

Cultural Norms and Economic Status in Relation to Responses to Air Pollution in Brgy. Palagay, Cabanatuan City

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Abstract- Air pollution is a pressing public health concern whose impact is mediated by socio-cultural and economic factors at the community level. This descriptive-correlational study examined the relationship between cultural norms, economic status, and responses to air pollution among 350 randomly selected adult residents of Barangay Palagay, Cabanatuan City, Nueva Ecija, Philippines. Data were gathered using a validated survey questionnaire and analyzed through descriptive statistics and Pearson Product-Moment Correlation. Results show that residents demonstrate high individual environmental responsibility (overall mean = 2.84) but a notable gap exists between awareness (mean = 3.33) and preventive action (mean = 2.76). Cultural norms — attitude toward environmental responsibility ($r = .143, p = .006$), community participation ($r = -.299, p < .001$), and family/peer influence ($r = .183, p < .001$) — were all significantly related to pollution responses. Economic status showed the strongest correlation ($r = .446, p < .001$), indicating that higher-income households have greater capacity for protective responses while lower-income households bear a disproportionate health burden. Findings underscore the need for culturally informed, economically inclusive air pollution interventions at the barangay level.

Index Terms- Air Pollution, Barangay-Level Study, Cultural Norms, Economic Status, Environmental Behavior, Philippines

I. INTRODUCTION

Environmental health is deeply intertwined with the social fabric of the communities it affects. In Barangay Palagay, the intersection of cultural norms and economic status creates a complex landscape that shapes how residents perceive, interact with, and respond to air pollution. While global environmental policies often focus on broad technical solutions, their localized success depends on understanding the human element, specifically how ingrained traditions

and financial realities shape community resilience or vulnerability.

Air pollution in suburban and rural-urban fringes like Palagay is frequently driven by vehicular emissions, agricultural practices, and domestic waste management. Cultural norms play a significant role in determining what constitutes an "acceptable" environmental risk. Traditional practices such as pagsisiga (backyard burning) may persist as cultural habits despite modern health warnings, reflecting a disconnect between ancestral practices and contemporary environmental science (Olowoyo et al., 2016).

Furthermore, the ability to mitigate poor air quality is often a privilege dictated by economic status. Residents with higher incomes may invest in air purification systems or better-sealed housing, whereas those in lower socioeconomic brackets face "environmental injustice", greater pollutant exposure with fewer resources to seek medical intervention or relocate (Mohai et al., 2009).

Despite a growing body of literature on air quality in the Philippines, a gap remains in understanding how socio-cultural and economic variables interact at the barangay level. This study bridges that gap by examining how traditional beliefs influence the recognition of air quality as a health threat and the extent to which financial constraints limit the adoption of greener household practices.

Research Objectives

The general objective was to determine the relationship between cultural norms, economic status, and responses to air pollution among residents of Brgy. Palagay. Specifically, this study sought to:

1. identify key cultural norms related to environmental awareness and action;
2. assess the economic status of households and access to resources;
3. examine how cultural norms and economic status independently and jointly influence residents' recognition of air pollution, adoption of mitigation behaviors, and participation in collective reduction efforts; and
4. provide evidence-based recommendations for context-appropriate interventions.

II. METHODOLOGY

Study Design and Setting

This study employed a descriptive-correlational quantitative research design (Gay, 1992). Research was conducted in Barangay Palagay, Cabanatuan City, Nueva Ecija, Philippines (15.4747°N, 120.9104°E; elevation 31.7 m). Based on the 2020 Census, the barangay had a population of 2,648 across approximately 514 households, with a more recent count of 2,712.

Participants and Sampling

The target population comprised adult residents (18 years and above) of Barangay Palagay. Using Slovin's formula at a 5% margin of error — $n = N / (1 + Ne^2) = 2,712 / (1 + 2,712 \times 0.0025) \approx 350$; the required sample size was established at 350 respondents. Simple random sampling was employed to give every eligible resident an equal chance of participation, minimizing selection bias.

Research Instrument

A researcher-developed survey questionnaire comprised four parts. Part I collected socio-demographic data (age, sex, educational attainment, household size). Part II measured cultural norms across three subscales: (A) Attitude Toward Environmental Responsibility, (B) Social Participation in Community, and (C) Influence of Family or Peers, using a four-point Likert scale (4 = Strongly Agree to 1 = Strongly Disagree). A pilot test with 10 respondents yielded a Cronbach's Alpha of 0.85 (Good reliability). Part III assessed economic status using an instrument adapted from Canela et al., measuring household income, employment, education, health insurance access, and living

conditions. Part IV measured responses to air pollution across three categories; Awareness, Preventive Measures, and Adaptation, adapted from Ahmed et al., yielding a Cronbach's Alpha of 0.78 (Acceptable reliability).

