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Applying The Theory of Planned Behavior to Analyze Household Plastic Waste Management Behavior in Coastal Areas

Sarinah Basri K.[1]*, Tri Septian Maksum[2], Ulfa Aulia[3], Indra G. Ahmad[4]
[1-3] Department of Public Health, Faculty of Sports and Health, Universitas Negeri Gorontalo, Gorontalo, Indonesia
[4]Department of Aquaculture, Faculty of Marine and Fisheries Technology, Universitas Negeri Gorontalo, Gorontalo, Indonesia

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ABSTRACT

Background: Household plastic waste management in coastal areas remains a challenge due to the low implementation of the 3R principles (Reduce, Reuse, Recycle). The Theory of Planned Behavior (TPB) can be used to explain the factors influencing waste management behavior.
Objective: To analyze the influence of TPB constructs on household plastic waste management behavior in coastal areas.
Methods: A quantitative study with a cross-sectional design was conducted in Bajo Village, Tilamuta District, Boalemo Regency, Gorontalo. The sample consisted of 185 households selected using simple random sampling. Data were collected through questionnaires and analyzed using path analysis with a significance level of 5%.
Results: Attitude toward Behavior ($p = 0.003$), Subjective Norm ($p < 0.001$), and Perceived Behavioral Control ($p < 0.001$) had significant effects on Behavioral Intention. Furthermore, Perceived Behavioral Control ($p = 0.008$) and Behavioral Intention ($p = 0.049$) significantly influenced plastic waste management behavior. Most TPB indicators and 3R behaviors showed significant effects, except for support for waste management regulations or policies, the reuse of plastic bottles, and participation in community recycling activities.
Conclusion: TPB effectively explains household plastic waste management behavior in coastal areas, with Perceived Behavioral Control emerging as the most dominant factor in shaping both behavioral intentions and actual behavior.

Corresponding Author:

Authors Name : Sarinah Basri K.
Affiliation : Department of Public Health, Faculty of Sports and Health, Universitas Negeri Gorontalo, Gorontalo, Indonesia
Email: b.sarinah99@ung.ac.id

INTRODUCTION

Plastic waste pollution in coastal areas has become a global environmental issue, as most marine debris originates from human activities on land, particularly from households (1). Indonesia is among the major contributors of plastic waste entering the oceans due to the high consumption of plastic and inadequate waste management systems (2). Coastal areas are particularly vulnerable to the accumulation of plastic waste because they serve as the final destination of river flows and receive waste inputs from various anthropogenic activities occurring both inland and along the coast (3,4). The presence of plastic waste in these areas poses a serious threat to the sustainability of coastal ecosystems (5,6). The accumulation of plastic waste in coastal environments can degrade environmental quality and disrupt the ecological functions of coastal and marine ecosystems (7).

Globally, plastic waste has affected both terrestrial and aquatic ecosystems and has generated significant ecological, economic, and health impacts (8). Plastic waste can reduce environmental quality through the contamination of water, sediments, and beaches, thereby disrupting the natural functions of coastal ecosystems (9). The accumulation of plastic debris can alter habitats and reduce marine biodiversity (10). Marine organisms often ingest or become entangled in plastic, resulting in injury or death (11). Microplastics can move through food chains via trophic interactions (12,13) and may pose risks to human health through seafood consumption (14), potentially causing metabolic, reproductive, and immune system disorders (15). In addition, plastic pollution leads to economic losses in the fisheries and tourism sectors (16), damages fishing gear and disrupts vessel operations (17) and serves as a carrier for hazardous chemicals and pathogenic microorganisms in marine environments (18,19).

Poorly managed plastic waste threatens the sustainability of coastal resources, which serve as the primary source of livelihood for coastal communities (20). Therefore, community behavior in managing household waste is a crucial factor in efforts to reduce environmental pollution in coastal areas (7).

Preliminary observations indicate that household plastic waste management in coastal areas remains suboptimal. Plastic waste is still commonly found in coastal environments and surrounding residential areas, while the implementation of the 3R principles (reduce, reuse, and recycle) in household waste management has not been fully optimized. These conditions suggest that household waste management behavior in coastal communities requires greater attention to support environmental sustainability in coastal areas.

