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CONSTRUCTIONAL WASTE MANAGEMENT PRACTICES: INSIGHTS FOR LOCAL GOVERNMENT POLICY RECOMMENDATIONS

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ABSTRACT

This research explores the constructional waste management practices in Pangasinan, aiming to develop a policy brief that addresses key issues in construction-related waste management. The study focuses on profiling the municipalities of Pangasinan's current construction waste management system, including the adequacy of human resources involved in constructional waste management system, and existing policies, activities, and programs influencing waste management as perceived by selected Civil Engineers in the province of Pangasinan. It also examines how constructional waste management practices are monitored and identifies the types of waste typically generated in construction projects by the local and provincial government, such as concrete debris, scraped asphalt, excavated materials, packaging waste, and fuel waste like oils. Moreover, the research assesses the level of awareness among local government personnel regarding waste management protocols and evaluates the seriousness of challenges faced in implementing effective constructional waste management strategies. The study is limited to constructional wastes and specific materials commonly encountered in road and building projects. Based on the findings, a thorough recommendation will be proposed to improve waste management practices, promote sustainable construction, and enhance policy formulation for the different local government units, including the Department of Public Works and Highways, of Pangasinan.

Keywords: Constructional Waste Management Practices, Local Government Policy Recommendations

INTRODUCTION

The Department of Public Works and Highways (DPWH) is committed to safeguarding the environment through proper waste segregation to reduce the solid waste generated in all its Offices. This shall be done with the four methods of implementation which are source reduction, reuse of materials, recycling, and purchase of recycled content materials. Through the guidance of Republic Acts 9003 Official Gazette (2001), 10964 Department of Budget and Management (2017), and 11260 Department of Budget and Management (2019), every employee of the Department has a personal responsibility for implementing these guidelines. Through the years, the DPWH has implemented various infrastructure projects under its manifold programs, with the envisioned organizational outcomes, namely: Reduced Travel Time through enhanced road network systems; Improved Road Network Quality and Safety that meets international standards through appropriate engineering solutions to road network quality and safety; and Lives and Properties Protected from Natural Disasters by mitigating damages to infrastructures and building disaster-resilient infrastructures.

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Transparency: The authors affirm that this manuscript presents an honest, accurate, and transparent account of the study. All essential aspects have been included, and any deviations from the original study plan have been clearly explained. The writing process strictly adhered to established ethical standards.

The massive implementation of various infrastructure projects of the DPWH entails environmental and social risks Philippine News Agency (2025). These may cause hazards, accident occurrences, and severe environmental damage [20]. Implementing Field Offices should therefore be made fully aware of their responsibilities on their compliance with all the environmental-related requirements before and during project implementation. Monitoring of compliance of each project specifically the conditions and provisions set forth in the issued Environmental Compliance Certificates (ECCs) and other existing environmental laws must be undertaken by the Implementing Offices Cariaso (2023).

The Ecological Solid Waste Management Act or Republic Act No. 9003 (2001), prescribes that "All government offices at the national and local levels, within the executive, legislative and judicial branches, and government-owned and controlled corporations, shall ensure information, education and actual implementation of waste management program at the workplaces and work premises, including the pursuit of environment-friendly purchasing policies for their offices". This type of legislation typically aims to address environmental concerns related to solid waste management, such as reducing waste generation, promoting recycling and composting, regulating disposal methods, and encouraging public participation in waste management efforts.

Pursuant to the said Act, the Department issued the D.O. 58 series of 2015 also known as the Guidelines and Procedures for the Implementation of D.O. 57, series of 2009 "DPWH Solid Waste Management Policy" Department of Public Works and Highways (2009), Department of Public Works and Highways (2015). Section VIII of DO 58, specifically states that DPWH Offices shall evaluate and implement feasible waste reduction opportunities to the maximum extent possible. The Department's initiatives are waste reduction, collection, separation, and recovery of solid waste generated in all its implemented contracts. Contractors, Stakeholders, and Employees of the Department involved in project contract management and implementation shall practice waste segregation at source to minimize the production of residual wastes being collected and brought to a sanitary landfill as final disposal. To increase the carrying capacity of sanitary landfills, wastes need to be diverted from entering the facility and further segregation is needed to capture recyclable materials from wastes as improper waste management will lead to health and environmental problems and delay the approach to sustainable waste management and difficulty in several aspects of waste management.

