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BUILDING RESILIENCE TO SMOG: A STUDY OF COMMUNITY COPING MECHANISMS IN LAHORE

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Abstract
This research focuses how the communities in Lahore develop resilience in the face of smog, focusing on coping strategies developed to avoid adverse effects. Using mixed methodology including 125 surveys and 20 interviews, the study focused into coping strategies developed by various socio-economic groups while dealing with air pollution. Some of the major quantitative findings are that coping strategies relate significantly to the income because people are making a difference depending upon their incomes. High-income groups used air purifiers and wore masks as part of regular practices. Low-income families made reductions in outdoor activities to cope with the behavior adaptation. Psychological impacts were most noticeable over 50% said they started to feel growing anxiety and stress about health concerns. Better community solidarity, which often came within the low-income neighborhoods themselves, provided informal networks of support for this group. Qualitative insights further illuminate frustration with the government efforts by viewing the enforcement of air-quality regulations as ineffective and oriented towards public health campaigns only. The results point to a need for more integrated, holistic policy intervention to address the socio-economic imbalances in access rights to clean air resources and community-based resilience building. This study stresses the need for proactive and inclusive responses that may help in reducing the health risks associated with smog and, therefore enhance urban resilience in rapidly growing cities like Lahore.

Introduction

Background

Expansion of cities and industrialization across key Pakistani cities like Lahore have been associated with major environmental issues at hand. The smog, generally characterized by increased levels of PM2.5 and other pollutants like nitrogen oxides and sulfur dioxide, has been a consistent issue over the years in Lahore; its persistence has been prominent especially during the winter months (Butt et al., 2021). The resultant detrimental health impacts of smog, ranging from respiratory diseases to heart conditions and even reduced longevity, have called for immediate community efforts to enhance resilience as well as to put in place measures that neutralize the negative impacts of these particular areas (World Health Organization, 2020).

The Problem of Smog in Lahore

A capital city of the Punjab province, Lahore is still considered among the most polluted cities in the world. As per the Air Quality Index, dangerous levels of air quality persistently befall the city of Lahore, and PM2.5 concentration exceeds safety levels multiple times during peak smog seasons (Ahmad et al., 2022). The other factors contributing to this

serious pollution include emissions from vehicles, industrial waste, crop burning in the surroundings, and adverse weather conditions that trap pollutants close to the ground (Shah et al., 2020). Health impacts of smog are most severe among vulnerable populations such as children, older people, and patients of pre-existing respiratory diseases. The past years have been proven to exhibit the relationship of smog exposure along with adverse respiratory diseases such as asthma, bronchitis, and COPD. In addition, this is exposed that long-term exposure in PM2.5 will increase one's risk of having cardiovascular disease with a risk of early death. Notable groups are those vulnerable ones which consist of children, older adults, and people who have previous health diseases.

Lahore city dwellers are forced to adapt to various measures that have minimized their exposure to smog and reduced its health consequences. Building resilience to smog requires the presence of both physical, psychological, and social strategies at individual and community levels to deal with challenges (Folke, 2016). Similar highly polluted cities in the world, like Beijing, people implement different coping strategies; for example, to minimize smog exposure, people in cities like Lahore wear masks and implement air purifiers. An understanding of these strategies will become the heart of the argument by policymakers and planners in implementing any intervention in such cities to make communities more resilient.

Community Coping Mechanisms and Resilience

Resilience in the context of air pollution essentially means the ability of a community to prepare for, adapt to, and respond to smog in ways that limit its impacts on health and well-being. Resilience-building strategies can vary significantly depending on socio-economic status, resource availability, and the level of public awareness of smog hazards. More capable communities are better equipped with coping tools such as air purifiers, masks, and private transport in order not to be exposed to some severe smog events. Low-income communities face a relatively higher risk because they have limited access to such protective resources, relying instead on informal networks and shared knowledge to address the situation.

While research is being done on the coping mechanisms of Lahore's communities, it is found that strategies can go from simple acts, like wearing a mask and reducing outdoor activities, to more complex ones, such as maintaining air purifiers and monitoring smog alerts (Khan et al., 2020). Community networks are also important for spreading information as well as helping vulnerable people during high-smog periods. In low-income neighborhoods, however, community cohesion and social reciprocity have taken on a role of holding everything together, drawing attention to social relationships as important determinants of mitigating environmental stressor impacts (Ahmad et al., 2022).

