WORLD RESOURCES INSTITUTE

CONFERENCE PROCEEDING

Scaling productive use of renewable energy (PURE) in the smallholder agriculture sector in Sub-saharan Africa (SSA)

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OVERVIEW

A High-Level Stakeholder Consultative Forum on Scaling Productive Use of Renewable Energy (PURE) in Sub-Saharan Africa (SSA) was held in Nairobi, Kenya on 7 February 2024. Co-hosted by World Resources Institute (WRI) Africa, Strathmore Energy Research Centre, CS Mott Foundation, IKEA Foundation, UKPACT, and Good Energies Foundation, the event brought together over 100 stakeholders from across the PURE ecosystem. Participants included PURE finance and investment organizations, suppliers of PURE equipment, policymakers (national and sub-national), as well as development organizations involved in supporting energy access and the smallholder agriculture sector. (See list of participants on page 7).

Proceedings at the high-level event included discussions on the scope of PURE opportunities in smallholder agricultural value-chains, barriers to scaling deployment of PURE technologies, and priority interventions needed to unlock PURE's potential – including data needed by different stakeholders to inform prioritization of the opportunities. Two panel sessions comprising key actors in the PURE ecosystem, complemented by focus group discussions further enriched the outcomes of the forum. The first panel discussion focused on gaining a better appreciation of the scale of PURE opportunities available in the smallholder agriculture sector in the East Africa region, while the second session focused on priority interventions needed to scale PURE solutions in the region. Thereafter, participants were organized in focus-group discussions structured along the four major categories of PURE actors, including financiers, PURE equipment suppliers, development partners, and policymakers (national and sub-national). Representatives from each

CONTENTS

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group shared their industry experience of key challenges in scaling PURE, as well as their proposed suit of solutions to address the challenges, including specific data points required to inform PURE investment decision-making.

The following were the key recommendations that emerged as priority interventions needed to scale PURE in SSA:

- Need for granular data and information to help demonstrate available Productive Use of Renewable Energy (PURE) opportunities to key stakeholders.
- Support end-users, including smallholder farmers, agribusiness entrepreneurs, and micro, small & medium enterprises (MSMEs), to play their role in the PURE value chains.
- Urgent need to bridge the gap between available financing and PURE market needs.
- Support sub-national governments to play their critical role in scaling PURE in the smallholder agriculture sector.

INTRODUCTION

According to IEA et al. (2023), 567 million people in Sub-Saharan Africa have no access to electricity, which constitutes 85 percent of the global population without electricity. Closing this access gap by 2030 will require doubling the current rate of annual electrification. However, energy access alone does not result in economic development unless it is augmented with income-generating activities that improve livelihoods. In turn, this enhances energy affordability and spurs further energy investment to support the expanded energy-intensive services. This is the idea behind the Productive Use of Renewable Energy (PURE) concept. Stimulating demand for electricity consumption through promotion of PURE is therefore essential to tackle energy access and socio-economic challenges simultaneously. PURE could be applied in almost any sector, including agriculture (such as through irrigation and grain milling); commercial and industrial activities (like carpentry, tailoring, and welding); the service industry (including electric mobility, bars, and restaurants, etc.); and healthcare. The agricultural sector presents key opportunities for integration of energy needs across the entire value chain, ranging from provision of Solar-Water-Pumping (SWP) systems, to cooling, drying, agro-processing, and rural transportation.

With the ever-increasing impacts of climate change, coupled with a growing demand for food in SSA, the need to increase agricultural production in ways that protect nature, reduce food loss, and restore our ecosystems is paramount. A circular food system is at the core of the needed approaches for sustainable food production. Available data and evidence demonstrate significant social and economic benefits of PURE to smallholder farmers and rural economic growth while contributing to positive environmental impacts. However, most of these opportunities remain untapped, and in cases where pilot interventions have been implemented, scaling has been limited. Supporting sector actors, including financiers, suppliers of PURE equipment, and end-users to scale these interventions will be key.

