HEAT, HEALTH AND ENVIRONMENTAL SUSTAINABILITY IN RESOURCE-LIMITED SETTINGS

Dr Bassey Ebenso

Associate Professor in International Health

Leeds Climate-Health Network

(LCHN) Kick-off Event

30 March 2026

UNIVERSITY OF LEEDS

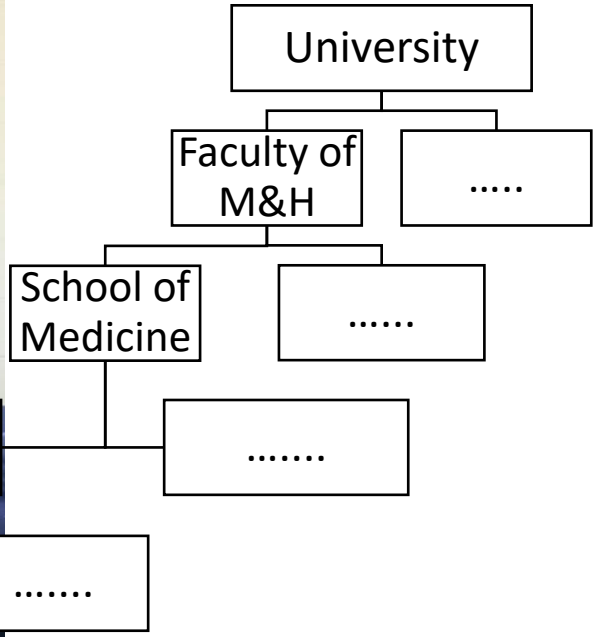
- MD trained in Nigeria
- Master of Public Health (Leeds)
- PhD in Sociology (Leeds)

- Interdisciplinary social researcher, started in disease control (W. Africa)

- **University of Leeds:** Health policy and systems research;
  - evaluation of applied health interventions;
  - mixed-methods participatory approaches

Nuffield Centre for International Health & Development

UNIVERSITY OF LEEDS



A **World Health Organization Collaborating Centre**

ON RESEARCH AND CAPACITY STRENGTHENING
OF HEALTH POLICY GOVERNANCE AND SERVICES

NUFFIELD RESEARCH

UNIVERSITY OF LEEDS

AS WHO-CC

WHAT DO WE DO?

Key Objectives include:

- Contributing to improved health policies and systems in pursuit of universal health coverage
- Exploring holistic multi-sectoral approaches for improving well-being of vulnerable groups.

Research Themes

1. Equity and Social Inclusion
2. Health policy and systems
3. Improving healthcare
4. **Urban Health**
   - Climate & health impacts in urban slums
5. **One Health/ Planetary Health**
   - Antimicrobial Resistance
   - Nature-based food systems

CHORUS
RESEARCH ON URBAN HEALTH

- FCDO-funded research programme consortium
- Focused on improving community health systems for urban dwellers
- in Bangladesh, Ghana, Nepal, and Nigeria.

