

# Evaluating the Impact of Social Protection Policies on Urban Climate Resilience in Ghana: A Comparative Analysis of Formal and Informal Settlements

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## Abbreviations

ASP	Adaptive Social Protection
AVE	Average Variance Extracted
BEV	Built Environment
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
CRSI	Cumulative Resilience Screening Index (five domains)
FGD	Focus Group Discussion
GIFMIS	Ghana Integrated Financial Management Information System
GVT	Governance
IFRC	International Federation of Red Cross and Red Crescent Societies
LEAP	Livelihood Empowerment Against Poverty
NADMO	National Disaster Management Organization
NEV	Natural Environment
NHIS	National Health Insurance Scheme
RMSEA	Root Mean Square Error of Approximation
RSK	Risk
SCT	Society (Social Capital)
SEM	Structural Equation Modelling
TLI	Tucker–Lewis Index

## Abstract

This study examines the impact of Ghana's Livelihood Empowerment Against Poverty (LEAP) program on urban resilience across six neighborhoods in Accra. Using structural equation modelling with 229 respondents, we assessed LEAP's effects on five resilience domains: built environment, governance, natural environment, risk reduction, and social cohesion. The sample was predominantly female (84.7%), middle-aged (40-60 years; 48.9%), with limited education and residing primarily in informal settlements (87.3%). Results reveal that LEAP participation significantly enhances all resilience dimensions ( $p < 0.001$ ). The strongest effect was on social cohesion ( $\beta = 0.859$ ), followed by built environment ( $\beta = 0.765$ ), risk reduction ( $\beta = 0.724$ ), natural environment ( $\beta = 0.700$ ), and governance ( $\beta = 0.595$ ). Gender-stratified analysis shows women benefit more in governance and infrastructure domains, while men report greater risk reduction. Settlement-type analysis demonstrates consistently stronger effects in formal areas compared to informal settlements, though both show significant improvements. Community-level variations indicate that while all neighborhoods benefit from LEAP, formal communities like Labone/La show higher infrastructure and environmental gains, whereas informal settlements like Agboghloshie demonstrate strong governance and social cohesion improvements. These findings suggest that social cash transfers serve as multidimensional catalysts for urban resilience, with variations reflecting local conditions and demographic characteristics.

**Keywords:** Accra, Livelihood Empowerment Against Poverty (LEAP), Urban climate resilience, Informal settlements, Urban climate resilience

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## 1. Introduction

Urban populations in Ghana face increasingly complex and interrelated challenges such as rising poverty, rapid urbanization, and intensifying climate risks. Informal settlements in Accra and other urban centers are particularly vulnerable to floods, heatwaves, and disease outbreaks, exacerbated by poor infrastructure and weak governance (Asibey, et al., 2022; Damte et al., 2023; Kosoe et al., 2021; Rain et al., 2011). Despite these mounting threats, the role of social protection programs, especially the Livelihood Empowerment Against Poverty (LEAP), as tools for enhancing urban climate resilience remains inadequately researched. While LEAP is widely acknowledged for its role in poverty reduction, its potential to deliver climate-responsive outcomes, such as improved infrastructure, secure resource access, and enhanced adaptive capacity, is still poorly understood, particularly when comparing formal and informal settlement contexts (Paul Jr et al., 2020).

How governance is set up largely determines whether social protection and climate adaptation work. In Ghana, bodies like the National Climate Change Committee and climate change units across key ministries were created to coordinate action (Tetteh, 2023). Yet in fast-growing cities, the usual systems are overstretched. Many urban and peri-urban areas run on hybrid arrangements where traditional authorities and state institutions overlap, shaping land allocation, flood control, and basic service delivery (Agyei-Mensah et al., 2024). These tangled dynamics slow programs down: bureaucratic delays, fragmented coordination, and political sensitivities hinder shock-responsive social protection and limit LEAP's ability to strengthen climate resilience

Also, there is limited comparative research on how LEAP's climate resilience effects vary across socio-economic strata and spatial typologies within cities, particularly formal versus informal settlements. Urban poor households in slum areas face compounded vulnerabilities: dense overcrowding, lack of formal infrastructure, and escalating health risks from climate-induced hazards like flooding (Damte et al., 2023). In contrast, residents of planned neighborhoods may have greater access to water, sanitation, and risk-mitigation infrastructure—and may be more able to leverage LEAP effectively. Yet empirical evidence comparing the resilience outcomes of LEAP beneficiaries across these spatial divides is lacking, and no existing studies disentangle such differential effects in terms of absorptive, adaptive, and transformative capacities.

At the same time, grassroots, community-led adaptation efforts are becoming increasingly visible across Ghanaian cities. Informal early warning systems, community savings groups, and locally developed measures, such as citizen-led flood monitoring and youth-driven environmental stewardship, are emerging as notable innovations in reducing vulnerability

(Adams, 2022). Locally driven adaptation practices are likewise gaining momentum as pathways toward more sustainable and inclusive resilience building (Tetteh, 2023). However, the intersections between these community-based initiatives and formal social protection mechanisms and climate policies remain insufficiently examined.

Given these gaps, there is a pressing need for practical, evidence-led policies that connect social protection with urban climate resilience. Ghana has woven adaptation into national strategies such as the National Climate Change Policy (EPA, 2013) and the National Adaptation Framework (Government of Ghana, 2018; UNFCCC, 2021), but implementation at the city level is still uneven. The Ministry of Gender, Children and Social Protection, including LEAP, has also signaled plans to build a shock-responsive approach (MoGCSP, 2022; MoGCSP, 2024). To make that momentum count, the next steps must be grounded in robust empirical insights that reflect both state-level coordination and the lived realities of urban residents across formal and informal settlements.

This study addresses a critical evidence gap through five interconnected objectives: (1) evaluating the effectiveness of LEAP in strengthening climate resilience among vulnerable urban populations; (2) analyzing governance arrangements and barriers to climate-responsive social protection; (3) investigating differential impacts across socio-economic groups and spatial contexts; (4) documenting community-driven innovations that link social protection with adaptation; and (5) producing actionable, evidence-based policy recommendations for both national and municipal authorities. Together, these objectives aim to determine whether social protection, reframed through the lens of climate resilience, can serve as a transformative pathway for inclusive urban development in Ghana.

## 2. Literature

Recent research and practice show social protection as a key means to building resilience to climate, particularly for the urban poor. Some studies have revealed that social protection interventions have the potential to improve the ability of communities and individuals to withstand socio-economic effects of climate-related disasters in the long and short run (Sengupta et al, 2024). In policy terms, this concept is termed Adaptive Social Protection (ASP), which combines social safety nets with disaster risk reduction and climate change adaptation strategies (Davies et al., 2013). With the ASP approach, safety net initiatives such as cash transfers, public works, and insurance not only mitigate chronic poverty but also enable households to invest and absorb shocks as well as adaptive capacities.

Evidence from multiple contexts confirms that social protection generates resilience co-benefits. Cash transfers, for example, have been found to deter adverse coping strategies after climate shocks, helping to prevent households from further sinking into poverty (Sengupta et al., 2024). Public labor-targeted works programs can provide support for income as well as build resilient infrastructure (e.g. better drainage or green parks) that reduce climate risk. Integrating social protection into climate reasons also entails wider sustainable development benefits, contributing to poverty alleviation, food security, health, and gender equity (Sengupta et al., 2024). Further, linking social protection to climate resilience allows space for new sources of finance and more representative types of governance, by merging safety nets with climate funds and community climate action (Costella et al., 2021).

Resilience is increasingly viewed as a multi-dimensional construct, encompassing different capacities to handle shocks and stress. Scholarly frameworks emphasize that households and systems need the ability to absorb immediate shocks, adapt to evolving risks, and transform structural conditions to reduce long-term vulnerability (Aleksandrova, 2021; Kundu et al., 2023). These categories, often termed absorptive, adaptive, and transformative resilience, provide an analytical lens for this evaluation (See Annex Figure 1).

LEAP is Ghana's flagship social cash transfer introduced in 2008 by the Ministry of Gender, Children and Social Protection to support extremely poor households with elderly (65 persons with severe disability without productive capacity or orphaned and vulnerable children. In addition to cash, LEAP links households to NHIS and complementary services. Over time, coverage expanded nationally and variants such as LEAP 1000 targeted pregnant/lactating women in poorer districts (Otieno et al., 2022). Evaluations show broad welfare gains (consumption smoothing, service use, some human-capital effects), with increasing attention to shock-responsive features (Dias et al., 2023). This background motivates our test: can LEAP also serve as a platform for climate resilience in cities?

The absorptive capacity is the ability to withstand and recover from temporary shocks by applying existing capabilities and resources (i.e., relief or coping aid). The adaptive capacity is scaled up to address longer-term changes or anticipated risks through proactive measures, e.g., livelihood diversification or sequential improvements to reduce risk. The transformative capacity is the capacity to significantly transform base systems or structures in order to decrease vulnerability (e.g., moving away from hazard-prone locations or investing heavily in infrastructure).

Within the LEAP context, the concepts help frame the analysis of resilience, identifying whether the program is simply enabling beneficiaries to adapt due to climate impacts, or

whether it's aiding greater adaptive or transformational change in their wellbeing. Throughout the study, evidence from Accra's communities is understood through this lens, identifying where institutions and households are stuck in coping, and where signs of adaptation or potential transformative change exist.

## 3. Methodology

### 3.1 Study Design and Context

This study adopted a sequential explanatory mixed-methods design, which involves two consecutive phases: an initial quantitative phase followed by a qualitative phase to explain and deepen the quantitative findings (Ivankova et al., 2006). We first analyze quantitative survey data with CFA/SEM to estimate how LEAP participation relates to five latent resilience domains (See Annex Figure 2), then use qualitative data, specifically, key-informant interviews and FGDs to explain mechanisms, heterogeneity (by gender/settlement), and lived experiences. We report domain-specific coefficients and then interleave verbatim quotes to illuminate pathways and implementation realities (e.g., flood coping, governance bottlenecks, social support). The research focused on six purposively selected communities in Accra (See Annex Figure 3) representing both formal and informal settlements. Communities such as Labone/La represented formal and peri-urban contexts, while Agbogbloshie, Chorkor, Ashiedu Keteke, Tunga and Glefe reflected diverse informal urban typologies. The focus on contrasting settlement types enabled comparative analysis of LEAP's effectiveness across spatial and socio-economic divides.

