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THE INFLUENCE OF SOCIO-ECONOMIC FACTORS ON COMMUNITY PARTICIPATION IN THE IMPLEMENTATION OF THE REDUCE-REUSE-RECYCLE PRINCIPLE IN LHOKNGA, ACEH BESAR REGENCY, ACEH PROVINCE

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ABSTRACT

Reduce, Reuse, and Recycle (3R) on waste management is one of the key strategies implemented in Indonesian to reduce the negative impact of waste on the environment. This study aims to explore the influence of socio-economic factors on the level of community participation of 3R in Lhoknga District, Aceh Province. The socio-economic factors analyzed include gender, age, educational attainment, income, occupation, housing status, and household size. This study used a descriptive quantitative survey approach involving 30 randomly selected respondents. Data analysis was conducted using Structural Equation Modeling-Partial Least Square (SEM-PLS) to identify the relationship between socio-economic variables and various forms of community participation, including cognitive participation, physical participation, material contributions, skills, and waste management. The analysis results show that socio-economic characteristics do not have a significant influence on the various forms of participation in waste management. The P Values for different types of participation are above 0.05, such as cognitive participation (0.342), physical participation (0.312), material contributions (0.390), skills (0.302), and general waste management participation (0.342). This indicates that there is no statistically significant relationship between socio-economic factors and the level of participation in waste management in Lhoknga. Participation in 3R activities is more influenced by individual awareness rather than socio-economic factors.

Keywords: Socio-economic factors, community participation, 3R principles, waste management, Aceh Besar

ABSTRAK

Pengelolaan sampah berbasis prinsip Reduce, Reuse, Recycle merupakan salah satu strategi penting yang diterapkan oleh pemerintah Indonesia untuk mengurangi dampak negatif sampah terhadap lingkungan. Penelitian ini bertujuan untuk menemukan pengaruh faktor sosial ekonomi terhadap tingkat partisipasi masyarakat dalam penerapan prinsip 3R di Kecamatan Lhoknga. Faktor sosial ekonomi yang dianalisis meliputi jenis kelamin, usia, tingkat pendidikan, pendapatan, pekerjaan, status tempat tinggal, dan jumlah anggota rumah tangga. Metode penelitian ini menggunakan pendekatan survei deskriptif kuantitatif dengan 30 responden yang dipilih secara

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acak. Analisis data dilakukan menggunakan Structural Equation Modelling- Partial Least Square (SEM-PLS) untuk mengidentifikasi hubungan antara variabel sosial ekonomi dan berbagai bentuk partisipasi masyarakat, yang terdiri dari partisipasi buah pikir, tenaga, kontribusi materi, keterampilan, dan pengelolaan sampah. Hasil analisis menunjukkan bahwa karakteristik sosial ekonomi masyarakat tidak memiliki pengaruh signifikan terhadap berbagai bentuk partisipasi dalam pengelolaan sampah. Nilai P Values untuk berbagai bentuk partisipasi berada di atas 0,05, hubungan sosio-ekonomi dengan partisipasi buah pikir (0,342), partisipasi tenaga (0,312), partisipasi kontribusi materi (0,390), partisipasi keterampilan (0,302), dan partisipasi dalam pengelolaan sampah secara umum (0,342). Hal ini menunjukkan bahwa tidak ada hubungan yang signifikan secara statistik antara faktor sosial ekonomi dan tingkat partisipasi dalam pengelolaan sampah di Kecamatan Lhoknga. Partisipasi dalam kegiatan 3R lebih dipengaruhi oleh kesadaran individu daripada faktor sosial ekonomi.

Kata Kunci: Faktor sosial ekonomi, partisipasi masyarakat, prinsip 3R, pengelolaan sampah, Aceh Besar.

Introduction

Generally waste management in Indonesia still depends on the role of the government. One of the steps taken by the government for handling this problem through Law regulation Number 18 of 2008 concerning Waste Management. The law regulates household waste management by implementing the 3R principle, namely reducing waste generation, reusing, and recycling waste. However, the efforts of the Indonesian government are still undefective for solving the waste problem, therefore, waste management is not only the government's responsibility but also requires active community participation in the management process (Cerya & Evanita, 2021).

