



Quantifying Appliance Access Gaps For a Climate-Resilient Africa

September 2023

Executive summary

This report quantifies appliance access gaps in Africa for five appliances essential for climate-resilient development: refrigerators, televisions, fans, air conditioners, and solar water pumps.

Appliances have a pivotal role in assisting the 3.6 billion people living in regions acutely susceptible to climate. Beyond facilitating adaptation to a warming world, they provide life-preserving cooling services and essential communication devices, enabling access to vital news and information. Efficient appliances empower people to live a quality life and build resilience to climate risks.

Unfortunately, numerous households and businesses lack access to the necessary appliances due to affordability constraints, unavailability of efficient options within their locale, or limited access to modern energy sources. The failure to bridge these crucial gaps in appliance access stifles development and exposes billions of people to significant risks in the wake of escalating climate hazards such as extreme heat, prolonged droughts, and more.

CLASP assessed the extent of appliance access gaps for five household appliances in Africa. We found that hundreds of millions of people still lack access to even the most basic appliances necessary to build climate resilience. An estimated 822 million people lack access to a refrigerator, while nearly all smallholder farmers across ten countries lack access to a solar water pump. Many of the countries and regions with the highest appliance access gaps are also those most exposed to climate hazards. Without urgent action, these inequities in the distribution of appliance ownership and use will persist, undermining the delivery of a just energy transition.

This report summarizes key findings for African countries from CLASP's forthcoming report, "Net Zero Heroes: Scaling Efficient Appliances for Climate Change Mitigation, Adaptation & Resilience." The Net Zero Heroes report, available in late November 2023, will include a complete analysis of global access gaps for ten appliances.

About this report

This resource outlines a selection of findings from CLASP's forthcoming report, "Net Zero Heroes: Scaling Efficient Appliances for Climate Change Mitigation, Adaptation & Resilience".

This report makes the case for prioritizing appliances in efforts to bolster climate adaptation, resilience, and sustainable development and quantifies global appliance access gaps for five appliances: refrigerators, televisions, fans, air conditioners, and solar water pumps. It closes with a summary of what is needed to bridge existing access gaps.

A full analysis of global appliance access gaps for ten appliances will be presented in CLASP's forthcoming Net Zero Heroes report, scheduled for publication in late November 2023.

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About CLASP

CLASP serves at the epicenter of collaborative, ambitious efforts to mitigate climate change and expand clean energy access, through appliance efficiency.

Our mission is to improve the energy and environmental performance of the appliances & equipment we use every day, accelerating our transition to a more sustainable world.

We envision a world in which appliances and equipment are life-changing, low-impact, and environmentally responsible.

[Learn more](#)

Report roadmap

The first chapter of this report provides a summary of the climate and development benefits of appliances.

The second chapter summarizes appliance access gaps in Africa for five appliances: refrigerators, televisions, fans, air conditioners, and solar water pumps.

Finally, the third chapter contains a high-level summary of what is needed to bridge appliance access gaps.

Introduction

Analysis

Refrigerators

Televisions

ACs and fans

Solar water pumps

Recommendations



Definitions

Term	Definition
Appliances	This report uses the term appliances to refer to appliances, lighting, and equipment. The appliances included in the scope of this report include ten household and light-commercial products: lighting, air conditioners, fans, refrigerators, heat pumps, electric cooking equipment, mobile phones, televisions, radios, and solar water pumps.
Climate resilient development	A solutions framework developed by the Intergovernmental Panel on Climate Change (IPCC) that successfully combines strategies to deal with climate risks (adaptation) with actions to reduce greenhouse gas emissions (mitigation) which result in improvements for nature and humanity’s well-being. For example, by reducing poverty and hunger, improving health and livelihoods, providing more people with clean energy and water and safeguarding ecosystems on land, in lakes and rivers and in the ocean.

