Architecture spatial arrangement of Bajo tribes settlement in Kabalutan Island of Central Sulawesi

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Abstract. Vernacular architecture is a potential phenomenon that capable of generating local theory for settlement arrangement in accordance with the condition of natural environment and local culture which is the development of sustainable architecture. In this research they study the phenomenon of architecture settlement which is focused on spatial layout of Bajo tribe in Kabalutan Island, using phenomenology method. The purpose of this research, to find the concept of spatial layout that underlies the order of Bajo settlements in Kabalutan Island. This research produces a spatial layout based on the concept of ethnic fraternity, integrating with the natural conditions that are adaptations of Bajo people's behaviour.

1. Introduction
The human aspect determines the environmental characteristics of the settlements (man-environment studies or society-environment studies). Space in human life is essentially socio-biogenic space and socio-spatial space (Lang, 1994) \([1]\). Human relationships with one another are always spatial relations, determined by psychological, social and cultural factors. The spatial system shows the rules of architecture, demonstrating its architectural principles (division of space, hierarchy, and values), from small to spatial framework (Rapoport, 1977) \([2]\).

The spatial study of Bajo settlements arises from humans and spaces with the uniqueness and wealth possessed and intimately connected between humans and their surroundings simultaneously and into historical (historical).

\[\text{System Spasial} \rightarrow \text{Spatial Container Architecture}\]

\[\text{Environmental Layout} \rightarrow \text{Human (Space, Time, Behaviour)} \rightarrow \text{socio-biogenic}\]

\[\text{socio-spatial}\]

\textbf{Figure 1}. Spatial and Human Spatial Systems Attachment Scheme
\textit{Source: [1], [2]}
Scheme 1, illustrates the link between spatial systems with humans and their environment that is influenced by space, time and behavior. Humans as the main actors influence the characteristics of spatial behavior and spatial behavior as the formation of the container. So the values of local wisdom Bajo tribe on the island of Kabalutan greatly affect the spatial layout of the settlement.

The geographical condition of the village of Kabalutan, which is one of the islands where the Bajo tribe live in Walea Islands sub-district, can be divided into several parts, namely: 8.01% plain, 12.97% coral reefs, and 72.02% of marine (source: RDTR Togean Islands). In the research area it was found that Bajo settlements 90% are in the waters and 10% are on land, this is due to the culture and belief that living or building a house on the waters is better and healthier [3].

Figure 2. Map of Kabalutan Island Settlement Area

2. Spatial Layout of Settlement Architecture

Historically (Lowe, 2003) [4], the existence of the Bajo tribe on the island before Dutch colonial rule entered Indonesia, through the trading of sea cucumbers and other marine products with Bugis origin trade inhabiting the surrounding area. Kabalutan Village is a unique village, inhabited by ethnic Bajo tribe with a culture of fishermen who have local wisdom, their residence is generally located in the waters or aquatic environment, and residential areas are around the associated reef hills by wooden bridges, while their main means of transportation is boats. the order of the settlement is shaped linearly following the landscape of the coral hill, this trend forms a pattern of settlements and unstructured building plots because the density of buildings in the area is constantly increasing.

Changes in the concept of life of the Bajo tribe, ranging from bidok, babaroh, as a place of residence by women and children, and increasingly firmly after being in papondok made as a residence which is an improvement of structural quality of babaroh, and become rumak (which means house in bahasa).[5]

By the time the boats are no longer used as shelter, and they live permanently, there is a change in the size of the residence adapted to the use of space, and the number of families. As a result of the change of tread (nomadic being settled on an island) from the bourgeoisie to the crow, is the incidence of territory, which is publicly private. The boundaries between residential land are clearer, thus facilitating the expansion of living space. This is in contrast to the unclear condition of treads of residential seawater at a time when their residence is still small with considerable distances, and the number of Bajo residences is increasing with the presence of Bugis among their homes.

Anthropologists note, for the Bajo sea the sea is a reliable place in their lives, so they are often called ‘sea nomandens’. They fled to the sea for avoiding war and turmoil on land. Since then, there have been boat humans which fully alive on the water. Bajo Tribe name given by other tribal residents on the island of Sulawesi or outside the island of Sulawesi. While the citizens of the Bajo tribe call themselves as the tribe “Same” and calling people outside his tribe as the tribe “Bagai”. Bajo tribal settlements spread widely in the waters of Sulawesi and surrounding islands. Its population is spread from Sabah Malaysia, the Philippine archipelago and the South China Sea, among others in Manado waters, Kendari Southeast Sulawesi, to Bajo Tribe in Central Sulawesi encountered in Togian Islands.
Tomini Bay, Tojo Una Una, Banggai Islands, Coastal Toli-toli, Parigi Moutong and Coastal Poso. Population and its distribution, among others; in Toli-toli twelve villages, Parigi Moutong two villages, one village Donggala, Tojo Una Una six villages, Poso two villages, Banggai five villages. Although the settlements are spread far apart, they are still in a kinship. One of the local wisdom of the Bajo Tribe is the adaptability of the outstanding Bajo Tribe.