According to the SIPSN 2023 report from the Indonesian Ministry of Environment and Forestry, Directorate General of Waste Management, the total waste generation across all regencies and cities in Indonesia in 2023 reaches 38,795,897.60 tons per year. However, only 62.13% of this waste is being managed effectively, which means that 37.87% remains improperly handled. Although the concept of 3R-based waste management (Reduce, Reuse, and Recycle) is familiar to the public, this implementation has not been widespread in the study area (Zaman, N. A., & Hossain, 2017). The result of Field observations and interviews with residents indicate that many people still lack full awareness of the importance of effective and sustainable waste management. One contributing factor to the issue of unmanaged waste is the insufficient participation of the community.

Participation can be simply defined as the involvement of individuals, groups, or communities in development programs. This means that a person, group, or community can contribute according to their abilities to support the success of development programs, through various forms of participation. This participation is divided into five parts, including; a). Participation of thought, which is contributed through discussion forums, meetings, or conferences; b). Participation of energy, which is channeled through activities that support village development or help others; c). Material or finance participation, which is in the form of contributions of property in village development activities or assistance to others; d). Participation in skills and expertise, which is given to support various businesses and industries; e). Social participation is shown through involvement in community activities, such as social

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gatherings, cooperatives, attending funerals, weddings, or other social activities (Huraerah, 2008).

Methods

Survey Design

The study was conducted in Lhoknga District, Aceh Besar Regency, from June to September 2024. It utilized a survey method with a cross-sectional design, allowing for the simultaneous collection of data for all research variables. This research employed a descriptive quantitative approach. The sample consisted of 30 respondents, selected using cluster random sampling techniques in Lhoknga District. The sample size was determined based on the Central Limit Theorem, which states that a minimum of 30 samples is sufficient to represent a larger population (Kaehe et al., 2018). Data collection involved a questionnaire that used a five-point Likert scale (very often, often, rarely, not often, and very rarely). Several data points and variables were observed in this study, and the conceptual framework illustrating the relationships between these variables is shown in **Figure 1.**

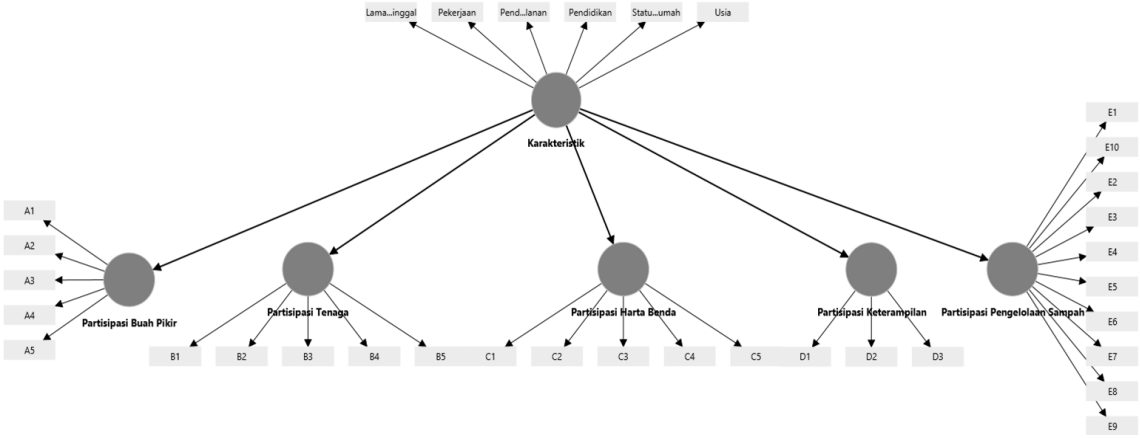

Figure 1. Conceptual Framework of Relationships Between Variables

The socio-economic factors studied include gender, age, education level, income, occupation, residential status, and number of household members, while the community participation variable can be seen in **Table 1.**

Table 1. Variables and Data Collected from the Community Participation Questionnaire