INTRODUCTION

Appliances as climate adaptation & resilience heroes



Efficient appliances are key to climate-resilient development

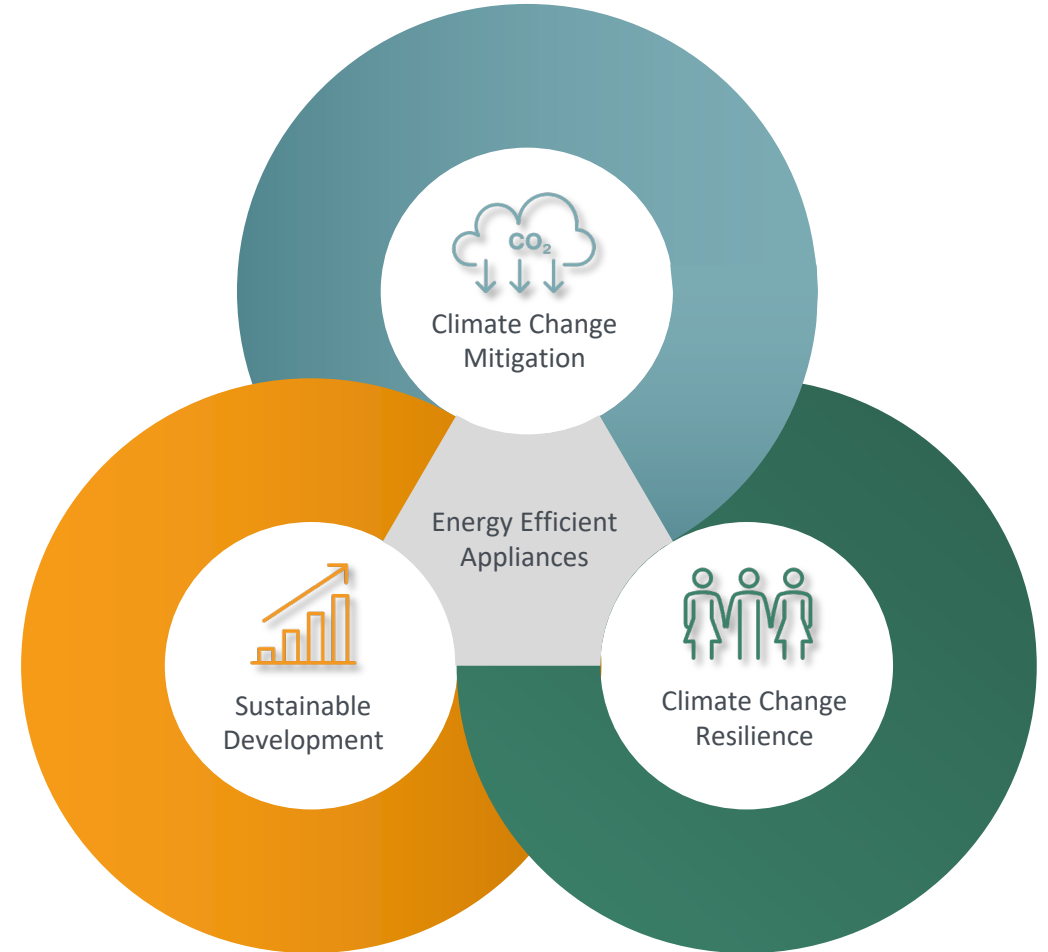
Energy-efficient appliances, lighting, and equipment are at the nexus of three global priorities: climate change mitigation, climate change resilience, and sustainable development.

Climate change mitigation: Efficient appliances are critical for lowering energy demand and emissions in the residential, commercial and industrial sectors.

Climate change resilience: Efficient appliances support communities in adapting to a warmer world by offering essential energy services for:

- Safety and comfort during heat waves
- Information during natural disasters
- Improved food security and health

Sustainable development: Access to efficient appliances enables households and businesses to engage in activities that generate new streams of income, fostering sustainable development.



Efficient appliances build climate resilience & promote sustainable development

As many as 3.6 billion people live in regions that are highly vulnerable to climate change.¹

The planet is already feeling the effects of climate change. From heat waves, to drought, to extreme weather, there is an urgent need to expand access to the appliances and equipment that help communities cope with a warming world.

CLASP has identified 10 essential household and light commercial appliances central to enhancing climate resilience and meeting the United Nations Sustainable Development Goals (SDGs). We have mapped these 10 appliances to their respective resilience benefits and applicable SDGs in Figure 1 on page 9.

