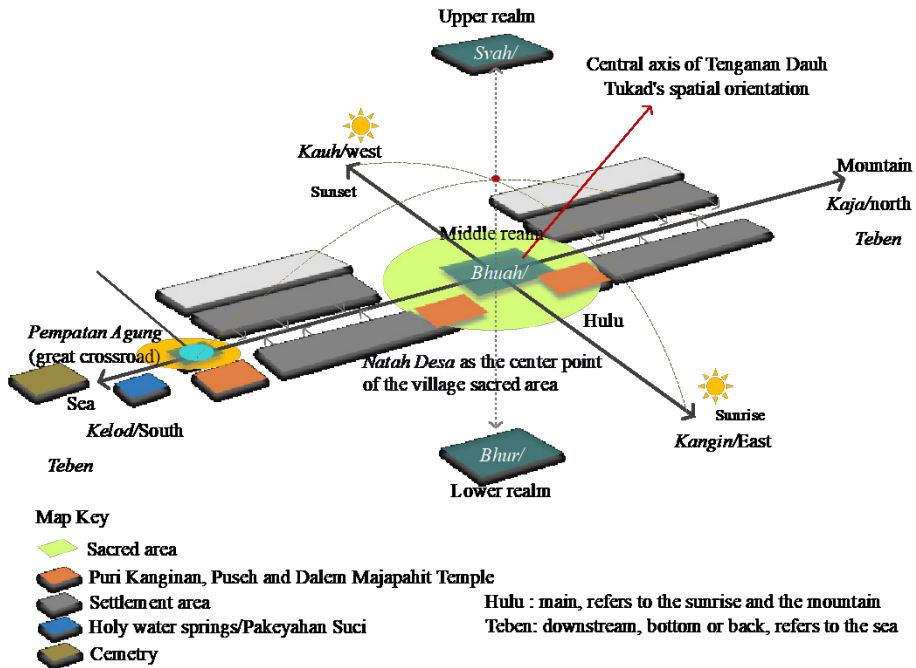


Figure 4. Geometric Construction of Traditional Settlement Spaces of the Tenganan Dauh Tukad (Source: Authors, 2022)

The perceived philosophical value of the settlement arrangement of Tenganan Dauh Tukad is also significantly influenced by their belief system of the afterlife in their cosmological conception of the universe of their ancestors. Therefore, community belief has two universes: the universe of humans and the universe of ancestors. The universe of ancestors, or the sacred area, is positioned in the middle of the village or called *natah desa*. Pura Bale Agung is strategically placed in this area to symbolize the worship of Brahma and the ancestors considered to have become *Dewa Hyang*. Meanwhile, residential areas are placed as a symbolization of the human world, the mortal, or *nista* (profane area). The center space is deemed pivotal for its sacredness. The more peripheral is the residential yard, which is the profane world, and the more peripheral is the backyard (*teba*), cemetery, and Pura Dalem. The religious space of Tenganan Dauh Tukad is structured symmetrically from the center to the north and south edges (Figure 5).

