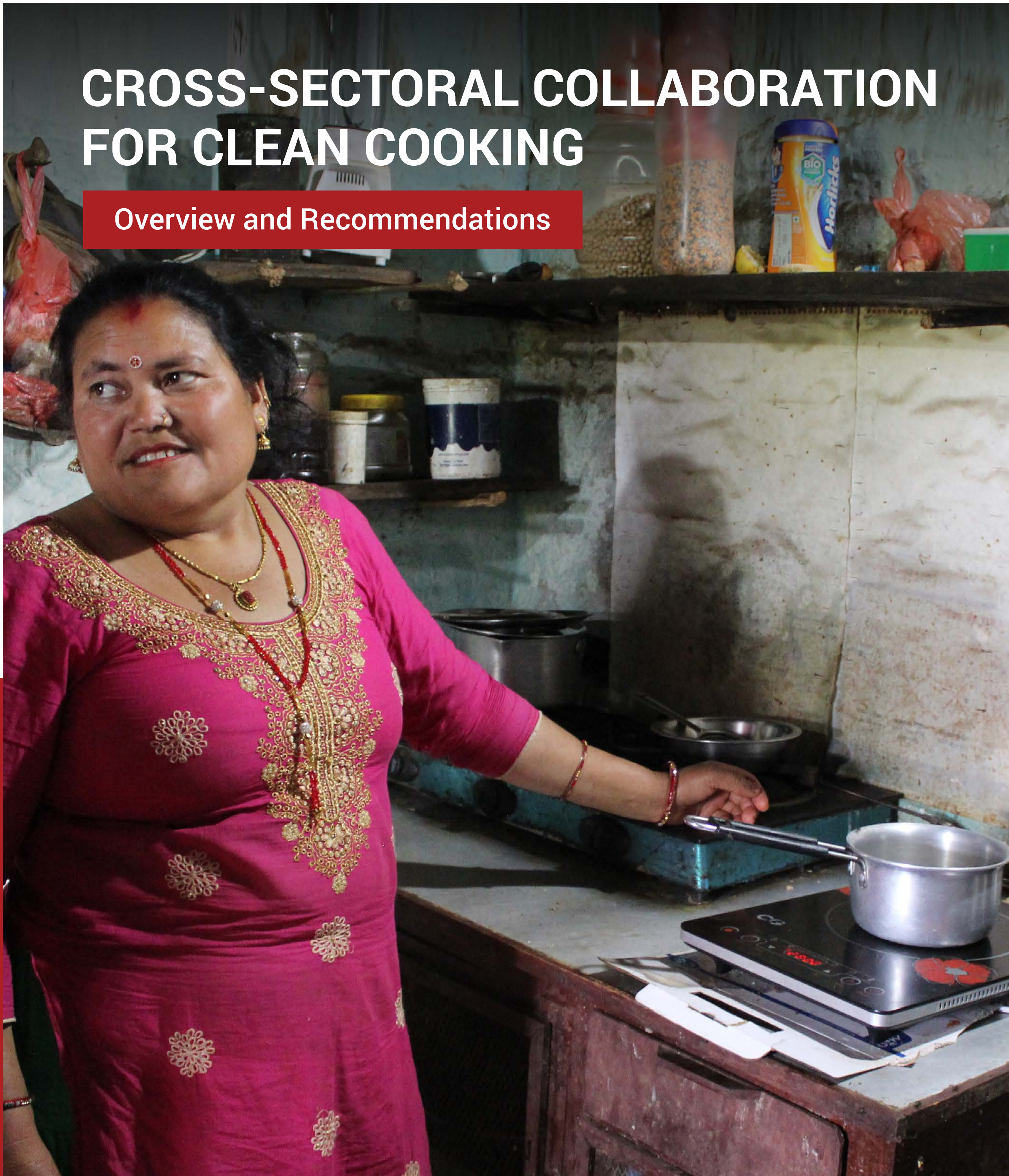
CROSS-SECTORAL COLLABORATION FOR CLEAN COOKING

Overview and Recommendations



CLEAN COOKING ALLIANCE

PATH

BRIDGECOLLABORATIVE

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Cover: Image 1.
A Nepalese woman cooking on an electric cookstove.