1. IPCC. "AR6 Synthesis Report: Climate Change 2023," 2023.
<https://www.ipcc.ch/report/sixth-assessment-report-cycle/>.

10 essential appliances for climate-resilient development



ACs



E-Cooking



Fans



Heat Pumps



Lighting



Mobile Phones



Radios



Televisions

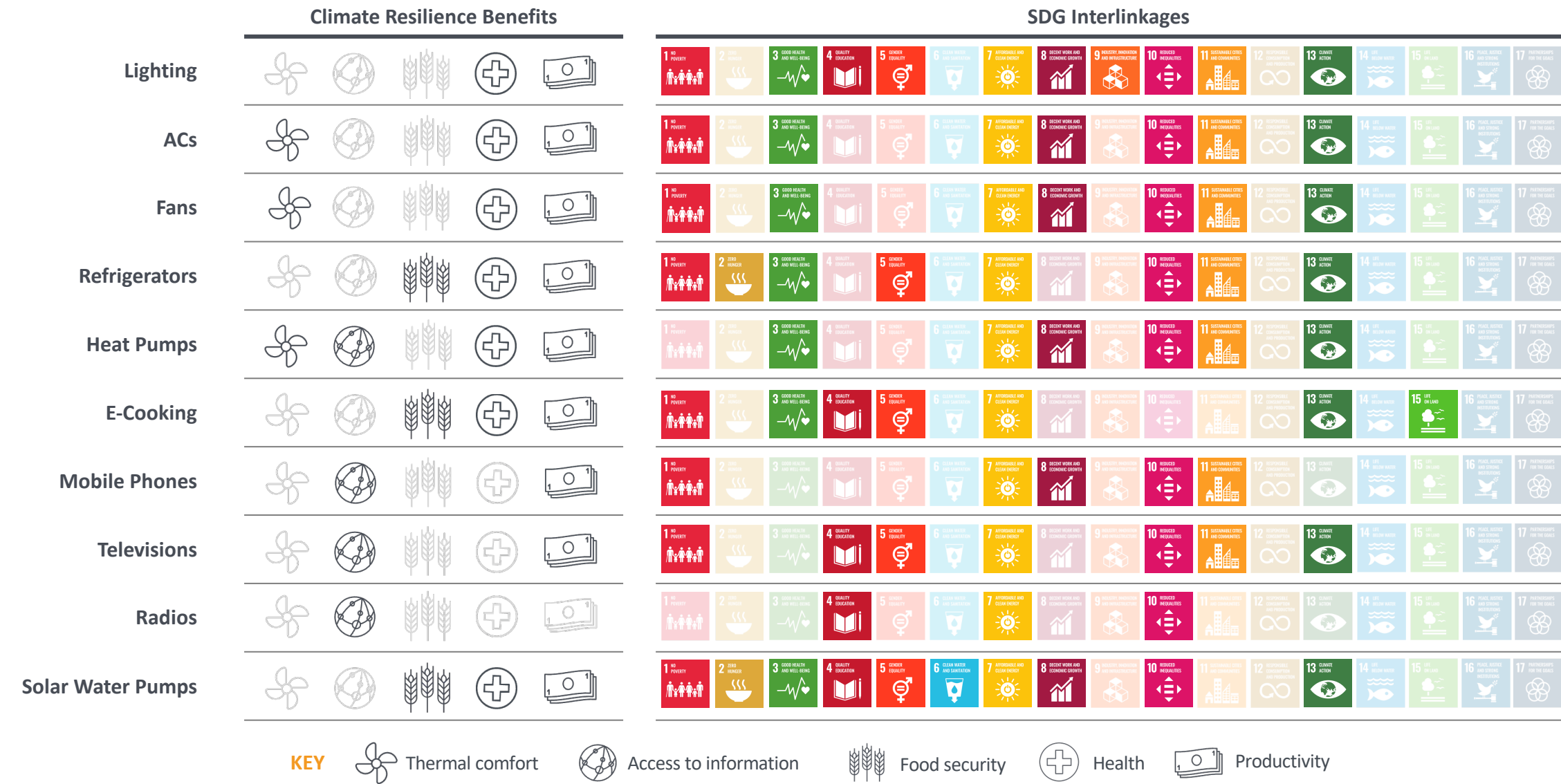


Refrigerators



Solar Water Pumps

Figure 1: Appliance Resilience and SDG Interlinkages²



2. CLASP. “Net Zero Heroes: Scaling Efficient Appliances for Climate Change Mitigation, Adaptation & Resilience”, CLASP, forthcoming.