Whereas the Department has been very responsive towards the implementation of RA 9003 in its different Bureaus and Field Offices, there is a gap left in its policies specifically on project-designated construction sites. Often than not, Contractors and even DPWH project implementers are left to mend disposal of construction-generated wastes to themselves. Observations revealed that waste disposal adopted on project sites contradicts the policies and guidelines outlined in RA 9003 as well as DOs 58 and 57 series of 2015 and 2009, respectively. With this, the researcher exerted his effort to help in resolving the issues concerning construction waste management practices in the DPWH-Pangasinan.

This study will show the current status of waste disposal management of DPWH. The result of this study will catalyze to the creation of waste disposal operations policy. The findings will encourage the support for the continuous improvement and implementation of project construction wastes of the DPWH. The study limits itself to the assessment of the existing practices in the project construction waste management of DPWH-Pangasinan. The indicators used in the assessment are explanatory and might not have been purely the result of the existing practices. The proxy indicator's validity and reliability are added limitations.

Most information gathered was based primarily on survey instruments and interviews, which posed certain limitations in terms of the accuracy of information. Furthermore, due to the lack of awareness of some of the respondents on the existing project construction waste management practices, the time considered in data gathering, the data gathering technique, the respondents considered, the scope of the research area, and the results are also taken in high considered in the scope and limitation of this study may pose as another variable in the limitations of the research and the researcher.

This study focused on all four (4) District Engineering Offices (DEOs) in Pangasinan namely: Pangasinan 1st DEO located in Alaminos City, Pangasinan headed by District Engineer, Engr. Marieta B. Mendoza Cariaso (2023), Pangasinan 2nd DEO located in Lingayen Pangasinan headed by District Engineer, Engr. Edita L. Manuel Department of Public Works and Highways (n.d.), Pangasinan 3rd DEO located in Rosales Pangasinan headed by District Engineer, Engr. Maria Venus S. Torio; and Pangasinan 4th DEO located in Sta Barbara Pangasinan headed by District Engineer, Engr. Mel Harvey A. Gonzalez.

The total population is also an added limitation. Not all of the employees have been covered due to the researcher's supervisory limitation, and also due to the fact that not all employees have a direct connection to project construction waste management. The study will only focus on infrastructural wastes such as concrete debris, scraped asphalt pavements, excavated unsuitable materials, used forms and metal products, etc. Waste disposal is also limited to the following materials namely: construction products and materials packaging, topsoil, Biodegradable materials such as grass leaves, etc., old concrete pavement, old asphalt, and fuel waste such as oils.

Figure 1

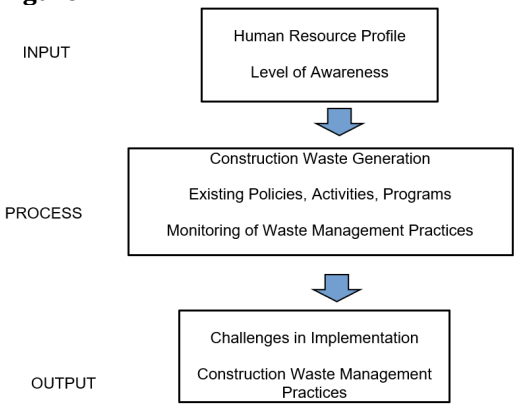

Figure 1 Conceptual Framework

MATERIALS AND METHODS

The descriptive case study research design will be used in this study. A case study was done individually on every participating district engineering offices identifying every input, output, and effect. This will be done province-wide later on. Respondents came from all participants of participating construction and maintenance operation employees who belong to the supervisory jurisdiction of the researcher. Number of expected respondents in every area of the supervisory jurisdiction of the researcher is listed in Table 1.