» EXECUTIVE SUMMARY

1.1 OVERVIEW

The Bridge Collaborative brings together people and organizations from health, environment, and development to promote collaboration across sectors to more effectively address critical global issues. This case study package applies that guiding principle to clean cooking. We assess a total of four national clean cooking interventions from Nepal and Kenya and consider the evidence for the co-benefits of clean cooking on health, the climate, the environment, gender equality, and livelihoods. Based on the lessons learned from the case studies, we then provide recommendations for leaders of future clean cooking interventions to realize the co-benefits of clean cooking by working more effectively across sectors.

For this package, we define “intervention” as a national-level program designed to promote clean cooking and reduce the negative impacts of cooking over open fires and inefficient stoves. While these interventions can have a broader focus, such as on energy poverty, cooking must be a significant component of the intervention. “Sectors” refer to areas that potentially benefit from clean cooking. They include health, the climate, the environment, gender equality, and livelihoods. Finally, we also consider how the inclusion of different stakeholder groups, such as govern-ments, end-users, private entrepreneurs and businesses, and civil society can support these national clean cooking interventions.

This package is divided into two components. One component presents two reports containing case studies of national clean cooking interventions by country; two interventions are assessed in Nepal and two in Kenya. The other component, this report, summarizes general evidence on and presents a visual representation of the multiple effects of clean cooking. It summarizes the four national interventions and it provides recommendations for future efforts.

The reports on Nepal and Kenya are available at: **nicholasinstitute.duke.edu/project/bridge-collaborative/publications**.

Image 2. A biogas system in Kenya, built with support from the Netherlands Development Organisation (SNV) and Hivos.

Image 3. A variety of biomass cookstoves on display in Kenya.

1.2 RECOMMENDATIONS

The final recommendations for planning, implementing, and evaluating clean cooking interventions are described in detail at the end of this report and are summarized here:

- » Seek meaningful and strategic involvement of key partners from all relevant sectors at all levels, from intervention planners and implementors to end-users.
- » Plan for, integrate, and conduct robust monitoring and evaluation to track intervention outputs, outcomes, and impacts across sectors and stakeholders.
- » Assess which technologies, fuels, and services are of the highest quality, provide benefits across sectors, and are suited to the end-users' preferences. Provide regular follow-up and after-sales service to ensure long-term sustainability.
- » Build the sustainability and reach of clean cooking enterprises with the expertise and resources of different sectors and stakeholders, which will help achieve co-benefits.
- » Engage multiple sectors in the development and implementation of clean cooking standards to strengthen the market and attain co-benefits.
- » Engage with end-users to build awareness and demand, which will help realize the co-benefits of clean cooking interventions.

» BACKGROUND

Lack of access to cleaner, more modern stoves and fuels is a global issue that harms health, the climate, and the environment, while placing a disproportionate burden on women and girls. Nearly three billion people cook on polluting, open fires or inefficient stoves, burning fuels such as wood, charcoal, coal, or kerosene. Most are living in low- and middle-income countries (World Health Organization, 2018).

Up to four million deaths every year are attributable to smoke exposure resulting from cooking on polluting, open fires and inefficient stoves, with the largest burden in sub-Saharan Africa and South Asia. Household air pollution (HAP) from cooking increases risk for diseases such as childhood pneumonia, chronic obstructive pulmonary disease, ischemic heart disease, stroke, and lung cancer (World Health Organization, 2018). Unsustainable harvesting of wood for cooking contributes to forest degradation, climate change, and loss of biodiversity (Bailis, Drigo, Ghilardi, & Masera, 2015). Reliance on polluting, open fires or inefficient stoves is a burden on families who must purchase or gather fuels. Families relying on solid biomass for cooking can dedicate up to 10 hours each week collecting this fuel, and several hours a day cooking—a burden largely borne by women and children (International Energy Agency, 2017).

