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WASTEWATER DISPOSAL PRACTICES OF HOUSEHOLDS IN TORIL DISTRICT UNSERVED BY DAVAO CITY WATER DISTRICT: A STUDY FOR INTERVENTION

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ABSTRACT
This research sought to investigate the practices on wastewater disposal of the unserved areas in Toril District, Davao City, of the Davao City Water District (DCWD)-served areas in Davao City at the grassroots level, and translate the outcomes to arrive at an intervention framework. This study used a cross-sectional and non-experimental quantitative research design, making use of exploratory factor analysis and a structured 30-item questionnaire using the Likert scale. The structured questionnaire was used to gather information from 150 eligible participants representing various eligible households (the adult counterpart residing in the DCWD unserved areas for at least six months). The reliability test revealed that the internal consistency for the items was acceptable (Cronbach's alpha = 0.702; McDonald's Omega = 0.204). The Kaiser-Meyer-Olkin (KMO) measure for sampling adequacy (.693) and the Sig. for the Bartlett test of sphericity (1019.132; $p < .001$) supported the suitability for factorability and hence extraction of the components. Principal component extraction and Varimax rotation were used to enable the retention of five components that were understandable and explained 41.613% of the total variance. The components that were extracted were as follows: LGU Support and Action; Household Awareness and Compliance; Service Clarity and Affordability; Discipline and Community Support; and Vigilance and Trust. This shows that the practice of disposing of wastewater in the DCWD unserved areas is influenced by interwoven aspects of governability, visibility, and serviceability, and the lack of confidentiality and casino trust. An intervention guide and framework for actions were therefore developed.

Keywords:
Wastewater Disposal, DCWD-unserved households, Toril District, Exploratory Factor Analysis, Sanitation **B**ehavior, Intervention Framework

INTRODUCTION

Domestic wastewater is also an ongoing concern relating to the environment and public health, especially if there is a gap within the sanitation chain, from storage and emptying, transportation, treatment, and disposal (Mara, Brown, & Lopez, 2010; Peal, Mara, & Karaivanov, 2014; World Health Organization & United Nations Children's Fund [WHO & UNICEF], 2023). Given the scenario of unserved/underserved communities, many domestic units depend on self-contained facilities that differ according to technical standards achieved, intervals of maintenance, and safe discharge transport. Failure to desludge the septic tanks and the practice of discharging greywater into open drains become hazardous that manifest within, beyond, and around the domestic unit, through the rapid linkage of transformers of these drains (Prüss-Ustün et al., 2019; WHO & UNICEF, 2023).

In the Philippine setting, sanitation and wastewater governance are framed by environmental and public health frameworks, including the Clean Water Act and related health guidance. Current literature reports, specifically for Davao City, have noted the presence of domestic wastewater as a contributing factor to the state of the waterways, including drainage, particularly in areas where the population is sparser but where the interaction between waterways and stormwater runoff is most pronounced, particularly for areas with high rainfall.. While the City and DCWD are developing septage management and related planning instruments, communities outside routine service arrangements can continue to manage wastewater characterized by limited access to clear service

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pathways, variable affordability, and limited information. This gap underlines the need for unserved contexts to have behavior- and governance-sensitive interventions, not only infrastructure-oriented strategies.

For the Philippine setting, sanitation and wastewater are addressed according to the country's public health guidance and regulation on the environment through the Clean Water Act (as per Department of Health, 2008; Republic Act No. 9275). Concerning local development and the community's understanding on the issue at the local setting, there have been reports and studies that have consistently identified the effect of domestic wastewater on water courses and drainage throughout the country, especially as the potential threat is identified to tend to escalate with higher population densities and the developments associated with the downstream population (EMB-XI, 2024; Walag, 2018). Regarding the Davao City context, local initiatives and plans focus on the responsibility to upgrade the sanitation sector and mitigate the effect on water quality through the intervention and action at the governance level (City Government of Davao, 2025; Davao City Water District, 2025a & b).

This research fills that gap by examining the profile of wastewater discharge behavior in DCWD unserved areas in Toril District, using exploratory structure identification to find the underlying factors influencing these behaviors, and using the discovered structure to identify directions for implementing improvements in local wastewater discharge.

Statement of the Problem

The study will help us determine the behaviors of the DCWD unserved households in relation to wastewater disposal. In addition to that, this study will help us know the proper solutions to effectively lessen the impact of those practices on the environment. The study will help us figure out what these contributors are to their behaviors and properly use the insights for better solutions and interventions. It particularly aims to investigate answers to these questions:

1. What really shapes (factors) the behavior of the DCWD-unserved households towards wastewater disposal?
2. What system/framework can be developed in order to improve wastewater disposal practices?
3. What interventions and supports will help DCWD-unserved households address the improper wastewater disposal??

Significance of the Study

The following are the intended beneficiaries of the study, to wit:

1. Davao City Water District (DCWD). This study will provide a clearer picture to better understand how households that are not within DCWD services dispose of their wastewater. Knowing the factors influencing their action will help DCWD build helpful programs aligned with its community constraints. This will also help DCWD in achieving its mandates under national and international law.
2. Local Government Units (LGUs) and Barangay Officials. The research will support the public officials to provide meaningful policies and plans in handling wastewater effectively within their area of responsibility. Understanding the factors influencing how people within their community practice unsafe wastewater disposal will help them realize that there are still areas for improvement, especially in protecting the environment and its people.
3. Residents and Communities unserved by DCWD. For households unserved by DCWD and will not be a direct beneficiary of the SMP, this study will help them realize that their current practice will not benefit the environment and them subsequently. This study will help them look for other alternatives within their community to take a different approach in order to lessen the impact of their current practices, knowing that they will not benefit directly from any sanitation services. This study will enlighten them that even their small, improper practice can still affect the environment in the long run and will force them to change their ways by looking at the factors where they can adjust and initiate, rather than waiting for the public officials to do everything for them.
4. Urban and Environmental Planners. Results from this study can offer guidance and relevant information to the planners while they integrate the proper wastewater treatment system in a specific area. The planners can better position themselves by putting sanitation as a central factor for public health and environmental protection. This might involve integrating proper sanitation concepts into town development, fostering robust environments where people flourish.

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5. Future Researchers. The data derived from this study can help future researchers to develop more focused and locally specific programs and policies. The study can provide the initial data that will serve as a starting point so that they will not be back to square one. This will also help them focus on more aspects of the study, such as exploring specific communities that could employ specific techniques to understand local practices.

REVIEW OF RELATED LITERATURE

Domestic wastewater in Davao City and the unserved setting

Domestic wastewater remains a persistent environmental and public health concern when sanitation systems are incomplete across the service chain, from containment and emptying to transport, treatment, and safe disposal (Mara et al., 2010; Peal et al., 2014; World Health Organization & United Nations Children's Fund [WHO & UNICEF], 2023). In many unserved or underserved settlements, households depend on self-managed on-site arrangements that vary in technical adequacy, maintenance regularity, and safety of discharge routes. When septic tanks are not desludged on time or when greywater is routinely released into open drains, risks extend beyond the household and become neighborhood and watershed problems because wastewater pathways connect quickly to communal drainage corridors and receiving waters (Prüss-Ustün et al., 2019; WHO & UNICEF, 2023).