Table 1

Table 1 List of Actual Respondents

District Engineering Offices		Rank-in-File	Middle	Senior	Policy Maker	Total
1.	Pangasinan 1	9	0	0	0	9
2.	Pangasinan 2	12	0	0	0	12
3.	Pangasinan 3	8	1	0	0	9
4.	Pangasinan 4	10	1	1	0	12
	Total	39	2	1	0	42

Since the population is so small, the researcher considered all respondents, hence, a complete enumeration was done. Part of the questionnaire will consist of open and closed-ended questions. The questions will be designed to gather data on training inputs and outputs. The research instrument will be pre-tested to selected employees of DPWH. Revisions will be made based on the result of the pre-test before the instrument will be used for final data collection. Semi-structured interviews will be conducted personally with the employees and supervisors.

The questionnaire will be floated personally by the researcher to ensure that the necessary instructions and clarification were given to the respondents and to guarantee that the necessary data were gathered as planned. Observation, ocular inspection, pictures, interviews, and focused group discussions are considered as other data-gathering tools to materially support and supplement the data that were gathered. A request letter to conduct of research will be prepared by the researcher and will be given to the interviewee personally. The schedule of floating questionnaires will be set based on the availability and convenience of the respondents. Please see Figure 2 for the Visual Flow-Chart Diagram of Methodology

Figure 2

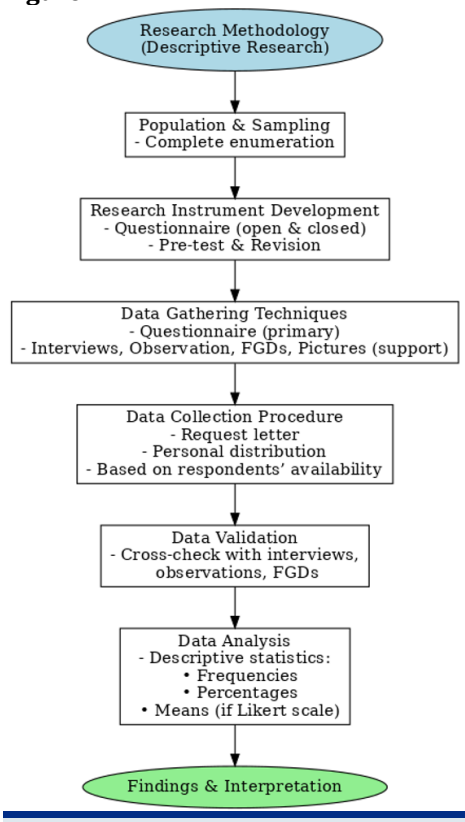

Figure 2 Visual Flow-Chart Diagram of Methodology

RESULTS AND DISCUSSIONS

DPWH PANGASINAN PROFILE

1) Number of Municipalities Covered per District Office

Each District Engineering Office (DEO) of DPWH in Pangasinan is responsible for overseeing infrastructure projects, including waste management, within specific municipalities. Understanding the coverage area for each district office provides insight into the geographical scope and the extent of responsibilities.

Pangasinan 1st DEO: 1st Congressional District of Pangasinan office is located in Poblacion, Alaminos City, Pangasinan. There are 10 municipalities/cities under its jurisdiction namely Agno, Alaminos, Anda, Bani, Bolinao, Burgos, Dasol, Infanta, Mabini, and Sual.