ark foundation
advancement through research and knowledge

BRAC UNIVERSITY
Inspiring Excellence

UNIVERSITY OF GHANA

HERD International

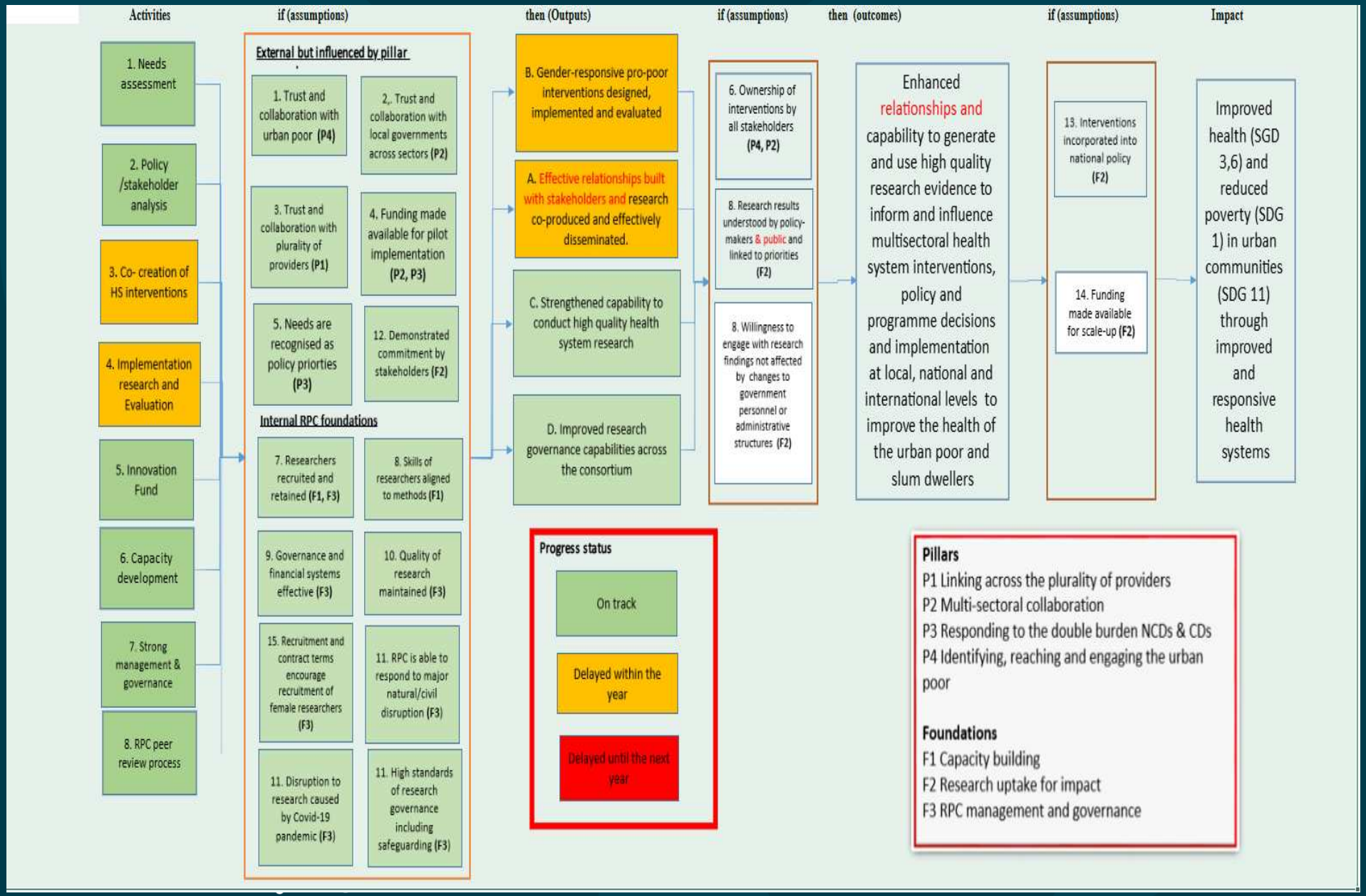
UNIVERSITY OF NIGERIA NSUKKA

UKaid
from the British people

UNIVERSITY OF LEEDS

UNIVERSITY of York

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE


Activities
if (assumptions)
then (Outputs)
if (assumptions)
then (outcomes)
if (assumptions)
Impact
1. Needs assessment
2. Policy /stakeholder analysis
3. Co- creation of HS interventions
4. Implementation research and Evaluation
5. Innovation Fund
6. Capacity development
7. Strong management & governance
8. RPC peer review process
External but influenced by pillar
1. Trust and collaboration with urban poor (P4)
2,. Trust and collaboration with local governments across sectors (P2)
3. Trust and collaboration with plurality of providers (P1)
4. Funding made available for pilot implementation (P2, P3)
5. Needs are recognised as policy priorties (P3)
12. Demonstrated commitment by stakeholders (F2)
Internal RPC foundations
7. Researchers recruited and retained (F1, F3)
8. Skills of researchers aligned to methods (F1)
9. Governance and financial systems effective (F3)
10. Quality of research maintained (F3)
15. Recruitment and contract terms encourage recruitment of female researchers (F3)
11. RPC is able to respond to major natural/civil disruption (F3)
11. Disruption to research caused by Covid-19 pandemic (F3)
11. High standards of research governance including safeguarding (F3)
B. Gender-responsive pro-poor interventions designed, implemented and evaluated
A. Effective relationships built with stakeholders and research co-produced and effectively disseminated.
C. Strengthened capability to conduct high quality health system research
D. Improved research governance capabilities across the consortium
6. Ownership of interventions by all stakeholders (P4, P2)
8. Research results understood by policy-makers & public and linked to priorities (F2)