Adopting cleaner, more modern stoves and fuels can reduce the burden of disease related to air pollution; emissions of climate pollutants; forest degradation; the drudgery and time spent on fuel collection and cooking; and household

CLEAN COOKING'S CONNECTIONS TO THE SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY	Clean cooking is necessary to leading healthy and productive lives, and it also helps consumers save time and money.
2 ZERO HUNGER	Clean cooking reduces fuel needs, thus reducing the burden on families to collect, buy, or trade other resources, such as food, for fuel.
3 GOOD HEALTH AND WELL-BEING	Clean cooking improves health by lowering the burden of disease from exposure to household air pollution.
4 QUALITY EDUCATION	Clean cooking can held children, especially girls, stay in school by reducing time spent on cooking and collecting fuel for the household.
5 GENDER EQUALITY	Clean cooking can reduce the burden of unpaid care work, which remains a major cause of gender inequality.
7 AFFORDABLE AND CLEAN ENERGY	Clean cooking is essential to addressing energy poverty and ensuring sustainable energy security for billions of people.
8 DECENT WORK AND ECONOMIC GROWTH	Energy access enables enhanced productivity and inclusive economic growth. A global clean cooking sector can boost job creation.
11 SUSTAINABLE CITIES AND COMMUNITIES	Clean cooking addresses household and ambient air pollution, resource efficiency, and climate vulnerability.
13 CLIMATE ACTION	Clean cooking reduces harmful, climate-damaging emissions from burning polluting fuels in inefficient stoves.
15 LIFE ON LAND	Clean cooking reduces the amount of wood required for cooking, thereby reducing environmental degradation and pressure on forest resources.

Figure 1. Clean cooking Clean cooking advances 10 of the 17 Sustainable Development Goals.

CONTINUUM OF COOKING TECHNOLOGIES AND PERFORMANCE

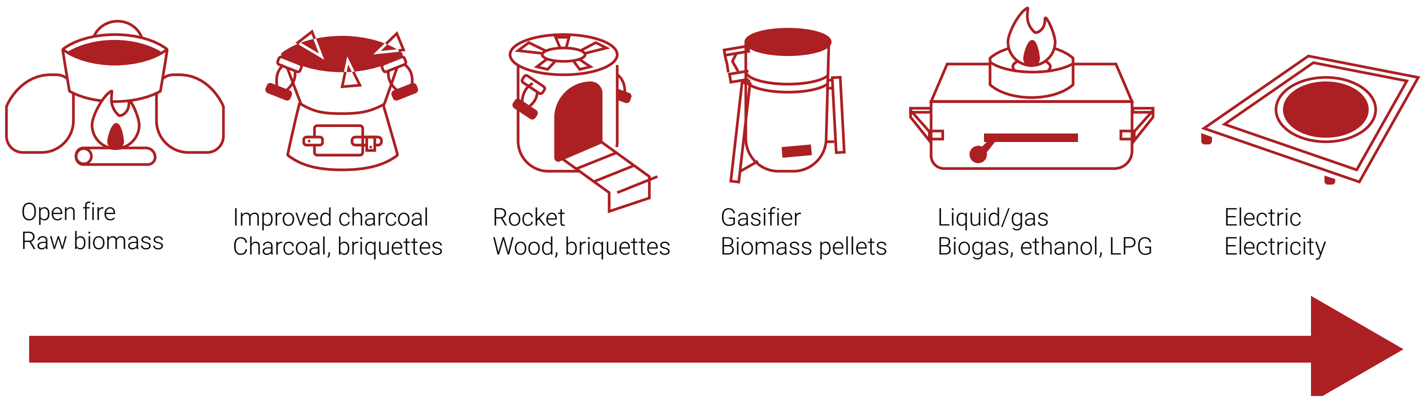

Figure 2. Performance generally increases with increased processing of fuel (from raw biomass to gas or electricity) and with increased industrialization of stove manufacturing (from an open fire to electric stoves).

expenditures on fuel (World Health Organization, 2018; Bailis, Drigo, Ghilardi, & Masera, 2015; Clean Cooking Alliance, 2019). These cross-sectoral benefits are exemplified in how clean cooking advances 10 of the 17 Sustainable Development Goals (SDGs), adopted in 2015 to mobilize the global community toward ending poverty, fighting inequalities, and tackling climate change (Figure 1).

There are a range of clean cooking solutions, each of which provides different benefits. The performance of a stove-fuel combination generally improves as the fuel is more processed and as stove manufacturing is more industrialized (Figure 2). On average, as performance increases, health, climate, and environmental benefits are more likely to be achieved. But performance is just one aspect. Long-term, consistent, and correct usage of clean cooking solutions in place of open fires and inefficient stoves is necessary to gain the most co-benefits.

