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Riview 1

Community-Based Sanitation Management Model Using Local Aspects of Coastal Areas

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Abstract. Previous findings showed that there are only a few studies on the core problem of environmental sanitation in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management (CBSM). A cross-sectional design was used, and the sample population consists of family heads in the Percut Sei Tuan Sub-district. The sample size was calculated using a category survey formula of 414 households. The samples were selected using a simple random sampling technique, and a questionnaire instrument, which was tested for its validity and reliability was used for data collection. The data were then analyzed using CFA (Confirmatory Factor Analysis) to assess the factors that influence CBSM. The results showed that gender roles have a significant effect on environmental sanitation management in coastal areas with a $P<0.001$, and culture has a significant effect on CBSM with a $P<0.001$. However, the role of stakeholders was insignificant in this study. CBSM in coastal areas was still very low in terms of participation in planning, implementation, and utilization. The involvement of women as an aspect of gender in the formation of a disciplined culture in sanitation management is very necessary to mobilize family members.

INTRODUCTION

Coastal areas have complex and unique issues, problems, opportunities, and challenges that are different from other regions. Furthermore, they are often characterized by a limited supply of clean water, latrines, wastewater disposal systems, landfills, and unhealthy housing (Heynnor, 2021), including in Indonesia. A previous study revealed that (Putri, Galib and Mubarak, no date), unclean water, poor sanitation, and hygiene are extremely detrimental to health and account for more than 10,000 deaths annually. Lack of attention from stakeholders (Widiastuti, 2019), poor culture (Sembiring, 2022), and gender dominance in decision-making regarding sanitation provision are some of the obstacles to creating a clean and hygienic environment (Abu, Bisung and Elliott, 2019).

A program, namely the Community Lead Total Sanitation (CLTS) was created in Indonesia to strengthen efforts to cultivate a clean and healthy living, prevent the spread of environmental-based diseases, improve community capacities, and implement the government's commitment towards improving access to drinking water and sustainable basic sanitation(Muaja, Pinontoan and Sumampouw, 2020). However, the implementation of the CLTS program in coastal areas is still less effective (Andriani, 2022) because it is not focused on a sustainable basis for these regions (Rany and Af, 2021).

The execution process is also still on evaluating community knowledge, attitudes, and actions (Hafizah, 2022). The interventions carried out are continuously running, but the inhabitants of coastal areas believe that sanitation is not a necessity (Juwono and Subagiyo, 2019). Several studies revealed that coastal communities still have passive attitudes toward proper hygiene (Mantiri, 2019; Susanto, 2019; Herdiansyah *et al.*, 2021). Although the inhabitants are knowledgeable, they still practice unhealthy open defecation (Andriani, 2022). Previous reports showed that only 62.77% of coastal areas have been verified as Open Defecation Free (ODF) villages. (Health, 2022). Indonesia has the second worst sanitation condition in the world, and if the root cause of the problem is not found and resolved, it can become very difficult to improve.

The low level of community-based sanitation management (CBSM) is caused by cultural, gender, and stakeholder factors (Chan *et al.*, 2020; Daniel *et al.*, 2021; Mulopo and Chimbari, 2021). The context of healthy living is not a priority in the fulfillment of women's basic rights (Roaf, de Albuquerque and Heller, 2018). This is evident from the low access to clean water which has not been used optimally by women on the coast (Hoque *et al.*, 2019). Previous studies revealed that their involvement as a gender aspect is very important for the success of sanitation programs, the formation of better culture, and community participation (Mova *et al.*, 2019). Furthermore, stakeholders are needed to make efforts to invite and influence the community to be involved in CBSM based on the unique characteristics of the area (Sulistyaningsih *et al.*, 2021).

The Percut Sei Tuan coastal area is a community with a homogeneous religion, lifestyle, behavior, and characteristics. The people live around the sea and use marine resources as the main source of livelihood. Furthermore, their daily needs revolve around the river due to the ease of access. In waste management, the community still collects the waste in front of the house and dispose refuse into the river. This habit has been passed down from generation to generation. Hanging latrines that are only covered with plastic as well as emergency washing stations are present along the river.

It is important to identify the influential factors inhibiting CBSM (Love *et al.*, 2022), including the community's knowledge, attitudes, and actions (Hafizah, 2022). Other aspects, such as culture, gender, and stakeholders also need to be studied. They are often considered in the evaluation of approaches for the community related to environmental sanitation. This is to ensure that people are willing and able to participate in creating a hygienic environment in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management.

METHOD

2.1. Study Design

This is a quantitative study with a cross-sectional design, which analyzed the roles of cultural, gender, and stakeholders in community-based sanitation management. This study design was selected to obtain basic data that has never been studied as well as develop them for the modeling stage.

2.2. Location and Time

This study was carried out in the coastal settlement of Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province from January 2021 to March 2022. Geographically, this

region is located at 3.7 latitudes and 98.7 east longitudes, 3 meters above sea level, with an area of 1,060 ha, as shown in Figure 3.

2.3. Research Sample

The sample consists of people living in the coastal settlement of Percut Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province. The sampling was carried out based on the mapping of the population in the sub-district office. Furthermore, the area consists of 5 points, namely hamlets 14 to 18, which are located on the outskirts of the river. Respondents were taken based on the head of the family, namely the father, or household members, namely the wife. The categorical survey formula was used to determine the number of households (n), namely 414, where the Z value for the confidence level was 95%.

2.4. Sampling Technique

The samples in this study were selected using the simple random sampling method. Data collection was carried out using a questionnaire that has been tested for validity and reliability. Furthermore, the respondents signed informed consent while maintaining confidentiality.

2.5. Dependent Variable

The dependent variables were community-based sanitation management, which consists of indicators of planning, implementation, and utilization of participation, as shown in Table 2.

Table 1. Dependent Variable Questions.

Community-Based Sanitation Management	Questions
1. Planning of Participation	1.1. Are there community meetings/deliberations to discuss environmental sanitation management, if Yes, how many times have they been held? 1.2. What is your attitude towards the results of the decisions that have been mutually agreed upon at the meeting, do you support or oppose the decision? 1.3. How do you actively participate in environmental sanitation management activities? 1.4. How often do you attend meetings to talk about environmental sanitation management? 1.5. What is your discussion activity level in the meeting? 1.6. In addition to meetings, do you often participate in activities that support environmental sanitation management activities?
2. Implementation of Participation	2.1. Are you excited when there is an environmental improvement from the government in your area? 2.2. Do you participate in helping when there is a SPAL/Sewer construction? 2.3. Do you participate in joint contributions for the maintenance of shared facilities?
3. Utilization of Participation	3.1. Do you take advantage of the sanitation facilities that have been built? 3.2. Do you participate in the supervision phase of the development of environmental infrastructure in your

Community-Based Sanitation Management	Questions
	environment? 3.3. Do you take care of the shared facilities? 3.4. Do you participate in repairing public facilities if they are damaged or disturbed? 3.5. Do you participate in the evaluation process or the evaluation of activities that have been carried out together? 3.6. Can the community provide suggestions for the improvement of environmental development? 3.7. Does the community need to participate in the evaluation of development activities? 3.8. Is the evaluation of community activities necessary? 3.9. Do you provide input at the evaluation meeting of an activity?

The dependent variable in this study was community-based sanitation management. Each question from the variables of planning, implementation, and utilization of participation was given a score with a minimum value of 1 (never) to a maximum of 5 (very often).

The questionnaires consist of 18 questions, of which 6, 3, and 7 were under the variables of planning, implementation, and utilization of participation, respectively. The answer options include Never (Ne), Rarely (R), N (Neutral), Often (O), and Very Often (VO).

2.6. Independent Variable

The independent variables are cultural, gender roles, and stakeholder roles, as described in Table 2.

Table 2. Independent Variable Questions.

Variable	Questions
1. Culture	1.1. Do you apply religious advice, such as cleanliness as part of your faith? 1.2. Do you gather and discuss activities after praying at the mosque?
2. Gender Role	2.1. Is your wife (mother) given the opportunity and willing to make decisions in providing sanitation tools or equipment to the family? 2.2. Is your wife (mother) involved in program planning in the community related to the environment? 2.3. Is your wife (mother) involved in implementing programs in the community related to the environment?
3. Stakeholder Role	3.1. The Role of Stakeholders a. Is it role of the village head to invite the community to participate in environmental sanitation management? b. Is the the village head supppsed to be involved in environmental sanitation management? c. What are the activities of the village head in every meeting on environmental sanitation management? d. What are the government policies related to environmental sanitation management in the place where

Variable	Questions
	you live? e. Is the government cooperating (village head) with the community for environmental sanitation management? f. Are the community leaders cooperating with the community for environmental sanitation management? g. Is the village head socializing regarding environmental sanitation management? h. What are the contribution of the village head in supporting environmental sanitation management within the community? 3.2. The Role of Community Leaders a. Is it the role of community leaders to invite the community to participate in environmental sanitation management? b. What are the activities of community leaders in every meeting on environmental sanitation management? c. What are the roles of community leaders in environmental sanitation management? d. What are the contributions of community leaders in supporting environmental sanitation management within the community? 3.3. The Role of Religious Figures a. Is it the role of religious leaders to invite the community to participate in environmental sanitation management? b. What are the activities of religious leaders in every meeting on environmental sanitation management? c. Are religious leaders involved in environmental sanitation management? d. Cooperation of religious leaders in environmental sanitation management with the community? e. Contribution of religious leaders in supporting environmental sanitation management within the community

The cultural variables consist of indicators of belief values (ordinal) and cultural norms (ordinal), while the gender roles contain indicators of decision-making (ordinal), involvement in planning (ordinal), and implementation (ordinal). Furthermore, the stakeholder variable consists of indicators, such as the role of government (ordinal), community leaders (ordinal), and religious leaders (ordinal).

2.7. Research Model

The research model in this study consists of gender and stakeholder roles that are directly related to culture, followed by culture related to community-based sanitation management. The model also contain the indirect influence of gender roles, and stakeholders on community-based sanitation management, as shown in Figure 1.

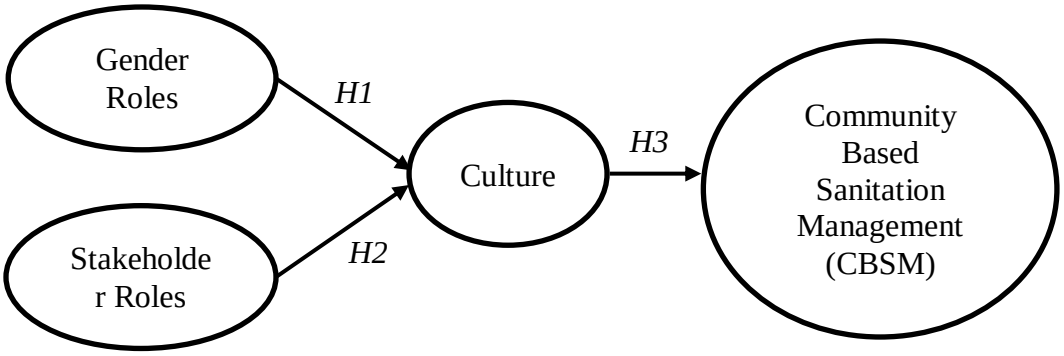

Figure 1. Research Model

H1. Gender has a significant effect on the culture of environmental sanitation management in coastal areas.

It also plays an important role in the formation of culture in these regions (Siles *et al.*, 2019). In most societies in Indonesia, women have the primary responsibility of managing household water supply, sanitation, and health (Elysia, 2018). They are also responsible for the provision and treatment of safe and adequate water for family needs (Radonic and Jacob, 2021). Furthermore, women are the main caregivers for children, which indicates that they have an important role in supporting children's health (Jalil and Tanjung, 2020).

The participation of female fishermen in decision-making is not well organized and less effective as a political force compared to males (Wuya, 2021). When women are given a place in an organization or decision-making process, they essentially bring a perspective that puts improving the quality of life and fisheries-based livelihoods as the priority (Owusu and Andriesse, 2020).

H2. The role of stakeholders has a significant effect on the culture of environmental sanitation management in coastal areas.

Furthermore, stakeholders include all actors or groups that influence and/or are affected by the policies, decisions and actions of a program (Ulum and Anggaini, 2020). They are needed to invite the community to attend and provide suggestions for every meeting held. This is because the community plays an important role in social, institutional and environmental conditions and they need to understand the goals and objectives of the program (Haldane *et al.*, 2019).

Stakeholders have a direct influence on culture related to environmental sanitation management in coastal areas (Mensah and Enu-Kwesi, 2019). The forms of support that are carried out continuously, either through policies or infrastructure, have effect on the cultural pattern of the community (Fatkhullah, Habib and Nisa, 2022). The formation of a culture is facilitated by the active intervention of stakeholders (Karanika-Murray, Gkiontsi and Baguley, 2018).

H3. Environmental sanitation management culture has a significant effect on community-based sanitation management.

Coastal communities have become part of a pluralistic society, but they still have a spirit of togetherness (Bayu and Rahmadina, 2020). Consequently, the average coastal community structure is a combination of the characteristics of urban and rural area. This indicates that they

can form cultural systems and values, which are acculturation of each component (Diansari *et al.*, 2020).

Cultural factors that include norms and belief values, are not easy to implement, especially in a certain community environment (Sihabudin, 2022). However, they can directly affect the level of community participation (David-Chavez and Gavin, 2018). The principles of participation must pay attention to togetherness, growing from the bottom (bottom-up), as well as trust and openness (Diab *et al.*, 2022).

2.8. Statistical Analysis

Data analysis was carried out with frequency distribution and CFA (Confirmatory Factor Analysis) using SmartPLS version 3. The data were analyzed to determine the dimensional construct of the dependent variable. The accuracy of the CFA test was used to assess the validity and reliability of the indicators forming the construct of behavioural variables based on the previous theory. Therefore, the right indicators were obtained to compile community-based sanitation management variables.

RESULT AND DISCUSSION

3.1 Culture, Gender role, and Stakeholder role of the Coastal Community of Percut Sei Tuan

Culture and gender play a major and active role in environmental sanitation. However, the function of stakeholders in mobilizing the community to participate in these activities in coastal areas is still suboptimal, as shown in Table 3.

Table 3. Identification of Factors Associated with Sanitary Behavior.

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
Culture	**Trust Value**			
	Never	8	1.9	0.7-3.4
	Seldom	27	6.5	4.3-8.7
	Sometimes	70	16.9	13.3-20.7
	Often	101	24.4	20.5-28.7
	Always	208	50.2	45.4-54.7
	Cultural Norms			
	Never	49	11.8	8.9-15.0
	Seldom	98	23.7	19.6-27.8
	Sometimes	67	16.2	12.8-20.3
	Often	69	16.7	13.1-19.8
	Always	131	31.6	27.1-36.5
Gender Role	**Decision-making**			
	Never	42	10.1	7.2-13.0
	Seldom	12	2.9	1.4-4.3
	Sometimes	20	4.8	2.9-7.2
	Often	110	26.6	22.8-31.2
	Always	230	55.6	51.0-60.6
	Involvement in Planning			

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Never	77	18.6	15.1-22.5
	Seldom	27	6.5	4.3-9.1
	Sometimes	30	7.2	4.7-10.0
	Often	88	21.3	17.1-25.6
	Always	192	46.4	41.8-51.0
	Involvement in Implementation			
	Never	85	20.5	16.7-24.3
	Seldom	22	5.3	3.5-7.5
	Sometimes	40	9.7	6.8-13.0
	Often	77	18.6	15.1-22.7
	Always	190	45.9	41.2-50.7
	The Role of Stakeholders (Government)			
Stakeholder Role	Very low	82	19.8	16.2-23.4
	Low	49	11.8	9.0-15.7
	Moderate	103	24.9	20.6-29.2
	High	147	35.5	31.2-40.2
	Very high	33	8.0	5.6-10.6
	The Role of Community Leaders			
	Very low	79	19.1	15.3-22.7
	Low	80	19.3	15.5-22.9
	Moderate	94	22.7	18.6-27.5
	High	138	33.3	29.5-37.9
	Very high	23	5.6	3.1-8.0
	The Role of Religious Figures			
	Very low	109	26.3	22.2-30.9
	Low	48	11.6	8.7-15.1
	Moderate	110	26.6	22.0-31.2
	High	114	27.5	23.2-31.9
	Very high	33	8.0	5.4-10.9

In the aspect of culture, cultural norms are not in a good range, and they have not been fully implemented. Stakeholders aspect is divided into three, namely the role of stakeholders government, community leaders, and religious figures, with percentages of 35.5%, 33.3%, and 27.5%, which was in the high category.