Various studies have shown that waste management behavior is influenced not only by environmental factors but also by individuals' psychological and social factors (21). Understanding the determinants of behavior is essential for designing effective household-level waste management interventions (22). One of the most widely used theories for explaining environmental behavior is the Theory of Planned Behavior (TPB) (23). TPB proposes that an individual's behavior is influenced by behavioral intention, which is shaped by Attitude toward Behavior, Subjective Norm, and Perceived Behavioral Control (24).

Although TPB has been widely applied in studies of household waste management, research examining household plastic waste management behavior among coastal communities remains relatively limited (7). Therefore, research on the application of the Theory of Planned Behavior (Attitude toward Behavior, Subjective Norm, Perceived Behavioral Control, and Intention) to analyze household plastic waste management behavior in coastal areas is necessary to serve as a basis for formulating more effective waste management interventions and policies.

RESEARCH METHODS

Study Design, Location, and Sample

This study employed a quantitative design using a cross-sectional approach. The research was conducted in Bajo Village, Tilamuta District, Boalemo Regency, Gorontalo, Indonesia. The study population consisted of all 345 households in Bajo Village. The sample size was determined using the Slovin formula, resulting in 185 respondents. A simple random sampling technique was applied, ensuring that each household had an equal opportunity to be selected as a respondent.

Variables and Data Collection

The independent variables in this study included Attitude toward Behavior, Subjective Norm, Perceived Behavioral Control, and Intention, while the dependent variable was household plastic waste management behavior in coastal areas. Data were collected using a structured questionnaire with a Likert scale.

Data Analysis

Data analysis was performed using univariate analysis to describe respondents' characteristics and the distribution of the study variables. In addition, path analysis was employed to examine the direct and indirect effects of behavioral beliefs, normative beliefs, and control beliefs on household plastic waste management behavior, with intention serving as a mediating variable. Data processing and analysis were conducted using a significance level of 5% ($\alpha = 0.05$).

RESULTS AND DISCUSSION

This study employed the Theory of Planned Behavior (TPB) framework to explain household plastic waste management behavior in coastal areas. The conceptual model was developed to illustrate the relationships among the constructs of Attitude toward Behavior, Subjective Norms, Perceived Behavioral Control, Behavioral Intention, and Plastic Waste Management Behavior. The structural model of the study is presented in Figure 1.

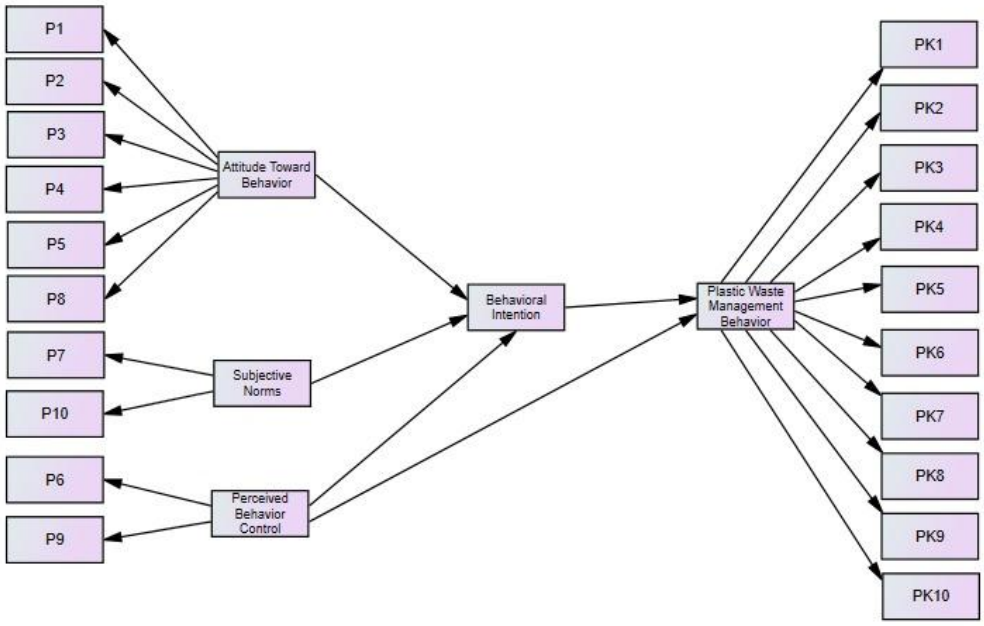

Figure 1. Structural Model of the Theory of Planned Behavior regarding Household Plastic Waste Management Behavior in Coastal Areas.

