

Behavioral Insights for Sustainable Living: Evaluating Household Waste Management Behavior for a Green Economy in Bali

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Abstract: - The rapid growth of tourism and urban activities has significantly increased household waste generation in Bali, while existing waste management systems face persistent capacity and behavioral challenges. Although socio-economic determinants of waste behavior have been widely examined, empirical studies that explicitly link household sustainability perceptions to community-based waste management mechanisms, including TPS3R, remain limited. This study aims to fill this gap by analyzing how environmental, health, and economic perceptions influence households' assessment of the importance of TPS3R in supporting sustainable development. The study is based on a survey of 100 households located in close proximity to TPS3R facilities in Denpasar City and Badung Regency. Perception-based indicators were validated and aggregated into composite indices and subsequently analyzed using a logistic regression model. The results show that environmental (odds ratio = 5.85), health (odds ratio = 2.25), and economic perceptions (odds ratio = 1.85) have a positive and statistically significant effect on the perceived importance of TPS3R. Gender is also significant, while formal education is not, suggesting that participation in community-based waste systems and local social practices plays a more decisive role than educational attainment alone. The qualitative findings suggest that ongoing participation in the TPS3R program, together with locally rooted social norms, plays an important role in reinforcing pro-environmental practices within households. Taken together, these results highlight the value of incorporating behavioral perspectives into community-based waste management efforts, especially in regions whose economies rely heavily on tourism, in order to support long-term environmental sustainability.

Key-Words: - household waste, waste management, infrastructure, environment, development.

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1 Introduction

Household waste is a problem that is getting worse every day. It is causing a lot of trouble for the environment, economies, and communities. According to the World Bank, by 2050, we will have been producing an enormous amount of waste,

about 3.4 billion tons every year, which is a lot more than we did in 2016. The reason for this is that more and more people are living in cities, and the population is growing fast, [1].

Household waste is really an issue that we need to think about because of the problems it causes for

our environment, economy, and society. The problem of waste is really bad in countries where a lot of trash is not thrown away properly. This worsens the existing pollution and can make people very sick. In the past five years, some countries have done a lot to improve waste management, [2]. Managing waste properly will help our planet; it will make us more responsible for the environment. To achieve sustainability, waste management and environmental responsibility are very important. One example is South Korea, which has been quite successful in developing sustainability. To make sure that it manages waste and uses resources appropriately, the country has put in place a lot of rules to make it happen.

Another example is Sweden, which has been successful in turning waste into energy. This country is able to recycle or turn more than 99 percent of its household waste into energy. South Korea and Sweden are examples of countries that are successfully working on waste management and the reuse of resources. Despite such successes, there are still large disparities across regions because of differences in socioeconomic, cultural, and policy environments. Cutting-edge technologies and better infrastructure have been involved in most waste management strategies. Those investments matter, but they do little on their own if we overlook the daily choices people make about throwing things away, sorting, and recycling. Behavioral economics, drawing on ideas about mental shortcuts, peer influence, and well-targeted rewards, gives us a powerful toolkit for nudging those everyday habits in a greener direction, [3]. For instance, "nudge" interventions, such as feedback about recycling rates or framing waste management goals in terms of social benefits, have shown to increase compliance with waste separation programs, [4]. Although scholars are increasingly turning to behavioral economics, its application to household waste practices is still scant, especially in settings with widely varying cultures and income levels. Good household-waste habits are essential if a place wants to grow without spoiling the very setting that attracts people to it. Bali, a small island with a huge tourism trade, feels this more than most. Every new guesthouse and every extra flight bring a lot of plastic cups, food scraps, and souvenirs that people throw away. When this pile of trash is not handled properly, the rivers get clogged, and the beaches become dirty. This triggers diseases among the local families and requires significant cleanup costs that have to be paid for by them.

The environment around us has an impact on how we deal with waste and the problems that come

from it. Several studies investigating how waste at home is handled found that it is a complicated issue. Scholars like [5] found that things like how much money we have, what we learned at school, and the rules we live by in our communities all play a big part in how we manage waste. The way we handle waste is affected by the situation we live in, the education we received, and the cultural norms we follow. We need to consider all these factors to understand waste management better.

[6] found out that household waste is affected by such factors as how much money people make, what they learned at school, what their family and friends think is normal, and whether they have access to things like trash cans and recycling bins.