Pangasinan 2nd DEO: 2nd Congressional District of Pangasinan office is located in Alvear E, Maniboc, Lingayen Pangasinan. There are eight (8) municipalities/cities under its jurisdiction namely Aguilar, Basista, Binmaley, Bugallon, Labrador, Lingayen, Mangatarem, Urbiztondo, Dagupan, Manaoag, Mangaldan, San Fabian, San Jacinto.

Pangasinan 3rd DEO: 5th and 6th Congressional District of Pangasinan office is located in Tumana, Rosales, Pangasinan. There are 20 municipalities/cities under its jurisdiction namely Alcala, Bautista, Binalonan, Laoac, Pozorrubio, Santo Tomas, Sison, Urdaneta City, Villasis, Asingan Balungao, Natividad, Rosales, San Manuel, San Nicolas, San Quintin, Santa Maria, Tayug, and Umingan.

Pangasinan 4th DEO: 3rd Congressional District of Pangasinan office is located in Santa Barbara, Pangasinan, formerly known as Pangasinan Sub-DEO. There are six (6) municipalities/cities under its jurisdiction namely Bayambang, Calasiao, Malasiqui, Mapandan, San Carlos, Santa Barbara.

Table 2

Table 2 Number of Municipalities Covered Per District

District	Frequency	Percent (%)
Pang 1 (District 1)	10	23
Pang 2 (District 2)	8	18

Pang 3 (District 3)	20	45
Pang 4 (District 4)	6	14
Total	44	100%

2) Human Resource Personnel Involved in Waste Management

The human resource personnel dedicated to waste management within DPWH Pangasinan include various professionals and workers. These personnel are responsible for planning, implementing, and maintaining waste management systems. Analyzing the composition and qualifications of this team is crucial to understanding the department's capacity to manage waste effectively.

Table 3

Table 3 Summary of the Respondents

	District Engineering Office				Total	
Position/ Designation	Pang 1	Pang 2	Pang 3	Pang 4	Frequency	Percentage
Engineer I	1	6	0	2	9	20
Engineer II	4	4	8	8	24	53.33
Engineer II/CS	1	0	0	0	1	2.22
Engineer II/PE - II	1	0	0	0	1	2.22
Engineer III	1	0	1	0	2	4.44
Engineer Assistant	0	2	0	2	4	8.89
District Engineer	1	1	1	1	4	8.89
Total	9	13	10	13	45	100

Table 3 shows that the majority of employees involved in the construction waste management practices of DPWH Pangasinan are Engineers I and II, with 20.00% and 53.33% respectively. It was expected that only a handful of 8.89% involved in waste management are in administrative positions, which are the District Engineers or every DEO. Though some DEOs (Pang 2 and Pang 4) have Engineering Assistants, this does not affect the output of the research. Pang 1 has the only DEO with manpower(s) with multiple designations.

3) Different Construction Waste Handled Per DEO

This section examines the types of wastes generated during construction projects, categorizing them into biodegradable, non-biodegradable, recyclable, and other types. By identifying and classifying these wastes, the section aims to provide a clear understanding of their composition and the implications for effective waste management strategies. The data in Table 4 presents a detailed breakdown of the types of wastes generated on construction projects across four district engineering offices (DEOs) in Pangasinan.

Table 4

Table 4 Types of Waste Generated on the Projects of DEO Districts 1-4

DEO/Type of Waste	Pang 1	Pang 2	Pang 3	Pang 4	Average %
BIODEGRADABLE	0%	9%	10%	15%	**8.5**
- Organic/Vegetables					
- Garden Waste					
- Wood/Trees/Branches					
NON-BIODEGRADABLE	80%	68%	35%	75%	**64.5**
- Cement					
- Asphalt					
- Building Materials					
- Glass					
RECYCLABLES	20%	20%	40%	10%	**22.5**
- Paper					

- Metals					
- Plastics/Rubber					
Others	0%	3%	15%	0	**4.5**
Total	100%	100%	100%	100%	**100%**

The data shows the need for enhanced waste management strategies, particularly focusing on reducing non-biodegradable waste. Implementing more robust biodegradable waste management and exploring innovative recycling methods could further improve sustainability in construction projects within the DEO districts.

