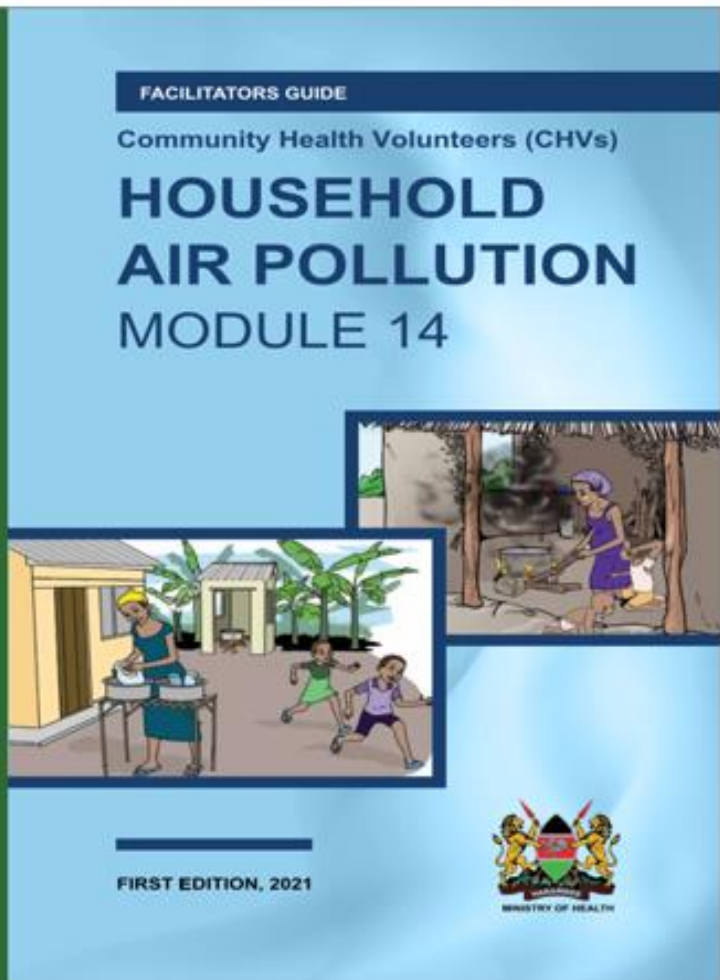




# Capacity strengthening on air pollution and health.



*Equipment set-up for measuring kitchen concentrations and personal exposure to household air pollution.*

*MicroPEMs are being used for PM<sub>2.5</sub>, and Lascar electrochemical monitors for CO.*

# Background to CLEAN-Air(Africa) work

## Reliance on polluting fuel and burden of disease

- Globally 3.8 million, SSA 80% HHs and Kenya 76% HHs

## Premature annual death attributable to HAP

- 2.3 Million globally, 695,000 SSA and 23,000 Kenya

## Contribution of Clean air Africa to the problem

Largely aims to accelerate the understanding of HAP-related disease burden through a unique set of studies that will

- strengthen national health systems for community health prevention of HAP-related disease and**
- provide evidence-based recommendations for population transition to clean household and institutional energy**



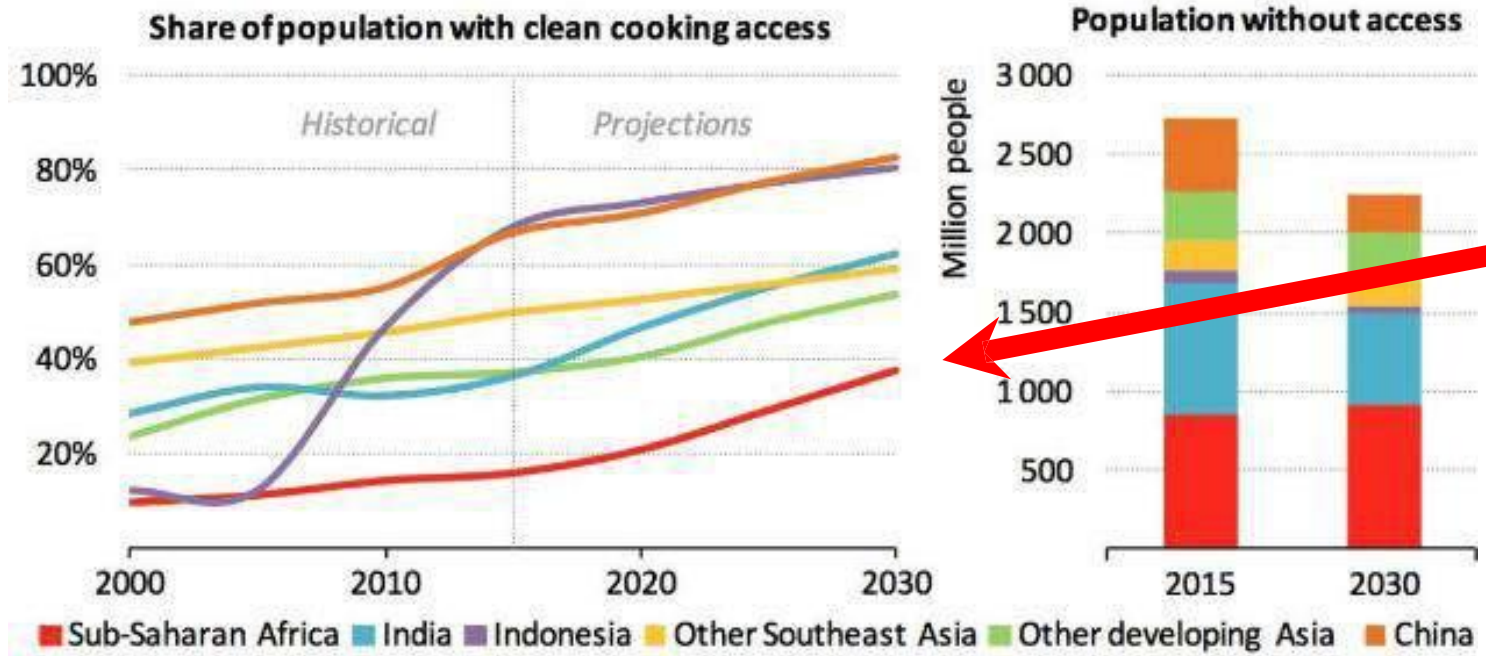
# SDG7: “Clean, Modern, Reliable Energy For All” 2030 Not On Track