It is against this backdrop that WRI, alongside its partners, organized a "high-level stakeholder consultative forum" to explore the interventions needed to scale PURE adoption beyond the existing pilots within the smallholder agricultural sector. The outcomes of the conference are documented in the next section in the form of major recommendations that various ecosystem actors need to deploy for PURE solutions to be scaled sustainably. The conference was aimed at unraveling lessons learned from pilots while addressing key scaling challenges in the following areas of concern:

- What is the scale of opportunities available for PURE across the East African region?
- What critical data and information are needed by investors and suppliers to make investment decisions, and what are the sources and providers of such data and information?

- What policy and regulatory interventions are needed to facilitate the flow of finance and investment at the scale and speed needed to unlock SSA's PURE sector?
- What are the lessons and experiences on sustainable and scalable business models used by funders and suppliers of PURE equipment?

FORUM OUTCOMES

Following is a description of each of the key recommendations from the forum:

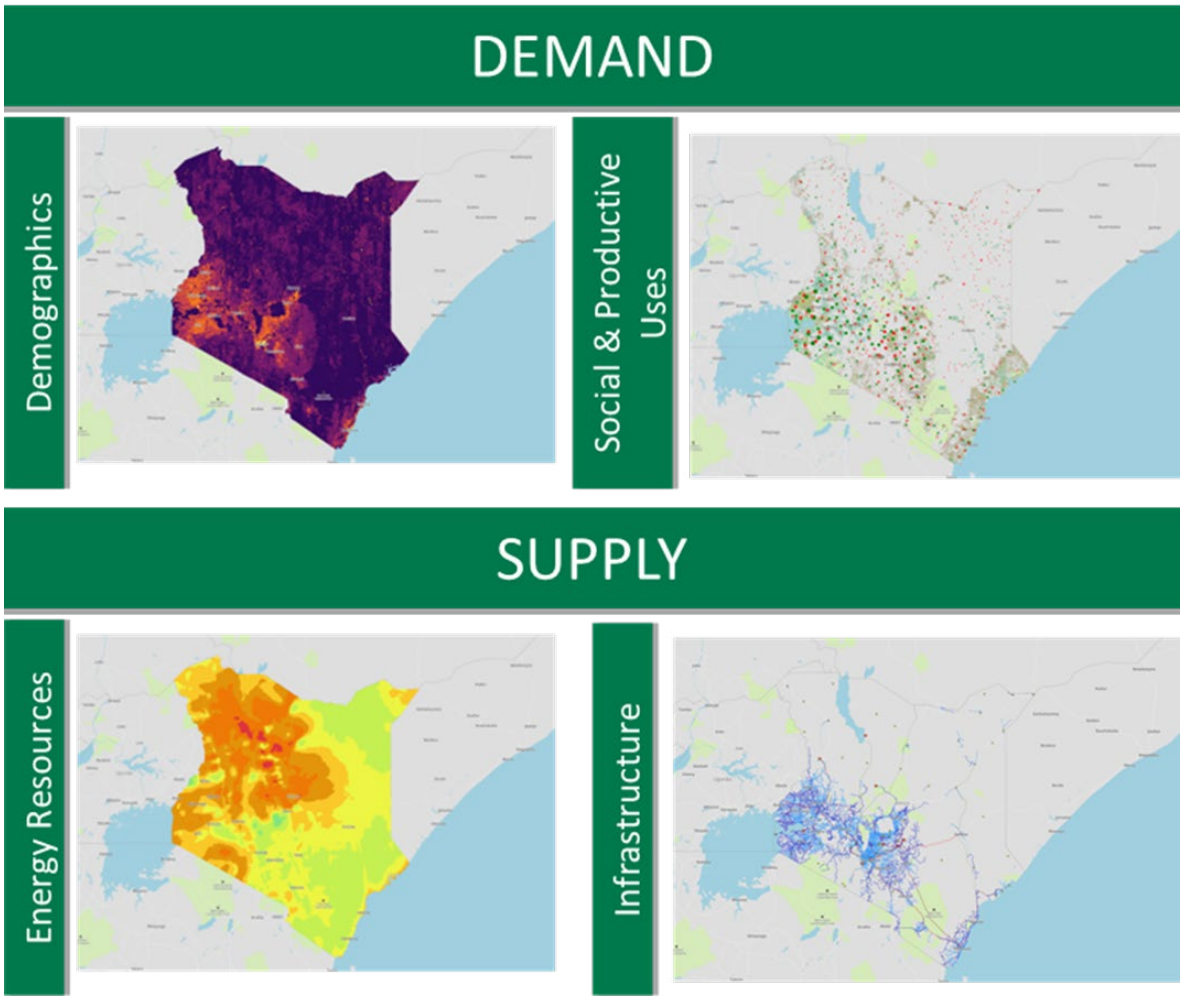
Recommendation 1: There is a need for granular data and information to help demonstrate available productive use of renewable energy (PURE) opportunities to key stakeholders