AWARENESS OF DPWH PANGASINAN PERSONNEL ON EXISTING POLICIES, AND ACTIVITIES AND PROGRAMS IN WASTE MANAGEMENT SYSTEM

Table 5

Table 5 Summary of Awareness of DPWH Pangasinan Personnel on Existing Policies (DO No. 58 s.2015), and Activities and Programs in Waste Management System

DEO	*n*	Existing Policies				Activities and Programs			
		Aware		Unaware		Aware		Unaware	
		Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Pang 1	9	6	66.67	3	33.33	2	22.22	7	77.78
Pang 2	13	1	7.69	12	92.31	3	23.08	10	76.92
Pang 3	10	1	10	9	90	3	30	7	70
Pang 4	13	5	38.46	8	61.54	7	53.85	6	46.15
Total	45	13	28.89	32	71.11	15	33.33	30	66.67

The awareness of DPWH Pangasinan personnel regarding existing waste management policies and their participation in related activities and programs is crucial for effective implementation and compliance. Table 5 provides a summary of the awareness across four districts (Pang 1-4), highlighting significant variations and areas needing improvement.

Across all four districts, only 28.89% (13 out of 45) of personnel are aware of the existing policies, while 71.11% (32 out of 45) are not. This indicates a significant gap in policy awareness that needs to be addressed to ensure effective waste management practices.

For activities and programs, leveraging various engagement strategies such as interactive workshops, hands-on training, and regular updates can foster greater participation and awareness among personnel. Implementing monitoring and evaluation mechanisms to regularly assess awareness levels and the effectiveness of communication strategies can help identify gaps and areas for improvement.

While some districts show moderate to high levels of awareness, the overall low awareness across all four districts indicates a pressing need for more effective communication, training, and engagement strategies to ensure comprehensive understanding and implementation of waste management policies and programs among DPWH Pangasinan personnel.

1) Awareness of Responsibility for Waste Management Practices in DPWH Pangasinan.

Awareness of who is responsible for executing various waste management practices is essential for the efficient functioning of DPWH Pangasinan's operations. Understanding these responsibilities ensures accountability and enhances the effectiveness of waste management efforts across the region. Table 6 shows the level of awareness (%) regarding who is responsible for carrying out various waste management practices of the different personnel in Pang 1-4 assessed across different waste management functions.

The awareness in Pangasinan 1 among personnel regarding responsibilities for waste management practices varies significantly across different functions. For solid waste management services to domestic premises, 2 out of 8 personnel (25%) are aware of who is responsible, with the majority, 6 personnel (75%), lacking clarity on these roles. Similarly, for solid waste management services to commercial/trade premises and industrial premises, only 2 personnel (25%) in each category are aware, while 6 personnel (75%) in each category are not aware.

In DPWH Pang 2 the awareness among personnel regarding responsibilities for waste management practices shows notable variations across different functions. For solid waste management services to domestic premises, 3 out of 12 personnel (25%) are aware of who is responsible, while 9 personnel (75%) are not aware. Similarly, for solid waste management services to

commercial/trade premises and industrial premises, only 2 personnel (17%) in each category are aware, with 10 personnel (83%) in each category lacking clarity on these roles.

