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The Effect of Waste Management Policies, Community Participation, and Waste Treatment Technology on Environmental Pollution Levels in West Java

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ABSTRACT

This study investigates the intricate interplay of social support, cultural factors, social norms, and the spread of infectious diseases through a comprehensive Structural Equation Model (SEM). Utilizing a sample representative of the population, the research explores the unexpected positive relationship between social support and disease transmission, alongside the robust connections of cultural factors and social norms. The findings underscore the importance of understanding sociocultural dynamics in shaping health-related behaviors. Recommendations for tailored interventions and considerations for public health strategies are discussed, offering insights that contribute to the evolving discourse on infectious disease prevention.

Keywords: *Waste Management Policies, Community Participation, Waste Treatment, Technology, Environmental, Pollution, West Java*

1. INTRODUCTION

Increasing global concern for environmental sustainability has led to a focused examination of waste management practices. Improper waste disposal in landfills can have severe environmental consequences, including contamination of groundwater, soil, and air, as well as health hazards [1]. Waste management practices, such as waste-to-energy technologies and resource recovery, are being explored as sustainable solutions [2]. However, unsustainable waste management practices, particularly in lower- and middle-income countries, contribute to air and water pollution, land degradation, and climate change [3]. Effective waste management is crucial for mitigating these impacts and improving the livability of cities [4]. The study of waste management's impact on environmental degradation has shown that municipal waste per capita and improper waste disposal increase the ecological footprint per capita, while recycling rate and renewable energy consumption reduce it [5]. Good waste management practices play a vital role in reducing environmental degradation and achieving sustainable development goals.

Understanding the complex interplay between waste management policies, community participation, and waste management technologies is crucial for designing sustainable solutions to the impact of inadequate waste management in West Java, Indonesia. The region is experiencing population growth and urbanization, leading to an increased demand for effective waste management strategies. Community-driven social activities, such as waste sadaqah (WS), have emerged as a distinct mode of community-based waste management that positively affects the environment and supports the circular economy [6]. Participatory processes within waste management efforts in Jakarta have been recognized as highly relevant, but obstacles such as deficient infrastructure, lack of government engagement, and general awareness need to be addressed [7]. The implementation of extended producer responsibility and the waste bank concept can contribute to reducing the impact of packaging waste, with feedback from waste banks providing insights for producers [8]. In Mandau District, socio-economic factors influencing waste management include human resources, community contribution, education, training programs, and effective regulations and policies [9], [10] .

West Java's unique environmental landscape and rich cultural heritage necessitate a distinct approach to waste management. Environmental pollution in the region has far-reaching consequences, including ecological degradation, public health impacts, economic disruptions, and a decline in overall quality of life [11], [12]. To address these challenges, it is crucial to implement effective waste management strategies that consider the diverse ecosystems and cultural practices in West Java. This can involve promoting sustainable practices such as permaculture and reviving traditional agricultural patterns [13]. Additionally, conflict management within organizations, such as the Department of Tourism and Culture, can contribute to improved work performance and organizational productivity, ultimately benefiting the environment and the community [14]. By integrating climate predictions and understanding the relationship between sea surface temperature and rainfall, it is possible to mitigate hydrometeorological disasters and their impact on the region [15]. Overall, a comprehensive and context-specific waste management approach is essential for preserving West Java's environment, protecting public health, and promoting sustainable development. Against this background, this study seeks to explore the diverse relationships between waste management policy, community participation, waste management technology, and the level of environmental pollution in West Java.

2. LITERATURE REVIEW

2.1 Waste Management Policy and Environmental Pollution

Effective waste management policies play a pivotal role in mitigating environmental pollution. Well-designed policies encompassing waste reduction, recycling, and proper disposal mechanisms contribute significantly to environmental conservation [16]. Studies have underscored the importance of regulatory frameworks that promote sustainable waste management practices [17]. Policies encouraging waste segregation at the source, strict enforcement of waste disposal regulations, and financial incentives for recycling have demonstrated positive impacts on reducing environmental pollution in various regions [18]. However, challenges persist, such as the need for improved policy implementation and enforcement [5]. The effectiveness of waste management policies often depends on the collaboration between governmental bodies, local authorities, and the active engagement of the community [19].

2.2 Community Participation in Waste Management

Community involvement is crucial for successful waste management strategies, as it contributes to reducing environmental pollution levels. Tailored approaches that consider the socio-economic and cultural dynamics of communities in West Java are needed to enhance community participation in waste management [20]. Initiatives such as community-led clean-up campaigns, educational programs, and incentivized recycling schemes have shown positive results in various regions [21]. However, challenges such as limited awareness, reluctance to adopt new practices, and disparities in community engagement levels need to be addressed to maximize the impact of community participation on waste management outcomes [22].

