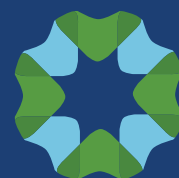




2020–2025 Research Strategy



CLEAN
COOKING
ALLIANCE



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Executive Summary

In 2019, the Clean Cooking Alliance (CCA) began an effort to define its research role within the clean cooking sector and establish its research priorities for 2020–2025. To accomplish this, CCA conducted 40 external, structured consultations with sector stakeholders to understand what they see as CCA's most important value-adds to the sector. CCA spoke with researchers, partner organizations, policy-makers, enterprises, investors, and donors to ensure that its consultations reflected a representative sample of the clean cooking sector. CCA also carried out a comprehensive literature review of all CCA-funded studies that produced peer-reviewed research (see **Annex I**) and used this synthesis to complement the external consultation process. Lastly, CCA engaged in a series of internal dialogues to confirm that the research strategy fully aligns with its other strategy refinement processes—namely updates to the policy strategy and the gender strategy, development of the clean cooking sector strategy, and design of the Monitoring & Evaluation (M&E) Framework. CCA used these internal reviews to vet the findings of the external consultations and to further refine the strategy's aims.

Throughout the external consultations, stakeholders repeatedly characterized CCA as a knowledge and action hub for the sector. They said CCA collects, maintains, and synthesizes the latest, high-quality clean cooking research and disseminates that knowledge to the sector. As a result, CCA ensures that policymakers have access to transparent, relevant evidence that they can use for decision-making. Stakeholders also noted that CCA leverages its understanding of the clean cooking evidence base to fund and enable research that fills critical knowledge gaps. The consultations revealed that few other organizations in the sector place a similar emphasis on using knowledge to influence action, and, as such, CCA should lean further into this role going forward.

Stakeholders clearly identified three key objectives that CCA should pursue over the next five years to serve as an effective knowledge and action hub for the sector. CCA should:

1. **Translate evidence to action** by serving as the go-to destination for clean cooking evidence that is credible,

accessible, and actionable and by providing practitioners¹ with easily digestible findings they can use for evidence-based decision-making.

2. **Fund research** that no other organizations are well-positioned to fund in order to fill critical research gaps in the sector.
3. **Enable research** by serving as a convener of sector actors, by acting as the key vehicle through which clean cooking research is disseminated, and by partnering with research organizations that have missions similar to CCA's to help them achieve their strategic goals.

By pursuing these objectives, CCA will become a stronger learning organization that continually develops its internal expertise, disseminates its learnings to the sector, and evolves in response to the sector's changing needs.

The following document outlines how CCA will achieve its research objectives from 2020–2025 and includes concrete examples of past and future CCA initiatives that illustrate its research strategy. The document also contains key definitions related to research, the rationale for this strategy, and an explanation of how CCA integrated this strategy across the organization.

KEY DEFINITIONS

Research

CCA defines research as: a systematic investigation that allows theories to evolve and be tested with the goal of producing generalizable findings for learning purposes. The quality and importance of the research is judged by a formal or informal peer review. Research includes both those systematic investigations of the health, environment, climate, gender, behavior change, and economic benefits of transitioning to clean cooking solutions and the factors that influence both the use of clean fuels and stoves and the disuse of traditional cooking practices. Research also includes systematic investigations of how to most effectively support the development and scale-up of clean cooking solutions, such as business model economics/case studies, the role of policies and trade barriers, product and technology pricing, and the role of economies of scale.

Evaluation

CCA views evaluation as a sub-set of research and defines evaluation as: an activity undertaken to assess a certain policy or intervention, including how implementation was executed or what effect implementation had. An impact evaluation measures a project's effect, whereas a process evaluation measures how a project is implemented.

Co-benefits

Co-benefits in the clean cooking sector refer to the fact that clean cooking has the potential to realize multiple benefits across health, climate, environment, economic, and gender outcomes.

1. This strategy defines practitioners as sector actors that implement programs and projects. In this way, they are distinct from other sector actors, such as research organizations, that do not directly execute programming.

Introduction and Background

Problem statement

To achieve universal access to clean cooking by 2030, governments, clean cooking enterprises, investors, and project implementers must make decisions informed by a robust evidence base. These practitioners frequently look to CCA as an expert advisor for supporting the development and scale-up of clean cooking solutions. CCA also provides public goods to the sector by maintaining research, resources, and tools. For CCA to continue to serve in these capacities, it must remain up to date on the latest evidence and play an active role in investigating still unknown questions. CCA must also disseminate these findings in an accessible and digestible manner so that they may be easily found, understood, and used by sector actors. As CCA moves into the next era of accelerating clean cooking access by supporting the development and scale-up of a robust clean cooking industry, it must define its research role and priorities for 2020–2025.

Current state

Since CCA was established in 2010, it has served as a thought leader in building the evidence base for clean cooking by commissioning and conducting various types of research and by producing the annual sector results report. When CCA was founded, the sector possessed a high-level understanding of the negative impacts of traditional cooking practices. However, the sector did not yet fully understand the evidence for country-specific pathways to clean cooking, the nuanced science behind the negative impacts of traditional stove/fuel use, and the full benefits of cooking with clean technologies and fuels.