8. Willingness to engage with research findings not affected by changes to government personnel or administrative structures (F2)
Enhanced relationships and capability to generate and use high quality research evidence to inform and influence multisectoral health system interventions, policy and programme decisions and implementation at local, national and international levels to improve the health of the urban poor and slum dwellers
13. Interventions incorporated into national policy (F2)
14. Funding made available for scale-up (F2)
Improved health (SGD 3,6) and reduced poverty (SDG 1) in urban communities (SDG 11) through improved and responsive health systems
Progress status
On track
Delayed within the year
Delayed until the next year
Pillars
P1 Linking across the plurality of providers
P2 Multi-sectoral collaboration
P3 Responding to the double burden NCDs & CDs
P4 Identifying, reaching and engaging the urban poor
Foundations
F1 Capacity building
F2 Research uptake for impact
F3 RPC management and governance

Pillar 2: Multi-Sectoral Collaboration to address Wider Determinants of Health

UNIVERSITY OF LEEDS

Innovation Fund project (IFP2):

Health Vulnerability from Heat Waves in Dhaka City

BRAC JAMES P GRANT SCHOOL OF PUBLIC HEALTH

BRAC UNIVERSITY Inspiring Excellence

IFP2: Health vulnerability from heat waves

UNIVERSITY OF LEEDS

- Aggravated in summer/post-summer
- Who was affected:
  - ✓**Age:** the elderly, school-aged children
  - ✓**Occupation groups:** those working in the fields
  - ✓**People living with** chronic conditions

- **Other drivers:** land-use activities increase ambient temperature during the dry months,
- Adversely affects health outcomes for vulnerable populations.

BRAC SCHOOL OF PUBLIC HEALTH JAMES P GRANT

BRAC UNIVERSITY Inspiring Excellence

3 Work Packages (WPs):

UNIVERSITY OF LEEDS

WP1: Mapping Land Surface Temperatures—GIS maps

WP2: FGDs and KIIs with relevant stakeholders

WP3: Develop Heat Vulnerability Index (HVI) from WP1 and WP2.

Mapped Land Surface Temperature (LST)

