

**ENVIRONMENTAL RESILIENCY FRAMEWORK AMONG INFORMAL
SETTLERS**

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ABSTRACT

Informal settlers have been rampant in the Philippines; most informal settler families are forced to live in places with inadequate sanitation and waste management. This study examines how resilient Filipinos are in adapting to living in areas lacking sanitation and waste management. The study was conducted in Davao City, where 150 informal settlers were identified as respondents. Five (5) out of thirty (30) questions were discarded through the rotated component matrix. Out of the 25 questions, the study found five factors contributing to informal settlers' environmental resiliency framework. These factors include adaptability, recognition of potential effects, presence and impact of foul smells, cognizance, and difficulties encountered.

Keywords:

Environmental Resiliency, Informal Settlers, Sanitation, Waste Management, Adaptability, Impact

INTRODUCTION

Environmental change poses significant challenges to informal settlers, especially in developing countries. Inadequate waste management, limited access to clean water, vulnerability to flooding and landslides, and exposure to air pollution are among the challenges. Informal settlements frequently lack basic amenities such as piped water, appropriate sanitation, and drainage, and their vulnerable placements are the result of residents evading eviction, leaving them at risk of social and environmental challenges (Archer, D. et al., 2020).

Aside from being rampant, the Philippines deals with a significant issue concerning informal settlers and their susceptibility, especially to environmental risks because of various factors. In response, informal settlers have developed practical skills and resilience methods (Abiera, S. et al., 2021). These strategies include community organizing, resource pooling, and innovative technologies to address their needs and risks.

In Davao City, informal settlers reside in high-risk areas such as coastlines, riverbanks, beneath bridges, near power lines, among garbage dumps, and in other unsafe environments, exposing them to health and environmental risks (Alburol, V. et al., 2015). This includes the informal settlement in Barangay Leon Garcia, where residents live on coastlines or near coastal roads and drainage areas.

The different aspects of living in an informal settlement were discussed in many studies. However, not delving into the resiliency of informal settlers, especially in Barangay Leon Garcia, where they have experienced some challenges such as the foul smell from their surroundings, sanitation, and waste management.

OBJECTIVES

The general objective of this study is to investigate and develop a comprehensive understanding of the strategies informal settlers employ to cope with and navigate the challenges posed by foul smells in their surrounding environment. This research aims to identify the resiliency mechanisms and adaptive strategies employed by informal settlers in mitigating the impact of unpleasant odors on their daily lives. Through an in-depth examination of their experiences, practices, and community dynamics, the study seeks to contribute valuable insights to developing a robust environmental resiliency framework to enhance the overall well-being and sustainability of informal settler communities facing such challenges.

METHODOLOGY

The 150 residents tagged as informal settlers of Barangay Leon Garcia were identified as research respondents. The study tool used to collect data was a 30-item questionnaire. The resiliency of the respondents was determined using Exploratory Factor Analysis (EFA). Through the Kaiser–Meyer–Olkin (KMO) test, the adequacy for factor analysis of the dataset collected and of the correlation of the underlying factors was measured. A KMO value closer to 1 indicates a more suitable sample for factor analysis, suggesting that the variables share enough common variance for meaningful factor extraction. The suitability of the dataset for dimensionality reduction techniques was then tested using Bartlett's test of sphericity. The eigenvalues of the factors in descending order against the number of factors were graphically represented in a Scree Plot to determine the optimal number of factors to retain.

RESULTS AND DISCUSSION

This section encompasses the analysis and interpretation of the data. The chapter dives into the results and findings of the study, utilizing the statistical software SPSS, where the KMO and Bartlett's Test are applied. The study involved 150 respondents residing in Brgy Leon Garcia, Davao City.