To meet these gaps, CCA funded research to answer fundamental questions on the potential health, environment, climate, gender, and economic benefits of clean cooking. During CCA's early years, the organization also commissioned markets research, such as country-level market assessments and in-depth consumer segmentation and preference studies. In addition to directly funding research, CCA played a role in disseminating knowledge to the sector by convening experts at workshops and international conferences, serving on research advisory councils, and maintaining an online database of research.

In 2016, CCA began an effort to refine its research priorities to better serve the sector. Specifically, CCA focused on demonstrating and evaluating the benefits associated with sustained clean cooking adoption, on establishing an evaluation research network, and on securing sustainable funding for research. Under this new focus, CCA commissioned research on:

- City-level cost-benefit analyses;
- The relationship between emissions and exposure;
- The climate and health co-benefits of high-performing biomass and liquid- and gas-burning (e.g., ethanol, LPG, and biogas) stoves during household use;
- The contribution of household air pollution (HAP) to ambient air pollution at the city-level; and
- Women's time-poverty and gender-based violence.

CCA identified these gaps as critical for conducting impact calculations, evaluating co-benefits, and accessing development financing. Similarly, in response to the needs of the sector, CCA began conducting evaluations—beginning with the Health Demonstration Project in Nepal—and in 2019 released the inaugural [“Clean Cooking Industry Snapshot”](#) report that reports investment and business model innovations in the sector.

Integration across CCA

CCA has undertaken several strategy refinement processes that are either still in development or recently completed. These include updates to the policy strategy and the gender strategy, development of the clean cooking sector strategy, and design of the M&E Framework. From the earliest stages of developing the research strategy, CCA has worked to fully integrate it across other areas of work within the organization. Each strategy and framework represents one facet of CCA's work, all of which build upon one another.

For example, the research strategy emphasizes the need for accessible and credible evidence to influence policy, thereby supporting the policy strategy. The research strategy also identifies gaps in the clean cooking evidence

base, one of which is a dearth of knowledge on the gender-specific impacts of clean cooking. These findings align with the gender strategy, which emphasizes the need for more robust evidence to advance gender equality through clean cooking interventions. Meanwhile, the clean cooking sector strategy represents a sector-wide effort, led by CCA, to leverage coordination and collaboration among organizations in pursuit of universal clean cooking access. With

its emphasis on partnership—both within the sector and beyond—the sector strategy closely aligns with the research strategy's enabling objective and others. Finally, the research strategy also complements CCA's M&E Framework, which specifies when and why CCA would choose to commission an evaluation. CCA might pursue an evaluation to fill a key knowledge gap, and the research strategy identifies where such knowledge gaps exist.

METHODOLOGY

To develop this strategy, CCA conducted consultations with a representative sample of the clean cooking sector, commissioned a review of all CCA-funded research that resulted in peer-reviewed literature, and held follow-up interviews with researchers and donors to assess any changed priorities due to COVID-19.

External consultations: CCA conducted 40 stakeholder consultations: 18 with researchers (45%), 11 with partner organizations (27%), 4 with policymakers (10%), 4 with enterprises and investors (10%), 1 with a donor (3%), and 2 with other stakeholders (5%). See **Annex II** for a full list of consulted organizations.

CCA-funded literature review: CCA also conducted a thorough literature review of all CCA-funded studies that resulted in peer-reviewed publications (see **Annex I** for a full list of these studies). This review was used in the research strategy to complement the findings of the external consultations.

Follow-up interviews: CCA conducted most of the consultations for this strategy before the onset of the COVID-19 pandemic. As such, CCA held 11 brief follow-up interviews with researchers and donors to assess how, if at all, their priorities had changed as a result of the pandemic. CCA used their responses to inform the final version of this strategy.



CCA Research Strategy

Overview

In CCA's external consultations, stakeholders emphasized that, to achieve success, the sector needs credible, relevant evidence and the ability to translate that evidence into action. They said the sector must have a strong body of research that demonstrates the full benefits of clean cooking, the negative impacts of traditional cooking practices, and the most effective clean cooking solutions and interventions. They also stressed that, for this knowledge to be useful, it must be readily accessible, easy to understand, and practical. Clean cooking research emerges from a variety of sources and often cannot be found in a single location. Additionally, a large amount of this research originates in academic institutions and can be highly technical and difficult for non-experts to digest. Stakeholders noted that practitioners rarely have the training or the time to interpret academic studies. Therefore, clean cooking research must be translated and communicated so that practitioners can draw real-world applications from it. Only in this way will the sector be able

to turn evidence into action and achieve universal access to clean cooking.

Stakeholders overwhelmingly agreed that CCA plays a critical role in fulfilling these needs for the sector. Specifically, CCA acts as a knowledge and action hub that bridges the gap between research and practice. CCA collects, maintains, and synthesizes the most up-to-date, rigorous research on clean cooking solutions and their impacts. CCA then translates and packages this evidence so that it can be easily accessed, understood, and used by practitioners for decision-making. Stakeholders also said CCA uses its knowledge of the clean cooking evidence base to identify research gaps in the sector. Sometimes, CCA offers direct funding for critical research. However, if CCA determines it is not an appropriate funder, it collaborates with sector partners to ensure the research gap is filled. The consultations showed that few other organizations in the sector place a similar emphasis on using knowledge to influence action. As such, stakeholders recommended

that CCA lean further into this role going forward in order to best serve the sector.