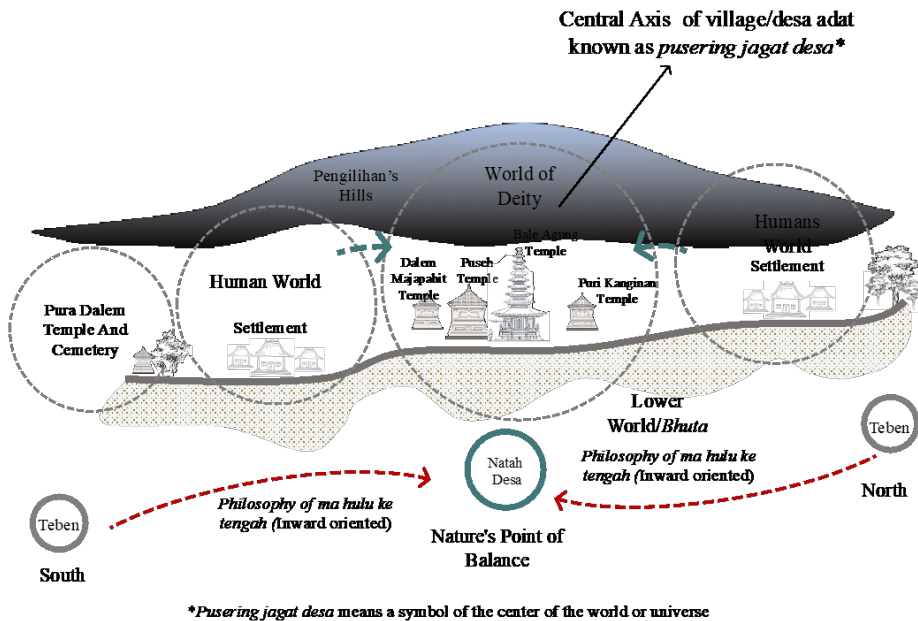


Figure 5. The Concept of Cosmic Balance of the Universe of Gods, Universe of Humans, and Universe of *Butha* in Tenganan Dauh Tukad Settlements (Source: Authors, 2022)

As the implications of the spatial concepts, values, and philosophies, the geometric construction of the settlement space of Tenganan Dauh Tukad is then structured from the concept of *mahulu ke tengah*. The spatial arrangement of settlements in Tenganan Dauh Tukad is directed to the center of the village as its sacred area. The presence of Pura Bale Agung (a temple of worship to Brahma, which is the origin of the creation of the universe) symbolizes the sacred zone in the Tenganan Dauh Tukad settlement as the central axis of the settlement. The spatial division of the settlement is established hierarchically from this point on. Accordingly, Tenganan Dauh Tukad’s sacred zone (*parhayangan*) is in the center of the settlement. Meanwhile, the residential zone is located north and south of this point. It is distinct from the concept of spatial space in the Bali Aga community, in which the sacred zone is consistently located in the upstream or northern part of the village, while the settlement zone is in the southern part (Widiastuti, 2018).

The spatial arrangement of Tenganan Dauh Tukad settlements is then categorized into four zones: 1) the upstream or north part of the village as a middle zone, which serves as a settlement area for migrants of the clan or *soroh bendesa* after the arrival of Java Hindu Kingdom of Majapahit; 2) The center of the village is the central zone, where the shrine or temple is built; 3) The center-south part as a middle zone is the old settlement area of the original residents of

Tenganan Dauh Tukad, and 4) The south end or *teben* or *nista* is the zone where the village *setra* or cemetery and other ancillary facilities are placed (Figure 6).