3.2 Community-Based Sanitation Management in Coastal Area

Community-based sanitation management on the coast of Percut Sei Tuan is in a low category in terms of participation in planning, implementation, and utilization, as shown in Table 4.

Table 4. Community-Based Sanitation Management in Coastal Area

Community-Based Sanitation Management	Frequency	Percentage (%)	95% Confident Interval
Participation of Planning			
Very low	157	37.9	33.6-42.4
Low	52	12.6	9.4-16.2
Moderate	63	15.2	11.6-18.8
High	60	14.5	10.9-18.0
Very high	82	19.8	15.6-24.3
Participation of Implementation			
Very low	61	14.7	11.2-18.4
Low	35	8.5	6.0-11.1
Moderate	88	21.3	16.9-25.1
High	171	41.3	36.7-45.9
Very high	59	14.3	11.0-18.1
Participation of Utilization			
Very low	172	41.5	36.8-46.3
Low	71	17.1	13.5-21.0
Moderate	71	17.1	13.3-21.3
High	36	8.7	6.0-11.1
Very high	64	15.5	12.2-19.2

In the coastal area of Percut Sei Tuan, two aspects were in the very low category, namely participation in planning, and utilization with percentages of 37.9%, and 41.5%, respectively. Meanwhile, the implementation aspect was still in the high category, namely 41.3%. The results also showed that half of the samples were had low participation.

Table 5. The result of the measurement model.

Contruct	Loading	Cronbach's alpha	Dijkstra–Henseler's rho (ρA)	CR	AVE
Culture		0.601	0.655	0.829	0.709
TV	0.779				
CN	0.901				
Gender		0.869	0.921	0.920	0.795
DM	0.755				
IP	0.957				
IM	0.949				
CBSM		0.717	0.718	0.841	0.638
PoP	0.814				
PoI	0.787				
PoU	0.795				
Stakeholder		0.940	0.981	0.961	0.891
RG	0.906				
RC	0.966				
RR	0.958				

Note (s): CR = composite reliability; AVE = average variance extracted; TV = Trust Value; CN = Cultural Norms; DM = Decision-making; IP = Involvement in Planning; IM = Involvement in Implementation; PoP = Participation of Planning; PoI = Participation of Implementation; PoU = Participation of Utilization; RG = The Role of Stakeholders (Government); RC = The Role of

Community Leaders; RR = The Role of Religious Figures

In evaluating the measurement model, the reliability of the scale for each construct was first analyzed. Table 5 shows that all variables have a very high level of item reliability, which was more than 0.708. For Dijkstra–Henseler's rho (ρA), they were also all reliable with an average value of > 0.7 except for the cultural variable. However, all CR values were more than 0.7, indicating that the variables have a high level of reliability. The convergent validity was then reviewed using extracted variance (AVE). The results showed that each construct variable was greater than 0.5 with a range of 0.638-0.891.

Table 6. Discriminant validity

		Culture	Gender	CBSM	Stakeholder
Fornell–Larcker criterion	Culture	0.842			
	Gender	0.300	0.892		
	CBSM	0.374	0.349	0.799	
	Stakeholder	0.141	0.223	0.221	0.944
Heterotrait-monotrait (HTMT) ratio	Culture				
	Gender	0.402			
	CBSM	0.548	0.417		
	Stakeholder	0.179	0.239	0.270	

The next step was discriminant validity analysis using the Fornell-Larcker criteria. The results of this study indicate that the square root of each value of the AVE construct must be higher than its correlation with other latent variables. For comparison, discriminant validity was also analyzed using Heterotrait-monotrait (HTMT) ratio. In this study, the value obtained was still below the cut-off value, which indicates very good reliability and validity, as shown in Table 6.

Table 7. Confirmatory Factor Analysis.

Hypothesis/Relationship	β	T value	95% Confident Interval	P values
H1: Gender→Culture	0.282	5.425	[0.175;0.377]	0.000*
H2: Stakeholder→Culture	0.078	1.692	[0.003;0.178]	0.091
H3: Culture→CBSM	0.374	9.198	[0.298;0.446]	0.000*

Based on the analysis, gender roles have a positive (β = 0.282; t = 5.425) and significant effect on the culture of environmental sanitation management in coastal areas (P value <0.000), as shown in Table 7. Stakeholders also have a positive effect (β = 0.078; t = 1.692) but has no significant effect (P value 0.091). Environmental sanitation management culture has a positive (β = 0.374; t = 9.198) and significant effect on community-based sanitation management (P value <0.000).

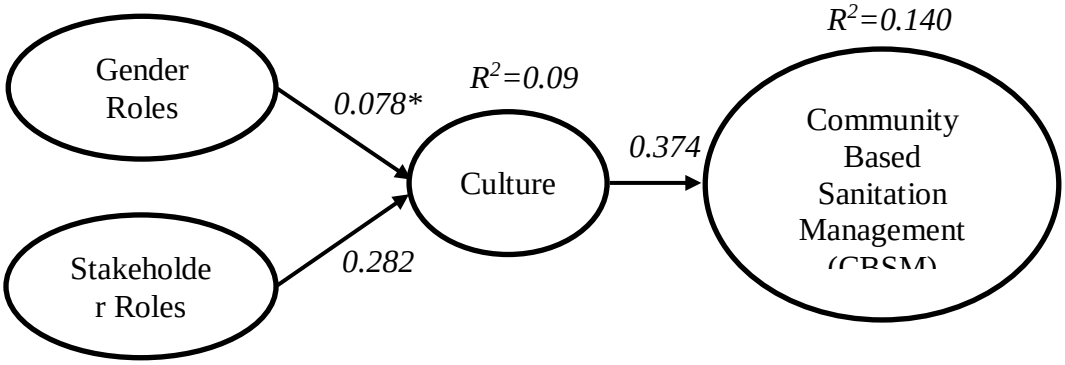

Figure 2. Community-Based Sanitation Management Model

The coastal area of Percut Sei Tuan is located in the coordinate range of 3,288.555354 m, 3.7086403^0 latitude and 98.777597^0 longitude, and it consists of the Bandar Sidora's river, as shown in Figure 3.

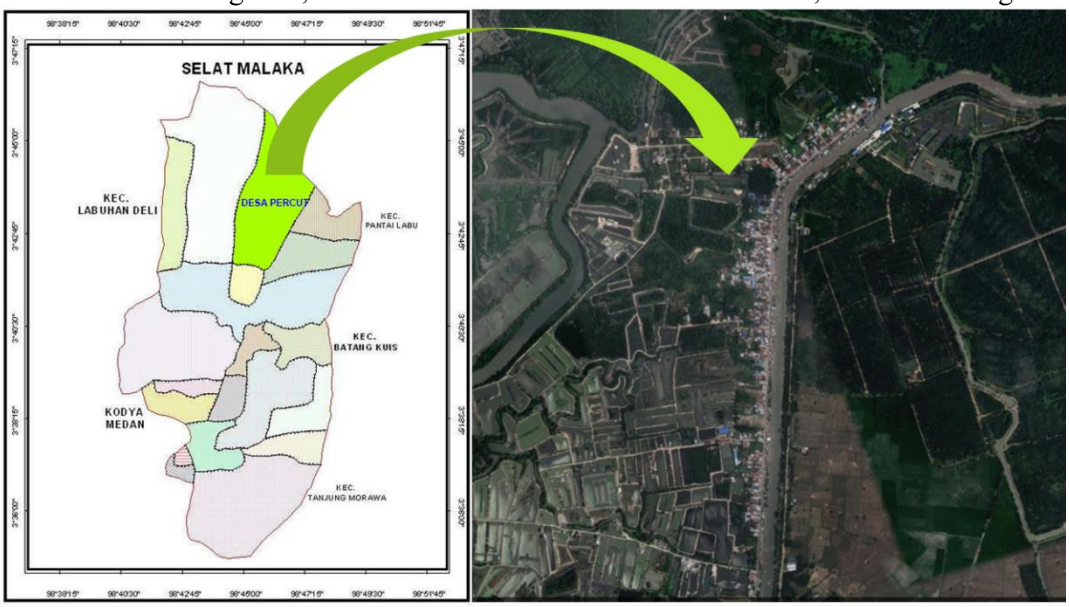

Figure 3. The Coastal Area of Percut Sei Tuan

Indonesia is an archipelagic country consisting of various ethnic groups (Antara and Yogantari, 2018), which led to the presence of different cultures (Fuadi, 2020). A large number of residents are certainly balanced by the diversity of ethnicities in each region, including coastal areas. However, the culture in these areas tends to be homogeneous (Sulistiyono, 2015), which affects the habits and behaviour that are almost similar among the inhabitants (Fuadi, 2020).

The coastal community of Percut Sei Tuan often throw garbage into the river, which can cause a decrease in aesthetics and environmental carrying capacity if not resolved, thereby leading to a low quality of settlements (Putri, Hadisoebroto and Hendrawan, 2019). It can also cause water pollution (Mensah and Enu-Kwesi, 2019) disease and flood (Mulki and Septianti, no date). Several studies revealed that some poor residents cannot meet their basic needs and sanitation requirement (Alam and Mondal, 2019; Sinharoy, Pittluck and Clasen, 2019; Corburn *et al.*, 2020; Riski, 2021). For example, catching fish for a long period prevents them from contributing to environmental sanitation. They only spend a short time at home and more time on the river or the sea (Equanti and Bayuardi, 2018). This condition illustrates inadequate housing and sanitation, where the Bandar Sidoras river, which empties into the sea, is an integral part of their lives.

The value of trust focuses more on the religious aspect of the cultural variable. Cultural norms, such as gathering and discussing activities after prayer are sometime, rarely, or never found among the inhabitants, as shown in Table 3. Based on gender roles related to decision-making as well as involvement in planning and implementation, only half of the respondents have a good level of participation. Furthermore, the role of stakeholders was still very weak. Based on data analysis, only gender and cultural roles have a significant effect on environmental sanitation in the coastal area, as shown in Table 7.

Culture influences community-based sanitation management, and provides a style of experience for individuals in the society (Zulfa, Amsani and Zuska, no date). It is a set of guidelines, which help humans adapt and deal with specific environments (Amraeni and Nirwan, 2021). The sanitation development problem is a socio-cultural challenge (Adwibaraski, 2018; Taouraout *et al.*, 2018; Roxburgh *et al.*, 2020; Kakwani *et al.*, 2021) due to the community behaviour, namely defecating in any place and throwing

garbage into the river (Ellis *et al.*, 2020). This often occurs because people in the unitary tribes have their respective cultural identities and unique systems (Nurrachmawati and Anggraeni, 2010). The results showed that cultures with poor values beliefs and norms cause bad knowledge, attitudes, and actions towards environmental sanitation. These poor behaviors lead to river pollution (Wang *et al.*, 2019), defecation in rivers (Okumah *et al.*, 2019), as well as lack of participation in the community's management (Knickmeyer, 2020).

The inhabitants of coastal communities often have hard and unruly character. In terms of demographics, they are often residents who work as seafarers (Nurhayani and Hodijah, 2018). The acceleration of sanitation improvement is often inhibited when culture is not reformed (Nagla, 2020). The programs held by the government are insufficient to sustainable address the problem of environmental sanitation cleanliness (Van Welie, Truffer and Yap, 2019). Cultural intervention is not enough to increase knowledge (Caesar, Dewi and Husna, 2019) because people who are very knowledgeable are not necessarily willing and able to participate in overcoming these problems, especially in coastal areas (Rahman, Sididi and Yusriani, 2020). This shows that other factors, such as gender and stakeholder roles are needed (Ciftcioglu, 2021).

Coastal areas are also identical to the division of gender roles. The function of women in environmental sanitation control decisions was in the excellent category. Gender has a significant relationship with hygienic behaviour (Rohendi and Nur, 2019) because women need high quality basic facilities (Silva *et al.*, 2020). They are also in charge of fostering sanitation-related families as wives, household managers, mothers (successors and educators of children), breadwinners, and community members (Puspitawati and Ma'mun Sarma, 2019). Women interact directly with water activities and are also the dominant users in the household (Als *et al.*, 2020). This is different from the coastal men, whose job is to find fish and fulfil economic needs (Torere, Goni and Waani, 2019).

Gender empowerment has a great influence on community behavior, especially families (Anderson *et al.*, 2021). The gender perspective is often used with the assumption that environmental problems, especially river pollution, are getting worse (Susilawaty *et al.*, 2021). One of the causes is the occurrence of inequality in the society, including coastal communities. Women who have a positive potential to preserve the environment, and their quality of life are not priotized by he community (Hudha and Rahardjanto, 2018). The role of women's groups is often ignored by the society, which makes their quality as human resources to be very effective in developing community life, while the environment is neglected. Furthermore, those who are more oriented towards the survival of family members often have a more optimistic, constructive and long-term way of thinking about environmental and community sustainability (Zaman *et al.*, 2021).

Stakeholders in this study had no significant effect on sanitation management, but they still play a passive role in overcoming environmental sanitation problems using the CBSM approach. A total of three stakeholders were explored in the coastal area, namely the government, community leaders, and religious leaders. The role of government and religious leaders was still in the low category at 35.5% and 27.5%, respectively, while the community leaders were high at 33.3%, a shown in Table 3.

Stakeholders as groups or individuals can influence or be influenced by the achievement of certain goals, and they have the authority and budget to improve sanitation (Kobusingye, Mungatu and Mulyungi, 2017). Therefore, improving community environmental hygiene can easily be carried out with their participation. The main activities consist of advocacy, capacity building, and increasing partnerships between stakeholders (Singh Chouhan *et al.*, 2022). The subject matter of this activity must be well-planned by community-based activity methods. The factor that affects the low participation of the community is that internal stakeholders are less active (Hadj, 2020). This is important because the CBSM on the coast of Percut Sei Tuan is still very low, as shown in Table 4.

Low CBSM hampers the development of sanitation in the region, especially in coastal areas (Lisafitri *et al.*, 2021). Participation in planning and utilization are carried out to trigger the sustainability of a sanitation improvement program (Surya *et al.*, 2021). This enables the community participate in selecting the most suitable solution and feel the benefits that have been built together (Spuhler and Lüthi, 2020).

CBSM, which progressed from this study involve gender roles to form a better culture a well as increasing the active role of stakeholders.

CONCLUSION

Community-based sanitation management in coastal areas is still very low, in terms of participation in planning, implementation, and utilization. Aspects of gender and cultural roles have a significant relationship with the managerial activities. The involvement of women as an aspect of gender as well as the active role of stakeholders is needed in the formation of a disciplined culture for sanitation management, which is very necessary to mobilize family members to participate in community improvement.

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Riview 2

Community-Based Sanitation Management Model Using Local Aspects of Coastal Areas

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Abstract. Previous findings showed that there are only a few studies on the core problem of environmental sanitation in coastal areas. The study Mawar and Wahidah (2018), the coastal community of Percut Sei Tuan only uses 20% clean water, does not have a latrine 42.9%, and does not have a SPAL of 46.7%. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management (CBSM). A cross-sectional design was used, and the sample population consists of family heads in the Percut Sei Tuan Sub-district. The sample size was calculated using a category survey formula of 414 households from the population. The samples were selected using a simple random sampling technique, and a questionnaire instrument, which was tested for its validity and reliability was used for data collection. The data were then analyzed using CFA (Confirmatory Factor Analysis) to assess the factors that influence CBSM. The results showed that gender roles have a significant effect on environmental sanitation management in coastal areas with a P<0.001, and culture has a significant effect on CBSM with a P<0.001. However, the role of stakeholders was insignificant in this study. CBSM in coastal areas was still very low in terms of participation in planning, implementation, and utilization. The involvement of women as an aspect of gender in the formation of a disciplined culture in sanitation management is very necessary to mobilize family members.

INTRODUCTION

Coastal areas have complex and unique issues, problems, opportunities, and challenges that are different from other regions. Furthermore, they are often characterized by a limited supply of clean water, latrines, wastewater disposal systems, landfills, and unhealthy housing (Heynnor, 2021), including in Indonesia. A previous study revealed that (Putri, Galib and Mubarak, no date), unclean water, poor sanitation, and hygiene are extremely detrimental to health and account for more than 10,000 deaths annually. Lack of attention from stakeholders (Widiastuti, 2019), poor culture (Sembiring, 2022), and gender dominance in decision-making regarding

sanitation provision are some of the obstacles to creating a clean and hygienic environment (Abu, Bisung and Elliott, 2019).