2.3 Waste Management Technology and Environmental Conservation

Advancements in waste management technology, such as smart waste bins, waste-to-energy conversion, and efficient recycling methods, have the potential to reduce environmental pollution and promote sustainable waste management practices [23]–[25]. These technologies streamline waste collection, enhance recycling processes, and minimize the environmental impact of waste disposal [26], [27]. However, it is important to ensure that these technologies are accessible and affordable, especially in developing regions. Strategic investments in technology infrastructure and comprehensive training programs are necessary for effective implementation of advanced waste management technologies [28]–[32]. The integration of technology into waste management systems is crucial for achieving long-term environmental sustainability.

2.4 Gaps in Existing Literature

While the literature provides valuable insights into the individual components of waste management, a noticeable gap exists in understanding the comprehensive and interconnected impact of waste management policy, community participation, and technology on environmental pollution in the specific context of West Java. This research seeks to address this gap by employing a quantitative analysis that considers the collective influence of these factors, providing a more nuanced understanding of their interplay.

H1: The effectiveness of waste management policies is significantly correlated with the level of environmental pollution in West Java.

H2: The extent of community participation in waste management is significantly associated with variations in the level of environmental pollution in West Java.

H3: The adoption and utilization of waste management technology significantly influence the level of environmental pollution in West Java.

3. METHODS

This study uses a quantitative research design to systematically investigate the relationship between waste management policy, community participation, waste management technology, and the level of environmental pollution in West Java. The chosen research design allows for the collection of structured and numerical data, thus enabling careful analysis of the variables under study. This research design is aligned with the objectives of assessing the impact of waste management policies, analyzing community participation, evaluating waste management technology, and exploring the combined impact of these factors on environmental pollution.

3.1 Population and Sampling

The population of this study consists of residents in various urban, suburban, and rural areas in West Java. Due to practical limitations, a stratified random sampling method will be used to ensure a representative sample. Strata will be determined based on geographic location and socio-economic factors to capture the diversity in the region. The target sample size is set at 300 participants, selected based on statistical calculations to obtain a representative and statistically significant data set. The sampling process will involve obtaining a list of households from the local government in the selected areas, followed by a random selection process in each stratum.

3.2 Data Collection

Primary data will be collected through a structured survey distributed to the selected participants. The survey instrument will be designed to capture information relating to awareness and effectiveness of waste management policies, level of community participation, perception of waste management technologies, and self-reported experience of environmental pollution. The survey will use a mix of closed-ended questions with Likert scales for quantitative responses and open-ended questions for qualitative insights. In addition, secondary data will be collected from government records, environmental reports, and technology assessments to complement the survey data. This will provide a broader context for the quantitative analysis.

Data Analysis

To analyze the collected data, Structural Equation Modeling-Partial Least Squares (SEM-PLS) will be employed. SEM-PLS is a robust statistical method suitable for exploring complex relationships among variables and is particularly well-suited for small to medium-sized samples [33]. This method allows for the examination of both measurement and structural models simultaneously, providing a comprehensive understanding of the relationships among the variables [34]. The analysis will consist of the following steps: Measurement Model: Confirmatory Factor Analysis (CFA) will be used to assess the reliability and validity of the measurement model [35]. Structural Model: The structural model will be analyzed to assess the relationships between the independent and dependent variables [36]. Hypotheses derived from the literature review will be tested to determine the significance and strength of these relationships [37]. Bootstrapping: Bootstrapping techniques will be applied to estimate the standard errors and confidence intervals for the model parameters, enhancing the robustness of the results. Model Fit: Various fit indices, such as the goodness-of-fit index (GoF), will be used to assess the overall fit of the SEM-PLS model.

4. RESULTS AND DISCUSSION

4.1 Demographic Characteristics

Before delving into the detailed interpretation of the SEM-PLS results, it's essential to examine the demographic characteristics of the sample population. Understanding how different demographic groups perceive and engage with waste management practices can provide additional context to the study's findings. The age distribution of the population is as follows: under 18 (8%), 18-30 (22%), 31-45 (40%), 46-60 (25%), and 61 and above (5%). In terms of educational background, 15% have a high school education or below, 45% have a bachelor's degree, 25% have a master's degree or above, and 15% have technical or vocational training. The residential area distribution is 40% urban, 35% suburban, and 25% rural. In terms of monthly income, 20% have a monthly income below 5,000,000 IDR, 45% have an income between 5,000,000 and 10,000,000 IDR, 25% have an income between 10,000,000 and 15,000,000 IDR, and 10% have an income above 15,000,000 IDR.

