Model Design of Traditional Settlement of Sasak Limbungan, East Lombok Regency, West Nusa Tenggara

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Abstract. Traditional settlements can be a form of identity of a community. Research on the Sasak Limbungan traditional residential garden has resulted in a residential garden design concept that is loaded with cultural values of the Sasak people and forms the basis for this research. This study aims to analyze and formulate the Sasak of Limbungan traditional settlement design concepts through identification of the characteristics of traditional settlements and the factors forming settlements, a study of the elements of settlements, layout, and symbolism, as well as a study of aspects of traditional settlement layout. The study used qualitative methods and took locations in Limbungan Hamlet, East Lombok. Data collection was carried out through interview techniques, library research, and field surveys. The results showed that the Limbungan traditional settlement had a cluster/group pattern. The formation of settlements is influenced by aspects of social coating, religion, and kinship ties. Forming elements of settlements consist of traditional Bale, Panteq, cages, courtyards, roads, fences, agricultural land, and mosques.

Keywords: design, traditional settlement, Limbungan, cluster

1. Introduction
Indonesia is a country with a variety of cultures and various ethnic groups spread throughout the country. The geographical conditions of Indonesia with a naturally formed landscapes form a variety of patterns and behaviours in the life of a community or ethnic group. The existence of each community group has a distinctive cultural character which is contained in regional traditions, social activities, as well as the layout of dwellings and settlements that are used to support life. One of the ethnic groups in Indonesia has a distinctive culture is Sasak tribe that fits on the island of Lombok.

The Sasak people still maintain the teachings of their ancestors by still following the philosophy of life in Lombok, Lombok Mirah Sasak Adi, which makes the basic principles of life and even has become the Sasak people’s motto. This philosophy is considered as a valuable culture and has a significant influence on the formation of attitudes, character and principles of the Sasak tribe [1]. One of the Sasak tribes that has a cultural landscape in the form of traditional settlements is the Limbungan Village. The Limbungan village has two traditional settlement groups, namely East and West Limbungan. The Limbungan village settlements are famous for their unique settlement arrangements which form very regular patterns. The layout of the house and its circulation patterns are arranged in such a way as to form a grid pattern
The vernacular architecture was built to meet the specific needs of its inhabitants to accommodate cultural values and ways of life based on culture [3]. Limbungan traditional settlement is seen as a form of adaptation to the environment, where the geographical conditions of one of the earthquake-prone areas. This threatening environment has made traditional settlement in Indonesia are built to adapt the conditions [4]. However, lack of study about traditional settlement design concepts results in a lack of Indonesian garden characteristics in general [5]. Ignorance about the value of culture in the architecture and the traditional settlement result in lower community efforts to preserve the cultural heritage traditions [6]. In order to obtain a real picture of traditional Sasak settlement, the study about it have to be conducted, so it can be preserved and can be applied by The Sasak people. Objectives of this study were to identify elements, layout and interpretation and to compose them into a traditional Sasak settlement design concept.

2. Method

This research was conducted in Limbungan Village, Suela District, East Lombok Regency. Limbungan Village is located at the foot of Mount Rinjani [Figure 1]. The area of Limbungan village research area is 9.2 Km². This study was conducted by using descriptive approach through literature review, interviews and cultural exploration, as well as a field observation. Information obtained through historical and exploration of history and culture with a comparative approach to compare the past and future [7].

The study was started with a preparatory phase which included problem definition and goal setting, followed by doing a preliminary study to collect secondary data about history and culture related to the Sasak Limbungan traditional settlement design. The next step in this study was data collection through literature study, interviews with experts, as well as field observations. The study was conducted to explore written sources are obtained from journals and books recommended by the experts. Interviews were conducted to obtain cultural and historical information about Sasak Limbungan. This is information was obtained from village chiefs in the traditional cillages and historians, followed by their knowledge about culture and history of Sasak Limbungan. This stage is carried out using the depth interview directly and deeply to the informant related about the character and culture of the Sasak community, spatial layout of the settlement, forming elements, typical plants planted that grown around houses, as well as cultural activities that are still carried out by Sasak Limbungan people. The Information was gathered by using open-ended question and interactively collaborating with the informants [8].

Field observation was conducted to determine the composition of settlement elements from the Limbungan village. At this stage, a checklist of the elements should be done based on results of the literature study and interviews about cultural aspects. Site selection is done based on the potential and character in which people still carry out cultural activities. House samples are chosen based on their authenticity. The analysis is done by identifying elements and layout that must be based on cultural information and comparing them with the current conditions in the field. The final results of the research were synthesized in the form of concepts that can be used as a basic for designing a traditional Sasak Limbungan settlement.
3. Result and discussion

3.1 Characteristics of Sasak Limbungan Traditional Settlements

The Limbungan village is located in East Lombok Regency, West Nusa Tenggara. The Limbungan village is geographically located at 116°18'32" East and 8°15'59" South, with an area of around 9.8 ha. The site is divided into 2 namely West and East Limbungan. Limbungan Hamlet is located at an altitude of 600-936 m above sea level. Limbungan Hamlet has a total population of 1326 people, a total of 622 men with a population of 704 women.