A program, namely the Community Lead Total Sanitation (CLTS) was created in Indonesia to strengthen efforts to cultivate a clean and healthy living, prevent the spread of environmental-based diseases, improve community capacities, and implement the government's commitment towards improving access to drinking water and sustainable basic sanitation(Muaja, Pinontoan and Sumampouw, 2020). However, the implementation of the CLTS program in coastal areas is still less effective (Andriani, 2022) because it is not focused on a sustainable basis for these regions (Rany and Af, 2021).

The execution process is also still on evaluating community knowledge, attitudes, and actions (Hafizah, 2022). The interventions carried out are continuously running, but the inhabitants of coastal areas believe that sanitation is not a necessity (Juwono and Subagiyo, 2019). Several studies revealed that coastal communities still have passive attitudes toward proper hygiene (Mantiri, 2019; Susanto, 2019; Herdiansyah *et al.*, 2021). Although the inhabitants are knowledgeable, they still practice unhealthy open defecation (Andriani, 2022). Previous reports showed that only 62.77% of coastal areas have been verified as Open Defecation Free (ODF) villages. (Health, 2022). Indonesia has the second worst sanitation condition in the world, and if the root cause of the problem is not found and resolved, it can become very difficult to improve.

The low level of community-based sanitation management (CBSM) is caused by cultural, gender, and stakeholder factors (Chan *et al.*, 2020; Daniel *et al.*, 2021; Mulopo and Chimbari, 2021). The context of healthy living is not a priority in the fulfillment of women's basic rights (Roaf, de Albuquerque and Heller, 2018). This is evident from the low access to clean water which has not been used optimally by women on the coast (Hoque *et al.*, 2019). Previous studies revealed that their involvement as a gender aspect is very important for the success of sanitation programs, the formation of better culture, and community participation (Mova *et al.*, 2019). Furthermore, stakeholders are needed to make efforts to invite and influence the community to be involved in CBSM based on the unique characteristics of the area (Sulistyaningsih *et al.*, 2021).

The Percut Sei Tuan coastal area is a community with a homogeneous religion, lifestyle, behavior, and characteristics. The people live around the sea and use marine resources as the main source of livelihood. Furthermore, their daily needs revolve around the river due to the ease of access. In waste management, the community still collects the waste in front of the house and dispose refuse into the river. This habit has been passed down from generation to generation. Hanging latrines that are only covered with plastic as well as emergency washing stations are present along the river.

It is important to identify the influential factors inhibiting CBSM (Love *et al.*, 2022), including the community's knowledge, attitudes, and actions (Hafizah, 2022). Other aspects, such as culture, gender, and stakeholders also need to be studied. They are often considered in the evaluation of approaches for the community related to environmental sanitation. This is to ensure that people are willing and able to participate in creating a hygienic environment in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management.

METHOD

This is a quantitative study with a cross-sectional design, which analyzed the roles of cultural, gender, and stakeholders in community-based sanitation management. This study design was selected to obtain basic data that has never been studied as well as develop them for the modeling stage. This study was carried out in the coastal settlement of Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province from January 2021 to March 2022. Geographically, this region is located at 3.7 latitudes and 98.7 east longitudes, 3 meters above sea level, with an area of 1,060 ha.

The sample consists of people living in the coastal settlement of Percut Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province. The population in this study was the coastal community of Percut Sei Tuan, Deli Serdang Regency, North Sumatra Province as many as 4714 people. The sampling was carried out based on the mapping of the population in the sub-district office. Furthermore, the area consists of 5 points, namely hamlets 14 to 18, which are located on the outskirts of the river. Respondents were taken based on the head of the family, namely the father, or household members, namely the wife. The categorical survey formula was used to determine the number of households (n), namely 414, where the Z value for the confidence level was 95%. The samples in this study were selected using the simple random sampling method. Sampling frames were obtained from the sub-district office and random sampling was carried out. Data collection was carried out using a questionnaire that has been tested for validity and reliability. Furthermore, the respondents signed informed consent while maintaining confidentiality.

The dependent variables were community-based sanitation management, which consists of indicators of planning (consists of community meetings/deliberations to discuss environmental sanitation management, attend meetings to talk about environmental sanitation management, participate in activities that support environmental sanitation management activities), implementation (participate in joint contributions for the maintenance of shared facilities), and utilization of participation (participate in repairing public facilities if they are damaged or disturbed, and participate in the evaluation process or the evaluation of activities that have been carried out together). The dependent variable in this study was community-based sanitation management. Each question from the variables of planning, implementation, and utilization of participation was given a score with a minimum value of 1 (never) to a maximum of 5 (very often). The questionnaires consist of 18 questions, of which 6, 3, and 7 were under the variables of planning, implementation, and utilization of participation, respectively. The answer options include Never (Ne), Rarely (R), N (Neutral), Often (O), and Very Often (VO).

The independent variables are cultural (apply religious advice, such as cleanliness as part of your faith), gender roles (given the opportunity and willing to make decisions in providing sanitation tools or equipment to the family), and stakeholder roles (the role of stakeholders, local leaders, and religious figures). The cultural variables consist of indicators of belief values (ordinal) and cultural norms (ordinal), while the gender roles contain indicators of decision-making (ordinal), involvement in planning (ordinal), and implementation (ordinal). Furthermore, the stakeholder variable consists of indicators, such as the role of government (ordinal), community leaders (ordinal), and religious leaders (ordinal).

The research model in this study consists of gender and stakeholder roles that are directly related to culture, followed by culture related to community-based sanitation management. The

model also contain the indirect influence of gender roles, and stakeholders on community-based sanitation management.

H1. Gender has a significant effect on the culture of environmental sanitation management in coastal areas.

It also plays an important role in the formation of culture in these regions (Siles *et al.*, 2019). In most societies in Indonesia, women have the primary responsibility of managing household water supply, sanitation, and health (Elysia, 2018). They are also responsible for the provision and treatment of safe and adequate water for family needs (Radonic and Jacob, 2021). Furthermore, women are the main caregivers for children, which indicates that they have an important role in supporting children's health (Jalil and Tanjung, 2020).

The participation of female fishermen in decision-making is not well organized and less effective as a political force compared to males (Wuya, 2021). When women are given a place in an organization or decision-making process, they essentially bring a perspective that puts improving the quality of life and fisheries-based livelihoods as the priority (Owusu and Andriesse, 2020).

H2. The role of stakeholders has a significant effect on the culture of environmental sanitation management in coastal areas.

Furthermore, stakeholders include all actors or groups that influence and/or are affected by the policies, decisions and actions of a program (Ulum and Anggaini, 2020). They are needed to invite the community to attend and provide suggestions for every meeting held. This is because the community plays an important role in social, institutional and environmental conditions and they need to understand the goals and objectives of the program (Haldane *et al.*, 2019).

Stakeholders have a direct influence on culture related to environmental sanitation management in coastal areas (Mensah and Enu-Kwesi, 2019). The forms of support that are carried out continuously, either through policies or infrastructure, have effect on the cultural pattern of the community (Fatkhullah, Habib and Nisa, 2022). The formation of a culture is facilitated by the active intervention of stakeholders (Karanika-Murray, Gkiontsi and Baguley, 2018).

H3. Environmental sanitation management culture has a significant effect on community-based sanitation management.

Coastal communities have become part of a pluralistic society, but they still have a spirit of togetherness (Bayu and Rahmadina, 2020). Consequently, the average coastal community structure is a combination of the characteristics of urban and rural area. This indicates that they can form cultural systems and values, which are acculturation of each component (Diansari *et al.*, 2020).

Cultural factors that include norms and belief values, are not easy to implement, especially in a certain community environment (Sihabudin, 2022). However, they can directly affect the level of community participation (David-Chavez and Gavin, 2018). The principles of participation must pay attention to togetherness, growing from the bottom (bottom-up), as well as trust and openness (Diab *et al.*, 2022).

Data analysis was carried out with frequency distribution and CFA (Confirmatory Factor Analysis) using SmartPLS version 3. The data were analyzed to determine the dimensional construct of the dependent variable. The accuracy of the CFA test was used to assess the validity

and reliability of the indicators forming the construct of behavioural variables based on the previous theory. Therefore, the right indicators were obtained to compile community-based sanitation management variables.

RESULT AND DISCUSSION

3.1 Culture, Gender role, and Stakeholder role of the Coastal Community of Percut Sei Tuan

Culture and gender play a major and active role in environmental sanitation. However, the function of stakeholders in mobilizing the community to participate in these activities in coastal areas is still suboptimal, as shown in Table 1.

Table 1. Identification of Factors Associated with Sanitary Behavior.

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
Culture	**Trust Value**			
	Never	8	1.9	0.7-3.4
	Seldom	27	6.5	4.3-8.7
	Sometimes	70	16.9	13.3-20.7
	Often	101	24.4	20.5-28.7
	Always	208	50.2	45.4-54.7
	Cultural Norms			
	Never	49	11.8	8.9-15.0
	Seldom	98	23.7	19.6-27.8
	Sometimes	67	16.2	12.8-20.3
	Often	69	16.7	13.1-19.8
	Always	131	31.6	27.1-36.5
Gender Role	**Decision-making**			
	Never	42	10.1	7.2-13.0
	Seldom	12	2.9	1.4-4.3
	Sometimes	20	4.8	2.9-7.2
	Often	110	26.6	22.8-31.2
	Always	230	55.6	51.0-60.6
	Involvement in Planning			
	Never	77	18.6	15.1-22.5
	Seldom	27	6.5	4.3-9.1
	Sometimes	30	7.2	4.7-10.0
	Often	88	21.3	17.1-25.6
	Always	192	46.4	41.8-51.0
	Involvement in Implementation			
	Never	85	20.5	16.7-24.3
	Seldom	22	5.3	3.5-7.5
	Sometimes	40	9.7	6.8-13.0
	Often	77	18.6	15.1-22.7
	Always	190	45.9	41.2-50.7
Stakeholder Role	**The Role of Stakeholders (Government)**			
	Very low	82	19.8	16.2-23.4
	Low	49	11.8	9.0-15.7

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Moderate	103	24.9	20.6-29.2
	High	147	35.5	31.2-40.2
	Very high	33	8.0	5.6-10.6
	The Role of Community Leaders			
	Very low	79	19.1	15.3-22.7
	Low	80	19.3	15.5-22.9
	Moderate	94	22.7	18.6-27.5
	High	138	33.3	29.5-37.9
	Very high	23	5.6	3.1-8.0
	The Role of Religious Figures			
	Very low	109	26.3	22.2-30.9
	Low	48	11.6	8.7-15.1
	Moderate	110	26.6	22.0-31.2
	High	114	27.5	23.2-31.9
	Very high	33	8.0	5.4-10.9

In the aspect of culture, cultural norms are not in a good range, and they have not been fully implemented. Stakeholders aspect is divided into three, namely the role of stakeholders government, community leaders, and religious figures, with percentages of 35.5%, 33.3%, and 27.5%, which was in the high category.

3.2 Community-Based Sanitation Management in Coastal Area

Community-based sanitation management on the coast of Percut Sei Tuan is in a low category in terms of participation in planning, implementation, and utilization, as shown in Table 2.

Table 2. Community-Based Sanitation Management in Coastal Area

Community-Based Sanitation Management	Frequency	Percentage (%)	95% Confident Interval
Participation of Planning			
Very low	157	37.9	33.6-42.4
Low	52	12.6	9.4-16.2
Moderate	63	15.2	11.6-18.8
High	60	14.5	10.9-18.0
Very high	82	19.8	15.6-24.3
Participation of Implementation			
Very low	61	14.7	11.2-18.4
Low	35	8.5	6.0-11.1
Moderate	88	21.3	16.9-25.1
High	171	41.3	36.7-45.9
Very high	59	14.3	11.0-18.1
Participation of Utilization			
Very low	172	41.5	36.8-46.3
Low	71	17.1	13.5-21.0
Moderate	71	17.1	13.3-21.3
High	36	8.7	6.0-11.1
Very high	64	15.5	12.2-19.2

In the coastal area of Percut Sei Tuan, two aspects were in the very low category, namely participation in planning, and utilization with percentages of 37.9%, and 41.5%, respectively. Meanwhile, the implementation aspect was still in the high category, namely 41.3%. The results also showed that half of the samples were had low participation.

Table 3. The result of the measurement model.

Contruct	Loading	Cronbach's alpha	Dijkstra–Henseler's rho (ρA)	CR	AVE
Culture		0.601	0.655	0.829	0.709
TV	0.779				
CN	0.901				
Gender		0.869	0.921	0.920	0.795
DM	0.755				
IP	0.957				
IM	0.949				
CBSM		0.717	0.718	0.841	0.638
PoP	0.814				
PoI	0.787				
PoU	0.795				
Stakeholder		0.940	0.981	0.961	0.891
RG	0.906				
RC	0.966				
RR	0.958				

Note (s): CR = composite reliability; AVE = average variance extracted; TV = Trust Value; CN = Cultural Norms; DM = Decision-making; IP = Involvement in Planning; IM = Involvement in Implementation; PoP = Participation of Planning; PoI = Participation of Implementation; PoU = Participation of Utilization; RG = The Role of Stakeholders (Government); RC = The Role of

Community Leaders; RR = The Role of Religious Figures

In evaluating the measurement model, the reliability of the scale for each construct was first analyzed. Table 3 shows that all variables have a very high level of item reliability, which was more than 0.708. For Dijkstra–Henseler's rho (ρA), they were also all reliable with an average value of > 0.7 except for the cultural variable. However, all CR values were more than 0.7, indicating that the variables have a high level of reliability. The convergent validity was then reviewed using extracted variance (AVE). The results showed that each construct variable was greater than 0.5 with a range of 0.638-0.891.

Table 4. Discriminant validity

		Culture	Gender	CBSM	Stakeholder
Fornell–Larcker criterion	Culture	0.842			
	Gender	0.300	0.892		
	CBSM	0.374	0.349	0.799	
	Stakeholder	0.141	0.223	0.221	0.944
Heterotrait-monotrait (HTMT) ratio	Culture				
	Gender	0.402			
	CBSM	0.548	0.417		
	Stakeholder	0.179	0.239	0.270	

The next step was discriminant validity analysis using the Fornell-Larcker criteria. The results of this study indicate that the square root of each value of the AVE construct must be higher than its correlation with other latent variables. For comparison, discriminant validity was also analyzed using Heterotrait-monotrait (HTMT) ratio. In this study, the value obtained was still below the cut-off value, which indicates very good reliability and validity, as shown in Table 4.

Table 5. Confirmatory Factor Analysis.

Hypothesis/Relationship	β	T value	95% Confident Interval	P values
H1: Gender→Culture	0.282	5.425	[0.175;0.377]	0.000*
H2: Stakeholder→Culture	0.078	1.692	[0.003;0.178]	0.091
H3: Culture→CBSM	0.374	9.198	[0.298;0.446]	0.000*

Based on the analysis, gender roles have a positive (β = 0.282; t = 5.425) and significant effect on the culture of environmental sanitation management in coastal areas (P value <0.000), as shown in Table 5. Stakeholders also have a positive effect (β = 0.078; t = 1.692) but has no significant effect (P value 0.091). Environmental sanitation management culture has a positive (β = 0.374; t = 9.198) and significant effect on community-based sanitation management (P value <0.000).