Data Collection and Ethical Considerations

Data were collected through printed questionnaires. Respondents received full information about the study's purpose and procedures and gave informed consent prior to participation (Siegle, 2023). Participation was voluntary and responses were treated confidentially. Completed questionnaires were coded systematically (CESSDA, 2022) before statistical analysis.

Data Analysis

Descriptive statistics; frequency distribution, percentage, mean, and standard deviation were used to characterize the sample and describe variable scores. Pearson Product-Moment Correlation Coefficient was applied to test the significance and direction of relationships between cultural norms, economic status, socio-demographic characteristics, and responses to air pollution. Statistical significance was set at $\alpha = .05$.

III. RESULTS AND DISCUSSION

Socio-Demographic Characteristics

Table 1. Socio-Demographic Characteristics

Characteristics	Frequency	Percentage
Sex		
Female	206	58.86
Male	144	41.14
Mean:	2.50	
SD:	1.24	
Age		
10–19	130	37.14
20–29	170	48.57
30–39	11	3.14
40–49	20	5.71
50–59	12	3.44
60–69	7	2.00
Mean:	24.58	

Characteristics	Frequency	Percentage
SD:	10.20	
Educational Attainment		
Elementary	0	0.00
High School	27	7.71
Senior High School	96	27.43
Bachelor's Degree	220	62.86
Master's Degree	7	2.00
Mean:	3.59	
SD:	0.66	
Household Size		
0–4	172	49.14
5–9	172	49.14
10–14	6	1.72
Mean:	4.74	
SD:	1.79	

The majority of the 350 respondents were female (58.86%), with males comprising 41.14%. The average age was 24.58 years (SD = 10.20), ranging from 14 to 67, with the largest cohort in the 20–29 bracket (48.57%), followed by 10–19 (37.14%). Most respondents held a Bachelor's degree (62.86%), followed by Senior High School graduates (27.43%); no respondent reported only elementary education. Average household size was 4.74 members (SD = 1.79), with roughly equal proportions in the 0–4 (49.14%) and 5–9 (49.14%) member categories.

The relatively young and educated profile of respondents is noteworthy. Higher educational attainment theoretically increases access to environmental information, yet as subsequent correlation results show, education alone is not a strong predictor of behavior change, suggesting that structural and economic factors mediate the relationship between knowledge and action.

Table 2. Relationship of Socio-Demographic Characteristics and Responses to Air Pollution

Characteristics	r-value	p-value
a. Age	0.303**	0.000
b. Sex	-0.182**	0.001

Characteristics	r-value	p-value
c. Educational Attainment	0.106*	0.047
d. Household Size	-0.158**	0.003

Among socio-demographic variables, age showed a moderate positive correlation ($r = .303$, $p < .001$), indicating that older respondents perceived and responded to air pollution more strongly attributable to cumulative health exposure and heightened risk awareness over time (WHO, 2021; Bambrick et al., 2021). Sex was negatively correlated ($r = -.182$, $p = .001$); coded female = 1, this indicates that female respondents reported higher response scores, consistent with research showing women exhibit greater environmental concern and are more proactive in adopting protective behaviors (Ballew et al., 2018; Sharma et al., 2020). Educational attainment showed a weak but significant positive correlation ($r = .106$, $p = .047$), while household size was negatively correlated ($r = -.158$, $p = .003$), likely reflecting differences in residential context — larger households being more common in peri-urban areas with generally lower ambient pollution levels — rather than differences in exposure per se (Health Effects Institute, 2022).