Figure 1 illustrates the structural model of the Theory of Planned Behavior (TPB) in explaining household plastic waste management behavior in coastal areas. The model shows that Attitude toward Behavior, Subjective Norms, and Perceived Behavioral Control influence Behavioral Intention. Furthermore, Behavioral Intention affects Plastic Waste Management Behavior. In addition, Perceived Behavioral Control has a direct effect on household plastic waste management behavior. The behavioral variable was measured using indicators representing the 3R principles (Reduce, Reuse, and Recycle).

The Theory of Planned Behavior proposes that behavior is directly influenced by behavioral intention, while intention is shaped by attitude toward the behavior, subjective norms, and perceived behavioral control (25). Several previous studies have also applied TPB to explain household waste management behavior and have demonstrated that these three constructs play important roles in shaping both intentions and waste management behavior (21,24,26).

Before analyzing the indicators of each construct, the relationships among variables in the structural model were first examined using path analysis. The results of the causal relationship testing among variables in the Theory of Planned Behavior (TPB) model are presented in Table 1.

Table 1. Results of Path Analysis of the Theory of Planned Behavior on Household Plastic Waste Management Behavior

Relationship	Estimate	S.E.	C.R.	ρ	Interpretation
Attitude toward Behavior → Behavioral Intention	-0.021	0.009	-2.288	0.003	Attitude toward Behavior significantly affects Behavioral Intention
Subjective Norms → Behavioral Intention	0.887	0.022	41.083	<0.001	Subjective Norms significantly affect Behavioral Intention
Perceived Behavioral Control → Behavioral Intention	1.004	0.016	64.152	<0.001	Perceived Behavioral Control significantly affects Behavioral Intention
Perceived Behavioral Control → Plastic Waste Management Behavior	0.938	0.353	2.655	0.008	Perceived Behavioral Control significantly affects Plastic Waste Management Behavior
Behavioral Intention → Plastic Waste Management Behavior	0.572	0.292	1.961	0.049	Behavioral Intention significantly affects Plastic Waste Management Behavior

Table 1 shows that Attitude toward Behavior has a significant effect on Behavioral Intention ($\rho = 0.003$). Although the estimated coefficient is negative ($\beta = -0.021$), the relationship remains statistically significant. This

finding indicates that individuals' attitudes toward plastic waste management still play a role in shaping behavioral intentions, although the direction of the relationship in this study differs from that reported in most previous studies, which generally found a positive association between attitude and behavioral intention. Previous studies have suggested that the more positive an individual's attitude toward waste management, the greater the likelihood of developing an intention to engage in such behavior (27,28).

Furthermore, Subjective Norms have a positive and significant effect on Behavioral Intention ($\rho = 0.000$), indicating that social support from family members, friends, community leaders, and the surrounding environment contributes to increasing people's intention to manage household plastic waste. This finding is consistent with previous studies showing that subjective norms are important predictors of pro-environmental intentions, including waste management and plastic reduction behaviors (29,30). In coastal communities, which generally possess strong social ties, social norms may serve as a major driving force for the development of pro-environmental behavior (31). Social and moral norms contribute to strengthening individuals' intentions to practice waste separation. When individuals perceive that important people in their lives support waste management behavior, their intention to perform such behavior increases (32).

Perceived Behavioral Control has a positive and significant effect on Behavioral Intention ($\rho = 0.000$), with the highest estimated coefficient ($\beta = 1.004$). This result indicates that people's perceptions regarding their ability, opportunities, and ease of managing plastic waste constitute the most dominant factor in shaping behavioral intentions. The stronger individuals believe that they are capable of properly managing waste, the stronger their intention to engage in such behavior. This finding is consistent with previous studies that identified perceived behavioral control as the strongest predictor of intentions related to plastic waste management and waste separation behaviors (33,34).

In addition to influencing behavioral intention, Perceived Behavioral Control also has a direct effect on plastic waste management behavior ($\rho = 0.008$). This finding suggests that individuals who perceive themselves as having sufficient abilities, facilities, and control are more likely to practice plastic waste management behaviors without being entirely dependent on their intentions. This result is consistent with the Theory of Planned Behavior, which proposes that perceived behavioral control can directly influence behavior when individuals possess a high degree of actual or perceived control over the behavior (28,30).