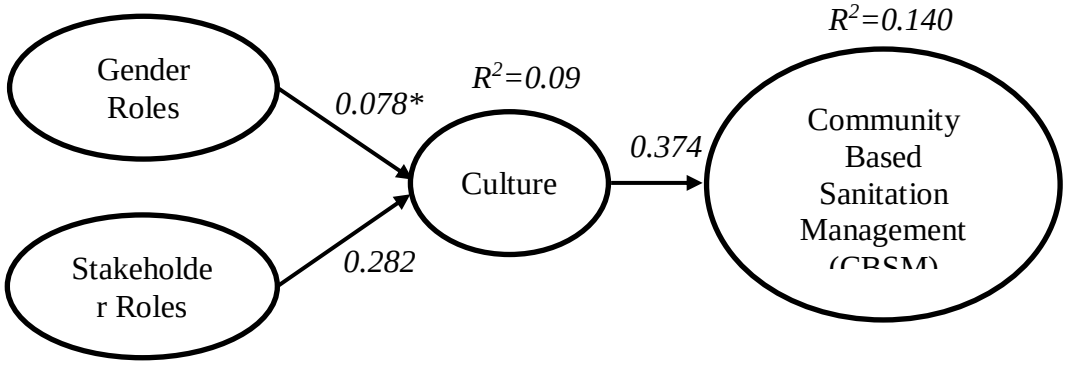

Figure 1. Community-Based Sanitation Management Model

The coastal area of Percut Sei Tuan is located in the coordinate range of 3,288.555354 m, 3.7086403^0 latitude and 98.777597^0 longitude, and it consists of the Bandar Sidora's river. Indonesia is an archipelagic country consisting of various ethnic groups (Antara and Yogantari, 2018), which led to the presence of different cultures (Fuadi, 2020). A large number of residents are certainly balanced by the diversity of ethnicities in each region, including coastal areas. However, the culture in these areas tends to be homogeneous (Sulistiyono, 2015), which affects the habits and behaviour that are almost similar among the inhabitants (Fuadi, 2020).

The coastal community of Percut Sei Tuan often throw garbage into the river, which can cause a decrease in aesthetics and environmental carrying capacity if not resolved, thereby leading to a low quality of settlements (Putri, Hadisoebroto and Hendrawan, 2019). It can also cause water pollution (Mensah and Enu-Kwesi, 2019) disease and flood (Mulki and Septianti, 2021). Several studies revealed that some poor residents cannot meet their basic needs and sanitation requirement (Alam and Mondal, 2019; Sinharoy, Pittluck and Clasen, 2019; Corburn *et al.*, 2020; Riski, 2021). For example, catching fish for a long period prevents them from contributing to environmental sanitation. They only spend a short time at home and more time on the river or the sea (Equanti and Bayuardi, 2018). This condition illustrates inadequate housing and sanitation, where the Bandar Sidoras river, which empties into the sea, is an integral part of their lives.

The value of trust focuses more on the religious aspect of the cultural variable. Cultural norms, such as gathering and discussing activities after prayer are sometime, rarely, or never found among the inhabitants, as shown in Table 1. Based on gender roles related to decision-making as well as involvement in planning and implementation, only half of the respondents have a good level of participation. Furthermore, the role of stakeholders was still very weak. Based on data analysis, only gender and cultural roles have a significant effect on environmental sanitation in the coastal area, as shown in Table 5.

Culture influences community-based sanitation management, and provides a style of experience for individuals in the society (Zulfa, Amsani and Zuska, 2020). It is a set of guidelines, which help humans adapt and deal with specific environments (Amraeni and Nirwan, 2021). The sanitation development problem is a socio-cultural challenge (Adwibaraski, 2018; Taouraout *et al.*, 2018; Roxburgh *et al.*, 2020; Kakwani *et al.*, 2021) due to the community behaviour, namely defecating in any place and throwing garbage into the river (Ellis *et al.*, 2020). This often occurs because people in the unitary tribes have their respective cultural identities and unique systems (Nurrachmawati and Anggraeni, 2010). The results showed that cultures with poor values beliefs and norms cause bad knowledge, attitudes, and actions towards environmental sanitation. These poor behaviors lead to river pollution (Wang *et al.*, 2019), defecation in rivers (Okumah *et al.*, 2019), as well as lack of participation in the community's management (Knickmeyer, 2020).

The inhabitants of coastal communities often have hard and unruly character. In terms of demographics, they are often residents who work as seafarers (Nurhayani and Hodijah, 2018). The acceleration of sanitation improvement is often inhibited when culture is not reformed (Nagla, 2020). The programs held by the government are insufficient to sustainable address the problem of environmental sanitation cleanliness (Van Welie, Truffer and Yap, 2019). Cultural intervention is not enough to increase knowledge (Caesar, Dewi and Husna, 2019) because people who are very knowledgeable are not necessarily willing and able to participate in overcoming these problems (Ajisuksmo and Iustitiani, 2020), especially in coastal areas (Rahman, Sididi and Yusriani, 2020). This shows that other factors, such as gender and stakeholder roles are needed (Ciftcioglu, 2021).

Coastal areas are also identical to the division of gender roles. The function of women in environmental sanitation control decisions was in the excellent category. Gender has a significant relationship with hygienic behaviour (Rohendi and Nur, 2019) because women need high quality basic facilities (Silva *et al.*, 2020). They are also in charge of fostering sanitation-related families as wives, household managers, mothers (successors and educators of children), breadwinners, and community

members (Puspitawati and Ma'mun Sarma, 2019). Women interact directly with water activities and are also the dominant users in the household (Als *et al.*, 2020). This is different from the coastal men, whose job is to find fish and fulfil economic needs (Torere, Goni and Waani, 2019).

Gender empowerment has a great influence on community behavior, especially families (Anderson *et al.*, 2021). The gender perspective is often used with the assumption that environmental problems, especially river pollution, are getting worse (Susilawaty *et al.*, 2021). One of the causes is the occurrence of inequality in the society, including coastal communities. Women who have a positive potential to preserve the environment, and their quality of life are not priotized by he community (Hudha and Rahardjanto, 2018). The role of women's groups is often ignored by the society, which makes their quality as human resources to be very effective in developing community life, while the environment is neglected. Furthermore, those who are more oriented towards the survival of family members often have a more optimistic, constructive and long-term way of thinking about environmental and community sustainability (Zaman *et al.*, 2021).

Stakeholders in this study had no significant effect on sanitation management, but they still play a passive role in overcoming environmental sanitation problems using the CBSM approach. A total of three stakeholders were explored in the coastal area, namely the government, community leaders, and religious leaders. The role of government and religious leaders was still in the low category at 35.5% and 27.5%, respectively, while the community leaders were high at 33.3%, a shown in Table 1.

Stakeholders as groups or individuals can influence or be influenced by the achievement of certain goals, and they have the authority and budget to improve sanitation (Kobusingye, Mungatu and Mulyungi, 2017). Therefore, improving community environmental hygiene can easily be carried out with their participation. The main activities consist of advocacy, capacity building, and increasing partnerships between stakeholders (Singh Chouhan *et al.*, 2022). The subject matter of this activity must be well-planned by community-based activity methods. The factor that affects the low participation of the community is that internal stakeholders are less active (Hadj, 2020). This is important because the CBSM on the coast of Percut Sei Tuan is still very low, as shown in Table 2.

Low CBSM hampers the development of sanitation in the region, especially in coastal areas (Lisafitri *et al.*, 2021). Participation in planning and utilization are carried out to trigger the sustainability of a sanitation improvement program (Surya *et al.*, 2021). This enables the community participate in selecting the most suitable solution and feel the benefits that have been built together (Spuhler and Lüthi, 2020). CBSM, which progressed from this study involve gender roles to form a better culture a well as increasing the active role of stakeholders.

CONCLUSION

Community-based sanitation management in coastal areas is still very low, in terms of participation in planning, implementation, and utilization. Aspects of gender and cultural roles have a significant relationship with the managerial activities. The involvement of women as an aspect of gender as well as the active role of stakeholders is needed in the formation of a disciplined culture for sanitation management, which is very necessary to mobilize family members to participate in community improvement.

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Rivisi 1

Community-Based Sanitation Management Model Using Local Aspects of Coastal Areas

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Abstract. Previous findings showed that there are only a few studies on the core problem of environmental sanitation in coastal areas. The study Mawar and Wahidah (2018), the coastal community of Percut Sei Tuan only uses 20% clean water, does not have a latrine 42.9%, and does not have a SPAL of 46.7%. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management (CBSM). A cross-sectional design was used, and the sample population consists of family heads in the Percut Sei Tuan Sub-district. The sample size was

calculated using a category survey formula of 414 households from the population. The samples were selected using a simple random sampling technique, and a questionnaire instrument, which was tested for its validity and reliability was used for data collection. The data were then analyzed using CFA (Confirmatory Factor Analysis) to assess the factors that influence CBSM. The results showed that gender roles have a significant effect on environmental sanitation management in coastal areas with a P<0.001, and culture has a significant effect on CBSM with a P<0.001. However, the role of stakeholders was insignificant in this study. CBSM in coastal areas was still very low in terms of participation in planning, implementation, and utilization. The involvement of women as an aspect of gender in the formation of a disciplined culture in sanitation management is very necessary to mobilize family members.

INTRODUCTION

Coastal areas have complex and unique issues, problems, opportunities, and challenges that are different from other regions. Furthermore, they are often characterized by a limited supply of clean water, latrines, wastewater disposal systems, landfills, and unhealthy housing (Heynnor, 2021), including in Indonesia. A previous study revealed that (Putri, Galib and Mubarak, no date), unclean water, poor sanitation, and hygiene are extremely detrimental to health and account for more than 10,000 deaths annually. Lack of attention from stakeholders (Widiastuti, 2019), poor culture (Sembiring, 2022), and gender dominance in decision-making regarding sanitation provision are some of the obstacles to creating a clean and hygienic environment (Abu, Bisung and Elliott, 2019).

A program, namely the Community Lead Total Sanitation (CLTS) was created in Indonesia to strengthen efforts to cultivate a clean and healthy living, prevent the spread of environmental-based diseases, improve community capacities, and implement the government's commitment towards improving access to drinking water and sustainable basic sanitation(Muaja, Pinontoan and Sumampouw, 2020). However, the implementation of the CLTS program in coastal areas is still less effective (Andriani, 2022) because it is not focused on a sustainable basis for these regions (Rany and Af, 2021).

The execution process is also still on evaluating community knowledge, attitudes, and actions (Hafizah, 2022). The interventions carried out are continuously running, but the inhabitants of coastal areas believe that sanitation is not a necessity (Juwono and Subagiyo, 2019). Several studies revealed that coastal communities still have passive attitudes toward proper hygiene (Mantiri, 2019; Susanto, 2019; Herdiansyah *et al.*, 2021). Although the inhabitants are knowledgeable, they still practice unhealthy open defecation (Andriani, 2022). Previous reports showed that only 62.77% of coastal areas have been verified as Open Defecation Free (ODF) villages. (Health, 2022). Indonesia has the second worst sanitation condition in the world, and if the root cause of the problem is not found and resolved, it can become very difficult to improve.

The low level of community-based sanitation management (CBSM) is caused by cultural, gender, and stakeholder factors (Chan *et al.*, 2020; Daniel *et al.*, 2021; Mulopo and Chimbari, 2021). The context of healthy living is not a priority in the fulfillment of women's basic rights (Roaf, de Albuquerque and Heller, 2018). This is evident from the low access to clean water which has not been used optimally by women on the coast (Hoque *et al.*, 2019). Previous studies revealed that their involvement as a gender aspect is very important for the success of sanitation programs, the formation of better culture, and community participation (Mova *et al.*, 2019). Furthermore, stakeholders are needed to make efforts to invite and influence the community to be involved in CBSM based on the unique characteristics of the area (Sulistyaningsih *et al.*, 2021).

The Percut Sei Tuan coastal area is a community with a homogeneous religion, lifestyle, behavior, and characteristics. The people live around the sea and use marine resources as the main source of livelihood. Furthermore, their daily needs revolve around the river due to the ease of access. In waste management, the community still collects the waste in front of the house and dispose refuse into the river. This habit has been passed down from generation to generation. Hanging latrines that are only covered with plastic as well as emergency washing stations are present along the river.

It is important to identify the influential factors inhibiting CBSM (Love *et al.*, 2022), including the community's knowledge, attitudes, and actions (Hafizah, 2022). Other aspects, such as culture, gender, and stakeholders also need to be studied. They are often considered in the evaluation of approaches for the community related to environmental sanitation. This is to ensure that people are willing and able to participate in creating a hygienic environment in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management.

METHOD

This is a quantitative study with a cross-sectional design, which analyzed the roles of cultural, gender, and stakeholders in community-based sanitation management. This study design was selected to obtain basic data that has never been studied as well as develop them for the modeling stage. This study was carried out in the coastal settlement of Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province from January 2021 to March 2022. Geographically, this region is located at 3.7 latitudes and 98.7 east longitudes, 3 meters above sea level, with an area of 1,060 ha.

The sample consists of people living in the coastal settlement of Percut Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province. The population in this study was the coastal community of Percut Sei Tuan, Deli Serdang Regency, North Sumatra Province as many as 4714 people. The sampling was carried out based on the mapping of the population in the sub-district office. Furthermore, the area consists of 5 points, namely hamlets 14 to 18, which are located on the outskirts of the river. Respondents were taken based on the head of the family, namely the father, or household members, namely the wife. The categorical survey formula was used to determine the number of households (n), namely 414, where the Z value for the confidence level was 95%. The samples in this study were selected using the simple random sampling method. Sampling frames were obtained from the sub-district office and random sampling was carried out. Data collection was carried out using a questionnaire that has been tested for validity and reliability. Furthermore, the respondents signed informed consent while maintaining confidentiality.

The dependent variables were community-based sanitation management, which consists of indicators of planning (consists of community meetings/deliberations to discuss environmental sanitation management, attend meetings to talk about environmental sanitation management, participate in activities that support environmental sanitation management activities), implementation (participate in joint contributions for the maintenance of shared facilities), and utilization of participation (participate in repairing public facilities if they are damaged or disturbed, and participate in the evaluation process or the evaluation of activities that have been carried out together). The dependent variable in this study was community-based sanitation management. Each question from the variables of planning, implementation, and utilization of

participation was given a score with a minimum value of 1 (never) to a maximum of 5 (very often). The questionnaires consist of 18 questions, of which 6, 3, and 7 were under the variables of planning, implementation, and utilization of participation, respectively. The answer options include Never (Ne), Rarely (R), N (Neutral), Often (O), and Very Often (VO).

The independent variables are cultural (apply religious advice, such as cleanliness as part of your faith), gender roles (given the opportunity and willing to make decisions in providing sanitation tools or equipment to the family), and stakeholder roles (the role of stakeholders, local leaders, and religious figures). The cultural variables consist of indicators of belief values (ordinal) and cultural norms (ordinal), while the gender roles contain indicators of decision-making (ordinal), involvement in planning (ordinal), and implementation (ordinal). Furthermore, the stakeholder variable consists of indicators, such as the role of government (ordinal), community leaders (ordinal), and religious leaders (ordinal).

The research model in this study consists of gender and stakeholder roles that are directly related to culture, followed by culture related to community-based sanitation management. The model also contain the indirect influence of gender roles, and stakeholders on community-based sanitation management.

H1. Gender has a significant effect on the culture of environmental sanitation management in coastal areas.

It also plays an important role in the formation of culture in these regions (Siles *et al.*, 2019). In most societies in Indonesia, women have the primary responsibility of managing household water supply, sanitation, and health (Elysia, 2018). They are also responsible for the provision and treatment of safe and adequate water for family needs (Radonic and Jacob, 2021). Furthermore, women are the main caregivers for children, which indicates that they have an important role in supporting children's health (Jalil and Tanjung, 2020).

The participation of female fishermen in decision-making is not well organized and less effective as a political force compared to males (Wuya, 2021). When women are given a place in an organization or decision-making process, they essentially bring a perspective that puts improving the quality of life and fisheries-based livelihoods as the priority (Owusu and Andriesse, 2020).

H2. The role of stakeholders has a significant effect on the culture of environmental sanitation management in coastal areas.

Furthermore, stakeholders include all actors or groups that influence and/or are affected by the policies, decisions and actions of a program (Ulum and Anggaini, 2020). They are needed to invite the community to attend and provide suggestions for every meeting held. This is because the community plays an important role in social, institutional and environmental conditions and they need to understand the goals and objectives of the program (Haldane *et al.*, 2019).

Stakeholders have a direct influence on culture related to environmental sanitation management in coastal areas (Mensah and Enu-Kwesi, 2019). The forms of support that are carried out continuously, either through policies or infrastructure, have effect on the cultural pattern of the community (Fatkhullah, Habib and Nisa, 2022). The formation of a culture is facilitated by the active intervention of stakeholders (Karanika-Murray, Gkiontsi and Baguley, 2018).

H3. Environmental sanitation management culture has a significant effect on community-based sanitation management.

Coastal communities have become part of a pluralistic society, but they still have a spirit of togetherness (Bayu and Rahmadina, 2020). Consequently, the average coastal community structure is a combination of the characteristics of urban and rural area. This indicates that they can form cultural systems and values, which are acculturation of each component (Diansari *et al.*, 2020).