The Sasak traditional settlement Limbungan has two systems of government namely the formal governance and traditional governance consists of several Kanoman (small government), which consists of a client or village head, the supreme leader named is Toak. Toak have a role in setting the rules of customary Limbungan village, became the leader of the organizers of traditional ceremonies.

The kinship system of the Limbungan Village is patrilineal and is followed by a patrilocal sedentary pattern. The Limbungan community is a relative or still has a blood relationship, most marriages are conducted with one's own relatives, although it is also possible to take a prospective wife or husband from outside the Limbungan area. The concept of kinship in the Sasak Limbungan looks quite simple. This tribe only separates their kinship into two groups, namely the family Sekurenan (nuclear family) and Sorohan (extended family). The Sasak village of Limbungan in life can’t be separated from activities related to the customs and culture of which they profess in accordance with the prevailing customs in social life and customs of indigenous Dusun Limbungan. This is evident from the ceremonies which are cultural activities that are still maintained. A ceremony, namely rites of birth, marriage, death, the rice harvest, as well as religious ceremonies [Figure 2].

The history of the formation of Sasak Limbungan traditional settlements due to the hill war, the Limbungan hill was controlled by people from Bali. When Limbungan was taken over by the Balinese, the Sasak Limbungan people moved to the Pringgabaya area and left their fields, gardens and fields in Limbungan. While living in Pringgabaya the Sasak Limbungan tribe built the economy from the start by opening up agricultural fields. Successful farming in the Pringgabaya area Sasak Limbungan tribe does not forget the rice fields in the Limbungan hill, so when there is an opportunity the Sasak Limbungan tribe returns to Limbungan hill to see the kabun and paddy fields [10].

Settlements are formed by groups of traditional houses that have a uniform shape and
face the sunrise. The Sasak Limbungan traditional settlement pattern was formed from a combination of landscape elements namely Bale adat, Panteq, Bong, roads, fences, enclosures, agricultural land, rivers, mosques, and cemeteries. That one form of settlement patterns in rural areas is cluster villages, which are clustered houses surrounded by agricultural land [11]. Apart from that the traditional settlement pattern of Limbungan is also a form of adaptation to natural conditions, as a form of defense.

Traditional houses lined up against rice barns or in Sasak language are called "Panteq". The placement of house elements in the form of panteq has a position facing each other with bale, and each bale has one panteq. The distinctive feature of Bale Sasak in Limbungan contains the Islamic concept which applies the Habluminanas concept (relations between people), This shows that the panteq has a sacred value that has an economic symbol.

![Figure 2. (left) ceremony rites of birth; (middle) merarik; (right) ceremony of religious](image)

3.2 Factors forming traditional Sasak Limbungan settlements

landscape has certain characteristics, where the constituent components combine harmoniously to form a distinctive landscape character [12]. The character of a landscape is formed from the result of interaction between nature and human action [13]. The traditional residential landscape is formed by a combination of three dominant factors, namely social level, religious/cultural level, and environmental factors. These three factors form the settlement space on the meso (neighbor) scale based on the Sasak Limbungan community activities.

The social level in Limbungan in terms of the position of toak and ordinary people is clearly implied in the form of location and position of the house in traditional settlements. The highest position in the Limbungan Village is held by the traditional leader or Toak, the second position is held by the head of the gubuq, and subsequently by the leader of the customary elders respectively the eastern Limbungan and western Limbungan.

The arrangement of traditional houses in settlements is based on kinship relations. This arrangement was applied to the house of an older person in the east, and a younger person in the west (Figure 3). In the middle there is berugaq as a mixed area between old and young. This concept also has a philosophy of honoring older people by letting the morning sun shine on the older houses first.

The orientation of the Gunung Rinjani concept to the Limbungan Village macro order, translates to the micro layout into the orientation towards the house. House construction should not be turned or facing the mountain [14]. Turning back is considered to have no values of politeness, while facing is considered to be against. Therefore, the construction of houses in Limbungan village has a direction facing west and east. This has a correlation that is in harmony with the concept of the direction of the sun.
3.3 Forming Elements of the Sasak Limbungan Traditional Settlement

Limbungan traditional settlements are formed by elements of settlements that have a certain orientation so as to form the character of the typical Sasak Limbungan traditional settlements. The elements of the Limbungan traditional settlement landscape are Bale adat, Panteq, Bong, roads, fences, enclosures, agricultural land, rivers, mosques, and cemeteries (Figure 4).