While there was consensus on the numerous opportunities for PURE in the smallholder agriculture sector, key stakeholders, particularly financiers/investors and suppliers of PURE equipment, don't have the right kind of granular data and information to make investment decisions. And each of these stakeholders has unique data needs that they rely on to identify viable PURE markets and prioritize interventions. In fact, financiers and investors present at the conference argued that the lack of a pipeline of bankable PURE projects has been one of the major barriers to unlocking a speedy flow of capital to these opportunities.

Some of the data and information that were identified by these stakeholders as being critical to informing investment decisions include: location and size of PURE opportunities; type of crops grown and their growing patterns; category and size of PURE technology needed to unlock the opportunity; projected impacts (including social, environmental, and economic benefits) resulting from the integration of clean energy; purchasing power of the rural populations; information on the organization of small-holder farmers (e.g., farmer cooperative societies); data on available water bodies and groundwater resources; and linkage to targeted markets (including forms of guarantees such as contracts with offtakers). Other priority data and information needs identified include access to finance or credit services, credit history and historical collection efficiency of agricultural enterprises, internet connectivity, and mobile phone penetration, among others.

Entry Points for Action

- To address the inadequacy of data and information for PURE opportunities, there is need for a centralized data-sharing platform that is accessible by all stakeholders. The platform should have granular data that will enable development partners to identify, and prioritize, high-impact PURE opportunities while helping financiers to make informed investment decisions. Similarly, such a platform would help suppliers of PURE equipment to identify areas where they can expand their market for PURE technologies while also benefiting end-users of PURE technologies (e.g., farmer co-operatives societies) by increasing their awareness of available PURE technologies, as well as the economic potential for their agricultural practices.
- The Energy Access Explorer (EAE)—an interactive platform that uses geospatial mapping to visualize and identify demand for clean energy markets—can provide resourceful input into the online data-sharing platform that industry associations could pursue.



Recommendation 2: Support is needed for end-users, including smallholder farmers, agribusiness entrepreneurs, and micro, small & medium enterprises (MSMEs) to play their role in the PURE value chains

Participants at the conference noted the critical role played by agribusiness entrepreneurs, including MSMEs—especially those located in the rural parts—in scaling PURE in SSA. Emerging business models, such as Pay-As-You-Go (PAYG) and Energy-as-a-Service (EaaS), were highlighted as some of the innovative approaches that are helping facilitate access to PURE technologies by smallholder farmers by reducing the high upfront cost, while creating a win-win partnership for financiers and end-users needs to be supported to scale-up.

However, delegates also observed that while provision of energy is a critical input to unlocking productive use opportunities, it is not a sufficient condition to automatically guarantee the realization of intended outcomes such as increased agricultural productivity or improved levels of incomes—among others—which are critical factors for sustainability and scalability of the PURE sector. Integration of other complementary factors, such as capacity building, access to affordable capital, and access to profitable and sustainable markets where smallholder farmers can sell their agricultural produce, were identified by the participants as being critical to sustainability and scalability of PURE interventions. Bringing critical sector actors to the table during the design and execution of a PURE program thus emerged as a key component for ensuring sustainability and replicability of PURE interventions. Delegates who spoke at the opening ceremony, as well as during the panel sessions, also noted the importance of partnership building in ensuring the success of such an approach. The role of development partners in facilitating such partnerships was identified as key.