Cultural factors that include norms and belief values, are not easy to implement, especially in a certain community environment (Sihabudin, 2022). However, they can directly affect the level of community participation (David-Chavez and Gavin, 2018). The principles of participation must pay attention to togetherness, growing from the bottom (bottom-up), as well as trust and openness (Diab *et al.*, 2022).

Data analysis was carried out with frequency distribution and CFA (Confirmatory Factor Analysis) using SmartPLS version 3. The data were analyzed to determine the dimensional construct of the dependent variable. The accuracy of the CFA test was used to assess the validity and reliability of the indicators forming the construct of behavioural variables based on the previous theory. Therefore, the right indicators were obtained to compile community-based sanitation management variables.

RESULT AND DISCUSSION

3.1 Culture, Gender role, and Stakeholder role of the Coastal Community of Percut Sei Tuan

Culture and gender play a major and active role in environmental sanitation. However, the function of stakeholders in mobilizing the community to participate in these activities in coastal areas is still suboptimal, as shown in Table 1.

Table 1. Identification of Factors Associated with Sanitary Behavior.

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
Culture	**Trust Value**			
	Never	8	1.9	0.7-3.4
	Seldom	27	6.5	4.3-8.7
	Sometimes	70	16.9	13.3-20.7
	Often	101	24.4	20.5-28.7
	Always	208	50.2	45.4-54.7
	Cultural Norms			
	Never	49	11.8	8.9-15.0
	Seldom	98	23.7	19.6-27.8
	Sometimes	67	16.2	12.8-20.3
	Often	69	16.7	13.1-19.8
	Always	131	31.6	27.1-36.5
Gender Role	**Decision-making**			
	Never	42	10.1	7.2-13.0
	Seldom	12	2.9	1.4-4.3
	Sometimes	20	4.8	2.9-7.2
	Often	110	26.6	22.8-31.2

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Always	230	55.6	51.0-60.6
	Involvement in Planning			
	Never	77	18.6	15.1-22.5
	Seldom	27	6.5	4.3-9.1
	Sometimes	30	7.2	4.7-10.0
	Often	88	21.3	17.1-25.6
	Always	192	46.4	41.8-51.0
	Involvement in Implementation			
	Never	85	20.5	16.7-24.3
	Seldom	22	5.3	3.5-7.5
	Sometimes	40	9.7	6.8-13.0
	Often	77	18.6	15.1-22.7
	Always	190	45.9	41.2-50.7
	The Role of Stakeholders (Government)			
Stakeholder Role	Very low	82	19.8	16.2-23.4
	Low	49	11.8	9.0-15.7
	Moderate	103	24.9	20.6-29.2
	High	147	35.5	31.2-40.2
	Very high	33	8.0	5.6-10.6
	The Role of Community Leaders			
	Very low	79	19.1	15.3-22.7
	Low	80	19.3	15.5-22.9
	Moderate	94	22.7	18.6-27.5
	High	138	33.3	29.5-37.9
	Very high	23	5.6	3.1-8.0
	The Role of Religious Figures			
	Very low	109	26.3	22.2-30.9
	Low	48	11.6	8.7-15.1
	Moderate	110	26.6	22.0-31.2
	High	114	27.5	23.2-31.9
	Very high	33	8.0	5.4-10.9

In the aspect of culture, cultural norms are not in a good range, and they have not been fully implemented. Stakeholders aspect is divided into three, namely the role of stakeholders government, community leaders, and religious figures, with percentages of 35.5%, 33.3%, and 27.5%, which was in the high category.

3.2 Community-Based Sanitation Management in Coastal Area

Community-based sanitation management on the coast of Percut Sei Tuan is in a low category in terms of participation in planning, implementation, and utilization, as shown in Table 2.

Table 2. Community-Based Sanitation Management in Coastal Area

Community-Based Sanitation Management	Frequency	Percentage (%)	95% Confident Interval
Participation of Planning			
Very low	157	37.9	33.6-42.4
Low	52	12.6	9.4-16.2
Moderate	63	15.2	11.6-18.8
High	60	14.5	10.9-18.0
Very high	82	19.8	15.6-24.3
Participation of Implementation			
Very low	61	14.7	11.2-18.4
Low	35	8.5	6.0-11.1
Moderate	88	21.3	16.9-25.1
High	171	41.3	36.7-45.9
Very high	59	14.3	11.0-18.1
Participation of Utilization			
Very low	172	41.5	36.8-46.3
Low	71	17.1	13.5-21.0
Moderate	71	17.1	13.3-21.3
High	36	8.7	6.0-11.1
Very high	64	15.5	12.2-19.2

In the coastal area of Percut Sei Tuan, two aspects were in the very low category, namely participation in planning, and utilization with percentages of 37.9%, and 41.5%, respectively. Meanwhile, the implementation aspect was still in the high category, namely 41.3%. The results also showed that half of the samples were had low participation.

Table 3. The result of the measurement model.

Contruct	Loading	Cronbach's alpha	Dijkstra–Henseler's rho (ρA)	CR	AVE
Culture		0.601	0.655	0.829	0.709
TV	0.779				
CN	0.901				
Gender		0.869	0.921	0.920	0.795
DM	0.755				
IP	0.957				
IM	0.949				
CBSM		0.717	0.718	0.841	0.638
PoP	0.814				
PoI	0.787				
PoU	0.795				
Stakeholder		0.940	0.981	0.961	0.891
RG	0.906				
RC	0.966				
RR	0.958				

Note (s): CR = composite reliability; AVE = average variance extracted; TV = Trust Value; CN = Cultural Norms; DM = Decision-making; IP = Involvement in Planning; IM = Involvement in Implementation; PoP = Participation of Planning; PoI = Participation of Implementation; PoU = Participation of Utilization; RG = The Role of Stakeholders (Government); RC = The Role of

Community Leaders; RR = The Role of Religious Figures

In evaluating the measurement model, the reliability of the scale for each construct was first analyzed. Table 3 shows that all variables have a very high level of item reliability, which was more than 0.708. For Dijkstra–Henseler's rho (ρA), they were also all reliable with an average value of > 0.7 except for the cultural variable. However, all CR values were more than 0.7, indicating that the variables have a high level of reliability. The convergent validity was then reviewed using extracted variance (AVE). The results showed that each construct variable was greater than 0.5 with a range of 0.638-0.891.

Table 4. Discriminant validity

		Culture	Gender	CBSM	Stakeholder
Fornell–Larcker criterion	Culture	0.842			
	Gender	0.300	0.892		
	CBSM	0.374	0.349	0.799	
	Stakeholder	0.141	0.223	0.221	0.944
Heterotrait-monotrait (HTMT) ratio	Culture				
	Gender	0.402			
	CBSM	0.548	0.417		
	Stakeholder	0.179	0.239	0.270	

The next step was discriminant validity analysis using the Fornell-Larcker criteria. The results of this study indicate that the square root of each value of the AVE construct must be higher than its correlation with other latent variables. For comparison, discriminant validity was also analyzed using Heterotrait-monotrait (HTMT) ratio. In this study, the value obtained was still below the cut-off value, which indicates very good reliability and validity, as shown in Table 4.

Table 5. Confirmatory Factor Analysis.

Hypothesis/Relationship	β	T value	95% Confident Interval	P values
H1: Gender→Culture	0.282	5.425	[0.175;0.377]	0.000*
H2: Stakeholder→Culture	0.078	1.692	[0.003;0.178]	0.091
H3: Culture→CBSM	0.374	9.198	[0.298;0.446]	0.000*

Based on the analysis, gender roles have a positive (β = 0.282; t = 5.425) and significant effect on the culture of environmental sanitation management in coastal areas (P value <0.000), as shown in Table 5. Stakeholders also have a positive effect (β = 0.078; t = 1.692) but has no significant effect (P value 0.091). Environmental sanitation management culture has a positive (β = 0.374; t = 9.198) and significant effect on community-based sanitation management (P value <0.000).

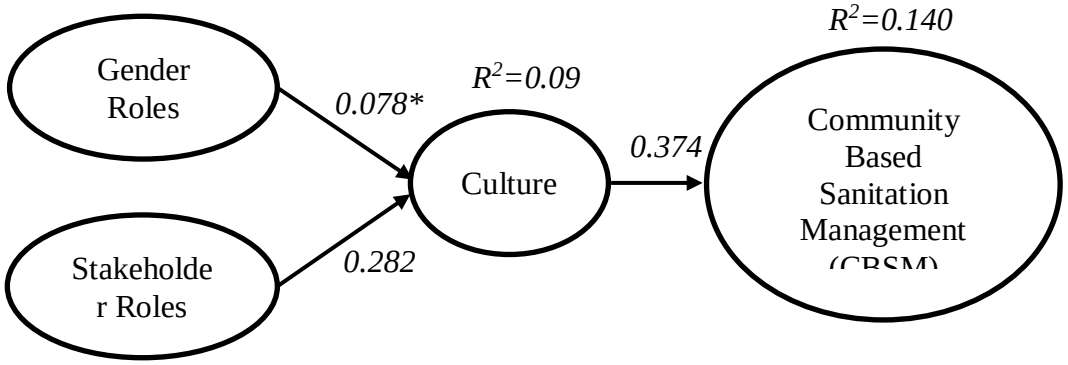

Figure 1. Community-Based Sanitation Management Model

The coastal area of Percut Sei Tuan is located in the coordinate range of 3,288.555354 m, 3.7086403^0 latitude and 98.777597^0 longitude, and it consists of the Bandar Sidora's river. Indonesia is an archipelagic country consisting of various ethnic groups (Antara and Yogantari, 2018), which led to the presence of different cultures (Fuadi, 2020). A large number of residents are certainly balanced by the diversity of ethnicities in each region, including coastal areas. However, the culture in these areas tends to be homogeneous (Sulistiyono, 2015), which affects the habits and behaviour that are almost similar among the inhabitants (Fuadi, 2020).

The coastal community of Percut Sei Tuan often throw garbage into the river, which can cause a decrease in aesthetics and environmental carrying capacity if not resolved, thereby leading to a low quality of settlements (Putri, Hadisoebroto and Hendrawan, 2019). It can also cause water pollution (Mensah and Enu-Kwesi, 2019) disease and flood (Mulki and Septianti, 2021). Several studies revealed that some poor residents cannot meet their basic needs and sanitation requirement (Alam and Mondal, 2019; Sinharoy, Pittluck and Clasen, 2019; Corburn *et al.*, 2020; Riski, 2021). For example, catching fish for a long period prevents them from contributing to environmental sanitation. They only spend a short time at home and more time on the river or the sea (Equanti and Bayuardi, 2018). This condition illustrates inadequate housing and sanitation, where the Bandar Sidoras river, which empties into the sea, is an integral part of their lives.

The value of trust focuses more on the religious aspect of the cultural variable. Cultural norms, such as gathering and discussing activities after prayer are sometime, rarely, or never found among the inhabitants, as shown in Table 1. Based on gender roles related to decision-making as well as involvement in planning and implementation, only half of the respondents have a good level of participation. Furthermore, the role of stakeholders was still very weak. Based on data analysis, only gender and cultural roles have a significant effect on environmental sanitation in the coastal area, as shown in Table 5.

Culture influences community-based sanitation management, and provides a style of experience for individuals in the society (Zulfa, Amsani and Zuska, 2020). It is a set of guidelines, which help humans adapt and deal with specific environments (Amraeni and Nirwan, 2021). The sanitation development problem is a socio-cultural challenge (Adwibaraski, 2018; Taouraout *et al.*, 2018; Roxburgh *et al.*, 2020; Kakwani *et al.*, 2021) due to the community behaviour, namely defecating in any place and throwing garbage into the river (Ellis *et al.*, 2020). This often occurs because people in the unitary tribes have their respective cultural identities and unique systems (Nurrachmawati and Anggraeni, 2010). The results showed that cultures with poor values beliefs and norms cause bad knowledge, attitudes, and actions towards environmental sanitation. These poor behaviors lead to river pollution (Wang *et al.*, 2019), defecation in rivers (Okumah *et al.*, 2019), as well as lack of participation in the community's management (Knickmeyer, 2020).

The inhabitants of coastal communities often have hard and unruly character. In terms of demographics, they are often residents who work as seafarers (Nurhayani and Hodijah, 2018). The acceleration of sanitation improvement is often inhibited when culture is not reformed (Nagla, 2020). The programs held by the government are insufficient to sustainable address the problem of environmental sanitation cleanliness (Van Welie, Truffer and Yap, 2019). Cultural intervention is not enough to increase knowledge (Caesar, Dewi and Husna, 2019) because people who are very knowledgeable are not necessarily willing and able to participate in overcoming these problems (Ajisuksmo and Iustitiani, 2020), especially in coastal areas (Rahman, Sididi and Yusriani, 2020). This shows that other factors, such as gender and stakeholder roles are needed (Ciftcioglu, 2021).

Coastal areas are also identical to the division of gender roles. The function of women in environmental sanitation control decisions was in the excellent category. Gender has a significant relationship with hygienic behaviour (Rohendi and Nur, 2019) because women need high quality basic facilities (Silva *et al.*, 2020). They are also in charge of fostering sanitation-related families as wives, household managers, mothers (successors and educators of children), breadwinners, and community

members (Puspitawati and Ma'mun Sarma, 2019). Women interact directly with water activities and are also the dominant users in the household (Als *et al.*, 2020). This is different from the coastal men, whose job is to find fish and fulfil economic needs (Torere, Goni and Waani, 2019).

Gender empowerment has a great influence on community behavior, especially families (Anderson *et al.*, 2021). The gender perspective is often used with the assumption that environmental problems, especially river pollution, are getting worse (Susilawaty *et al.*, 2021). One of the causes is the occurrence of inequality in the society, including coastal communities. Women who have a positive potential to preserve the environment, and their quality of life are not priotized by he community (Hudha and Rahardjanto, 2018). The role of women's groups is often ignored by the society, which makes their quality as human resources to be very effective in developing community life, while the environment is neglected. Furthermore, those who are more oriented towards the survival of family members often have a more optimistic, constructive and long-term way of thinking about environmental and community sustainability (Zaman *et al.*, 2021).

Stakeholders in this study had no significant effect on sanitation management, but they still play a passive role in overcoming environmental sanitation problems using the CBSM approach. A total of three stakeholders were explored in the coastal area, namely the government, community leaders, and religious leaders. The role of government and religious leaders was still in the low category at 35.5% and 27.5%, respectively, while the community leaders were high at 33.3%, a shown in Table 1.

Stakeholders as groups or individuals can influence or be influenced by the achievement of certain goals, and they have the authority and budget to improve sanitation (Kobusingye, Mungatu and Mulyungi, 2017). Therefore, improving community environmental hygiene can easily be carried out with their participation. The main activities consist of advocacy, capacity building, and increasing partnerships between stakeholders (Singh Chouhan *et al.*, 2022). The subject matter of this activity must be well-planned by community-based activity methods. The factor that affects the low participation of the community is that internal stakeholders are less active (Hadj, 2020). This is important because the CBSM on the coast of Percut Sei Tuan is still very low, as shown in Table 2.

Low CBSM hampers the development of sanitation in the region, especially in coastal areas (Lisafitri *et al.*, 2021). Participation in planning and utilization are carried out to trigger the sustainability of a sanitation improvement program (Surya *et al.*, 2021). This enables the community participate in selecting the most suitable solution and feel the benefits that have been built together (Spuhler and Lüthi, 2020). CBSM, which progressed from this study involve gender roles to form a better culture a well as increasing the active role of stakeholders.

CONCLUSION

Community-based sanitation management in coastal areas is still very low, in terms of participation in planning, implementation, and utilization. Aspects of gender and cultural roles have a significant relationship with the managerial activities. The involvement of women as an aspect of gender as well as the active role of stakeholders is needed in the formation of a disciplined culture for sanitation management, which is very necessary to mobilize family members to participate in community improvement.

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Rivisi 2

Community-Based Sanitation Management Model Using Local Aspects of Coastal Areas

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Abstract. Previous findings showed that there are only a few studies on the core problem of environmental sanitation in coastal areas. The study Mawar and Wahidah (2018), the coastal community of Percut Sei Tuan only uses 20% clean water, does not have a latrine 42.9%, and does not have a SPAL of 46.7%. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management (CBSM). A cross-sectional design was used, and the sample population consists of family heads in the Percut Sei Tuan Sub-district. The sample size was

calculated using a category survey formula of 414 households from the population. The samples were selected using a simple random sampling technique, and a questionnaire instrument, which was tested for its validity and reliability was used for data collection. The data were then analyzed using CFA (Confirmatory Factor Analysis) to assess the factors that influence CBSM. The results showed that gender roles have a significant effect on environmental sanitation management in coastal areas with a P<0.001, and culture has a significant effect on CBSM with a P<0.001. However, the role of stakeholders was insignificant in this study. CBSM in coastal areas was still very low in terms of participation in planning, implementation, and utilization. The involvement of women as an aspect of gender in the formation of a disciplined culture in sanitation management is very necessary to mobilize family members.