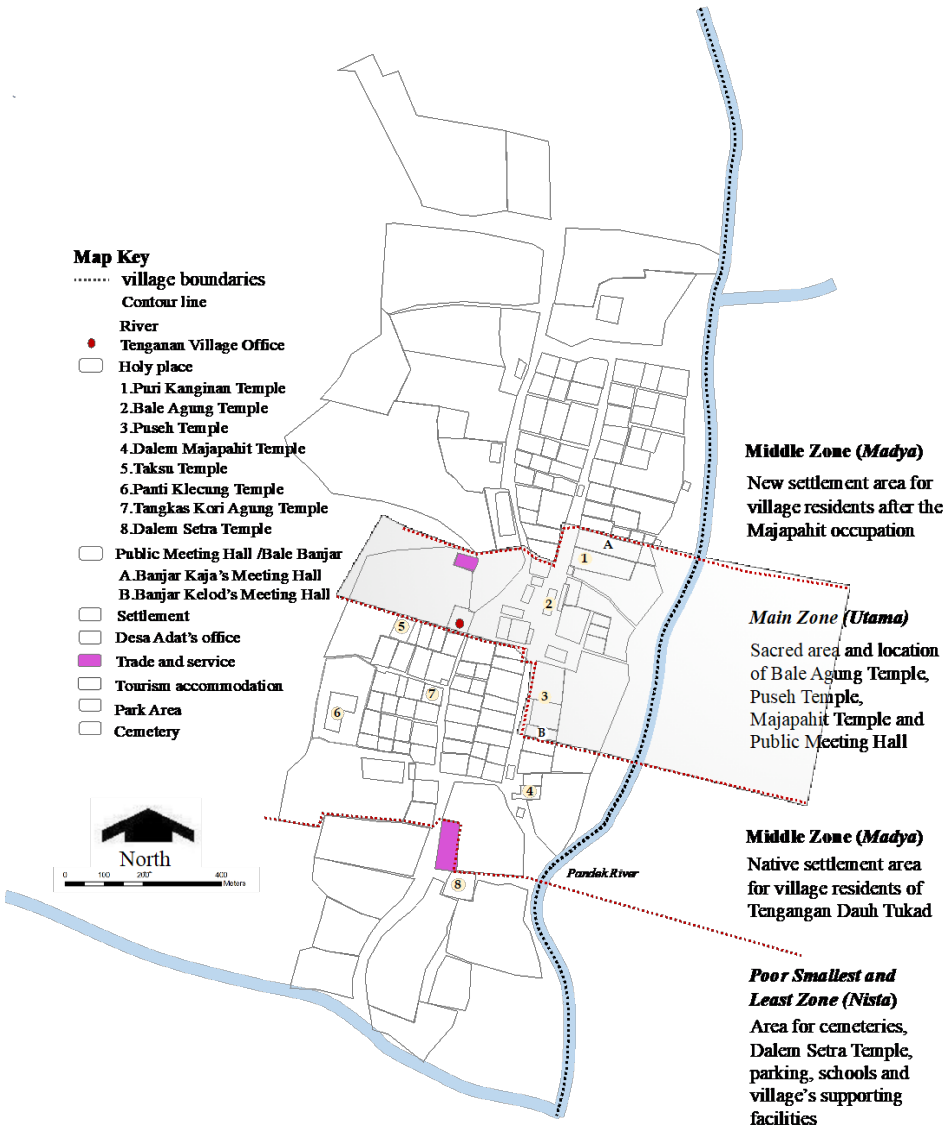


Figure 6. The Map of the Current Spatial Layout of Traditional Settlements in Tenganan Dauh Tukad (Source: Authors, 2024)

5. Conclusion

This study explores the background of the basic concepts, values, and philosophy of forming the epitome of a traditional settlement in an old Bali village called Tenganan Dauh Tukad. Three conclusions are drawn by conducting a series of analysis processes and field observations of the settlement setting.

First, the background concept of the value and philosophy of the arrangement of the traditional settlement space of Tenganan Dauh Tukad is anchored on the philosophy of harmonizing between *Bhuana Agung* and *Bhuana Alit*. The harmonization of the elements of the universe is accomplished through a series of ceremonies, locally known as *ngusaba aci acian* that illustrates the life cycle. The rotation of the life cycle is viewed as the philosophy of the *Nemu Gelang* ritual, representing the continuous rotation of the universe to eventually reach a point of equilibrium.

Second, as an implication of the concepts, values, and philosophies previously discussed, the Tenganan Dauh Tukad settlement's spatial arrangement is subsequently constructed per the concept of *mahulu ke tengah*. The *natah desa* then functioned as the central axis or the center point of village orientation. *Natah desa* is regarded as a symbol of *pusering jagat*, or the starting point of the creation of the universe. Further, the settlement structure progresses from this point to the north and south.

Third, the cultural acculturation between Bali Aga and Majapahit led to a shift in the orientation of the settlement space. The structure and spatial pattern of the village evolved towards the Java Hindu Kingdom of Majapahit tradition. The alteration is visible from the direction of spatial orientation, which puts the upper reaches in the northern part of the village as no longer a sacred area but as a new settlement area for the *soroh* (descendant) Java Hindu Kingdom of Majapahit. Presently, the spatial arrangement of settlements in Tenganan Dauh Tukad is segmented into four zones by their sacredness. The center of the village becomes the central zone (*parahyangan*), which is encircled by the middle zone as the residential area of its residents (*pawongan*) and then the *nista* (lower) zone (*palemahan*) in the southernmost part of the village.

The study's results can guide spatial planning in Bali, particularly in creating traditional residential environments and communities. Further, this study contributes as a reference in arranging traditional residential spaces by considering socio-cultural aspects dynamically. Moreover, it is crucial to adopt traditional settlements as urban and regional planning units to create a supportive and adaptive living environment that adheres to the philosophy of harmony between the macrocosm and microcosm concepts (human-environment-God harmony). Future studies are required through reconstruction studies of village area territory management during the early formation of the Tenganan Dauh Tukad settlement through historical and anthropological studies. It is crucial to comprehend the basic foundations, ideas, and agreements patrons employed to manage the residential environment then.

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