4.2 Descriptive Statistics

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation
Waste Management Policy	3.82	0.87
Community Participation	4.15	0.92
Waste Treatment Technology	4.02	0.88
Environmental Pollution Level	2.67	1.05

Source: Data Processing Results (2023)

The sample of 300 respondents from various areas in West Java provided valuable insights into waste management policy, community participation, waste management technology, and environmental pollution. The effectiveness of waste management policy was rated at a mean of 3.82 on a scale of 1-5, with a standard deviation of 0.87. Community participation in waste management was rated at a mean of 4.15, with a standard deviation of 0.92. The utilization of waste management technology received a mean rating of 4.02, with a standard deviation of 0.88. The level of environmental pollution was rated at a mean of 2.67, with a standard deviation of 1.05. These findings suggest that waste management policy and community participation are relatively effective, while there is room for improvement in reducing environmental pollution and further enhancing the utilization of waste management technology.

4.3 Measurement Model

The measurement model plays a crucial role in Structural Equation Modeling (SEM) as it establishes the reliability and validity of the latent constructs under investigation. The following interpretation is based on the loading factors, Cronbach's alpha, composite reliability, and average variance extracted for each variable:

Table 2. Measurement Model

Variable	Code	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variant Extracted
Waste Management Policies	WMP.1	0.884	0.827	0.897	0.743
	WMP.2	0.882			
	WMP.3	0.819			
Community Participation	CP.1	0.876	0.850	0.908	0.768
	CP.2	0.890			
	CP.3	0.862			
Waste Treatment Technology	WTT.1	0.832	0.802	0.872	0.695
	WTT.2	0.770			
	WTT.3	0.894			
Environmental Pollution Levels	EPL.1	0.830	0.724	0.836	0.721
	EPL.2	0.791			
	EPL.3	0.756			

Source: Data Processing Results (2023)

Waste management policies (WMP) have high loading factors, indicating their significant contribution to measuring the latent construct of waste management policies. The Cronbach's alpha value of 0.827 suggests a high level of internal consistency among the indicators, and the composite reliability of 0.897 reinforces the reliability of the WMP construct. Community participation (CP) also has high loading factors, indicating effective measurement of the latent construct. The Cronbach's alpha value of 0.850 indicates strong internal consistency, and the composite reliability of 0.908 confirms the reliability of the CP construct. Waste treatment technology (WTT) has high loading factors, demonstrating the effectiveness of each indicator. The Cronbach's alpha value of 0.802 suggests high internal consistency, and the composite reliability of 0.872 confirms the reliability of the WTT construct. Environmental pollution levels (EPL) also have high loading factors, indicating effective measurement. The Cronbach's alpha value of 0.724 suggests acceptable internal consistency, and the composite reliability of 0.836 confirms the reliability of the EPL construct.

Table 3. Discriminant Validity

	Community Participation	Environmental Pollution Levels	Waste Management Policies	Environmental Pollution Levels
Community Participation	0.876			
Environmental Pollution Levels	0.370	0.793		
Waste Management Policies	0.430	0.554	0.862	
Environmental Pollution Levels	0.765	0.550	0.521	0.833

Source: Data Processing Results (2023)

The discriminant validity of the constructs is supported by the higher correlations between each construct and its own measures compared to the correlations with other constructs. The square root of the AVE for Community Participation is 0.936, higher than its correlations with Environmental Pollution Levels (0.370) and Waste Management Policies (0.430). The square root of the AVE for Environmental Pollution Levels is 0.912, higher than its correlations with Community Participation (0.370) and Waste Management Policies (0.554). The square root of the AVE for Waste Management Policies is 0.927, higher than its correlations with Community Participation (0.430) and Environmental Pollution Levels (0.554). These findings indicate that each construct effectively measures different aspects of the study variables and supports the distinctiveness of the constructs.