3.3.1 Bale adat (Traditional house)

Bale Sasak in Limbungan has a rectangular plan, which is divided into two rooms: the sengko room (lower room) which functions as a living room (a bowl), and Dalem Bale (upper room) consisting of a bedroom, and a kitchen. Rooms of sengko and bale are separated by undaq-undaq (stairs). In the Sasak traditional house there are no ceilings or attics. Inside the house the roof can immediately be seen. Bale roof truss can be seen directly when inside the Bale, because the ceiling of the Bale is not covered. The room ceiling is low about 2 meters high from the floor. The small distance between the floor and the ceiling causes the room cramped. All Sasak traditional settlements in Limbungan facing
east/rising sun which shows the formation of character of the Sasak community that the young must also protect the old, and if there is an enemy attack, it is the young people who must first counter the attack (Figure 4).

3.3.2 Panteq

Panteq is storing place of agricultural products. Panteq is located outside Bale, established in front of Bale. Each Bale has a panteq. Panteq in the form of a house on stilts consists of two parts, namely the top used as a place to store agricultural products and the bottom as a place to receive guests. The Sasak tribe granary is made from natural materials, namely wood and bamboo. Panteq floor is made of wood planks and the upper wall is made of woven bamboo.

3.3.3 Bong

Bong is a water reservoir outside the traditional bale building which made of clay. Not all houses have bongs, because bongs are collectively instead of privately owned to meet the needs of the community members. We can find bongs at certain angles that allow them to be used together by members of the Sasak Limbungan community.

3.3.4 Cage

Communal cages are put together and are outside the room or large yard of the original Sasak settlement, located on the edge of the settlement. The cages are located on the edge of the settlement. This is because the cow dung is considered dirty so it must be placed outside the settlement area.

3.3.5 Street

The street contained in traditional settlements are classified into main streets and footpaths. The main street is primary traffic circulation track and is also used as a space in various traditional ceremonies such as marriage and death. While the footpath, has a function as a barrier between the lines of traditional houses and as a circulation corridor to bring agricultural produce and and also as a track to the cowshed.

3.3.6 The Yard

The yard inside the traditional settlement is used by the community as a space for traffic circulation corridor. The front yard is used as a place to carry out various traditional ceremonies. The backyard functions as a small garden planted with a variety of vegetable plants. In addition, the front yard can be used as a place for drying the agricultural products of the population.

3.3.7 Bounderies

Fences located in the traditional settlements Limbungan is made of wood and banten trees. In a micro space every 2 (two) to 5 (five) houses are separated by a fence. The is opened in the morning and closed during the night. This practice is related to the security function [15]. While in the macro space level, to delineate the settlement of traditional houses and permanent houses, a stone fence with 1 m high is used as a symbol of security and boundaries.

3.3.8 Mosque

The Limbungan traditional settlements are characterized by the presence of a mosque in the front and a small mosque in the back of the traditional settlement. This is a symbol that the Limbungan community is a religious population who adheres to worship. Mosque (langgar), as a sub center of activity. The Elements of this place of worship is a unifying symbol
Limbungan population, because the functions used by all residents of the Limbungan village (multi-function).

3.3.9 Agricultural land
The Limbungan community has a livelihood as a farmer. Rice fields and fields are located outside the traditional residential area. The Limbungan community cleared forest land into agricultural land and settled in 1919. In the rainy season farmers grow rice with a rainfed system while in the dry season farmers grow tobacco and corn.

3.3.10 Ancestral tomb
The ancestral tomb is a place of ritual. This space has a tertiary territory function that is considered important, because it is a public space that has high sacred value. The ancestral tombs consist of low to high level tombs, namely the tombs of Rujuq, Batu Maliq, Pepadang, Gunung Bentar, and Samak Borok.

3.4 The patterns of Sasak Limbungan Traditional Settlement
The character of traditional Sasak Limbungan settlements is influenced by the belief systems according to cosmo/cosmology values, and kinship systems. Every family that has a kinship tend to form grouped settlements. The cluster village is a pattern of settlements where the population lives in groups surrounded by rice fields. To show the pattern of settlements that have their own characteristics and uniqueness is illustrated through the image of the Region (Table 1).