As shown in Figure 3a, land-surface temperature and modeled travel times to police, fire, and hospital services vary markedly across the study communities. Shorter access (0–5 minutes) clusters along major road corridors, whereas several peripheral neighborhoods fall within the 10–15-minute band. The coincidence of longer response times with hotter micro-environments points to areas of compounded risk for households. We use these spatial patterns to frame our discussion of emergency preparedness and the extent to which LEAP may buffer climate-related shocks.

### 3.2 Data Collection and Sampling

The research applied a mixed-methods data collection approach of a representative household survey, semi-structured in-depth key informant interviews, and focus group discussions with the communities. Stratified sampling design was applied to promote representation by education level, gender, and settlement type. Questionnaires filled by respondents addressed systematically (a) participation in LEAP at the household level, (b) measures of community resilience in five dimensions—Risk (RSK), Governance (GVT), Built

Environment (BEV), Natural Environment (NEV), and Society (SCT)—and (c) demographic as well as socio-economic factors (e.g., education, gender, settlement type). The last data set comprised 229 respondents, enough to fulfil minimum sample requisites for Structural Equation Modelling (SEM), wherein indicative ratios span 10–15 observations per estimated parameter.

### 3.3 Analytical Strategy

The measurement model linking indicators to latent constructs appears in Eq. (1) with indicator-level form in Eq. (2); the structural model across latent variables appears in Eq. (3). Sections 3.3.1 and 3.3.2 detail these with standard CFA/SEM notation (loadings, errors, disturbances;  $\beta$  path coefficients), and reliability/validity are summarized via CR, AVE, CFI, TLI, RMSEA.

The analysis used a two-step Structural Equation Model (SEM) approach. The initial step involved a Confirmatory Factor Analysis (CFA) of the measurement aspects of the latent constructs. The structural model in the second step estimated the directional associations among LEAP and the five resilience dimensions.

The central exogenous variable of the model was the Livelihood Empowerment Against Poverty (LEAP) program, measured by ten program coverage, adequacy, and reliability indicators (LEAP1–LEAP10). The endogenous variables mapped out sequential yet connected community domains of resilience: Risk (RSK1–RSK10), Governance (GVT1–GVT10), Built Environment (BEV1–BEV10), Natural Environment (NEV1–NEV10), and Society (SCT1–SCT10). In order to explain program heterogeneity in impacts, gender, education, and settlement status (immigrant or non-immigrant) were added as moderator variables in order to enable a more differentiated evaluation of how social-demographic and spatial environments shape the association between social protection and resilience outcomes.

#### 3.3.1 Measurement Model

For each latent construct  $\eta_j$ , the relationship with its observed indicators  $y_j$  is expressed as:

$$y = A_y \eta + \varepsilon \quad (1)$$

Where:

- $y$  = vector of observed indicators (e.g., LEAP1–10, RSK1–10, etc.),

- $A_y$  = factor loadings matrix,
- $\eta$  = vector of latent constructs (LEAP, RSK, GVT, BEV, NEV, SCT),
- $\varepsilon$  = measurement error terms.

Each indicator thus satisfies:

$$y_{ij} = \lambda_{ij}\eta_j + \varepsilon_{ij} \quad (2)$$

where  $\lambda_{ij}$  denotes the standardized loading of indicator  $i$  on latent construct  $j$ .

### 3.3.2 Structural Model

The causal pathways between LEAP and resilience domains were specified as:

$$\eta = B\eta + \Gamma\xi + \zeta \quad (3)$$

Where:

- $\eta$  = vector of endogenous latent variables (RSK, GVT, BEV, NEV, SCT),
- $\xi$  = exogenous latent variable (LEAP),
- $B$  = matrix of coefficients among endogenous constructs,
- $\Gamma$  = coefficient matrix linking exogenous to endogenous constructs,
- $\zeta$  = structural disturbances.

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## 3.4. Ethical Considerations

All participants provided informed consent after information on study aims, voluntary participation, and confidentiality; no identifying information is reported. Interviews/FGDs were conducted in private or semi-private settings, audio-recorded with permission, and stored on encrypted drives accessible only to the research team. Participants could withdraw at any time without consequence.

# 4. Results and Findings

## 4.1 Descriptive Statistics

### 4.1.1 Socio-Demographic Characteristics

The survey captured a diverse urban population across the six selected communities (See Annex Figure 4). Labone/La was the largest among the respondents (29.7%), followed by Chorkor (26.2%), Ashiedu Keteke (19.7%), Tunga (10.0%), Agbogbloshie/Old Fadama (9.2%), and Glefe (5.2%). Almost 87.3% of all the respondents live in informal (unplanned) settlements, and only 12.7% live in formal (planned) settlements (See Annex Figure 4). What this suggests is that most beneficiaries are in high-density, under-served settings. The majority of the respondents (55.9%) indicated they were household heads, with 44.1% of them indicating non-head members. This composition provides information for decision-making household members and dependents.

Women dominate the sample: 84.7% of respondents are female and only 15.3% are male (Figure 4). Age distribution shows that the largest segment is middle-aged (40–60 years; 48.9%), followed by aged respondents (61+ years; 38.0%), and youth (18–39 years; 13.1%) (Figure 4). Education levels are generally low. Over one-third (35.5%) of respondents have completed only junior high school (JHS), 21.5% have primary education, and 21.5% have no formal schooling. Only 18.9% reached senior high or vocational school, and a mere 2.6% attained tertiary education (See Annex Figure 4). These figures suggest that most beneficiaries have limited formal schooling, reinforcing their vulnerability in terms of income and opportunities.

Gender-stratified analysis underscores the predominance of women in all categories (see Annex Table 1). For example, among non-household heads, 88.1% are female, and among household heads, 82.0% are female. Women also represent over 80% of respondents in every community: male shares range from only 8.3% in Glefe to 20.0% in Chorkor (See Annex Table 1). Similarly, women make up about 85% of residents in both formal (89.7%) and informal (84.0%) settlements. These patterns indicate that survey participation and/or LEAP enrolment is heavily skewed toward women in these communities.

Educational attainment varies markedly by location and social role (See Annex Table 2). In formal neighborhoods such as Labone/La, education levels are higher: 43.3% of Labone/La respondents have JHS and 17.9% have completed SHS/vocational school. In contrast, informal settlements show lower schooling: for example, in Agbogbloshie 47.6% of residents have no formal education and none have tertiary training. Similarly, non-household heads (mostly younger members) are more likely to have at least JHS (39.6%) than household heads (32.3%), whereas household heads have a larger share with no formal education (26.8% vs. 14.9%). In sum, the cross-tabulations reveal that educational attainment is highest among younger, non-head individuals in well-served communities, and lowest among older heads in marginalized areas.

Housing conditions and basic services are generally poor (See Annex Figures 5 and 6). Fully 87.3% of respondents live in compound houses—a multi-household dwelling with shared facilities. Only 5.2% live in detached houses, 4.4% in improvised structures, and 3.1% in semi-detached homes. Regarding tenure, 46.3% occupy their home rent-free via family, 32.3% rent, and only 20.5% own their dwelling. This mix indicates widespread housing insecurity and overcrowding: nearly half rely on kinship networks for shelter, and about one-third are exposed to the risks of renting in low-income areas.

Water, sanitation, and energy access show both coping strategies and deficits. A majority (53.7%) of households use sachet water as their main drinking source, while 24.9% have pipe-borne water and 17.9% use public taps (Figure 5). Very few use boreholes or bottled water. For sanitation, 71.6% rely on public toilets and only 27.5% have flush toilets at home; open defecation is reported by 0.9% (Figure 5). Electricity service is widespread (97.4% on the grid, 2.6% kerosene lamps), but cooking fuels remain polluting: 75.6% use charcoal and only 22.7% LPG (See Annex Figure 5). These results indicate that while most households have lighting, they largely depend on communal sanitation and market-purchased water, and biomass fuel for cooking. These factors raise both health and environmental concerns.

The economic profile of households (See Annex Table 3) shows that LEAP cash transfers are the main income source for 36.7% of respondents, surpassing all other sources. Petty trading (31.0%) and more formal trading (24.9%) support over half of households, while remittances and wages are cited by only 3–4%. Average spending patterns (See Annex Table 4) further illustrate priorities and pressures. Monthly food expenditure averages GHS 540.17 (about 39.9% of total spending), followed by education (GHS 308.52, 22.8%) and health (GHS 214.49, 15.8%). Housing costs are modest on average (GHS 88.17, 6.5%), as are utilities (GHS 127.55, 9.4%) and transport (GHS 85.22, 6.3%). Notably, expenditures are highly variable (standard deviations are of the same order of magnitude as means), implying large differences: some families spend more or less nothing across categories, while others spend thousands of Ghana cedis, depending on needs and household size.

#### **4.1.2 Community-driven Climate Adaptation and Social Protection in Accra**

To assess community readiness for climate shocks, we analyzed survey responses related to three governance indicators (GVT8–GVT10) across six LEAP-targeted neighborhoods in Accra. These indicators correspond to: (1) continuity of operations planning, (2) training of local emergency personnel, and (3) community involvement in resilience networks. By comparing responses from Tunga, Agbogbloshie (Old Fadama), Ashiedu Keteke, Chorkor,

Glefe, and Labone/La, we can identify patterns of preparedness. (See Annex Table 5 for the full distribution of responses.)

#### 4.1.2.1 Continuity of Operations Plans

34.6% of the respondents from Chorkor reported that their community has no continuity of operations plan (COOP) in the event of emergencies. Similarly, 19.2% from Ashiedu Keteke. These are very high proportions, and they validate that most residents within both communities lack a written emergency plan altogether. In reality, this means that in the event of a flood or disaster, Chorkor and Ashiedu Keteke may face greater confusion and delayed response as both communities are prone to flooding and infrastructure failures. By contrast, in Labone/La – a more formal, centrally located neighborhood – only 19.2% said there was no plan, and 35.0% confirmed a *comprehensive and tested* COOP. Agboghloshie showed modest preparedness: 15.0% of respondents had a tested plan and 25.0% described a *limited* plan. Even Ashiedu Keteke had some planning: 15.0% reported a tested plan, and another 18.9% had plans in progress. These figures suggest that formal institutions and active community organizations can support local planning even in informal settings. In communities where institutional support is stronger, residents reported higher levels of official preparedness.

Other communities exhibited mixed results. In Tunga, 11.5% said *no plan* and only 5.0% had a comprehensive plan, with the rest indicating uncertainty or partial progress. Glefe reported similarly low engagement: just 5.0% of residents had a fully tested COOP, while 37.7% were *unsure* whether any plan existed (and 24.6% said a plan was still *in progress*). In summary, neighborhoods with weaker formal planning structures (Tunga, Glefe) appear much more common in vulnerable zones. Without tested COOPs, community functions may halt during an emergency, leaving residents to rely on ad hoc measures.