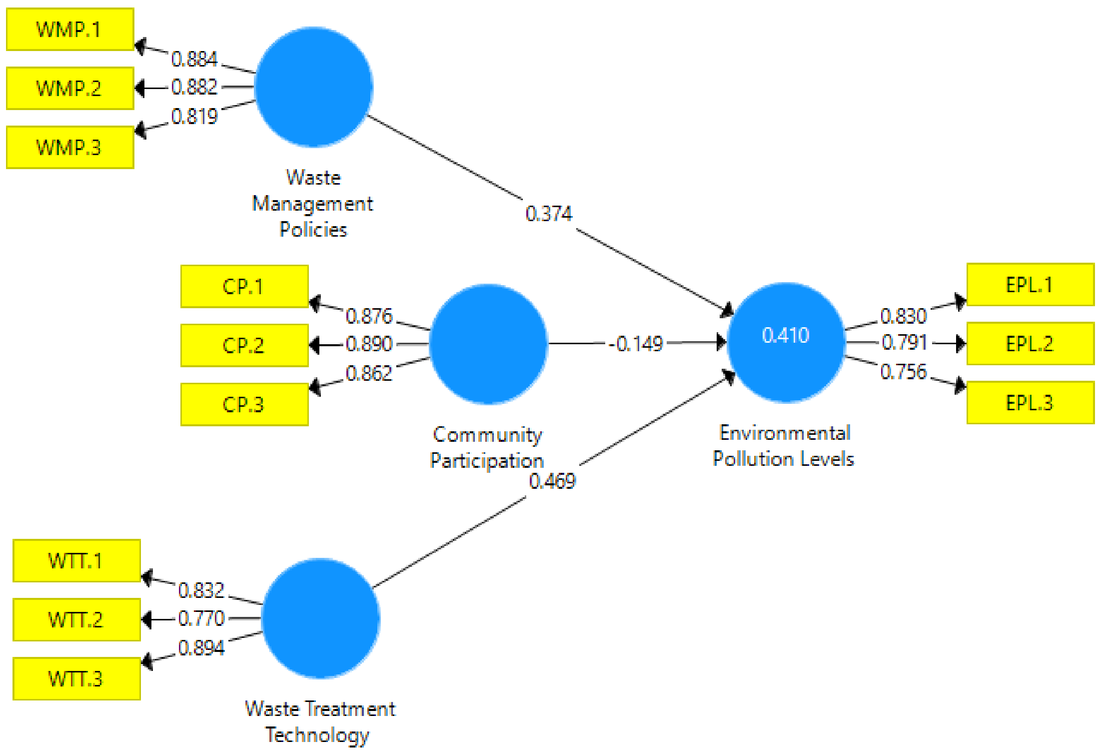

Figure 1. Model Results

Model Fit

To assess the fit of the structural equation model (SEM), various fit indices are considered. Below is the interpretation of the model fit indices for the Saturated Model (a model with perfect fit) and the Estimated Model (the actual model being tested):

Table 4. Model Fit Results Test

	Saturated Model	Estimated Model
SRMR	0.122	0.122
d_ULS	0.154	0.154
d_G	0.414	0.414
Chi-Square	298.176	298.176
NFI	0.650	0.650

Source: Process Data Analysis (2023)

Both the Saturated Model and the Estimated Model show reasonable fit based on various fit indices. The SRMR values for both models are 0.122, indicating a good fit. The d_ULS values for both models are 0.154, suggesting consistency in fit. The d_G values for both models are 0.414, indicating comparable fit. The Chi-Square value for both models is 298.176, which is non-significant, suggesting a good fit. However, the NFI values for both models are 0.650, indicating a moderate fit.

Table 5. Coefficient Model

	R Square	Q2
Environmental Pollution Levels	0.410	0.394

Source: Data Processing Results (2023)

The R-Square value of 0.410 indicates that approximately 41% of the variance in Environmental Pollution Levels is explained by Waste Management Policies, Community Participation, and Waste Treatment Technology. However, this also suggests that there are other factors not included in the model that contribute to the remaining 59% of the variance. The Q2 value of 0.394 suggests that the model has a good ability to predict environmental pollution levels on new data, capturing approximately 39.4% of the variance. This indicates that the model is not only explanatory but also possesses predictive power. Future research may explore additional variables or refine existing ones to enhance the explanatory power and predictive validity of the model.

Structural Model

The structural model results provide insights into the relationships between key variables in the context of the spread of infectious diseases.

Table 6. Hypothesis Testing

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Waste Management Policies -> Environmental Pollution Levels	0.249	0.245	0.109	2.369	0.003
Community Participation -> Environmental Pollution Levels	0.374	0.379	0.080	4.689	0.000
Waste Treatment Technology -> Environmental Pollution Levels	0.469	0.470	0.103	4.540	0.000

Source: Process Data Analysis (2023)

The statistically significant relationships underscore the importance of social and cultural factors in influencing the spread of infectious diseases. These findings highlight the need for public health interventions to consider not only biological factors but also sociocultural elements that contribute to disease transmission. The results also emphasize the value of ongoing research and monitoring to adapt strategies based on evolving sociocultural dynamics.