No.	Variable	Data
1.	Participation of thought	contributions involving thoughts, ideas, analysis, or input on waste management
2.	Participation of energy	Physical contribution/active involvement in waste management
3.	Participation of Finance	Participate in material form
4.	Participation of skills	Participate in the form of skills

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No.	Variable	Data
5.	Sorting organic and inorganic waste	Public interest in sorting organic and inorganic waste

Resources: Huraerah (2008)

Data Analysis Techniques

Participation measurement was conducted using a Likert scale, where respondents evaluate their involvement in waste management across five aspects of community participation as outlined by Huraerah (2008). To assess the impact of socio-economic variables on community participation in the implementation of the 3R (Reduce, Reuse, and Recycle) initiative, we utilize Partial Least Squares Structural Equation Modeling (PLS-SEM). This statistical technique enables the simultaneous testing of a series of complex relationships (Santoso, 2015). Data processing is carried out using the Smart PLS 4.0 application.

Results and Discussion

Socio-economic Characteristic Respondents

Table 2. Shows the socio-economic characteristics of respondents. The data shows that the majority of respondents are women (21%) from nuclear families (96.67%), of productive age (36-45 years, 43.33%), with income above the Aceh Besar UMR 2024, which is IDR 2,500,001 - IDR 5,000,000. High levels of education, with the majority being high school graduates (30%) and post-secondary education (50%), have the potential to increase awareness and participation in 3R waste management, which is greatly influenced by their socio-economic background (Santoso, 2015).

Table 2 Socio-economic Characteristic of Respondents

Characteristics	Total (%)	Characteristics	Total (%)
Gender		**Type of Family**	
Male	9,00	Nuclear	96,67
Female	21,00	Joint	3,33
Age		**Monthly household income (in IDR)***	
<25 years	20,00	0	0,00
26-35 years	13,33	100,000 - 1,000,000	30,00
36-45 years	43,33	1,000,001- 2,500,000	23,33
46-55 years	13,33	2,500,001- 5,000,000	36,67
>56 Years	10,00	> 5,000,000	10,00
Education		**Number of people in the house**	
Elementary school	3,33	< 3 people	23,33
Junior high school	13,33	4-6 people	13,33
High school	30,00	7-9 people	63,33
Undergraduate	23,33	9-11 people	0,00
Graduate/Post Graduate	26,67	>11 people	0,00
Occupation		**Duration of Residence**	
Unpaid Worker	0,00	0-3 Years	3,33

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Characteristics	Total (%)	Characteristics	Total (%)
Gender		**Type of Family**	
Male	9,00	Nuclear	96,67
Female	21,00	Joint	3,33
Casual Worker	6,67	4-6 Years	6,67
Own Account Worker	13,33	7-9 Years	3,33
Paid Worker	33,33	9-11 Years	33,33
Employee (PNS/BUMN/TNI)	46,47	>11 years	53,33

*Note: Regional Minimum Wage of Aceh Besar in 2024 is IDR 3,460,672

The number of individuals in a household (7 to 9 people, 63.33%) is linked to an increase in waste volume. Most respondents are employed as permanent workers or civil servants/BUMN (46.47%) and have lived in the same community for more than 11 years (53.33%), which enhances their attachment to the area. These socio-economic conditions contribute to a greater potential for participation in waste management in the Lhoknga District. This aligns with findings that indicate education, income, and social connections play significant roles in shaping environmental awareness and behavior (Ghosh et al., 2021)

Participation of thought

Figure 2 illustrates that community participation in the Lhoknga District regarding waste management-related activities is still relatively low. Activities such as providing suggestions and criticisms, engaging in discussions, participating in counseling and socialization, appealing to residents, and attending training sessions are mostly infrequent among community members. For instance, 13 respondents reported that they very rarely provide suggestions or criticisms, while 15 respondents very rarely participate in counseling and socialization activities. The lowest level of participation was noted in training sessions, with 21 respondents indicating that they very rarely engage in this activity.