In addition to the ranges of stoves and fuels, clean cooking interventions are varied in approach. They can include subsidies, cookstove distribution, fuel connection initiatives, business model innovations, restrictions on polluting fuels, consumer financing, strengthening technology standards, and behavior change campaigns, to name a few.

Due to the breadth of negative impacts of cooking on open fires or inefficient stoves, clean cooking interventions can and must involve diverse actors such as governments, multilateral organizations, non-governmental organizations, financial institutions, consumer representatives, and entrepreneurs from the health, climate, environment, gender, and development sectors. With so many potential partners and solutions, cross-sectoral collaboration can be difficult to implement in practice. Nonetheless, well-implemented and well-planned collaboration is imperative for success on a cross-cutting issue like clean cooking and will serve to strengthen an intervention.

» METHODS

We conducted a literature review analyzing 89 relevant publications on the multiple impacts and potential benefits of clean cooking for health, the climate, the environment, gender equality, and livelihoods. The full list of reviewed literature is in the annex of this report. Next, we established a cross-sectoral working group and convened two meetings to discuss the literature, develop a generalized results chain, and select interventions to include in supporting case studies. These case studies assess two national clean cooking interventions in Nepal and two in Kenya. In addition, we consulted in-country stakeholders to provide critical context and information about selected interventions. Throughout this process, we followed the **Bridge Collaborative Practitioner's Guide,** a resource for cross-sectoral action planning and evidence evaluation.

We selected the featured interventions based on relevance within broader, national clean cooking efforts; availability of relevant evaluations; and guidance from in-country experts. Throughout the development of the case studies, the refinement of the generalized results chain, and the resulting recommendations, we consulted both the working group and the in-country stakeholders. Their input and feedback were incorporated into the final products.

» RESULTS CHAIN

A generalized results chain is an infographic depicting how an intervention may lead to positive and negative consequences. Results chains include the theory behind an intervention. Nodes depict causes and consequences, and links are lines or arrows representing how a change in one node may cause a change in another node. Other terms for similar models include logic model, theory of change, influence diagram, means-end diagram, causal chain, impact pathway, and results framework (Tallis, Kreis, Olander, & Ringler, 2017).

The generalized results chain in Figure 3 depicts potential impacts of clean cooking in multiple sectors.

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RESULTS CHAIN

All arrows leading into a box are important for interpreting the arrows leading out of a box. The chain should be read from the beginning, incorporating the information from the boxes and arrows that proceed a point. For example, adoption and use of cleaner, more modern stoves and fuels decrease the use of traditional stoves and solid biomass fuels, which decreases woodfuel harvesting.

This generalized chain does not depict the strength of evidence underpinning each pathway. Important assumptions and additional considerations not represented in this diagram include fuel type, stove durability, and the performance of stoves and fuels over time.