In the Philippine setting, sanitation and wastewater governance are framed by environmental and public health frameworks, including the Clean Water Act and related health guidance. Current literature reports, specifically for Davao City, have noted the presence of domestic wastewater as a contributing factor to the state of the waterways, including drainage, particularly in areas where the population is sparser but where the interaction between waterways and stormwater runoff is most pronounced, particularly for areas with high rainfall.. While the City and DCWD are developing septage management and related planning instruments, communities outside routine service arrangements can continue to manage wastewater characterized by limited access to clear service pathways, variable affordability, and limited information. This gap underlines the need for unserved contexts to have behavior- and governance-sensitive interventions, not only infrastructure-oriented strategies.

Household awareness and compliance as a behavior pathway

Although awareness and compliance are normally considered important drivers of behavior change, they are sporadically translated into a performance routine under scenarios where routines are constrained through time, cost, space, and a perception of a lack of credible enforcement/support. Awareness may exist that DHS, for instance, exudes improper behavior, yet such a behavior is undertaken since a better, safer, and sounder option does not feel credible, confusing, and costly, especially where there are no foreseeable services available. It becomes evident that "compliance" can actually be more than just knowledge for behavior changes to happen.

Behavior theories help explain why awareness sometimes fails to produce routine compliance. The Health Behavior theories assist to understand why sometimes awareness is ineffective for routine compliance. The Health Belief Model stresses the central role of both perceived susceptibility and perceived severity concerning preventive actions, but also, and crucially, of both perceiving barriers and perceiving benefits. These are seen to have a powerful inhibiting effect on sanitation practices presented with concerns about service availability and affordability. The role of attitudes, subjective norms, and perceiving behavioral control in determining behaviors is also elucidated by the Theory of Planned Behaviors, which would suggest improved routine compliance once there is also a belief in safe disposal as what is expected by peers and possible within their own community. Norm-activation and value-belief-norm theories show an amoral role for personal standards in amplifying pro-environmental behaviors, but again, only when there is a supportive context and community standards defining suitable behaviors. Awareness is thus given effect when coupled with routine-supported behaviors reflecting perceptions of behavioral control and community standards.

Service Clarity and Affordability in the Sanitation Chain

Service clarity and affordability represent tangible factors that have been recognized for their importance in encouraging participation in sanitation services again and again; this is because community willingness may depend on the service chain being well understood and trusted. Additionally, when the community is not serviced, factors such as variability in the desludging schedules, variability in treatment destinations, and variability regarding costs may exist in a way that discourages desludging and disposal. It is likely that a household that is not clear on what happens to their refuse after collection may have weakened compliance regarding a service that may be considered unreliable or expensive.

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Empirical and conceptual work on sanitation demand emphasizes the fact that for adoption to take place, and to be sustained, convenience, reliability, and affordability are more important than risk awareness alone.Diffusion and adoption approaches further highlight that practices are adopted as a visible benefit can be gained from adoption, if adoption is compatible with lifestyle, and if adoption does not seem excessively complicated. In other words, safe disposal avenues will be followed if the instructions are clear, templates are predictable, costs are transparent, and payment structures are compatible with household funds. Clarity and affordability in particular can make barriers easier to overcome, improve perceived control over behavior, and make safe action easier to repeat, thus improving the chances of new behaviors being sustained rather than adopted once and discarded.

Discipline and Collective Support as Community Mechanisms

Family discipline is concerned with those microscopic actions to which risk aversion is connected in sanitation, such as proper disposal of kitchen refuse, draining, septic tanks, and avoiding direct dumping where there are other pathways. At a macro level, relevance is connected to the fact that sanctions in sanitation are often because of the aggregate effect of minute actions, such as putting off maintenance, slow draining, overflows during heavy rainfall, and routine dumping into sewers. In unattended areas, discipline will become hedge actions, but may be quite difficult to maintain, especially when the concerned families are coping with space, time, and unavailability of quality services.

The use of collective support mechanisms is necessary and relevant because there are some externalities involved with sanitation challenges. The sanitation challenges presented by some households impact other neighboring households. The impact occurs because they share a common drainage system, they smell, they are conducive grounds for vectors, and they are also conducive grounds for environmental contamination. According to the collective action theory, there are strategies involved to make cooperation efficient. These strategies follow two main contexts: reducing the cost of coordination and providing rules and mechanisms for controlling free-riding. In areas not yet served, reducing individual cost and free-riding are facilitated using individual and collective decision mechanisms.

LGU Support and Action as Enabling Governance

Local government action shapes sanitation behavior by determining whether households experience governance as visible, predictable, and supportive. Viewed institutionally, rules, incentives, enforcement credibility, and arrangements that reduce uncertainty and transaction costs are shaping factors for household choice (North, 1990). In unserved contexts, households often act without routine utility guidance, so the visibility of LGUs becomes key to establishing what is expected and what is achievable. When barangays provide clear information, credible monitoring, and practical support, households may view safe practices as achievable rather than optional or symbolic. Implementation research further indicates that policy outcomes are contingent on how governance is conducted in everyday practice, particularly by street-level officials who translate general rules into practical actions and discretionary decisions (Lipsky, 1980).

When people feel that there is a delayed response or confusing procedure and irregular enforcement on the part of the government or LGUs, this will make residents perceive sanitation regulations as a mere signal, which decreases their intention to comply with regulations. However, as Pressman and Wildavsky stated in "Implementation as Handmaid to Policy Analysis," these officials can maintain a consistent follow-through mechanism via proper referral systems and enforcement action that will make households perceive governance as legitimate and something that is worth supporting. Thus, "LGU enabling" acts as a force that manifests not only as "authority" as a facilitative environment that reinforces community sanitation practices.

Vigilance and Trust, Risk Cues, and Verification

Vigilance and trust influence whether households continue safe practices when costs and inconvenience are involved. In the context of sanitation settings, vigilance involves observing risk cues-such as odor, discoloration, overflow, or murky drainage water-and responding to them through reporting, checks, or changes in practices. For their part, households will trust that reporting produces action or results and that wastewater is handled correctly beyond containment in the household. Households that do not trust the system-or cannot verify that waste reaches safe endpoints-may disengage, in particular, if compliance requires money, time, or social effort.

It is evident in the literature on risk and protective measures that behavior can be influenced by the perceived credibility of information, the availability of communications channels, and trust in the capability of institutions to respond appropriately (Lindell & Perry, 2012). Trust in the provision of sanitation services can also be established by having visible channels that lead to provision because it gives a sense that household compliance

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has benefits rather than simply going somewhere else. Vigilance and trust can therefore be considered as stabilizing factors that retain households on the path through feedback and credible response systems that remove suspicions of reverting to convenient practices that are harmful.