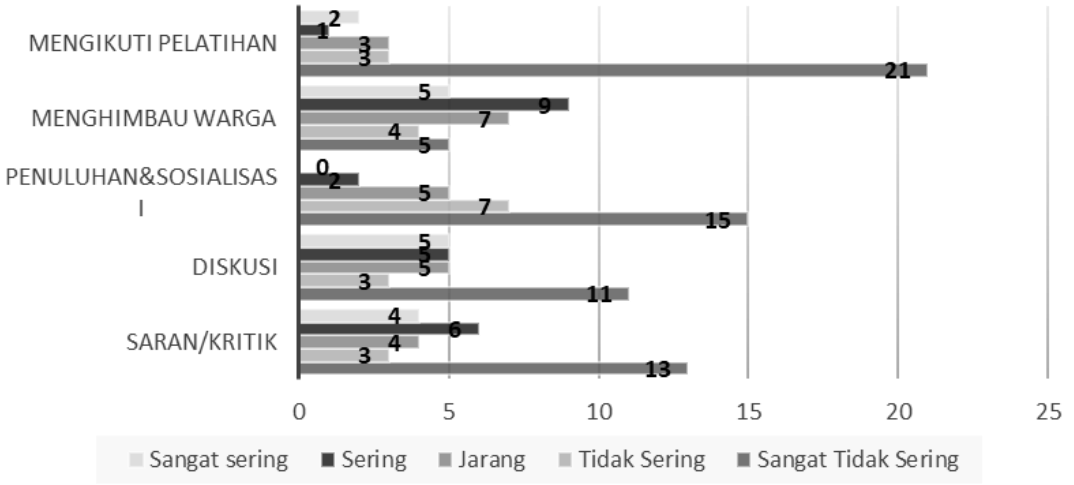

Figure 2. Bootstrapping SEM-PLS Results

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In activities such as appealing to residents, 9 respondents were often involved. Meanwhile, discussions and providing suggestions/criticism showed better involvement, with 5 respondents each doing it often or very often. Low community participation in socialization and training activities indicates a lack of involvement in activities that require time commitment and social interaction. This is in line with research stating that limited access to environmental education programs and lack of individual motivation can reduce the level of community participation in waste management (Alya Puspita et al., 2023). In addition, these results also reflect that people tend to participate in activities that are more individual in nature or that do not require intense social interaction, such as appealing to residents directly. Based on research by Risyart (2022), motivation to participate in waste management activities is greatly influenced by the level of individual awareness and support for the environment, not solely because of socio-economic factors. Continuous education, accompanied by training programs that are more easily accessible to all levels of society, can help improve their involvement more actively and effectively.

Participation of Energy

Data on community participation in the form of labour can be seen in **Figure 3**. shows that mutual cooperation activities, disposing of garbage in its place, maintaining cleanliness so that garbage is not scattered, and collecting garbage have a fairly high level of involvement. A total of 9 respondents are often and 9 respondents are very often involved in mutual cooperation, while 13 people often and very often dispose of garbage in its place and keep garbage from being scattered. The activity of collecting garbage also shows active participation, with 14 people very often involved.