KMO and Bartlett's Test

Table 1 presents the results of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO score of .875 indicates that the samples exhibit strong correlations, rendering them suitable for factor analysis. Additionally, Bartlett's test of Sphericity yielded a value of 2627.308 and a significance level of less than .000, suggesting that the data is suitable for the environmental resiliency analysis of residents residing in an environment with a foul smell. Furthermore, rejecting the null hypothesis based on Bartlett's test of Sphericity implies that a framework of resiliency exists for residents living in a foul-smelling environment.

**Table 1. KMO
Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.875
Bartlett's Test of Sphericity	Approx. Chi-Square	2627.308
	df	435
	Sig.	0

and

Scree Plot

The Scree Plot

illustrated the total variance, and Eigenvalues plotted against all factors in a graphical manner. This plot depicts the decreasing trend of Eigenvalues and helps determine the significance of each component. The Scree Plot is a valuable tool for deciding the number of factors to retain, with the inflection point indicating where the curve flattens. In this study, the curve starts to flatten at component number six as Eigenvalues of less than one begin to appear. If the items of each dimension fall below the minimum threshold, the dimension will be eliminated. Consequently, the analysis retained only five factors.

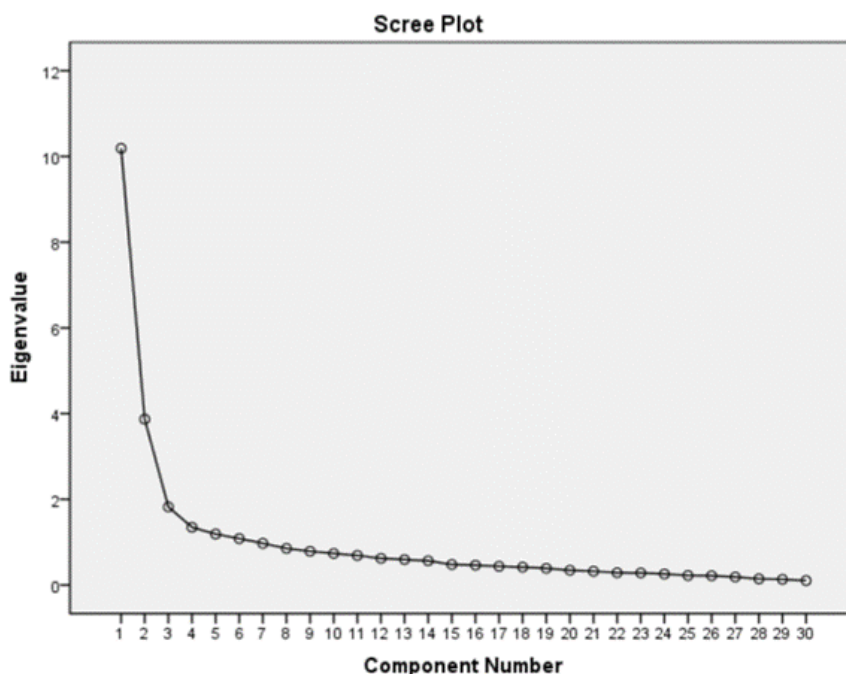


Figure 1. Scree Plot Rotated Component Matrix

Rotated Component Matrix

Table 2 shows the attributes grouped as “Adaptability,” which focuses on the individual’s ability to adjust and live under inadequate sanitation and waste management. The data show that participants rated Item 27 with a score of 0.819, indicating that they have already adapted to the present environmental conditions in their community. Items 26, 24, 21, 25, 22, 28, 23, 19, and 20 show that the residents and community have adapted ways in dealing with ways to mitigate the foul smell in the environment.

Regarding sanitation, the community in the area was satisfied with their overall conditions. Clean and hygienic public toilets are also available for the residents' use. As for their waste, the community actively participates in waste reduction and recycling efforts and is aware of garbage collection services in the area. The community also believes that with the help of local authorities and ordinances, the foul smells in the community will be minimized. As quoted by Climaco, D. et al. (2016), it is evident among Filipinos to adjust and adapt to circumstances and any eventualities and that Filipinos are flexible and able to adjust to any situation. Filipino persistence, as others say, also means flexibility; we Filipinos can easily adjust in whatever situation we may come to experience; it is, after all, the best attribute of resilience. It is easy for us to experience hardship, for we are used to experiencing it in any form and circumstance (Garay et al., 2020).