METHODOLOGY

A cross-sectional, non-experimental design was employed, making use of Exploratory Factor Analysis to uncover the underlying factors on the disposal of domestic wastewater as extracted by a pre-prepared questionnaire. The scope of the research shall cover households within Toril District, Davao City, which were not served by DCWD. The respondents were adult household representatives aged 18 years and above who had stayed in the area for at least six months and who did not have an active household connection with DCWD during the data-gathering period. This paper used a purposive sampling technique in identifying households that are eligible to self-manage wastewater systems. A total of 150 responded to the final survey.

Data collection was done through the use of a structured 30-item questionnaire using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The items were developed in an informed way from the literature domains summarized in the RRL, which are local governance support, household awareness and compliance routines, service clarity and affordability, collective support mechanisms, and vigilance and trust cues. Informed consent on the study's purpose, confidentiality, and voluntariness of participation was secured from the eligible respondents after permission had been granted. The surveys were then administered to household representatives in identified DCWD-unserved areas in Toril District. Data encoding and preparation of the responses for statistical analysis were then performed.

Reliability was calculated by Cronbach alpha and McDonald's omega, with omega as an additional reliability coefficient. Sampling adequacy and factorability tests were carried out by Kaiser-Meyer Olkin values and Bartlett's Test of Sphericity. Factors were extracted and then subjected to varimax rotation in an attempt to improve interpretation. All calculations were conducted using IBM's SPSS Statistics software.

RESULTS AND DISCUSSION

The current section showcases the findings of the factor analysis conducted on the 30-item wastewater disposal practices survey. The need to test the reliability of the survey tool was considered important before doing the factor analysis, and testing was conducted to show that the research tool is reliable enough during this type of exploratory research. The Kaiser-Meyer Olkin test was conducted, alongside the Bartlett Test of Sphericity, which was used to test the suitability of the sample.

Cronbach's alpha and McDonald's omega

Table 1 shows the results of the reliability and factorability tests conducted to establish whether the instrument and data were appropriate for use in extracting the exploratory structure. The instrument was found to have internal consistency appropriate for use in exploratory community research, with a Cronbach alpha value of 0.702 and a McDonald's omega value of 0.704, which indicates that it has a degree of internal consistency appropriate for use as an initial exploratory instrument.

Scale Reliability Statistics		
	Cronbach's α	**McDonald's ω**
Scale	0.702	0.704

Table 1: Cronbach's α and McDonald's ω

KMO and Bartlett's Test

Table 2 details other statistics calculated, specifically the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's Test of Sphericity, both of which are measures used in validating the adequacy of the sample and the patterned correlation among the variables. The value of the KMO index was 0.692, indicating that it was in the acceptable range for factor analysis, meaning that the correlation was sufficiently agglomerated for extraction. Moreover, the significance test, known as Bartlett's Test of Sphericity, was significant, with Chi-Square Approx. 1019.132, df= 435, and $p < .001$, thus rejecting the null hypothesis that the correlation matrix was an identity matrix. These findings collectively suggest that there was enough communal variance and patterned correlation in the dataset,

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warranting the appropriateness of factor analysis in uncovering the underlying dimensions of the wastewater disposal practices in the unserved households in Toril District of the DCWD.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.692
Bartlett's Test of Sphericity	Approx. Chi-Square	1019.132
	df	435
	Sig.	0.000

Table 2. KMO and Bartlett's Test

Scree Plot

Figure 1 below is the scree plot for the analysis, which groups the eigenvalue values for the 30 items used in the analysis. The scree plot indicates the degree of eigenvalue drop-off per component, starting from the first component down to the thirtieth component. It clearly indicates where the common variation has a steeper drop-off, which will require fewer factors. This clearly indicates the point where the factors begin flattening out, forming the "elbow" point where the common variation declines slowly. Based on the results and the objective to serve the goal of the analysis by making it more interpretable, the best or ideal number of factors or components for the analysis will include five components or factors (k=5), which represents the ideal or best interpretation of the underlying factors or themes existing within the practices on disposing wastewater by the unserved households of the DCWD-Toril District. Analysis of Variance Percentage

The other factors also made significant contributions to the major entity as a whole. Component 4 had an eigenvalue of 1.806, explaining 6.020%, which summed to 36.368%, while Component 5 had an eigenvalue of 1.574, explaining 5.245%. In totality, these five factors accounted for a cumulative percentage of 41.613% of all factors considered. It can thus be ascertained that the initial two factors had accounted for considerably larger portions of common variance, and factors 3 to 5 ensured added meaning necessary for a holistic view of the factors embodied in wastewater disposal behavior exhibited by DCWD unserved households of Toril District.

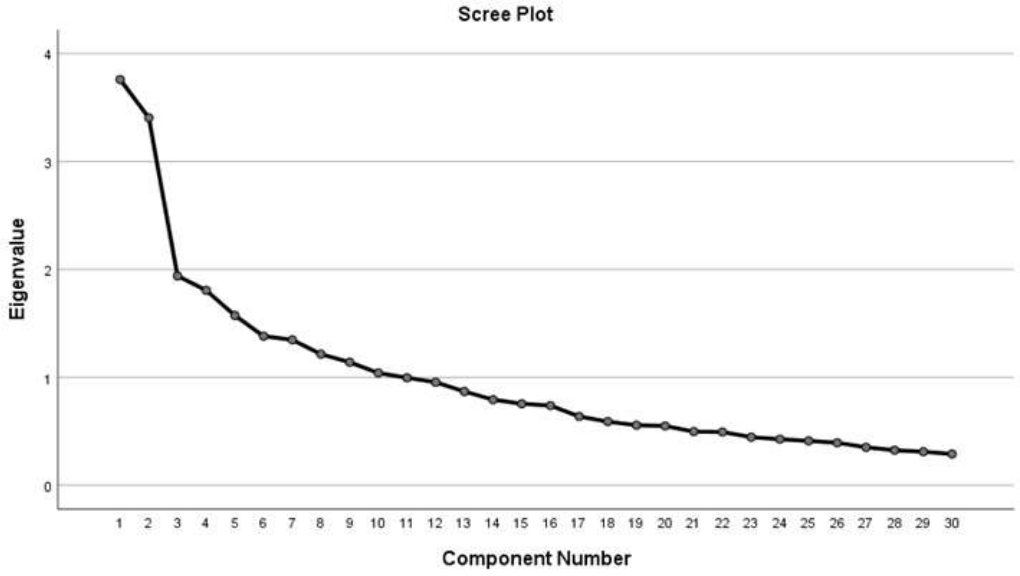

Figure 1. Scree Plot Rotated Component Matrix

Analysis of Variance Percentage

Table 3 above shows the total variance explained using principal component analysis, including both eigenvalues and sums of squared loadings for extracting retained components. From Table 3, it can be seen that five components were extracted, with eigenvalues greater than 1.00. The first component, Component 1, had an eigenvalue of 3.759 and explained 12.530% of the total variance. The next component, Component 2, with an eigenvalue of 3.405, explained an additional 11.350% of total variance, contributing 23.880% to total variance explanation. The third component, Component 3, with eigenvalue 1.940, explained 6.467%, contributing 30.347% to the total variance explanation.