Table 6

Table 6 Awareness of Responsibility for Waste Management Practices of DPWH Pang 1-4

	Pangasinan			
	1 (n=8)	2 (n=12)	3 (n=10)	4 (n=13)
Solid waste management service to domestic premises	25	25	30	61.54
Solid waste management service to commercial/trade premises	25	16.67	30	61.54
Solid waste management service to industrial premises	25	16.67	30	53.85
Street sweeping	50	75	100	84.62
Tree/grass cutting	50	75	100	100
Drainage cleansing	50	75	80	92.31
Removal of dead animals	37.5	41.67	60	69.23
Removal of garden waste	25	16.67	70	69.23
Removal of bulky waste e.g. huge rock, lumber, etc.	62.5	41.67	60	92.31
Removal of abandoned vehicles	25	16.67	80	76.92
Procurement of vehicles/equipment involved in waste management	50	16.67	60	69.23
Maintenance of vehicles and equipment involved in waste management	50	16.67	70	84.62
Recruitment of project construction waste management staff	37.5	16.67	60	69.23
Training of project construction waste management staff	25	16.67	60	76.92

In DPWH Pang 3, the awareness among personnel regarding responsibilities for waste management practices varies across different functions, reflecting a mix of understanding and areas for improvement. For solid waste management services to domestic, commercial/trade, and industrial premises, approximately 3 out of 10 personnel (30%) are aware of who is responsible, while 7 personnel (70%) in each category lack awareness of these roles.

In DPWH Pang 4, the awareness among personnel regarding responsibilities for waste management practices reflects varying levels of understanding across different functions. Solid waste management services to domestic, commercial/trade, and industrial premises show relatively high awareness, with 8 out of 13 personnel (62%) aware of who is responsible, while 5 personnel (38%) in each category are not fully aware of these roles as shown.

LEVEL OF SERIOUSNESS OF THE CHALLENGES DPWH FACES IN IMPLEMENTING AN EFFECTIVE WASTE MANAGEMENT SYSTEM FOR CONSTRUCTION PROJECTS

Table 7

Table 7 Level of Seriousness of DPWH Pang 1 Waste Management Implementation Challenges

Problem	Weighted Mean	Description
Inadequate service coverage (some people not given service)	4.33	Very Serious Problem
Lack service quality (not frequent enough, spill, etc.)	4	Serious
Lack of authority to make financial and administrative decision	4.33	Very Serious Problem
Lack of financial resources	4	Serious
Lack of trained personnel	4	Serious
Lack of vehicles	3.5	Serious
Lack of equipment	3.5	Serious
Old vehicle/ equipment frequent breakdown	4.33	Very Serious Problem
Difficult to obtain spare parts	3.5	Serious
Lack of capability to maintain/ repair vehicle/ equipment	3.5	Serious

No standardization of vehicle/ equipment	4	Serious
No proper institutional set-up for solid waste management service	4.25	Very Serious Problem
Lack of legislation	5	Very Serious Problem
Lack of enforcement measure and capability	4.67	Very Serious Problem
Lack of planning (short, medium and long term plan)	4.25	Very Serious Problem
Rapid urbanization outstripping service capacity	4	Serious
Uncontrolled proliferation of squatter settlements	4	Serious
Difficult to locate and acquire landfill site	4	Serious
Difficult to obtain cover material	3.75	Serious
Poor cooperation by Government agencies	3.75	Serious
Poor public cooperation	4.67	Very Serious Problem
Uncontrolled use of packing material	4.33	Very Serious Problem
Poor response to waste minimization (reuse/ recycling)	4.33	Very Serious Problem
Lack of qualified private contractors	4	Serious
Difficult to control contractual service	4.33	Very Serious Problem
Lack of control on hazardous waste	4.25	Very Serious Problem

Table 7 shows that DPWH Pangasinan 1 faces numerous challenges in implementing an effective waste management system for construction projects, each with varying levels of seriousness as indicated by the weighted mean scores. Inadequate service coverage, the lack of authority to make financial and administrative decisions, frequent breakdowns of old vehicles and equipment, uncontrolled use of packing material, and difficulty in controlling contractual services all received a weighted mean of 4.33, categorizing them as very serious problems. Similarly, the absence of proper institutional set-up for solid waste management services, lack of planning, and lack of control over hazardous waste are also very serious, with weighted means of 4.25 each.