[7] and [8] found that people who are financially adequate are more likely to separate and recycle their trash. On the other hand, people with a limited amount of money are less likely to do so and to have the knowledge to do it properly, [6]. Household waste segregation and recycling practices are clearly influenced by household waste generation and disposal practices, [6], [7], [8]. Moreover, the education level and environmental awareness of the members in the household could also impact the practice because a person with higher education will have greater chances of developing concern for waste reduction and recycling activities, [9], [10]. While studies on waste management systems have been well conducted globally, socio-economic dynamics in Bali at the household level have not yet been much explored. Filling this gap is important for developing appropriate and effective interventions.

Especially for Bali, which relies heavily on the tourism sector, source-based waste management becomes urgent, [11]. Meanwhile, Bali's landfills are running out of space, and its recycling systems still fall short, fueling ecological stress, most visibly in the form of plastic waste ending up in the sea, [12]. Tackling the problem must begin with households themselves; they produce the bulk of everyday rubbish and, with the right habits, can become the main engine of a more sustainable waste regime.

Research carried out at the global level emphasizes the strong influence of socio-economic factors on waste management. For example, studies conducted in India and Nigeria found that there is a positive association of high income and education with involvement in recycling programs and willingness to fund waste management services, [7], [13]. Bali's distinct blend of social norms, cultural traditions, and economic conditions needs to be studied by taking into account its local realities. A

key pillar of household waste governance on the island is the growth of community-run “waste banks,” through which residents sort their rubbish and earn money by selling recyclables. Studies report that these grassroots programs streamline waste handling and, at the same time, provide welcome income, especially for families at the lower end of the earnings scale, [14].

Several studies provide important insights into waste management practices and the challenges faced in Indonesia, [15]. Efforts to achieve higher recycling rates and encourage active household participation are indispensable, [16]. Previous studies suggested that it is essential that municipal solid waste management policies be adapted to local contexts and situations in their implementation. Many studies showed how important it is to take into account socio-economic factors when we make plans for managing waste. Even though we have made some progress, there are still some gaps in what we know and what we do. For example, we do not take into account what we know about how people behave when making policies. Our current policies often do not incorporate economic considerations. Due to this, not many people take part in waste management programs. The impact of socio-economic differences on the success of these programs is different across regions. This shows that we need to make plans that work specifically for each region because we do not want any unexpected effects. Socio-economic factors and behavioral insights need to be taken into account in planning waste management. Policies like pay-as-you-throw have caused people to dump trash illegally in some cases. This shows that we need to come up with plans that are fair and work well for everyone. To overcome the problems, we need to develop an economy that uses resources in a way that is good for the earth and does not make a lot of waste. Pay-as-you-throw schemes and other similar policies are important to understand. The green economy is important because it focuses on using resources appropriately and making minimal waste. This study will formulate ways to manage waste that really work and are based on how people behave. We need to find effective strategies to deal with waste management.

The key research questions to be addressed in this study are:

- Which behavioral factors significantly influence household waste management practices?

- How can behavioral economics principles be effectively applied in designing interventions for sustainable waste management?

- How can the formulated behavioral interventions be integrated into wider economic and environmental policies to support a greener economy?

The study will provide people who work with waste in Bali with some ideas on how to make things better, making sure Bali’s waste systems are good for the island and the environment. By considering what people need, what is good for the environment, and what the rules are, the study will provide suggestions that people can actually implement to improve waste management. It is hoped that the implementation of the suggestions will improve Bali’s household waste system, making it more sustainable. This, in turn will be beneficial for Bali and help the island meet its sustainability targets. This way, the study will help advance the spirit of the Sustainable Development Goals (SDG), especially SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production) while helping protect Bali’s distinctive cultural heritage and fragile environment.

2 Problem Formulation

2.1 Literature Review

Among the conceptual lenses used to decode environmentally relevant human action, the Theory of Planned Behavior (TPB) remains especially influential, [17]. The model holds that the surest short-run predictor of what people actually do is what they intend to do. Intent, in turn, rests on three pillars: the person’s own evaluation of the act, their sense of what “people like me” expect, and the degree of control they feel they have over carrying it out. Environmental researchers routinely deploy TPB to explain why individuals embrace or resist green habits such as waste recycling or sorting, and its power has been demonstrated across a wide range of cases from householders’ readiness to separate food scraps [18] to consumers’ willingness to pay more for eco-friendly products, [19]. TPB’s main strength is that it knits together personal and social forces that shape intention and, ultimately, action. A survey of low-income families in coastal Malaysia, for example, revealed that decisions to invest in eco-labelled goods were driven by a blend

of private attitudes, perceived community expectations, and feelings of self-efficacy, [19].