The Behavioral Intention variable also has a significant effect on household plastic waste management behavior ($\rho = 0.049$). Within the TPB framework, intention is considered the primary predictor that determines whether an individual will perform a particular behavior (35). Previous studies have shown that strong intentions are positively associated with household waste separation and waste management behaviors (36). When individuals possess clear and strong intentions, they are more likely to engage in the intended behavior. Intentions to reduce plastic waste are subsequently translated into actual waste reduction behaviors (37).

After analyzing the relationships among variables in the structural model, the next step was to examine the indicators that constitute each TPB construct and plastic waste management behavior. The results of the indicator analysis are presented in Table 2 and Table 3.

Table 2. Indicator Analysis of the Theory of Planned Behavior (TPB) Constructs in Household Plastic Waste Management

No.	Indicator	TPB Construct	ρ	Interpretation
P1	Individual responsibility in plastic waste management	Attitude toward Behavior	0.000	Significant effect
P2	Concern for the cleanliness of the coastal environment	Attitude toward Behavior	0.000	Significant effect
P3	Support for the implementation of the 3R principles (Reduce, Reuse, Recycle)	Attitude toward Behavior	0.000	Significant effect
P4	Negative perception of scattered plastic waste	Attitude toward Behavior	0.000	Significant effect
P5	Agreement with reducing the use of single-use plastics	Attitude toward Behavior	0.000	Significant effect
P6	Ability and readiness to separate household plastic waste	Perceived Behavioral Control	0.000	Significant effect
P7	Support for waste management regulations or policies	Subjective Norm	0.138	No significant effect
P8	Sense of responsibility for maintaining the cleanliness of coastal and marine areas	Attitude toward Behavior	0.000	Significant effect
P9	Ability to change habits that do not support waste management	Perceived Behavioral Control	0.000	Significant effect
P10	Family support and influence in maintaining environmental cleanliness	Subjective Norm	0.000	Significant effect

Based on Table 2, most indicators within the TPB constructs showed significant effects. This finding is consistent with previous studies indicating that TPB indicators are valid predictors for explaining waste management and recycling behaviors at both the household and individual levels (38).

Within the Attitude toward Behavior construct, the indicators of individual responsibility for waste management, concern for coastal environmental cleanliness, support for the implementation of the 3R principles, negative perceptions of the presence of plastic waste, agreement with reducing single-use plastic consumption, and responsibility for maintaining the cleanliness of coastal and marine areas all demonstrated significant effects ($\rho < 0.05$). These findings are consistent with previous studies showing that positive attitudes are important factors influencing household waste classification behavior (28), environmental concern contributes to the formation of attitudes and waste management behavior within the framework of the Theory of Planned Behavior (30), attitudes play a role in strengthening intentions to implement sustainable household waste management practices (39), perceptions of the negative impacts of waste encourage anti-littering intentions (40), and positive attitudes toward reducing single-use plastics enhance intentions to decrease their consumption (29).

Within the Perceived Behavioral Control construct, the indicators related to the ability to separate waste and the ability to change habits that do not support waste management also showed significant effects. These findings are in line with previous studies indicating that perceived behavioral control is an important, and often the strongest, predictor of intentions to engage in plastic waste separation (34) Moreover, perceived behavioral control reflects individuals' perceptions regarding the ease or difficulty of performing waste management behaviors (30).

In contrast, within the Subjective Norm construct, the indicator concerning support for waste management regulations or policies did not show a significant effect ($\rho = 0.138$). This result suggests that the existence of regulations or policies has not yet been able to shape people's perceptions of social pressure to engage in plastic waste management. Subjective norm refers to an individual's perception of the expectations or social pressure exerted by important others to perform or refrain from a particular behavior. Therefore, when regulations or policies are not perceived as strong social expectations or have not been internalized by the community, such indicators may not significantly contribute to the formation of subjective norms (41). Conversely, family support and influence in maintaining environmental cleanliness demonstrated a significant effect ($\rho = 0.000$). This finding is consistent with the Theory of Planned Behavior, which posits that subjective norms are formed through individuals' beliefs about the expectations of significant others, such as family members, friends, or social groups that serve as behavioral references (41).