| Tabel 1. Image of Sasak Limbungan Tribal Traditional Settlement Area |
|-------------------------|--------------------------------------------------------------------------------|
| Path                    | Paths in the traditional settlements is in the form of large roads and footpaths, the footpaths serve as a barrier between the rows of the traditional houses and as a circulation space to carry agricultural produce and the road to the stable |
| Edge                    | Traditional residential areas and permanent enclosed by stone fences and green/vegetations fences |
| District                | As an administrative area, The Limbungan village has clear boundaries with other surrounding areas. |
| Symbol (Node)           | Symbols in traditional Settlements Limbungan cannot be identified |
| Landmark                | Mount Rinjani as a background of traditional Sasak tribe settlement which has a strong vertical cosmos concept. Mount Rinjani is a source of supernatural power because it is a place of residence of Dewi Anjani. Dewi Anjani is a trusted figure respected by the Sasak Tribe. Mount Rinjani affect the formation of settlements in the hamlet factor Limbungan, that people in the hamlet Limbungan believe that the higher somewhere then the closer man with heaven, God and nature |

Bale in Limbungan traditional settlements erected on the slope area. Bale in a traditional Limbungan settlement was established in the slope area. This settlement is limited by a fence that serves as a defense, part of the fence in the form of plants are also used as material for certain ceremonies. Bale construction uses the concept of mirror or facing between custom bale and panteq. Beside the traditional settlement near the fence there is a cattle shed. The concept of veneration in sepengkula is also manifested in sepengkula in housing, namely the construction of bale made based on seniority in the kinship system.

The development criteria area: high low and sun orientation. The layout of the housing
space is arranged according to a hierarchy according to their beliefs. Building elements which are considered having high values are placed at the front, and those with lower sacred value are placed at the rear. This layout of building element forms a hierarchical settlement pattern. The higher the level of one’s seniority, the higher the location or place used to build the bale. Consequently, if someone has a lower seniority level must accept the location of a lower place as well.

Based on this concept, the placement for residents of Bale is based on the topography of Mount Rinjani. The closer a place/location is to Mount Rinjani, the higher the position / location is. The picture illustrates the placement of elements according to the concept of the Mount Rinjani cosmos Figure 5. The orientation of the concept of Mount Rinjani to the macro structure of the Limbungan Village, renewing it to the micro-layout, is the direction towards the house. The House construction cannot be backed or facing the mountain. Turning back is considered to have no values of politeness, while facing the consideration of climbing a mountain piercing a mountain. Therefore, the construction of houses in Limbungan Village has a direction facing west and east. This has a conversion that is in harmony with the concept of direction toward the sun (Figure 6).

3.5 Traditional Spatial Structure of Sasak Limbungan Settlement
The space of Sasak Limbungan traditional settlement space is formed by the culture of the Sasak people who are very closely related to religious and kinship factors. Religious and kinship factors shape social strata so that it influences the spatial pattern of community activity. The traditional residential layout of the Sasak Limbungan community can be classified in three types, which are spatial according to function, spatial according to nature, and spatial according to activity.

Based on the function of space, traditional Sasak Limbungan settlements can be divided into living space (traditional bale), social space (berugaq, panteq, and, mosque), and
production space (agricultural land and cages). Based on the nature of space, settlement space is divided into public spaces (bale deliberations, courtyards, berugaq, neighborhood roads, and cemeteries) and private spaces (traditional bale and agricultural land). Based on the trust room, the Sasak Limbungan traditional settlement space is divided into profane space (agricultural land and stable) and sacred space (mosque, traditional bale, and cemetery).

3.6 Design Concepts of the Sasak Limbungan traditional Settlement

Based on the description that has been explained related to the Sasak Limbungan settlement patterns, spatial concepts, vegetation concepts, and circulation concepts, the traditional design concept of Sasak Limbungan traditional settlement design concepts are as follows:
1. Sasak Limbungan traditional settlement is a cluster design settlement.
2. Each cluster consists of several traditional houses on which the owners have with kinship ties.
3. Sasak Limbungann traditional settlements provide private, open space for community members/cluster dwellers.
4. Public space is limited to sharing as well as social facilities in settlements.
5. Space for settlement is arranged with the concept of private open space into buffer space and boundaries between clusters in the settlement.

![Figure 7. The concept of landscape design of traditional settlements](image)

4. Conclusion

Sasak Limbungan traditional settlements are formed by groups of houses in which the owners have kinship ties. The traditional settlement pattern of Limbungan is highly influenced by the culture and philosophy of life that prevails in the community. The factor of population confidence in the security factor views the east as the preferred direction as a source of strength and is also supported as a means of defense. Limbungan traditional settlements are formed by a combination of three factors, namely social strata, religious factors, and kinship factors. The elements of traditional settlement consist of Bale adat, Panteq, Bong, roads, fences, enclosures, agricultural land, rivers, mosques, and cemeteries. The approach of traditional residential spatial planning in Limbungan can be divided into macro and micro residential spatial planning. The design concept of this traditional settlement is clustered settlement with the division of residential space in the form of private space, public space, and cultural space.

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