UNIVERSITY OF LEEDS

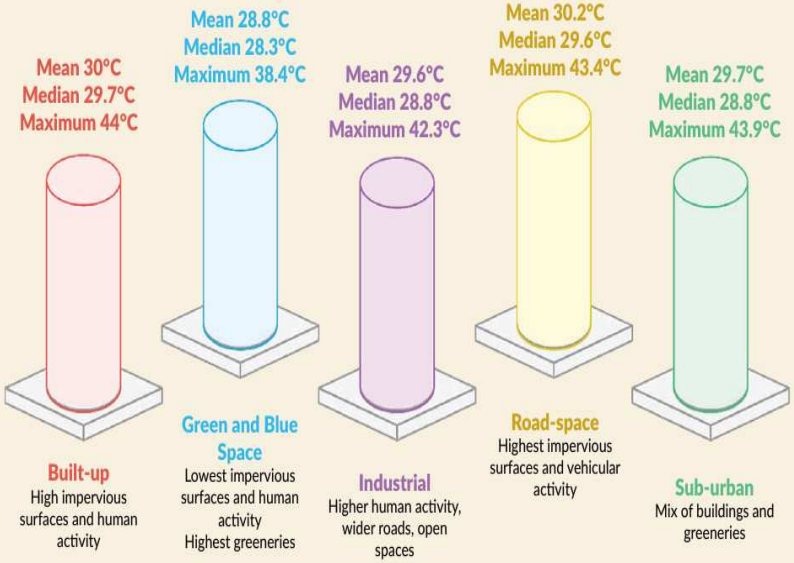


Figure 1. Temperature by Land Use categories

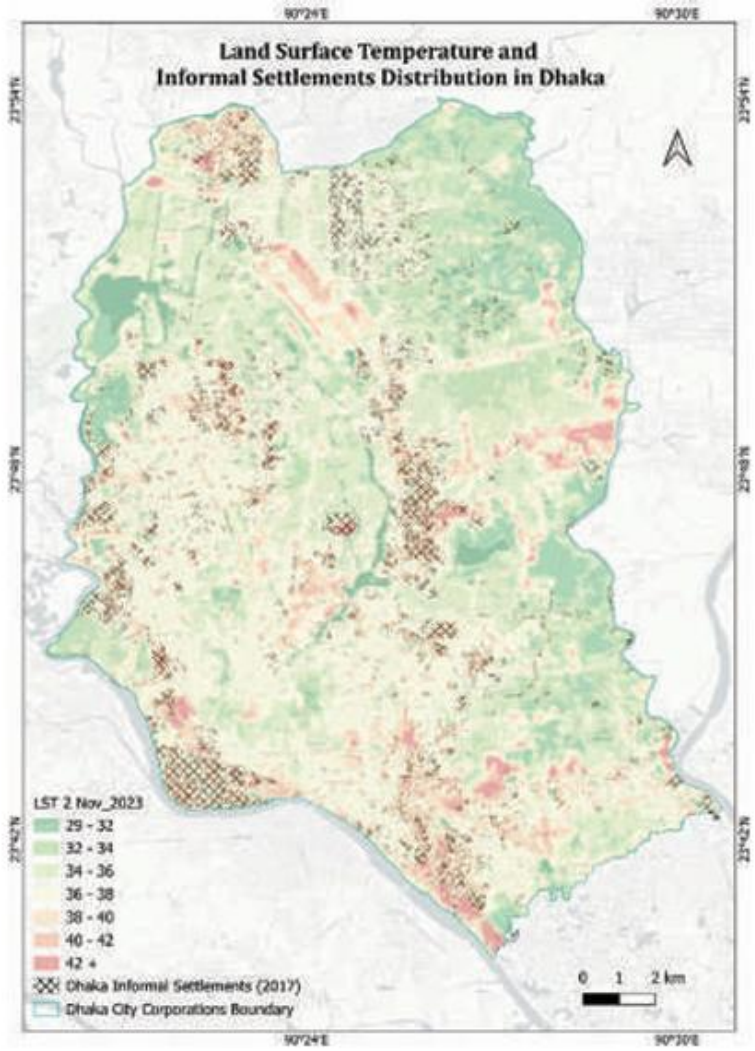


Figure 3. Temperature variability in informal settlements

OTHER ACTIVITIES

UNIVERSITY OF LEEDS

Activity

- ✓ 10 **KIIs with key stakeholders** in Heat and Environment domain.
- ✓ 9 **FGDs with communities** from vulnerable areas
- ✓ Thematic qualitative analysis.
- ✓ Analysis of Dhaka heat exposure using field and satellite data
- ✓ Ward-level and grid-level Heat Vulnerability Index (HVI) for Dhaka

Key findings

- ✓ Dhaka experiences heat extremes more often than is recorded by the single monitoring station
- ✓ Informal settlements lack access to clean drinking water, health facilities, shade and walkways
- ✓ Heat exposure affected vulnerable groups disproportionately
- ✓ Policies lacked monitoring, preparedness & adaptation strategies to address heat vulnerability
- ✓ Several wards (the lowest administrative unit) and areas with high heat exposure lacked cooling infrastructure
- ✓ Citizens lack awareness and resources to combat heat extremes.