INTRODUCTION

Coastal areas have complex and unique issues, problems, opportunities, and challenges that are different from other regions. Furthermore, they are often characterized by a limited supply of clean water, latrines, wastewater disposal systems, landfills, and unhealthy housing (Heynnor, 2021), including in Indonesia. A previous study revealed that (Putri, Galib and Mubarak, no date), unclean water, poor sanitation, and hygiene are extremely detrimental to health and account for more than 10,000 deaths annually. Lack of attention from stakeholders (Widiastuti, 2019), poor culture (Sembiring, 2022), and gender dominance in decision-making regarding sanitation provision are some of the obstacles to creating a clean and hygienic environment (Abu, Bisung and Elliott, 2019).

A program, namely the Community Lead Total Sanitation (CLTS) was created in Indonesia to strengthen efforts to cultivate a clean and healthy living, prevent the spread of environmental-based diseases, improve community capacities, and implement the government's commitment towards improving access to drinking water and sustainable basic sanitation(Muaja, Pinontoan and Sumampouw, 2020). However, the implementation of the CLTS program in coastal areas is still less effective (Andriani, 2022) because it is not focused on a sustainable basis for these regions (Rany and Af, 2021).

The execution process is also still on evaluating community knowledge, attitudes, and actions (Hafizah, 2022). The interventions carried out are continuously running, but the inhabitants of coastal areas believe that sanitation is not a necessity. Several studies revealed that coastal communities still have passive attitudes toward proper hygiene (Herdiansyah *et al.*, 2021). Although the inhabitants are knowledgeable, they still practice unhealthy open defecation (Andriani, 2022). Previous reports showed that only 62.77% of coastal areas have been verified as Open Defecation Free (ODF) villages. (Health, 2022). Indonesia has the second worst sanitation condition in the world, and if the root cause of the problem is not found and resolved, it can become very difficult to improve.

The low level of community-based sanitation management (CBSM) is caused by cultural, gender, and stakeholder factors (Chan *et al.*, 2020; Daniel *et al.*, 2021; Mulopo and Chimbari, 2021). The context of healthy living is not a priority in the fulfillment of women's basic rights (Roaf, de Albuquerque and Heller, 2018). This is evident from the low access to clean water which has not been used optimally by women on the coast (Hoque *et al.*, 2019). Previous studies revealed that their involvement as a gender aspect is very important for the success of sanitation programs, the formation of better culture, and community participation (Mova *et al.*, 2019). Furthermore, stakeholders are needed to make efforts to invite and influence the community to be involved in CBSM based on the unique characteristics of the area (Sulistyaningsih *et al.*, 2021).

The Percut Sei Tuan coastal area is a community with a homogeneous religion, lifestyle, behavior, and characteristics. The people live around the sea and use marine resources as the main source of livelihood. Furthermore, their daily needs revolve around the river due to the ease of access. In waste management, the community still collects the waste in front of the house and dispose refuse into the river. This habit has been passed down from generation to generation. Hanging latrines that are only covered with plastic as well as emergency washing stations are present along the river.

It is important to identify the influential factors inhibiting CBSM (Love *et al.*, 2022), including the community's knowledge, attitudes, and actions (Hafizah, 2022). Other aspects, such as culture, gender, and stakeholders also need to be studied. They are often considered in the evaluation of approaches for the community related to environmental sanitation. This is to ensure that people are willing and able to participate in creating a hygienic environment in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management.

METHOD

This is a quantitative study with a cross-sectional design, which analyzed the roles of cultural, gender, and stakeholders in community-based sanitation management. This study design was selected to obtain basic data that has never been studied as well as develop them for the modeling stage. This study was carried out in the coastal settlement of Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province from January 2021 to March 2022. Geographically, this region is located at 3.7 latitudes and 98.7 east longitudes, 3 meters above sea level, with an area of 1,060 ha.

The sample consists of people living in the coastal settlement of Percut Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province. The population in this study was the coastal community of Percut Sei Tuan, Deli Serdang Regency, North Sumatra Province as many as 4714 people. The sampling was carried out based on the mapping of the population in the sub-district office. Furthermore, the area consists of 5 points, namely hamlets 14 to 18, which are located on the outskirts of the river. Respondents were taken based on the head of the family, namely the father, or household members, namely the wife. The categorical survey formula was used to determine the number of households (n), namely 414, where the Z value for the confidence level was 95%. The samples in this study were selected using the simple random sampling method. Sampling frames were obtained from the sub-district office and random sampling was carried out. Data collection was carried out using a questionnaire that has been tested for validity and reliability. Furthermore, the respondents signed informed consent while maintaining confidentiality.

The dependent variables were community-based sanitation management, which consists of indicators of planning (consists of community meetings/deliberations to discuss environmental sanitation management, attend meetings to talk about environmental sanitation management, participate in activities that support environmental sanitation management activities), implementation (participate in joint contributions for the maintenance of shared facilities), and utilization of participation (participate in repairing public facilities if they are damaged or disturbed, and participate in the evaluation process or the evaluation of activities that have been carried out together). The dependent variable in this study was community-based sanitation management. Each question from the variables of planning, implementation, and utilization of

participation was given a score with a minimum value of 1 (never) to a maximum of 5 (very often). The questionnaires consist of 18 questions, of which 6, 3, and 7 were under the variables of planning, implementation, and utilization of participation, respectively. The answer options include Never (Ne), Rarely (R), N (Neutral), Often (O), and Very Often (VO).

The independent variables are cultural (apply religious advice, such as cleanliness as part of your faith), gender roles (given the opportunity and willing to make decisions in providing sanitation tools or equipment to the family), and stakeholder roles (the role of stakeholders, local leaders, and religious figures). The cultural variables consist of indicators of belief values (ordinal) and cultural norms (ordinal), while the gender roles contain indicators of decision-making (ordinal), involvement in planning (ordinal), and implementation (ordinal). Furthermore, the stakeholder variable consists of indicators, such as the role of government (ordinal), community leaders (ordinal), and religious leaders (ordinal).

The research model in this study consists of gender and stakeholder roles that are directly related to culture, followed by culture related to community-based sanitation management. The model also contain the indirect influence of gender roles, and stakeholders on community-based sanitation management.

H1. Gender has a significant effect on the culture of environmental sanitation management in coastal areas.

It also plays an important role in the formation of culture in these regions (Siles *et al.*, 2019). In most societies in Indonesia, women have the primary responsibility of managing household water supply, sanitation, and health (Elysia, 2018). They are also responsible for the provision and treatment of safe and adequate water for family needs (Radonic and Jacob, 2021). Furthermore, women are the main caregivers for children, which indicates that they have an important role in supporting children's health.

The participation of female fishermen in decision-making is not well organized and less effective as a political force compared to males (Wuya, 2021). When women are given a place in an organization or decision-making process, they essentially bring a perspective that puts improving the quality of life and fisheries-based livelihoods as the priority (Owusu and Andriesse, 2020).

H2. The role of stakeholders has a significant effect on the culture of environmental sanitation management in coastal areas.

Furthermore, stakeholders include all actors or groups that influence and/or are affected by the policies, decisions and actions of a program. They are needed to invite the community to attend and provide suggestions for every meeting held. This is because the community plays an important role in social, institutional and environmental conditions and they need to understand the goals and objectives of the program (Haldane *et al.*, 2019).

Stakeholders have a direct influence on culture related to environmental sanitation management in coastal areas (Mensah and Enu-Kwesi, 2019). The forms of support that are carried out continuously, either through policies or infrastructure, have effect on the cultural pattern of the community (Fatkhullah, Habib and Nisa, 2022). The formation of a culture is facilitated by the active intervention of stakeholders (Karanika-Murray, Gkiontsi and Baguley, 2018).

H3. Environmental sanitation management culture has a significant effect on community-based sanitation management.

Coastal communities have become part of a pluralistic society, but they still have a spirit of togetherness. Consequently, the average coastal community structure is a combination of the characteristics of urban and rural area. This indicates that they can form cultural systems and values, which are acculturation of each component (Diansari *et al.*, 2020).

Cultural factors that include norms and belief values, are not easy to implement, especially in a certain community environment. However, they can directly affect the level of community participation (David-Chavez and Gavin, 2018). The principles of participation must pay attention to togetherness, growing from the bottom (bottom-up), as well as trust and openness (Diab *et al.*, 2022).

Data analysis was carried out with frequency distribution and CFA (Confirmatory Factor Analysis) using SmartPLS version 3. The data were analyzed to determine the dimensional construct of the dependent variable. The accuracy of the CFA test was used to assess the validity and reliability of the indicators forming the construct of behavioural variables based on the previous theory. Therefore, the right indicators were obtained to compile community-based sanitation management variables.

RESULT AND DISCUSSION

3.1 Culture, Gender role, and Stakeholder role of the Coastal Community of Percut Sei Tuan

Culture and gender play a major and active role in environmental sanitation. However, the function of stakeholders in mobilizing the community to participate in these activities in coastal areas is still suboptimal, as shown in Table 1.

Table 1. Identification of Factors Associated with Sanitary Behavior.

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
Culture	**Trust Value**			
	Never	8	1.9	0.7-3.4
	Seldom	27	6.5	4.3-8.7
	Sometimes	70	16.9	13.3-20.7
	Often	101	24.4	20.5-28.7
	Always	208	50.2	45.4-54.7
	Cultural Norms			
	Never	49	11.8	8.9-15.0
	Seldom	98	23.7	19.6-27.8
	Sometimes	67	16.2	12.8-20.3
	Often	69	16.7	13.1-19.8
	Always	131	31.6	27.1-36.5
Gender Role	**Decision-making**			
	Never	42	10.1	7.2-13.0
	Seldom	12	2.9	1.4-4.3
	Sometimes	20	4.8	2.9-7.2
	Often	110	26.6	22.8-31.2
	Always	230	55.6	51.0-60.6

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Involvement in Planning			
	Never	77	18.6	15.1-22.5
	Seldom	27	6.5	4.3-9.1
	Sometimes	30	7.2	4.7-10.0
	Often	88	21.3	17.1-25.6
	Always	192	46.4	41.8-51.0
	Involvement in Implementation			
	Never	85	20.5	16.7-24.3
	Seldom	22	5.3	3.5-7.5
	Sometimes	40	9.7	6.8-13.0
	Often	77	18.6	15.1-22.7
	Always	190	45.9	41.2-50.7
	The Role of Stakeholders (Government)			
Stakeholder Role	Very low	82	19.8	16.2-23.4
	Low	49	11.8	9.0-15.7
	Moderate	103	24.9	20.6-29.2
	High	147	35.5	31.2-40.2
	Very high	33	8.0	5.6-10.6
	The Role of Community Leaders			
	Very low	79	19.1	15.3-22.7
	Low	80	19.3	15.5-22.9
	Moderate	94	22.7	18.6-27.5
	High	138	33.3	29.5-37.9
	Very high	23	5.6	3.1-8.0
	The Role of Religious Figures			
	Very low	109	26.3	22.2-30.9
	Low	48	11.6	8.7-15.1
	Moderate	110	26.6	22.0-31.2
	High	114	27.5	23.2-31.9
	Very high	33	8.0	5.4-10.9

Source: Survey Data, 2022

In the aspect of culture, cultural norms are not in a good range, and they have not been fully implemented. Stakeholders aspect is divided into three, namely the role of stakeholders government, community leaders, and religious figures, with percentages of 35.5%, 33.3%, and 27.5%, which was in the high category.

3.2 Community-Based Sanitation Management in Coastal Area

Community-based sanitation management on the coast of Percut Sei Tuan is in a low category in terms of participation in planning, implementation, and utilization, as shown in Table 2.

Table 2. Community-Based Sanitation Management in Coastal Area

Source: Survey Data, 2022

Community-Based Sanitation Management	Frequency	Percentage (%)	95% Confident Interval
Participation of Planning			
Very low	157	37.9	33.6-42.4
Low	52	12.6	9.4-16.2
Moderate	63	15.2	11.6-18.8
High	60	14.5	10.9-18.0
Very high	82	19.8	15.6-24.3
Participation of Implementation			
Very low	61	14.7	11.2-18.4
Low	35	8.5	6.0-11.1
Moderate	88	21.3	16.9-25.1
High	171	41.3	36.7-45.9
Very high	59	14.3	11.0-18.1
Participation of Utilization			
Very low	172	41.5	36.8-46.3
Low	71	17.1	13.5-21.0
Moderate	71	17.1	13.3-21.3
High	36	8.7	6.0-11.1
Very high	64	15.5	12.2-19.2

In the coastal area of Percut Sei Tuan, two aspects were in the very low category, namely participation in planning, and utilization with percentages of 37.9%, and 41.5%, respectively. Meanwhile, the implementation aspect was still in the high category, namely 41.3%. The results also showed that half of the samples were had low participation.

Table 3. The result of the measurement model.

Contruct	Loading	Cronbach's alpha	Dijkstra–Henseler's rho (ρA)	CR	AVE
Culture		0.601	0.655	0.829	0.709
TV	0.779				
CN	0.901				
Gender		0.869	0.921	0.920	0.795
DM	0.755				
IP	0.957				
IM	0.949				
CBSM		0.717	0.718	0.841	0.638
PoP	0.814				
PoI	0.787				
PoU	0.795				
Stakeholder		0.940	0.981	0.961	0.891
RG	0.906				
RC	0.966				
RR	0.958				

Note (s): CR = composite reliability; AVE = average variance extracted; TV = Trust Value; CN = Cultural Norms; DM = Decision-making; IP = Involvement in Planning; IM = Involvement in Implementation; PoP = Participation of Planning; PoI = Participation of Implementation; PoU =

Participation of Utilization; RG = The Role of Stakeholders (Government); RC = The Role of Community Leaders; RR = The Role of Religious Figures

Source: Survey Data, 2022

In evaluating the measurement model, the reliability of the scale for each construct was first analyzed. Table 3 shows that all variables have a very high level of item reliability, which was more than 0.708. For Dijkstra–Henseler's rho (ρA), they were also all reliable with an average value of > 0.7 except for the cultural variable. However, all CR values were more than 0.7, indicating that the variables have a high level of reliability. The convergent validity was then reviewed using extracted variance (AVE). The results showed that each construct variable was greater than 0.5 with a range of 0.638-0.891.

Table 4. Discriminant validity

		Culture	Gender	CBSM	Stakeholder
Fornell–Larcker criterion	Culture	0.842			
	Gender	0.300	0.892		
	CBSM	0.374	0.349	0.799	
	Stakeholder	0.141	0.223	0.221	0.944
Heterotrait-monotrait (HTMT) ratio	Culture				
	Gender	0.402			
	CBSM	0.548	0.417		
	Stakeholder	0.179	0.239	0.270	

Source: Survey Data, 2022

The next step was discriminant validity analysis using the Fornell-Larcker criteria. The results of this study indicate that the square root of each value of the AVE construct must be higher than its correlation with other latent variables. For comparison, discriminant validity was also analyzed using Heterotrait-monotrait (HTMT) ratio. In this study, the value obtained was still below the cut-off value, which indicates very good reliability and validity, as shown in Table 4.

Table 5. Confirmatory Factor Analysis.

Hypothesis/Relationship	β	T value	95% Confident Interval	P values
H1: Gender→Culture	0.282	5.425	[0.175;0.377]	0.000*
H2: Stakeholder→Culture	0.078	1.692	[0.003;0.178]	0.091
H3: Culture→CBSM	0.374	9.198	[0.298;0.446]	0.000*

Source: Survey Data, 2022

Based on the analysis, gender roles have a positive (β = 0.282; t = 5.425) and significant effect on the culture of environmental sanitation management in coastal areas (P value <0.000), as shown in Table 5. Stakeholders also have a positive effect (β = 0.078; t = 1.692) but has no significant effect (P value 0.091). Environmental sanitation management culture has a positive (β = 0.374; t = 9.198) and significant effect on community-based sanitation management (P value <0.000).