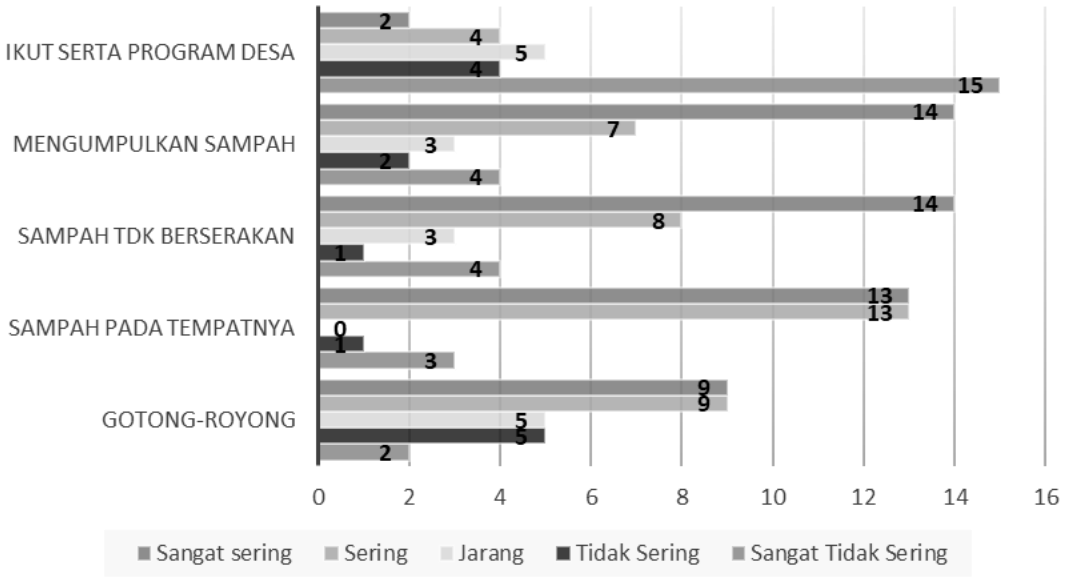

Figure 3. Boostraping SEM-PLS Results

However, participation in village program activities was relatively low, with 15 people very rarely involved. This result indicates that people tend to be more active in independent cleaning activities compared to organized community programs.

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According to research by (Muchlis et al., 2020), socio-economic factors and environmental awareness have a significant influence on community participation, especially in community-based activities. Zaman and Hossain (2017) also emphasized the importance of environmental education to increase involvement in village programs and environmental activities.

Participation of Material

The results of the study on community participation in Lhoknga District in the form of material or property contributions **(Figure 4.)** to waste management shows quite striking variations among the various types of contributions. This participation includes payment of levies, financial donations, food donations, equipment donations, and the provision of trash bins.

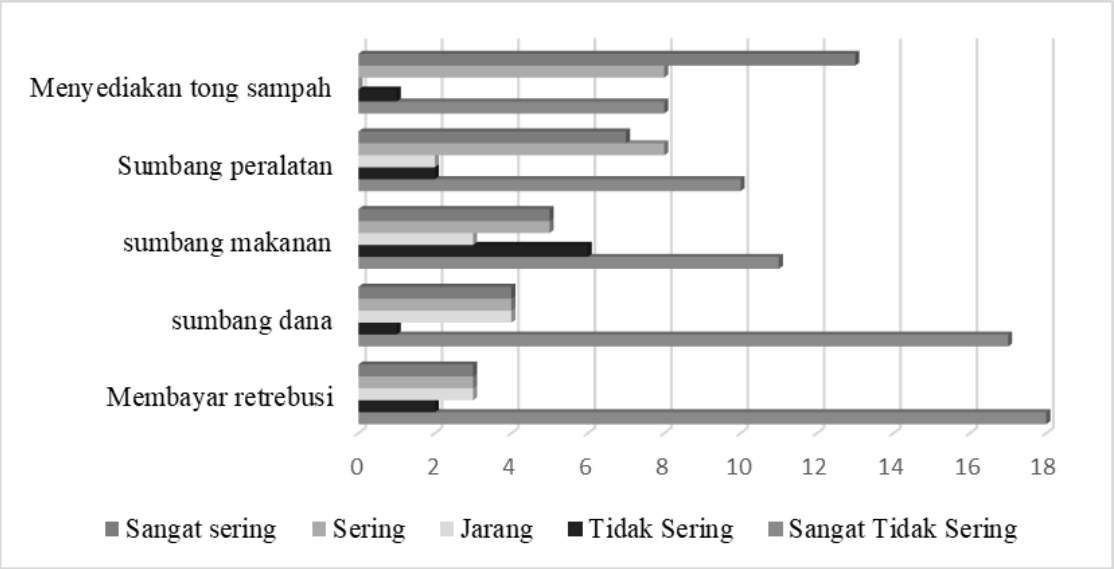

Figure 4. Bootstrapping SEM-PLS Results

The data shows that paying levies is the lowest form of participation. A total of 18 respondents reported that they very rarely pay levies, and only 3 respondents do so regularly. This indicates a challenge in encouraging the community to contribute financially, which may be influenced by a lack of understanding of the direct benefits of paying levies for improving waste management. In terms of cash donations and food donations, participation levels also tend to be low. 17 respondents very rarely donate money, while 11 respondents rarely donate food. However, there was a slight increase in engagement, with 4-5 respondents each participating frequently or very often in this form. Food donations tend to be more popular because they may be seen as more directly helping activities carried out in the community, such as cleaning work.

