Cohabitation of people and animals in vernacular settlements:
insight from Indonesian villages

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Abstract

This paper investigates vernacular architecture as a model of cohabitation between people and animal. Animals and people have shared living spaces across cultures and generations, demonstrating the intertwine between domestic life, community, and nature. Relations between people and animal in architectural discourse is often polarized, limiting the discussion to how its architecture becomes a refuge from the wild. Many cultures position animals merely as a means for economic activities, rituals as part of cultural activity, as supporting roles in the society—thus positioning animals beneath people spatially. In the modern context, such polarization creates detachment between people and the wider ecologies, generating further fragmentation between their spatialities. The vernacular perspective is important in exploring the people-animal relations as such discourse appreciates the grounded connection between architecture and nature, and celebrates the tight relations with its social and environmental context. Investigation of people-animal cohabitation expand how nature can be defined in vernacular contexts.

This study explores people-animal relations and its spatialities in Indonesian villages. Data collection is done through investigating various studies on Indonesian village dwellings, mapping the shared living spaces and the different people-animal relations across communities. Through secondary studies and fieldworks, this study explores various living patterns and the qualities that enable separation and connection between people and animal, from boundaries, visibility, accessibility, and interrelation of domestic program. Based on such knowledge, the study identifies models of people-animal cohabitation and their shared living system. Understanding such a shared living patterns provides new domestic possibilities with recognition of the cultural practice of its communities and expansion of the people-animal relations.

Keywords: People-animal, Cohabitation, Vernacular, Nature-Culture, Domestic

1. Introduction

This paper is interested in exploring how vernacular architecture may provide insights about models of people-animal occupancy. The growing studies on people-animal relations in architecture (Mackie, 2014; Wolch et al., 1995) is part of the emerging exploration towards the socially and ecologically just built environment, with the focus on supporting biodiversity and decenters the anthropomorphic view of development (Aisher & Damodaran, 2016; Arcari et al., 2021; Gissen, 2015). Such development perceives animals not only as a resource but also parts of the interdependent web of living things (Arcari et al., 2021; Prominski, 2014; Wadham, 2020). Focusing on people-animal relations at large, creates a shift towards the dichotomy between nature and culture, where nature is often seen solely as the counterpart of culture (Descola & Palsson, 2004; Prominski, 2014). Dichotomy of nature and culture creates spatial fragmentation in the people settlements, separating the wild and the domesticated, determining what kinds of nature is included or excluded in the built environment (Philo, 1995). In contrast this research aims to extend the current studies and practices of architecture which explores how conception of nature is socially constructed, and that nature may exist in a multifaceted, hybridised meaning (Descola & Palsson, 2004; Gissen, 2009; Harrison, 2012).

This study investigates people-animal relations in vernacular settings. Studies regarding the vernacular architecture often focuses on its social and spatial existence, providing technical description of the building's space arrangements, symbolic role of the building and its elements, to the daily rituals of the dwellers (Nas & Schofeld, 2008). It is annotated that other studies have also elaborates the way vernacular architecture demonstrates a tight physical relationship with nature (Rapoport, 1969; Weber & Yannas, 2014). However, discussion of animal and other living being as part of nature is limited in the vernacular architecture discourse, and when available, it focuses more on animal as ritual representation (Ellisa & Azharia, 2020). This paper aims to expand such limitations through investigation of people-animal cohabitation in the context of vernacular architecture.

In demonstrating relation between nature and culture, vernacular exploration becomes necessary beyond its existence as a context, but as a cultural embodiment that demonstrates attitudes towards nature (Glassie, 1990). Utilizing vernacular architecture as the basis of learning reflects knowledge "rooted in close intimacy and connection with the natural world" (Selby, 2017, p. 9). In addition, vernacular architecture reflects an array of people responses towards various spatial and material forces in accordance with its wider surroundings and equally, with the society's ways of living (Rapoport, 2006). As vernacular architecture demonstrates a model that describes systemic relations between people, the environment, and the characteristics of the built environment itself (Rapoport, 2006), investigating the existence of animals as other living beings in the system potentially expands such models.

This study starts with some literature explorations about spatiality of people-animal relations in vernacular dwellings. The study follows by outlining the research methodologies of exploration of people-animal cohabitation in Indonesian vernacular dwellings. In subsequent, analysis on models of people-animal occupancy in such domestic contexts are presented. Based on such investigation, this study concludes on the model of people-animal cohabitation as the intertwine between nature and culture, potentially informing further practical and theoretical discussion of nature and architecture.

2. Shared Spatiality of People-Animal in Vernacular Settings: Relations and Practices
2.1 Attitudes of nature-culture in vernacular discourse

Positioning people-animal relations in vernacular discussion requires some reading on differing attitudes between nature and culture in such discourse. Rapoport (1969) provides some classifications towards these attitudes, which consist of religious and cosmological attitudes where environment dominates over people, symbiotic attitudes which aim to balance the existence of people and nature, as well as more exploitative attitudes, where people modify and exploit nature. In a slightly different way, Pálsson (2004) offered other classifications through his discussion on orientalism, pastoralism, and communalism in reading relations between people and its surrounding environment. Orientalism demonstrates a negative people-environment relationship where exploitation prevails, pastoralism assumes people responsibility to protect the environment, while communalism suggests that there is reciprocal exchange between people and the environment, celebrating participation and dialogue (Pálsson, 2004).