Cultural Norms and Responses to Air Pollution

Table 3. Cultural Norms

Cultural Norms	Pooled Mean	Description
a. Attitude Toward Environmental Responsibility	2.84	Agree
b. Social Participation in Community	3.04	Agree
c. Influence of Family and Peers	2.62	Agree
OVERALL MEAN	2.83	Agree

Table 4. Relationship of Cultural Norms and Responses to Air Pollution

Cultural Norms	r-value	P-value
a. Attitude Toward Environmental Responsibility	0.143**	0.006
b. Social Participation in Community	-0.299**	0.000

Cultural Norms	r-value	p-value
c. Influence of Family and Peers	0.183**	0.000

Attitude Toward Environmental Responsibility (Pooled Mean = 2.84, Agree). Residents demonstrated strong individual environmental awareness. The highest-scoring item was concern about air pollution's health effects (mean = 3.71, Strongly Agree), followed closely by personal responsibility for protecting the environment (mean = 3.63, Strongly Agree). Residents strongly rejected the view that environmental protection is unimportant in their community (mean = 1.54, Strongly Disagree). This positive attitudinal baseline was significantly correlated with pollution responses ($r = .143, p = .006$), confirming that a personal sense of environmental duty promotes more proactive behavior. This aligns with a Colombian KAP study (Marín et al., 2024), which found that higher environmental knowledge scores predicted more positive attitudes and protective practices such as mask-wearing during pollution alerts.

Social Participation in Community (Pooled Mean = 3.04, Agree). Community engagement was predominantly event-based. Residents agreed they participate in clean-up drives (mean = 3.22) and encourage others toward environmental protection (mean = 3.47), but disagreed that they are active members of formal environmental organizations (mean = 1.99, Disagree). Critically, community participation showed the strongest cultural norm correlation with pollution responses, yet in a negative direction ($r = -.299, p < .001$). Higher participation in general community activities was associated with lower positive responses to air pollution specifically. This counterintuitive finding suggests that existing community programs in Brgy. Palagay do not adequately integrate environmental content, other local priorities such as livelihood, infrastructure, and social welfare dominate community agendas. This mirrors Wu et al. (2023), who found that high willingness to participate in community programs contrasts with low actual pro-environmental behavior due to competing priorities. The implication is significant: community participation infrastructure

exists but is not yet channeled toward environmental outcomes.

Influence of Family or Peers (Pooled Mean = 2.62, Agree). Social influence from close relationships was the weakest subscale. Respondents disagreed that their environmental behavior is purely driven by others (mean = 1.95) and that they feel social pressure to act "green" (mean = 2.03). Nevertheless, this variable was positively correlated with responses ($r = .183, p < .001$), confirming that social networks remain meaningful channels for transmitting environmental awareness even when not experienced as explicit pressure. Zhu et al. (2021) similarly found that frequent interpersonal interaction promotes low-cost pro-environmental behaviors through conformity and social awareness. In the Filipino cultural context, the values of *kapwa* (shared identity) and *bayanihan* (community cooperation) represent untapped vehicles for embedding environmental responsibility within everyday social interactions.

Taken together, the cultural norm findings reveal a pattern consistent with Delvaux and Van den Broeck (2024): people are more likely to engage in pro-environmental actions when they internalize environmental responsibility as part of their identity, but stronger collective action requires active social norms and structured community participation that have yet to fully develop in Brgy. Palagay.

Economic Status and Responses to Air Pollution

Table 5. Economic Status

Economic Status	Mean	Description
a. Economic Status	3.21	Agree
b. Monthly Income	17,228.57	SD: 9,319.50

Table 6. Relationship of Economic Status and Responses to Air Pollution

Economic Status	r-value	p-value
a. Economic Status	0.446**	0.000

The composite economic status mean of 3.21 (Agree) indicated moderately stable household conditions. The largest income group earned between ₱10,001 and ₱20,000 monthly (35.71%), followed by those earning

₱20,001 and above (24.29%), below ₱5,000 (24.00%), and ₱5,000–₱10,000 (16.00%). Mean monthly income was ₱17,228.57 (SD = ₱9,319.50), reflecting considerable variation. Health insurance access scored highest among economic indicators (mean = 3.50, Strongly Agree), suggesting relatively broad awareness of or enrollment in health protection programs.

Economic status demonstrated the strongest overall relationship with pollution responses ($r = .446, p < .001$). This reflects a dual dynamic documented widely in the environmental justice literature. On one side, higher-income households, with greater access to private vehicles, larger homes, and energy-intensive technologies contribute more to ambient pollution. OXFAM (2022) confirms that the wealthiest 10% in Southeast Asia, including the Philippines, account for over a third of national carbon emissions, four times the share of the poorest 50%. On the other side, lower-income households, despite contributing less to pollution, bear amplified health consequences due to limited healthcare access, poorer housing quality, and unavoidable exposure in heavily polluted zones. The American Lung Association (2026) reports that PM2.5 exposure shows stronger health effects in low-SES neighborhoods, with hazard ratios up to 1.39 for disadvantaged groups compared to 0.90 for affluent ones.