As shown in Table 8, DPWH Pangasinan 2 faces several challenges in implementing an effective waste management system for construction projects, with varying degrees of seriousness. The challenge of uncontrolled use of packing material stands out as very serious, with a weighted mean of 4.25. Closely following are issues like the lack of authority to make financial and administrative decisions, lack of financial resources, and poor public cooperation, each with a weighted mean of 4.08, indicating they are serious problems. The frequent breakdown of old vehicles and equipment also poses a significant challenge, with a weighted mean of 4.00.

DPWH Pangasinan 3 faces a range of challenges in implementing an effective waste management system for construction projects, with varying levels of seriousness. The most pressing issues include the lack of equipment, with a weighted mean of 4.33, and the inadequate institutional set-up for solid waste management services and the difficulty in locating and acquiring landfill sites, both with weighted means of 4.25. These are classified as very serious problems, indicating critical areas that need immediate attention. Please see Table 9.

DPWH Pangasinan 4, as shown in Table 10, faces numerous challenges in implementing an effective waste management system for construction projects, each with varying degrees of seriousness. The most critical issues include the lack of trained personnel, rapid urbanization outstripping service capacity, and lack of control on hazardous waste, each with a weighted mean of 4.08. These are categorized as serious problems, reflecting significant obstacles that require immediate and focused interventions.

Table 8

Table 8 Level of Seriousness of DPWH Pang 2 Waste Management Implementation Challenges

Problem	Weighted Mean	Description
Inadequate service coverage (some people not given service)	3.67	Serious
Lack service quality (not frequent enough, spill, etc.)	3.67	Serious
Lack of authority to make financial and administrative decision	4.08	Serious
Lack of financial resources	4.08	Serious
Lack of trained personnel	3.67	Serious
Lack of vehicles	3.67	Serious
Lack of equipment	3.45	Serious
Old vehicle/ equipment frequent breakdown	4	Serious

Difficult to obtain spare parts	2.83	Mildly Serious
Lack of capability to maintain/ repair vehicle/ equipment	3.08	Mildly Serious
No standardization of vehicle/ equipment	3.58	Serious
No proper institutional set-up for solid waste management service	3.92	Serious
Lack of legislation	3.67	Serious
Lack of enforcement measure and capability	3.67	Serious
Lack of planning (short, medium and long term plan)	2.92	Mildly Serious
Rapid urbanization outstripping service capacity	3.42	Serious
Uncontrolled proliferation of squatter settlements	3.33	Mildly Serious
Difficult to locate and acquire landfill site	3.55	Serious
Difficult to obtain cover material	3.8	Serious
Poor cooperation by Government agencies	3.67	Serious
Poor public cooperation	4.08	Serious
Uncontrolled use of packing material	4.25	Very Serious
Poor response to waste minimization (reuse/ recycling)	4.17	Serious
Lack of qualified private contractors	3.08	Mildly Serious
Difficult to control contractual service	2.92	Mildly Serious
Lack of control on hazardous waste	3.92	Serious

Table 9

Table 9 Level of Seriousness of DPWH Pang 3 Waste Management Implementation Challenges

Problem	Weighted Mean	Description
Inadequate service coverage (some people not given service)	3.5	Serious
Lack service quality (not frequent enough, spill, etc.)	3.25	Mildly Serious
Lack of authority to make financial and administrative decision	3.5	Serious
Lack of financial resources	3.75	Serious
Lack of trained personnel	3.75	Serious
Lack of vehicles	3.75	Serious
Lack of equipment	4.33	Very Serious
Old vehicle/ equipment frequent breakdown	4	Serious
Difficult to obtain spare parts	3.75	Serious
Lack of capability to maintain/ repair vehicle/ equipment	3.75	Serious
No standardization of vehicle/ equipment	3.75	Serious
No proper institutional set-up for solid waste management service	4.25	Very Serious
Lack of legislation	3.75	Serious
Lack of enforcement measure and capability	3.5	Serious
Lack of planning (short, medium and long term plan)	3.75	Serious
Rapid urbanization outstripping service capacity	3.75	Serious
Uncontrolled proliferation of squatter settlements	4	Serious
Difficult to locate and acquire landfill site	4.25	Very Serious
Difficult to obtain cover material	3.5	Serious
Poor cooperation by Government agencies	3.67	Serious
Poor public cooperation	3.67	Serious
Uncontrolled use of packing material	3.5	Serious