Similarly, studies on household food-waste separation show that interventions succeed only when they engage with residents' underlying beliefs and perceptions, [18]. As the global population climbs, behavioral insights of this kind are increasingly vital for nudging societies toward sustainability; TPB provides a sturdy scaffold for probing the web of factors behind pro-environmental conduct and for designing interventions that work at both household and community levels, [17], [18].

Regardless of all this, due to rising waste volumes and complexity, we also require strategies that focus solely on individual choice. Social Practice Theory (SPT) widens the scope by examining how everyday routines, cultural meanings, and material arrangements develop waste-related behavior, [20]. From this perspective, waste reflects broader patterns of living than a by-product of isolated decisions. A study of "waste banks" in Java, for instance, found that such schemes flourished only where social capital trust, shared norms, and reciprocity were strong, [21]. Likewise, a Chinese field experiment reported that modest cash rewards were more effective than moral suasion in boosting household sorting rates, underscoring the intricate interplay between economic motives and social cues, [22].

[23] pushed this argument further, calling for an integrated view of municipal waste that marries behavioral incentives with an appreciation of cultural routines and physical infrastructure. Therefore, seen through the SPT lens, to be effective, waste policies must combine garbage bins and trucks with strategies that gradually reshape everyday practices and social meanings, [20].

2.2 Methods

This study was conducted in Denpasar City and Badung Regency in Bali Province, Indonesia. The two regions were chosen as the study locations due to the large amount of their waste generation. Being conducted at the regional level, the study population was the residents of the two regions. In 2023, the population of Denpasar was projected to be around 748.4 thousand people, and the population of Badung was projected to be around 563.3 thousand people, [24]. Therefore, the total population of the two regions was around 1,347.7 thousand people. Samples were taken by using Slovin's formula with a margin of error of 10%, resulting in a sample size of 100 people. Although the sample size is modest relative to the broader population, the analysis is

based on a deliberately homogeneous sampling frame of households located in the vicinity of TPS3R facilities. Moreover, the use of a parsimonious regression specification with a limited set of predictors helps support the credibility of the results as an exploratory assessment of behavioral relationships. The survey focused on the households living near the TPS3R facility, who participate directly in its daily workings or interact with it more informally.

Recent advances in behavioral economics show that less tangible drivers, such as emotions and intuitions, influence the decisions made by individuals. Based on the respondents' perceptions of the existence of TPS3R, their sustainability dimensions (SD) could be measured. The study explored how the respondents, after considering all the possible sustainability efforts at the local level, would view the importance of the existence of TPS3R among the environmental, health, and economic dimensions of sustainability. Their perceptions were measured by using a Likert scale. The sustainability dimensions above, which reflect their awareness of the existence of TPS3R to support sustainable development through waste management, become the dependent variables.

The indicators used to form the sustainability dimension variable in this study are described in Table 1 (Appendix). The answers to the questions for each indicator are stated on a Likert scale with an ordinal score of 1 to 5, 1 being for strongly disagree, 2 for disagree, 3 for moderate, 4 for agree, and 5 for strongly agree.

The sustainability dimension variable in this study uses some indicators that are described in Table 1 (Appendix). The indicators have questions, and the answers to these questions are rated on a scale. The scale is called a Likert scale, which has numbers from 1 to 5. The sustainability dimension variable is formed using these indicators. For each indicator, a number from 1 to 5 can be chosen by the respondents. If they choose 1, it means that they strongly disagree with the statement. If they choose 2, it means that they disagree. Number 3 shows that they are moderate, meaning that they neither agree nor disagree. If they choose 4, it means that they agree with the statement. If they choose 5, it means that they strongly agree with the statement. The sustainability dimension variable uses these indicators and their answers to understand a phenomenon.

Before conducting the regression analysis, we looked at the health and economic dimensions to see if they were consistent and made sense together. We did this to make sure that the environmental, health,

and economic dimensions could be combined into one score that we could trust.

This step was taken to check if those dimensions were measured so that a single score for each can be obtained. The step was taken just to check the quality of the dimensions, not to create a complicated model that shows how things are related. The aggregated composite indices were subsequently used as independent variables in a logistic regression framework, for which model fit and explanatory power were evaluated using the Hosmer–Lemeshow test and Nagelkerke R Square.

The independent variable in this study is the household characteristics believed to influence the respondents' perceptions of the presence of TPS3R in their environment, including levels of the sustainability dimensions, supported by several control variables, such as the number of family members, gender, and last education.

3 Problem Solution

Bali's economic growth is heavily reliant on its main supporting sector, i.e., tourism. As a matter of fact, development in tourism has led to increasing waste production, [25]. The current waste situation in Bali reduces tourist comfort and disrupts overall tourism performance. This linear relationship with economic growth leads to more waste and negative externalities. Sustainable waste management can, in fact help balance the negative effects of the economy and urbanization. Even in the long run, sustainable waste management can be a new source of growth in the circular economy. According to Kuncoro and Nasrullah, every Rp1,000 of additional expenditure allocation that increases demand in the waste management sector in Bali will provide a multiplier output impact of Rp1,700, which shows the magnitude of the multiplier effect of the waste management sector in Bali, [26]. Until now, the contribution of the Water Procurement, Waste Management, Waste and Recycling sector to Bali's GRDP is still around 0.19%. However, this sector has the potential to generate relatively large profits. Waste management corporations in the U.S. can have net profits that are far higher than those of other countries and also those of the famous Hermes fashion company, [26]. This is because the net profit margin of the waste business in developed and developing countries, which ranges from 4 to 7.5 percent, can be said to be high. However, in Indonesia, the cost structure of this business is still classified as inefficient.

Waste generation in Bali reached 1.336 million tons/year or around 3,662 tons/day in 2021. This

figure increased by almost a thousand tons from 2019, when it reached 2,633 tons/day. The 2024 Waste-Management Balance Sheet for Bali paints a stark picture: only 3.04 % of all the collected rubbish received treatment. Of that sliver, roughly 2.98 % was turned into useful inputs (animal feed, compost, or recycled/up-cycled materials) while only 0.055 % was converted to energy, [27]. Disposal options are also limited. The island relies on only five active landfills: Suwung in Denpasar, Kapal in Badung, Temesi in Gianyar, Buruan in Tabanan, and Sente in Klungkung. With the large volume of waste generation, the capacity of the five landfills will not be enough if the waste is not processed. The largest waste contributor is Denpasar City, with a waste generation volume of 1,063 tons/day or 29% of the total waste in Bali. However, the amount of waste generated by activities in Denpasar is not supported by the number of TPS3R. TPS3R is a waste disposal site with the concept of reduce, reuse, and recycle. In Table 2 (Appendix), the results of the survey about the respondents' perceptions and their control variables are shown.

Table 2 (Appendix) shows that most of the people who answered the questions were women, with a mean of 1.44. This shows that women play a significant role in household waste management in Bali. Women in Bali usually take care of things at home and look after the environment. Therefore, it is important to take into account what women think and do when planning community-based waste management activities.

According to the United Nations Environment Programme, the green economy will improve human welfare and increase equality over the long term without causing problems for the earth and without using up all the natural resources that future generations will need. Waste management will greatly contribute to the green economy if it uses technology that does not cost a lot and that is good for the environment; if it reuses, recycles, and reduces waste materials in such a way that they are more recycled and recovered than are thrown away; if it protects the people's health and safety; and if it does not pollute the air, water and soil. Therefore, the existence of TPS3R is very important. This perception was also held by the respondents, which can be seen from their responses when they were given a choice of whether they considered TPS3R important ($D=1$) or not important ($D=0$) in supporting environmental sustainability. Their answers showing an average value of 0.69 means that the majority of the people living around TPS3R consider its existence important.

The importance of TPS3R is supported by the three dimensions that are also considered important by the respondents. It is shown in Table 2 (Appendix) that the environment variable has the lowest and highest values of 3 and 5, respectively, with an average value of 4.05. Meanwhile, the health variable has the lowest and highest values of 2 and 5, respectively, with an average value of 4.03. The economic variable has the lowest and highest scores of 3 and 5, respectively, with an average value of 4.06. Based on the analysis of the three dimensions of sustainability, the respondents' perceptions of the importance of public health around the house have the lowest average value, being indicated by their low perceptions of anticipation of the spread of diseases and access to public health facilities. Meanwhile, the other two dimensions, environment and economy, were considered as having a relatively higher level of importance. Results of the outer model testing are shown in Table 3 (Appendix).