Rapoport's (1969) classification of nature-culture relations determines daily rituals, modification of site, and how dwellings are situated and how they are formed. It is important to note that Pálsson's discussion of communalism has started to reject the form of separation between people and nature, therefore creating a new theoretical stance beyond nature as a separate entity that is subjected to people act (and vice versa) but they can be inherently inseparable. A similar position is offered by discussion of 'andscapes' by Prominski (2014) as a unitary concept of nature and culture; allowing culture to be shaped by nature, and the other way around. With this line of discussion, the more intimate way of reading nature is celebrated, with appreciation that nature changes and animates, creating contingencies in the way living activities can be conducted. An example of such people-nature connection can be seen in Suryantini et al's (2022) study on the gestures of *Orang Suku Laut,* a hunter-gatherer vernacular communities that lives in the sea and needs to understand the dynamic of the sea and its ever-changing conditions.

The study is interested in exploring how these attitudes towards nature arguably influence how space is organized with consideration of other species in context. In exploring such organization, it is beneficial to refer to Oma's (2013) proposition of 'meeting points', defined as the place where people-animal relation is physically happening based on society's local practices that interact with objects and architectural features. In her study about vernacular dwelling in Sicily and Scandinavia, four different kinds of meeting points were outlined, which are spaces of people-animal shared daily rhythm, cosmological structures exist in the dwelling and around the dwelling, spaces to refine animal products, and incorporation of animal materials throughout the living spaces (Oma, 2013). In addition, Tang's (2022) discussion of animals as home-markers and creation of home-feelings in medieval Icelandic is also significant. The study discusses how certain animals and domestic practices related to them influence how specific built elements are generated by the society, and how other kinds of animals may instead intimately invoke home feeling (Tang, 2022). Understanding people-animal shared spatiality therefore highlights the occupation of interrelated spaces in accordance to practices concerning particular species, yet, the meaning of and the experience with such species also intimately influence their living spaces.

2.2 People-animals shared spaces and practices across societies

Studies on the vernacular architecture have discussed various types of space that construct its internal and external layout. Variations and arrangements of these spaces change from one context to another, as the value systems that govern the social activities, connection to surroundings, and individual needs may change across localities (Rapoport, 1969). This section aims to briefly discuss the variation and arrangements of spaces that is relevant for people-animal occupations which exist in current vernacular literatures. Following discussion of meeting points (Oma, 2013) elaborated above, this study aims to review some literature that consider the existence of people- animal spatialities for their daily and ritualistic practices, as well as the material experience of animals in vernacular societies.

In vernacular communities that conduct some form of agricultural activities, keeping livestock around the dwelling becomes one of the common livelihood practices. Existence of space for people and animal in vernacular context varies, depending on the level of differentiation of living spaces existing in its society. Man, and animal can share the same room, or positioned in separate space but still under one roof, located in the separated building but close, or can also be located in entirely distanced buildings (Rapoport, 1969). Understanding how animals (and animal related activities) and their spatiality across vernacular contexts becomes important.

The spatiality of animals in vernacular context is tightly related with the domestic arrangements defined by the society's value system. The way the domestic space is arranged in the vernacular setting can be understood through four aspects, which are orientation, laterality, frontality, and centrality (Oliver, 1997). Orientation is defined by the reference points that create the direction path of the spaces; while laterality, frontality, and centrality are the distribution of space in lateral (left-right), front-back, and centralized orientation with regard to the reference points of the society's value system (Oliver, 1997). An example of reference points is the use of geographical features as the mountain and the sea, or the east and the west in line with the direction of the site, into more complicated reference points such as 'head and tail' area or upstream and downstream area (Waterson, 2014). The arrangements of domestic space also follow existing social structures, determining forms, hierarchies, allocation, and temporality of the house (Schefold, 2003; Waterson, 2014).

With regards to the above spatial and social rules, there are strict rules on how members of a tribe may treat animals, and different kinds of animals may have different status depending on the society's value system (Oliver, 1997). Some animals may only be kept for religious events, such as the existence of water buffalo in Palu'e settlement in Flores. The water buffalo is an important part of sacrificing ritual for the prosperity of the society, and the water buffalo even has its own house in the middle of the settlements (Vischer, 2003). Nevertheless, as this paper focuses on the existence of animals that share living spaces with the dwellers, the discussion of animals in the dwelling is focused on the animals with the value of sustenance, or related with the process of how society acquires, stores, prepares, and consumes their food.