Pillar 2: Multi-Sectoral Collaboration to address Wider Determinants of Health

Protecting the Health of Urban School Children as part of the Enugu State Green Initiative:

Goal: To contribute to creating an environmentally sustainable State.

Key green projects and adaptation strategies include:

1. Greening Enugu State Initiative (GESI) & Reforestation

- **Tree Planting Campaigns:** To plant 20 trees for every tree cut down.
- **Urban Greening zones:** To mitigate urban heat & improve air quality.
- **Youth-Led Initiatives:** To plant >500 economic trees/youth group & create school conservation clubs

2. Sustainable Transportation and Clean Energy

- **Compressed Natural Gas (CNG) Buses:** A clean-mobility initiative with 200 CNG buses to reduce emissions from the transport sector.
- **Renewable Energy Deployment:** provide solar power for residential areas & businesses to ensure 80% renewable energy usage by 2060,
- **Solar for Health:** Provide 24-hour renewable electricity to PHC centres for cold chain storage for vaccines and 24/7 care.

Green projects and adaptation strategies Cont…

3. Climate-Smart Agriculture and Urban Resilience

- **Smart Green Schools:** Integrating climate education into the "Smart Green Schools" curriculum to equip the next generation with green skills
- **Waste Management Improvements:** Modern waste management equipment (compactors, sweepers) to improve sanitation and prevent flooding.

4. Policy and Institutional Framework

- **ESCPAP:** Enugu State Climate Policy and Action Plan aimed to increase the state's GDP by 25-fold by 2060 while creating over 792,000 jobs in green sectors.
- **Local Adaptation Plan of Action (LAPA):** To create resilience strategies against heat waves, floods and drought.

Policy Research Agenda

Together with collaborators in Nigeria…

1. Conduct a monitoring, evaluation and Learning (MEL) type study

2. Aimed at accompanying the Government on its journey of implementing the above bundle of green projects.

3. Introduce a climate and mental health assessment into the MEL study.

Dissemination:

REVIEW ARTICLE

Is the Health Security of Children Assured in Nigerian Schools? Assessment of Urban Schools' Responses to the Health Needs of Schoolchildren

Ifunanya Clara Agu[1,2,3] | Prince Agwu[1,4,5] | Chinelo Obi[1,6] | Charles Orjiakor[1,7,8] | Chinyere Mbachu[1,2,9] | Eleanor Hutchinson[10] | Adaeze Oreh[11] | Uzoma Okoye[1,4] | Obinna Onwujekwe[1,6]

[1]Health Policy Research Group, University of Nigeria, Enugu, Nigeria | [2]Institute of Public Health, University of Nigeria, Enugu, Nigeria | [3]Institute of Health Sciences, University of Leeds, Leeds, UK | [4]Department of Social Work, University of Nigeria, Enugu, Nigeria | [5]Education and Society, University of Dundee, Dundee, UK | [6]Department of Health Administration and Management, University of Nigeria, Enugu, Nigeria | [7]Department of Psychology, University of Toronto, Scarborough, Canada | [8]Department of Psychology, University of Nigeria, Enugu, Nigeria | [9]Department of Community Medicine, University of Nigeria, Enugu, Nigeria | [10]London School of Hygiene and Tropical Medicine, London, UK | [11]Ministry of Health, Port Harcourt, Rivers State, Nigeria

Correspondence: Ifunanya Clara Agu (ifunanya.agu.pg82641@unn.edu.ng)