#### 4.1.2.2 Training of Local Emergency Management Personnel

We asked respondents to rate the training of their local emergency responders. Chorkor again emerged as highly vulnerable: 32.0% of its respondents said local personnel were *not trained* at all. Ashiedu Keteke, Glefe, and Tunga each had 12.0% saying “not trained,” and Agboghloshie had 8.0%. These neighborhoods—among Accra’s poorest and most hazard-exposed, appear to have frontline teams that are largely unprepared. In practical terms, untrained personnel might lack skills in coordinating evacuations, administering first aid, or communicating risks during disasters. By contrast, Labone/La reported much higher training levels: only 28.0% said “not trained,” while 38.9% described personnel as *highly trained*. Agboghloshie also rated its responders relatively high: 28.1% of its respondents said they

were *highly trained*. Across all communities, substantial shares reported *adequately trained* or *well-trained* staff (often 20–30%). This suggests that basic training programs exist in many neighborhoods, though advanced or scenario-specific drills may still be lacking.

However, the data reveal critical gaps. Communities with the weakest training often correspond to those lacking strong COOPs. In other words, some areas know of emergency plans but have few trained personnel to execute them, while other areas have trained individuals but no formal plan to follow. No community in our sample achieved uniformly high scores on both metrics. For example, Chorkor had the highest “not trained” rate and many lacking plans, whereas Labone/La had strong training but still 28% “not trained.” These patterns point to the need for integrated approaches: linking training programs with actual drills and planning exercises could ensure that skills and plans reinforce each other during crises.

#### **4.1.2.3 Community Involvement in Resilience Networks**

The third indicator examined whether communities engage in broader resilience or emergency-preparedness networks (such as municipal disaster forums or initiatives like the 100 Resilient Cities network). Engagement levels varied widely. Remarkably, Ashiedu Keteke reported full involvement: 100.0% of its respondents said they were *fully engaged* in some resilience network. This exceptional result suggests that, despite its challenges, Ashiedu Keteke’s residents are deeply connected to planning units, NGOs, or pilot projects focused on disaster resilience.

Labone/La also showed strong engagement: 46.4% of Labone/La respondents said they were somewhat involved in networks, and 50.0% said very involved. Tunga saw 30.0% of its residents as very involved (though 11.9% there said they were not at all involved). Agbogbloshie likewise demonstrated high connectivity: 30.0% very involved and 20.0% somewhat involved. These levels are likely because of organized civil-society associations and NGO collaborations that link residents into citywide resilience initiatives.

On the contrary, Chorkor and Glefe were somewhat isolated. In Chorkor, 36.2% indicated being somewhat involved and 23.8% were not involved at all in any organized system. 7.1% of those interviewed in Glefe indicated being somewhat involved, with no one indicating higher engagement. In the absence of these associations, residents of the community may not hear about training or assistance during or before disasters. Generally, there were formal neighborhoods such as Labone/La that blended institutional preparedness and networking linkages, while informal settlements had planning and training deficits but strong networks at some points (e.g., Agbogbloshie and Ashiedu Keteke). Chorkor’s double deficit of limited

planning and limited connectivity points to high risk. The three governance indicators combined highlight where preparedness is lacking and where community-level efforts are making up for it.

## 4.2 Structural Equation Modelling

### 4.2.1 Measurement Model

The measurement model (See Annex Table 6) also demonstrated high construct reliability and indicator quality on all domains. We applied the standard SEM item retention standards – factor loadings optimally  $\geq 0.70$  (min 0.50) with  $p < 0.05$  and removed items with failing these thresholds (Cheung et al., 2024). In the Built Environment (BEV) domain, we lost four of the initial ten items that were dropped due to low or non-significant loadings (e.g. BEV1:  $-0.016$ ,  $p=0.86$ ). The six retained items (BEV3,5,6,7,8,10) loaded strongly ( $\lambda=0.729-0.836$ , all  $p < 0.001$ ; max BEV6= $0.836$ ,  $T=42.58$ ) with justifiable multicollinearity (VIF 1.6–2.30). This defines a one-dimensional BEV construct (infrastructure quality, sanitation, safety in housing) based on SEM best-practice (Cheung et al., 2024). Likewise, for Governance (GVT), five (GVT3,5,6,7,9) of eight indicators remained ( $\lambda=0.759-0.789$ ,  $p < 0.001$ ) following the exclusion of poor items (e.g. GVT2:  $0.008$ ,  $p=0.937$ ). All the GVT VIFs were  $< 2.0$ , and the retained items indicate local government's transparency, participation, and accountability.

The LEAP program construct functioned very well: all nine items (LEAP1–LEAP9) remained, loading  $0.771-0.890$  ( $p < 0.001$ ; highest LEAP3= $0.890$ ). None of the indicators were excluded, suggesting a coherent, unidimensional latent construct. VIFs ranged from 2.13–3.68 (acceptable considering inter-item relatedness), consistent with LEAP's multidimensional cash-transfer, health insurance, and food-security design. These findings agree with literature on SCT; by delivering regular income, LEAP arguably relieved household liquidity constraints and enabled investment in physical and human capital (Asfaw & Davis, 2018).

In the Natural Environment (NEV) domain, five of ten items were excluded. Retained items (NEV4,6,8,9,10) loaded  $0.734-0.829$  ( $p < 0.001$ ; highest NEV8= $0.829$ ), covering environmental cleanliness, air/water quality, and green space. Dropped items (e.g. NEV1, NEV7 negative loadings) lacked construct relevance despite statistical significance. All retained NEV VIFs were  $< 2.5$ . The final NEV indicators showed a strong convergent validity, recording perceptual gains in sanitation and ecological conditions associated with LEAP benefits.

For the Risk (RSK) domain, six items (RSK1,2,4,7,9,10) were retained with loadings  $0.724-0.806$  ( $p < 0.001$ ). Items RSK3,5,6,8 was dropped for low or negative loadings. The remaining

indicators (e.g. economic shock coping, disaster preparedness) exhibited VIFs 1.70–2.08, indicating low redundancy. These RSK indicators reflect a reduction in community vulnerability, consistent with the role of cash transfers in establishing buffers in the household.

In Society (SCT), seven indicators (SCT1,4,5,6,7,8,9) were retained ( $\lambda=0.785-0.830$ ,  $p<0.001$ ), measuring social cohesion, trust, and mutual support. SCT2,3,10 was dropped due to sub-threshold loadings or non-significance. VIFs were 2.09 to 2.49. SCT5 had the largest loading (0.830), indicating strong common identity/perception of support. Generally, the retained items across domains satisfy conventional SEM criteria ( $\lambda >0.70$ ,  $VIF<5$ ) and guarantee each construct's one-dimensionality (Cheung et al., 2024).

Table 7 indicates the reliability and validity of the constructs. Cronbach's alpha varied from 0.854 (GVT) to 0.939 (LEAP), far beyond the 0.70 satisfactory reliability benchmark (Cheung et al., 2024). Composite reliability (CR) was equally high (0.862–0.941). These internal consistency estimates concur with SEM best practices ( $\alpha \geq 0.70$ ,  $CR \geq 0.70$ ) (Cheung et al., 2024). Convergent validity was also high, with average variance extracted (AVE) for each construct being  $\geq 0.576$ , exceeding the 0.50 criterion (Cheung et al., 2024). For instance, BEV's AVE was 0.602 ( $\sqrt{0.776}$ ), higher than its maximum correlation with any other construct (0.765 with LEAP). The Fornell-Larcker criterion was satisfied for all constructs, indicating discriminant validity. (Interestingly, LEAP's  $\sqrt{AVE}=0.821$  is slightly above its highest inter-construct correlation with SCT at 0.815, meeting the standard margin). Overall, the measurement model is psychometrically sound; high  $\alpha$  and CR,  $AVE \geq 0.58$ , and discriminant validity evident across the six latent factors (Cheung et al., 2024).

#### 4.2.2 Structural Model

Focusing on the structural model, all hypothesized paths from LEAP participation to resilience domains were strongly positive and highly significant ( $p<0.001$ ) (Table 8). The LEAP→BEV path coefficient was  $\beta=0.765$ , which establishes that participation in LEAP had significantly enhanced perceptions of physical infrastructure and services. According to some beneficiaries, *“the money if you use it to buy roofing sheets, how much would even be left? The rest will just go to the carpenter”* (FGD, Agboghloshie, 2025). This supports our first hypothesis and suggests that cash transfers helped households invest in housing, sanitation, and drainage. By increasing disposable income and reducing liquidity constraints, LEAP likely supported beneficiaries to improve their built environment – a finding consistent with resilience theory that cash transfers facilitate proactive infrastructure improvements (Asfaw & Davis, 2018).

Similarly, LEAP→GVT was  $\beta=0.595$ ; this positive link suggests that LEAP promotes governance outcomes; beneficiaries cite increased transparency, accountability, and civic participation. An official hinted that *"We work with assembly members, environmental health officers, and NADMO. Since we're all in the same municipality, we collaborate when issues arise. For example, when we identify a problem like flooding, we report it to the appropriate agency, and they take action. We don't handle certain areas directly, so we rely on these agencies to step in where needed"* (District social worker, 2025). Social protection can enable poor citizens to engage with local institutions and assert better services, in line with emerging evidence that cash transfers may enhance recipients' political efficacy. Our finding supports the hypothesis that LEAP's cooperative governance arrangement (Foli et al., 2025) can turn into local governance perceived benefits. By connecting the beneficiaries to government services (e.g., universal health insurance) and community platforms, LEAP seems to enhance institutional trust and inclusive decision-making in low-income urban communities.

The LEAP→NEV path was  $\beta=0.700$ . Households reporting LEAP benefits perceived significantly improved environmental conditions (clean water, waste disposal, green space). This empirically validates Hypothesis H3: cash transfers can yield "eco-social" dividends. The mechanism may be that increased income allows payments for clean water, waste collection, or adoption of sustainable practices (e.g. home gardens, sanitation upgrades). Such eco-friendly behaviors are often foregone by cash-poor families. A community focal person argued that *"there should be more education on how we manage our waste. We also need more recycle companies who would take the waste and recycle it, but to take the waste and dispose it off just like that, it is something that will worry the ecosystem. When we focus more on recycling, I think that is where we are going to see the benefits of protecting our ecosystem and then the waste"* (Community focal person, Agboghloshie, 2025). Theoretically, SCTs alleviate resource constraints, thus facilitating better natural resource management (Asfaw & Davis, 2018). Our results indicate that social protection has spillover effects beyond consumption, promoting healthier environments, and supporting the sustainability aspect of resilience.