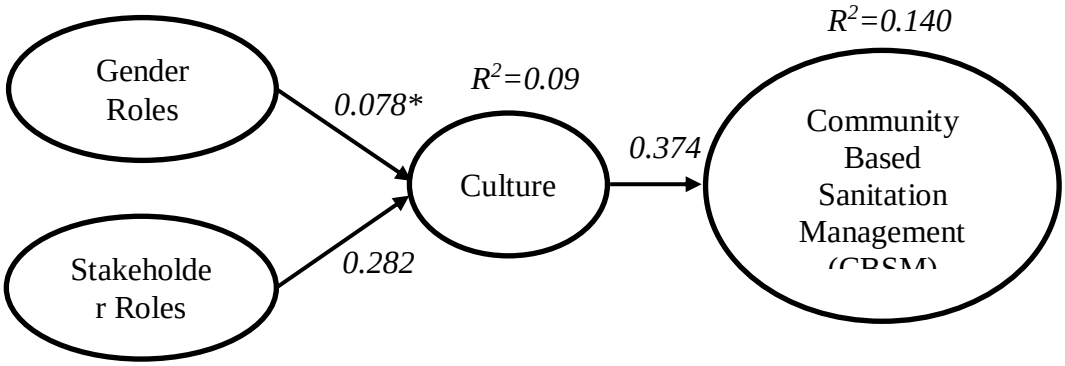

Figure 1. Community-Based Sanitation Management Model

The coastal area of Percut Sei Tuan is located in the coordinate range of 3,288.555354 m, 3.7086403^0 latitude and 98.777597^0 longitude, and it consists of the Bandar Sidora's river. Indonesia is an archipelagic country consisting of various ethnic groups (Antara and Yogantari, 2018), which led to the presence of different cultures (Fuadi, 2020). A large number of residents are certainly balanced by the diversity of ethnicities in each region, including coastal areas. However, the culture in these areas tends to be homogeneous (Sulistiyono, 2015), which affects the habits and behaviour that are almost similar among the inhabitants (Fuadi, 2020).

The coastal community of Percut Sei Tuan often throw garbage into the river, which can cause a decrease in aesthetics and environmental carrying capacity if not resolved, thereby leading to a low quality of settlements (Putri, Hadisoebroto and Hendrawan, 2019). It can also cause water pollution (Mensah and Enu-Kwesi, 2019) disease and flood. Several studies revealed that some poor residents cannot meet their basic needs and sanitation requirement (Alam and Mondal, 2019; Sinharoy, Pittluck and Clasen, 2019; Corburn *et al.*, 2020; Riski, 2021). For example, catching fish for a long period prevents them from contributing to environmental sanitation. They only spend a short time at home and more time on the river or the sea (Equanti and Bayuardi, 2018). This condition illustrates inadequate housing and sanitation, where the Bandar Sidoras river, which empties into the sea, is an integral part of their lives.

The value of trust focuses more on the religious aspect of the cultural variable. Cultural norms, such as gathering and discussing activities after prayer are sometime, rarely, or never found among the inhabitants, as shown in Table 1. Based on gender roles related to decision-making as well as involvement in planning and implementation, only half of the respondents have a good level of participation. Furthermore, the role of stakeholders was still very weak. Based on data analysis, only gender and cultural roles have a significant effect on environmental sanitation in the coastal area, as shown in Table 5.

Culture influences community-based sanitation management, and provides a style of experience for individuals in the society. It is a set of guidelines, which help humans adapt and deal with specific environments. The sanitation development problem is a socio-cultural challenge (Taouraout *et al.*, 2018; Roxburgh *et al.*, 2020; Kakwani *et al.*, 2021) due to the community behaviour, namely defecating in any place and throwing garbage into the river (Ellis *et al.*, 2020). This often occurs because people in the unitary tribes have their respective cultural identities and unique systems. The results showed that cultures with poor values beliefs and norms cause bad knowledge, attitudes, and actions towards environmental sanitation. These poor behaviors lead to river pollution (Wang *et al.*, 2019), defecation in rivers (Okumah *et al.*, 2019), as well as lack of participation in the community's management (Knickmeyer, 2020).

The inhabitants of coastal communities often have hard and unruly character. In terms of demographics, they are often residents who work as seafarers (Nurhayani and Hodijah, 2018). The acceleration of sanitation improvement is often inhibited when culture is not reformed (Nagla, 2020). The programs held by the government are insufficient to sustainable address the problem of environmental sanitation cleanliness (Van Welie, Truffer and Yap, 2019). Cultural intervention is not enough to increase

knowledge (Caesar, Dewi and Husna, 2019) because people who are very knowledgeable are not necessarily willing and able to participate in overcoming these problems (Ajisuksmo and Iustitiani, 2020), especially in coastal areas (Rahman, Sididi and Yusriani, 2020). This shows that other factors, such as gender and stakeholder roles are needed (Ciftcioglu, 2021).

Coastal areas are also identical to the division of gender roles. The function of women in environmental sanitation control decisions was in the excellent category. Gender has a significant relationship with hygienic behaviour because women need high quality basic facilities (Silva *et al.*, 2020). They are also in charge of fostering sanitation-related families as wives, household managers, mothers (successors and educators of children), breadwinners, and community members. Women interact directly with water activities and are also the dominant users in the household (Als *et al.*, 2020). This is different from the coastal men, whose job is to find fish and fulfil economic needs.

Gender empowerment has a great influence on community behavior, especially families (Anderson *et al.*, 2021). The gender perspective is often used with the assumption that environmental problems, especially river pollution, are getting worse. One of the causes is the occurrence of inequality in the society, including coastal communities. Women who have a positive potential to preserve the environment, and their quality of life are not priotized by he community. The role of women's groups is often ignored by the society, which makes their quality as human resources to be very effective in developing community life, while the environment is neglected. Furthermore, those who are more oriented towards the survival of family members often have a more optimistic, constructive and long-term way of thinking about environmental and community sustainability.

Stakeholders in this study had no significant effect on sanitation management, but they still play a passive role in overcoming environmental sanitation problems using the CBSM approach. A total of three stakeholders were explored in the coastal area, namely the government, community leaders, and religious leaders. The role of government and religious leaders was still in the low category at 35.5% and 27.5%, respectively, while the community leaders were high at 33.3%, a shown in Table 1.

Stakeholders as groups or individuals can influence or be influenced by the achievement of certain goals, and they have the authority and budget to improve sanitation (Kobusingye, Mungatu and Mulyungi, 2017). Therefore, improving community environmental hygiene can easily be carried out with their participation. The main activities consist of advocacy, capacity building, and increasing partnerships between stakeholders (Singh Chouhan *et al.*, 2022). The subject matter of this activity must be well-planned by community-based activity methods. The factor that affects the low participation of the community is that internal stakeholders are less active (Hadj, 2020). This is important because the CBSM on the coast of Percut Sei Tuan is still very low, as shown in Table 2.

Low CBSM hampers the development of sanitation in the region, especially in coastal areas (Lisafitri *et al.*, 2021). Participation in planning and utilization are carried out to trigger the sustainability of a sanitation improvement program (Surya *et al.*, 2021). This enables the community participate in selecting the most suitable solution and feel the benefits that have been built together (Spuhler and Lüthi, 2020). CBSM, which progressed from this study involve gender roles to form a better culture a well as increasing the active role of stakeholders.

CONCLUSION

Community-based sanitation management in coastal areas is still very low, in terms of participation in planning, implementation, and utilization. Aspects of gender and cultural roles have a significant relationship with the managerial activities. The involvement of women as an aspect of gender as well as the active role of stakeholders is needed in the formation of a disciplined culture for sanitation management, which is very necessary to mobilize family members to participate in community improvement, and the surrounding community must maintain the environmental sanitation facilities that

have been provided by the local government and work together to clean and maintain the sanitary cleanliness of the surrounding environment and clean them at least once a week.

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Revisi 3

Community-Based Sanitation Management Model Using Local Aspects of Coastal Areas

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Abstract. Previous findings showed that there are only a few studies on the core problem of environmental sanitation in coastal areas. The study Mawar and Wahidah (2018), the coastal community of Percut Sei Tuan only uses 20% clean water, does not have a latrine 42.9%, and does not have a SPAL of 46.7%. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management (CBSM). A cross-sectional design was used, and the sample population consists of family heads in the Percut Sei Tuan Sub-district. The sample size was calculated using a category survey formula of 414 households from the population. The samples were selected using a simple random sampling technique, and a questionnaire instrument, which was tested for its validity and reliability was used for data collection. The data were then analyzed using CFA (Confirmatory Factor Analysis) to assess the factors that influence CBSM. The results showed that gender roles have a significant effect on environmental sanitation management in coastal areas with a P<0.001, and culture has a significant effect on CBSM with a P<0.001. However, the role of stakeholders was insignificant in this study. CBSM in coastal areas was still very low in terms of participation in planning, implementation, and utilization. The involvement of women as an aspect of gender in the formation of a disciplined culture in sanitation management is very necessary to mobilize family members.

INTRODUCTION

Coastal areas have complex and unique issues, problems, opportunities, and challenges that are different from other regions. Furthermore, they are often characterized by a limited supply of clean water, latrines, wastewater disposal systems, landfills, and unhealthy housing (Heynnor, 2021), including in Indonesia. A previous study revealed that (Putri, Galib and Mubarak, no date), unclean water, poor sanitation, and hygiene are extremely detrimental to health and account for more than 10,000 deaths annually. Lack of attention from stakeholders (Widiastuti, 2019), poor culture (Sembiring, 2022), and gender dominance in decision-making regarding sanitation provision are some of the obstacles to creating a clean and hygienic environment (Abu, Bisung and Elliott, 2019).

A program, namely the Community Lead Total Sanitation (CLTS) was created in Indonesia to strengthen efforts to cultivate a clean and healthy living, prevent the spread of environmental-based diseases, improve community capacities, and implement the government's commitment towards improving access to drinking water and sustainable basic sanitation(Muaja, Pinontoan and Sumampouw, 2020). However, the implementation of the CLTS program in coastal areas is still less effective (Andriani, 2022) because it is not focused on a sustainable basis for these regions (Rany and Af, 2021).

The execution process is also still on evaluating community knowledge, attitudes, and actions (Hafizah, 2022). The interventions carried out are continuously running, but the inhabitants of coastal areas believe that sanitation is not a necessity. Several studies revealed that coastal communities still have passive attitudes toward proper hygiene (Herdiansyah *et al.*, 2021).

Although the inhabitants are knowledgeable, they still practice unhealthy open defecation (Andriani, 2022). Previous reports showed that only 62.77% of coastal areas have been verified as Open Defecation Free (ODF) villages. (Health, 2022). Indonesia has the second worst sanitation condition in the world, and if the root cause of the problem is not found and resolved, it can become very difficult to improve.

The low level of community-based sanitation management (CBSM) is caused by cultural, gender, and stakeholder factors (Chan *et al.*, 2020; Daniel *et al.*, 2021; Mulopo and Chimbari, 2021). The context of healthy living is not a priority in the fulfillment of women's basic rights (Roaf, de Albuquerque and Heller, 2018). This is evident from the low access to clean water which has not been used optimally by women on the coast (Hoque *et al.*, 2019). Previous studies revealed that their involvement as a gender aspect is very important for the success of sanitation programs, the formation of better culture, and community participation (Mova *et al.*, 2019). Furthermore, stakeholders are needed to make efforts to invite and influence the community to be involved in CBSM based on the unique characteristics of the area (Sulistyaningsih *et al.*, 2021).

The Percut Sei Tuan coastal area is a community with a homogeneous religion, lifestyle, behavior, and characteristics. The people live around the sea and use marine resources as the main source of livelihood. Furthermore, their daily needs revolve around the river due to the ease of access. In waste management, the community still collects the waste in front of the house and dispose refuse into the river. This habit has been passed down from generation to generation. Hanging latrines that are only covered with plastic as well as emergency washing stations are present along the river.

It is important to identify the influential factors inhibiting CBSM (Love *et al.*, 2022), including the community's knowledge, attitudes, and actions (Hafizah, 2022). Other aspects, such as culture, gender, and stakeholders also need to be studied. They are often considered in the evaluation of approaches for the community related to environmental sanitation. This is to ensure that people are willing and able to participate in creating a hygienic environment in coastal areas. Therefore, this study aims to examine the cultural, gender, and stakeholder aspects of community-based sanitation management.

METHOD

This is a quantitative study with a cross-sectional design, which analyzed the roles of cultural, gender, and stakeholders in community-based sanitation management. This study design was selected to obtain basic data that has never been studied as well as develop them for the modeling stage. This study was carried out in the coastal settlement of Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province from January 2021 to March 2022. Geographically, this region is located at 3.7 latitudes and 98.7 east longitudes, 3 meters above sea level, with an area of 1,060 ha.

The sample consists of people living in the coastal settlement of Percut Sei Tuan Sub-district, Deli Serdang Regency, North Sumatra Province. The population in this study was the coastal community of Percut Sei Tuan, Deli Serdang Regency, North Sumatra Province as many as 4714 people. The sampling was carried out based on the mapping of the population in the sub-district office. Furthermore, the area consists of 5 points, namely hamlets 14 to 18, which are located on the outskirts of the river. Respondents were taken based on the head of the family, namely the father, or household members, namely the wife. The categorical survey formula was used to

determine the number of households (n), namely 414, where the Z value for the confidence level was 95%. The samples in this study were selected using the simple random sampling method. Sampling frames were obtained from the sub-district office and random sampling was carried out. Data collection was carried out using a questionnaire that has been tested for validity and reliability. Furthermore, the respondents signed informed consent while maintaining confidentiality.

The dependent variables were community-based sanitation management, which consists of indicators of planning (consists of community meetings/deliberations to discuss environmental sanitation management, attend meetings to talk about environmental sanitation management, participate in activities that support environmental sanitation management activities), implementation (participate in joint contributions for the maintenance of shared facilities), and utilization of participation (participate in repairing public facilities if they are damaged or disturbed, and participate in the evaluation process or the evaluation of activities that have been carried out together). The dependent variable in this study was community-based sanitation management. Each question from the variables of planning, implementation, and utilization of participation was given a score with a minimum value of 1 (never) to a maximum of 5 (very often). The questionnaires consist of 18 questions, of which 6, 3, and 7 were under the variables of planning, implementation, and utilization of participation, respectively. The answer options include Never (Ne), Rarely (R), N (Neutral), Often (O), and Very Often (VO).

The independent variables are cultural (apply religious advice, such as cleanliness as part of your faith), gender roles (given the opportunity and willing to make decisions in providing sanitation tools or equipment to the family), and stakeholder roles (the role of stakeholders, local leaders, and religious figures). The cultural variables consist of indicators of belief values (ordinal) and cultural norms (ordinal), while the gender roles contain indicators of decision-making (ordinal), involvement in planning (ordinal), and implementation (ordinal). Furthermore, the stakeholder variable consists of indicators, such as the role of government (ordinal), community leaders (ordinal), and religious leaders (ordinal).

The research model in this study consists of gender and stakeholder roles that are directly related to culture, followed by culture related to community-based sanitation management. The model also contain the indirect influence of gender roles, and stakeholders on community-based sanitation management.

H1. Gender has a significant effect on the culture of environmental sanitation management in coastal areas.

It also plays an important role in the formation of culture in these regions (Siles *et al.*, 2019). In most societies in Indonesia, women have the primary responsibility of managing household water supply, sanitation, and health (Elysia, 2018). They are also responsible for the provision and treatment of safe and adequate water for family needs (Radonic and Jacob, 2021). Furthermore, women are the main caregivers for children, which indicates that they have an important role in supporting children's health.

The participation of female fishermen in decision-making is not well organized and less effective as a political force compared to males (Wuya, 2021). When women are given a place in an organization or decision-making process, they essentially bring a perspective that puts improving the quality of life and fisheries-based livelihoods as the priority (Owusu and Andriesse, 2020).

H2. The role of stakeholders has a significant effect on the culture of environmental sanitation management in coastal areas.

Furthermore, stakeholders include all actors or groups that influence and/or are affected by the policies, decisions and actions of a program. They are needed to invite the community to attend and provide suggestions for every meeting held. This is because the community plays an important role in social, institutional and environmental conditions and they need to understand the goals and objectives of the program (Haldane *et al.*, 2019).