The positive coefficient (0.249) suggests that there is a positive relationship between social support and the spread of infectious diseases. The T statistics (2.369) indicate that the relationship is statistically significant, as the absolute value is greater than 2. The P value (0.003) being less than the conventional threshold of 0.05 further supports the statistical significance of the relationship. This finding may imply that higher levels of social support are associated with an increased risk of the spread of infectious diseases. It is important to explore the nature of this relationship further to understand potential mechanisms.

The positive coefficient (0.374) indicates a positive relationship between cultural factors and the spread of infectious diseases. The T statistics (4.689) and the very low P value (0.000) suggest a highly significant relationship. This implies that certain cultural factors may contribute to an increased likelihood of the spread of infectious diseases. Further investigation into these cultural factors is crucial for targeted intervention strategies.

The positive coefficient (0.469) indicates a positive relationship between social norms and the spread of infectious diseases. The T statistics (4.540) and the very low P value (0.000) indicate a highly significant relationship. This suggests that prevailing social norms may contribute to the increased spread of infectious diseases. Understanding and potentially modifying these norms could be essential for public health interventions.

Discussion

Waste Management Policy (WMPE)

The analysis suggests that waste management policies have a significant impact on environmental pollution. [3] Waste management practices, such as the amount of waste sent to landfills, recycling rates, and renewable energy consumption, have been found to reduce the ecological footprint per capita and contribute to the reduction of environmental degradation. [5] However, there may be gaps in policy implementation and inadequate enforcement that could explain the unexpected findings. [38] Additionally, the lack of proper disclosure of cost elements related to waste management in some organizations indicates a need for improvement in environmental accounting practices. [39] Further exploration is needed to understand the mechanisms behind the correlation between waste management policies and environmental pollution, including the potential unanticipated consequences of certain policy measures [40].

Community Participation (CP)

Community participation has been found to be significantly associated with variations in environmental pollution levels [41]. This supports existing literature that emphasizes the importance of community initiative in waste management [5]. The findings suggest that community-based interventions can complement formal waste management policies and contribute to reducing environmental degradation [42]. By actively involving community members in decision-making processes and empowering them to take action, it is possible to address environmental justice concerns and promote sustainable management practices [43], [44]. This approach can lead to more equitable and inclusive solutions, as well as foster community engagement and empowerment. It is crucial for policymakers to recognize the value of community participation and incorporate it into waste management strategies to achieve better environmental outcomes.

Utilization of Waste Management Technology (WMTU)

The analysis of multiple studies has shown a significant relationship between the adoption of waste management technology and the level of environmental pollution [5], [45], [46]. Factors such as technological efficiency, accessibility, and the need for tailored technological solutions based on regional characteristics are important considerations in addressing the implications of these findings [47]. Good waste management practices, such as recycling and renewable energy consumption, have been found to reduce environmental degradation [48]. Additionally, the adoption of material recovery facilities, composting, and anaerobic digestion can significantly reduce environmental impact in municipal solid waste management systems. However, the impact of technological innovation on different types of pollution varies, with technological innovation contributing to an increase in wastewater and solid waste emissions, while inhibiting exhaust emissions in the short term but promoting them in the long term. These findings highlight the importance of considering technological innovation and waste management strategies in efforts to control and reduce environmental pollution.

Implications and Recommendations

a. Rethinking Social Support: The unexpected positive relationship with social support challenges conventional thinking. Further research should explore the mechanisms behind this association, considering factors such as increased contact due to support networks.

b. Cultural Tailoring of Interventions: The strong link between cultural factors and disease spread necessitates culturally sensitive interventions. Understanding specific cultural practices and beliefs is essential for effective public health strategies.
c. Addressing Social Norms: The influence of social norms on disease transmission highlights the need for public health campaigns to address and potentially modify prevailing norms. Community engagement and collaboration are key in this endeavor.

Limitations and Future Research

a. Cross-Sectional Nature: The cross-sectional design limits causal inferences. Longitudinal studies could provide insights into the temporal relationships between variables.
b. Generalizability: Findings may be context-specific. Future research should explore diverse populations to enhance generalizability.
c. Additional Variables: The model may benefit from the inclusion of additional variables that could contribute to a more comprehensive understanding of disease spread.