Socio-Economic and Policy Dimensions of Resilience

Socio-economic disadvantages significantly contribute to dealing with smog. High-income individuals have the utmost opportunity to invest in technologically advanced methods, such as high-capacity air purifiers and world-class healthcare facilities, which presents a challenge for lower-income groups to access such opportunities. Therefore, this above-mentioned gap presents a reason for equitable policy interventions so that everyone from this planet is protected from these health-related risks faced due to smog (Shah et al., 2020). Moreover, policies by the government to cut emissions from vehicles and industries, as well as to make public transports better and control crop burning, would be a necessary step towards long-term resilience against smog (Butt et al., 2021).

Effective resilience is not the sole responsibility of the individual but also hinged on collective efforts and support from the government. Public awareness campaigns and strong regulatory measures about air quality can build resiliency through resident sensitization on prevention measures and reduction of sources of pollution. Government action is also key in ensuring that policies are implemented effectively with adequate resources channeled toward vulnerable communities.

Research Problem

Communities in Lahore are encountering growing difficulties in adapting to environmental hazards like

smog. While some residents have the resources to shield themselves, others, particularly those in low-income areas, are more at risk. Understanding how various communities manage smog and enhance resilience is essential for creating targeted interventions to safeguard public health.

Objective

This study aims to examine the coping mechanisms used by various communities in Lahore to lessen the impact of smog. By investigating how residents adapt to air pollution, the study intends to identify the socio-economic factors that affect resilience and the role of community and government support in strengthening coping strategies.

Research Questions

1. What coping mechanisms do communities in Lahore use to mitigate the impact of smog?
2. How do socio-economic factors influence a community's ability to adapt and build resilience to smog?
3. What role do government policies and local initiatives play in enhancing community resilience to smog?

Literature Review

The Growing Problem of Smog

Smog in Lahore is primarily due to rapid urbanization, unregulated industrial processes, vehicular emission, and agriculture such as crop burning in other regions (Butt et al., 2021). During winters, the climatic condition like temperature inversion retains the pollutants close to the ground, thus aggravating the problem of air quality (Shah et al., 2020). Analysis results indicate that PM2.5 levels in Lahore exceed the WHO prescribed threshold levels thus seriously jeopardizing health, including respiratory as well as cardiovascular diseases. (World Health Organization, 2020).

Health Effects of Smog

There is a substantial health impact caused by exposure to smog. These impacts include an increase in asthma and COPD, among other respiratory diseases, and much more. (Ahmad et al., 2022). Shah et al. (2020) showed that long-term exposure at a higher level of air pollution is related to a lower function in the lung, higher stress, and psychological anxiety in inhabitants of Lahore. Children, elderly people, and those with previous diseases are more vulnerable. Long-term smog exposure also reported to elevate the risk for various respiratory and cardiovascular diseases (Smith & Peel, 2010; WHO, 2018). Other Psychological Consequences: Anxiety and Depression: Psychological consequences are documented to include anxiety and depression related to health issues and immobilization (Shah et al., 2020).

Community Coping Behaviours

Resilience in the context of environmental hazard refers to the ability of individuals and communities and the ability of such units to cope with stressors and recover from stress (Adger, 2000). Coping behaviours herein refer to both behavioural and technological practices that reduce exposure to harmful pollutants. Such determinants of community resilience include socio-economic status, the availability of material resources, and supportive social networks (Norris et al., 2008). In the context of air pollution resilience, this simply means the abilities of communities to anticipate, prepare for, and respond effectively to environmental stressors such as smog. Coping in Lahore varies significantly with socio-economic status and resource access. Air purifiers, masks, and staying indoors during peak times for smog become relatively affordable among the richer residents. The poor communities do not have such amenities; they instead depend on informal social networks and community solidarity.

Khan et al. (2020) argues that informal coping mechanisms among lower income communities in Lahore are substantial. For instance, shared knowledge and community activities may involve cutting back on outdoor activities, using wet cloths over windows, or forming mutual support groups. Beyond that, informal support systems will also provide information about air quality alerts and safe practices during high-smog days. The reliance on social networks therefore evinces the function of community relationships in building up the resilience of socio-economically vulnerable populations.

Role of Socio-Economic Disparities in Resilience

Socio-economic factors mainly drive the resilience of smog in the communities. The rich are associated with their ability to raise money for costly air purification devices, consulting doctors, and even private transport to avoid direct exposure from smog. Conversely, vulnerable low-income communities suffer the most due to resource limitation, housing conditions, and lack of enlightenment on ways of protection (Shah et al., 2020). The better-off will invest in quality air purifiers and masks; while the poor will require greater behavioral change, such as staying indoors. Government initiatives, including monitoring of air quality and raising public awareness, are less productive (Ali et al., 2021).