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The other components contributed significantly at this juncture. Component 4 had an eigenvalue of 1.806, contributed 6.020%, and had a cumulative variance of 36.368%, while Component 5 had an eigenvalue of 1.574 and explained 5.245%. In total, the five components explained a cumulative variance of 41.613%. This shows that the first two components explained the dominant portion of the common variance, while Components 3 through 5 contributed explanatory power to adequately describe the dimensions inherent in the practices of wastewater discharge in the context of DCWD-unserved households in Toril District.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.759	12.530	12.530	3.759	12.530	12.530
2	3.405	11.350	23.880	3.405	11.350	23.880
3	1.940	6.467	30.347	1.940	6.467	30.347
4	1.806	6.020	36.368	1.806	6.020	36.368
5	1.574	5.245	41.613	1.574	5.245	41.613

Table 3. Total Variance Explained

Rotated Component Matrix

The rotated component matrix with group attributes is a summary of the Exploratory Factor Analysis, reporting how the responses of the survey are grouped into different components. This, in simpler terms, allows an understanding of the variables that are interlinked and behave in a particular manner that forms a trend or pattern that can then be defined with clarity.

In order to clarify these groupings, a varimax rotation was done. This process refines the distinctions among the components, pointing out which items are dominating a dimension. Even after rotating, these five retained components continue to account for a sum of 41.6 percent of the variance, which, instead, ranges from 11.70 to 6.93 percent for all five components, respectively.

In examining the results in a matrix, there is a focus on those with more noticeable loadings. These are usually at least .50 in applied research. There is also a focus on those with more acceptable levels of uniqueness. These are the best at capturing what is represented in a given dimension because they demonstrate less overlap with other dimensions.

Local Government Unit Support. Table 4 presents Component 1, labeled LGU Support and Action, which reflects how visible barangay and LGU efforts, together with practical assistance, shape households' willingness to adopt safer wastewater practices. The strongest indicator is *"Item 14: In the past, we learned practical wastewater tips from barangay posts, talks, or social media and applied at least one tip with factor loading of 0.692",* which suggests that when households receive clear and usable sanitation tips through barangay posts, community talks, or social media, and are able to apply them, compliance becomes more workable in everyday life. The next highest loadings, *"Item 5: When compliant options are limited, we support/choose practical interim solutions endorsed by the LGU to stay compliant with factor loading of 0.616"* and *"Item 30: The barangay/LGU takes visible action against illegal wastewater discharge (e.g., warnings, notices) with loading of 0.582"*, point to the same direction: households are more likely to comply when the LGU provides realistic interim options and when enforcement against illegal discharge is seen and felt at the community level. This supports the view that compliance is influenced by what local governance actually delivers, not only by what it requires on paper. The remaining items, *"Item 9: Cheaper or subsidized options would increase households' use of proper wastewater management and desludging services with factor loading of 0.562"* and *"Item 18: Since last year, our area received new wastewater assistance/infrastructure (e.g., scheduled desludging, equipment, facility) (0.554)",* highlight enabling conditions such as affordability support and basic infrastructure assistance. Taken together, the component implies that households respond more positively when compliance is supported through concrete measures rather than framed purely as a personal responsibility.

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Factor	Attributes	Loading, λ
LGU Support & Action	Item 14. In the past, we learned practical wastewater tips from barangay posts, talks, or social media and applied at least one tip.	0.692
	Item 5. When compliant options are limited, we support/choose practical interim solutions endorsed by the LGU to stay compliant.	0.616
	Item 30. The barangay/LGU takes visible action against illegal wastewater discharge (e.g., warnings, notices).	0.582
	Item 9. Cheaper or subsidized options would increase households' use of proper wastewater management and desludging services.	0.562
	Item 18. Since last year, our area received new wastewater assistance/infrastructure (e.g., scheduled desludging, equipment, facility).	0.554

Table 4: Rotated Component Matrix with Grouped Attributes of LGU Support & Action

Together, this element implies that the compliance cost for a household is largely a function of visibility. Households will comply when information is clear and understandable, enforcement is credible, and some sort of enabling assistance is provided. Such observations confirm the related discussion within the literature review on how compliance with sanitation can be characterized as a problem related to transaction costs. If costs or levels of compliance remain expensive, uncertain, or inadequately enforced, the easiest thing for the household would be to maintain informal or convenient alternatives. By increasing neighborhood satisfaction with government visibility aspects, compliance is the rational or more easily attained choice between the two alternatives put forward by North (1990), Lipsky (1980), and Pressman & Wildavsky (1973).
From an intervention perspective, what these findings suggest is that there is value to be found in improving visible implementation over and above reminder and information. Clearly posted information about fees, contacts, and step-by-step procedures, along with enforcement and better options, can help to ease the complaint and improve satisfaction that the waste management system is working fairly and predictably. This is consistent with the reasoning that if community-level rules and monitoring are enhanced, then it can improve community-level coordination and lead to easier maintenance of community-level norms (Ostrom, 1990)

Household Awareness and Compliance. Table 5 portrays common domestic practices and decision-making patterns associated with proper wastewater management practices. Indeed, the most relevant factor loading measure can be found in the statement "*Item 4: In the past months, we reported or joined clean-ups so canals near our home stay clear and avoid clogs/overflows with a factor loading measure of 0.669,"* because it implies the households' propensity to report or participate in clean-ups so canals will remain free from obstructions and spills. Almost the same measure can also be observed in the statement *"Item 2: We maintain the septic system (no leaks, timely desludging) to keep our home and surroundings problem-free of 0.666,"* which provides relevant emphasis on the maintenance activities the households must perform on their septic systems. Apparently, the statement "Item 12: Our barangay/LGU or provider posts clear prices for desludging and disposal, and we use that information when deciding with a factor loading measure of 0.609" indicates the importance of readily available data on the desludging process, which acts as a decisive ingredient on the part of the households, while the statement *"Item 1: Our household ensures wastewater is treated or taken for treatment rather than discharged into waterways with a factor loading measure of 0.559"* clearly provides emphasis on the households' preference for the treated instead of the untreated wastewater.