Participation in equipment donations showed better results, with 8 respondents often and 7 respondents very often participating. This indicates that the community is more motivated to contribute in the form of necessary physical goods, perhaps because of the direct impact they can see from the donation. The highest participation was seen in the form of providing trash bins, with 13 respondents reporting that they very often

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offer trash bins in their environment. This indicates a relatively high level of awareness of the importance of adequate waste management facilities at the household level.

The low participation in the form of financial contributions, such as paying levies and financial donations, and the higher participation in the form of direct and concrete contributions, indicate that the community tends to be more willing to contribute if the benefits are clearly visible and felt directly. This is in accordance with the findings of Zaman and Hossain (2017), who stated that community contribution to environmental management is higher when the impact of the contribution can be felt in real terms.

Skill Participation

Figure 5. show skill participation in waste management, such as creating new products from waste, processing plastic waste, and composting, still low in District Lhoknga. Majority respondents are not often involved in these activities. For example, there are 17 persons not commons for creating new products from waste, and 19 people are seldom in processing plastic waste. The number of Participating in composting activities is the lowest. It is shown from 20 respondents which involve only 1 person who does it frequently.

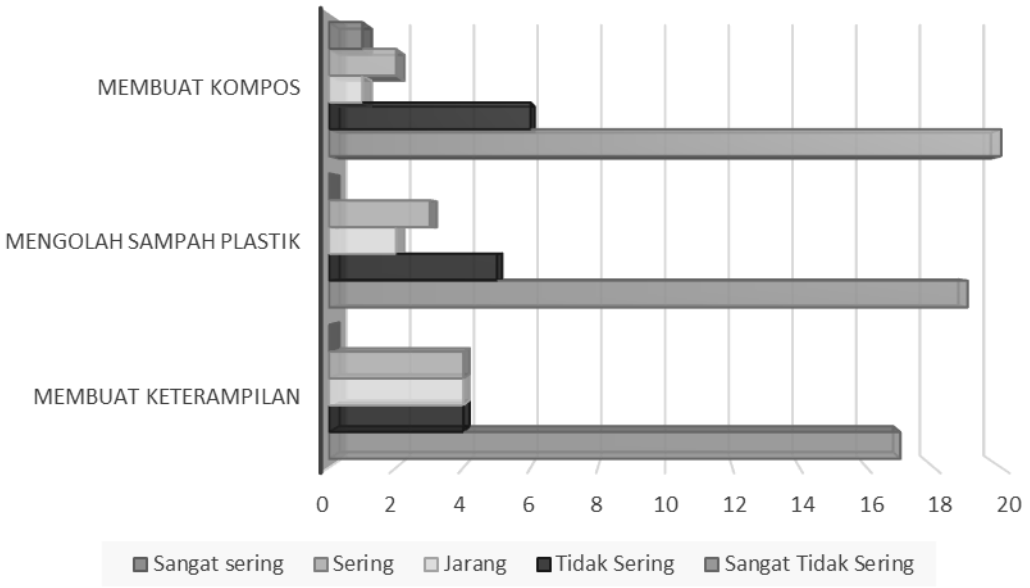

Figure 5. Bootstrapping SEM-PLS result

This situation can be caused by the limited knowledge and access to get training about waste management skills, As expressed in Zaman's research and Hossain (2017) said awareness and training have an essential role for increasing community participation in waste management. Research by Risyart (2022) are promote that social economic factor and society awareness can influence community involvement in sustainable activities.

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Waste Management Participants

The result of society participation in waste management can be seen in **figure 6.** This figure showed most of respondents rarely involved in sustainable activities for reducing waste.