Stakeholders have a direct influence on culture related to environmental sanitation management in coastal areas (Mensah and Enu-Kwesi, 2019). The forms of support that are carried out continuously, either through policies or infrastructure, have effect on the cultural pattern of the community (Fatkhullah, Habib and Nisa, 2022). The formation of a culture is facilitated by the active intervention of stakeholders (Karanika-Murray, Gkiontsi and Baguley, 2018).

H3. Environmental sanitation management culture has a significant effect on community-based sanitation management.

Coastal communities have become part of a pluralistic society, but they still have a spirit of togetherness. Consequently, the average coastal community structure is a combination of the characteristics of urban and rural area. This indicates that they can form cultural systems and values, which are acculturation of each component (Diansari *et al.*, 2020).

Cultural factors that include norms and belief values, are not easy to implement, especially in a certain community environment. However, they can directly affect the level of community participation (David-Chavez and Gavin, 2018). The principles of participation must pay attention to togetherness, growing from the bottom (bottom-up), as well as trust and openness (Diab *et al.*, 2022).

Data analysis was carried out with frequency distribution and CFA (Confirmatory Factor Analysis) using SmartPLS version 3. The data were analyzed to determine the dimensional construct of the dependent variable. The accuracy of the CFA test was used to assess the validity and reliability of the indicators forming the construct of behavioural variables based on the previous theory. Therefore, the right indicators were obtained to compile community-based sanitation management variables.

RESULT AND DISCUSSION

3.1 Culture, Gender role, and Stakeholder role of the Coastal Community of Percut Sei Tuan

Culture and gender play a major and active role in environmental sanitation. However, the function of stakeholders in mobilizing the community to participate in these activities in coastal areas is still suboptimal, as shown in Table 1.

Table 1. Identification of Factors Associated with Sanitary Behavior.

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Trust Value			
Culture	Never	8	1.9	0.7-3.4
	Seldom	27	6.5	4.3-8.7

Variable	Indicators	Frequency	Percentage (%)	95% Confident Interval
	Sometimes	70	16.9	13.3-20.7
	Often	101	24.4	20.5-28.7
	Always	208	50.2	45.4-54.7
	Cultural Norms			
	Never	49	11.8	8.9-15.0
	Seldom	98	23.7	19.6-27.8
	Sometimes	67	16.2	12.8-20.3
	Often	69	16.7	13.1-19.8
	Always	131	31.6	27.1-36.5
Gender Role	**Decision-making**			
	Never	42	10.1	7.2-13.0
	Seldom	12	2.9	1.4-4.3
	Sometimes	20	4.8	2.9-7.2
	Often	110	26.6	22.8-31.2
	Always	230	55.6	51.0-60.6
	Involvement in Planning			
	Never	77	18.6	15.1-22.5
	Seldom	27	6.5	4.3-9.1
	Sometimes	30	7.2	4.7-10.0
	Often	88	21.3	17.1-25.6
	Always	192	46.4	41.8-51.0
	Involvement in Implementation			
	Never	85	20.5	16.7-24.3
	Seldom	22	5.3	3.5-7.5
	Sometimes	40	9.7	6.8-13.0
	Often	77	18.6	15.1-22.7
	Always	190	45.9	41.2-50.7
	The Role of Stakeholders (Government)			
Stakeholder Role	Very low	82	19.8	16.2-23.4
	Low	49	11.8	9.0-15.7
	Moderate	103	24.9	20.6-29.2
	High	147	35.5	31.2-40.2
	Very high	33	8.0	5.6-10.6
	The Role of Community Leaders			
	Very low	79	19.1	15.3-22.7
	Low	80	19.3	15.5-22.9
	Moderate	94	22.7	18.6-27.5
	High	138	33.3	29.5-37.9
	Very high	23	5.6	3.1-8.0
	The Role of Religious Figures			
	Very low	109	26.3	22.2-30.9
	Low	48	11.6	8.7-15.1
	Moderate	110	26.6	22.0-31.2
	High	114	27.5	23.2-31.9
	Very high	33	8.0	5.4-10.9

Source: Primary Data, 2022

In the aspect of culture, cultural norms are not in a good range, and they have not been fully implemented. Stakeholders aspect is divided into three, namely the role of stakeholders government, community leaders, and religious figures, with percentages of 35.5%, 33.3%, and 27.5%, which was in the high category.

3.2 Community-Based Sanitation Management in Coastal Area

Community-based sanitation management on the coast of Percut Sei Tuan is in a low category in terms of participation in planning, implementation, and utilization, as shown in Table 2.

Table 2. Community-Based Sanitation Management in Coastal Area

Community-Based Sanitation Management	Frequency	Percentage (%)	95% Confident Interval
Participation of Planning			
Very low	157	37.9	33.6-42.4
Low	52	12.6	9.4-16.2
Moderate	63	15.2	11.6-18.8
High	60	14.5	10.9-18.0
Very high	82	19.8	15.6-24.3
Participation of Implementation			
Very low	61	14.7	11.2-18.4
Low	35	8.5	6.0-11.1
Moderate	88	21.3	16.9-25.1
High	171	41.3	36.7-45.9
Very high	59	14.3	11.0-18.1
Participation of Utilization			
Very low	172	41.5	36.8-46.3
Low	71	17.1	13.5-21.0
Moderate	71	17.1	13.3-21.3
High	36	8.7	6.0-11.1
Very high	64	15.5	12.2-19.2

Source: Primary Data, 2022

In the coastal area of Percut Sei Tuan, two aspects were in the very low category, namely participation in planning, and utilization with percentages of 37.9%, and 41.5%, respectively. Meanwhile, the implementation aspect was still in the high category, namely 41.3%. The results also showed that half of the samples were had low participation.

Table 3. The result of the measurement model.

Contruct	Loading	Cronbach's alpha	Dijkstra–Henseler's rho (ρA)	CR	AVE
Culture		0.601	0.655	0.829	0.709
TV	0.779				
CN	0.901				
Gender		0.869	0.921	0.920	0.795
DM	0.755				
IP	0.957				

IM	0.949				
CBSM		0.717	0.718	0.841	0.638
PoP	0.814				
PoI	0.787				
PoU	0.795				
Stakeholder		0.940	0.981	0.961	0.891
RG	0.906				
RC	0.966				
RR	0.958				

Note (s): CR = composite reliability; AVE = average variance extracted; TV = Trust Value; CN = Cultural Norms; DM = Decision-making; IP = Involvement in Planning; IM = Involvement in Implementation; PoP = Participation of Planning; PoI = Participation of Implementation; PoU = Participation of Utilization; RG = The Role of Stakeholders (Government); RC = The Role of Community Leaders; RR = The Role of Religious Figures

Source: Primary Data, 2022

In evaluating the measurement model, the reliability of the scale for each construct was first analyzed. Table 3 shows that all variables have a very high level of item reliability, which was more than 0.708. For Dijkstra–Henseler's rho (ρA), they were also all reliable with an average value of > 0.7 except for the cultural variable. However, all CR values were more than 0.7, indicating that the variables have a high level of reliability. The convergent validity was then reviewed using extracted variance (AVE). The results showed that each construct variable was greater than 0.5 with a range of 0.638-0.891.

Table 4. Discriminant validity

		Culture	**Gender**	**CBSM**	**Stakeholder**
Fornell–Larcker criterion	Culture	0.842			
	Gender	0.300	0.892		
	CBSM	0.374	0.349	0.799	
	Stakeholder	0.141	0.223	0.221	0.944
Heterotrait-monotrait (HTMT) ratio	Culture				
	Gender	0.402			
	CBSM	0.548	0.417		
	Stakeholder	0.179	0.239	0.270	

Source: Primary Data, 2022

The next step was discriminant validity analysis using the Fornell-Larcker criteria. The results of this study indicate that the square root of each value of the AVE construct must be higher than its correlation with other latent variables. For comparison, discriminant validity was also analyzed using Heterotrait-monotrait (HTMT) ratio. In this study, the value obtained was still below the cut-off value, which indicates very good reliability and validity, as shown in Table 4.

Table 5. Confirmatory Factor Analysis.

Hypothesis/Relationship	**β**	**T value**	**95% Confident Interval**	**P values**
H1: Gender→Culture	0.282	5.425	[0.175;0.377]	0.000*
H2: Stakeholder→Culture	0.078	1.692	[0.003;0.178]	0.091
H3: Culture→CBSM	0.374	9.198	[0.298;0.446]	0.000*

Source: Primary Data, 2022

Based on the analysis, gender roles have a positive (β = 0.282; t = 5.425) and significant effect on the culture of environmental sanitation management in coastal areas (P value <0.000), as shown in Table 5. Stakeholders also have a positive effect (β = 0.078; t = 1.692) but has no significant effect (P value 0.091). Environmental sanitation management culture has a positive (β = 0.374; t = 9.198) and significant effect on community-based sanitation management (P value <0.000).

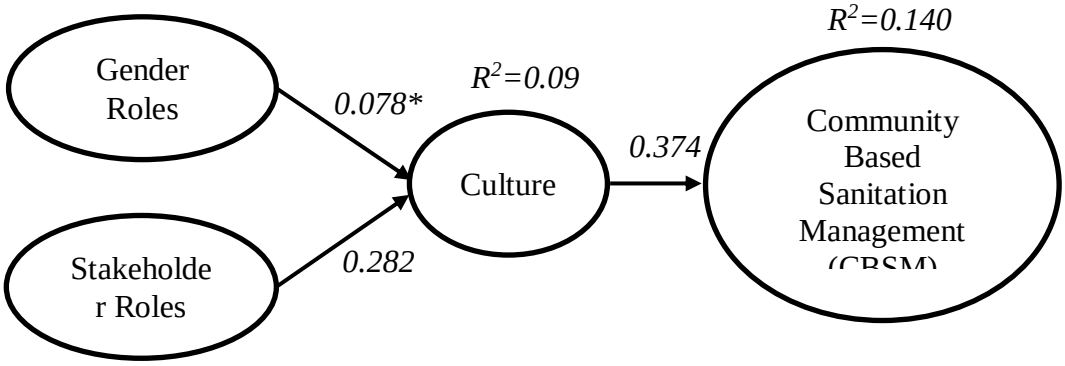

Figure 1. Community-Based Sanitation Management Model

The coastal area of Percut Sei Tuan is located in the coordinate range of 3,288.555354 m, 3.7086403^0 latitude and 98.777597^0 longitude, and it consists of the Bandar Sidora's river. Indonesia is an archipelagic country consisting of various ethnic groups (Antara and Yogantari, 2018), which led to the presence of different cultures (Fuadi, 2020). A large number of residents are certainly balanced by the diversity of ethnicities in each region, including coastal areas. However, the culture in these areas tends to be homogeneous (Sulistiyono, 2015), which affects the habits and behaviour that are almost similar among the inhabitants (Fuadi, 2020).

The coastal community of Percut Sei Tuan often throw garbage into the river, which can cause a decrease in aesthetics and environmental carrying capacity if not resolved, thereby leading to a low quality of settlements (Putri, Hadisoebroto and Hendrawan, 2019). It can also cause water pollution (Mensah and Enu-Kwesi, 2019) disease and flood. Several studies revealed that some poor residents cannot meet their basic needs and sanitation requirement (Alam and Mondal, 2019; Sinharoy, Pittluck and Clasen, 2019; Corburn *et al.*, 2020; Riski, 2021). For example, catching fish for a long period prevents them from contributing to environmental sanitation. They only spend a short time at home and more time on the river or the sea (Equanti and Bayuardi, 2018). This condition illustrates inadequate housing and sanitation, where the Bandar Sidoras river, which empties into the sea, is an integral part of their lives.

The value of trust focuses more on the religious aspect of the cultural variable. Cultural norms, such as gathering and discussing activities after prayer are sometime, rarely, or never found among the inhabitants, as shown in Table 1. Based on gender roles related to decision-making as well as involvement in planning and implementation, only half of the respondents have a good level of participation. Furthermore, the role of stakeholders was still very weak. Based on data analysis, only gender and cultural roles have a significant effect on environmental sanitation in the coastal area, as shown in Table 5.

Culture influences community-based sanitation management, and provides a style of experience for individuals in the society. It is a set of guidelines, which help humans adapt and deal with specific environments. The sanitation development problem is a socio-cultural challenge (Taouraout *et al.*, 2018; Roxburgh *et al.*, 2020; Kakwani *et al.*, 2021) due to the community behaviour, namely defecating in any place and throwing garbage into the river (Ellis *et al.*, 2020). This often occurs because people in the unitary tribes have their respective cultural identities and unique systems. The results showed that cultures with poor values beliefs and norms cause bad knowledge, attitudes, and actions towards environmental

sanitation. These poor behaviors lead to river pollution (Wang *et al.*, 2019), defecation in rivers (Okumah *et al.*, 2019), as well as lack of participation in the community's management (Knickmeyer, 2020).

The inhabitants of coastal communities often have hard and unruly character. In terms of demographics, they are often residents who work as seafarers (Nurhayani and Hodijah, 2018). The acceleration of sanitation improvement is often inhibited when culture is not reformed (Nagla, 2020). The programs held by the government are insufficient to sustainable address the problem of environmental sanitation cleanliness (Van Welie, Truffer and Yap, 2019). Cultural intervention is not enough to increase knowledge (Caesar, Dewi and Husna, 2019) because people who are very knowledgeable are not necessarily willing and able to participate in overcoming these problems (Ajisuksmo and Iustitiani, 2020), especially in coastal areas (Rahman, Sididi and Yusriani, 2020). This shows that other factors, such as gender and stakeholder roles are needed (Ciftcioglu, 2021).

Coastal areas are also identical to the division of gender roles. The function of women in environmental sanitation control decisions was in the excellent category. Gender has a significant relationship with hygienic behaviour because women need high quality basic facilities (Silva *et al.*, 2020). They are also in charge of fostering sanitation-related families as wives, household managers, mothers (successors and educators of children), breadwinners, and community members. Women interact directly with water activities and are also the dominant users in the household (Als *et al.*, 2020). This is different from the coastal men, whose job is to find fish and fulfil economic needs.

Gender empowerment has a great influence on community behavior, especially families (Anderson *et al.*, 2021). The gender perspective is often used with the assumption that environmental problems, especially river pollution, are getting worse. One of the causes is the occurrence of inequality in the society, including coastal communities. Women who have a positive potential to preserve the environment, and their quality of life are not priotized by he community. The role of women's groups is often ignored by the society, which makes their quality as human resources to be very effective in developing community life, while the environment is neglected. Furthermore, those who are more oriented towards the survival of family members often have a more optimistic, constructive and long-term way of thinking about environmental and community sustainability.

Stakeholders in this study had no significant effect on sanitation management, but they still play a passive role in overcoming environmental sanitation problems using the CBSM approach. A total of three stakeholders were explored in the coastal area, namely the government, community leaders, and religious leaders. The role of government and religious leaders was still in the low category at 35.5% and 27.5%, respectively, while the community leaders were high at 33.3%, a shown in Table 1.

Stakeholders as groups or individuals can influence or be influenced by the achievement of certain goals, and they have the authority and budget to improve sanitation (Kobusingye, Mungatu and Mulyungi, 2017). Therefore, improving community environmental hygiene can easily be carried out with their participation. The main activities consist of advocacy, capacity building, and increasing partnerships between stakeholders (Singh Chouhan *et al.*, 2022). The subject matter of this activity must be well-planned by community-based activity methods. The factor that affects the low participation of the community is that internal stakeholders are less active (Hadj, 2020). This is important because the CBSM on the coast of Percut Sei Tuan is still very low, as shown in Table 2.

Low CBSM hampers the development of sanitation in the region, especially in coastal areas (Lisafitri *et al.*, 2021). Participation in planning and utilization are carried out to trigger the sustainability of a sanitation improvement program (Surya *et al.*, 2021). This enables the community participate in selecting the most suitable solution and feel the benefits that have been built together (Spuhler and Lüthi, 2020). CBSM, which progressed from this study involve gender roles to form a better culture a well as increasing the active role of stakeholders.

CONCLUSION

Community-based sanitation management in coastal areas is still very low, in terms of participation in planning, implementation, and utilization. Aspects of gender and cultural roles have a significant relationship with the managerial activities. The involvement of women as an aspect of gender as well as the active role of stakeholders is needed in the formation of a disciplined culture for sanitation management, which is very necessary to mobilize family members to participate in community improvement, and the surrounding community must maintain the environmental sanitation facilities that have been provided by the local government and work together to clean and maintain the sanitary cleanliness of the surrounding environment and clean them at least once a week.

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