Factor	Attributes	Loading, λ
Household Awareness and Compliance	Item 4. In the past months, we reported or joined clean-ups so canals near our home stay clear and avoid clogs/overflows.	0.669
	Item 2. We maintain the septic system (no leaks, timely desludging) to keep our home and surroundings problem-free.	0.666
	Item 12. Our barangay/LGU or provider posts clear prices for desludging and disposal, and we use that information when deciding.	0.609
	Item 1. Our household ensures wastewater is treated or taken for treatment rather than discharged into waterways.	0.559

Table 5: Rotated Component Matrix with Grouped Attributes of Household Awareness and Compliance

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In essence, the implication here is that compliance is maintained through the capabilities and habitual follow-through in the household, not only because the service exists in the neighborhood. Through the use of the Health Belief Model, the implication here is that the household is likely to respond because the gains are tangible and observable, such as a cleaner environment and a reduced number of overflow occurrences, and the cues for action are also visible, such as the sighting of the canals becoming full and the drainage conditions worsening. Through the Theory of Planned Behavior, the implication here is that perceived control influences whether the behavior actually occurs through everyday acts such as maintenance and proper disposal (Rosenstock, 1974; Ajzen, 1991).
In terms of its applications, there are a couple of implications that could be made to support a strategy that aims to facilitate easier maintenance routines for households. These may include simple maintenance tips that are realistic and relatable, reminders that are connected with regular routines, as well as local reminders to remind them to follow through. It also aligns with one of the ideas discussed in the literature review, where just awareness alone may not lead to any changes when there are challenges to overcome (Ajzen, 1991; Rosenstock, 1974).

Service Clarity and Affordability.
Table 6 presents whether wastewater services are understandable, predictable, and financially manageable. The strongest indicator is *"Item 7: In the past months, we received clear information on where collected wastewater is taken for treatment (0.654),"* suggesting that willingness to comply is higher when households know where collected wastewater is brought for treatment. *"Item 25: The community needs a clear, regular schedule for septic tank desludging to be announced (0.619)"* highlights the importance of a clear and regular desludging schedule, implying that predictability helps households plan and makes compliance timing more realistic. *"Item 8: Installment plans would make desludging payments manageable for our household, and we would use them (0.582)"* further shows that payment flexibility matters, since installment options can reduce financial strain and encourage households to avail services instead of postponing them.

Factor	Attributes	Loading, λ
Service Clarity & Affordability	Item 7. In the past months, we received clear information on where collected wastewater is taken for treatment.	0.654
	Item 25. The community needs a clear, regular schedule for septic tank desludging to be announced.	0.619
	Item 8. Installment plans would make desludging payments manageable for our household, and we would use them.	0.582

Table 6: Rotated Component Matrix with Grouped Attributes of Service Clarity & Affordability

Taken collectively, this component indicates that there is an improvement in levels of compliance where the community can "see the chain" and where they can trust where their wastewater actually goes. This aligns with the principles of both the FSM and JMP, which frame sustainable quality not only within containment, but also what happens after, including transport, treatment, and end disposal verification or end-use destinations (Peal et al., 2014; WHO and UNICEF, 2023). If it's unclear where it's going, and potentially if it's unclear where it's going based on this schedule, then those who opt to be compliant can end up being compliant anyway if it's derailed somewhere along this line.
From an intervention perspective, what this outcome suggests is two intervention handles: transparency and affordability. As expected under both HBM and TPB frameworks, despite perceiving proper disposal as preferable and advantageous, individuals are likely to procrastinate until they are uncertain about cost (in sum) and/or clarity on schedule and availability for delivery (Rosenstock, 1974; Ajzen, 1991). In this manner, improved clarity on schedules, definitions on target achievement, and facilities for installment payment are direct intervention mechanisms to enhance turning intent into action.

Discipline and Collective Support.
Table 7 presents Component 4 (Daily Discipline and Collective Support), which combines routine preventive practices with community-based arrangements that make compliance more achievable. The strongest indicator is "Item 27: We scrape food and grease before washing to prevent drain blockage and dirty runoff (0.595)", pointing to everyday discipline such as scraping food and grease to prevent drain blockage and dirty runoff.

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"Item 16: We feel responsible for improving our household's wastewater practices and take action when needed (0.568) reinforces personal responsibility and readiness to act when needed. At the same time, *"Item 26: We are more likely to avail services when payments are pooled/collected through the barangay/community group (0.519)"*, suggests that pooled payment schemes through barangay or community groups can increase service uptake, while *"Item 10: A shared or communal wastewater management facility would help households in similar situations. (0.511)"*, indicates that shared facilities may serve as workable options for households facing similar constraints. In the literature, this pattern aligns with adoption and collective practice perspectives, where compatibility with daily routines, observability of benefits, and local coordination help reduce barriers and support sustained uptake of compliant behavior (Rogers, 2003; Ostrom, 1990; Lindell & Perry, 2012).

Factor	Attributes	Loading, λ
Discipline & Collective Support	Item 27. We scrape food and grease before washing to prevent drain blockage and dirty runoff.	0.595
	Item 16. We feel responsible for improving our household's wastewater practices and take action when needed.	0.568
	Item 26. We are more likely to avail services when payments are pooled/collected through the barangay/community group.	0.519
	Item 10. A shared or communal wastewater management facility would help households in similar situations.	0.511

Table 7: Rotated Component Matrix with grouped attributes of Discipline & Collective Support

Taken together, this component suggests the presence of two types of forces that cooperate to improve the adoption of wastewater management. The first type involves micro-routines that are set to prevent issues before they become bigger. The second type involves social agreements to ensure compliance is less complicated and less costly for people. This is consistent with the Diffusion of Innovation paradigm concerning the manner by which adoption improvements are connected to the simplicity and observability to the general public so that they see improvements in their own neighborhoods (Rogers, 2003). This is also consistent with the provision that rules and public systems help reduce the problem of coordination to ensure the success of norms for compliance (Ostrom, 1990).

In terms of designing an intervention, there is evidence that joint activities in habit development and community assistance are encouraged. Pooling schemes, common facilities, and public examples may increase the feasibility and validity of compliance, particularly in light of shared circumstances among households. However, in light of the concerns about day-to-day discipline, there appears to be actual viability in working through small behaviors at the micro level in improving the upstream impact on drains. In terms of protective actions, social prompts in the form of community engagement and information prompts in the form of barangay advisories can improve motivation through feasible avenues that reduce isolation (Lindell & Perry, 2012).

Vigilance and Trust.

Table 8 presents Component 5 (Vigilance and Trust), which reflects households' sensitivity to environmental risk cues and their confidence that wastewater is handled properly. The strongest indicator is *"Item 23: As good neighbors, our household practices safe wastewater disposal even when it takes extra time or cost, with a factor loading of 0.706"*, suggesting that safer disposal is linked to a sense of social responsibility and a willingness to comply even when it requires extra time or money. "*Item 22: We trust that collected wastewater from septic tanks is brought to an approved treatment facility, and we verify when possible with factor loading of 0.662",* points to trust combined with verification, highlighting the importance of believing that wastewater reaches an approved treatment facility and, when possible, confirming that this is true. *"Item 21: In the past month, we noticed sewage odors or murky water near our home and reported/checked the cause with factor loading of 0.517",* anchors the theme in vigilance, where households notice signs such as foul odor or murky water and respond by reporting concerns or checking possible causes.