Table 3. Indicator Analysis of Household Plastic Waste Management Behavior Based on the 3R Principles

No.	Plastic Waste Management Behavior Indicator	3R Dimension	ρ	Interpretation
PK1	Reduction in the use of single-use plastics	Reduce	0.000	Significant effect
PK2	Use of reusable shopping bags	Reduce	0.002	Significant effect
PK3	Refusal to use unnecessary plastic products	Reduce	0.000	Significant effect
PK4	Reuse of plastic bottles	Reuse	0.863	No significant effect
PK5	Reuse of plastic containers for other purposes	Reuse	0.000	Significant effect
PK6	Reuse of plastic items that are still suitable for use	Reuse	0.008	Significant effect
PK7	Separation of plastic waste before disposal	Recycle	0.000	Significant effect
PK8	Collection of plastic waste for recycling	Recycle	0.000	Significant effect
PK9	Participation in community recycling activities	Recycle	0.074	No significant effect
PK10	Implementation of the 3R principles in daily life	3R	0.000	Significant effect

The findings indicate that most indicators of plastic waste management behavior based on the Reduce, Reuse, and Recycle (3R) principles have significant effects. Within the Reduce dimension, all indicators showed significant relationships, including reducing the use of single-use plastics, using reusable shopping bags, and refusing unnecessary plastic products. The Reduce strategy is considered the highest priority in the waste management hierarchy because it minimizes the amount of waste generated before it enters subsequent treatment processes (42,43). Moreover, reduction practices are strongly influenced by changes in individual behavior as well as policies that encourage the limitation of single-use plastic consumption (43,44)

Within the Reuse dimension, the indicators related to reusing plastic containers for other purposes and reusing plastic items that are still suitable for use showed significant effects. The use of reusable bags plays an important role in reducing environmental impacts, while reusing plastic containers, particularly rigid plastics used as food containers, can extend their useful lifespan (45). However, the indicator concerning the reuse of plastic bottles did not show a significant effect ($\rho = 0.863$). This finding suggests that not all forms of plastic reuse behavior are practiced consistently by the community. This variation may be associated with differences in preferences, habits, and perceptions regarding the usefulness and practicality of reusing certain types of plastics, particularly plastic bottles.

Within the Recycle dimension, the indicators of separating plastic waste before disposal and collecting plastic waste for recycling demonstrated significant effects. Household-level waste separation is an important factor in improving the quality of recyclable materials while simultaneously reducing the amount of waste that ends up in landfills or coastal environments (43,46).

However, the indicator of participation in community recycling activities did not show a significant effect. The lack of significance of participation in community recycling activities in this study may be attributed to differences in social conditions within the community. Recycling behavior is influenced by various factors at the individual, household, community, and infrastructure levels; therefore, the influence of each factor may vary across different social contexts (47). Overall, the indicator representing the implementation of the 3R principles in daily life demonstrated a significant effect. This finding indicates that household plastic waste management behavior is primarily reflected through practical actions, such as reducing plastic consumption, reusing items that are still suitable for use, and separating and collecting waste for recycling.

CONCLUSION

Based on the findings of this study, it can be concluded that the Theory of Planned Behavior (TPB) effectively explains household plastic waste management behavior in coastal areas. The constructs of Attitude toward Behavior, Subjective Norm, and particularly Perceived Behavioral Control significantly influence Behavioral Intention, while Behavioral Intention and Perceived Behavioral Control also exert direct effects on household plastic waste management behavior. Among these constructs, Perceived Behavioral Control emerged as the most dominant factor influencing both intention and behavior, indicating that perceptions regarding ability, ease, and the availability of supporting facilities play a crucial role in waste management practices.

At the indicator level, most TPB indicators demonstrated significant effects, except for the indicator concerning support for waste management regulations or policies within the Subjective Norm construct. Furthermore, most behavioral indicators based on the 3R principles (Reduce, Reuse, and Recycle) also showed significant effects, although the reuse of plastic bottles and participation in community recycling activities did not demonstrate significant influences. These findings suggest that efforts to improve plastic waste management behavior in coastal areas should focus on strengthening community capacity, providing supporting facilities, enhancing the role of families and the social environment, and improving policy implementation so that it is better accepted and internalized by the community.