A widely discussed position of livestock in the vernacular dwelling is under the house itself, especially dwelling with raised or multi levelled floors (Julistiono & Arifin, 2006; Nas &

Iwabuchi, 2003). Such a position has been discussed for many reasons. An example is the existence of vertical orientation, such as in Aceh traditional houses, where animals are intended for the ground, elevated houses are for people (Nas & Iwabuchi, 2003), and the rooftops are intended for the elders. In Tongkonan house, the animals are part of the underworld, the middle structure is for people beings, while the upper structure is intended for the gods (Julistiono & Arifin, 2006). Apart from such different beliefs, in more temperate climates such as in Sherpa dwelling in Nepal, placing animals underneath the lower ground floor brings warmth towards the spaces above it (Sestini & Somigli, 1978). Some vernacular contexts demonstrate connection between livestock area and the service space, such as the Nu ethnic in rural China, who built animal pens under the kitchen as they would supply food remnants to feed the animal (Pei & Cohen, 2019).

In a more compound or courtyard-based dwelling, there are different variations of the position of livestock. In the Masai compound where the animal is a status and wealth symbol, the cattle is positioned in the center of a multi-family compound, surrounded by other dwelling units (Rapoport, 1969). In another compound with polygamous kinship structure such as in Cameroon and Ambo in Africa, the cattle is positioned near the women's space of the compound (Hillier & Hanson, 1989; Rapoport, 1969). Another example of the Mosuo matriarchal community with courtyard dwelling also demonstrates the connection between the livestock animals and the food storage area, integrating or placing the space and animals with the granaries (Feng et al., 2023).

The above examples show that the value systems of the society designate the separation and connection of people and animal in space. Some cultures enable mixtures of the people and animal activities in one space, while others may strictly prohibit such intertwining. In such differing rules, the boundaries, materiality, and arrangements of the people and animal themselves become different. For example, areas underneath the house in Aceh house are also used for the place to rest and swing the children, as well as performing some household duties (Nas & Iwabuchi, 2003). The area is rather large with open boundaries. On the other hand, the Tongkonan house is strictly used for animal purposes, with the height of the space referring to the size of the animals, and with more enclosed boundaries around the area (Julistiono & Arifin, 2006), so that it is not easily accessible. Hierarchies of space and interrelation of one space of the other also determines the visibility of the animal space itself, connecting the animal and the rest of the settlements. For example, the position of the animals in the middle of the compound, near the entrance, or near the dwelling unit potentially enables continuous supervision and safety of the animals (Rapoport, 1969).

The above discussion demonstrates the arrangements of domestic spaces that separates and connect people and animal in space based on certain value systems of the society. The cohabitation of people and animal was reflected by the intertwine between people and animal domestic activities. The spatialities of such intertwining are determined by the reference points which become the basis of positioning the animal, and the qualities of the space demonstrated by its boundaries, visibility, accessibility, and interrelation between spaces.

3. Methodology

This study investigates models of people-animal cohabitation in Indonesian vernacular dwellings. The study explores seven vernacular dwellings from different tribes across Indonesia, from Batak Toba tribe at North Sumatra, Kerinci tribe at Jambi, Samin tribe at Central Java, Balinese tribe at Bali, Rotinese tribe at Roti island, Tolaki tribe at Southeast Sulawesi and Dani tribe at West Papua. The selection of these tribes is driven by some considerations, and are particularly related with the availability of data regarding distinctive people-animal relations in such a context. It is also important to note that this selection covers important vernacular dwelling characteristics with a variety of internal layout of its domestic structures that are relevant to Southeast Asian context. For example each of the chosen dwellings demonstrate some of the important features of Southeast Asian-type vernacular houses, either as tripartite house, where the house is raised to create different division of the house, multi levelled floors that demonstrate different hierarchies of space, outward slanting gable or walls, the existence of gable or finials, the saddle-backed roof, and the use of timber as primary material especially for the top and bottom structure of the dwelling (Schefold, 2003; Waterson, 2014).

The study explores data acquired primarily from secondary sources, exploring existing literature, news, and databases about each dwelling. From each source, the study collected existing plans and sections of the dwellings, as well as local narratives about the people-animal relation manifesting in each dwelling. An exception was the data about the Samin tribe, which was acquired from a 2022 student fieldwork to the Samin tribe area at theri village in Klopoduwur and Bojonegoro at Central Java. In this fieldwork, photographic documentation of the community and their living spaces were captured, in addition to the plans and sectional drawings with regards to the different types of house available in the village. The fieldwork also collects some information regarding their daily living activities from the local people. Analysis is further conducted to discuss how the people-animal relation in the dwelling demonstrates arrangements that allow separation and connections from each other. Through the act of mapping and diagramming the existing plans and section, elaboration regarding boundaries, visibilities, access, interrelation between animal and people activities in accordance with the society's value system is outlined. The study then concludes how such arrangements of separation and connection create various models of shared people-animal occupancy in the vernacular setting, discussing the potential of such models in shifting the nature-culture dichotomy.

3.1 Reading the people-animal shared spatialities: Insight from Indonesian villages

As previously discussed, the study explores six dwellings from different villages across Indonesia. These six dwellings consist of *rumah Bolon* of the Batak Toba tribe at North Sumatra, *rumah Samin* of the Samin tribe at Central Java, *bale* of the Balinese tribe at Bali, *uma* of Rotinese tribe at the Roti island, *laika* of the Tolaki tribe at Southeast Sulawesi and *honai* of the Dani tribe at West Papua. The study divides these dwellings depending on the shared living patterns of people and animals. Based on such living patterns, the study proposes three models of cohabitation, from living in levels, living in between, and living together.