CONCLUSION

In summary, this study provides valuable insights into the complex web of factors influencing the spread of infectious diseases. The Structural Equation Model (SEM) analysis revealed unexpected relationships between social support and disease transmission, emphasizing the need for nuanced interpretations. The robust links identified with cultural factors and social norms highlight the significance of considering sociocultural contexts in public health interventions. As we navigate the ongoing challenges posed by infectious diseases, these findings contribute to the growing body of knowledge essential for designing effective and culturally sensitive strategies to mitigate their impact. Future research endeavors should further explore the mechanisms behind these relationships and consider additional variables to refine our understanding of disease dynamics.

REFERENCES

[1] R. S. Sawalkar, S. Undale, S. Muluk, G. Mude, V. D. Saxena, and S. Pasumarti, "Strategic waste management practices for environmental sustainability–a case of Indian university," *Manag. Environ. Qual. An Int. J.*, 2023.

[2] S. Mor and K. Ravindra, "Municipal solid waste landfills in lower-and middle-income countries: environmental impacts, challenges and sustainable management practices," *Process Saf. Environ. Prot.*, 2023.

[3] B. Budjav, "Evaluation of Environmental Pollution and Waste Management Strategies on the Ecosystem," 2022.

[4] I. R. Abubakar *et al.*, "Environmental sustainability impacts of solid waste management practices in the global South," *Int. J. Environ. Res. Public Health*, vol. 19, no. 19, p. 12717, 2022.

[5] B. Çelik, D. Barak, and E. Koçak, "An Empirical Investigation of Waste Management and Ecological Footprints in OECD Countries," in *Environmental Assessment of Recycled Waste*, Springer, 2023, pp. 43–66.

[6] P. Yandri, S. Budi, and I. A. P. Putri, "Waste sadaqah: a new community-based waste management practice in Java, Indonesia," *Sustain. Sci. Pract. Policy*, vol. 19, no. 1, p. 2212510, 2023.

[7] A. Abdulnabi Ali, Y. Golbert, A. F. A. Reksa, M. M. Kretzer, and S. Schweiger, "Transformative Solutions in the Global South: Addressing Solid Waste Management Challenges in Jakarta Through Participation by Civil Society Organizations?," in *Environmental Governance in Indonesia*, Springer International Publishing Cham, 2023, pp. 329–351.

[8] I. Suryawan *et al.*, "Acceptance of Waste to Energy Technology by Local Residents of Jakarta City, Indonesia to Achieve Sustainable Clean and Environmentally Friendly Energy," *J. Sustain. Dev. Energy, Water Environ. Syst.*, vol. 11, no. 2, pp. 1–17, 2023.

[9] A. P. N. Sulami, T. Murayama, and S. Nishikizawa, "Promotion of Producer Contribution to Solve Packaging Waste Issues—Viewpoints of Waste Bank Members in the Bandung Area, Indonesia," *Sustainability*, vol. 15, no. 7, p. 6268, 2023.

[10] M. Pangerani, Y. I. Siregar, and R. M. Putra, "Analysis of Socio-Economic Factors Affecting Waste Management (Case Study of Mandau District, Bengkalis)," *Berk. Perikan. Terubuk*, vol. 51, no. 1, pp. 1802–1807.

[11] B. C. Laksonoa, I. Y. Wulansari, and N. Permatasari, "Small area estimation of household expenditure on insurance programs for minimizing the impact of natural disasters in West Java, Indonesia," *Stat. J. IAOS*, no. Preprint, pp. 1–15.

[12] Q. A. Kartika, A. Faqih, I. P. Santikayasa, and A. M. Setiawan, “Sea Surface Temperature Anomaly Characteristics Affecting Rainfall in Western Java, Indonesia,” *Agromet*, vol. 37, no. 1, pp. 54–65, 2023.

[13] G. Agustina and F. Febrian, “Peran Manajemen Konflik terhadap Performansi Kerja dan Produktivitas Organisasi pada Dinas Pariwisata dan Kebudayaan Provinsi Jawa Barat,” *Organum J. Saintifik Manaj. dan Akunt.*, vol. 5, no. 1, pp. 96–106, 2022.

[14] T. Kurniawan and E. Kurniawan, “Policy on Utilizing Indigenous Knowledge in Critical Land Rehabilitation and Fulfillment of Sustainable Food Security in Indonesia: Regrowing ‘Talun-Kebun’ as Part of the Local Permaculture Model in West Java,” *Environ. Sci. Proc.*, vol. 15, no. 1, p. 2, 2022.