Received: 7 May 2025 | **Revised:** 7 January 2026 | **Accepted:** 29 January 2026

Keywords: child's rights | health-promoting school | school clinic | school health | urban health

ABSTRACT

Background: The World Health Organisation's (WHO) vision for Health Promoting Schools aims to create environments that are healthy and safe for both education and the wellbeing of schoolchildren. However, in Nigeria, the realisation of this vision is debatable, given the country's notably poor child health statistics. We undertook this research to assess the readiness of schools in responding to the health needs of schoolchildren in alignment with the WHO's vision of making schools health-promoting.

Methods: A mixed-method cross-sectional study was conducted in two selected urban areas in Nigeria. The study compared a well-off urban area (formal settlement) with an urban slum (informal settlement). Data were collected through interviewer-administered questionnaires from 408 schoolchildren and 156 teachers across 20 schools. Furthermore, focus group discussions and in-depth interviews involved caregivers, policymakers, teachers, and students. Qualitative data were analysed using thematic analysis, while quantitative data were examined using descriptive statistics and multilevel logistic regression.

Results: Consistent with the qualitative data, the quantitative aspect of the study found that 71.6% of schoolchildren and 69.9% of teachers reported a lack of qualified healthcare personnel in their schools. Additionally, 13.5% of schoolchildren and 22.4% of teachers said that ill students were usually referred or taken to health centres. A total of 43.9% of schoolchildren and 52.6% of teachers reported that first aid services were routine in their schools. Multivariate logistic regression revealed that, compared to students in formal settlements, those in informal settlements were five times more likely to be sent home when sick (OR 4.976, 95% CI 2.41–10.24, $p < 0.001$). The analysts also found that children in public schools were eight times more likely to be sent home when ill than those in private schools (OR 8.112, 95% CI 3.97–16.589, $p < 0.001$).

Conclusion: These findings from both qualitative and quantitative methods confirm the low prioritisation of health services in

Reflections

- I have gained experience in climate and health over the past 4 years from ongoing projects: CHORUS + One Health project.
- Also interested in understanding the mental impacts of climate change
- **Previous Bids:** climate impact on environment & health
- **Current bids:** Wellcome Trust call for establishing 5 hubs to power evidence synthesis in LMICs, deadline: May 7
- Looking forward to building networks in Leeds

Prince Agwu is a Research Fellow at the Health Policy Research Group, University of Nigeria, and an academic staff in Department of Social Work, University of Nigeria. He holds a PhD in Social Policy, a Commonwealth Alumnus of the University of Dundee, the Communications Lead for the African Health Observatory Platform, Nigeria National Centre, and he is the Research Uptake Lead for the CHORUS Programme in Nigeria. Prince is the African Section Editor of Social Work and Social Sciences Review, and an Academic Editor for PLoS ONE, among other editorial board positions. His research expertise covers health sector corruption, urban health, health system policy, primary healthcare system, migration/human trafficking, and education policy. His expertise is well documented through extensive peer reviewed journals, and he is currently listed among the top-500 scholars in Nigeria.

Mr. Riaz Khan is an assistant scientist at the Center for Urban Equity and Health in BRAC JPGSPH. He supervises the team for environmental and health studies, specifically air quality, temperature and noise monitoring, and ambient lighting in Dhaka city. Earlier, he worked on a project through the Public Health Department at the University of Cambridge that involved the statistical analysis and systems analysis of surveys relating to piped water supply systems in several villages in rural Bangladesh. He also consulted on several climate changes, community engagement, and waterlogging projects in different parts of Bangladesh.

ark foundation
advancement through research and knowledge

BRAC UNIVERSITY
Inspiring Excellence

UNIVERSITY OF GHANA

HERD International

UNIVERSITY OF NIGERIA NSUKKA

UKaid
from the British people

UNIVERSITY OF LEEDS

UNIVERSITY of York

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE