



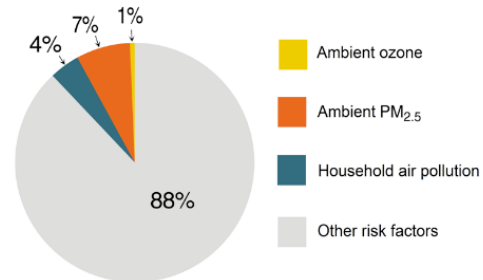
Can evidence supporting health co-benefits
unlock new revenue to scale up clean cooking?

A third of the global population (2.4 billion people) cooks with biomass fuels (e.g. wood, charcoal, dung)



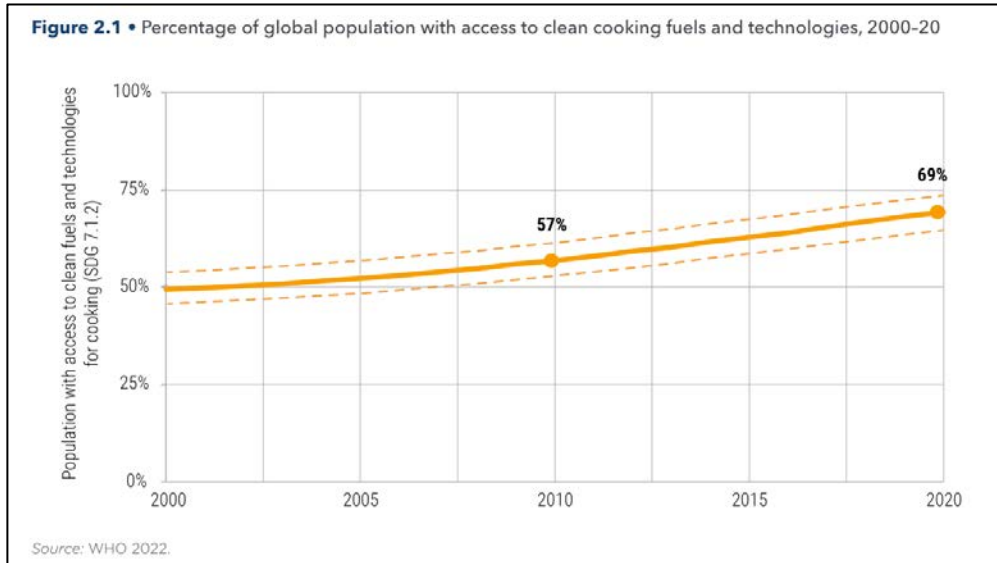
Cooking this way results in **Household Air Pollution** which was responsible for 2.3 million deaths in 2019 (4% of all global deaths)

FIGURE 12 Percentage of global deaths attributable to individual pollutants.



By nature of their typical domestic roles, women (and children) are highly exposed

Little progress toward scale in last 20 years



- Access to clean fuels and technologies for cooking still at only 69%
- Only 1% annual increase in access to clean cooking fuels between 2010 and 2020.

AND:



- Number of people without access in Sub-Saharan Africa is **increasing**
- African population without access to clean cooking set to increase by 20 million/year through 2030

World Bank (ESMAP and Ci-Dev)- funded project with Berkeley Air Monitoring Group

Central Question:

Can quantification (and subsequent monetization) of co-benefits from clean cooking interventions (health, gender, and short-lived climate pollutants) catalyze transitions to clean cooking, via results-based finance?

Health impact methodology: averted disability-adjusted life-years (aDALYs)

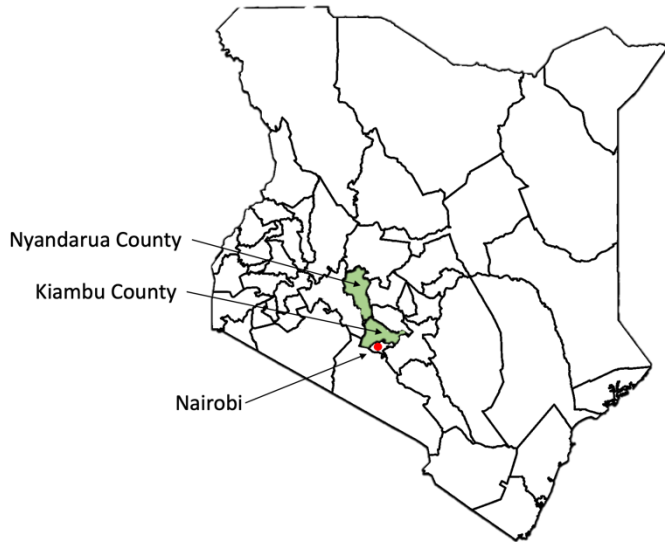
aDALYS = metric of averted illness and mortality attributable to the clean cooking system