3.2 Living in levels: Separation and connection from vertical hierarchies

The vernacular dwellings explored in these patterns consist of *rumah Bolon* of the Batak Toba tribe and *laika* from Tolaki tribe. The spatial organisation of *rumah Bolon* is square shaped and follows vertical cosmologies as its value system, dividing the house into three parts (See Figure 1), which are *Banua Gijang* or the top world that is considered sacred and is used to keep offerings, *Banua Tonga* or the middle part for the dwellers activities, and *Banua Toru* or the bottom world, that is used for cattle (Yusran & Dirgantara, 2021). The frontality of the house follows a north-south orientation, similar with the overall settlement patterns itself (Sudarwani et al., 2022). On the other hand, the spaces of *laika* from Tolaki tribe are rectangular shaped and follow both north-south and front-back orientation (See Figure 2), with bridges separating the front area and the back area (Franciska & Wardani, 2014; Ramadan, 2018). The front area is used for the bedroom and living room, while the kitchen and the dining room are located separately in the back area. There are different floor levels in the bedroom and living area to indicate different allocation of space. The bottom area under the house is used solely to keep their cattle, but it has also been used to store wood.
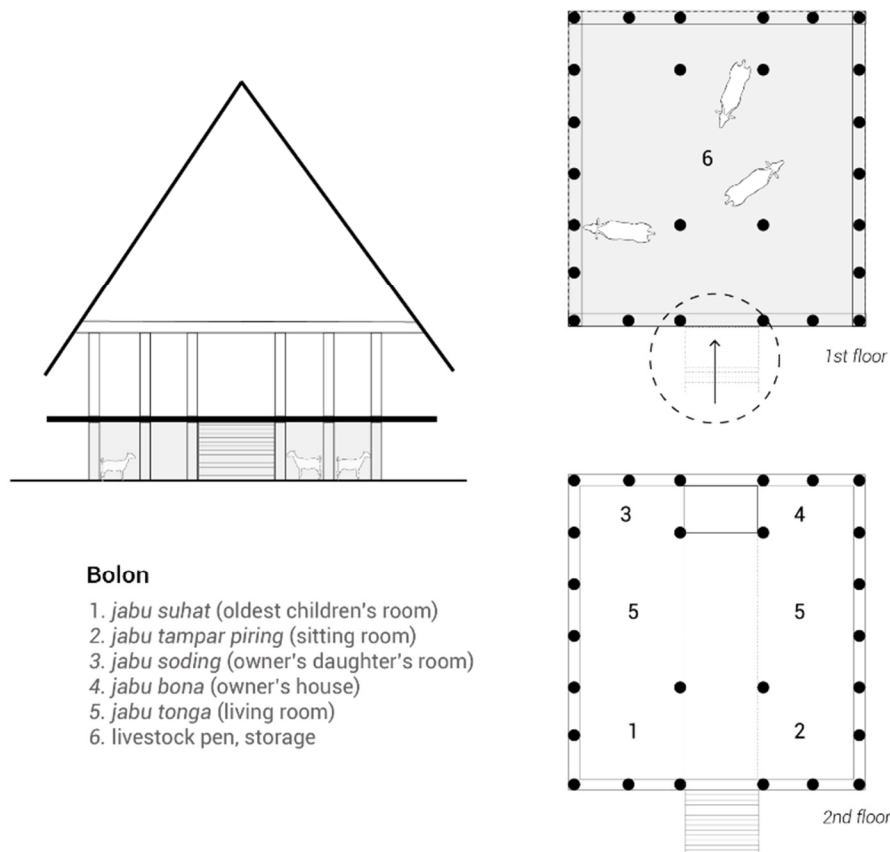

Bolon
1. *jabu suhat* (oldest children's room)
2. *jabu tampar piring* (sitting room)
3. *jabu soding* (owner's daughter's room)
4. *jabu bona* (owner's house)
5. *jabu tonga* (living room)
6. livestock pen, storage

Figure 1: *Rumah Bolon* spatial organization for animal in the ground level
Source: Author, 2023