ANALYSIS

Quantifying appliance access gaps in Africa



Quantifying appliance access gaps

Using existing social, economic, and appliance ownership data from the United Nations, World Bank, United States Agency for International Development (USAID), Lawrence Berkeley National Laboratory (LBNL), the International Telecommunication Union, and others, we modeled appliance ownership in as many as 162 countries.

Our results find that billions of people worldwide lack access to the ten appliances needed for climate-resilient development.

Pages 12-20 of this report present an in-depth look at current access gaps in Africa for five of ten appliances: air conditioners, fans, and refrigerators, solar water pumps and televisions.



A smiling man with dark skin and a short beard, wearing a light-colored plaid shirt, stands next to a white chest freezer. He is holding a glass bottle of orange juice in his right hand. The freezer is open, revealing several other bottles inside. The background is a wall made of reddish-brown bricks. The overall scene is brightly lit, suggesting an indoor setting with natural light.

APPLIANCE OWNERSHIP

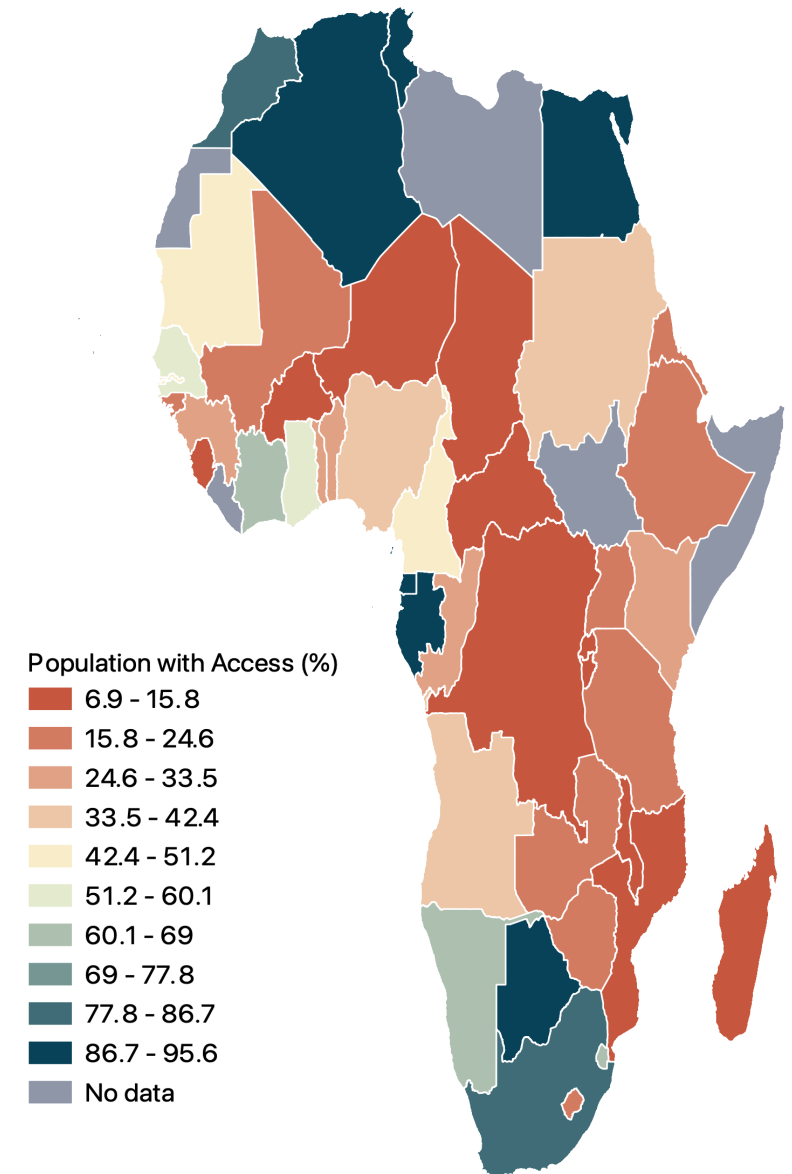
Refrigerators

■ 822 million people in Africa do not own a refrigerator

Refrigerators are an essential appliance for sustainable development. Universal access alleviates the burden of unpaid labor, particularly for women and children, by reducing meal preparation time. Additionally, refrigerators can serve as sources of additional income for small businesses through the sale of cold refreshments.

60% of the population in Africa (822 million people) does not own a refrigerator. Globally, access rates are significantly higher, with just 25% of the population lacking access to a refrigerator. Within Africa, most of the people that do not own a refrigerator live in sub-Saharan Africa (770 million).

Within the sub-region Botswana, Gabon, Equatorial Guinea, Mauritius and South Africa have the highest rates of refrigerator ownership, with 85% or more of the population in each country having access.





APPLIANCE OWNERSHIP

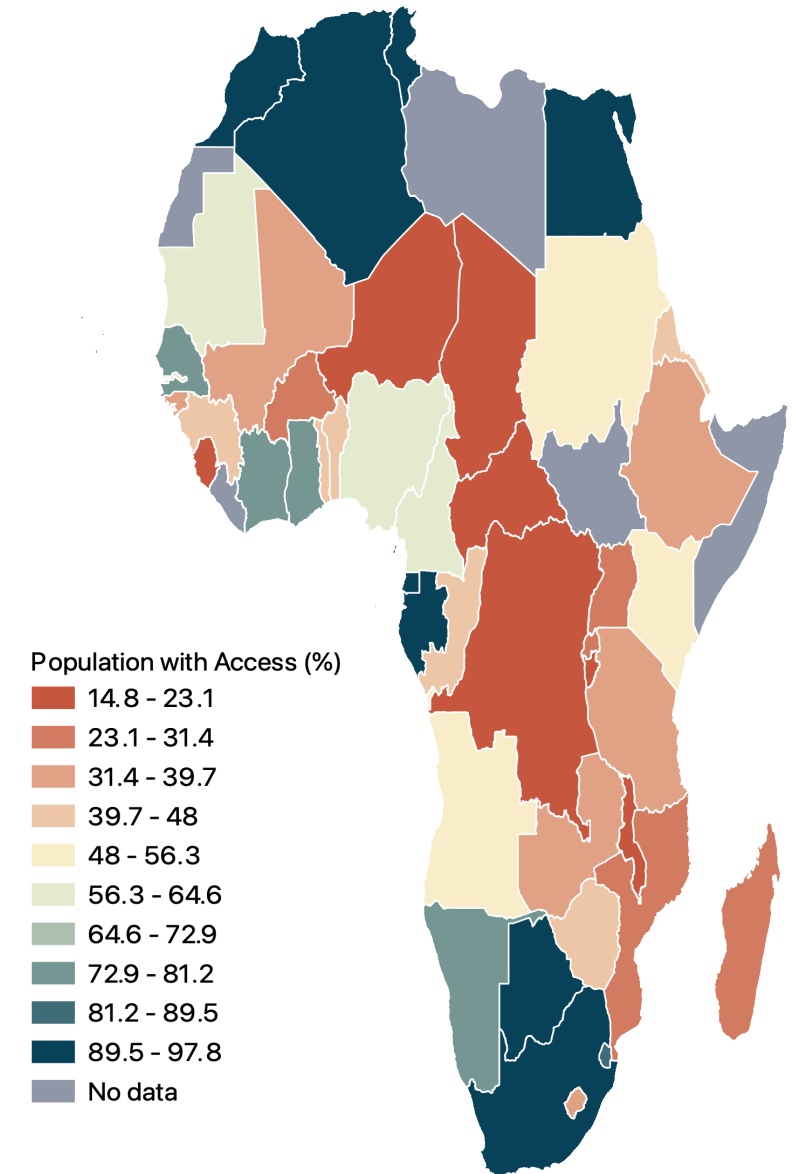
Televisions

■ 625 million people in Africa do not own a television

Televisions are among the most popular household appliances and critical sources of news and information during climate-related emergencies.

45% of the population in Africa (625 million people) does not own a television. While televisions are among the most common household appliances in Africa, ownership is significantly lower than in other regions. Globally, just 13% of the population does not have access to a television. In Europe and the Americas, less than 6% of the population does not own a television.