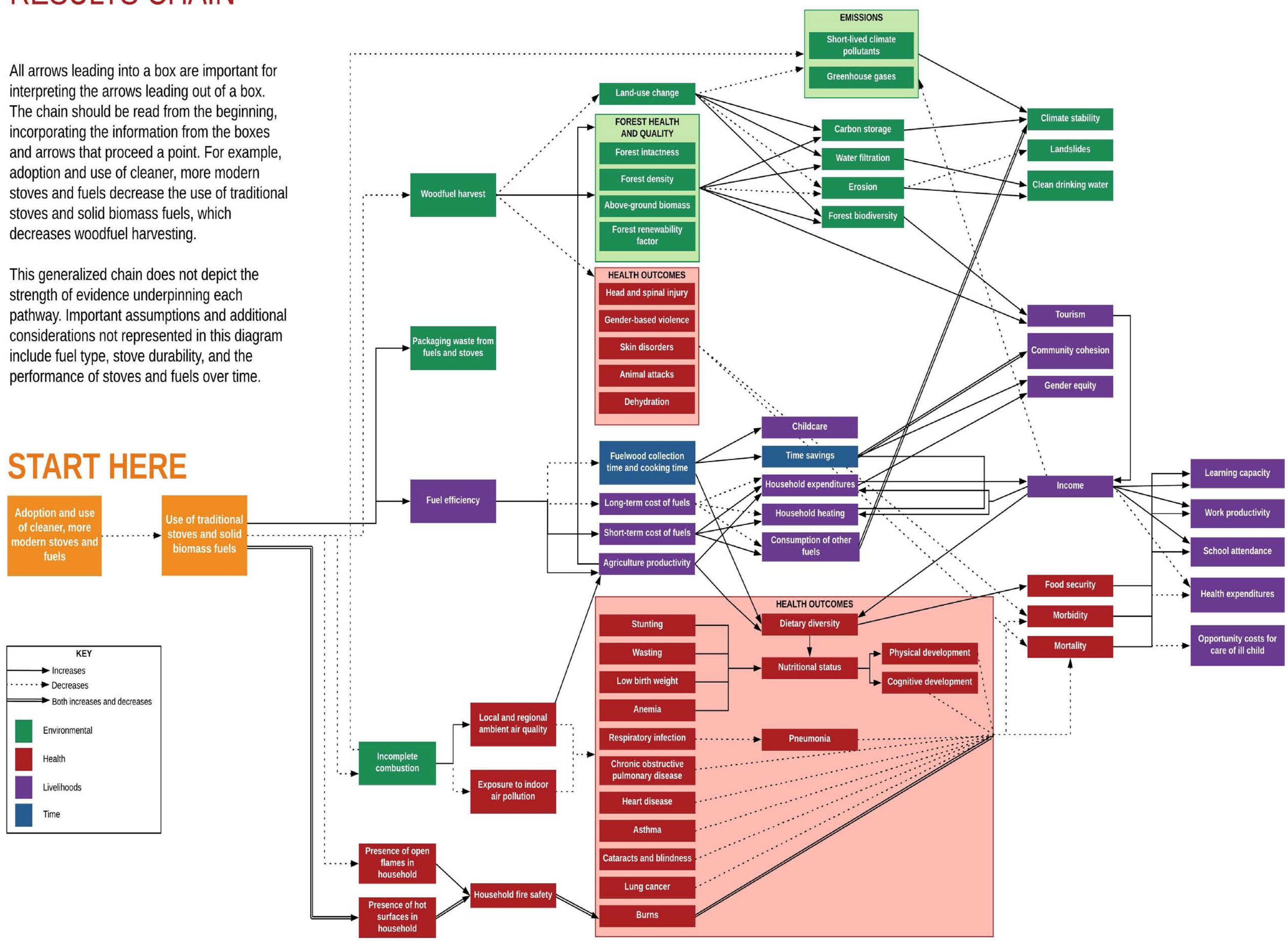

Figure 3. A generalized results chain depicting potential positive and negative impacts in multiple sectors of displacing polluting open fires and inefficient stoves with clean cooking.

» CASE STUDY SUMMARIES

Below are summaries of the case studies on Nepal and Kenya. In each country, two interventions were assessed. These countries were selected for several reasons: (i) both have seen decades of significant activity related to clean cooking; (ii) the local context of these two countries offer different examples of challenges and solutions; and (iii) the burden from HAP is especially high in sub-Saharan Africa and South Asia (World Health Organization, 2018; World Bank Group, 2017; Sustainable Energy for All, 2016).

5.1 NEPAL

Seventy-two percent of Nepal's population, or 21 million people, depend on polluting open fires or inefficient stoves for cooking (World Health Organization, 2016b; United Nations, 2017). Some 23,000 Nepalese people die prematurely every year from illnesses attributable to HAP exposure (World Health Organization, 2016a). The government of Nepal has made great strides in increasing access to clean cooking, but additional efforts are needed to achieve the national commitment of universal clean cooking by 2030 (World Bank Group, 2017). In the past 30 years, numerous clean cooking interventions have been put into place (World Bank Group, 2018). We analyzed the Biogas Support Programme (BSP) and the National Rural and Renewable Energy Programme (NRREP).

Started in 1992, BSP is an ongoing public-private partnership deploying household biogas systems in rural areas as a substitute for wood, agricultural residue, and animal dung (Bajgain & Shakya, 2005). The goal of this program is to increase the sustainability of household energy. Meanwhile, NRREP was a five-year program (2012-2017) that aimed to increase household access to clean cooking through financial support to purchase improved biomass stoves and biogas systems, technical support to improve quality and delivery of these solutions, and business development for micro-, small-, and medium sized enterprises (Government of Nepal, 2012).

Health, climate, environmental, gender, and livelihood factors were all considered during the planning process of these programs. Additionally, both interventions prioritized collaboration in the decision-making process at all levels—from local communities to international organizations. By 2016, BSP had installed more than 250,000 biogas systems; by 2017, NRREP had installed more than 680,000 household clean cooking systems.

The full Nepal report is available at: **nicholasinstitute.duke.edu/project/bridge-collaborative/publications**.

Image 4. Kenyan Jiko cookstove manufacturers.

5.2 KENYA

Eighty-seven percent of Kenya's population, or 43 million people, depend on polluting open fires and inefficient stoves for cooking (World Health Organization, 2016b; United Nations, 2017). Some 15,000 Kenyan people die prematurely every year from illnesses attributable to HAP exposure (World Health Organization, 2016a). The government of Kenya has been actively promoting clean cooking since the 1980s, but there is much to be accomplished before the country can attain the national goal of universal clean cooking by 2030 (Sustainable Energy for All, 2016). We analyzed the Developing Energy Enterprises Project (DEEP) and the Africa Biogas Partnership Programme (ABPP). DEEP was and ABPP is a multi-country energy intervention implemented in East Africa (Clough, 2012; World Bank Group, 2014).

The goal of DEEP, which ran from 2008 to 2013, was to reduce energy poverty and generate income by improving access to modern energy services, including improved biomass and biogas cooking, in Kenya, Tanzania, and Uganda. Like BSP in Nepal, a long-term objective of DEEP was to stimulate a more sustainable energy sector. Started in 2013, ABPP is an ongoing program that helps construct domestic biogas plants as a local and sustainable energy source, with the goal of developing a commercially viable and market-oriented biogas sector in Kenya, Burkina Faso, Ethiopia, Tanzania, and Uganda (World Bank Group, 2014).

Both DEEP and ABPP increased access to market-based cooking solutions, partially by supporting the private sector. In Kenya, DEEP reached nearly 250,000 households with improved biomass cookstoves over the course of five years (Clough, 2012). As of May 2019, an estimated 21,000 household biogas systems were constructed in Kenya under ABPP.

The full Kenya report is available at: **nicholasinstitute.duke.edu/project/bridge-collaborative/publications**.

» DISCUSSION

6.1 RECOMMENDATIONS

We developed the following recommendations for clean cooking interventions from the literature review, generalized results chain, and case studies. These recommendations are designed to provide high-level guidance to leaders from any sector undertaking a clean cooking intervention. Contexts vary, so recommendations should be applied after a careful assessment of the landscape and identification of key stakeholders as not every recommendation is universally applicable.

- **Seek meaningful and strategic involvement of key partners from all relevant sectors at all levels, from intervention planners and implementors to end-users.**
  - Consider the cross-sectoral impacts of clean cooking when identifying partners to ensure that there is representation from all relevant stakeholder groups.
  - Ensure partners are aligned on the goals of the intervention across all sectors from the outset to avoid ambiguity at a later stage.
  - Create systems of accountability with clear delegation and ownership of roles and responsibilities for all partners to ensure optimal coordination.
  - Include end-users in planning, execution, and evaluation of interventions to ensure uptake, use, and maintenance of, as well as satisfaction with, the implemented clean cooking solutions.

- **Plan for, integrate, and conduct robust monitoring and evaluation to track intervention outputs, outcomes, and impacts across sectors and stakeholders.**
  - Consult diverse stakeholders to develop a monitoring and evaluation plan that ensures priority indicators from all sectors are measured within the intervention's time and resource constraints. Ensure that targets are set for each sector that are realistic and well-defined.
  - Create a monitoring and evaluation plan as part of the intervention design and adapt this plan as the program evolves. If evaluation reveals that the intervention is not achieving its cross-sectoral objectives, adjust the intervention.
  - Ensure that indicators measure both outputs (e.g., number of stoves) and outcomes (e.g., stove use over time). This is needed to determine if impacts have been achieved, rather than relying on assumptions based on outputs (e.g., assumed use based on the number of stoves distributed).
  - Track the most fundamental indicators if resources are limited. This should include impact indicators across time, collected and analyzed regularly so that the data can be used to adapt and improve intervention implementation.

- Plan for external impact evaluations that can track the causal impact of the intervention, where feasible.