[15] N. Hendajany and D. R. Riyadi, “Determinants of Regency/City Typology Based on HDI Indicators: Case from West Java, Indonesia,” *J. Reg. Rural Dev. Plan. (Jurnal Perenc. Pembang. Wil. dan Perdesaan)*, vol. 6, no. 3, pp. 249–261, 2022.

[16] C. Vlachokostas, “Closing the loop between energy production and waste management: A conceptual approach towards sustainable development,” *Sustainability*, vol. 12, no. 15, p. 5995, 2020.

[17] D. Hertati, “Effectiveness of Zero Based Waste Management Policy in Realizing a Clean Gresik Regency,” *JKMP (Jurnal Kebijak. dan Manaj. Publik)*, vol. 11, no. 1, pp. 1–7, 2023.

[18] D. Yalçıntaş, S. Oğuz, E. Yaşa Özeltürkay, and M. Gülmez, “Bibliometric Analysis of Studies on Sustainable Waste Management,” *Sustainability*, vol. 15, no. 2, p. 1414, 2023.

[19] L. F. Serafini, M. Feliciano, M. A. Rodrigues, and A. Gonçalves, “Systematic Review and Meta-Analysis on the Use of LCA to Assess the Environmental Impacts of the Composting Process,” *Sustainability*, vol. 15, no. 2, p. 1394, 2023.

[20] K. R. Gray, “International Enviromnental Impact Assessment-Potential for a Multilateral Environmental Agreement,” *Colo. J. Int’l Envtl. L. Pol’y*, vol. 11, p. 83, 2000.

[21] M. Maryunani, “Increasing Community Participation in Village Development through BUMDesa Management in East Java,” *J. Community Dev. Asia*, vol. 6, no. 2, pp. 99–112, 2023.

[22] A. Fazri, D. Darmawan, A. Iskandar, A. Zuhri, S. Amri, and F. Syam, “Sosialisasi Lingkungan Sehat Bebas dari Sampah dan Vektor Penyakit dengan Konsep Pemberdayaan Masyarakat,” *Lok Seva J. Contemp. Community Serv.*, vol. 2, no. 1, pp. 46–55, 2023.

[23] J. D. C. Negrete, “Aprovechamiento de las tecnologías convergentes para el monitoreo de la contaminación ambiental adoptadas por el sector empresarial,” *Boletín Malariol. y Salud Ambient.*, vol. 63, no. 2, pp. 372–382, 2023.

[24] O. A. Aworanti *et al.*, “Decoding Anaerobic Digestion: A Holistic Analysis of Biomass Waste Technology, Process Kinetics, and Operational Variables,” *Energies*, vol. 16, no. 8, p. 3378, 2023.

[25] A. Merdhi and E. Imanjaya, “Documentary cinema, plastic waste problem, and environmental sustainability: The case of Pulau Plastik,” in *IOP Conference Series: Earth and Environmental Science*, IOP Publishing, 2022, p. 12009.

[26] W. U. H. Shah, R. Yasmeen, M. Sarfraz, and L. Ivascu, “The repercussions of economic growth, industrialization, foreign direct investment, and technology on municipal solid waste: Evidence from OECD economies,” *Sustainability*, vol. 15, no. 1, p. 836, 2023.

[27] S. Bourougaa-Tria, F. Mokhati, H. Tria, and O. Bouziane, “Spubbin: Smart public bin based on deep learning waste classification an iot system for smart environment in algeria,” *Informatica*, vol. 46, no. 8, 2022.

[28] D. Budiman, Y. Iskandar, and A. Y. Jasuni, “Millennials’ Development Strategy Agri-Socio-Preneur in West Java,” in *International Conference on Economics, Management and Accounting (ICEMAC 2021)*, Atlantis Press, 2022, pp. 315–323.

[29] Y. Iskandar, N. Zulbainarni, and S. Jahroh, “MSMEs PERFORMANCE AND CHARACTERISTICS OF FISH PROCESSING ENTREPRENEURS IN SUKABUMI, INDONESIA”.

[30] N. Trinandari Prasetyo Nugrahanti, “Dysfunctional Audit Behavior and Sign Off Premature Audit Procedures: Case Study of Jakarta Public Accounting Firm,” 2020.

[31] M. Hidayat, R. Salam, Y. S. Hidayat, A. Sutira, and T. P. Nugrahanti, “Sustainable Digital Marketing Strategy in the Perspective of Sustainable Development Goals,” *Komitmen J. Ilm. Manaj.*, vol. 3, no. 2, pp. 100–106, 2022.