SUGGESTION

Based on the study findings, it is recommended that local governments, village administrations, and relevant agencies strengthen educational initiatives, provide supporting facilities, and enhance plastic waste management programs based on the 3R principles in coastal areas. In addition, greater involvement of families and communities through sustainable activities should be encouraged to improve community capacity, awareness, and commitment to consistently implementing plastic waste management behaviors.

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REFERENCES

1. Jambeck J, Geyer R, Wilcox C, Siegler TR, Perryman M, Andrady A, et al. Plastic waste inputs from land into the ocean. Mar Pollut [Internet]. 2015;347(6223):768-. Available from: https://science.sciencemag.org/CONTENT/347/6223/768.abstract
2. Lebreton LCM, Van Der Zwet J, Damsteeg JW, Slat B, Andrady A, Reisser J. River plastic emissions to the world's oceans. Nat Commun [Internet]. 2017;8:1–10. Available from: http://dx.doi.org/10.1038/ncomms15611
3. Cordova MR, Kelly MR, Hafizt M, Wibowo SPA, Ulumuddin YI, Purbonegoro T, et al. From riverbank to the sea: An initial assessment of plastic pollution along the Ciliwung River, Indonesia. Mar Pollut Bull [Internet]. 2024;206:116662. Available from: https://www.sciencedirect.com/science/article/pii/S0025326X24006398
4. Veiga JM, van Veen B, Buckman L, van Gils J, Wuriyandoko DT, van der Sluys C, et al. Assessing Plastic Waste Discharges into the Sea in Indonesia: An Integrated High-Resolution Modeling Approach That Accounts for Hydrology and Local Waste Handling Practices. Water [Internet]. 2023;15(6). Available from: https://www.mdpi.com/2073-4441/15/6/1143
5. Marshall M. From pollution to solution. Vol. 237, New Scientist. 2018. 34–37 p.