Tolaki

1. *botono* (living room)
2. *tinumba ihana* (man's bedroom)
3. *tinumba moeri* (woman's bedroom)
4. *tinumba ibungu* (kitchen)
5. *tinumba irai* (terrace)
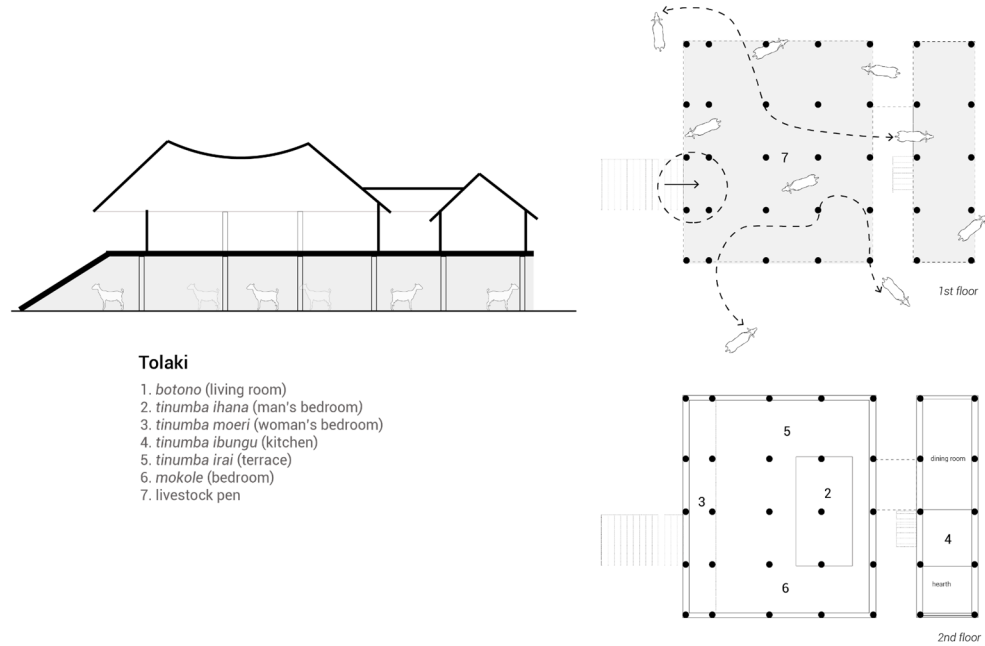6. *mokole* (bedroom)
7. livestock pen

Figure 2. *Laika* spatial organization for animal in the ground level
Source: Author, 2023

The boundaries in the bottom area of *rumah Bolon* is created from its main poles, which is located on the side so that the middle space can be used for livestock (Sudarwani et al., 2022). Spaces between the poles are covered with narrow wood planks, separating the inside and the outside. The cattle area is accessed from the front area of the dwelling, behind the main ladder, and that the cattle area in *rumah Bolon* is not used for any other domestic activities. Meanwhile, the boundaries in the bottom area of *laika* are more open, as it consists of poles that support the houses in a grid pattern, occupying the middle area at the bottom of the house (Franciska & Wardani, 2014). There is no wall covering around the bottom area of the house, therefore the cattle area can be supervised from the kitchen area in the back. In addition, the bottom area is accessible from anywhere around the house, and it is also used to hang around together, or store farming utensils (Ramadan et al., 2021).

Such varied use of space demonstrates how the bottom area of *laika* is flexibly used for various activities at once, while the animal area in *rumah Bolon* is much more secluded. The front-back division of house form in *laika* also creates connection between people activities at the top and at the animal activities at the bottom, which is not available in *rumah* Bolon. In the dwelling with vertical hierarchies where separation of domestic activities and animal activities is imminent due to its top-bottom organisation, connection is driven by porosity of boundaries of the animal area which signifies how rigid the animal space is contained and separated from other domestic activities. The differentiation of access also influences such containment, where the main access of the house in *Rumah Bolon* is also part of the access to the animal area, while in *laika* such accesses are separated from each other. Detachment of the house form in *laika* also provides visual access to the animal.

3.3 Living in between: Separation and connection among dispersed spaces

The vernacular dwellings explored in these patterns consist of Bali dwellings by Balinese tribe, and *honai* from the Dani tribe. Bali dwellings consist of a shared courtyard dwelling occupied by a family. The dwelling follows a geographical reference point, arranging the space based on the mountain-sea axis and east-west axis (Rosilawati, 2019). The overall space arrangements are divided into three zones, *utama, nista,* and *madya (*See Figure 3*). Utama* denotes areas sacred and pure in reference to the gods and the mountain, while *nista* denotes a low area that is impure and includes the sea, with *madya* as the people area that spans from the sea to the mountain (Wulandari & Fajarwati, 2020). The sacred area is located more on the east, while the dirty area is more located on the west. These three zones then create a nine-square division, where the right top area of the division is the more sacred area for the family temple, whilst the bottom left corner is intended for the outer area of the dwelling, positioned for the animal area and the garbage pit (Wulandari & Fajarwati, 2020). The *honai* dwellings are parts of a compound dwelling called *silomo* (Nasaningrum, 2021; Salipu, 2015; Salipu et al., 2022). The compound follows male-female division of space, dividing the dwelling unit and their location based on the social function of male and female in the society (Salipu, 2015). The main *honai* for male is located across the entrance (See Figure 4) to maintain safety and supervision of the incoming people coming to the compound (Salipu et al., 2022). On the other hand, *honai* for females called *ebe ai* is located along the compound, facing the rectangular shaped family kitchen. The space for animals, usually for pigs and cattle, is placed behind the family kitchen (Salipu et al., 2022). There is also a courtyard around the space to enable the animals to roam and feed themselves. Pigs demonstrate an important cultural and wealth value, their sacrifice is used for many rituals, and they are commonly only consumed on specific occassions or exchanged with other families (Suroto, 2014).