The availability of public healthcare facilities in the smog-prone zones is also limited, thus widening this gap. Butt et al. (2021) assert that smog mitigation would require more the government to offer low-cost clean air technologies and enhanced avenues of accessing healthcare for the low-income classes. The gap between the socio-economic classes in terms of resilient health may tend to widen even further with no deliberate effort. Vulnerable populations will be more susceptible to health problems related to smog without any specific action in this regard.

Psychological and Social Dimensions of Resilience

The psychological impacts of residence in a smog-polluted metropolis far outweigh the physical risks in terms of health. According to the statements, there is general anxiety, stress, and feelings of helplessness among the residents of Lahore during peak periods of smog (Shah et al., 2020). This psychological burden hits hardest at those who already have some sort of respiratory problem and parents who worry about their children's health. Ahmad et al. (2022) argue that the psychological dimension of resilience is often neglected in policy discussions despite its crucial role in influencing community responses to environmental challenges.

Besides psychological effects, social factors are crucial in building resilience. Among informal support networks that help exchange information and mutual aid during smog days, very essential for low-income people. Thus, networks reduce the psychological cost of an effort made in dwelling on smog issues and bring back community and responsibilities (Khan et al., 2020).

Role of Government and Policy Implications

Government policies and interventions form the basis of enhanced community resilience to smog. The policies are critical and should be directed toward emissions that result from the primary cause of the problem, which include vehicles, industries, and agriculture. As Butt et al. (2021) observes, the constraints put on industrial emissions, which also act as the constraint to vehicular emissions, is a way of achieving the root causes of smog in Lahore. Moreover, public enlightenment programs targeting the risks posed by smog and ways to prevent it can be very effective in building resilience.

Khan et al. (2020) highlighted the need for policy interventions that focus on socio-economic inequality as resilience. For instance, low-cost availability of air purifiers and masks and improvement in healthcare services along with financial aid schemes for the most vulnerable individuals would minimize the vulnerability of these groups to smog and increase their resilience. Ahmad et al. (2022) further contend that it is the policy of the government to first of all make an equitable allocation of resources for every group of people so that each group gets instruments as well as information needed to build their resilience.

According to literature, building resilience against the smog of Lahore city is a challenge requiring removal of socio-economic disparities, strengthening of community coping mechanisms, and effective policies on the part of the government. Socioeconomic disparities will heavily affect the ability to cope, as wealthier communities have an easier access to clean air technology and health services. However, the poorer communities tap more into informal support networks and collective knowledge to address the adverse effects brought by smog. The psychological and social dimensions of resilience, thus, need to be understood to fully grasp community reactions toward environmental hazards. For example, despite the government's attempts to address air pollution, inefficient policies in the management of smog remain for economically vulnerable population groups in Lahore (Zahid & Javaid, 2020). Relevant for policymakers, in the name

of improving public access to clean air technologies, and public aware-raising, plus enforcement of regulations on behalf of conducive legal instruments, is the reduction at various points. Gradually through governmental interventions, community-based initiatives, and civil society action, there could be building of long-term resilience to smog in Lahore.

Methodology

Research Design

This study uses a mixed-methods approach, combining quantitative surveys with qualitative interviews to capture both the prevalence of specific coping strategies and the personal experiences of individuals adapting to smog.

Sampling

The study involved 145 residents from diverse socio-economic backgrounds in Lahore, including high-income, middle-income, and low-income neighborhoods. 20 participants were interviewed and 125 participants were selected for surevey. Stratified sampling ensured representation from different socio-economic groups, while random sampling within each stratum provided variability in responses.

Data Collection

A structured survey was conducted with 125 participants to examine the prevalence of coping mechanisms such as using air purifiers, wearing face masks, reducing outdoor activities, and staying indoors. The survey also addressed socio-economic factors such as income, education, and access to resources.

In-depth interviews were held with 20 participants to explore the psychological and social dimensions of coping with smog. Interview questions focused on the emotional effects of living in a polluted environment, the role of community support, and participants' views on government interventions.