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Factor	Attributes	Loading, λ
Vigilance & Trust	Item 23. As good neighbors, our household practices safe wastewater disposal even when it takes extra time or cost.	0.706
	Item 22. We trust that collected wastewater from septic tanks is brought to an approved treatment facility, and we verify when possible.	0.662
	Item 21. In the past month, we noticed sewage odors or murky water near our home and reported/checked the cause.	0.517

Table 8: Rotated Component Matrix with Grouped Attributes of Vigilance & Trust

Taken together, this component indicates that vigilance is maximized when households receive credible cues and take them as significant risk-related cues, as posited by the logical framework of the HBM, in which susceptibility, severity, and cues to action influence subsequent behavior, or action, by Rosenstock in 1974. On the other hand, the TPB indicates that norms and control influence behavior in response to the credible cues, particularly when costs in terms of efforts and action are considered, as informed by Ajzen in 1991.
In terms of designing an intervention, there are also grounds to support improving pathways of feedback and verification because trust can never simply be a mindset, as trust can thrive with visible indicators showing that indeed, the chain of services is completed properly. In line with JMP's perspective, "safely managed" sanitation will naturally include the disposal of excreta and verification as a component of adequacy, apart from a septic tank's mere presence (WHO & UNICEF, 2023). In line with PADM, indicators such as odor and murkiness will tend to encourage intervention better with pathways that aim at allowing households to make informed decisions with an action pathway, such as hotlines and barangay response, as well as indicators of treatment (Lindell & Perry, 2012).

Framework Based on the Findings

Figure 2 presents the framework developed from the study. The findings indicate that wastewater disposal practices among DCWD-unserved households in Toril District are shaped by five major determinants: (1) LGU Support and Action, (2) Household Awareness and Compliance, (3) Service Clarity and Affordability, (4) Discipline and Collective Support, and (5) Vigilance and Trust. These interrelated dimensions reflect both governance and service conditions, as well as day-to-day household routines and community mechanisms. Taken together, the framework provides a practical and integrated view of how disposal practices are formed and sustained in unserved settings, and it serves as a guide for designing realistic interventions that improve compliance, coordination, and accountability across the local sanitation chain.

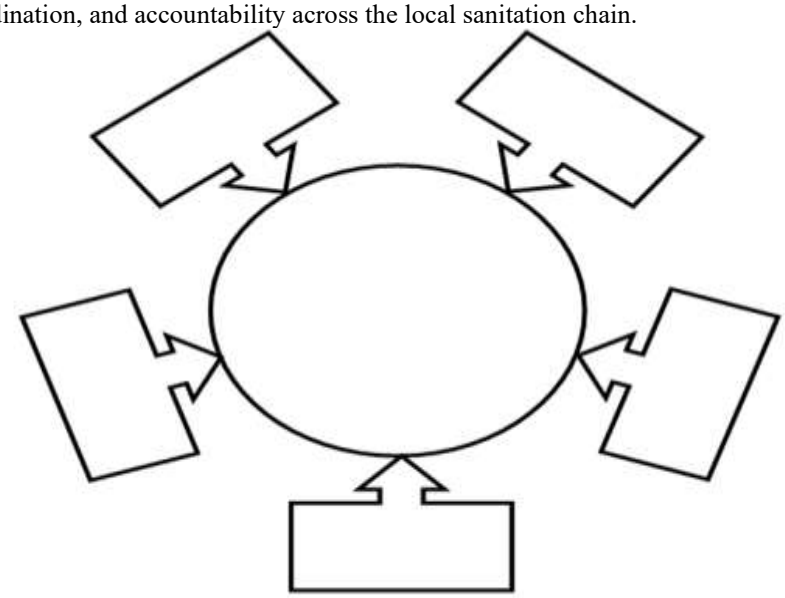

Figure 2. Framework Developed Based on Findings

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The answers of the unserved households of DCWD in Toril District indicate five interrelated dimensions that affect wastewater discharge behavior. As indicated in Figure 3, these dimensions are LGU Support and Action, Household Compliance Habits, Service Clarity and Payment, Discipline in Daily Activities, and Vigilance and Trust. These dimensions do not function as distinct boxes. Rather, they function like a network that affects how HHs decide, how they behave, and if they can continue their compliant behavior amidst real-world community limitations. This description corresponds with the primary claim in the review of literature that both institutional cues and HH decision-making processes are vital in influencing sanitation behaviors. Governance and service deliverability correspond with feasibility, while knowledge, norms, and habits relate to follow-through.

First, LGU Support and Action reflects how well or poorly compliance is sustained or undermined by how visible and credible local actions are to households. If households get clear guidance, see sustained enforcement, and benefit from supportive actions like assistance and small infrastructure development, then compliance can be more feasible and less "optional." This taps into an institutional perspective that policies work best when they are implemented, and predictable governance signals occur (Lipsky, 1980; North, 1990; Pressman & Wildavsky, 1973). In other words, this factor determines whether households get a sense of decent sanitation governance as being there, being just, and being doable.

Second, the issue of domestic compliance is also associated with habits and a sense of responsibility. When a group of items related to septic system care, sound routing options, and canal protection is combined, the clear implication is that people who are capable of transforming awareness into habits are likely to adopt proper disposal practices. Yet it has become obvious that the lack of clear service or the absence of legitimate cost and access for the domestic sector would not make awareness an adequate solution.

Third, Service Clarity and Payment indicate that the ability to comply relies on the understandability and financial feasibility of the organizational service flow. By understanding the fate of the septages they produce, and observing a certain routine and being offered payment terms that fit their household finances, these families have a higher probability of taking advantage of the proper services. This supports the proposition in the literature review that the chain from containment through treatment must not only function properly for sanitation to be managed correctly, but also that uncertainty and costs might only reduce levels of desired compliance (Peal et al., 2014; WHO & UNICEF, 2023). This factor indicates the extent to which the goal of compliance is attainable.

Fourth, Discipline and Collective Support indicates that the enhancement of wastewater improvement is increased when combined with minimal daily practices and community structures that lessen individual effort. Preventive practices like reducing the blocking of drains were important, but they became more important when combined with community structures like cooperative payment systems and shared facilities. This corresponds to the emphasis on adoption and collective practices, where greater adoption is increased through solutions that fit everyday practices and where the community can come together and minimize individual effort (Ostrom, 1990; Rogers, 2003). In the model, the discipline and collective support variable acts as the connecting rod between individual practices and community structures for compliance.