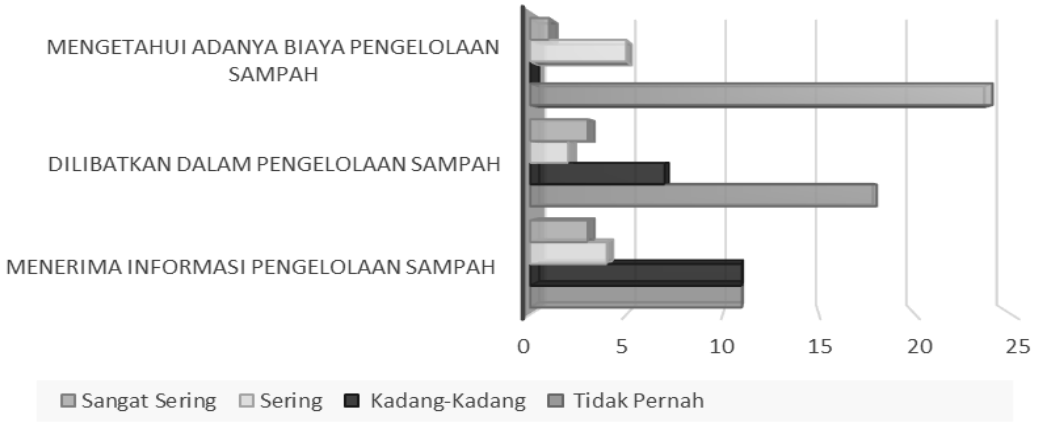

Figure 6. Bootstrapping SEM-PLS Results

18 respondents are not often bringing their own container, there are 24 people who save their waste, and 17 respondents rarely bring their waste-to-waste temporary shelter. Some activities such as using bottles, saving on plastic use, using handkerchiefs, and sorting waste also show low participation. However, some activities showed higher participation, like reusing tumbler or their own bottle, from 11 people doing this oftentimes, and 12 people very often. Saving plastic waste has a positive response from participants, on the other side there are 8 frequently. This result is in line with Zaman and Hossain research (2017), which said that society participation in waste management is still low due to lack of environmental awareness and unformed habits. Research by Kesatu and Pasal (2015) also confirms the essential of social economic awareness to increase sustainable participation.

Socio-economic impact with community participation

Relation	Origin sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistic (|O/STDEV|)	P Values
Caracteristic -> Participation of thought	0,629	0,049	0,661	0,951	0,342
Caracteristic -> participation of manpower	0,509	0,295	0,504	1,011	0,312
Caracteristic -> Financial participation	-0,474	-0,208	0,551	0,860	0,390
Caracteristic -> Skills Participation	-0,501	-0,251	0,486	1,032	0,302
Caracteristic -> waste management paticipation	-0,587	-0,271	0,617	0,951	0,342

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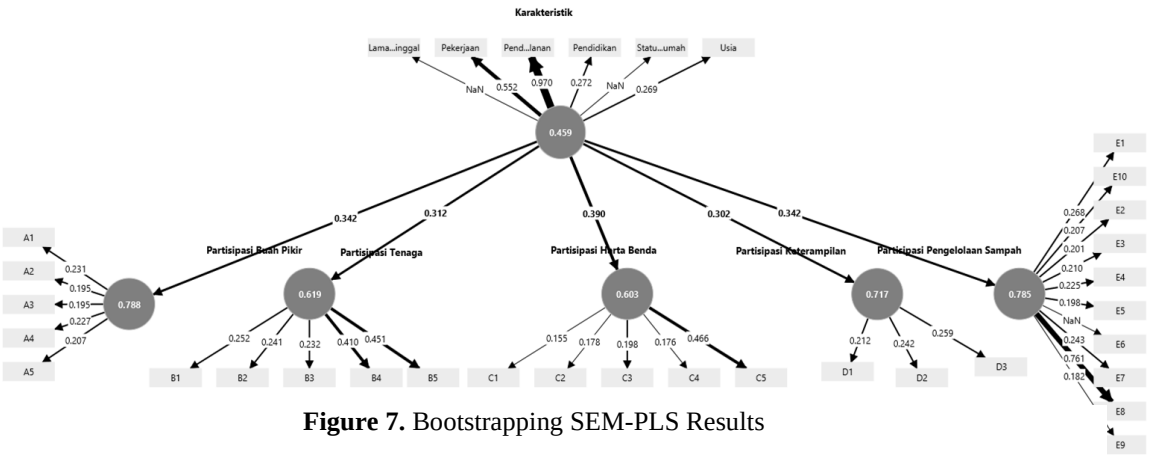