(Gold Standard Methodology)

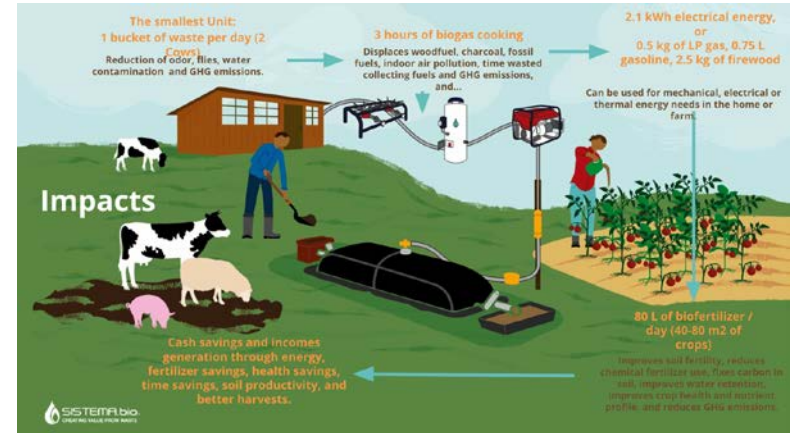
The screenshot shows the Gold Standard website page for Health Impacts: Averted Disability-Adjusted Life Years (ADALYs). The page has a black navigation bar at the top with the Gold Standard logo and menu items: STANDARD + SOLUTIONS, INNOVATIONS, TAKE ACTION, RESOURCES, ABOUT US, and a search icon. Below the navigation bar is a green header with the text "Health Impacts: Averted Disability-Adjusted Life Years (ADALYs)". The main content area is white and features the following elements:

- A teal square icon with a white plus sign, followed by the text "HEALTH IMPACTS: Averted Disability-Adjusted Life Years (ADALYs)".
- The Gold Standard logo, which consists of a circular arrangement of colored dots.
- The text "Gold Standard certified SDG impacts".
- A green square icon with a white plus sign, a white heart, and a white pulse line, with the text "3 GOOD HEALTH AND WELL-BEING" and "certified by Gold Standard".
- The text "What is an ADALY?".
- A paragraph of text: "Averted Disability Adjusted Life Years (ADALYs) are a commonly used metric for public health reporting. They represent the number of years of healthy life made possible by a given intervention and can also be used to calculate the economic cost of poor health."

We implemented this methodology in Kenya among a group of biogas adopters (and matched controls)



Project implementer: Sistema.bio



The health impact is calculated based on reduction in **exposure to particulate matter** (PM_{2.5}) and its known relationships to ill health.

Personal Exposure Measurement: baseline and project scenarios

48-hour deployment of the UPAS personal air pollution monitor (measures PM_{2.5})



Filter weighing

PM_{2.5} collects on a filter, must be pre- and post-weighed at the same facility.



Post-deployment filter

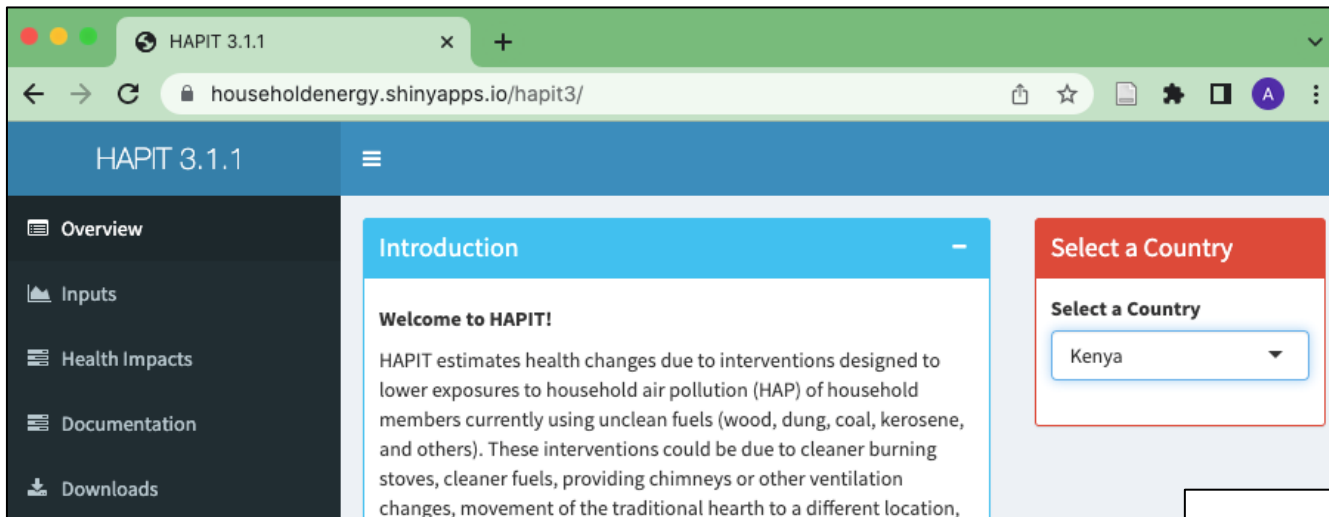
Precision pre- and post-deployment filter weighing (repeated 6x/filter) determines PM_{2.5} concentration