For the Risk (RSK) domain, the LEAP→RSK coefficient was  $\beta=0.724$ . This strongly supports that LEAP has a strong effect on reducing perceived exposure to shocks. In practice, reliable cash transfers insure against income loss (consumption smoothing) and may even enable migration from hazard-prone areas. The high effect size suggests that LEAP beneficiaries feel substantially more resilient to economic, health, or climate shocks, agreeing with Hypothesis H4. This is consistent with the literature that regular cash infusions improve coping capacity and reduce economic stress (Asfaw & Davis, 2018). By reducing poverty-induced exposure (e.g. preventing risky coping like child labor), LEAP appears to bolster both material and psychological resilience.

Society (SCT) effect was largest with  $\beta=0.859$ . According to some beneficiaries, “We help out each other. Those whose houses have not been flooded help out those whose rooms have been flooded” (FGD, Agbogloboshie, 2025). Other beneficiaries also stated that “Some youth groups used to help clean the gutters then when we have little amount of money on us then we give them for encouragement so that they can also get something to eat, but now they are not very active and they feel they’re too grown for that. At first there are few churches who support people during floods by giving food or clothing but not anymore....” (FGD, Ashiedu Keteke, 2025). This confirms that LEAP exerts an extremely strong positive influence on trust, social cohesion, and collective efficacy. The beneficiaries experience more mutual aid and a sense of belonging. A coefficient at this high indicates that in addition to material prosperity, LEAP delivers social solidarity. Possible reasons are decreased poverty, stigma increases, self-esteem and reciprocity; excess money to spend in community events; or beneficiary group formation networks. Although few studies measure this directly, theory suggests that there should be high “social multiplier” effects of cash transfers. Our results show that LEAP has the most significant impact on social relationships and is indicative of an important dimension of resilience, which is a strong social capital.

Figure 7 summarizes all structural estimates. All five hypothesized relationships (H1–H5) were statistically supported. The uniform significance ( $p<0.001$ ) and large effect sizes indicate that LEAP participation has pervasive, multidimensional benefits for urban communities’ resilience profiles. These findings confirm the conceptual framework of the study: social protection seems to yield gains in infrastructure, governance, environment, risk management, and social fabric. Most significantly, the strongly positive LEAP→SCT effect suggests that the social aspects of resilience may be highly sensitive to cash transfers.

We further disaggregated the model by gender and settlement type to uncover nuanced patterns. Gender-stratified results (See Annex Figure 8) reveal that women generally report more uniform benefits in most domains. For Built Environment, females’  $\beta=0.773$  versus males’ 0.718. Women also see greater gains in Governance (female 0.626 vs. male 0.456) and slightly higher in Natural Environment (0.709 vs. 0.689). Conversely, men report a much stronger Risk reduction (0.889 vs. 0.687). Social cohesion effects were similarly high for both (male 0.886, female 0.854). All gendered paths remain significant ( $p<0.001$ ). This contrast reveals gendered experience: women’s role in the household, water, sanitation, and community group roles potentially places them as more sensitive to infrastructure and governance change, while men’s breadwinner role of income/security may enable their higher-risk perceptions. More importantly, the fact that women emerge as the greatest beneficiaries in governance supports the view that cash transfers can enhance women’s voice and influence within local communities (Centre for Financial Inclusion & World Food Program, 2023).

Settlement-type analysis (See Annex Figure 9) shows consistently stronger effects in formal (planned) areas. LEAP→BEV is 0.855 in formal zones vs. 0.754 informal; LEAP→GVT 0.760 vs. 0.576; NEV 0.784 vs. 0.693; RSK 0.858 vs. 0.706; SCT 0.911 vs. 0.853. In every instance, both groups realize considerable advantages, but formal zones always benefit more. A community focal person stated that “...distance to the banks... language barrier and also timidity... If we have somehow an informal system... mobile money vendors could be enrolled... it will be easy for them to access their funds” (Community focal person, Agbogbloshie, 2025). This most probably represents structural benefits: planned neighborhoods gain from improved roads, services and institutional access, allowing households to reach LEAP funds more fully. Slums are plagued by limitations (tenure insecurity, absence of basic services) that reduce outcomes. Notably, the trend is repeated elsewhere. Otieno et al. (2022) observed that program effects were highly responsive to local service quality. In our case, other high-quality formal environments seem to enhance LEAP's effectiveness in every area, demonstrating the importance of contextual factors on social protection programs.

Community-level analysis (Figure 10) reveals diversity across Accra neighborhoods. Tunga (informal) exhibits the largest LEAP→BEV (0.876), NEV (0.892), and RSK (0.784) effects. Agbogbloshie (high-density informal sector) exhibits the largest LEAP→GVT (0.826) and one of the largest social cohesions (0.877) values, demonstrating intensive program reach in poor neighborhoods. Ashiedu Keteke and Chorkor exhibit more moderate effects (lowest BEV ~0.72, lower GVT ~0.43–0.53), possibly due to being mixed with urban-poor environments. Glefe (informal) also has high SCT (0.863) and moderate to high impacts elsewhere. In all five of the communities, the LEAP→SCT pathway is consistently high (0.843–0.877). These results validate LEAP's far-reaching coverage: in poor communities (Agbogbloshie, Glefe), the beneficiaries have strong improvement in resilience, especially socially. Formal neighborhoods (Labone/La) continue to dominate infrastructure/environment outcomes, once more highlighting how community conditions are a mediating variable. Overall, the findings reliably demonstrate that LEAP is an agent of multidimensional resilience, with the diversity explained by gender roles and settlement contexts.

## 4. Discussion and Implications

### 5.1 Descriptive Statistics

#### 5.1.1 Socio-Demographic Characteristics

This study provides a profile for LEAP beneficiaries, marked by urban poverty, gender disparity, and infrastructure deprivation. Notably observed is the dominance of females (85% of the respondents). On the one hand, this indicates targeting by the program and that,

under poor households, women are more likely to take on the role of household managers. Women in informal urban areas are likely to live in one-parent homes or have market activities as their primary means of livelihood. Their dominance in the sample suggests that any assessment of household well-being or resilience must center on women's experiences. The underrepresentation, however, underestimates men's needs and views. For example, few young and working-age men were sampled, possibly underestimating issues like male unemployment or problematic drug use that may impact household welfare. In designing programs, the notable proportion of women beneficiaries necessitates gender-sensitive policy. LEAP and associated services not only have to remit money to women but also empower women through special education, health and livelihood skills.

The spatial distribution of respondents indicates significant place-based disparities. The inclusion of diverse neighborhoods from formal Labone/La to marginal settlements like Agbogbloshie and Glefe permits comparison of conditions. Residents of formal areas like Labone/La have higher education attainment and somewhat better housing (more detached/semi-detached homes, flush toilets) compared to those in informal settlements. In informal communities, by contrast, low or no schooling is common; 47.6% of respondents in Agbogbloshie report no formal education and makeshift housing is widespread. These spatial patterns imply that urban poverty is not uniform: it clusters in high-risk zones with weak infrastructure. Consequently, social protection in Accra must be sensitive to locality. Interventions in informal settlements might prioritize infrastructure improvements (water, sanitation, roads) and adult education, whereas in formal areas they might focus more on employment and skills. For example, water supply is more common in Labone/La, whereas most others rely on relatively expensive sachet water. A holistic policy should integrate LEAP transfers with city planning: for instance, using LEAP as an entry point for subsidizing piped water connections or sanitary latrine construction in slums.

The age profile indicates that LEAP is reaching its targeted poor populations, mainly the elderly (38.0% of sample) and middle-aged caregivers (48.9%). The excess proportion of older people aligns with LEAP's mission to protect elderly individuals without coverage. It is further consistent with urban demographic change; networks of support within extended families disintegrate migration, so the elderly are dependent on the state. Middle-aged adults (typically looking after children or disabled parents) and other categories are also over-represented, suggesting mid-life economic vulnerability is high. Underrepresentation of the youth (13.1%) may suggest that young adults are working informally beyond LEAP's traditional eligibility, or that they under-participate in the survey. This gap creates a policy issue: does social protection need to extend coverage to include the urban youth, who experience high unemployment and housing instability? Improved youth mobilization,

perhaps through training in skills or connection to microcredit, can reinforce solidarity transfers to more senior recipients and create more long-lasting intergenerational families.

Education is another major dimension of inequality. Overall, low levels of schooling (limited higher education) limit economic prospects and knowledge access. Spatially, the more resourced communities report greater secondary school completion (Labone/La: 43.3% JHS, 17.9% SHS/Voc) than the slums (Agbogbloshie/Glefe: almost half with no schooling). Since LEAP is focused on building human capital, this evidence indicates possible limitations: recipients in informal arrangements may not be in a position to realize education benefits (such as literacy components or child allowances) if they or their children face systemic barriers. Furthermore, the gender distribution across education is revealing. Women lead all education groups, though this is partly due to their more balanced presence in the sample, but also suggests historical patterns whereby older men would have left school earlier to earn a living and women stayed on longer. In any case, improving education, particularly beyond JHS is an obvious priority. Policies could include secondary scholarship programs and vocational training for LEAP families, or mobile schooling services within slum populations to lower dropout rates.

Housing and access to services data points to urgent needs. The high proportion of compound houses and informal ownership is indicative of insecure living. Overcrowding in compounds is likely to augment exposure to shocks (e.g., epidemics, fire) and reduce privacy. Nearly half the respondents occupy rent-free rooms in relatives' homes, which is indicative of family-dependent but also insecurity in case it ceases. The frequent use of public toilets (71.6%) and sachet water (53.7%) is proof of coping behavior but also of shared anxiety, and also public toilets are typically unclean and unsafe at night, and sachet water spending overburdens tight budgets. These conditions also have gendered consequences as girls and women disproportionately experience poor sanitation and water availability. Interventions might involve community-level sanitation programs (e.g., building additional public toilets or subsidizing latrines for households) and encouraging communal water kiosks at regulated prices, possibly tied to LEAP payment points to ensure safe water.

The findings on energy and cooking also have broad implications. Near-universal electricity access is a positive sign, suggesting that basic lighting is not a major barrier in Accra's poor areas. However, the reliance on charcoal (75.6%) for cooking remains a health hazard (indoor air pollution) and environmental issues (deforestation). Although 22.7% use LPG, cost and refill logistics are likely preventing wider uptake. This divide implies an opportunity: programs could encourage clean fuel use among LEAP beneficiaries by providing LPG vouchers or microloans for stoves. Reducing charcoal use would have immediate health benefits (especially for women and children) and align with broader climate goals.