**Goal 7:**  
Ensure access to affordable, reliable, sustainable and modern energy for all.



**International Energy Agency:**

“Unless rapid action is taken, the world will fall short of the universal access target for clean cooking by almost 30%, achieving 72% of the population in 2030.”



More than 60% of sub-Saharan Africa will be without access to clean cooking fuel in 2030

Sources: WHO (historical); IEA analysis (projected).



# CLEAN-Air(Africa) Unit structure

Funder: NIHR

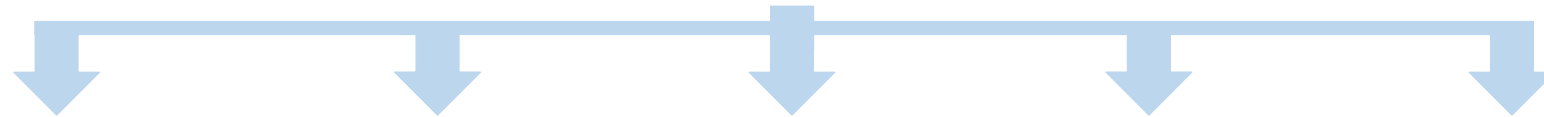


Independent Scientific Advisory Board (ISAB)

## Directorship

University of Liverpool  
NIHR contract holder  
UK

KEMRI  
KENYA



Douala  
General  
Hospital  
CAMEROON

Makerere  
Lung  
Institute  
UGANDA

Moi  
University  
(KENYA)

Rwanda  
Biomedical  
Center  
RWANDA

University of  
Dar es  
Salaam  
TANZANIA

## Collaborators

World Health Organization

World Food Programme

UK-Aid Modern Energy Cooking  
Services

Global LPG Partnership

Berkeley Air Monitoring Group

CircleGas Ltd

The 625 Ltd  
(TeachBox)



# CLEAN-Air(Africa)'s Aims and 2030 Sustainable Development Goals

**Aim 1:** To facilitate the transition for vulnerable communities and public institutions to clean cooking for positive health, climate, and gender

**Aim 2:** To evaluate and quantify chronic and hidden health burdens from polluting fuel use that can be addressed through clean cooking

**Aim 3:** To advocate for disease prevention from reductions in air pollution through health systems strengthening

**Aim 4:** To develop a sub-Saharan African Air Pollution Centre of Excellence (training and air quality monitoring)



# Research

**AIM 1:** *To facilitate the transition for vulnerable communities and public institutions to clean cooking to address health, environment, climate, and gender impacts from reliance on solid fuels*

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**RCT1:** Evaluation of LPG adoption through PAYG smart meters  
*(Kenya)*

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**RCT2 and RCT 4:** *Evaluation of LPG exclusive use in PAYG users through PCs + behavior change + Evaluation of the impact of a mobile phone texting campaign (Kenya & Tanzania)*

**RCT3:** *Evaluation of LPG exclusive use through PCs (Rwanda)*



# Research

**AIM 1:** *To facilitate the transition for vulnerable communities and public institutions to clean cooking to address health, environment, climate, and gender impacts from reliance on solid fuels*

## Work Package 2: Schools

Using interventions to evaluate innovations for the adoption and sustained use of clean cooking fuels in households **(Kenya, Rwanda)**

- *Health, and cost impacts*
- *SUMs and HAP measurement*

Energy Mapping for Public Institutions (Schools)  
**(Kenya & Rwanda)**

Evaluation of transition to LPG for cooking Kenya **(Nairobi)**



# Research



Global Health  
Research Unit

*AIM 2: To evaluate and quantify hidden additional health burdens from household air pollution that can be addressed through clean cooking*

## Work Package 3: health facilities

Investigating and documenting hospital and community-acquired adult and pediatric burns from household use of fuels through routine surveillance

*(Uganda, Cameroon, Kenya)*

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**Clinical Evaluation of Burns:** (i) Retrospective record review and (ii) Prospective evaluation of fuel-related burns

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**Primary Care Evaluation of Burns:** (i) Prospective evaluation of fuel/stove-related burns and (ii) Interviews with patients to understand the contexts of burns





# Research

**AIM 2: To evaluate and quantify hidden additional health burdens from household air pollution that can be addressed through clean cooking**

## Work Package 4: health facility

Measuring the association between fuel use, household air pollution, and respiratory/ cardiovascular disease.