- **Assess which technologies, fuels, and services are of the highest quality, provide benefits across sectors, and are suited to the end-users' preferences. Provide regular follow-up and after-sales service to ensure long-term sustainability.**
  - Conduct market research on end-users' preferences and ability-to-pay, and incorporate consumer testing and feedback throughout the intervention design process. This will increase products' usability, which is critical to long-term sustainability and achieving desired benefits.
  - Consider benefits to community and society, such as an improved climate and environment, as well as benefits for the individual, such as improved health and reduced drudgery.
  - Institute customer support and regular servicing mechanisms to ensure correct use and long-term maintenance of clean cooking solutions.

- **Build the sustainability and reach of clean cooking enterprises with the expertise and resources of different sectors and stakeholders, which will help achieve co-benefits.**
  - Create partnerships between the public sector, private sector, and non-governmental organizations to help realize society-level benefits by providing clean cooking to a larger population (e.g., carbon credits or policy incentives).
  - Institute consumer financing, such as payment plans and context-appropriate subsidies, to ensure accessibility for as many communities as possible.
  - Collaborate across sectors to provide appropriate and relevant mentorship and tailored technical assistance to help businesses address key challenges to gain momentum, grow, and strengthen their ability to attract funding. This will reduce costs overall, increase access to clean cooking, and increase product quality.

- **Engage multiple sectors in the development and implementation of clean cooking standards to strengthen the market and attain co-benefits.**
  - Incorporate views from multiple sectors and use market data when developing product standards. This will ensure that deployed solutions are appropriate to the context and have the potential to achieve co-benefits.
  - Institute well-defined standards to build consumer and investor confidence in the market as well as in the quality of a product.
  - Engage in a comprehensive standards implementation plan. This can include building testing capacity, developing compliance mechanisms, and consumer-facing activities, such as product certification or labeling.
  - Include monitoring, verification, and evaluation against standards to ensure compliance. Based on evaluation data, regularly update standards in consultation with key stakeholders from relevant sectors.
  - Communicate about standards, requirements, and implications to stakeholders in all relevant sectors to ensure it is understood and used effectively.

Image 5. Biogas systems, like the Kenyan one pictured here, require waste from cattle to produce energy.

- **Engage with end-users to build awareness and demand, which will help realize the co-benefits of clean cooking interventions.**
  - Use behavior change campaigns to motivate initial uptake of clean cooking solutions. This will help drive the demand needed to support scale-up of clean cooking enterprises.
  - Create context-specific campaigns that motivate households to transition to cleaner, more modern stoves and fuels by changing knowledge, attitudes, and social norms around cooking.
  - Encourage exclusive or near-exclusive use of clean cooking solutions, and disuse of polluting open fires and inefficient stoves, through these campaigns, in order to maximize the achieved benefits.

6.2 LIMITATIONS

Although the recommendations from this analysis can advance future clean cooking efforts, it is important to acknowledge limitations. First, only a sample of four programs in Kenya and Nepal were considered, which are not representative of all clean cooking interventions. Additionally, the clean cooking landscape can be complex and multiple factors outside of the interventions' design may have affected the interventions' success. Available data may not fully capture all relevant external factors. Finally, we developed general recommendations that may not be relevant to every context and intervention.

6.3 CONCLUSION

Clean cooking can confer individual and societal benefits for health, the climate, the environment, gender equality, and livelihoods. Effectively incorporating a diversity of expertise can enhance clean cooking interventions. However, cross-sectoral collaboration can be difficult to implement in practice. Additional effort is required on the part of the designers, implementors, and evaluators, but this effort can help create sustainable clean cooking interventions that realize numerous co-benefits. The recommendations and lessons from this package provide guidance on cross-sectoral collaboration that can strengthen future clean cooking interventions.

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» ANNEX

Below is the full list of literature reviewed in support of this case study package.

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Image 6. Two Nepalese women walking through a forest.

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The Clean Cooking Alliance works with a global network of partners to build an inclusive industry that makes clean cooking accessible to the three billion people who live each day without it. Established in 2010, the Alliance is driving consumer demand, mobilizing investment to build a pipeline of scalable businesses, and fostering an enabling environment that allows the sector to thrive. Clean cooking transforms lives by improving health, protecting the climate and the environment, empowering women, and helping families save time and money. Learn more at **CleanCookingAlliance.org**.

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