Stakeholders identified three critical objectives that CCA should pursue over the next five years to function as an effective knowledge and action hub for clean cooking. From 2020–2025, CCA should:

1. **Translate evidence to action.** CCA will serve as the go-to destination for clean cooking evidence that is credible, accessible, and actionable. It will periodically (i.e., quarterly) track the publication of and review the latest, high-quality clean cooking research, communicating directly with researchers when necessary to understand results. CCA will collect and maintain this knowledge to serve as a resource for the sector and to build its own internal expertise. Finally, CCA will translate evidence into outputs that are clear and practical and disseminate those outputs to the sector for use by practitioners.
2. **Fund research.** CCA will fund targeted research that other sector actors cannot or will not fund. CCA will leverage its role as a knowledge hub to understand where the most pressing gaps in clean cooking research exist. It will then strategically fund high-impact research by partnering with organizations with similar missions, by providing add-on funds for targeted projects, or by funding research independently. CCA will follow a standardized review protocol, enlisting external expertise as necessary, to draft the Request for Proposals, to review proposals, and to select grantees.
3. **Enable research.** CCA will enable scientific and technical research by serving as a convener of various sector actors. It will host convenings (e.g., meetings, conferences, etc.) to allow organizations to come together, collaborate, and share learnings that may otherwise remain siloed. CCA will also serve as the key vehicle through which clean cooking research is disseminated, using its communications infrastructure to amplify the sector's work. CCA will enable the sector by helping other organizations achieve their strategic goals, provided they are in line with CCA's research objectives.

As shown in **Fig. 1**, CCA's research objectives are linked and complementary. For example, because CCA repeatedly reviews, collects, and synthesizes the latest clean cooking evidence, it can identify the critical evidence gaps in the sector that need to be filled. CCA may conclude that it is the

organization best suited to help in filling a given gap; it will then directly fund research on that topic. Alternatively, CCA may determine it is not well-suited to support research in a particular area. It will then leverage its role as an enabler to either signal the importance of this research to other organizations and/or serve as a fundraising partner to those organizations. The new evidence created will then be collected and maintained by CCA and made into an output that is digestible, actionable, and accessible for practitioners. This will allow the newly generated evidence to produce action on the ground, thereby creating a tangible benefit. The descriptions of CCA's 2020–2021 activities offer further examples of the interrelationships among these objectives.

By pursuing its research strategy, CCA will become a stronger learning organization that develops its internal expertise, continually adapts to meet the sector's changing needs, and disseminates these learnings to the sector. CCA acquires knowledge by regularly reviewing, collecting, and organizing clean cooking research. It also creates knowledge by synthesizing the research it collects, identifying gaps, and funding or enabling research to fill those gaps. CCA transfers knowledge by sharing its work with the sector and by amplifying the voices of partners with shared goals. Taken together, these activities allow both CCA and the sector to strengthen its knowledge around clean cooking and what needs to be done to achieve universal clean cooking access.

Objectives

Translate evidence to action

Stakeholders said CCA plays a critical role as a translator of evidence into action. They said they look to CCA as a knowledge hub that packages and communicates research so that it can be used for decision-making. The consultations showed that this role is unique to CCA and that few other sector actors prioritize converting evidence into digestible and usable outputs. Stakeholders described these functions as critical to the sector's success. As such, they said CCA should embrace its research translation role and dedicate more time and resources to become the primary conveyer of evidence and information to the sector.

To fill this role, CCA will, over the next five years, expand and strengthen its research communication efforts. It will periodically (i.e., quarterly) track the publication of new clean cooking research, including academic studies

