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The Impact of Local Wisdom on the Coastal Settlement Spatial Configuration in the City of Parepare

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Abstract

Soreang Settlement is located on the waterfront of Parepare City in South Sulawesi, Indonesia. Initially, it was inhabited by the Soreang kingdom community and then developed due to by local culture. This research was to explain the influence of local culture on the spatial configuration of the Soreang settlement. The research method used is a synchronic reading analysis technique, which is supported by ArcGIS and the space syntax methods. The results of the research are: the first, the spatial configuration of Soreang settlements is influenced by three local cultures, namely *Sipakatau* cultural meaning is sense mutual respect, *Sipakalebbi* cultural meaning is sense of equity and *Simasemaseang* cultural meaning is sense of family. The second, the *Simasemaseang* culture, infact to a clustered settlement pattern formed. *Sipakalebbi* culture in fact to settles into a linear and spreading pattern formed, whereas *Sipakatau* culture in fact to a settles into an elongated and centered pattern formed. Third, *Simasemaseang* culture forms the most integrated spatial configuration. This research might well be utilized to generate a design for waterfront settlement based on local wisdom.

Keywords: Local wisdom; settlements; spatial configuration; waterfront

1. Introduction

Soreang settlement is the first settlement formed since the beginning of the formation of the City of Parepare known as the Kingdom of Soreang [1]. According to *Lontara*, in the XIV century, a son of King Suppa left the palace and went south to establish his settlement area on the waterfront because it has a hobby of fishing, initially consisting of several plots of houses, as the population grew and was influenced by the activities that occurred now developing to form groups of settlements that are bound to each other with various settlement patterns.

The aspect that develops the settlement group is the activity of local wisdom, which is part of a society's culture and should be used as a principle/guide to life. Local wisdom is made up of three principles: *Sipakatau*, *Sipakalebbi* and *Simasemaseang* cultures, which are still followed as a basic of community life and are firmly maintained by the people of Parepare [2].

In Buginese philosophy about people, *Sipakatau* is the essential component that maintains all of our human ways [3], humanizing one another regardless of origin. *Sipakalebbi* means "to complement one another", meaning that both humans and nature need to comprehend one another. This includes seeing one's own characteristics in others and appreciating one's own inherent abilities by experiencing and living in harmony with nature. Love, care for, aid, collaborate, give, and have a deep sense of kinship with one another is what *Simasemaseang* implies.

Local wisdom's three principles are essentially concepts of connectedness that serve as guidance for social interaction and relationships. Claims that a community's social interaction, namely its sense of oneness, has a substantial influence on the urban space arrangement [4]. In his book "Human Aspect of Urban Form"[5], he proposes three aspects that determine the space and structure of the built environment, including culture, physicality, and mechanism. This characteristic of culture is used to assess its influence on the space formed in coastal settlements [6] and [7].

A study is needed to interpret the textual form of local wisdom into the distribution pattern of coastal settlements, explain its influence on the configuration of the space formed by measuring the connectivity and integrity of space using space syntax analysis, and use it as a reference in structuring coastal settlement areas by looking at the conditions of settlements that carry local wisdom. The conclusions of this study are critical for the growth of architectural science, particularly in terms of understanding the form of coastal areas while taking into consideration the effect of local wisdom.

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2. Research Method

A mixed methods approach describes the impact of local wisdom on the spatial configuration of coastal settlements [8]. In this study, mapping methods using Arcgis software and space syntax analysis methods were used to enhance synchronic reading analysis approaches [9] in [10]. Researchers utilized synchronic reading analysis approaches based on field observation data [11], as well as settlement mapping with Arcgis software, to translate literary forms of culture into settlement distribution patterns. Meanwhile, the space syntax approach [12], is used to investigate and describe the culture of *sipakatau*, *sipakalebbi*, and *Simasemaseang's* influence on space configuration.

The space syntax analysis approach is used to determine axiality, convexity, and isovist. Convexity is used to examine interactions in space (interior), whereas Isovist is used to test how far the eye can see when moving in one direction [13]. Axiality is the ability to determine the longest line of a road segment by drawing it through the axial line using the idea of the longest line that can be seen and to monitor movement. In order to assess the space's connectivity and integrity, only the axiality of coastal towns is measured in this study.

Based on their administrative territories along the seaside areas of the Makassar Strait in Parepare City, South Sulawesi Province, Ujung Sabbang Village, Kampung Pisang Village, Lakessi Village, and Wattang Soreang Village were separated into four zones. The research location is shown in Fig. 1.