PM_{2.5} filter-weighing robot in the lab at Colorado State University

Household Energy Intervention Tool (HAPIT) estimates aDALYs

<https://householdenergy.shinyapps.io/hapit3/>



HAPIT 3.1.1

Introduction

Welcome to HAPIT!

HAPIT estimates health changes due to interventions designed to lower exposures to household air pollution (HAP) of household members currently using unclean fuels (wood, dung, coal, kerosene, and others). These interventions could be due to cleaner burning stoves, cleaner fuels, providing chimneys or other ventilation changes, movement of the traditional hearth to a different location,

Select a Country

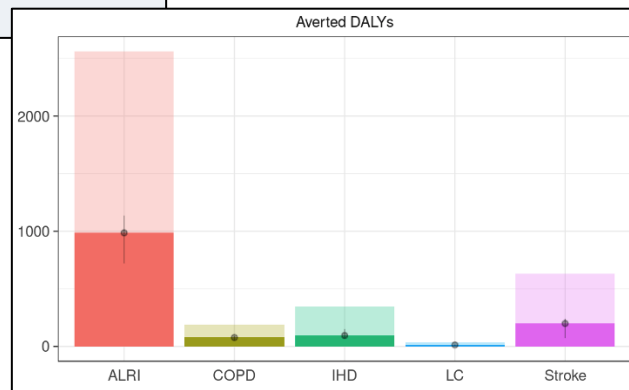
Select a Country

Kenya

Inputs: $PM_{2.5}$ exposure reductions, lifespan of intervention, number of homes targeted, and percent of homes using intervention.

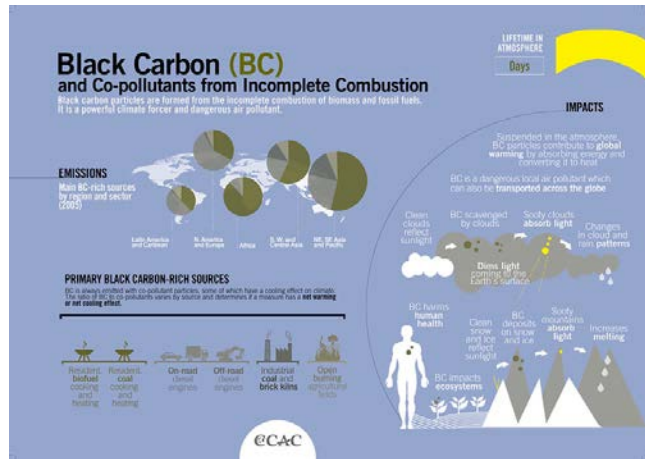
Applies integrated $PM_{2.5}$ exposure-risk curves for diseases known to be associated with air pollution exposure and aggregates impact into aDALYs.

(Impact observed, results currently under review)



In Parallel...

The project also refined measures to quantify other co-benefits of clean cookstove adoption:



Reduction in short-lived climate pollutants (e.g. black carbon)



Gender impact for women

Related project: Clean Impact Bond (CIB) - A project of The International Finance Corporation & partners

On a pilot basis, took the next step toward mobilization of finance:

First **development impact bond** in the clean cooking sector

- innovative blended finance instrument, centered on quantification and sale of cookstove co-benefits to philanthropic outcome buyers)

(Certification of impact currently underway)