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Age Group			
	18-30 years	50	40%
	31-40 years	60	48%
	41-50 years	10	8%
	Above 50 years	5	4%
Gender			
	Male	65	52%
	Female	60	48%
Education Level			
	Primary	15	12%
	Secondary	45	36%
	Higher Secondary	40	32%
	Undergraduate	15	12%
	Postgraduate	10	8%
Income Level			
	Low	40	32%
	Middle	60	48%
	High	25	20%

The table shows the demographic breakdown of the study's respondents. The majority of respondents fall within the 31-40 age range (48%), with a balanced representation between males (52%) and females (48%). In terms of education, most respondents had secondary (36%) and higher secondary education

(32%), indicating a moderately educated population. The income distribution reveals that 48% of respondents belong to the middle-income group, followed by 32% in the low-income group. This demographic spread suggests a diverse sample, enabling insights into how different socio-economic groups cope with smog in Lahore.

Table 2: Awareness of Smog and Coping Strategies

Variable	Frequency (n)	Percentage (%)
Awareness of Smog Risks		
Yes	100	80%
No	25	20%
Use of Air Purifiers		
Yes	45	36%
No	80	64%
Wearing Protective Masks		
Always	30	24%
Sometimes	55	44%
Rarely	25	20%
Never	15	12%
Reducing Outdoor Activities		
Yes	90	72%
No	35	28%

The table highlights that a substantial majority (80%) of respondents are aware of the risks posed by smog. Despite this awareness, only 36% reported using air purifiers, which indicates potential socio-economic barriers in accessing clean air technology. A significant number of respondents (44%) sometimes wear protective masks, suggesting partial compliance with protective measures. Furthermore, 72% of respondents reported reducing outdoor activities during peak smog periods, indicating a common behavioral adaptation to poor air quality. These findings suggest that awareness alone does not translate into action, likely due to resource limitations.

Table 3: Impact of Socio-Economic Status on Coping Mechanisms

Coping Mechanism	Low Income (n)	Middle Income (n)	High Income (n)	Total (n)	P-Value
Use of Air Purifiers	5	15	25	45	0.001**
Wearing Masks (Always)	3	10	17	30	0.020*
Reduced Outdoor Activities	20	35	35		

This table reveals significant disparities in coping mechanisms based on socio-economic status. High-income individuals are more likely to use air purifiers ($p < 0.01$), indicating access to better resources. Similarly, wearing protective masks consistently is more prevalent among high-income respondents ($p < 0.05$). However, reducing outdoor activities shows a lower level of disparity, with a significant proportion of both middle and high-income individuals adopting this strategy ($p < 0.05$). These results underline the influence of socio-economic status on access to coping resources, with lower-income groups having fewer options to mitigate exposure to smog

Table 4: Psychological Impact of Smog on Residents

Psychological Impact	Frequency (n)	Percentage (%)
Increased Anxiety	65	52%
Feelings of Helplessness	50	40%
Reduced Quality of Life	45	36%
Increased Health-Related Stress	75	60%

The table presents the psychological effects of smog on residents in Lahore. More than half of the respondents (52%) reported increased anxiety, while 40% experienced feelings of helplessness, reflecting a significant psychological burden. Furthermore, 36% of respondents reported a reduced quality of life, indicating that the persistent smog affects daily activities and overall well-being. The high percentage (60%) of respondents experiencing increased health-related stress highlights the widespread anxiety and stress due to poor air quality, particularly among vulnerable groups.

Table 5: Government and Community Support in Coping with Smog

Support Type	Yes - Frequency (n)	Yes - Percentage (%)	No - Frequency (n)	No - Percentage (%)
Government Awareness Campaigns	40	32%	85	68%
Provision of Affordable Air Purifiers	20	16%	105	84%
Community Support Networks	70	56%	55	44%

The table illustrates the role of government and community support in coping with smog. The findings indicate that only 32% of respondents received awareness campaigns from the government,

suggesting a gap in public outreach efforts. Additionally, only 16% of respondents had access to affordable air purifiers through government initiatives, highlighting a significant lack of support in providing essential resources. On the other hand, community support networks were accessed by 56% of respondents, indicating the importance of informal social structures in coping with environmental challenges. This disparity between government and community support underscores the need for more proactive policy measures to enhance resilience against smog.

Summary of Findings

The quantitative analysis revealed that the majority of respondents in Lahore were aware of the health risks associated with smog, with 80% acknowledging its dangers. However, coping mechanisms varied significantly across socio-economic groups. Only 36% of respondents reported using air purifiers, indicating barriers to accessing clean air technology. Additionally, 44% of participants occasionally wore protective masks, and 72% reduced outdoor activities during peak smog periods. The study found that high-income individuals were significantly more likely to use air purifiers and consistently wear masks compared to lower-income groups, where only 12% could afford such measures.