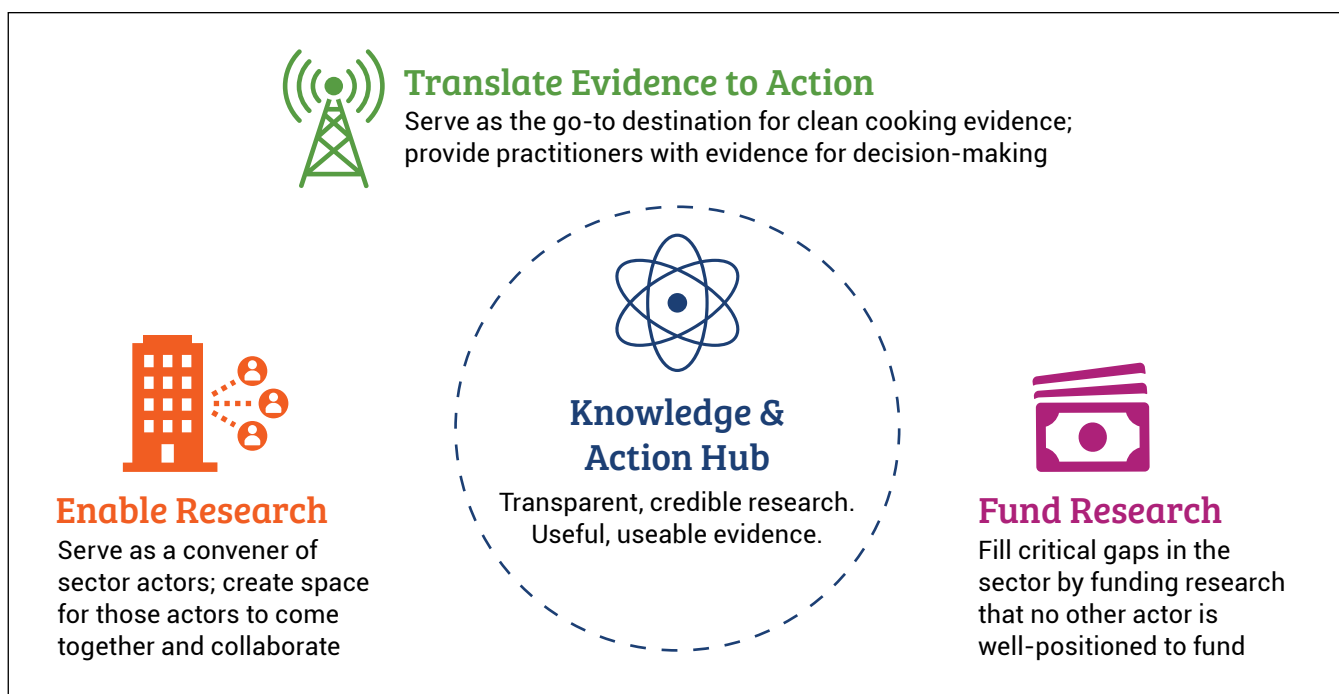


Figure 1. CCA's research objectives

and grey literature (i.e., research not formally published in academic sources such as journals). CCA will also use its internal expertise in clean cooking impacts and in econometric and statistical methods to carefully vet evidence before sharing it more broadly with the sector. Where study results are complex or require specific technical expertise to understand, CCA will leverage its relationships with researchers and research organizations to interpret the nuanced findings. CCA will, as necessary, collaborate with study authors to accurately convey their results to various audiences.

Stakeholders emphasized that the dissemination of research is useful only if it is credibly and transparently conveyed. As such, CCA will always communicate both negative and positive results, tempering exciting findings with any limitations in study design (e.g., sample size, response bias, etc.) or generalizability. CCA will also explicitly note CCA-funded or affiliated research and strive to clearly communicate its research priorities with any partners and collaborators. While advocacy represents a portion of CCA's work, the organization will always balance its role as a champion of clean cooking with its firm belief in the importance of evidence-based action.

To disseminate evidence to the sector, CCA will, from 2020–2025, create opportunities for contact and

collaboration among sector actors that might otherwise remain siloed. CCA will accomplish this by planning and hosting regular webinars, workshops, conferences, and meetings. It will carefully select participants for and design the individual sessions of these events to ensure they are as effective and useful as possible. These events, both in-person and virtual, will provide individuals and organizations with a space to come together, identify opportunities for partnership, and share learnings with one another. CCA will also communicate research to the clean cooking sector through social media channels, newsletters, and CCA's website. CCA will use tweets, periodic "research update" blog posts, and long-form articles on its website to update the sector on the latest clean cooking evidence.

CCA will also seek to measure and continually improve the reach of its communication outputs by tracking important metrics (e.g., number of views, shares, etc.) associated with each publication. CCA also maintains various open-access tools (e.g., HAPIT, FACIT, and ABODE) designed to help sector practitioners and stakeholders make sense of clean cooking research. These tools serve to translate complex data into evidence that is understandable and actionable, thereby empowering diverse actors to ensure that knowledge becomes action. CCA will continue to host and publicize these tools from 2020–2025.

Fund research

Stakeholders agreed that the sector possesses compelling data and evidence to act; however, within the body of clean cooking research, important gaps remain. They said that CCA adds value to the sector by funding targeted research that no other actors are likely to fund. They recommended that CCA should, over the next five years, solidify its role as a funder of research so that it can help to close critical knowledge gaps in the sector that may, otherwise, remain unfilled.

Several existing organizations in the clean cooking sector have the requisite expertise and resources to fill some of these evidence gaps, including the Clean Cooking Implementation Science Network (ISN) at the National Institutes of Health (NIH), Modern Energy Cooking Services (MECS), and the World Bank. However, for research that these organizations are not inclined to support, CCA will serve as a targeted funder when able. Stakeholders listed several examples of research that CCA may be uniquely well-suited to fund, including market intelligence, livelihoods, and gender research. The consultations yielded a larger list of priority research areas that the sector should investigate going forward. This list can be found in **Annex III**.

Stakeholders also noted that CCA can fill research gaps by funding studies that add on to existing, large-scale programs. Many research organizations have access to substantial funding that they use for expensive, multi-year studies with big sample sizes. CCA can use its funds strategically by supporting smaller studies that build on these programs to investigate specific research questions. For example, the Household Air Pollution Intervention Network (HAPIN) trial is a large, international study funded by NIH with other partners. With 7,200 participants in four countries, the study has produced rich data on the health impacts of improved cookstoves and clean fuels.

The ISN is working to obtain funding for a study that examines how HAP exposure over time affects children's development. The current HAPIN funding does not support this research question. As such, CCA could consider providing funding for the ISN study. By supporting a targeted add-on that takes advantage of the existing HAPIN data, CCA would reap large benefits for the sector and for itself with a relatively small investment. From 2020–2025, CCA will fund strategic add-ons that investigate meaningful questions, offer good value for the money spent, and amplify the work of partners.

Following the onset of the COVID-19 pandemic, stakeholders looked to CCA to take the lead on research exploring the

relationship between chronic HAP exposure and COVID-19. Donors and partners alike reached out to CCA to assess the possibility of funding studies on this relationship. HAP-COVID research represents the kind of niche area that CCA is well-positioned to fund while other organizations may not be. Moreover, both HAP-COVID research studies that CCA has selected for funding are add-ons to existing programs. Over the next five years, CCA will continue to support research that it is uniquely poised to fund and seek out opportunities where strategic investments can lead to large returns.