Before testing the predictive relationships between variables, the measurement model was first assessed to ensure the reliability and validity of the constructs. Results of the outer model testing are shown in Table 3 (Appendix). Indicator reliability and convergent validity were assessed exclusively as a preliminary scale validation procedure to ensure the measurement adequacy of the Likert-based constructs prior to their use as composite variables in the regression analysis; accordingly, the study does not implement or infer any structural equation modelling framework.

Table 3 (Appendix) shows that the loading value is higher than 0.5, which indicates that the indicators in each variable meet the validity and reliability to form a model. In the environment variable, the indicator considered the most influential is the existence of sewerage around the home environment that is in proper condition (X1.2), with a loading factor value of 0.849. The most important indicator in the health variable is healthy living habits demonstrated by the habit of washing hands before and after meals to prevent disease transmission (X2.1) with a loading factor value of 0.913. While in the economic variable, the most influential indicator is the ability to meet primary needs (X3.2) with a loading factor value of 0.874.

After establishing the validity of the measurement model, a logistic regression was performed to examine the influence of the sustainability dimensions and control variables on the perceived importance of TPS3R. The logistic model testing shows the significance of the Hosmer

and Lemeshow Test with a Chi-square value of 4.633 with a p-value of 0.796 (greater than 0.05), which means that this model is fit for use. Meanwhile, the Nagelkerke R Square value of 0.632 means that 63.2 percent of the importance of TPS3R presence in Bali is influenced by the sustainability dimension and the other control variables (gender, education, and number of family members). The regression test results are shown in Table 4 (Appendix).

The three dimensions of sustainability indicated by the respondents' perceptions all show significance. This means that they feel the importance of environmental, health, and economic influences. The evidence shows that their waste-handling habits are deeply influenced by the community and settings around them. As the task of managing rubbish becomes ever more complicated, neighborhood-led solutions have proven to be some of the most practical ones. One prominent example is the TPS3R program, which is aimed at reducing the volume of refuse heading to landfills and capturing as much material as possible for recycling or second-time use. This behavior provides a positive impetus to their perception of the importance of TPS3R as one of the solutions in sustainable waste management. Although there are challenges in the implementation, the long-term benefits of TPS3R for the environment and community are significant. Through collaboration between the government, community, and private sector, TPS3R can be an effective model for better waste management in Bali.

Gender emerges as one of the most influential factors in shaping respondents' views on the importance of TPS3R. The estimated coefficient is positive and statistically significant ($B = 1.62$; $p < 0.05$), while the odds ratio of 5.03 indicates a markedly higher likelihood among women. Even when differences in environmental awareness, health considerations, economic conditions, educational background, and household size are taken into account, female respondents are far more inclined than men to assign importance to TPS3R.

The strong connection between gender and views on the importance of TPS3R means that gender is not a secondary control variable, but actually plays a key role in the model. This is in line with the information provided in Table 2 (Appendix). Most of the people who answered the questions are women. On the scale where 1 means female, the average score is 1.44, showing that women are deeply involved in making decisions about waste at home. It is not surprising that women in Bali have such a say in household waste

management. Therefore, the gender factor - the role of women - is very important in the model. Women play a prominent role in making decisions about household waste, which is a key aspect in the model. Women are deeply involved in domestic routines and community practices, making them the main actors in waste generation and handling. The statistical relevance of the gender coefficient further indicates that the observed gap between men and women is unlikely to be explained by chance alone.

The fact that the odds ratio is quite large means that gender is connected to the way people behave in their lives when it comes to TPS3R rather than just being about who people are. This makes sense considering that in Bali, women are usually the ones who take care of activities to keep the house clean, for rituals, and to make sure their families are healthy. Therefore, it is natural that it is women who sort, recycle, and reuse waste. On the other hand, formal education does not seem to have a significant influence on perceptions of the importance of TPS3R. This finding implies that engagement with environmental initiatives in this setting is shaped less by schooling and more by lived roles and habitual involvement. From a policy perspective, these results point to the importance of designing waste management programs that explicitly recognize and support women's roles, as such an approach is likely to enhance participation and strengthen the sustainability of TPS3R implementation.