Figure 7. Bootstrapping SEM-PLS Results

Relationship between Social Economic and participation of thought

Social economic characteristic showed positive connection with society participation of thought, such as the way of thinking and ideas towards waste management. 0,629 as the *Original Sample Coefficient (O)* showed the leveling up of social economy trends are in line with participation of thought. However, *T Statistic value* as much as 0,951 and *P Value* as much as 0,342 indicate this relationship is not significant in statistics (P > 0,05). This is in line with research from Risyart (2022), which reveals that although socio-economic characteristics can influence participation, public awareness plays a more important role in increasing involvement in the field of waste management.

Relationship between Socioeconomic Characteristics and Participation of Energy

The relationship between socioeconomic characteristics and manpower participation has a coefficient of 0.509, indicating a moderate positive correlation, meaning that individuals with higher socioeconomic status tend to be slightly more involved in physical activities related to waste management, such as cooperation or maintaining environmental cleanliness. However, the T Statistic value of 1.011 and the P-value of 0.312 indicate that this correlation is insignificant. In this context, research conducted by Zaman and Hossain (2017) states that physical participation in environmental activities is often more related to awareness and a sense of collective responsibility than socioeconomic factors.

Relationship between Socioeconomic Characteristics and Participation of material

Socioeconomic characteristics have a negative relationship with participation in the form of material (O = -0.474), indicating that individuals with higher socioeconomic characteristics tend not to contribute materially to waste management activities. The T Statistic value of 0.860 and the P-value of 0.390 confirm that this relationship is also insignificant. This is in line with the findings of Huraerah (2008), which shows that material contributions in environmental programs often come more from community groups that have high environmental awareness, regardless of economic status.

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Relationship between Socioeconomic Characteristics and Skill Participation

The study's results showed a negative relationship with a coefficient of -0.501 between socioeconomic characteristics and skill participation in waste management. This means that people with higher socioeconomic characteristics tend to be less involved in waste processing activities that require skills, such as recycling. With a T Statistic of 1.032 and a P-value of 0.302, this relationship is also insignificant. This is based on research which states that skills in waste management are often higher in communities with direct exposure to environmental issues (Santoso, 2015).

Relationship between Socioeconomic Characteristics and Participation in Waste Management

This study found a negative relationship (O = -0.587) between socioeconomic characteristics and participation in waste management activities, but this relationship was also not statistically significant (T Statistic = 0.951, P Value = 0.342). Based on these results, it can be concluded that socioeconomic characteristics are not the main determining factor in community participation in waste management, according to the findings of Ferdinand (2002) who stated that participation in environmental activities is often more influenced by social values and cultural norms that develop in society.

Conclusion

This research showed that social economic factors of society in Lhoknga do not give significant impact with waste management. From the results of statistical analysis, there are positive and negative trends, however it is not strongly considered to have a real impact. In terms of participation in thinking or ideas, a positive relationship is seen, but the value is not significant (T Statistic 0.951 and P Value 0.342). This means that socio-economic status does not affect how often people provide ideas or suggestions related to waste management. Participation in the form of labor, such as mutual cooperation, also shows a positive relationship but is not strong enough (T Statistic 1.011 and P Value 0.312). This means that the socio-economic status of the community does not determine how often they are directly involved in maintaining environmental cleanliness.

In terms of material contributions, the results of the analysis show a negative relationship that is not significant. In other words, differences in socio-economic status do not create significant differences in participation in the form of material contributions. Likewise, in participation in skills, such as processing waste or making compost, there is no significant influence of socio-economic characteristics.

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