The areas for livestock in Bali courtyard dwelling tend to be open, without or with minimal boundaries. Some dwelling leaves the animal in the open yard called *teba* (Aryani & Tanuwidjaja, 2013). Other dwelling has some roofed enclosure without a wall or with short wall around it (Lisa et al., 2019). In comparison, the pig pen in a *silomo* in Papua is rectangular shaped (Lokbere et al., 2012), and tends to be always roofed with full enclosure around it and divisions for multiple numbers of pigs kept by the society. The enclosure in the *silomo* can be accessed from behind the family kitchen and behind female *honai*, whilst in *Balinese* dwelling the boundaries are much more open and the animal area is part of the *nista* area located rather near the entrance, which contains the bathroom, kitchen, and granaries. Despite the different value of the livestock demonstrated by both societies, spatiality of animals living in between courtyard/compound dwellings demonstrate tight interrelation with another domestic program, which are either the service areas (e.g bathroom, kitchen areas, food storage, or community garden), or the areas for community member that mainly care for the animals.
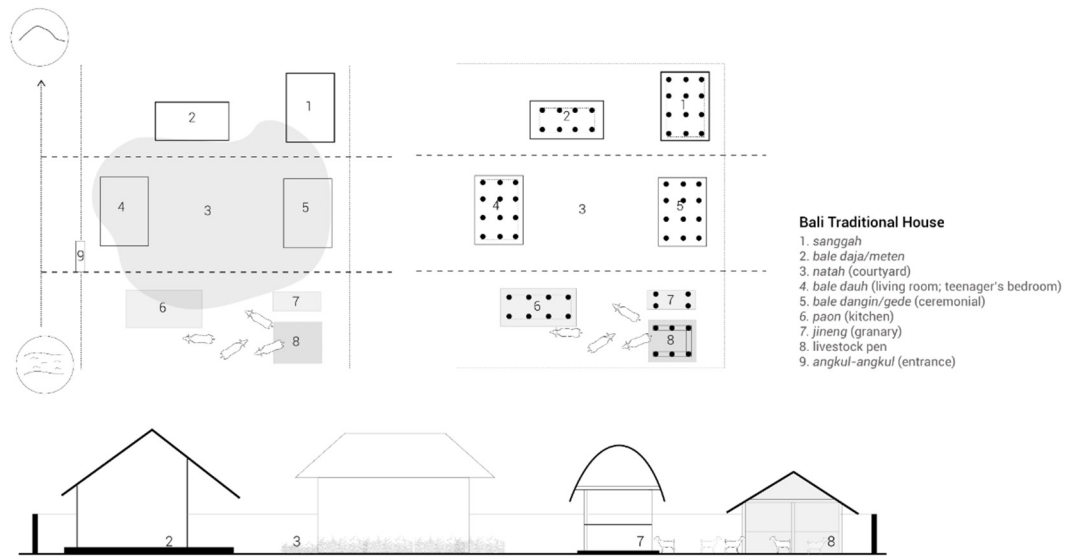
Bali Traditional House
1. *sanggah*
2. *bale daja/meten*
3. *natah* (courtyard)
4. *bale dauh* (living room; teenager's bedroom)
5. *bale dangin/gede* (ceremonial)
6. *paon* (kitchen)
7. *jineng* (granary)
8. livestock pen
9. *angkul-angkul* (entrance)

Figure 3. Spatial organization for animal in Balinese courtyard dwelling based on three separate zones of *utama, madya, nista*
Source: Author, 2023

Honai
1. *Holakola* (entrance)
2. *Pilamo* (man's honai)
3. *Hunila* (kitchen)
4. *Ebe-ai* (woman's honai)
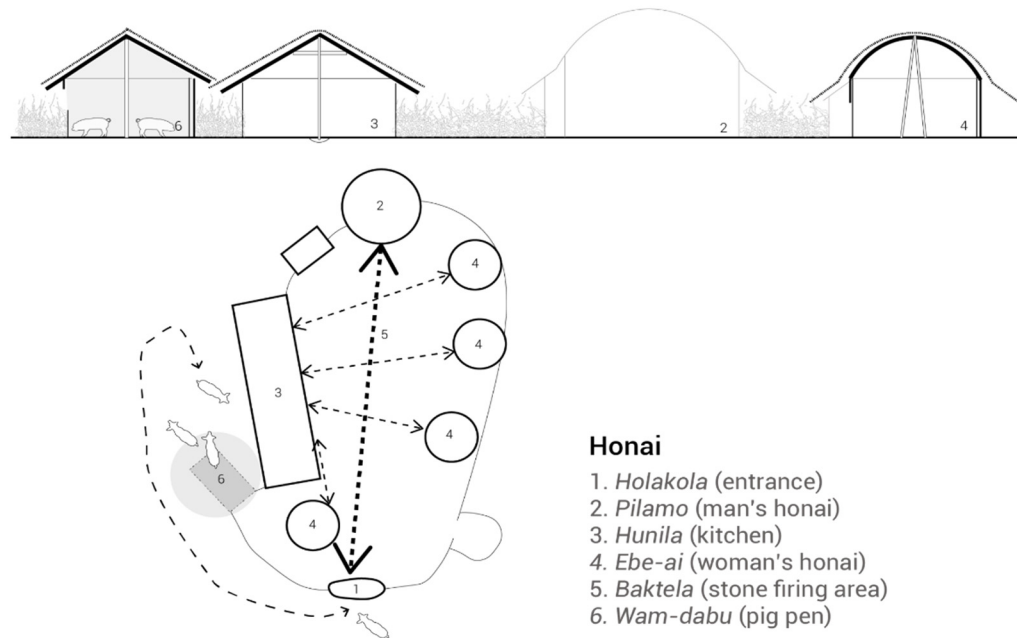5. *Baktela* (stone firing area)
6. *Wam-dabu* (pig pen)