6. Thushari GGN, Senevirathna JDM. Plastic pollution in the marine environment. Heliyon [Internet]. 2020 Aug 1;6(8). Available from: https://doi.org/10.1016/j.heliyon.2020.e04709
7. Voronkova A, Wyles K, Syamsiyah N, Sudarso, Soedjono E, Henderson L, et al. Predictors of waste management behaviours in coastal communities in Indonesia: The role of community attachment and environmental concern. Mar Pollut Bull [Internet]. 2025;214:117741. Available from: https://www.sciencedirect.com/science/article/pii/S0025326X25002164
8. Pérez-García Á, van Emmerik THM, Mata A, Tasseron PF, López JF. Efficient plastic detection in coastal areas with selected spectral bands. Mar Pollut Bull [Internet]. 2024;207:116914. Available from: https://www.sciencedirect.com/science/article/pii/S0025326X24008919
9. Almroth BC, Eggert H. Marine plastic pollution: sources, impacts, and policy issues. Rev Environ Econ policy. 2019;
10. Gregory MR. Environmental implications of plastic debris in marine settings—entanglement, ingestion, smothering, hangers-on, hitch-hiking and alien invasions. Philos Trans R Soc B Biol Sci [Internet]. 2009 Jul 27;364(1526):2013–25. Available from: https://doi.org/10.1098/rstb.2008.0265
11. Wright SL, Thompson RC, Galloway TS. The physical impacts of microplastics on marine organisms: A review. Environ Pollut [Internet]. 2013;178:483–92. Available from: https://www.sciencedirect.com/science/article/pii/S0269749113001140
12. Smolyakov BS, Makarov VI, Shinkorenko MP, Popova SA, Bizin MA. Effects of Siberian wildfires on the chemical composition and acidity of atmospheric aerosols of remote urban, rural and background territories. Environ Pollut [Internet]. 2014;188:8–16. Available from: https://www.sciencedirect.com/science/article/pii/S0269749114000232
13. Stazi V, Tomei MC. Enhancing anaerobic treatment of domestic wastewater: State of the art, innovative technologies and future perspectives. Sci Total Environ [Internet]. 2018;635:78–91. Available from: https://www.sciencedirect.com/science/article/pii/S004896971831235X
14. Rochman CM, Tahir A, Williams SL, Baxa D V., Lam R, Miller JT, et al. Anthropogenic debris in seafood: Plastic debris and fibers from textiles in fish and bivalves sold for human consumption. Sci Rep. 2015;5(September):1–10.
15. Aulia A, Azizah R, Sulistyorini L, Rizaldi MA. Literature review: Dampak mikroplastik terhadap lingkungan pesisir, biota laut dan potensi risiko kesehatan. J Kesehat Lingkung Indones. 2023;22(3):328–41.
16. Beaumont NJ, Aanesen M, Austen MC, Börger T, Clark JR, Cole M, et al. Global ecological, social and economic impacts of marine plastic. Mar Pollut Bull. 2019;142:189–95.
17. Newman S, Watkins E, Farmer A, Brink P ten, Schweitzer J-P. The economics of marine litter. In: Marine anthropogenic litter. Springer; 2015. p. 367–94.
18. Galloway TS, Cole M, Lewis C. Interactions of microplastic debris throughout the marine ecosystem. Nat Ecol \& Evol. 2017;1(5):116.
19. Amelia TSM, Khalik WMAWM, Ong MC, Shao YT, Pan H-J, Bhubalan K. Marine microplastics as vectors of major ocean pollutants and its hazards to the marine ecosystem and humans. Prog earth Planet Sci. 2021;8(1):12.
20. Etnayanti E, E.Fachry M, Zubair H. The behavior of Coastal Families Related to the Household Waste Management for the Sustainability of Marine Resources using gender Approach in Kapoposang Islands, South Sulawesi. Int J Environ Agric Biotechnol. 2020 Dec 31;5:1625–30.
21. Hu J, Tang K, Qian X, Sun F, Zhou W. Behavioral change in waste separation at source in an international community: An application of the theory of planned behavior. Waste Manag [Internet]. 2021;135:397–408. Available from: https://www.sciencedirect.com/science/article/pii/S0956053X21005171
22. Yandri P, Masduki U, Aini N, Suryani S, Mardika I, Fathurrahman A, et al. Understanding the Household Waste Management: An Application of the Theory of Planned Behavior. J Pengelolaan Sumberd Alam dan Lingkung (Journal Nat Resour Environ Manag. 2025 Sep 2;15:751.
23. Setiawan B, Afiff A, Heruwasto I. Integrating the Theory of Planned Behavior With Norm Activation in a Pro-Environmental Context. Soc Mar Q. 2020 Aug 19;26:152450042094922.
24. Razali F, Daud D, Choong WW, Jiram W. Waste separation at source behaviour among Malaysian households: The Theory of Planned Behaviour with moral norm. J Clean Prod. 2020 Jun 1;271:122025.
25. Ajzen I. The theory of planned behavior: Frequently asked questions. Hum Behav Emerg Technol. 2020 Jun 10;2.
26. Saleh M, Alfiyah N, Susilawaty A, Ikhtiar M, Gafur A. The Determinants of Rural Community Participation in Waste Bank: An Approach Using the Theory of Planned Behavior. Al-Sihah Public Heal Sci J [Internet]. 2024;16(1):51–59. Available from: https://journal.uin-alauddin.ac.id/index.php/Al-Sihah/article/view/47909
27. Sun Y, He H. Understanding consumers' purchase intentions of single-use plastic products. Front Psychol. 2023;14:1105959.
28. Zhang S, Hu D, Lin T, Li W, Zhao R, Yang H, et al. Determinants affecting residents' waste classification intention and behavior: A study based on TPB and A-B-C methodology. J Environ Manage [Internet]. 2021;290:112591. Available from: https://www.sciencedirect.com/science/article/pii/S0301479721006538
29. Batooli Z, Zarein-Dolab S, Mohamadloo A, Rahimzadeh M. Using theory of planned behavior to determine consumer intention in choosing cloth vs plastic bags. Appl Environ Res. 2022;44(1):54–66.
30. Wu L, Zhu Y, Zhai J. Understanding Waste Management Behavior Among University Students in China: Environmental Knowledge, Personal Norms, and the Theory of Planned Behavior. Front Psychol [Internet]. 2022;Volume 12. Available from: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.771723
31. Simmons EC, Fielding KS. Psychological predictors of fishing and waste management intentions in Indonesian coastal communities. J Environ Psychol [Internet]. 2019;65:101324. Available from: https://www.sciencedirect.com/science/article/pii/S0272494418307746