Within sub-Saharan Africa, the largest access gaps persist in Central Africa and parts of Southern Africa. Access rates in West Africa are highest in the region, with over 70% of the population having access to a television.





APPLIANCE OWNERSHIP

Air conditioners & fans

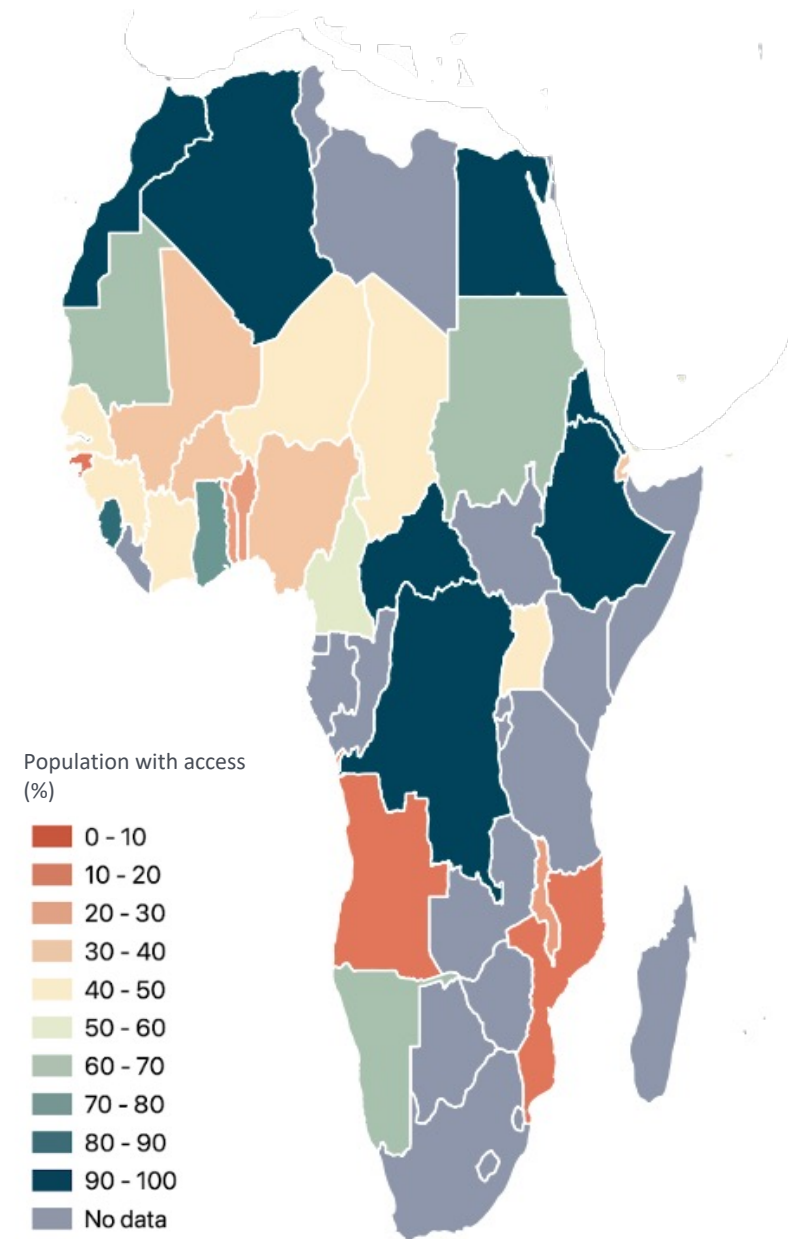
■ 400 million people in Africa* do not own a fan or air conditioner

Air conditioners and fans deliver vital cooling services, enhancing thermal comfort by boosting airflow and/or reducing ambient temperatures in a given space. This enhanced environment mitigates the hazards of heat-related health issues and has the potential to enhance productivity.

In a sample of 66 high-impact countries provided by Sustainable Energy for All, 1.2 billion people are at high risk due to a lack of cooling access. **Of those 1.2 billion people, 31% live in sub-Saharan Africa.**

Of the African countries assessed, 37% of high-risk populations (rural and urban poor) do not own a fan or air conditioner.

*Data only available for a sample of the 66 high-impact countries assessed in Sustainable Energy for All's 2022 report [Chilling Prospects: Tracking Sustainable Cooling for All](#). The map depicts the proportion of the high-risk population (rural and urban poor) that do not own a fan or an air conditioner.



A full-page photograph showing a farmer in a cap and work clothes using a long-handled watering tool to spray water onto rows of young corn plants in a field. In the background, a solar panel is mounted on a wooden frame above a large black water storage tank. The sky is blue with some clouds, and distant hills are visible.

APPLIANCE OWNERSHIP

Solar water pumps

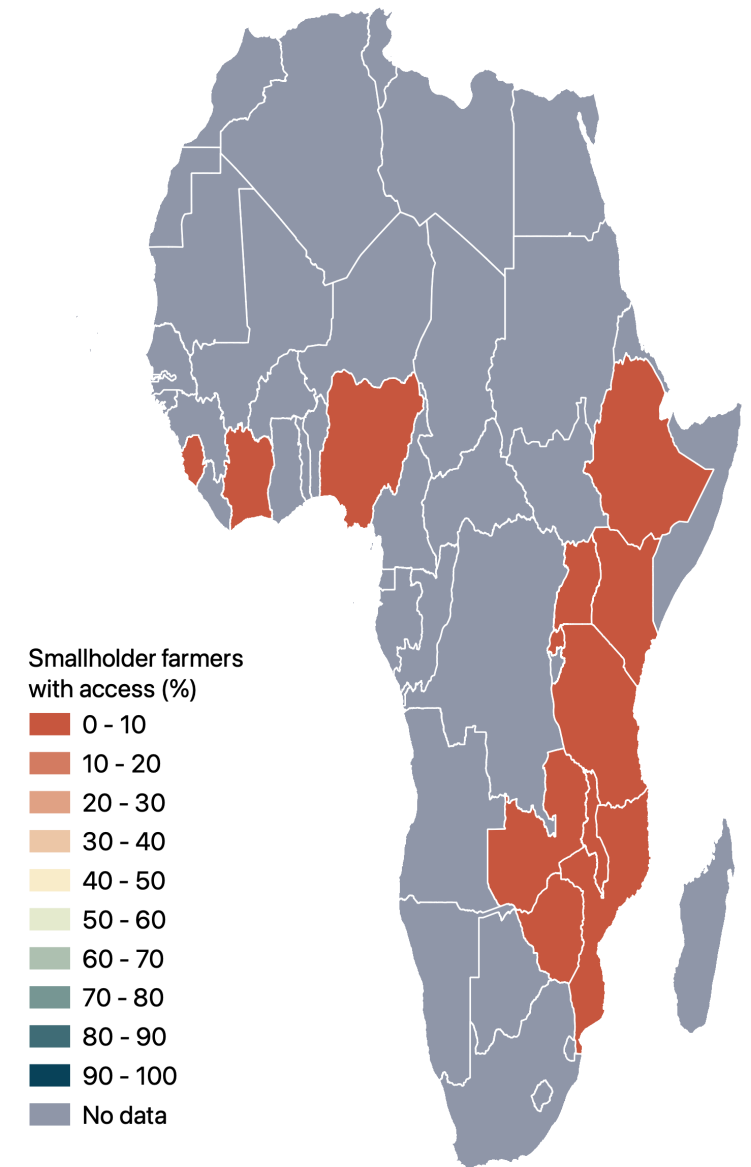
■ 100 million smallholder farmers in Africa* do not own a solar water pump

Approximately 95% of farmland in sub-Saharan Africa is rainfed—relying on unpredictable weather patterns. Solar water pumps have the potential to increase yields by two- to threefold, depending on crop type and climate.

Less than 1% of smallholder farmers in a sample of ten African countries own a solar water pump. Despite making some strides in expanding access, there is room for further efforts in Kenya.

While commercially accessible, solar water pumps are yet to achieve widespread implementation. More support for the solar irrigation sector is needed to increase awareness of solar pumping technology, expand distribution and repair networks, and improve affordability.

*Our analysis was limited to 10 African countries for which data were available.