Economically, the data underscores how essential LEAP cash is for many. With over one-third citing LEAP as their main income, the program is more than a supplement—it is foundational. Combined with informal trading (petty business and trading totaling 55.9%), it reveals a precarious livelihood structure: many families cobble together small-scale earnings plus cash transfers just to survive. The low share of wages (3.5%) confirms that the formal labor market is largely out of reach. This pattern suggests that strengthening LEAP should go hand-in-hand with support for small entrepreneurs: financial literacy training, access to microfinance, or organizing cooperatives could help turn subsistence trade into stable income.

The expenditure breakdown highlights the pressures facing households. Food absorbs nearly 40% of monthly budgets on average, and education and health together claim another 38%. These proportions show that basic needs drive spending, leaving little for savings or investment. The high variability in spending (some households report zero spending in categories while others spend several thousand cedis) indicates heterogeneity in need and capacity within the beneficiary population. Households with no food expenditure (the minimum is GHS 0) might be subsidized through other means (gifts, subsistence farming, or starvation!), while others pay GHS 8400, likely for large families or emergencies. Policymakers should note this volatility. For example, linking LEAP with the National Health Insurance Scheme and school feeding programs could stabilize the health and education costs borne by recipients. The data suggests that even among very poor families, education is prioritized (22.8% of spending), so making schooling cheaper or free (textbook subsidies, fee waivers) would directly support a goal these households already value.

### **5.1.2 Community-driven Climate Adaptation and Social Protection in Accra**

Several important insights emerge from these results. First, the contrast between neighborhoods reflects a common urban pattern: better-served areas tend to have stronger institutional capacity for disasters, while poorer, informal areas struggle. Labone/La's relatively robust COOP presence and training levels are consistent with its more formal planning and infrastructure. Informal settlements like Chorkor and Ashiedu Keteke exhibit the vulnerabilities of high density and weak service provision. However, an encouraging nuance is that informal areas often compensate through social networks. Ashiedu Keteke's universal network engagement suggests that dense social capital or NGO activity can partially fill governance gaps. In policy terms, this indicates that resilience strategies should build on existing community strengths: even if a neighborhood lacks formal plans, its grassroots networks can be a foundation for improvement.

A second implication is that social protection programs like LEAP could serve as platforms for climate adaptation. LEAP's cash transfers already target the urban poor, making it a natural conduit for resilience-building. For instance, LEAP could incorporate disaster-preparedness training for beneficiaries: cash transfer meetings could double as forums for COOP education or evacuation drills. Beneficiaries might receive incentives (such as bonus payments) for participating in community resilience workshops. Since LEAP officers routinely visit households, they could also check whether families have flood escape plans or emergency supplies. In this way, LEAP would move beyond poverty alleviation into "adaptive social protection." Such linkage is seen in other contexts: for example, some countries have piloted shock-responsive cash transfers that automatically increase during floods or droughts. Ghana could explore similar mechanisms so that when a flood is forecast, the most vulnerable households receive immediate top-ups or quick-relief payments through the LEAP system. By merging poverty support and disaster readiness, social protection can amplify community resilience.

However, realizing this potential requires confronting significant governance bottlenecks, as our qualitative interviews revealed. Stakeholders repeatedly cited several challenges that undermine effective policy delivery and resilience building efforts. One major challenge is the politicization of development and the short-term outlook of elected officials. Community members and local officials complained that political cycles severely undermine continuity. Elected representatives often engage only in high-profile, short-term projects timed around elections. For example, residents noted that politicians promise to fix flooding or upgrade infrastructure before votes, but once in office they shift focus elsewhere. One community leader summarized the sentiment: *"They only show up when elections are coming. After that, we don't see them again"* (Old Fadama [Agbogbloshie] resident, 2025). This cycle breeds cynicism. When authorities only commit to action four years at a time, it discourages long-term planning and erodes trust. Volunteers and community groups become wary of investing effort in initiatives that might disappear with a new administration.

Another equally pressing challenge is the coordination failures among institutions, which weaken the delivery of well-formulated policies. Although Ghana has well-developed policies on climate adaptation and social protection, implementation falters due to siloed agencies. For instance, NADMO (the National Disaster Management Organization) is charged with emergency relief, while the Ministry of Gender, Children and Social Protection oversees LEAP. In practice, these agencies rarely coordinate. One social welfare officer admitted there is no formal protocol linking NADMO and LEAP: when a beneficiary floods, a staffer must make an informal phone call to ask NADMO for help. Similarly, municipal departments (public works, waste management, health, etc.) often operate independently. An NGO representative lamented that community proposals "sit idle" because each agency

expects another to act. This fragmentation means that opportunities for joint action—say; a combined flood response involving cash support and sanitation services—are frequently missed. The lack of a unified response framework limits adaptive capacity.

Beyond coordination gaps, the delivery and accessibility of programs also remain a major challenge. Even when policies reach the community, administrative hurdles weaken effectiveness. Urban LEAP was rolled out slowly, and many eligible households remain excluded. Local officials described how they had to lobby repeatedly before new areas were added. Once enrolled, beneficiaries face glitches: in flood-prone neighborhoods; cards often get lost or water-damaged. Municipal staff reported cases of families going months without payment because their e-payment cards were missing or expired. As one official said, *“Some of the members, their cards are missing... so those people are not collecting [their money]”* (Local Official, La, 2025). The payments accumulate in accounts, but the delay in distribution leaves households without resources when needed. Such operational issues severely undermine the program’s relief function. When cash transfers do not arrive reliably, households’ absorptive capacity – their ability to cope with shocks – is eroded.

Another significant challenge has to do with community engagement and compliance. On the community side, officials noted difficulties in mobilizing residents for resilience efforts. For example, municipal calls for neighborhood clean-ups (to clear clogged drains before the rains) often see minimal voluntary turnout. One local official sighed that *“when we do these clean-ups, it will assist [with flooding], but when we call for that exercise, they do not participate. So now everything falls on the municipality. They must find time and force people to do the cleanup”* (Local Official, La, 2025). Local committees and NGOs do exist (a Chorkor residents’ committee was mentioned), but they lack formal authority or resources. A youth leader in Chorkor described how his group organizes awareness events about lagoon flooding, *“you talk and talk, but if nobody assists you to push it, it will be difficult before interventions go to the right areas... If only they will listen to us.”* (Community NGO Leader, Accra, 2025). Without structured channels for engagement, residents feel sidelined. They report voicing concerns (for instance about a blocked culvert or a missing payment), only to be ignored. This lack of feedback and ownership creates apathy. Even well-intentioned infrastructure (like a new gutter) can fail if the community is not involved in its design or maintenance.

Together, these bottlenecks form a vicious cycle, where political neglect leads to broken promises, which erodes community trust and reduces citizen participation. In turn, officials interpret low turnout as apathy, justifying further top-down planning. Breaking this cycle and finding pathways through which resilience could be strengthened is essential to build an adaptive capacity. One critical step is to depoliticize resilience projects by committing them within long-term statutory plans and insulated funding that extends beyond election

cycles. This ensures that projects are sustained regardless of political turnover. If infrastructure projects (drains, shelters) and COOP development are embedded in statutory city budgets, they can continue irrespective of political changes. Demonstrating that a project will be maintained long-term can rebuild community trust and signal that resilience initiatives are not electoral promises but sustainable commitments.

An equally important solution is the need to institutionalize coordination across agencies. Currently fragmented mandates hinder joint action but establishing a lasting formal structure that link relevant agencies. One option is a standing coordination committee with representatives from social welfare, NADMO, urban planning, health services, and civil society. This committee could develop joint disaster plans and protocols (for instance, automatically enrolling affected LEAP households into emergency response). By institutionalizing cooperation, ad hoc fixes can give way to predictable collaboration. For example, after a flood, the committee could trigger an agreed procedure: NADMO provides relief and medical aid; social welfare does rapid cash top-ups, and public works begin cleanup—without waiting for separate requests.

A third pathway involves expanding and streamlining the LEAP program to better meet the needs of vulnerable urban populations. The LEAP program should be expanded to include more vulnerable urban residents, while the enrolment process should be simplified to allow for the quick inclusion of new beneficiaries during emergencies. Exploring alternative payment methods such as mobile money and community-based distribution to prevent disruptions caused by lost or damaged cards. By ensuring that assistance reaches people on time, especially during floods, the program would become far more effective.

Consequently, it is important to leverage existing community networks. Grassroots organizations including church groups, youth clubs, and women's cooperatives, often mobilize rapidly during crises, yet their contributions are rarely recognized in formal planning. Providing training and small grants to these associations and integrating them into municipal hazard-mapping workshops or disaster committees would bridge the gap between the government and the citizens. Experience from Ashiedu Keteke and Agboghloshie show that residents are eager to engage if given the opportunity.

Alternative pathway is to enhance accountability and communication between officials and residents. Developing structured feedback channels, such as regular community meetings, or mobile-based reporting platforms or citizen advisory boards to monitor service delivery, would make service delivery more transparent. When residents see that their complaints (for instance, a complaint about a broken storm drain) lead to action, their trust in local government increases. Effective two-way communication can motivate cooperation: if

people believe that maintenance of a new drain will be prompt, they may be more willing to help keep it clear.

Lastly, resilience could be strengthened by integrating risk education into existing social protection frameworks. LEAP, for instance, provides a direct link to vulnerable households and could be used as a platform to promote disaster preparedness. Social workers could incorporate checks on household readiness, such as emergency supplies and evacuation plans during their visits. Similarly, community payment days could include brief workshops on household preparedness on water sanitation, first aid, and emergency contacts. This kind of risk education would improve immediate coping abilities (*absorptive capacity*) and gradually build the knowledge foundation for more adaptive thinking, which would over time, make households more aware of climate threats and how to reduce their personal vulnerability.

These proposed measures embody an adaptive governance approach, emphasizing flexibility, learning, and collaboration. In resilience theory, this means moving beyond solely *absorptive* strategies (reacting to disasters) toward *adaptive* changes (adjusting systems) and ultimately *transformative* shifts (changing socio-political structures). Currently, many of Accra's efforts remain absorptive – providing relief after floods – while adaptive and transformative capacities are nascent. For example, upgrading drainage infrastructure would be an adaptive change, while addressing land tenure or formalizing informal settlements would be transformative. Our findings imply that, while Accra's governance is not yet fully adaptive or transformative, the foundation (especially in the form of active community networks) is there. Building on this foundation through policy reforms and capacity-building could help shift the city along the absorptive–adaptive–transformative continuum.