32. Li Y, Bhutto MY, Sun C, Mehdi SM. Do information publicity and moral norms trigger waste-sorting intention among households? A sequential mediation analysis. Front Psychol [Internet]. 2023;Volume 14. Available from: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2023.1193411
33. Satriyono RDAP, Ramadhani DS. Identification of Factors Driving Household Intention to Implement Circular Economy. Effic Indones J Dev Econ. 2023;6(3):281–9.
34. Aikowe LD, Mazancová J. Plastic Waste Sorting Intentions among University Students. Sustainability [Internet]. 2021;13(14). Available from: https://www.mdpi.com/2071-1050/13/14/7526
35. Wang S, Wang J, Yang S, Li J, Zhou K. From intention to behavior: Comprehending residents' waste sorting intention and behavior formation process. Waste Manag [Internet]. 2020;113:41–50. Available from: https://www.sciencedirect.com/science/article/pii/S0956053X20302713
36. Jacob DB, Dwipayanti NMU. Planned Behavior Theory Approach to Waste Management Behavior in South Denpasar District. J Promkes Indones J Heal Promot Heal Educ [Internet]. 2022;10(2):118–129. Available from: https://e-journal.unair.ac.id/PROMKES/article/view/32577
37. Nguyen HTD, Kaida N, Tamura M. Drivers of plastic waste reduction in island communities in Central Vietnam: An application of the extended theory of planned behavior. Resour Conserv Recycl Adv [Internet]. 2026;29:200298. Available from: https://www.sciencedirect.com/science/article/pii/S2667378925000550
38. Juliana N, Lada S, Chekima B, Abdul Adis A-A. Exploring Determinants Shaping Recycling Behavior Using an Extended Theory of Planned Behavior Model: An Empirical Study of Households in Sabah, Malaysia. Sustainability [Internet]. 2022;14(8). Available from: https://www.mdpi.com/2071-1050/14/8/4628
39. Ariyani L, Ririh KR. Understanding behavior of household food waste management: Food waste hierarchy context. J Ilm Tek Ind. 2020;19(2):142–54.
40. Singh J, Kaur R. Influencing the Intention to Adopt Anti-Littering Behavior: An Approach With Modified TPB Model. Soc Mar Q. 2021 May 3;27:152450042110133.
41. Ajzen I. The theory of planned behavior. In: Handbook of Theories of Social Psychology. 2012. p. 438–59.
42. Hu J, Longfor NR, Dong L, Qian X. Beyond theory of planned behavior: A meta-analysis of psychological and contextual determinants of household waste separation. Environ Impact Assess Rev [Internet]. 2026;116:108087. Available from: https://www.sciencedirect.com/science/article/pii/S0195925525002847
43. Ssenoga D, Ntayi JM, Walugembe A, Nuwagaba D, Kusemererwa C, Kimuli S. Theorizing household plastic waste reduction in low-resource urban contexts: Integrating the Theory of Planned Behavior, social marketing, norms, and structural opportunity. A systematic literature review. Clean Waste Syst [Internet]. 2026;15:100540. Available from: https://www.sciencedirect.com/science/article/pii/S2772912526000734
44. Paramananda N, Idawati IAA, Yamawati NKS, Putra IKAS, Aprianto NG. The Influence of Norms, Environmental Attitudes, and Perceived Behavioral Control on Plastic Bag Use: A Behavioral-Economic Perspective. J Appl Business, Tax Econ Res [Internet]. 2025 Dec 1;5(2 SE-Articles):329–47. Available from: https://equatorscience.com/index.php/jabter/article/view/523
45. Omondi I. Reuse and waste reduction potential of reusable lightweight plastic bags in Kenya. Environ Manag Econ Policy [Internet]. 2026;3:100018. Available from: https://www.sciencedirect.com/science/article/pii/S3117325X26000180
46. T'ing LC, Moorthy K, Mei CY, Yin FP, Ying WZ, Khong CW, et al. Determinants of 3Rs behaviour in plastic usage: A study among Malaysians. Heliyon. 2020;6(12).
47. Macklin J, Curtis J, Smith L. Interdisciplinary, systematic review found influences on household recycling behaviour are many and multifaceted, requiring a multi-level approach. Resour Conserv Recycl Adv [Internet]. 2023;18:200152. Available from: https://www.sciencedirect.com/science/article/pii/S266737892300024X