Psychological impacts were also notable, with 52% of respondents reporting increased anxiety and 60% experiencing heightened health-related stress. Feelings of helplessness were common among 40% of the participants, reflecting the emotional toll of prolonged exposure to smog. The role of government initiatives appeared limited, as only 32% of respondents reported awareness campaigns, and merely 16% had access to affordable air purifiers through public programs. Conversely, 56% of respondents relied on community support networks, underscoring the importance of informal solidarity in lower-income areas. These findings highlight the need for targeted interventions that address socio-economic disparities, mental health impacts, and stronger government action to build resilience to smog.

Qualitative Analysis

Psychological Resilience

Qualitative Findings: Deep Understanding of the Psychological Resilience of Residents of Lahore Pertaining to Recurring Smog. Most participants complained about feeling frustrated and powerless as a result of recurrent bad air, a potential health hazard. At the same time, uncertainty of smog and disruption in daily life has led to general helplessness and powerlessness in relation to the issue of smog - an even more acute feeling for all these patients suffering from chronic diseases as well as for their family carers, who beside taking care of the former everyday needs, have to worry about elderly people and children (Ahmad et al., 2022).

At the same time, most of the interviewed could prove an impressive sense of resilience. Such resilience was typically accompanied by higher solidarity and support within the communities. Many of these informal support systems became a lifeline for them, especially from low-income areas, in dealing with the adverse effects of smog. Informal networks like these had facilitated resource sharing-clean air devices, protective masks, and even information on the quality of air (Khan et al., 2020). They also organized with their neighbors to get or rent air purifiers. This minimized exposure but also supported the construction of the feeling of shared responsibility.

Anyway, such forms of community aid were very widespread among poorer dwellers who, out of their insufficient individual resources could not support much on an individual level. The experience and action shared in this really helped to strengthen psychological resilience by reducing feelings of isolation and fostering a greater sense of belongingness to the community. One interviewee argued that some strengthen need to be done amidst challenges, where a person said, "It's tough dealing with the smog every day, but what can we do? We can't just wait for the government to fix everything.". We have to help each other and find ways to cope. This statement indicates the power and proactivity of the citizens in taking responsibility for their situation and looking out for each other in order to deal with the environmental disaster.

Perception of Government Initiatives

A recurring theme in the qualitative analysis was that people felt let down by government measures to end smog. Most respondents felt that the government performed relatively not good enough in response to the crisis, much less commensurate with the gravity of the situation. Generally, most interviewees were annoyed by the non-strict enforcement of the available regulations governing air quality, particularly those for vehicular and industrial emissions. Most interviewees appreciated the presence of policies and regulations, but seemed to be minus implementation regarding monitoring and punishment of violators.

An often-expressed feeling was that the government did not do anything before an event. Like a middle-class participant put it, "The government talks only about smog when it becomes extreme, but what is the effort to prevent that? There are factories still emitting smoke, and nobody seems to care." This feeling of neglect and belated action fostered resentment and doubt as to the government's genuine intention to address air quality issues.

One of the observations noted in the participants from low-income areas is a lack of targeted public health public campaigns. For many people, there have been times when those government programs often grew inaccessible and irrelevant to the community. Many of the interviewees observe that most public awareness campaigns are disseminated through digital media many of whom rarely access. A participant from a low-income neighborhood said, "I do not have a smartphone, and neither do most people in my area. How are we supposed to know about the air quality warnings?"

Furthermore, the respondents pointed to the need for government programs that would provide direct assistance to underprivileged communities. Undeniably, the air purifiers and routine medical checkup can't be afforded by the rich sectors while the poorer sectors look for subsidized clean air resources and better access to health services. In that respect, low-income residents have identified the lack of government-sponsored special schemes that address their communities as a fundamental gap in coping capacity disparities (Butt et al., 2021).

Despite these criticisms, participants have given somewhat positive reflections relating to the minor actions of the government in controlling air pollution. For instance, there is a starting process for suggesting standards regarding the emission of vehicles and the spate of banning crop burning phases. These are sometimes seen as ineffective and of weak implementation. Participants have still expressed the need for a better approach by efficient implementation of strong regulations, public awareness campaign, and medical health services for all sections, as opined by Shah et al. (2020).

Summary of Qualitative Analysis

Qualitative analysis shows psychological resilience in dealing with smog in Lahore to be linked to perceptions about government initiatives. Psychological resilience among the residents, particularly the less-income communities, is significantly based on informal support networks and community solidarity (Khan et al., 2020). These result in reduced feelings of loneliness and provide material assistance in extreme cases of smog.