## 5.2 Structural Equation Model

The empirical results offer compelling evidence that Ghana's LEAP cash transfer program strengthens multiple facets of urban community resilience. First, the high factor loadings and reliability of our constructs validate that we captured the intended dimensions (infrastructure, governance, environment, risk, society) with precision. This lends confidence to interpret the substantive findings. Second, the uniformly positive path coefficients underscore that LEAP participation *does* matter far beyond immediate poverty relief. In particular, LEAP's strongest impact on social cohesion (SCT) suggests that cash transfers function as social safety nets in a double sense – they not only alleviate economic hardship but also weave social capital by fostering mutual aid, trust, and collective identity. This resonates with findings from other African contexts where well-designed cash programs

have yielded psychosocial benefits and community support networks (Asfaw & Davis, 2018). By enabling households to meet basic needs and engage more fully in communal life, LEAP appears to reduce stigma and increase reciprocity, creating a virtuous cycle of solidarity.

The substantial LEAP→BEV effect highlights the infrastructural implications of income support. This implies that even a modest transfer can translate into upgraded housing, sanitation, or water access. It suggests that households treat LEAP cash as an investment in the built environment. In practice, policy could leverage this by coordinating LEAP with local infrastructure projects – for example, combining cash grants with sanitation campaigns or minor home repair grants. Our findings thus align with the concept that social protection underwrites more than consumption; it can be viewed as seed capital for community infrastructure (Asfaw & Davis, 2018).

Governance gains (LEAP→GVT) were moderately positive, indicating that beneficiaries perceive more responsive and participatory local governance. This offers an empirical counterpoint to criticism that welfare breeds passivity. Instead, LEAP seems to have built political efficacy among the urban poor. One interpretation is that by linking the poor to formal systems (e.g. NHIS, conditionalities), LEAP encourages engagement and trust. The literature on collaborative governance notes that programs like LEAP are deliberately structured to involve communities in implementation (Foli et al., 2025). Our results suggest this strategy pays off: citizens feel heard by authorities and are more capable of voicing needs. For policymakers, this underscores that integrating cash transfers with civic processes (community meetings, local committees) could multiply governance dividends.

The positive environmental effects (LEAP→NEV) are particularly interesting. Poverty alleviation often leads to better public and private environmental outcomes, as households can afford clean water and waste services. Our data implies that such “green” benefits are indeed part of the LEAP story in Accra. Given increasing attention to climate-resilient development, this is encouraging: social protection is contributing to urban sanitation and possibly reducing pollution. While the analysis is perceptual, it aligns with broader findings that cash transfers can relax economic trade-offs between livelihood and environmental stewardship (Asfaw & Davis, 2018). In practice, the government could build on this by coupling LEAP with environmental education or microgrants for home gardens or rainwater catchment in beneficiary neighborhoods.

Importantly, the strong LEAP→RSK impact confirms that cash safety nets work: beneficiaries feel markedly better able to handle shocks. This resonates with empirical work across Africa showing that predictable cash flows smooth consumption and allows

preparatory investments (e.g. storing food) (Asfaw & Davis, 2018). In urban Ghana, such risk reduction might mean avoiding informal borrowing, feeding children during crises, or affording minor home flood defenses. The especially high male coefficient for RSK (0.889) suggests that men may feel more confident in discharging their protector role when LEAP is present. This gender finding indicates that CTs can change risk dynamics in households: men perceive less financial pressure, while women may worry about other types of risk (domestic health and food security) that the program addresses to a lesser extent. Future programs might build on this by including women-targeted risk reduction components (e.g. addressing domestic violence or food insecurity) to bring women's risk perception in line.

The gender-disaggregated results have broader implications for program design. That women beneficiaries saw larger impacts on infrastructure and governance outcomes suggests that cash transfers are effectively reaching and empowering them. This aligns with international guidance: directing transfers to women tends to enhance their economic decision-making and social standing (Centre for Financial Inclusion & World Food Program, 2023). It also reinforces the call to intentionally involve women in all aspects of LEAP (e.g. targeting, training, monitoring) to sustain these benefits. The slightly lower but still high SCT effect for women indicates that while community cohesion rises for all, program refinements (such as women's groups or mentorships) could further amplify women's social networks.

The settlement-based differences reveal that urban inequalities shape the program impact. Formal areas enjoyed greater resilience gains, likely because these neighborhoods already had the necessary "absorptive capacity": better infrastructure, security of tenure, and clearer governance channels. Informal settlements, while benefiting significantly, may face systemic constraints (e.g. lack of addresses, illegal land status) that dampen effect magnitude. This suggests a potential limitation in one-size-fits-all transfer design. To improve equity, policymakers might consider complementary measures for slums – for instance, mobile payment systems, community-based targeting, or legal recognition of new settlements – to allow LEAP funds to translate into tangible improvements. This context sensitivity is echoed in Otieno *et al.*'s finding that the benefits of Ghana's LEAP 1000 are amplified in high-quality service areas (Otieno *et al.*, 2022). We similarly observe that LEAP's value is mediated by local conditions; thus, integrated approaches (social protection plus infrastructure investment) are recommended, especially in informal urban zones.

The study has several caveats. First, the sample, while covering diverse Accra communities, is not nationally representative. We deliberately oversampled certain neighborhoods (e.g. Labone/La, Agbogbloshie) to contrast formal and informal settings; results should not be generalized beyond similar urban contexts. Second, the heavy female bias (84.7%) means men's situations are under described. Some of this bias may stem from survey timing

(women being more likely at home during interviews) or program registration patterns, which could skew our understanding of household dynamics. Third, all measures are based on self-report surveys, which may be subject to social desirability or recall bias. However, the high consistency of findings across models (and strong statistical significance) mitigates this concern. Fourth, the factor-reduction process, while statistically justified, means some theoretically relevant indicators were dropped. Future research could explore these latent factors with higher-order modelling to capture omitted nuances. Finally, the study is context-specific to Accra's urban low-income areas; extrapolation to rural Ghana or other countries should be done cautiously. Despite these limitations, the robustness checks (reliability/validity metrics) and alignment with related literature suggest the core insights are reliable and actionable.

## 5. Conclusions

Our analysis shows that LEAP delivers robust, multidimensional gains in urban resilience, with the strongest improvements in social cohesion and notable advances in infrastructure, governance, environmental conditions, and risk coping. These effects are sensitive to context and gender: women and residents of formal neighborhoods often experience greater benefits, underscoring the need for inclusive, tailored implementation that considers settlement-specific constraints. The findings support a broader view of cash transfers as platforms for resilience, not only for poverty relief. By providing predictable income, LEAP helps households stabilize consumption while also strengthening local assets and networks. Policymakers should continue and expand LEAP while intentionally linking it to local infrastructure and community development initiatives so that transfers translate into safer housing, functional drainage, and greener neighborhoods.

Building resilience in Accra requires technical and institutional changes together. Physical investments (drains, shelters, safe housing) must be paired with inter-agency coordination, clear protocols, and sustained community participation. Resilience is relational: well-connected communities access information and support faster, while isolated ones fall behind. Strengthening social infrastructure training, participatory planning, and feedback mechanism can move communities “from vulnerability to capability.”

Looking ahead, LEAP should be more explicitly climate oriented. The next practical steps include piloting cash-plus models that pair transfers with climate education, preparedness drills, and shock-responsive features (e.g., temporary top-ups after floods), and then tracking outcomes over time. These efforts should be co-produced with local governments and communities, aligning social protection and disaster management to deliver timely, place-

appropriate support. Only by transforming both technical systems and governance arrangements can Accra build resilient neighborhoods for its most vulnerable residents. See Section 7.0 for a concise list of actionable recommendations.

## 6. Recommendations

- Piggyback climate-risk activities onto LEAP delivery by co-scheduling evacuation drills, early-warning sign-ups, and household preparedness sessions at cash-out points or pay-days.
- Establish and strengthen youth and women leaders for gutter cleaning days, hazard spotting, and two-way feedback with assemblies/NADMO, issue simple SOPs and recognition.
- Targeted add-ons for informal areas through mobile payments (e.g., agent networks), small grants/loans for flood-safe home retrofits, and bundled NHIS renewal at LEAP events to cut access barriers.
- Link LEAP households (or caregivers) with community recycling/segregation initiatives to convert plastics/waste into income.
- Routine joint clinics with assemblies, Environmental Health, and NADMO at community centers (storm-season calendar); publish simple service charters and contacts.
- Couple transfers with women-led safety groups, GBV referral info, and childcare support during drills to ensure equitable participation.
- Add 3–5 climate/resilience indicators to LEAP monitoring (e.g., evacuation knowledge, safe-home improvements, waste service access)

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## Annex A: Figures and Tables

**Table 1: Gender Distribution Across Household Headship, Education, Community, and Settlement Type**

Variable	Category	Male	Female
Household Headship	No	11.88%	88.12%
	Yes	17.97%	82.03%
Education Level	No Formal Education	4.08%	95.92%
	Primary	6.12%	93.88%
	Junior High School (JHS)	22.22%	77.78%
	SHS/Vocational	23.26%	76.74%
	Tertiary	16.67%	83.33%
Community/Neighborhood	Tunga	13.04%	86.96%
	Agbogbloshie (Old Fadama)	14.29%	85.71%
	Ashiedu Keteke	13.33%	86.67%
	Chorkor	20.00%	80.00%
	Glefe	8.33%	91.67%
	Labone/La	14.71%	85.29%
Settlement Type	Formal (Planned)	10.34%	89.66%
	Informal (Unplanned)	16.00%	84.00%

**Table 2: Distribution of Educational Attainment by Community, Settlement Type, and Household Headship**

Variable	Category	No Formal Education	Primary	JHS	SHS/Vocational	Tertiary
Community / Neighborhood	Tunga	39.13%	30.43%	21.74%	8.70%	0%
	Agbogbloshie (Old Fadama)	47.62%	9.52%	33.33%	9.52%	0%
	Ashiedu Keteke	13.33%	17.78%	44.44%	22.22%	2.22%
	Chorkor	21.67%	20.00%	26.67%	28.33%	3.33%
	Glefe	33.33%	33.33%	33.33%	0.00%	0.00%
	Labone/La	10.45%	23.88%	43.28%	17.91%	4.48%
Settlement Type	Formal	10.34%	17.24%	24.14%	44.83%	3.45%
	Informal	23.12%	22.11%	37.19%	15.08%	2.51%
Household Headship	No	14.85%	19.80%	39.60%	21.78%	3.96%
	Yes	26.77%	22.83%	32.28%	16.54%	1.57%

**Table 3: Distribution of Main Source of Income**

Main Source of Income	Frequency	Percentage
LEAP Cash Transfer	84	36.68%
Petty Business	71	31.00%