Figure 4. Spatial organization for animal in *honai* that follow male-female division
Source: Author, 2023

With a more dispersed form of dwellings, where dwelling units are not integrated with each other, the animal is separated in a macro arrangement of the dwelling, which can be divided by zones of sacredness or by social structure. However, in a more micro way, the animals are still connected with the areas of its surroundings through positioning it around spaces that support flows of daily activities that are related with each other. The boundaries of spaces for animals living in-between is not necessarily limited to the form of its pen. The fluid position of the animal around the other dwelling unit is enabled by an existing value system that separates the inside and the outside of the overall dwelling as a whole, allowing the animal to roam free.

3.4 Living together: Separation and connection among integrated spaces

This section discusses patterns of people-animal relations in the dwellings that integrate animal spaces with their living area, which consist of *rumah Samin* of the Samin tribe and *uma* by the Rotinese tribe. Unlike the previous sections which discuss forms of raised houses and courtyard/compound houses, both dwellings discussed in this section are landed houses, or houses with slightly raised floors. *Rumah Samin* is usually constructed out of wood, and organised based on the front-back axis, where the front area is used to receive guests and living room, the middle area for bedrooms, and the back area for kitchen, storage for harvest products, and animal pen (See Figure 5) (Putra et al., 2021). There are variations of which the kitchen and the animal pen are located along the side across the bedrooms (Setyabudi et al., 2022). On the other hand, the dwellings of *Rotinese* consist of elevated ridge pole structures with large roof structure with dichotomy or trichotomy division of space which follow directional coordinates with symbolic meanings (Fox, 2006; Saputra, 2019). The east and west direction demonstrate the movement of the south, while the north-south direction symbolically demonstrates the flow of power, emphasizing the south as the powerful area (Fox, 2006).
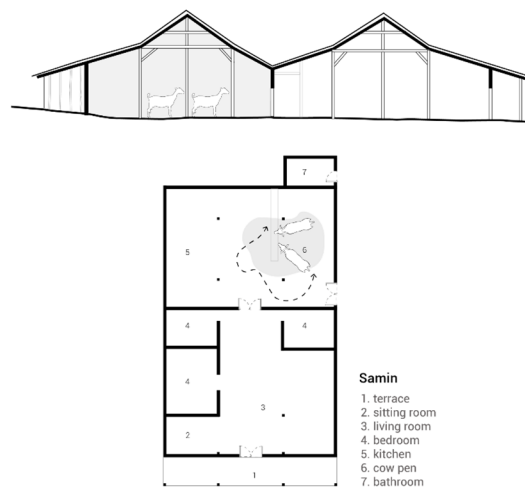

Figure 5. Integrated spatial organization for animal and people in *Rumah Samin*
Source: Author, 2023

The internal layout of the dwelling follow male-female division (Figure 6); and in dichotomy house the west area is discussed as the inner and the east area is considered the outer side of the house, while in trichotomy house the outer layer of the house is further divided into the head area and the inner middle area (Fox, 2006). The inner side of the house is called *Uma Dalek* and it is a women territory, with specific kinds of animal identified as female such as cats and pigs; while the outer side of the house is called *Uma Deak* is a male territory, where animals such as dogs, goats, sheep are kept (Fox, 2006; Noach-Patty, 1995).

In both dwellings there are lack of internal boundaries of people and animal space, and the animal space is accessible from other domestic spaces. There is an interrelation between animal spaces and specific areas of the house, and the size of animal area is often similar or even bigger in size in comparison to people area. In *Rumah Samin*, the animal space is related to the kitchen area, and the space is only divided by small feeding structures or by short partitions. In *Rotinese* dwelling, the animal space is related and mainly accessible to the area of its caretakers. Within the space, there are limited rigid internal boundaries, however there may be some small partitions and height differences between the animal area and the rest of the living area. In terms of space, the women area of *Uma Dalek* is slightly smaller and therefore occupied by smaller-sized livestock. The arrangements of animals based on their kinds and caretaker space demonstrates the intertwine between people and animal living spaces.
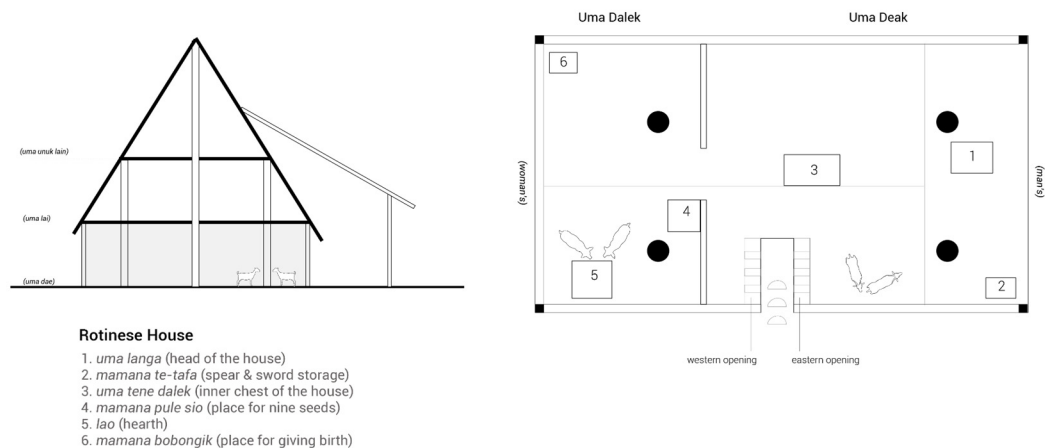