Table 2: Rotated component matrix with grouped attributes of Adaptability

Factor	Attributes	Loading
Adaptability	Item 27 - I am satisfied with the overall sanitation conditions in my community.	0.819
	Item 26 - Our community actively participates in waste reduction and recycling efforts.	0.802

	Item 24 - There are regular garbage collection services in my area.	0.739
	Item 21 - There are public toilets available for use by residents which are clean and hygienic.	0.706
	Item 25 - I segregate my waste/garbage disposals.	0.703
	Item 22 - I regularly practice handwashing with soap and water after using the toilet.	0.655
	Item 28 - I believe that education and awareness can help manage foul smells.	0.6
	Item 23 - I would support policies that require local businesses to minimize odors.	0.591
	Item 19 - I participate in or support initiatives aimed at addressing air quality issues in the community.	0.544
	Item 20 - Adequate ventilation is available in our living spaces to improve air quality.	0.532

Table 3 shows items 12, 13, 14, 17, 16, and 11, where the residents recognize the Potential effects of Foul smells in the community. The community is aware of the potential effects on their overall quality of life and their health brought by the foul smells in the environment.

The association of smell with potential effects dates way back to medieval times. Medieval city government officials have linked environmental pollution to both disease and disgust. On the other hand, inhabitants of medieval cities associated foul smells with disease (Jørgensen, 2013). Dalton P. et al., 2014 stated that complaints of health symptoms from ambient odors have become more frequent in communities.

Table 3: Rotated component matrix with grouped attributes of Recognition of Potential effects

Factor	Attributes	Loading
Recognition of Potential effects	Item 12 - I believe that proper waste management can reduce foul smells.	0.783
	Item 13 - I think that community leaders should address the issue of foul smells.	0.654
	Item 14 - I think that my community's air quality is negatively affected by foul smells.	0.651
	Item 17 - The odors in my community affect my overall quality of life.	0.632
	Item 16 - I am concerned about the health implications of the odors in my community.	0.617
	Item 11 - The foul smells in my community are a result of natural factors (e.g., livestock, geography, etc.)	0.614

Table 4 shows that Items 5, 4, and 3 described the impact of foul smell in the community. Jørgensen, 2013 stated that smell is not a private matter but a public concern; it became a transgression of private space and boundaries. The community has recognized that due to the foul smell, they cannot invite guests over and sometimes lose their appetite. Using air fresheners is one way of the solutions that the community has utilized to combat the foul smell. Tang, 2020 shared Dr. Fisher's ways of eliminating odor. Dr. Fisher shared that the first step is to prevent the formation of odor: for example, restrict the growth of mold in your home through appropriate ventilation, regular disinfecting of surfaces, and minimizing moisture, and the second step is controlling odor at home: for example, through improving ventilation.

Table 4: Rotated component matrix with grouped attributes of the Impact of Foul Smells

Factor	Attributes	Loading
Impact of Foul Smell	Item 5 - The presence of foul smells affects my ability to invite guests over.	0.79
	Item 4 - The foul smell relatively impacts our ability to enjoy meals.	0.765
	Item 3 - I use air fresheners or purifiers (e.g. charcoal) to combat the odor.	0.604

Table 5 presents the grouped attributes related to Cognizance, how knowledgeable and aware are the community in their surroundings. Item 1 shows that the respondents are aware of the unpleasant odor, while items 29 and 30 show that the respondents are hopeful that through the implementation of strict regulations, there will be improvements in combating the foul smell.