Remittances	9	3.93%
Trading	57	24.89%
Wages	8	3.49%

**Table 4: Summary Statistics of Monthly Household Expenditures (in Ghana Cedis)**

Expenditure Item	Summaries Statistics			
	Mean (GHS)	Standard Deviation	Minimum	Maximum
Total Monthly Expenditure	1355.18	1150.92	0	6000
Food	540.17	756.44	0	8400
Housing (Rent/Repairs)	88.17	170.17	0	1500
Utilities (Water/Electricity)	127.55	125.84	0	660
Education (Fees/Supplies)	308.52	520.67	0	3000
Health Expenditure	214.49	242.62	0	1500
Transport	85.22	130.71	0	1200

**Table 5: Distribution of Governance Indicators by Community**

Indicator & Response Category	Community					
	Tunga	Agbogbloshie	Ashiedu Keteke	Chorkor	Glefe	Labone/La
<i>Continuity of Operations Plan for Emergencies</i>						
No	11.54%	7.69%	19.23%	34.62%	7.69%	19.23%
Unsure	8.20%	4.92%	14.75%	27.87%	6.56%	37.70%
In progress	11.59%	10.14%	26.09%	23.19%	4.35%	24.64%
Yes, but limited	11.32%	11.32%	18.87%	24.53%	3.77%	30.19%
Yes, comprehensive and tested	5.00%	15.00%	15.00%	25.00%	5.00%	35.00%
<i>Training of Local Emergency Management Personnel</i>						
Not trained	12.00%	8.00%	12.00%	32.00%	8.00%	28.00%
Minimally trained	14.04%	7.02%	22.81%	22.81%	5.26%	28.07%
Adequately trained	7.46%	5.97%	23.88%	28.36%	4.48%	29.85%
Well trained	8.06%	12.90%	17.74%	27.42%	4.84%	29.03%
Highly trained	11.11%	16.67%	11.11%	16.67%	5.56%	38.89%
<i>Community Involvement in Resilience Networks</i>						
Not at all	11.89%	11.19%	21.68%	23.78%	6.29%	25.17%
Slightly involved	4.26%	8.51%	19.15%	36.17%	2.13%	29.79%
Somewhat involved	3.57%	3.57%	14.29%	25.00%	7.14%	46.43%
Very involved	30.00%	0.00%	0.00%	20.00%	0.00%	50.00%
Fully engaged	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%

**Table 6: Factor Loadings & Measurement Items**

Measurement Items	Factor Loadings	Standard deviation	P-Values	VIF
<i>Built Environment Domain (BEV)</i>				
BEV1	-0.016 (dropped)	0.093	0.86	1.097
BEV2	-0.068 (dropped)	0.084	0.421	1.03

BEV3	0.778	0.03	0	1.867
BEV4	-0.104 (dropped)	0.086	0.227	1.06
BEV5	0.729	0.033	0	1.6
BEV6	0.836	0.02	0	2.302
BEV7	0.775	0.028	0	1.831
BEV8	0.752	0.029	0	1.689
BEV9	-0.07 (dropped)	0.084	0.405	1.109
BEV10	0.777	0.03	0	1.91
<b>Governance Domain (GVT)</b>				
GVT1	-0.076 (dropped)	0.097	0.436	1.229
GVT2	0.008 (dropped)	0.104	0.937	1.18
GVT3	0.786	0.031	0	1.874
GVT4	-0.028 (dropped)	0.095	0.771	1.062
GVT5	0.781	0.029	0	1.795
GVT6	0.763	0.033	0	1.796
GVT7	0.789	0.024	0	1.857
GVT8	0.669 (dropped)	0.049	0	1.535
GVT9	0.759	0.031	0	1.665
GVT10	-0.019 (dropped)	0.099	0.849	1.087
<b>Livelihood Empowerment Against Poverty (LEAP)</b>				
LEAP1	0.793	0.026	0	2.211
LEAP2	0.771	0.031	0	2.141
LEAP3	0.89	0.016	0	3.677
LEAP4	0.827	0.021	0	2.616
LEAP5	0.798	0.023	0	2.388
LEAP6	0.873	0.015	0	3.305
LEAP7	0.8	0.025	0	2.298
LEAP8	0.778	0.027	0	2.131
LEAP9	0.853	0.019	0	2.972
<b>Natural Environment Domain (NEV)</b>				
NEV1	-0.205 (dropped)	0.09	0.022	2.416
NEV3	0.041 (dropped)	0.099	0.68	1.095
NEV4	0.771	0.029	0	1.84
NEV5	0.691 (dropped)	0.043	0	1.531
NEV6	0.734	0.038	0	1.65
NEV7	-0.195 (dropped)	0.095	0.041	2.567
NEV8	0.829	0.022	0	2.27
NEV9	0.812	0.023	0	2.093
NEV10	0.78	0.028	0	1.985
<b>Risk Domain (RSK)</b>				
RSK1	0.724	0.033	0	1.696
RSK10	0.778	0.029	0	1.939

RSK2	0.749	0.033	0	1.792
RSK3	0.019 (dropped)	0.084	0.824	1.113
RSK4	0.788	0.024	0	1.985
RSK5	0.676 (dropped)	0.042	0	1.506
RSK6	-0.084 (dropped)	0.083	0.311	1.137
RSK7	0.806	0.022	0	2.083
RSK8	-0.111 (dropped)	0.083	0.18	1.147
RSK9	0.774	0.03	0	1.959
<b>Society Domain (SCT)</b>				
SCT1	0.785	0.026	0	2.12
SCT2	0.681 (dropped)	0.035	0	1.597
SCT3	0.013 (dropped)	0.077	0.863	1.149
SCT4	0.818	0.023	0	2.328
SCT5	0.83	0.021	0	2.49
SCT6	0.81	0.023	0	2.303
SCT7	0.824	0.022	0	2.422
SCT8	0.807	0.022	0	2.362
SCT9	0.773	0.029	0	2.085
SCT10	-0.038 (dropped)	0.088	0.662	1.07

**Table 7: Constructs Reliability & Validity**

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
BEV	0.867	0.869	0.602
GVT	0.854	0.862	0.578
LEAP	0.939	0.941	0.674
NEV	0.863	0.868	0.596
RSK	0.877	0.881	0.576
SCT	0.915	0.918	0.628

**Table 8: Discriminant Validity (Fornell-Larcker Criterion)**

Constructs	BEV	GVT	LEAP	NEV	RSK	SCT
BEV	<b>0.776</b>					
GVT	0.479	<b>0.76</b>				
LEAP	0.765	0.595	<b>0.821</b>			
NEV	0.611	0.431	0.7	<b>0.772</b>		
RSK	0.602	0.411	0.724	0.522	<b>0.759</b>	
SCT	0.712	0.516	0.859	0.652	0.712	<b>0.8</b>

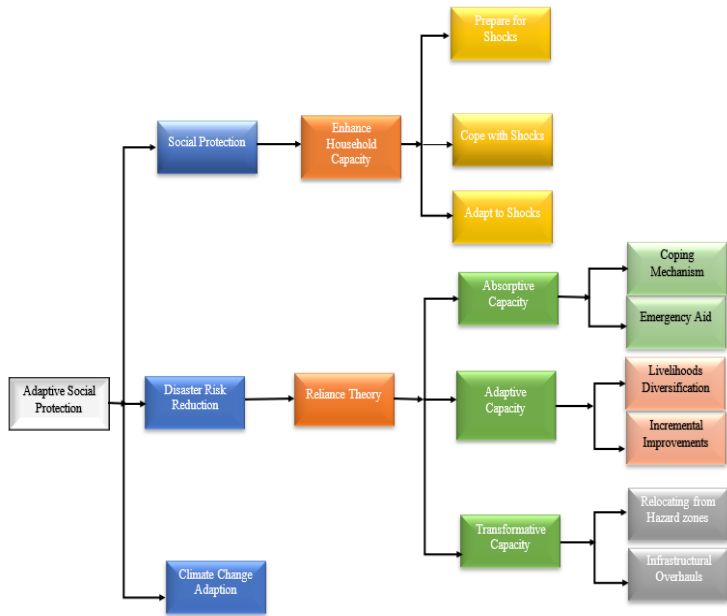


Figure 1: Adaptive Social Protection Framework



Figure 2: LEAP & Urban Climate Resilience: Interconnected Domains

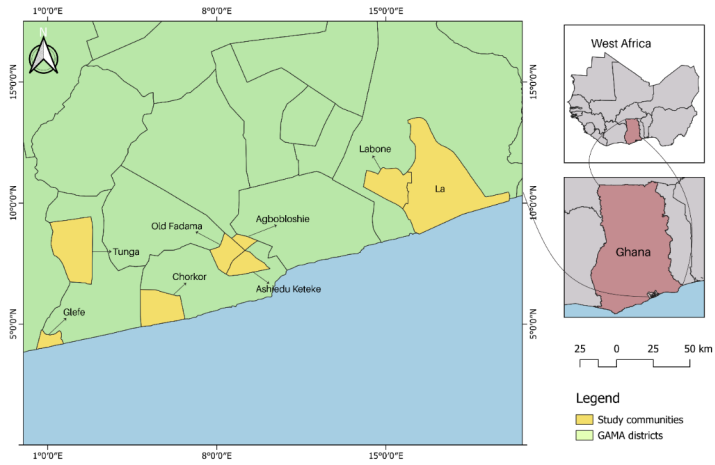


Figure 3: Map of Study Areas

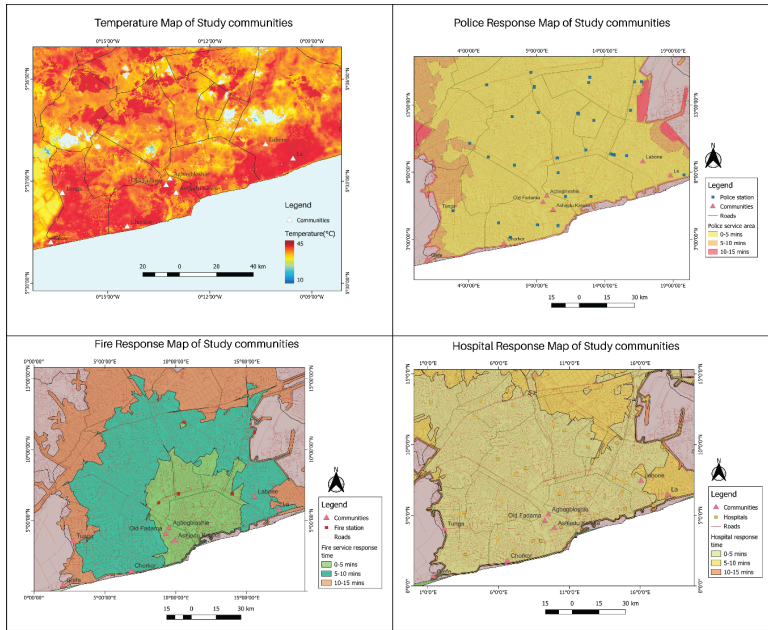


Figure 3a: Emergency response and heat exposure maps of study communities (police, fire, hospital response times; land-surface temperature).