Poor response to waste minimization (reuse/ recycling)	3.75	Serious
Lack of qualified private contractors	3.75	Serious
Difficult to control contractual service	3.75	Serious
Lack of control on hazardous waste	3.75	Serious

Table 10

Table 10 Level of Seriousness of DPWH Pang 4 Waste Management Implementation Challenges

Problem	Weighted Mean	Description
Inadequate service coverage (some people not given service)	3.58	Serious
Lack service quality (not frequent enough, spill, etc.)	3.42	Serious
Lack of authority to make financial and administrative decision	3.67	Serious
Lack of financial resources	3.83	Serious
Lack of trained personnel	4.08	Serious
Lack of vehicles	3.73	Serious
Lack of equipment	3.92	Serious
Old vehicle/ equipment frequent breakdown	3.83	Serious
Difficult to obtain spare parts	3.42	Serious
Lack of capability to maintain/ repair vehicle/ equipment	3.58	Serious
No standardization of vehicle/ equipment	3.83	Serious
No proper institutional set-up for solid waste management service	3.92	Serious
Lack of legislation	3.67	Serious
Lack of enforcement measure and capability	3.83	Serious
Lack of planning (short, medium and long term plan)	4	Serious
Rapid urbanization outstripping service capacity	4.08	Serious
Uncontrolled proliferation of squatter settlements	3.92	Serious
Difficult to locate and acquire landfill site	3.83	Serious
Difficult to obtain cover material	3.83	Serious
Poor cooperation by Government agencies	3.91	Serious
Poor public cooperation	3.83	Serious
Uncontrolled use of packing material	3.91	Serious
Poor response to waste minimization (reuse/ recycling)	3.92	Serious
Lack of qualified private contractors	3.45	Serious
Difficult to control contractual service	3.5	Serious
Lack of control on hazardous waste	4.08	Serious

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

The lack of availability of most of the respondents were the main reason for not achieving 100% of data being gathered form the respondents. In addition, their lack of time due to administrative designations/jobs, administrative intervention, training, schooling are some of the main reasons for their lack of fundamental understanding on the construction waste management system of the DPWH. In addition, the absence of designated personnel who has a close monitoring job description in terms of construction waste management system is a clear indication that these claims were justified. The expected bloat on the problem on the level of seriousness was produced by the chemistry of these above-mentioned variables including the internal and external dynamics of contracts and politics in the basis of the Local Government Unit jurisdictional powers in the areas of implementation of every DPWH projects.

RECOMMENDATION

It is highly recommended that policy for construction waste management system be implemented in accordance to the variables found out in the results and finding. Detailed brief policy is highly recommended to the administration of the DPWH Province of Pangasinan to improve the current construction waste management system. The policy brief includes the following but not limited to:

1) The DPWH may involve all employees to enhance the level of awareness on how the construction waste materials of the agency conform with the Republic Act No. 9003.
2) The generated construction materials which are subject to disposal may consider the system management attributed to REDUCE, REUSE, and RECYCLE.
3) Collaboration with LGU's may look into an established waste management may be adapted by the DPWH to maximize its waste management utilization.
4) The DPWH may include a position to the organizational structure who will manage the generated waste data by contractors and the agency.
5) Possible landfill for the District Engineering Offices (DEOs) may be established, and Manual of Operations may be crafted to address waste management concerns; and
6) A follow up study may be considered wider in scope to include all District Engineering Offices in Region 1.

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