Further, delegates also highlighted the importance of ensuring end-users' involvement during the design of PURE interventions as a key part of promoting the sustainability of interventions. However, end-users' lack of awareness of potential economic impacts of PURE technologies, as well as limited knowledge—including in identifying appropriate PURE technology—was identified as a key barrier to scaling PURE. There is therefore the need for investment in awareness-raising among end-users either by the developers/suppliers of PURE equipment, or through collaborations with national and sub-national administrations through institutions such as energy centers, which can be used as demonstration sites for PURE technologies. At the same time, the need to address concerns around quality standards of PURE technologies was also identified as key for building confidence in end-users.

Entry Points for Action

- Development partners that are supporting PURE sectors need to also identify and support agribusiness entrepreneurs and MSMEs involved in the agribusiness value chains. Provision of technical assistance to this important group of actors will enable them to plug in and play their role in scaling PURE while ensuring the success of such interventions to drive rural jobs and economic growth.
- While supporting PURE interventions, development partners also need to ensure that all critical players in a selected PURE value chain—financiers, off-takers of agricultural produce, providers of PURE technologies, and policymakers (national and sub-national)—are brought together during the design of a PURE intervention, and that all critical factors of success are well understood and supported, to ensure sustainability and scale. Lessons from successful PURE projects that have been implemented using an ecosystem approach should be documented and shared to provide inspiration and knowledge in terms of how to design such a model, as well as to demonstrate the benefits of such approaches.
- Smallholder farmers, especially in rural remote communities, need to be involved and empowered by building their capacity to increase awareness and understanding of PURE technologies, available financing options, and off-take markets to boost PURE adoption. Similarly, SMEs, including agribusiness entrepreneurs, also have a major role to play in the region's economic growth. Providing technical assistance to enable these key stakeholders to build sustainable and scalable models to attract finance and investment to their respective opportunities will be critical for the sector's success.

Recommendation 3: There is an urgent need to bridge the gap between available financing and PURE market needs

Delegates at the forum—including suppliers of PURE equipment, representatives of the end-users, and development partners—noted challenges with access to finance as one of the major barriers to scaling PURE in the region. Lack of end-user finance, partly due to perceived risks associated with the uncertainty of the smallholder agriculture sector in the region, including volatile returns from the sector, were seen as some of the major factors contributing to the challenge. Further, delegates also highlighted how limited awareness of the PURE technologies, as well as perceived technology risks – particularly with those that haven't reached market maturity—have contributed to the inability of local financing institutions to provide credit to end-users.

On the other hand, representatives of end-users that were present at the forum identified high upfront costs and short-term financing tenures as a deterrent to accessing capital. The mismatch in expectations between financiers, PURE suppliers, and end-users were highlighted as some of the factors that create bottlenecks to scaling PURE financing. The need for alignment between expected return on investment, payback periods and project ticket sizes emerged as important interventions that need to be put in place to facilitate access to capital for both PURE suppliers as well as end-users.

The importance of innovative financing models such as blended finance mechanisms that combine grants, patient capital, and concessional financing was highlighted as a major intervention needed to unlock capital for PURE. Additionally, the need for de-risking instruments that would build the confidence of local financing institutions to provide credit to suppliers and end-users of PURE equipment was also highlighted as key for unlocking domestic capital that is much needed for the sector.