Evaluating the Impact of Social Protection Policies on  
Urban Climate Resilience in Ghana: A Comparative Analysis of Formal and Informal Settlements

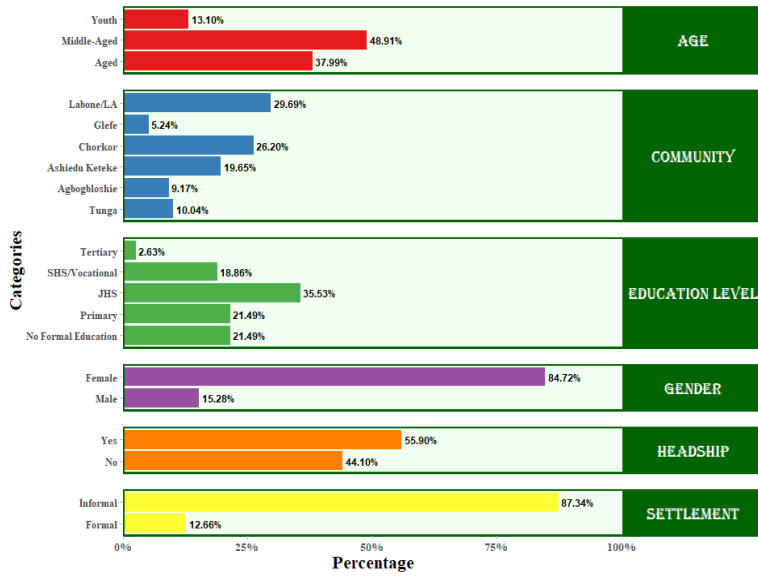


Figure 4: Distribution of Key Socio-Demographics

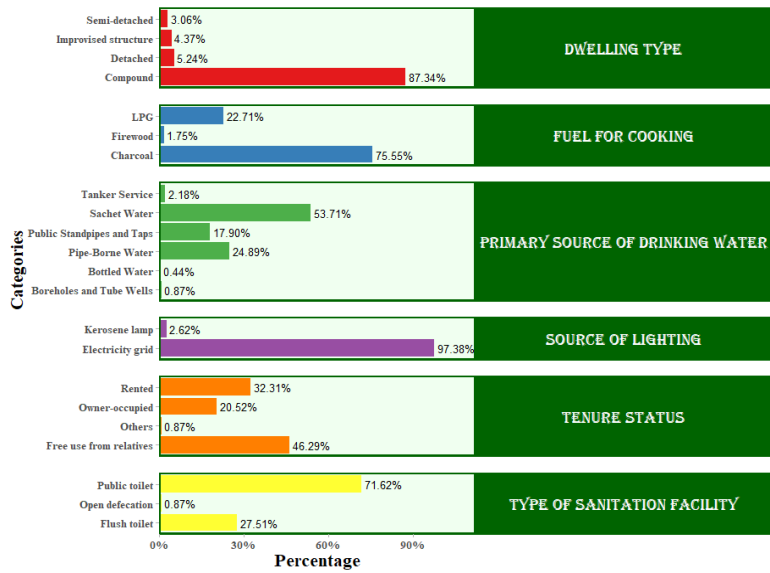


Figure 5: Distribution of Household Characteristics



Figure 6: Dwelling Type and living conditions of some LEAP beneficiaries in Agbogbloshie.

Source: Authors 2025

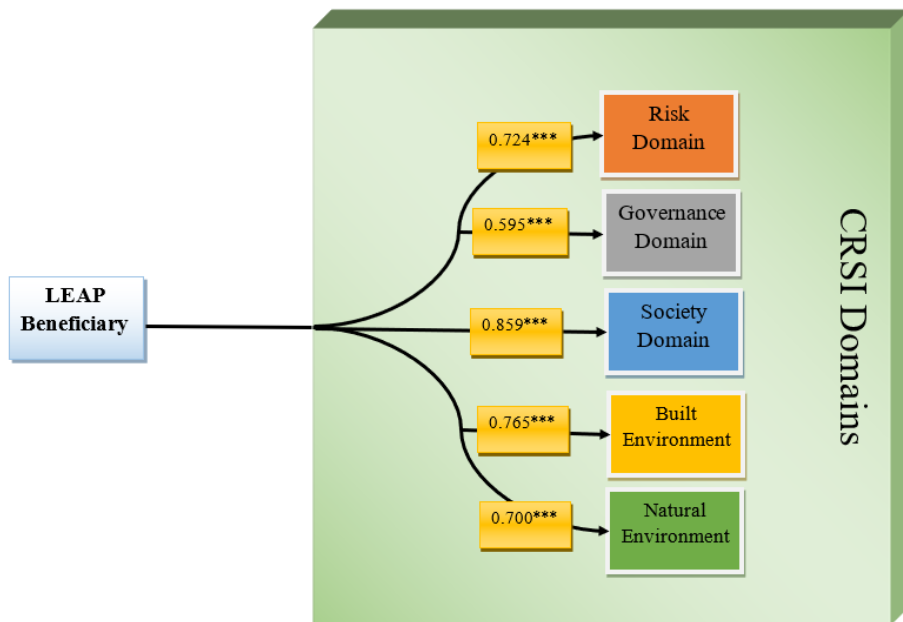


Figure 7: Impact of LEAP on CRSI Domains

Significant codes  $p < 0.01 = **$ ,  $p < 0.01 = ***$ ,  $p < 0.001 = ****$

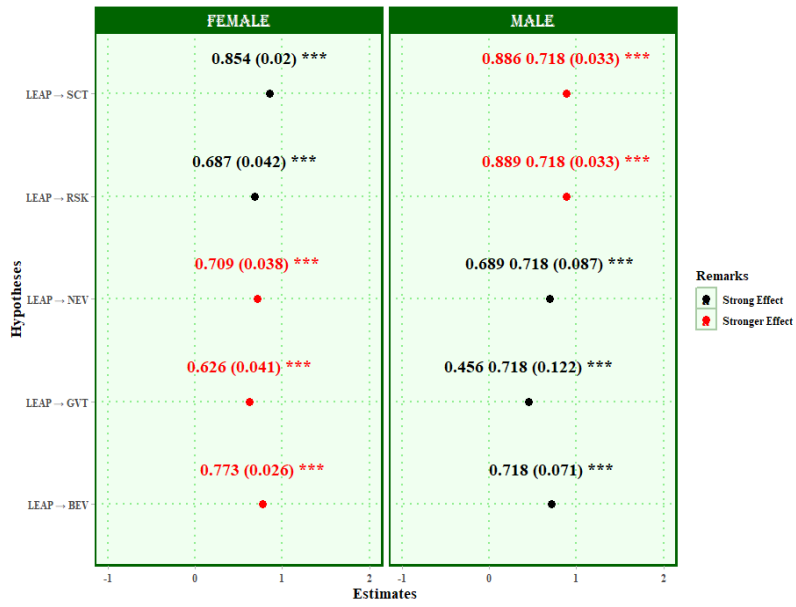


Figure 8: Gender-Based Analysis

Significant codes  $p < 0.01 = **$ ,  $p < 0.01 = ***$ ,  $p < 0.001 = ****$

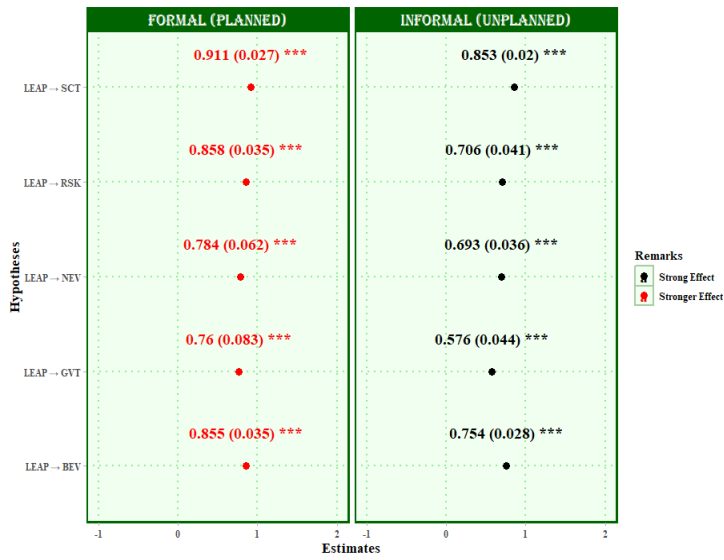


Figure 9: Settlement-Type Analysis

Significant codes  $p < 0.01 = "**"$ ,  $p < 0.01 = "***"$ ,  $p < 0.001 = "****"$

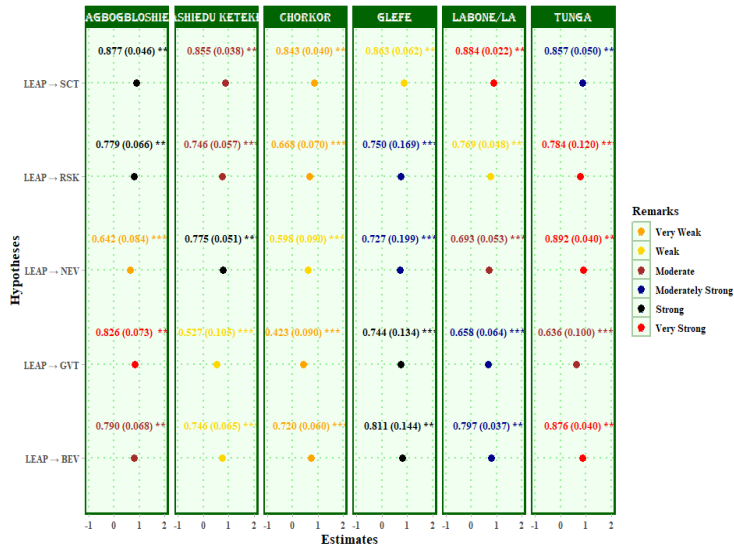


Figure 10: Community-Based Analysis

Significant codes  $p < 0.01 = "**"$ ,  $p < 0.01 = "***"$ ,  $p < 0.001 = "****"$