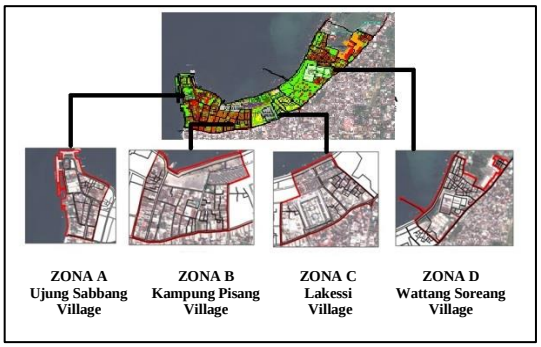

Figure 1. The research site is in Parepare City's Coastal Settlement

3. Results and Discussion

3.1. *The Parepare seaside communities' arrangement has evolved in response to cultural influences*

The distribution of settlement patterns carrying cultural principles is mapped using a sample system at two or three delineations in each village, exhibiting the interpretation of the literary form of local wisdom in the shape of a map of Parepare City's seaside region. Figure 2 displays the culture of four village's: Ujung Sabbang Village's *Simasemaseang* Culture and *Sipakatau* Culture; Kampung Pisang Village's *Simasemaseang* Culture and *Sipakatau* Culture; Lakessi Village's *Simasemaseang* Culture and *Sipakatau* Culture; and Lakessi Village's *Sipakatau* Culture. Wattang Soreang is a settlement where the cultures of *Simasemaseang* and *Sipakalebbi* interact.

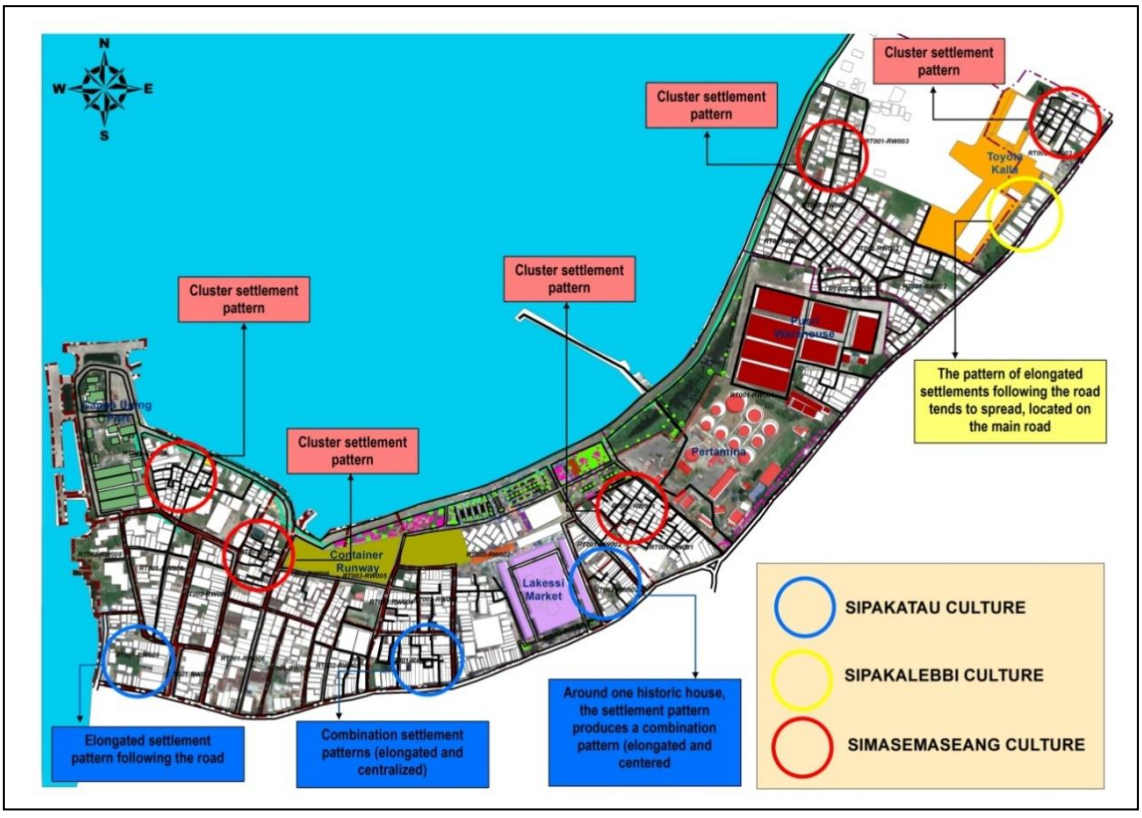

Figure 2. Map of cultural representation based on the layout of settlements created in Parepare City's Seaside Area

3.2. *The three cultures of the city of Parepare have created a unique configuration of coastal settlement space*

In measuring the interactions/relationships between road networks in a spatial configuration, apart from using the RA (integration result) calculation to see the depth of space, we also use the Depthmap x-0.50 software. The use of simulations with UCL Depthmap x-0.50 can produce differences in depth analysis by providing a spectrum display to blue where the red color indicates the area that receives the most movement and is most integrated with other spaces or roads [14]. While the blue color indicates the area that receives the least movement and is also the least integrated with other spaces or roads. The results of the spatial configuration are as follows:

a. *Ujung Sabbang village's coastline settlement space configuration*

The spatial configuration indicated in Figs. 3 and 4, the settlements in Ujung Sabbang Village bear the *Simasemaseang* and *Sipakatau* culture.

The influence of *Simasemaseang* Culture on the Spatial Configuration of the Ujung Sabbang Settlement is shown in Fig. 3. (a) Shows that the location of Ujung Sabbang via google earth image 2019, (b) show in the *Simasemaseang* civilization, the spatial structure of the clustered settlemen pattern is positioned on the edge of the sea, (c) draw an axial map with the observation point at Lontangnge harbor street so that the steps to the deepest section, (d) as shown in the access diagram, may be counted it takes 6 steps (step depth) with a total of 110 steps to reach the deepest side, the RA value is 0.109, showing that the spatial arrangement is integrated. (e) Road section 0 (Lontangnge Harbor street), roads 5 and 3, highlighted in red and orange, have the highest connectedness, suggesting that the road network is most directly connected to other roads. Meanwhile, the road network with limited connection is designated in teal and dark blue on roads 24, 17, 27, 18, 25, 26, 22, 13, 32, suggesting that the road network is at least connected to other road networks. (f) The road segment 0 (Lontangnge Harbor street), roads 5 and 3, shown in red, has the highest integration, suggesting that the route is the most accessible to users, is busy with varied activities, and is easy to access. While sections 24, 18, 25, 32, and 27 are marked with a dark blue color, indicating that the road is accessed by the fewest people, is quiet from activities, is difficult to access, is not connected (dead end), and has the potential to be ignored, sections 24, 18, 25, 32, and 27 are marked with a light blue color, indicating that the road is accessed by the fewest people, is quiet from activities, is difficult to access, and has the potential to be ignored.

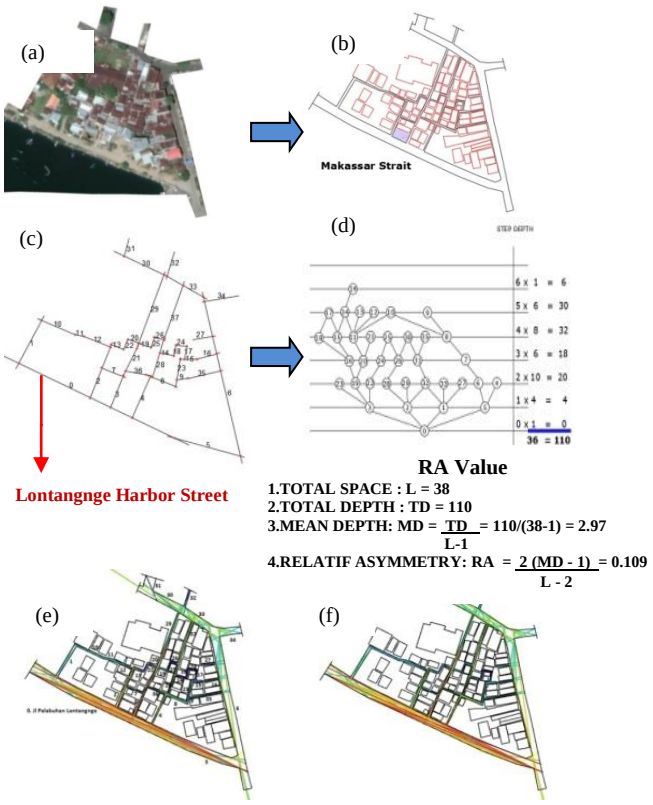

Figure 3. *Simasemaseang* Culture analysis map of Ujung Sabbang (a) Location map, (b) Map of Sipakatau culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

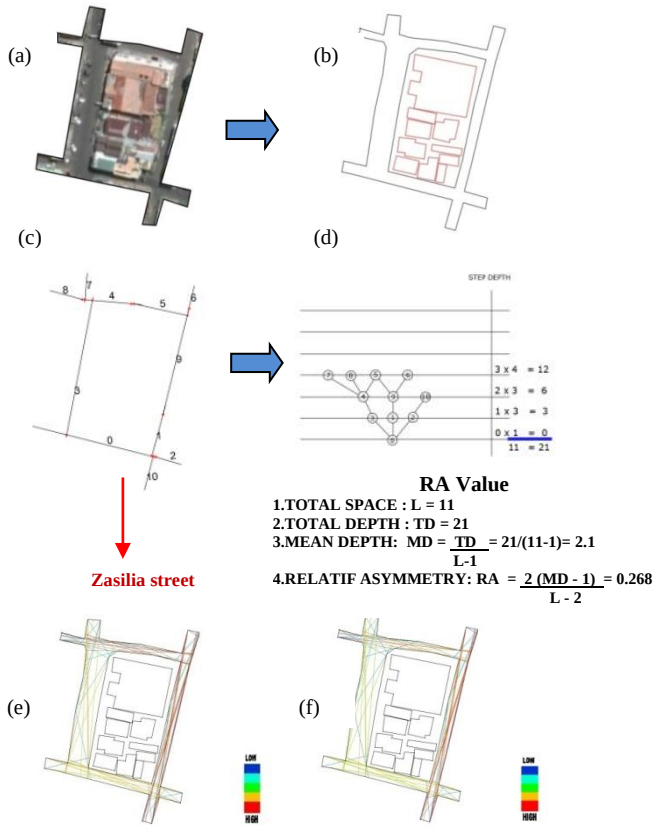

Figure 4. *Sipakatau* Culture analysis map of Ujung Sabbang (a) Location map, (b) Map of Sipakatau culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

Figure 4 shows in the influence of *Sipakatau* Culture on the Spatial Configuration of the Ujung Sabbang Settlement. (a) Shows that the location of Ujung Sabbang via google earth image 2019, (b) show in the *Sipakatau* civilization, the spatial results in an elongated settlement pattern that follows the road, (c) illustrates an axial map with observation points from section 0 so that steps can be computed to reach the deepest part, as shown in the access diagram (d) It takes 3 steps to reach the deepest side, for a total of 21 steps, a RA of 0.268 indicates that the spatial arrangement is integrated. (e) Road sections 1 (Zasilia street) and 5 (Zasilia street) have high connectivity, suggesting that the road network is most directly connected to other roads. Meanwhile, roads 8 and 2, which are shown in teal and dark blue, respectively, have minimal connectivity, indicating that the road network is at least connected to other road networks. (f) The highest levels of integration are seen on road sections 1 (Zasilia street) and 5, which are highlighted in red. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Meanwhile, the least integrated parts are 8 and 2, which are indicated with a dark blue color to indicate that the road is used by the fewest people, is quiet from activities, is difficult to access, and is not connected (dead end).

b. Kampung Pisang village's coastline settlement space configuration

The spatial configuration indicated in Figs. 5 and 6, the settlements in Kampung Pisang Village bear the *Simasemaseang* and *Sipakatau* culture

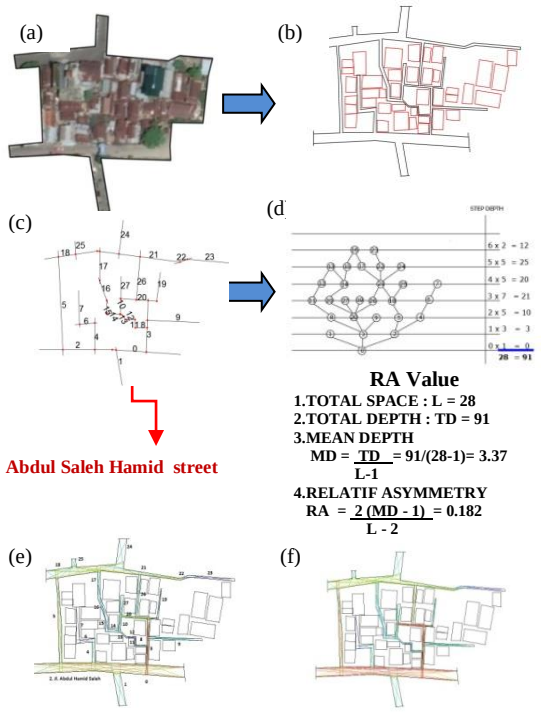

Figure 5. *Simasemaseang* Culture analysis map of Kampung Pisang (a) Location map, (b) Map of Simasemaseang culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

The influence of *Simasemaseang* Culture on the Spatial Configuration of the Kampung Pisang settlement is shown in Fig. 5. (a) Shows that the location of Kampung Pisang via google earth image 2019, (b) show in the *Simasemaseang* civilization, the spatial layout results in a clustered settlement pattern near the sea. (c) illustrates an axial map with observation sites from Abdul Hamid Saleh street so that the steps to reach the deepest segment may be estimated, (d) as shown in the access diagram, it takes 6 steps (step depth) to reach the deepest side, for a total of 91 steps, the RA value of 0.182 suggests that the integrated spatial arrangement is good (e) Road 2 (Abdul Hamid Saleh street), roads 0 and 3 (shown in red and orange) have the highest connectivity, indicating that the road network is most directly connected to other roads. While the road network with poor connectivity is shown in teal and dark blue on roads 16, 15, 12, 11, 13, 27, 19, 9, 6, 7, 25, 24, and 23, suggesting that the road network is the least connected to other road networks. (f) The highest level of integration is seen on road section 2 (Abdul Hamid Saleh street), which includes roads 0, 20, 5, and 3, all of which are marked in red. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Meanwhile, the lowest integration occurs on sections 16, 15, 12, 11, 13, 27, 19, 9, 6, 7, 25, 24, and 23, which are marked with a dark blue color to indicate that the road is accessed by the fewest people, is quiet from activities, is difficult to access, is not connected (deadlocked), and has the potential to be used as a garbage disposal site.

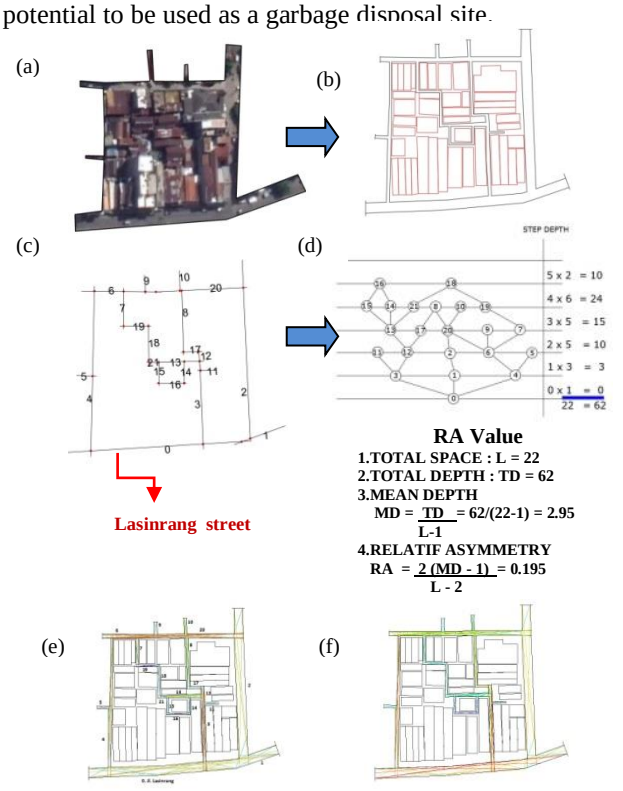

Figure 6. *Sipakatau* Culture analysis map of Kampung Pisang (a) Location map, (b) Map of *Sipakatau* culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, and (f) Maps of integration analysis

Figure 6 shows in the influence of *Sipakatau* Culture on the Spatial Configuration of the Kampung Pisang Settlement. (a) Shows that the location of Kampung Pisang via google earth image 2019, (b) show the spatial configuration in *sipakatau* culture forms a combination settlement pattern (elongated and centered). (c) The *Sipakatau* culture's spatial configuration depicts an axial map with observation points from Lasinrang street with circular routes and connected to each other to move from one place to another so that steps can be counted to arrive at the deepest segment, (d) Illustrated in the access diagram, it takes 5 steps (step depth) to reach the deepest side, for a total of 62 steps, and the RA value of 0.195 indicates that the spatial arrangement is integrated. (e) The road network is most directly connected to other roads on road section 0 (Lasinrang street), road sections 3, 4, 6, and 20, which are all marked in red and orange. Meanwhile, the road network with limited connection is designated in teal and dark blue on roads 5, 10, 11, 14, 16, 17, 18, 19, and 21, suggesting that the road network is at least connected to other road networks. (f) The road portion 0 (Lasinrang street) has the most integration, while roads 3 and 4 are highlighted in red. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Sections 5, 9, 10, 11, 14, 15, 16, 17, 18, 19, and 21 are highlighted in dark blue, suggesting that the road has the least access to people, is silent from activities, is difficult to access, is not connected (dead end), and might be used as a dumping ground.

c. Residential space along the coast at Lakessi village

With the spatial structure shown in Figs. 7 and 8, the settlements in Lakessi Village bear the *Simasemaseang* and *Sipakatau* culture.

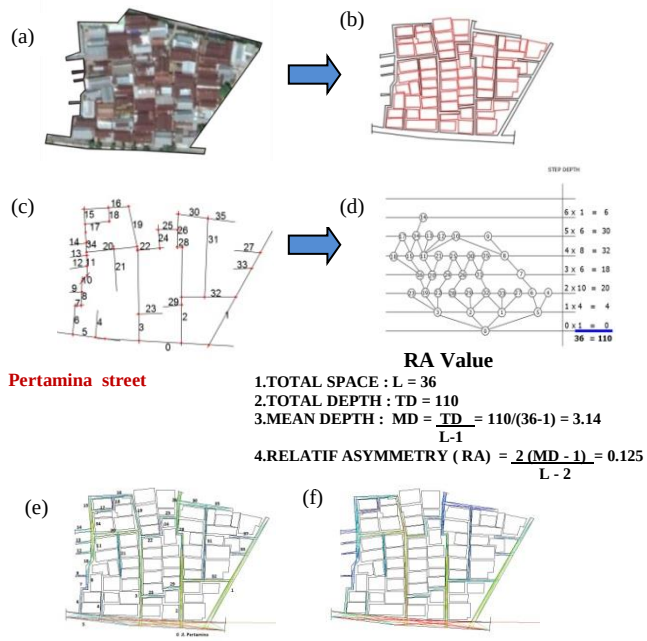

Figure 7. *Simasemaseang* Culture analysis map of Lakessi (a) Location map, (b) Map of *Simasemaseang* culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

The influence of *Simasemaseang* Culture on the Spatial Configuration of the Lakessi settlement is shown in Fig. 7. (a) Shows that the location of Lakessi via google earth image 2019, (b) Show the *Simasemaseang* culture has a clustered settlement pattern near the sea. (c) Depicting an axial map with observation points from Pertamina street so that the steps to reach the deepest segment can be calculated, (d) As shown in the access diagram, it takes 6 steps (step depth) to reach the deepest side, for a total of 110 steps, and the RA value is 0.125. (e) Road segments 0 (Pertamina street) and 5 (marked with red and orange colors) have high connectivity, suggesting that the road network is most directly connected to other roads. Meanwhile, the road network with low connectivity is designated in teal and dark blue on roads 31, 37, 33, 28, 24, 18, 21, 7, 4, 29, 14, 13, 12 and 9, indicating that it is the least connected to other road networks. (f) On road sections 0 (Pertamina street) and 5, highlighted in red, the highest integration occurs. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Meanwhile, the lowest integration occurs on sections 26, 30, 31, 37, 21, 18, 17, 14, 13, 12, 9, 4, 23, 29, and 25, which are marked in dark blue and indicate that the road is accessed by the fewest number of people, quiet from activities, difficult to access, roads are not connected (deadlocked), and have the potential to be used as a garbage dump.

Figure 8 shows in the influence of *Sipakatau* Culture on the Spatial Configuration of the Lakessi Settlement. (a) Shows that the location of Lakessi via google earth image 2019, (b) Show The spatial configuration in *sipakatau* culture forms a combination settlement pattern (elongated and centered), which extends along the road and is centered around 1 house with a circular route and is connected to each other to move from one place to another. (c) Describes an axial map with observation points from lasinrang street so that steps can be counted to arrive at the deepest segment. (d) As shown in the access diagram, it takes 5 steps (step depth) to reach the deepest side, for a total of 41 steps, and the RA value is 0.208. (e) Road section 0 (Lasinrang street), roads 3 and 7, highlighted in red and orange, have the highest connectivity, suggesting that the road network is most directly connected to other roads. While roads 10, 12, 13, 8, 9, 5 and 15 are highlighted in teal and dark blue, suggesting that they are at least connected to other road networks, the road network with minimal connection is found on roads 10, 12, 13, 8, 9, 5 and 15. (f) The road portion (Lasinrang street), roads 3 and 7, indicated in red, has the maximum integration. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. While sections 10, 12, 13, 8, 9, 5 and 15 are marked in dark blue, indicating that the road is accessed by the fewest people, is quiet from activities, is difficult to access, is not connected (dead end), and has the potential to be ignored, sections 10, 12, 13, 8, 9, 5 and 15 are marked in light blue.

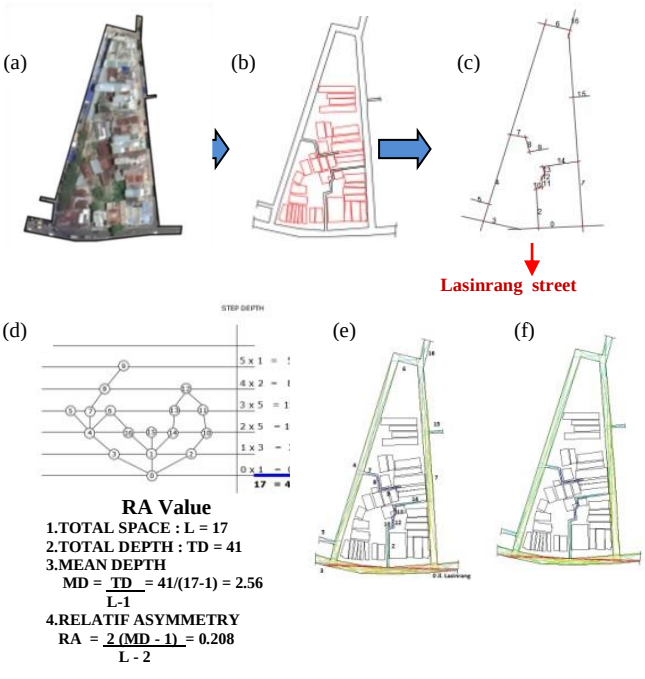

Figure 8. *Sipakatau* Culture analysis map of Lakessi (a) Location map, (b) Map of *Sipakatau* culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

d. Wattang Soreang village's coastline settlement space configuration

The *Simasemaseang* and *sipakalebbi* cultures are carried by the settlements in the Wattang Soreang Village, as shown in Figs. 9, 10 and 11.

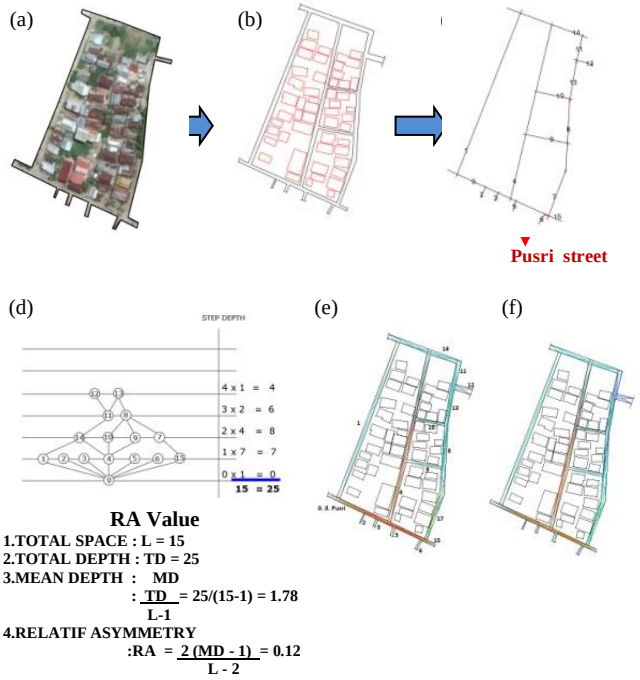

Figure 9. *Simasemaseang* Culture analysis map of Wattang Soreang 1, (a) Location map, (b) Map of *Simasemaseang* culture Settlement pattern 1, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

The influence of *Simasemaseang* Culture on the Spatial Configuration of the Wattang Soreang settlement is shown in Fig. 9. (a) Shows that the location of Wattang Soreang via google earth image 2019, (b) Show the *Simasemaseang* 1 culture's spatial configuration is a clustered settlement pattern near the sea with interconnected routes but connected by passageways to move from one place to another. (c) Depicting an axial map with observation points from Pertamina street so that the steps to reach the deepest segment can be calculated. (d) As shown in the access diagram, it takes 4 steps (step depth) to reach the deepest side, for a total of 25 steps, and the RA value is 0.12. (e) Road sections 0 (Pusri street) and 4 (marked with red and orange colors) have high connectivity, suggesting that the road network is most directly connected to other roads. While roads 2, 3, 5, 6, and 12 are indicated in teal and dark blue, suggesting that they are at least connected to other road networks, the road network with minimal connection is found on roads 2, 3, 5, 6, and 12. (f) The road sections 0 (Pusri street) and 4 (marked in red) have the highest integration. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Meanwhile, sections 2, 3, 5, 6, and 12 are indicated in dark blue, suggesting that the road is used by the fewest number of people, is quiet from activities, is difficult to reach, is not connected, and has the potential to be neglected.

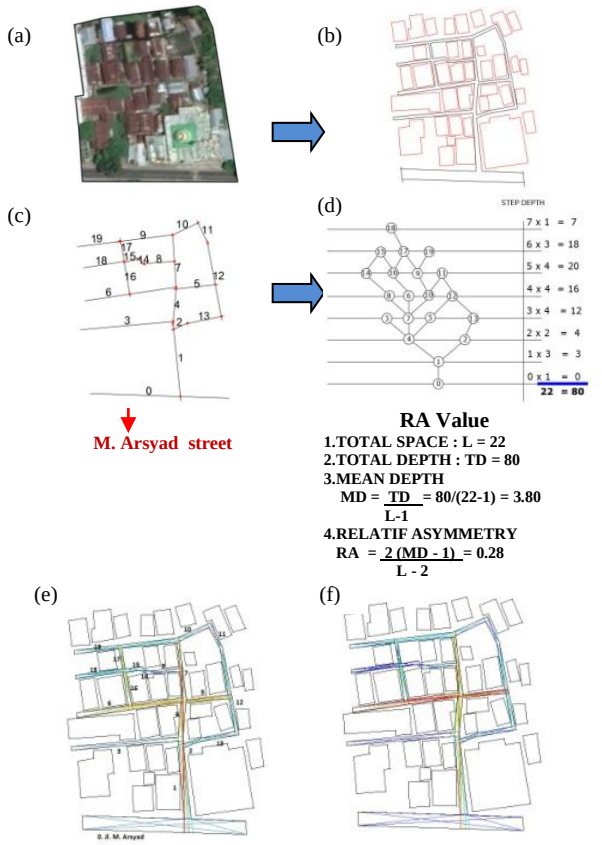

Figure 10. *Simasemaseang* Culture analysis map of Wattang Soreang 2, (a) Location map, (b) Map of *Simasemaseang* culture settlement pattern 2, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

Figure 10 shows in the influence of *Simasemaseang* Culture on the Spatial Configuration of the Lakessi Settlement 2 (a) Shows that the location of Lakessi via google earth image 2019, (b) Show the spatial configuration in the *Simasemaseang* 2 culture forms a clustered settlement pattern near Toyota with interconnected routes but not connected to the main road. (c) Depicting an axial map with observation point from M. Arsyad street so that steps can be counted to arrive at the deepest segment. (d) Illustrated in the access diagram, it takes 7 steps (step depth) to reach the deepest side, for a total of 80 steps, and the RA value is 0.28. (e) Roads 1, 4, and 7, which are colored red and orange, have high connectivity, suggesting that the road network is most directly connected to other roads. Meanwhile, the road network with minimal connectivity is marked in teal and dark blue on roads 8, 14, 15, 18, and 3, showing that it is at least connected to other road networks. (f) The red-colored roadways 1, 4, 5, and 6 have the highest level of integration. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. Sections 6, 17, 15, 14, 8, 11, and 3 have the lowest integration, indicating that the road is visited by the fewest people, is quiet from activities, is difficult to reach, is not connected, and has the potential to be utilized as a location to reside. removing rubbish.

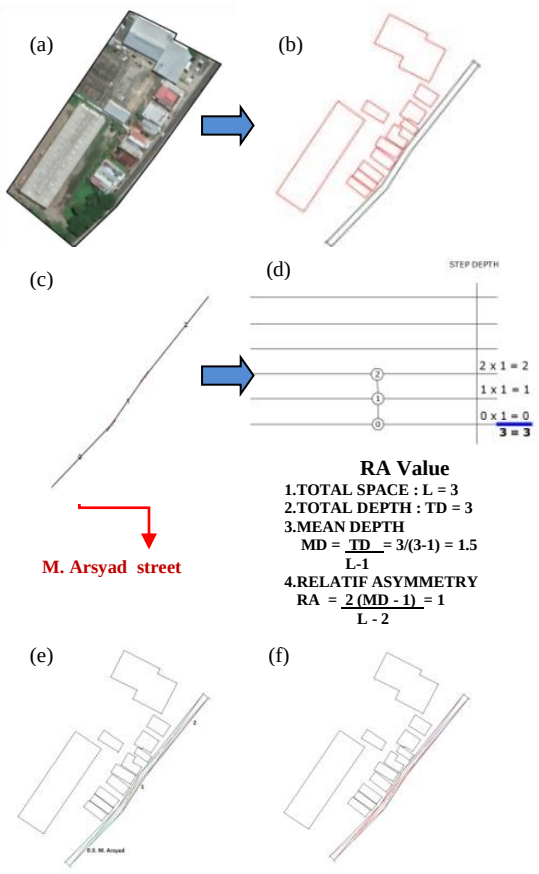

Figure 11. *Sipakalebbi* Culture analysis map of Wattang Soreang (a) Location map, (b) Map of *Sipakalebbi* culture Settlement pattern, (c) Axial maps, (d) Access graph and computation of RA values, (e) Maps of connectivity analysis, (f) Maps of integration analysis

Table 1. The results of the room configuration analysis

Village	The culture that is formed	The pattern and layout of settlements	RA Value
Ujung Sabbang	*Simasemaseang*	Cluster settlement pattern	0,109
	Sipakatau	Elongated settlement pattern following the road	0,268
Kampung Pisang	*Simasemaseang*	Cluster settlement pattern	0,182
	Sipakatau	Combination settlement patterns (elongated and centralized)	0,195
Lakessi	*Simasemaseang*	Cluster settlement pattern	0,125
	Sipakatau	Around one historic house, the settlement pattern produces a combination pattern (elongated and centered).	0,208
Wattang Soreang	*Simasemaseang* 1	Cluster settlement pattern	0,12
	Simasemaseang 2	Cluster settlement pattern	0,28
	Sipakalebbi	The pattern of elongated settlements following the road tends to spread, located on the main road	1

The influence of *Simasemaseang* Culture on the Spatial Configuration of the Wattang Soreang settlement is shown in Fig. 11. (a) Shows that the location of Wattang Soreang via google earth image 2019, (b) Show The *Sipakalebbi* culture's spatial configuration forms a pattern of elongated settlements that follow the road and tend to spread, located on the primary collector road with one route connecting the settlements.(c) Depicting an axial map with observation points from M. Aryad street so that steps can be counted to arrive at the deepest segment. (d) As shown in the access diagram, the RA value of 1 also shows that the spatial arrangement is integrated but has low integrity, as it takes 2 steps (step depth) to reach the deepest side with a total of 3 steps (e) Roads 0, 1 and 2 (M. Arsyad street), highlighted in red and orange, have the highest connectedness, suggesting that the road network is most directly connected to other roads. And there isn't a single road network that isn't connected. (f) The maximum level of integration is found on routes 0, 1, and 2 (M. Arsyad street), which are highlighted in red. Shows that the route is the most frequently used by users, that it is bustling with diverse activities, and that it is easy to reach. There is also no road network with a poor level of integration.

3.3. The comparison of the findings of the spatial configuration study in each culture.

Table 1 shows comparison of findings of spatial configuration studies in each culture in line with, that spatial patterns of coastal settlements have different shapes according to ecological characteristics and growth processes (Kostof dan Darjosanjoto, 2007) in [15]. Spatial patterns of coastal settlements generally form elongated patterns, group patterns, and spread patterns.

4. Conclusion

There are three cultures that influence the development of the spatial configuration of slums in the Commercial area of Parepare City, namely *Sipakatau* culture which means mutual respect, forming a combined settlement pattern (elongated and centralized) with moderate integration, *Sipakalebbi* culture meaning mutual respect, forming a linear settlement pattern

(elongated) and tends to spread. with low integration and *Simasemaseang* Culture means loving each other, forming a clustered settlement pattern with high integration. *Simasemaseang* culture has a spatial arrangement that is mutually integrated/high integration (low depth) with other rooms in the layout or is well connected to the observation room, because it has a smaller RA value, where RA produces a number between 0 and 1, the smaller the RA value indicates integrity is getting higher.

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