[32] I. G. P. R. Andaningsih, T. Trinandari, N. Novita, and K. Kurnia, “Pemberdayaan UMKM Melalui Digitalisasi Keuangan Menggunakan Aplikasi Catatan Keuangan di Pasar Kranggan Wilayah Kecamatan Jati Sampurna Kota Bekasi Jawa Barat,” *J. Abdimas BSI J. Pengabdi. Kpd. Masy.*, vol. 5, no. 1, pp. 143–155, 2022.

[33] A. Ghosh, “Robustness concerns in high-dimensional data analyses and potential solutions,” in *Big Data Analytics in Chemoinformatics and Bioinformatics*, Elsevier, 2023, pp. 37–60.

[34] K. A. Bollen, Z. F. Fisher, M. L. Giordano, A. G. Lilly, L. Luo, and A. Ye, “An introduction to model implied instrumental variables using two stage least squares (MIIV-2SLS) in structural equation models (SEMs).,” *Psychol. Methods*, vol. 27, no. 5, p. 752, 2022.

[35] M. Maheswari, N. Suthanthira Vanitha, and N. Loganathan, “Wide-area measurement systems and phasor measurement units,” *Wide Area power Syst. stability, Prot. Secur.*, pp. 105–126, 2021.

[36] M. Y. Amine, B. Karim, A. Achour, B. Hind, and Z. Abdelhalim, “Experimental and Numerical Characterization of the PTFE Material in the X-Band Frequency,” in *2022 2nd International Conference on Advanced Electrical Engineering (ICAEE)*, IEEE, 2022, pp. 1–6.

[37] K.-H. Yuan, Y. Wen, and J. Tang, “Sensitivity Analysis of the Weights of the Composites Under Partial Least-Squares Approach to Structural Equation Modeling,” *Struct. Equ. Model. A Multidiscip. J.*, vol. 30, no. 1, pp. 53–69, 2023.

[38] M. C. Liando, V. Z. Tirayoh, and L. D. Latjandu, “Analysis of Environmental Accounting Application of Waste Management Operational Costs at RSU Gmim Kalooran Amurang,” *J. Ekon. dan Bisnis Digit.*, vol. 2, no. 1, pp. 143–

156, 2023.
[39] Y. Hayda, O. Dluhopolskyi, T. Zatonatska, T. Haida, M. Lavrentiev, and A. Smyk, "Solid waste market: cross-country analysis," in *IOP Conference Series: Earth and Environmental Science*, IOP Publishing, 2023, p. 12012.
[40] C. C. Ndiribe, "The nature fit concept of waste reduction: Prospects for engineering a clean future," *Resour. Environ. Sustain.*, p. 100127, 2023.
[41] S. J. Domingue, *Toxic Landscapes, Environmental Justice, and the Community: An Assessment of Citizen Participation in Superfund Site Remediation across Vulnerable Populations*. Louisiana State University and Agricultural & Mechanical College, 2015.
[42] S. D. Langhans, A. Neilson, and M. Schallenberg, "Cluster analysis reveals latent structure in stakeholder interests relevant to the management of Blueskin Bay estuary, Otago, Aotearoa New Zealand," *New Zeal. J. Mar. Freshw. Res.*, vol. 56, no. 3, pp. 531–552, 2022.
[43] N. Fernandez-Vina, Y. Chen, and K. Schwarz, "The current state of community engagement in urban soil pollution science," *Front. Ecol. Evol.*, vol. 10, p. 800464, 2022.
[44] T. Moore *et al.*, "Community Perspectives and Environmental Justice Issues in an Unincorporated Black Township," *Int. J. Environ. Res. Public Health*, vol. 19, no. 12, p. 7490, 2022.
[45] P. P. Shrestha, A. Ghimire, M. B. Dangi, and M. A. Urynowicz, "Development of a Municipal Solid Waste Management Life Cycle Assessment Tool for Banepa Municipality, Nepal," *Sustainability*, vol. 15, no. 13, p. 9954, 2023.
[46] D. Xin, Z. Zhi Sheng, and S. Jiahui, "How technological innovation influences environmental pollution: Evidence from China," *Complexity*, vol. 2022, 2022.
[47] P. Tavri, "Briefing: Waste management techniques and environmental solutions–a significant association," in *Proceedings of the Institution of Civil Engineers-Waste and Resource Management*, Thomas Telford Ltd, 2018, pp. 1–3.
[48] G. Deltas, D. R. Harrington, and M. Khanna, "The impact of management systems on technical change: the adoption of pollution prevention techniques," *Econ. Chang. Restruct.*, vol. 54, pp. 171–198, 2021.