When CCA identifies a potential opportunity to serve as a funder of research, it will follow a standardized protocol for drafting the Request for Proposals (RFP), proposal review, and awardee process. CCA will consider necessary expertise before RFPs are posted, include requirements/quotas for female principal investigators (PIs), include provisions for building capacity of local research institutions, establish an internal (and potentially external) review committee for proposal reviews, and standardize reporting requirements.

Enable research

Sector stakeholders said CCA plays a key role in enabling scientific and technical research. They suggested that CCA embrace its role as a convener in the sector by fostering opportunities for collaboration among partners and serving as the key vehicle through which clean cooking research is disseminated. The consultations also revealed that CCA has a stronger communications infrastructure than most other sector actors, and, therefore, CCA should use these resources to amplify the sector's work.

To best position itself as an enabler for the sector, CCA will, from 2020–2025, strengthen its existing relationships with other key funding organizations including—but not limited to—the ISN, the Sustainable Energy Transitions Initiative (SETI), the Climate and Clean Air Coalition (CCAC), and Modern Energy Cooking Services (MECS) to enable high-quality and critical research. The consultations also demonstrated that CCA should expand its relationships to include more actors from related sectors (e.g., sustainable energy, air pollution, health, climate, food systems, etc.). Over the next five years, CCA will strengthen collaboration with organizations including Sustainable Energy for All (SEforALL), GOGLA, Global Alliance on Health and Pollution (GAHP), Vital Strategies, United Nations International Children's Emergency Fund (UNICEF), and others. Through this collaboration, CCA will gain important learnings from other sectors and amplify



all work that expands energy access, not just clean cooking.

CCA will also work to signal which research gaps remain uninvestigated that are critical for decision-making. Its subject matter experts will invest in building strong relationships with the research community and with sector decisionmakers to understand where research priorities should be. CCA will then communicate those priorities to the sector on a routine basis through position papers and other publications. It will also enable critical research by disseminating the latest research methods and best practices through workshops, conferences, and other events.

CCA's consultations also showed that it should support other research organizations to achieve their strategic goals, provided they are in line with CCA's research strategy. As previously mentioned, the ISN is seeking funding to monitor children's exposure to HAP by building on the HAPIN trial. Since the original HAPIN trial does not support this specific research, CCA could consider providing the funding to enable

this crucial add-on. CCA will continue and strengthen its support for all organizations that share a similar mission. From 2020–2025, CCA will serve as an active fundraising partner for research groups to help them secure funding for critical research. It will also serve as a direct funder for research opportunities that offer good value relative to the cost and that have the potential for large benefits to the sector.

The Clean Cooking Academy (described in more detail below) represents another example of CCA's enabling activities. This event, to be held in partnership with the ISN, will provide an opportunity for policymakers to engage in a series of virtual workshops and trainings on clean cooking. The goal of the academy is to translate research into targeted policy guidance and convene researchers and policymakers to strengthen the clean cooking community. To execute this event, CCA will work closely with the ISN to leverage the strengths of each organization, that is, expertise and funding. By bringing its unique strengths to the table, CCA will work

with a partner to achieve a shared goal. The workshop will also serve as an opportunity for CCA to act on its commitment to increase the sector's engagement with the Global South over the next five years. These are the countries most affected by the lack of clean cooking access. Therefore, it is paramount that they have a seat at the table and that the sector's direction is charted in partnership with them.

2020–2021 activities

Throughout 2020, CCA has had the opportunity to realize its research strategy through several new and existing projects. CCA's ongoing support for HAP-COVID research as well as CCA's open-access tools show how the organization has acted upon its research strategy in the past. Meanwhile, upcoming initiatives scheduled to take place in 2021, such as the Clean Cooking Academy and the State of the Evidence Base 10-Year Conference, show how CCA will continue to embody its research strategy in the future.

HAP-COVID research

Since the onset of the COVID-19 pandemic, a variety of hypotheses have linked the impact of air pollution to the incidence and outcomes of the disease. Air pollution has numerous negative effects on an individual's health, including decreased pulmonary, cardiovascular, and nervous system functions and even possible reductions to one's immune functions. COVID-19 has many of the same negative effects. Given the plausible connections between these two threats, CCA sought to better understand how COVID-19 impacts individuals exposed to chronic household air pollution (HAP) from indoor cooking and heating. Research on this relationship is one example of a niche study area that CCA may be uniquely well-suited to fund while other sector actors are not.

HAP-COVID Workshop. In August 2020, CCA planned and hosted a workshop to identify the potential value of studying the association between chronic exposure to HAP and COVID-19 in community or clinical settings, explore key research questions, and determine the feasibility of conducting HAP-COVID studies given the current constrained mobility. The two-day workshop brought together more than 60 experts in the fields of household air pollution, epidemiology, immunology, virology, infectious disease, and other relevant fields. Participants explored whether exposure to HAP is likely to increase the risk of infection of COVID-19 and/or

result in more severe cases. Participants agreed that further research is needed to investigate this interaction in order to support public health responses now and in the future.

HAP-COVID Research. CCA decided to release an RFP to examine 1) the effect of chronic HAP exposure on COVID-19, or 2) the impact of interventions to control COVID-19 on HAP exposure and related human health outcomes. In response to the RFP, 16 organizations submitted proposals. A steering committee of eight experts in relevant fields reviewed the proposals and selected the two most promising projects for funding. CCA will work with these groups throughout 2021 and 2022 to advance HAP-COVID research.