At last, Vigilance and Trust indicate how households react to cues, and the extent to which they believe and can prove that wastewater is treated in the appropriate way. If the households identify cues, voice concerns, and attempt to prove treatment endpoints, it indicates a health-protective behavior, which can enhance accountability. This correlates with the assumptions in the HBM/TPB, which suggest that action cues, health risks, and perceptions interact with norms and health control, influencing the development of vigilance into action (Ajzen, 1991; Rosenstock, 1974). It also verifies the view taken by the JMP, which suggests that adequacy in sanitation also requires assurance in the endpoint rather than mere containment facilities (WHO & UNICEF, 2023). In any case, the approach considers the treatment of household wastewater discharge as the result of two groups of conditions: the governance and provision capacities, and the doing capacities. If the five conditions are mutually supporting, people are more likely to find it easy to follow. As one condition falls, for instance, when the frequency is indefinite, the extent of trust is low, or the cost is unaffordable, people are more likely to postpone, use unconventional routes, or experience regular sanitation threats. Using this approach, the design of the intervention can be grouped around feasible approaches that will fit the contexts of DCWD unserved areas located in the Toril District.

Proposed Intervention Program: Toril Safe Wastewater Practices Program: A Community-Based Intervention for DCWD-Unserved Households

A 12-month people-centered, barangay, and LGU-led initiative with a focus on improving the practices of wastewater disposal for unserved households in the Toril District. It shall be built upon five factors, namely: LGU Support and Action, Household Awareness and Compliance, Service Clarity and Affordability, Discipline

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and Support, and lastly, Vigilance and Trust. The objective of improving practices of wastewater disposal of DCWD unserved households by enhancing governance visibility, compliance, structures for clarity and affordability, cooperation, and accountability stands valid.

Specific objectives of the program within 12 months:

1. Enhance the visibility and role of the LGU and barangay in facilitating compliance and preventing the practice of unsafe disposal.
2. Emphasize strengthening home routines in maintaining septic systems, disposing of waste properly, and protecting canals.
3. Clarify the paths for services offered (and the route for wastewater) and make possible schemes for payment support.
4. Establish group support mechanisms that alleviate the burden on households through scheduling, grouping, and community collaboration.
5. Enhance vigilance and trust through reporting, action, and feedback systems that verify responsible treatment and actions.

The intervention is implemented through the Barangay Council, utilizing sanitation focal persons, and the program is supported by their partners in the LGU. The intervention is implemented through the processes of planning, organizing, directing, and controlling. There are also monthly and periodic review meetings.

The intervention will be conducted through two successive phases to ensure the intervention has a sound foundation before large-scale implementation. The Grounding Phase will cover the entire Month 1–3, which will mostly include the establishment of the system and all the necessary tools for successful implementation. This will include activities by the barangay and the stakeholders in the Community Mapping and Stakeholder Engagement, which will include activities such as creating a household list for the eligible unserved DCWD and the constraints on access, together with the documentation on common wastewater concerns, such as the common discharge points, the frequency of septic problems, together with the common complaints by the community. At the same time, there will also be the creation of agreements and partnerships through the processes of scheduling and reporting, which will ensure the definition of the role within the service coordination and follow-through. These activities will also include the awareness activities and mobilization of the outputs in the Information, Education, and Community Components.

The second stage involves the Implementation Phase (Months 4 to 12), where the comprehensive intervention package will be implemented, ensuring the sustainability of programs and activities through continuous reinforcement and monitoring. Periodic IEC sessions will be conducted in the communities to reinforce improvements in household practices and sustain awareness efforts to avoid one-time orientation efforts. This will involve an interactive system where the barangay will keep visible postings of schedules, procedures, persons to contact, and reminders so that households will have access to updated and complete information when they need to take action. Service coordination will be ensured via booking systems, announcements, and follow-up reminders to decrease the number of missed appointments and the timeliness of compliance. In feasible programs, the intervention will explore the implementation of payment facilitation schemes, such as installment payments or pooling, to decrease the affordability gap that usually postpones decisions to dispose of resources safely. There will be continuous monitoring and reporting systems in this third stage, ensuring that there will be feedback, written updates, and documented resolutions to sustain accountability, trust, and improvements over time. Finally, the intervention will conclude the program evaluation to assess accomplishments toward targets, determine existing gaps, and offer recommendations to sustain programs in the barangay and partner office to practice effectively beyond the 12-month period to be served.

The intervention program matrix comprises five essential key result areas that are linked directly to the identified determinants in the study. Each of the five areas outlines the objective, core activities, indicators for measurement, agents of change, timeline, and budget. In Key Result Area 1: LGU Support and Action, the project will focus on improving the visible support of the barangays and LGUs that promote compliance and deter unsafe discharge. These will be achieved through IEC sessions at the barangays, purok orientations, continuous posting and update of procedures, contact persons, fees, and schedule in strategic places, and recording of actions taken in the barangays on unsafe discharge through reminder signs, notices, and other forms of enforcement or correction. These project goals would be measured through household coverage, targeting at least 80 percent (120 out of 150 households) in IEC activities, public postings updated monthly for 12 out of 12 months, and keeping a record of at least eight actions taken through good governance initiatives within the project period. These activities would be undertaken through the Barangay Council and LGU partners in collaboration with IEC Committee members in a budget of ₱65,000."

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For Key Result Area 2: Household Awareness and Compliance, the Key Activity is to improve household and wastewater disposal practices to achieve wastewater reduction. The strategy will be implemented through providing a household guide and instruction on wastewater reduction at no cost to residents, conducting septic system maintenance and instruction at no cost to residents, and referring to canal protection and clean-up participation at no cost to residents. The Key Result Indicators to measure are to target at least 70 percent (105 out of 150) adoption of the household guide, at least 75 percent (105 out of 140) reporting at least one improved practice, and to attain a 25 percent decrease in complaints for odor, overflow, and/or clogs by the latter part of the intervention. The Key Activity will be implemented starting from Month 2 to Month 12 through the IEC Committee, the Monitoring Committee, and the purok leaders. Budget allocation is set at ₱45,000.

Under Key Result Area 3: Service Clarity and Affordability, it is hoped that there will be an improvement in the predictability of services, a clear step-by-step process for accessing wastewater services, as well as the development of mechanisms for the affordability of services to make compliance more feasible. Key results include the completion of at least 80 percent (or 120 out of 150 households registered for the registry for booking and scheduling, at least maintained through at least ten schedule announcements or updates as programmed, and completion of at least 40 percent (or 60 out of 150 households for participation in either documentation for installment paid or community payments. These will also be implemented from Months 1 to 12 with a budget of ₱60,000 through the Service Coordination Committee, with service providers, and barangay focal persons.

For Key Result Area 4: Discipline and Collective Support, the program aims to develop regular discipline practices and implement collective actions that can minimize individual household work and enhance follow-through. These involve encouraging regular discipline practices like drainage discipline, household monitoring assignment, and safer routing practices, creating a mechanism for organizing households into clusters for common scheduling and joint actions, and piloting collective solution options like joint scheduling or access sharing that would make the activity more feasible given the limited setting. The program's success would be measured by guaranteeing that at least two regular discipline practices are observed by Month 9 to 12, creating at least six operational clusters composed of around 20 to 25 households for each cluster, and maintaining at least four out of six clusters or around 67% as operational until the end of the program. These will be implemented from Month 3 to 12 by barangay focal persons, Service Committee, and HOA or purok leaders for a budget worth ₱50,000.