Several previous studies have confirmed the importance of individual behavior that plays a crucial role in the success of community-based sustainable waste management, as implemented in the TPS3R program. Increasing knowledge, awareness, and positive perceptions of waste management, as well as the provision of adequate facilities and infrastructure, are key in encouraging active community participation, [28], [29], [30], [31]. The role of gender revealed in the current study is also in line with that revealed in some other studies. [32] found that women are more concerned about the environment and more involved in household waste management. This is very true for women in Bali. They take on multiple roles in their daily lives: following traditional customs, working, taking care of their homes, and looking after their families. Despite their numerous responsibilities, they still care a lot about the environment, especially when it comes to managing household waste. They are often the main actors driving recycling practices, waste sorting, and the reuse of household materials to reduce waste. This dedication reflects a balance between traditional

responsibilities and environmental awareness, contributing to cultural and ecological sustainability in Bali. However, the insignificant effect of education confirms that some of the residents, regardless of their education levels, may develop awareness of sustainable waste management.

When people live in places with communities, and they often see others doing good things for the environment, it seems that going to school does not make as much of a difference in how they behave towards the environment. This is because people learn from each other and pick up habits, no matter how much formal education they have. Studies by ^(15,23), for example, found this to be true.

Other studies, like the one conducted by [16] showed that waste management programs and good infrastructure are really important. The roles that men and women have in the household also matter. These things are more important than going to school when it comes to how people deal with waste. Having an education does not really explain why people take care / do not take care of the environment. Waste management programs and good infrastructure are key. The roles of men and women in the household are also important when we talk about waste. Formal education is not as important as these factors when we look at how people behave with waste. Therefore, the insignificance of education found in this study does not contradict the broader literature, but rather indicates that within community-based waste management systems, including TPS3R, behavioral engagement is influenced more strongly by local social practices and institutional exposure than by formal education differences. This finding shows the importance of contextualizing socio-economic determinants of waste behavior rather than assuming that their effects are uniform across institutional settings.

4 Conclusion

Bali is a popular place that people from all over the world like to visit. However, it still has a problem with waste. To overcome the problem, the government, the local community, and the business sector need to work together. The amount of trash is getting bigger and bigger. In many places, there is not enough space to throw it away. The old way of throwing trash in landfills is not working anymore. Nowadays, people around the world are talking about managing waste in a sustainable way. Because of all this, new programs like TPS3R are being started to help solve the problem. Such programs provide benefits to everyone involved. Bali and its

waste problem need solutions like TPS3R to make a difference. Community-run TPS3R hubs are actually doing something about the "reduce, reuse, recycle" idea. Those who run TPS3R hubs have a simple goal, i.e., reducing the amount of trash that ends up in landfills. They think that every item that can be saved should be given a chance. This can be done by recycling or finding a use for the TPS3R hubs' items. In short, the TPS3R hubs are about reducing waste and helping the environment.

This study employed a group of people, the number being one hundred, which means that the results' generalizability to the broad population of Denpasar and Badung is limited. Using a simple model that has proven to work well, the study sought to learn more about things. Although the results cannot be generalized to the whole population of the two regions, they are beneficial for understanding how some people in the regions behave in the context of the TPS3R program.

Using information about how people behave is really important for making changes. In Bali, women are often the ones who make sure their families recycle and sort waste. They also find ways to reuse things. To get people involved, it is a good idea to teach them about recycling in their neighborhoods. Games can also be made out of recycling. People can be given some money for doing a good job. These are some of the ways to get the community to work together and help Bali become a cleaner and more environmentally friendly place.

Nudge interventions designed by taking into account Bali's socio-cultural context may become an effective tool for encouraging more sustainable waste management behaviors. This approach not only supports the TPS3R program but also strengthens the role of communities and local values in achieving a green economy. The study's findings can be directly translated into several targeted "nudge" interventions that are aligned with local socio-cultural contexts and leverage existing community structures. The first is the "Social Proof" nudge, which reflects the intuition that individuals tend to follow the actions of the majority or relevant groups. Its application involves placing notice boards in *banjar* or TPS3R locations that show the percentage of households that sort waste properly, along with photos or names of active participants as public recognition. The expected impact is increased social compliance and motivation to participate.

The second is the "Ease and Default" nudge, which shows that people are more likely to do something when the process is easy and has been set as the default setting. The application of this idea

includes providing color-coded and intuitively labeled trash bins at homes, making sorting the default option with easily accessible infrastructure. It is hoped that this step will reduce behavioral barriers and increase consistency in sorting.