This finding is further supported by Su et al. (2024) and Tan et al. (2024), whose studies in California and eastern China respectively confirm that socioeconomic status shapes both the level and type of air pollution exposure, and that communities with moderate socioeconomic status may face the highest concentrations of certain pollutants. The Environmental Kuznets Curve framework (Grossman & Krueger, 1991) also contextualizes these findings at a macro level: pollution tends to worsen during early economic development but eventually declines as societies accumulate the resources to invest in cleaner technologies and regulatory enforcement.

Responses to Air Pollution

Table 7. Responses to Air Pollution

Responses to Air Pollution	Pooled Mean	Description
a. Awareness	3.33	Agree
b. Preventive Measures	2.76	Agree
c. Adaptation Strategies	3.01	Agree
OVERALL MEAN	3.03	Agree

Awareness (Pooled Mean = 3.33, Agree). Residents showed moderate to high awareness across most items, with the strongest agreement that air pollution is a serious problem (mean = 3.65, Strongly Agree) and that family members are likely harmed by it (mean = 3.59, Strongly Agree). However, belief that public awareness alone will reduce pollution scored notably lower (mean = 2.57), indicating a gap in understanding collective action mechanisms. This pattern is consistent with Whitmarsh et al. (2011), who noted that while the public often possesses broad "holistic" environmental understanding, detailed technical knowledge about specific pollutants, sources, and mitigation pathways is frequently lacking.

Preventive Measures (Pooled Mean = 2.76, Agree). Engagement in preventive behaviors was the weakest response category, despite high awareness scores. Proper disposal of household chemicals showed the highest adoption (mean = 3.26), while trash or leaf burning was actively rejected (mean = 1.97, Disagree). Non-participation in community clean-up activities also scored low (mean = 2.01). This knowledge-action gap is well theorized by Kollmuss and Agyeman (2002), who argue that awareness is insufficient to overcome situational factors, lack of incentives, and ingrained social behaviors. The data confirm that despite knowing the risks, practical application of preventive strategies remains residents' weakest area of environmental response.

Adaptation Strategies (Pooled Mean = 3.01, Agree). Residents were markedly more willing to adjust behavior reactively than to take proactive preventive action. Keeping windows and doors closed during high-pollution days was most commonly practiced (mean = 3.37), followed by mask-wearing (mean =

3.19). Checking daily air quality updates before going outdoors scored lowest (mean = 2.70), suggesting monitoring habits remain underdeveloped. Bickerstaff and Walker (2001) explain this pattern well: public response to air pollution is typically reactive, with people more likely to change immediate behavior to protect health than to engage in long-term preventive lifestyle changes, a tendency confirmed by the higher means in adaptation relative to prevention across this sample.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study found that cultural norms, economic status, and socio-demographic characteristics all have significant relationships with how residents of Barangay Palagay respond to air pollution, though the strength and direction of these relationships vary meaningfully across variables.

Residents possess a strong individual sense of environmental responsibility and genuine concern about air pollution, yet these positive dispositions do not reliably translate into preventive action. The consistent gap between high awareness scores and low preventive behavior scores points to structural and social barriers that attitudes alone cannot overcome. Community participation, while present, is not currently oriented toward environmental outcomes; a structural gap that represents both a challenge and an opportunity. Family and peer influence, though not experienced as pressure, functions as a meaningful social channel for environmental norm transmission.

Economic status emerged as the strongest correlate of pollution response, underscoring the inseparability of environmental behavior from material conditions. Higher-income households demonstrate greater response capacity but also greater pollution contribution, while lower-income households are more environmentally exposed and health-vulnerable despite contributing less to pollution. This environmental inequality; where contribution and burden are unevenly distributed, demands explicitly redistributive policy responses.

Older residents and women were more attuned and responsive to air pollution concerns, while larger households showed lower perceived urgency, findings that point to the importance of demographic targeting in awareness and intervention campaigns.

Recommendations

Based on the foregoing conclusions, the following recommendations are offered:

For Future Researchers. This study's scope was limited to Brgy. Palagay using close-ended survey instruments. Future research should expand geographically to include comparable barangays across Nueva Ecija and other Philippine regions, incorporate qualitative methods to explore the lived dimensions of cultural practice and household decision-making around air pollution, and examine additional variables, including occupational exposure, housing quality, proximity to pollution sources, and specific traditional practices, that were outside the scope of the present study.

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