Finally, the Key Result Area 5: Vigilance and Trust emphasizes improving reporting, follow-through, and trust by providing visibility through feedback and verification efforts. These shall be achieved by ensuring the development of a reporting system within the community through a logbook and assigned contact person/hotline, development of a follow-through system whereby every report is documented and pursued, and providing monthly public feedback outputs with verification pointers, if possible. Successful key result area indicators would involve logging a minimum of thirty reports regarding odor, dangerous discharge, and clogging, which would indicate active reporting, completing the program cycle with at least an eighty percent follow-through ratio involving resolution, referral, and verification within a period of seven days, and providing a minimum of twelve public feedback outputs within the span of the program cycle. The Key Result Area shall operationalize from Month 1–12 with a budget of ₱30,000 under the Verification Committee, Barangay Council, and partner offices.

CONCLUSION

It appears from the results that there are various factors that influence the disposal of wastewater among unserved households of DCWD in Toril District. These factors are not only solitary but are interconnected as well. First, visibility counts in governance too. The more households rally when the barangay and LGU respond actively in real, tangible ways like guiding actions, postings, and measures against improper disposal, the better. The presence of regulations that lack visibility becomes more of a suggestion, more of a cost too high to pay, when it comes to observing the rules.

Second, household compliance is related to routine practices and the feeling of responsibility. The bundling of items related to septic system maintenance, safer routing choices, and canal preservation implies that those who can translate awareness into habitual practices are more prone to adopting safer disposal practices. However, it is clear that without clear service paths and given legitimate cost and access conditions on the part of the householders, mere awareness is not a satisfactory solution.

Third, service clarification and affordability offer actual entrance points to those who comply. Households become cooperative in the correct sewage management if they understand where their sewage goes, when collection occurs, and if pricing terms suit their financials. Nonetheless, if these elements are not in order,

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households will resort to delay, informal, or convenient sewage discharge methods regardless of their knowledge about adverse outcomes.

Lastly, being community-based, the mechanisms promote sustainability. Indiscipline practices in the daily lives of people of the area tend to reduce the effects of drain use, although the use of community-based structures, such as pooled ideas, collective problem-solving techniques, and community-based monitoring, makes it feasible for different households facing the same constraints. In addition, alertness and trust play an important role in the matter since when the procedures followed by the households are visible concerning follow-up, as well as the assurance that the sewage is managed appropriately beyond the point of collection, the effort will show effectiveness.

RECOMMENDATION

On the findings and conclusions derived, the following recommendations are provided with the end objective of providing a systematic guide that can be acted upon in making unserved households of the DCWD adopt better practices involving wastewater disposal. The proposed recommendations consider the identified behavioral drivers, the framework, and intervention support, which make adherence more realistic and thus socially accepted within the Toril District.

Davao City Water District (DCWD) – DCWD can improve its delivery of services to unserved areas of Toril through better coordination and referral activities with the City LGU and involved barangays. This will promote community-level management of wastewater concerns that are not isolated household concerns to be individually resolved. It means that DCWD can help better define what household information can generally be expected, such as information about sources to consult, options, requirements, and what constitutes price and schedule realities that can be comprehended. DCWD can also help improve information drives that are localized to emphasize working household practices and measures that rationalize to household conditions found in unserved areas, as well as provide encouragement to address barangay-level strategies that encourage cluster methodologies, reducing individual household discomfort and realities to facilitate compliance. DCWD can also help sustain community trust through encouragement and promotion of straightforward tracking and feedback mechanisms to record community concerns and provide action follow-through, to ensure that there are no silences that occur due to expressed concerns.

LGU units and barangays. The City LGU and barangays are urged to convert the aspirations for sanitation into a common, visible, and simple and easy-to-follow local practice by keeping procedures, contacts, schedules, and guidance on payments accessible and regularly updated where and how locals actually can observe, and keeping the data consistent across officials, purok leaders, and the relevant communication networks. Orientation activities should let go of the mere formal and as-audience lecture format approaches and instead function on short and repeated and hands-on sessions that will provide households with the routine activities, heavy rains, overflow events, and clean-up periods after the flood events so the practices become routine activities instead. Communities may also function in the support role for their barangays by breaking down the households into workable units for pooling and schedule coordination, primarily on the affordability and accessibility concerns. Shared responsibility can again be preserved by holding regular activities and events on the preservation of drainage lines and discouraging unsafe disposal. Simultaneously, enforcement messages must also create credibility through the provision of corrective and preventive attention supported by simplified documentation on the actions taken, primarily on governance visibility, where, through the presence or absence thereof, the interventions become felt necessary and worthwhile by others.

Residents and communities unserved by DCWD. In unserved areas, households can improve their sewerage practices by treating better disposal as a requirement not only at a regulatory level, as a normal course of protecting families and communities from harmful diseases around flooded areas, canal obstruction, and water stagnation. Residents are advised to perform routine activities to avoid improper dumping and draining, while seeking verified reports from their barangay instead of uncertain reports or mere word-of-mouth information. In situations wherein drainage servicing as a compliance process may pose cost and logistical challenges, there are possible group activities through clustering, as communal practices are more efficient and less burdensome compared to solitary actions taken by a household alone. Communities are also advised to contribute to a communal sense of accountability through responsible reporting of discharge violations, involvement with approved group actions, and support with corrective actions taken to mitigate improper sewerage practices adopted by any community. In due course, communities can also benefit from an increased level of trust, especially should they see active compliance along with support from institutions operating at a local level.

Urban and environmental planners. The actors in the planning can make use of the derived factors as a criterion for developing sanitation plans for unserved settlements. This ensures that the plans are not solely based on the

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proposed infrastructure investment. They may cover the institutional roles, coordination, easily accessible services, as well as specific community levels that can be handled by creating adaptable behavior change paths for the settlements based on factors like available space or income. Indeed, planners can create strategies for community organizing based on settlement reality. These may involve systems like cluster schedules that can be handled at a low cost. They should make community organizing feasible in settlements based on reality regarding space or income, as well as accessible drainage systems. The account can be made more significant by creating understanding metrics for monitoring at the local level. These may be based on actions by the local government on a fixed frequency. Additionally, community participation rates as well as drainage improvement can be used.

Future researchers. Future research could extend the model of care need into other unserved barangays, districts, or seasonal scenarios and further improve the wording of some questions that seem inadequate and make the instrument much more reliable. Others can investigate affordability levels, willingness-to-pay patterns, and possible models on how to apply funds effectively because, in some instances, cost and service simplicity are essential dimensions regarding compliance even if there are awareness-generating initiatives. Flexible research could elucidate underlying reasons for how households respond to community regulations regarding some community systems that keep on working while others eventually fall through, as well as the impact of responsiveness on trust and future cooperation

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