The third is the "Linked to Balinese Values" nudge, which shows that people listen more when you talk about things that matter to them. Therefore, it is a great idea to use stories that show how being clean is connected to the Tri Hita Karana concept, which is about being in harmony with nature, humans, and God. Things that are important to the Balinese people, like the *poleng* (black and white) cloth, can be used in communication materials. The goal of all this is to make people feel more connected to where they live and want to take care of the environment.

The fourth is the "Immediate Feedback" nudge, which helps people see how their actions are making a difference. If we use such things as cards or messages on our phones to show how each household is sorting waste and how the activity helps reduce the amount of waste that ends up in landfills, people will be more aware of what they are doing, and they will want to keep doing it. This is an example of the implementation of the "Immediate Feedback" nudge, and it works best when people make a habit of doing the right thing, when the government supports them, and when the community works together. The nudge makes people understand that their actions are having an impact, and such an understanding is what will keep them going. Environmental initiatives that start with real human behavior can deliver lasting gains and help Bali achieve the Sustainable Development Goals.

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APPENDIX

Table 1. Variables and Indicators Affecting Sustainability Dimensions

Variables	Indicators
Environment variables	The existence of landfills around the house that are in a proper condition (X1.1)
	The existence of sewerage around the home environment that is in a proper condition (X1.2)
	Alert to always keep the environment around the house clean (X1.3)
Public health variables	Healthy living habits demonstrated by the habit of washing hands before and after meals to prevent disease transmission (X2.1)
	The existence of health access indicated by perceptions of the adequacy of health facilities in serving the community (X2.2)
	The importance of having resident health insurance (X2.3)
Economic variables	Changes in household expenditure with the presence of TPS3R compared to before (X3.1)
	Ability to meet primary needs (X3.2)
	Ability to save (X3.3)

Source: created by the authors

Table 2. Descriptive Statistics on the Respondents' Perceptions and Their Control Variables

	Minimum	Maximum	Mean	Std. Deviation
Environment variables	3.00	5.00	4.0562	0.57027
Public health variables	2.00	5.00	4.0327	0.60566
Economic variables	3.00	5.00	4.0631	0.70243
Gender (dummy = 1, female)	1.00	2.00	1.4400	0.49889
Education (dummy = 1, high education)	1.00	2.00	1.1800	0.38612
Number of Family Members	2.00	6.00	4.0900	0.97540
Importance of the TPS3R existence to support sustainable development (dummy = 1, important)	0.00	1.00	0.6900	0.46482

Source: created by the authors

Table 3. Construct Validity and Reliability Assessment

Variables	Indicators	Loading Factor	AVE	CR
Environment variables	The existence of landfills around the house that are in a proper condition (X1.1)	0.801	0.715	0.882
	The existence of sewerage around the home environment that is in a proper condition (X1.2)	0.884		
	Alert to always keep the environment around the house clean (X1.3)	0.849		
Public health variables	Healthy living habits demonstrated by the habit of washing hands before and after meals to prevent disease transmission (X2.1)	0.913	0.791	0.919
	The existence of health access indicated by perceptions of the adequacy of health facilities in serving the community (X2.2)	0.837		
	The importance of having resident health insurance (X2.3)	0.916		
Economic variables	Changes in household expenditure with the presence of TPS3R compared to before (X3.1)	0.844	0.730	0.890
	Ability to meet primary needs (X3.2)	0.874		
	Ability to save (X3.3)	0.845		

*CR: composite reliability, AVE: average variance extracted

Source: created by the authors

Table 4. Results of the Determinant Regression Analysis of the Importance of TPS3R in Supporting Sustainable Development

Variables in the Equation				
	B	S.E.	Wald	Exp(B)
Environment Variables	1.77***	0.52	11.52	5.85
Public health variables	0.81*	0.50	2.63	2.25
Economic variables	0.62*	0.38	2.60	1.85
Gender	1.62**	0.73	4.86	5.03
Education	-0.87	0.77	1.27	0.42
Number of Family Members	0.23	0.36	0.41	1.26
Constant	-0.72	2.08	0.12	0.49

Source: created by the authors

Contribution of Individual Authors to the Creation of a Scientific Article

- Ni Putu Wiwin Setyari was responsible for conceptualization, writing – original draft, and supervision.
- Widhiantini conducted the formal analysis.
- I Made Endra Kartika Yudha developed the methodology.
- Ida Ayu Gede Bintang Madrini carried out data validation.
- I Made Putra Yasa performed the data analysis.
- I Gusti Agung Ngurah Gede Satria Utama and Ni Wayan Sutami Ekaningsari handled project administration.

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