Table 5: Rotated component matrix with grouped attributes of Cognizance

Factor	Attributes	Loading
Cognizance	Item 1 - I notice the unpleasant odors in my immediate surroundings.	0.702
	Item 29 - I think community regulations should be strictly implemented to control foul smell.	0.593
	Item 30 - I am hopeful that improvements in foul smell control can be achieved in my community.	0.583

Table 6 presents the grouped attributes relating to the difficulties encountered by the respondents while living in their community. This factor contains items where the foul smells in the community caused distress, which greatly impacts the quality of life and health of the residents. The community has considered moving out as they felt helpless in dealing with the foul smell in the environment which they believed to be the result of commercial activities in the area.

Table 6: Rotated component matrix with grouped attributes of Difficulties encountered

Factor	Attributes	Loading
Difficulties encountered	Item 18 - I would consider moving out of my community due to the foul smells.	0.781
	Item 9 - I feel helpless in dealing with the foul smell in my community.	0.606
	Item 10 - I think the foul smells in my community are a result of commercial activities.	0.567

STUDY FRAMEWORK

Presented in Figure 2 is the framework developed based on the findings. The researchers found that the factors of the Environmental Resiliency Framework among Informal Settlers are (1) Adaptability, (2) Recognition of Potential Effects, (3) Presence and Impact of Foul Smells, (4) Cognizance, and (5) Difficulties Encountered.

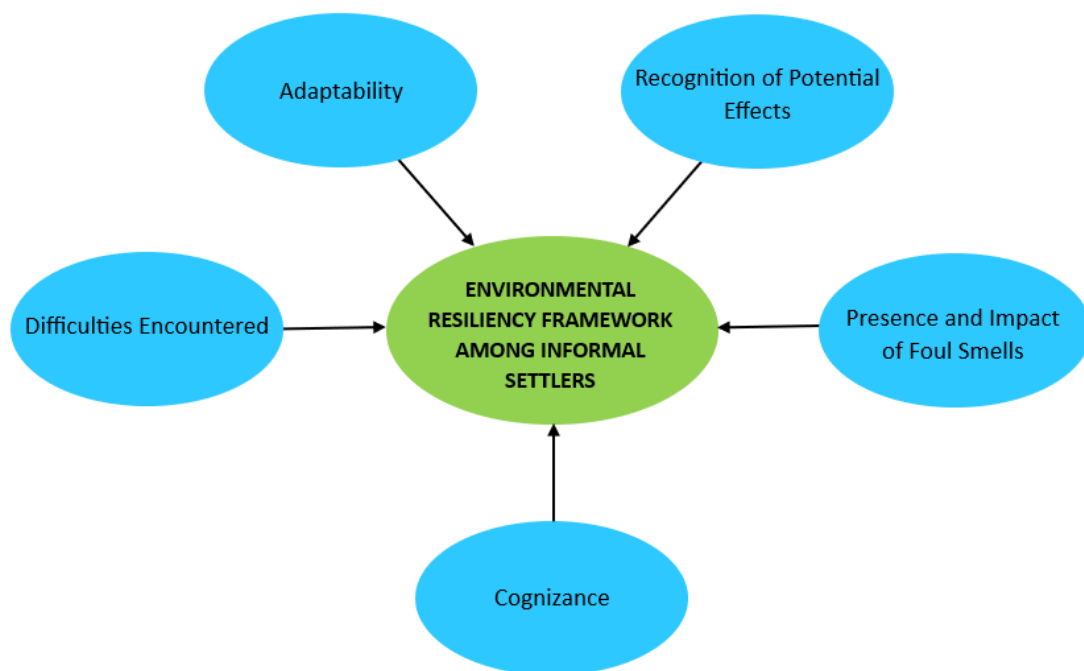


Figure 2. Environmental Resiliency Framework Among Informal Settlers

CONCLUSION

Based on the findings, the researchers have concluded that the environmental resilience of informal settlers in Brgy. Leon Garcia is primarily characterized by factors such as Adaptability, Recognition of Potential Effects, the Presence and Impact of Foul Smells, Cognizance, and Difficulties Encountered. These characteristics displayed by individuals highlight their resilience and showcase their ability to adapt skillfully to challenging environmental conditions.

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