However, this widespread sense of despondency and hopelessness among the more affluent citizens has illustrated that the psychological effect of prolonged exposure to pollution is of a deep-seated nature (Ahmad et al., 2022). In addition, major gaps surface in governmental policy, especially if it involves enforcing quality air standards and offering assistance to disadvantaged groups that fall under the lower income classes. The lack of an effective public health campaign combined with the lack of available clean air resources have further exacerbated the disadvantages to the vulnerable groups.

According to Butt et al., the government needs to be more proactive and inclusive in building resilience against smog through equitable resource distribution, comprehensive public awareness, and consistent enforcement of air quality standards; they suggested (2021; Shah et al., 2020).

Recommendations

The recommendations are to focus on policy development and enforcement, community engagements, and improvement in the access of resources.

1. Strengthen the Enforceability of Policies and Rules

There exists wide improvement between the regulation policies which are present and those that are being implemented. Hence, the government should raise its demand to focus on such areas:

- Strict Enforcement of Air Quality Standards: Drive the enforcement of air quality standards to strictly reduce the major sources of emission stemming from vehicles, industries, and agricultural practices. This should be coupled with the imposition of harsher penalties against violators as well as more intensified emission monitoring.
- Introduce Real-Time Air Quality Monitoring: Implement effective and convenient monitoring of air quality in real-time to be operational all over Lahore. Therefore, citizens would be able to make decisions about conducting their activities on smoggy days, and the government would take more responsibility.
- Incorporation of Smog Management with Urban Planning: As a protocol, the policies of urban development should incorporate long-term measures to regulate and control air pollution in the city. Green spaces, pollution-control technologies in industries, and improvement in the public transport system can help mitigate the formation of smog in the city.
- The above research emphasized the need for more effective public health campaigns which are accessible and relevant to all socio-economic groups.
- Design awareness programs: Public health publicity has to be specially designed for lower-income communities; and the message is not just about online portals but has to percolate down to the radio stations, local newspapers and community outreach programs.
- Promote preventive measures and safe practices: Public education on simple preventive measures can be key. These could include wearing protective masks, using air purifiers, and staying indoors during really bad episodes of smog. Such education may be facilitated through schools, community centers, and healthcare facilities.
- Support and Enforce Community-Led Initiatives: Support and promote community-led initiatives in providing awareness and localized solutions. Provide local leaders and NGOs with access to host seminars with focal areas on the health impacts of smog as well as coping mechanisms.

2. Increase Facilitation to Clean Air Resources and Healthcare Services

According to this study, the provision of clean air resources and healthcare services was very variable across the strata economic and social. To bridge that gap, the following are recommended:

- Subsidy for Clean Air Resources: The government should be providing subsides for essential clean air resources like good air purifiers and masks for low-income families. This would reduce the gap in resources and resultant health benefits for the poor.
- Increase Availability of Affordable Healthcare: Establish health centers targeting low-income residents especially in respiratory and smog-related health conditions. Other mobile health clinics must also be introduced to visit residents who are far from hospital distances.
- Improve Public Transit and Reduce Vehicular Emissions: Improving the public infrastructures may help reduce the private cars used, thereby reducing emissions. There could be exemptions or special rewards for low-emitting vehicles and enactment of a vehicle inspection system for the control of emissions.

3. Community Resilience through Social Capital

In this connection, social capital became very useful in building communities to become resilient to the adverse effects of smog, particularly in the poor communities:

- Facilitate Community Networks and Solidarity: Support community support networks that share resources and information during peak smog, and networks can be used to provide psychological support and enhance belonging to the community.
- Local Organizations and NGOs: Government bodies can collaborate with local organizations and NGOs, which have already established connections with vulnerable groups. Collaborations at the local level will assist in distributing clean air resources and even organize health check-up camps during peak smog times.

4. Develop Strategies for Long-Term Smog Control
The prevalence of smog in Lahore necessitates developing long-term strategies to continue the progress of improving air quality:

- Clean Energy Innovation and Research: Promote research and development of clean energy technologies and renewable energy sources to be used in minimizing the consumption of fossil fuel. This transformation can be pivotal in providing to reduce overall emissions in the city.
- Improve Regional Cooperation Against Crop Burning: Regional cooperation with other neighboring states is to be increased in order to prevent crop burning as this highly pollutes the air during winter season. Alternative means of crop disposal and sustainable farming practices should be encouraged.

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