Rotinese House
1. *uma langa* (head of the house)
2. *mamana te-tafa* (spear & sword storage)
3. *uma tene dalek* (inner chest of the house)
4. *mamana pule sio* (place for nine seeds)
5. *lao* (hearth)
6. *mamana bobongik* (place for giving birth)

Figure 6. Integrated spatial organization for animal and people in *Rotinese* dwelling
Source: Author, 2023

The vernacular dwellings with integrated living are one of the responses to keep the safety of the animals in agricultural society and also establish continuous food supply in communities that are often subjected to drought. Internal arrangements of such dwelling are driven by interrelation of the programs or the actor. In both dwellings, hierarchies are created by the gradient of public-private areas. However, the meaning and value system of the society determines whether the animals are then positioned in the front, back or other parts of the space. The following table compares the value system and the differences of means of separation and connection across six dwellings.

Table 1: Comparisons of six dwellings
Source: Author, 2023

Dwellings	Boundary	Visibility	Access	People- Animal Activities	Value System
Rumah Bolon	Enclosed animal boundary	No visibility from above	Access limited	Separated	Vertical cosmologies (top-middle-bottom); north-south orientation
Laika	Open/ no boundary	Visibility from kitchen	Multi-access	Separated	*Madya, suci, nista;* front-back orientation
Balinese courtyard dwelling	Semi-enclosed boundary	Visibility from around	Access limited	Related with other spaces, particularly kitchen	River-mountain orientation; *nista-suci*
Honai	Enclosed boundary	No visibility	Access limited	Related with kitchen	Female-male orientation
Rumah Samin	Shared boundary	Visibility from inside the house	Access from inside and outside	Related with kitchen and outdoor area; flexible	Front-back orientation
Rotinese dwelling	Shared boundary	Visibility from inside the house (lower lever)	Access from inside and outside	Related with the caretakers territory	Female-male orientation; east-west directional path

4. Conclusion

This study explores people- animal relations that drive their spatiality in the vernacular dwellings, defining their model of cohabitation. The exploration of people-animal spatiality is part of the attempt to expand nature- culture dichotomy in architectural discourse, and investigation of people- animal connection in vernacular dwellings as the embodiment of culture potentially expand such oppositions. This study analyses six dwellings in North Sumatra, Jambi, Central Java, Rote, Southeast Sulawesi, and Papua and discusses the separation and connection between people and animal based on the society's value system. Qualities that drive separation and connection, such as boundaries, visibility, accessibility,

and interrelation of spaces are analyzed and then compared for each classification of the living system. The analysis is structured based on the house form and settlement patterns of the chosen dwelling, discussing houses with raised floors, compound/courtyard houses, and landed/low-rise houses.

Based on the analysis above, we may conclude three different models of people-animal cohabitation and their spatialities driven by the society's value system. The first model is living in levels; which values rigid, hierarchical separation between people and animal, without or with very limited intersection between people and animal activities. In this model, the animal area can be enclosed with limited access for safety assurance, or have open boundaries but with some supervision from the top area of the dwelling. The second model is living in between; where spaces of the animals can be more fluid, as the inside areas of the dwelling consist of layers that define different zones. In this model, the boundaries of animal spaces are not rigid, but consist of the intersection with other dwelling units. The third model is living together; where spaces of people and animals are integrated without or with very limited boundaries. This model stacks the spaces for people and animals altogether, and activities of both people and animals are conducted in the same space. Separation is done through individual roles of the people in caring for the animals, and division of the animal types itself.

This study contributes to the discussion about nature in the context of vernacular architecture, which is still limitedly discussed in accordance to the physicality of the site (Rapoport, 1969; Weber & Yannas, 2014). Research about animals in this study expands such a definition of nature, extending meanings of nature existing not as a neutral background (Forty, 2004), but as living entities with agencies that engage with society's daily livelihood. The connection of spatiality and animals in relation with community practices and belief systems bring forward the connection between nature and culture that is often polarized (Prominski, 2014). Future studies may expand the discussion on other kinds of vernacular settings, generating other models of cohabitation that demonstrate further intertwining between nature and culture.

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