**(Cameroon, Rwanda)**

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**Modelled Health Impacts from LPG:** (i)HAP measurement and (ii) HAPIT Modelling **(Rwanda)**

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**Lung Function and Cooking Fuel:** (i)cooks through (ii) Spirometry and surveys **(Cameroon)**

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**HAP exposure and Heart Rate Variability:** (i)Cooks through HAP measurement, SUMs (Bluetooth beacons), wearable HRV monitors **(Cameroon)**

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# Capacity Strengthening

**AIM 3: To advocate for disease prevention from reductions in household air pollution through national health systems strengthening**

## **Work Package 5:**

Empowering community health workforces (CHW) through education on household air pollution, health, and prevention to decrease the burden of air pollution-related diseases **(Kenya, Uganda, Cameroon, Rwanda)**



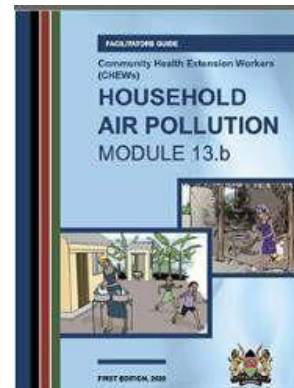
## ***Monitoring and Evaluation of CHW National Training Initiative in HAP, Health, and Prevention***

- Training Evaluation (CHVs/ materials/ delivery),
- Messaging Evaluation (CHVs/ Job Aids and
- Preparation for UHC (led through CCEH TWG)

## ***Digital Delivery of Training and Health Surveillance (TeachBox)***

**Kenya, Uganda, Rwanda**

- Module delivery Health Surveillance (Kenya Informatics)



## ***Adaption of CHW Training Initiative for sub-Saharan Africa***

- Module 14 and Job Aids and
- Preparation and piloting **(Uganda, Rwanda, Cameroon)**



# Capacity Strengthening

**AIM 4:** *To establish a sub-Saharan African Centre of Excellence in air pollution monitoring and prevention through capacity building and investment*

## **Work Package 6:**

Developing a sub-Saharan African Centre of Excellence in air pollution

**A:Technical:** Establishment of Air pollution Hub



- (i) State-of-the-art gravimetric filter weighing and analysis lab
- (ii) Air quality monitors
  - Gravimetric-UPAS
  - Light Scattering: Purple Air
  - (PM2.5, Cox, Nox, Sox)
- (iii) Highly trained technicians,



# Capacity Strengthening

**AIM 4: To establish a sub-Saharan African Centre of Excellence in air pollution monitoring and prevention through capacity building and investment**



- (i) The HUB has the potential to support results-based financing (RBF) initiatives for clean energy transition programs
- (ii) Through the partnership with the Berkeley Air Monitoring Group, staff will receive classroom and field-based training *(on the use of equipment, air monitors, and data handling)*.
- (iii) Support research studies and monitoring components of public and private institutions seeking to have analyses conducted at the Hub.
- (iv) Support HAP Monitoring in 47 countries and other African Countries *i.e Ghana*

# Capacity Strengthening

**AIM 4: To establish a sub-Saharan African Centre of Excellence in air pollution monitoring and prevention through capacity building and investment**

## **Work Package 6:**

Developing a sub-Saharan African Centre of Excellence in air pollution

### **B. APCE Education Training Centre**



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### **Develop professional pieces of training on HAP i.e:**

- (i) Health Practitioner Training in Air Pollution, Energy, and Health
- (ii) Health Journalism and Public health communication (*journalist cohort for Unit*)
- (iii) Health Impact Assessment

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### **Mentorship/ support for Academic Trainee Posts**

- (i) Ph. D. Programs
- (ii) PDRA fellowship to support research on HAP

# IMPACT and MANAGEMENT

**AIM 5: Community Engagement and Involvement (CEI) through the bespoke steering group, building on local capacity, participation, and two-way communication**

## **Work Package 7:**

**Maximizing Community Engagement and Involvement through CEI steering committee**



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## **CEI Steering Committee**

(i) Chaired by Prof Were: World leading expert in the community-based empowerment and public health

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(ii) Community representatives from each focus country

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(iii) Input into all aspects of the Unit's activities (*through governance structure*) and documenting success stories.



## CAA Directorship



**Prof. Dan Pope**



**Dr Elisa Puzzolo**



**Dr James Mwitari**

# Discussion