Tools

CCA supports a number of open-access tools—such as the Household Air Pollution Intervention Tool (HAPIT), the Fuel Analysis, Comparison & Integration Tool (FACIT), and the Air Pollution Burden of Disease Explorer (ABODE)—to help practitioners and stakeholders in the sector understand the potential impacts of clean cooking interventions.

There is a growing focus on interventions seeking to reduce the burden of disease associated with household air pollution. [HAPIT](#) provides policymakers and program implementers with an easy-to-use tool by which to compare the relative merits of programs both within and between countries, assisting with optimization of limited resources. Although several uncertainties remain, HAPIT represents the “state of the science” and relies on the best available knowledge. It is built to easily integrate new knowledge and findings to better hone estimates.

[FACIT](#) provides interactive access to data and information generated from a comparative analysis conducted from 2015–2016. The study evaluated relevant environmental impacts associated with production, distribution, and use of multiple fuels used in cookstoves, while also considering social and economic factors. FACIT allows users to visually compare impacts and trade-offs of different fuels used to provide energy for cooking. Stakeholders involved in making decisions related to optimizing the fuel value chain find this tool particularly useful. The study was conducted in coordination with a companion study completed by the U.S. Environmental Protection Agency (EPA).

[ABODE](#) estimates health changes due to interventions designed to lower exposures to HAP of household members currently using unclean fuels (e.g., wood, dung, coal,

kerosene, etc.). These interventions could take the form of cleaner burning stoves, cleaner fuels, providing chimneys or other ventilation changes, movement of the traditional hearth to a different location, motivating changes in behavior, or a combination of the above. ABODE can also estimate changes in health due to changes in ambient air pollution from household interventions that may not be measured in normal household exposure measurements. With some care in entering input parameters, it can be used for evaluating other interventions to reduce HAP, including those for lighting and space heating. ABODE is a new tool for the sector, having been completed in early 2020. As such, CCA plans to socialize it over the next several years by hosting webinars, featuring it on the CCA website, and sharing it throughout CCA's network.

Clean Cooking Academy

In 2021, CCA will collaborate closely with the ISN to develop and execute a clean cooking academy for policymakers where participants will engage in a series of virtual workshops and trainings on clean cooking. The goal of the academy is to translate clean cooking research related to health and implementation science (i.e., the science of the uptake and scale-up of evidence-based practices) published in the past several years into targeted policy guidance. The academy will also serve as a meeting place among researchers and policymakers to create a strong enabling environment for the successful adoption and use of clean cooking technologies within the countries participating in the academy. This event serves as an example of CCA's objectives to translate evidence to action and to enable research.

The State of the Evidence Base 10-Year Conference: Household Energy, Air Pollution, and Health

In collaboration with NIH, EPA, United States Agency for International Development (USAID), and Centers for Disease Control (CDC), CCA will plan and execute a global conference for researchers, policymakers, investors, funders, and other stakeholders that showcases the clean cooking evidence

base to date. This conference will serve as a stocktaking of existing clean cooking evidence, identifying successes as well as what work remains to be done. Topics will include, but are not limited to: interactions between indoor and outdoor air pollution, associated effects of clean cooking on women's safety and empowerment, advances in biomarker development for exposure and health impacts, program implementation science methodology, and impacts on global warming emissions. Participants will prepare for the next 10 years by defining a collective research agenda that ensures existing gaps are filled and that the sector moves swiftly toward universal clean cooking access by 2030. The conference will also prioritize engagement from the Global South to shift the locus of clean cooking research efforts to those countries that are most affected by clean cooking access or the lack thereof.

LOOKING AHEAD

By pursuing its three research objectives, CCA will continue and strengthen its role as a knowledge and action hub for the clean cooking sector. In this way, CCA will become a stronger learning organization while also providing the sector with the support it needs to achieve universal access to clean cooking. By maintaining, synthesizing, and disseminating clean cooking research, CCA will build its own expertise while also contributing to the sector's collective understanding of the impacts of clean cooking and the most effective interventions. Through its funding activities, CCA will develop its internal capacity for supporting high-impact research and help the sector close critical evidence gaps. Finally, by acting as an enabler of research, CCA will better situate itself as a convener in the sector and will support sector actors in collaborating and partnering more effectively with one another.