The state of Bajo settlements shows clear patterns by forming groups according to their family clusters, there is also a pattern of following parallel to the connecting road between the plains of the hill so as to be linear. Overall, the pattern that emerged from the Bajo Kabalutan settlements was the pattern that formed the letter U, the trend of the pattern is to accommodate the existing socio-cultural conditions. The U-shaped pattern provides wide space for easy accessibility to the settlement. The open space at the midpoint of the meeting in the settlement area tries to accommodate the ecological balance so that the development and movement of aquatic biota around the settlements have a free space.

From the survey results found local wisdom is generally applicable to the concept of environmental arrangement of the Bajo tribe, the pattern of structuring and development in linear that follow the shoreline or island by selecting a certain area on the location (in local terms ber "hall" that is the area of the basin on an island / beach) which they think is the most ideal place, because it has several advantages in terms of nature. These areas generally have good coral reefs, sheltered from western winds (certain times that have the highest wind speed in the area), the waves are relatively quiet but have good tidal flow and smooth, areas that are protected from storms and have good access to the sea or to the land area, in this case the area of land or island is large enough that they use as a gardening area and have a fresh water source from the storm and have good access to the sea and to the land area, in this area in the form of a large land or island that they use as an area for gardening and has a fresh water source.

Although the pattern of settlement arrangement is not regular because they build the house only consider the condition of nature, and seen some houses on the land close together and very crowded. While the existing house at sea lies far apart.

The condition of the existing house on the mainland is very solid The conditions of the houses on the sea are mutually exclusive

Figure 3. Spatial Environmental Condition of Island Kabalutan

The pattern of arrangement of their settlements in groups according to the closest family relationship with the pattern of the road as a liaison between the coral hills with existing facilities around their homes, sehingga form a pattern similar to the letter U which provides accessibility accessibility. The U-shaped pattern linearly follows the coastline or pulause so as to accommodate the ecological balance and the development of marine biota around the settlements have free space.

Bajo tribal settlements are always oriented in two directions ie at the front and back of the dwelling. The orientation of the front of the dwelling is directly related to the access roads in the form
of wooden bridges or the mainland area (outer side of the tilted coral hill), while the orientation towards the back of the dwelling into the waters (sea) in accordance with the character of the settlement with the center of water-based activities. On the back of this dwelling has its own uniqueness in terms of function, in this section is always equipped with a porch / terrace which is used as a place to sit / rest in the afternoon and evening, and also used as a place to manage the seafood and bersandarnya their ship at the anchor.

![](image)

Access, connected with tetean

**Figure 4.** Tetean as inter-house access that is on water

Interconnection between houses with tetean made by wood, as well as used as a gathering room or social space. While the existing dwelling on land, dihunbungkan with roads from the pavement that is a help from the government.

The process of spatial development of Bajo settlements on the island of Kabalutan, strongly influenced by their life orientation and attachment to the sea. Their village was originally inhabited by Bajos who had different stratifications, the highest level of a Ponggawa (leader) who had knowledge of marine life as a source of life, known as Lolo Bajo (Chief Tribe). Historically, they originally came from a family group that constantly lived on a boat, then settled and formed a village to this day. They live as fishermen, throw nets, fishing (seaweed), sometimes stop and moor boats on the island or around corals that have abundant sea produce.

3. Development of Spatial Arrangement of Settlements

In figure 5, there are seven elements that influence the development of spatial settlement in Kabalutan Island, one of which is the most powerful human interaction with nature. These elements can be seen in the elements of settlements arranged in the major orientation on the sea, and in accordance with local geographical conditions of sea water, hills, rocks, and forests. They also exploit the natural potential around as a source of life based on nature's character, recognizing natural signs, especially at sea (searching for seafood as fishermen)
Figure 5. Scheme of elements that affect the development of spatial architecture of the settlement of Island Kabalutan

Fenomena from the uniqueness of the Bajo Tribe which is the basic value and the principle of life is, united with God the creator of nature, maintaining tradition and keeping the sea. The concept of cultural diversity and tribe (Bajo Tribe, and Bugis Tribe) located on the island of Kabalutan, is a mutually beneficial relationship, so that achieved a safe, peaceful and prosperous life.

Spatial order is a series of relationships between the elements of space and humans are in it, arranged based on certain patterns based on the rules that make it and have the meaning as a whole [6]. There is access by sea as the front side, as the inhabitants of this region spend most of their time on the chart (on a boat) foraging at sea. They retain life near the sea by erecting a shelter-shaped dwelling, on a shallow sea (0.5-3 m), with settlement patterns spreading over water, and linear patterns of settlements on the coast.

Figure 6. Spatial Order of Kabalutan Island Settlements

The picture above explains that when the settlements (houses) are located on the water and on the coast will form an individual pattern. Meanwhile, when settlements (houses) are located on the land will develop to form elongated patterns, patterns form open spaces and joint patterns. This explains that initially formed individual settlement patterns then develop into elongated patterns, patterns forming open spaces and joint patterns. Individual settlement patterns are formed due to coastal
linkages in this case livelihood activity and adaptation to the environment. The elongated pattern is formed by the influence of the movement pattern of the community toward the coast in terms of community activities related to the livelihood. While the pattern of open space and joint patterns formed from groups of houses due to kinship factors.

![Diagram of spatial spatial atmosphere of settlement of Island Kabalutan](image)

**Figure 7.** Illustration of spatial spatial atmosphere of settlement of Island Kabalutan

Based on the rules of spatial arrangement, the settlements on the island of Kabalutan, including in settlements whose arrangement does not adhere to irregular cities. Irregular cities can be said are settlements that are not designed but grow based on social logic space [7]. There are several groups of homes that have the concept of individuals without planning with the pattern of the home order with different orientations according to availability of land that is ad, both in the waters or above the reef (mainland). This is because there is no clear plot limits on the land so that the growth of the house also adjusts to the available land available. The structure of residential space.

**Table 1.** Site conditions and aspects that affect the spatial layout of the settlement architecture of Kabalutan Island

| Side Condition | Change of Form home | Settlement Patterns | Physical Aspects | Non-Physical Aspects (Social Culture) |
|----------------|---------------------|---------------------|-----------------|--------------------------------------|
| Sea (on water) | Shelter on the boat | Flocking            | Conditions and traditions of the sea | Attachment to the Sea, Sea as the main orientation |
| SeaSide        | Houses on stilts on the coast. | Individual pattern | Sea Condition | Place Adaptation, Natural Way of living. |
| Coral (land)   | Coral (land) House on stilts water becomes a house on the mainland. | Individual and elongated patterns | Ocean and Coral condition | Linkage to the beach, solidarity to work, A Natural and collective way of living. |
| Hill           | House of the family stage and a place of | The pattern is elongated and | Sea and hill conditions | Solidarity due to work and kinship |
Table 1, explains that the adaptation of the place due to the linkage to the sea causes the sea area to become a residence, so that the land arrangement in the waters serves as a land of livelihood and settlement. When a natural way of settling forms a settlement as part of a livelihood field, then the meaning of living is as a place to live and settle. So that the function of the sea turned into a settlement, then the meaning of settlements evolved into a common space.

4. Conclusion
The area of Kabalutan island settlement has a unique spatial arrangement, the sea as the main space that forms the spatial arrangement of its settlement, which is patterned like U-letters is not symmetrical, ie the main orientation is the sea as the central area, surrounded by settlements on hills and rocks.

The spatial theory of the architecture of the settlement of the island of Kabalutan is influenced by seven elements, namely (1) human-natural interaction, (2) natural condition, (3) kinship, (4) main orientation, (5) historical adaptation, (6) tradition, (7) socio-economic. These seven concepts come from a central principle that the sea is the main source of life of the Bajo tribe in Kabaluatan Island.

5. References
[1] Lang, J., 1994, Urban Design: The American Experience, New York: Van Nostrand Reinhold.
[2] Rapoport, A. 1977, Human Aspects of Urban Form: Towards a Man-Envirnment Approach to Urban Form and Design, New York: Pergamon Press.
[3] Mulyati, Ahda, Sama in Lao as the Foundation for the Establishment of Bajo Tribal Architecture in Central Sulawesi’s Kabalutan Island, Dissertation, PPS of Gadah Mada University Yogyakarta.
[4] Lowe, 2003, The Magic of Place: Same at Sea and on Land in Sulawesi, Indonesia, in Bijdragen tot de Taal, Land-en Volkenkunde, 2003, Leiden, http: www.kitly-journls.nl
[5] Syam, Syahriana, 2016, Community Attachment to Public Space Vernacular on Ethnic Settlement, The 10th International Symposium on City Planning, Makassar Indonesia.
[6] Purbadi, YD, 2010, Tribal and Spatial Arrangements on Dawan Tribal Settlement Architecture in Kaelbaun Village on Timor Island, Dissertation, PPS Universitas Gadah Mada Yogyakarta.