Expanding access to the 100 million smallholder farmers that need them would deliver significant benefits³



15 million households would experience yield increases greater than 30%, while **98 million people** would benefit from increased food security.



23 million people would benefit from improved access to water, sanitation, and hygiene (WASH)



13 million people—over 1 million of them women—would experience the time-saving benefits from reduced drudgery and manual labor, largely from water collection.



850,000 new jobs could be created in SWP manufacturing, assembly, and distribution.



USD \$100 billion in fuel costs and **410 Mt of CO₂** could be avoided per year if the entire access gap for solar water pumps were closed by solar pumps instead of diesel pumps.

3. Benefits estimated using the Efficiency for Access Impact Assessment Framework. Source: Efficiency for Access. "Impact Assessment Framework: Solar Water Pumps," 2022. <https://storage.googleapis.com/e4a-website-assets/Impact-Assessment-Framework-Solar-Water-Pumps.pdf>.

CONCLUSION

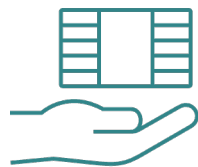
Closing appliance access gaps



Closing appliance access gaps will require significant commitments and investments from multiple actors



GOVERNMENTS National energy policies and international climate commitments (NDCs) should explicitly support appliance technologies. Electrification and energy access plans should include appliance access targets in addition to current metrics focused on new connections and power supply. Appliance efficiency policies should be updated frequently with increasing stringency to drive down the total cost of appliance ownership, making them more affordable to consumers. Quality standards for emerging products like DC-compatible appliances should also be considered to protect the most vulnerable consumers from substandard products. Governments should develop a suite of complementary policies and programs to promote market growth, ranging from government-backed bulk procurement to tax and duty exemptions.



DONORS Greater financial support is needed to scale existing programs. To ensure that no one is left behind, donors, along with governments, must deploy end-user subsidies and concessional financing to ensure everyone can access energy-efficient appliances. A just energy transition demands that everyone has access to efficient appliances. Consumer financing plays a critical role in lowering the first-cost barrier, especially for low-income consumers and those living beyond the reach of the electric grid.

Closing appliance access gaps will require significant commitments and investments from multiple actors



MANUFACTURERS Commit to producing high-quality appliances that perform well and meet consumers' expectations. Products that undergo quality verification are tested for resilience to harsh conditions such as high temperatures, ensuring greater climate resilience. Manufacturers will also require funding from governments and donors to scale up operations in more mature markets and expand into areas that would otherwise not be serviced at all.



CIVIL SOCIETY ORGANIZATIONS Advocate for efficient, affordable appliances. Efficient appliances deliver important benefits to consumers. Policymakers, manufacturers, and others need to know that these benefits matter to consumers, especially to low-income consumers who struggle most with high energy costs and accessing energy services. Consumer, energy, environmental, and health advocates must argue vigorously for ambitious, people-centered climate action and hold decision makers accountable for making the necessary progress.

Tracking appliance access to leave no one behind



LEAVE NO ONE BEHIND Data collection efforts should also aim to collect gender-, income- and disability-specific data from survey respondents to ensure that vulnerable groups are not left behind in the clean energy transition. To do this, donors, market development programs, businesses, investors and others should develop holistic and harmonized targets, indicators, and tracking mechanisms. These efforts will help form a consensus about what it means to be inclusive. Determining how and how often data will be collected and assessed is a critical first step towards establishing a baseline against which to measure progress.



PLAN, TRACK, MEASURE All market actors should commit to closing appliance access gaps. Once those commitments are made, governments, donors, and civil society organizations should work together to track progress. Regular data collection helps track what interventions are supporting households and the marketplace and informs targeted action. Periodic national household data collection efforts should include questions about appliance ownership and usage. These data will help identify those who do not yet have access to essential appliances and, thus, where additional investment is needed. Market surveillance is needed to confirm compliance with policies.

STAY IN TOUCH

A full analysis of global appliance access gaps for ten essential household appliances will be presented in CLASP's forthcoming report, Net Zero Heroes: Scaling Efficient Appliances for Climate Change Mitigation, Adaptation & Resilience, scheduled for publication in late November 2023. Please subscribe to our newsletter to be notified of its release.



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