Annex I: CCA-Funded Studies that Produced Peer-reviewed Research

Title	Author(s)
A user-centered, iterative engineering approach for advanced biomass cookstove design and development	Ming Shan, Ellison Carter, Jill Baumgartner, Mengsi Deng, et al.
Factors influencing the adoption and sustainable use of clean fuels and cookstoves in China—a Chinese literature review	Guofeng Shen, Weiwei Lin, Yuanchen Chen, Dingli Yue, Zuoli Liu, and Chunli Yang
Barriers and facilitators to adoption and use of fuel pellets and improved cookstoves in urban Rwanda	Ryan Seguin, Valerie L. Flax, and Pamela Jagger
Implementation and scale-up of a biomass pellet and improved cookstove enterprise in Rwanda	Pamela Jagger and Ipsita Das
Adoption of Liquefied Petroleum Gas Stoves in Guatemala: A Mixed-Methods Study	Lisa M Thompson, Mayari Hengstermann, John R Weinstein, and Anaite Diaz-Artiga
Determinants of Cookstoves and Fuel Choice Among Rural Households in India	V. Menghwani, H. Zerriffi, P. Dwivedi, J. Marshall, A. Grieshop & R. Bailis
Ghana's rural liquefied petroleum gas program scale up: A case study	Kwaku Poku Asante, Samuel Afari-Asiedu, Martha Ali Abdulai, Darby W. Jack, et al.
Sustained usage of bioethanol cookstoves shown in an urban Nigerian city via new SUMs algorithm	Amanda Northcross, Matt Shuplera, Donee Alexander, et al.
Quantifying the rural residential energy transition in China from 1992 to 2012 through a representative national survey	S. Tao, M. Y. Ru, W. Du, X. Zhu, Q. R. Zhong, et al.
Pellet-fed gasifier stoves approach gas-stove like performance during in-home use in Rwanda	Wyatt M. Champion and Andrew P. Grieshop
Black carbon cookstove emissions: A field assessment of 19 stove/fuel combinations	Charity Garland, Samantha Delapena, Rajendra Prasad, Christian L'Orange, Donee Alexander, and Michael Johnson
Comparative Analysis of Fuels for Cooking	

Title	Author(s)
The carbon footprint of traditional wood fuels	Robert Bailis, Rudi Drigo, Adrian Ghilardi, and Omar Masera
"Geospatial Analysis and Modeling of Non-Renewable Biomass: WISDOM and beyond" (Includes Kenya, Honduras, India)	Robert Bailis, Rudi Drigo, Adrian Ghilardi, and Omar Masera
Potential environmental benefits from wood fuel transitions in Haiti: Geospatial scenarios to 2027	Adrian Ghilardi, Andrew Tarter, and Robert Bailis
"Spatiotemporal modelling of fuelwood environmental impacts: Towards an improved accounting for non-renewable biomass" published in Environmental Modelling & Software	Adrian Ghilardi, Rob Bailis, Jean Francois Mas, M.M. Skutsch, et al.
Emission factors of health and climate relevant pollutants measured in home during a carbon finance approved cookstove intervention in rural India	Andrew P. Grieshop, Grishma Jain, Karthik Sethuraman, and Julian D. Marshall
In-Use Emissions and Estimated Impacts of Traditional, Natural- and Forced-Draft Cookstoves in Rural Malawi	Roshan Wathore, Kevin Mortimer, and Andrew P. Grieshop
Research Report: What motivates women to buy? Uganda gendered marketing applied research study	Kim Beevers
Residential Solid Fuel Combustion and Impacts on Air Quality and Human Health in Mainland China: Executive Summary	Shu Tao
WHO Report: Burning Opportunity: Clean Household Energy for Health, Sustainable Development, and Wellbeing of Women and Children	Heather Adair-Rohani, Jessica Lewis, Jonathan Mingle, and Sophie Gummy
HAPIT, the Household Air Pollution Intervention Tool, to Evaluate the Health Benefits and Cost-Effectiveness of Clean Cooking Interventions (from the book Broken Pumps and Promises: Incentivizing Impact in Environmental Health published by Springer International Switzerland)	Ajay Pillarisetti, Sumi Mehta, and Kirk R. Smith
Kitchen PM _{2.5} concentrations and child acute lower respiratory infection in Bhaktapur, Nepal: The importance of fuel type	Michael N Bates, Amod K Pokhrel, Ram K Chandyo, et al.

Title	Author(s)
Estimating Indoor PM _{2.5} and CO Concentrations in Households in Southern Nepal: The Nepal Cookstove Intervention Trials	Chen Chen, Scott Zeger, Patrick Breysse, et al.
Current respiratory symptoms and risk factors in pregnant women cooking with biomass fuels in rural Ghana	Vliet et al.
Prenatal Household Air Pollution Alters Cord Blood Mononuclear Cell Mitochondrial DNA Copy Number: Sex-Specific Associations	Seyram Kaali, Darby W. Jack, Rupert Delimini, Lisa Hu, et al.
Prenatal household air pollution is associated with impaired infant lung function with sex-specific effects: Evidence from GRAPHs, a cluster randomized cookstove intervention trial	Alison G. Lee, Seyram Kaali, Ashlinn Quinn, et al.
Effect of a clean stove intervention on inflammatory biomarkers in pregnant women in Ibadan, Nigeria: A randomized controlled study	Christopher O Olopade, Elizabeth Frank, Emily Bartlett, Donee Alexander, et al.
Pregnancy outcomes and ethanol cook stove intervention: A randomized-controlled trial in Ibadan, Nigeria	Donee A Alexander, Amanda Northcross, Theodore Karrison, et al.
Randomized controlled ethanol cookstove intervention and blood pressure in pregnant Nigerian women	Donee Alexander, Amanda Northcross, Nathaniel Wilson, et al.
Household air pollution and angiogenic factors in pregnant Nigerian women: A randomized controlled ethanol cookstove intervention	Anindita Dutta, Katherine Brito, Galina Khramstova, Ariel Mueller, Sireesha Chinthala, Donee Alexander, et al.
Household air pollution and chronic hypoxia in the placenta of pregnant Nigerian women: A randomized controlled ethanol Cookstove intervention	Anindita Dutta, Galina Khramtsova, Katherine Brito, Donee Alexander, et al.
Indoor air pollution from biomass cookstoves in rural Senegal	Candela de la Sota, Julio Lumbreras, Noemí Pérez, Marina Ealo, Moustapha Kane, Issakha Youm, and Mar Viana
Boiling Point 68: Energy In Emergency Settings	Multiple authors
Statistical Snapshot: Access to Improved Cookstoves and Fuels and its Impact on Women's Safety in Crises	

Title	Author(s)
White Paper: Gender-Based Violence in Humanitarian Settings: Cookstoves and Fuels	
Implementation Science to Accelerate Clean Cooking for Public Health	Joshua Rosenthal, Kalpana Balakrishnan, Nigel Bruce, David Chambers, et al.
The need for policies to reduce the costs of cleaner cooking in low income settings: Implications from systematic analysis of costs and benefits	Marc Jeuland, Jie-Sheng Tan Soo, and Drew Shindell
Analyzing the costs and benefits of clean and improved cooking solutions	Marc Jeuland and Jie-Sheng Tan Soo

Annex II: List of Consulted Organizations

Accenture Development Partnerships

Acumen

Africa Enterprise Challenge Fund (AECF), Kenya

Bidhaa Sasa, Kenya

Boston College, USA

Centers for Disease Control and Prevention (CDC), USA

Centre for Integrated Research and Community Development (CIRCODU), Uganda

Centre for Research on Energy and Energy Conservation (CREEC), Uganda

Colorado School of Public Health, USA

Duke University, USA

ENEA Consulting

Energising Development (EnDev)

Federal Ministry of Health, Nigeria

Fraym

Global LPG Partnership

Gold Standard

Greenway, India

International Center for Research on Women

Johns Hopkins Bloomberg School of Public Health, USA

Kenya Industrial Research and Development Institute

McGill University, Canada

Ministry of Health and Wellness, Botswana

National Institutes of Health (NIH), USA

Netherlands Development Organisation (SNV), Ethiopia

North Carolina State University, USA

Peking University, China

Power4All

Public Health Institute (PHI), Berkeley, USA

Standards Organization of Nigeria

Stockholm Environment Institute (SEI)

Tanzania Bureau of Standards (TBS)

UNFCCC Project Developer Forum

United States Environmental Protection Agency (EPA)

University of Illinois at Chicago (UIC), USA

Annex III: Priority Research Areas

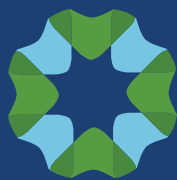
In CCA's external consultations, stakeholders identified the following priority research areas that the sector should investigate going forward:

- The factors that influence the use of clean cooking solutions and a “clean stack” and the disuse of traditional stoves and fuels
- Country-level and sub-national analyses of cooking practices and requirements
- Mapping of clean cooking practices to cooking technologies
- Country- and city-level cost-benefit analyses
- The benefits of clean cooking on forests and biomass regrowth
- The impacts of fuel use and cooking practices on regional land-use and land-cover in East and West Africa
- Market analyses in developing countries on the market potential and growth for clean cooking, including size of market potential, consumer profiles and characteristics, current clean cooking product offerings, assessments of which products are best suited for particular markets or consumer segments, and assessments of broader policy and macroeconomic environments
- The gender-differentiated impacts of clean cooking, including those related to livelihoods
- Standardized indicators/data to fully understand gender dynamics and impacts within the clean cooking sector
- The decision-making dynamics of household energy use, particularly how willingness to pay factors for men and women vary across countries and within rural and urban populations
- Consumer insights, specifically around women's motivations for adopting clean cooking methods, customers' use of products, and customers' reactions to advanced cooking technologies

Annex IV: List of Objectives and Activities

Objectives	Activities
Translate evidence to action	Track the publication of research
	Develop policy briefs, infographics, factsheets, and other materials that are easily digestible
	Publish tweets, periodic “research update” blog posts, and long-form articles on the CCA website
	Track the impact (e.g., number of views, shares, etc.) of each publication
	Transparently communicate both negative and positive results
	Note CCA-funded or affiliated work
	Acknowledge study limitations (including sample size, response bias, etc.), and generalizability
	Coordinate directly with study authors to understand and convey nuanced results to various audiences
Fund research	Fund targeted research that no other sector actor is well-positioned to fund
	Provide targeted funding to existing trials that have funding needs or additional aims that could be supported
	Follow a standardized protocol for the drafting of the Request for Proposals (RFP), proposal review, and awardee process
	Consider necessary expertise before RFPs are posted
	Include requirements/quotas for female PIs and PIs from the Global South
	Include provisions for building capacity of local research institutions
	Establish an internal (and potentially external) review committee for proposal reviews
	Standardize reporting requirements
	Present results to both the study community and local and national governments

Objectives	Activities
Enable Research	Strengthen existing relationships with the ISN, SETI, CCAC, and MECS to enable high-quality and critical research
	Expand relationships with actors across the clean cooking sector as well as adjacent sectors (e.g., off-grid solar, air pollution, health, climate, etc.)
	Collaborate with partner organizations on research and policy briefs, research dissemination workshops, webinars, and communication toolkits
	Serve as a fundraising partner for research groups and support in securing funding for critical research
	Build and maintain internal scientific and technical expertise
	Signal to the sector which research gaps remain uninvestigated that are critical for decision-making
	Communicate research priorities to the sector on a routine basis through position papers and other publications
	Enable critical research by disseminating the latest research methods and best practices through workshops, conferences, and other events



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