Entry Points for Action

- There is a need to collaborate with financiers to build their capacity and increase their awareness and understanding of PURE technologies. This will enhance the extension of tailored financing products for PURE to smallholder farmers.
- There is also the need to support smallholder farmers to aggregate their produce, thus enabling them to meet the size of the financing ticket required by investors. Farmer co-operatives and grassroots organizations can play a critical role by supporting smallholder farmers to aggregate demand for PURE, thus demonstrating potential for scale. This will help in building large PURE portfolios from small PURE opportunities, thus helping attract the attention of investors. In addition, this will also help reduce financiers' transaction costs during the deal-making process from project identification to due diligence and closure of transactions. As economies of scale are achieved by financiers, the barriers of accessing capital by individual smallholder farmers are also reduced. PURE equipment suppliers will also benefit from demand aggregation as bulk purchasing can reduce the cost per unit of equipment installations while simultaneously pooling resources from investors in a more seamless manner by spreading financial risk from the individual smallholder farmer level to the portfolio level of PURE projects.

Recommendation 4: Sub-national governments should be supported to play their critical role in scaling PURE in the smallholder agriculture sector

Policy makers at the forum highlighted the role of sub-national governments in scaling PURE in the region. For example, speaking during the 1st panel session that was looking at the scope of opportunities for PURE, the Governor of Makueni County—H.E. Hon. Mutula Kilonzo Jr.—articulated how the development of sub-national energy plans(County Energy Plans [CEPs]), which is a requirement by law, presented an opportunity for his county to prioritize PURE opportunities. He further demonstrated the link between energy planning and delivery of sub-national priorities as articulated in the County Integrated Development Plan (CIDP). With most of the CIDPs across the country prioritizing smallholder agriculture, the governor noted that this presents a unique opportunity to identify priorities at the nexus of energy and development priorities. Similar (although not identical) opportunities are available in other jurisdictions across the region, either through district or regional governments, which, if harnessed, can play a key role in scaling PURE interventions.

Additionally, the forum participants highlighted the importance of cross-sector partnerships through the involvement of agricultural sector stakeholders—especially when considering the applicability of renewable energy technologies as key. Cross-sector partnerships across the various value chain segments is critical, considering that some PURE technologies are more developed and market-ready while others are at a nascent stage.

Entry Points for Action

- As most county governments in Kenya are yet to develop their energy plans as required by law, this presents a unique opportunity to ensure integration of PURE in such plan. These energy plans should outline available PURE opportunities at the local level, with inputs from community members. To attract investors, these opportunities should be translated into an investment prospectus that showcases the size of the opportunities, as well as the level of investment needed to unlock those opportunities.

- As sub-national governments develop and/or update their development strategies (CIDP, in the case of Kenya), there is a need to ensure alignment between those strategies and energy plans. This would also ensure efficiency in resource allocation.
- Development partners should collaborate with sub-national administrations to identify and put in place necessary interventions needed to build the confidence of investors to invest in the identified opportunities.
- Inter-Ministerial Committee on Productive Use of Renewable Energy

NEXT STEPS

It is evident from the proceedings of the conference that there exist numerous opportunities to scale PURE interventions, but this will take a multi-pronged and coordinated approach from policymakers, development partners, financiers, PURE suppliers, and end-users to achieve the desired scale.

From the foregoing, WRI commits to working with partners within the PURE space to undertake the following key action items:

1. Map-out PURE opportunities from across the targeted countries and integrate granular data on such opportunities in the Energy Access Explorer to enable investors and suppliers of PURE equipment to identify such opportunities.
2. Undertake research on sustainable and scalable business models for investment in PURE technologies and collaborate with end-users, including agribusiness entrepreneurs, to develop viable business and financing models that can attract financing to these opportunities.
3. Support sub-national governments to identify clear pathways for integrating PURE into their sub-national development plans and strategies, including in their energy plans.
4. Collaborate with the national government—including ministries of energy, agriculture, and finance (among others)—to identify policy and regulatory interventions needed to unlock investment in PURE space.
5. In partnership with DFIs, philanthropic funders, and other financing institutions, undertake research geared towards informing avenues and means of accelerating flow of domestic and international, public, and private finance at scale and the speed needed to unlock the potential of PURE opportunities in SSA.

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ABOUT WRI AFRICA

World Resources Institute has been working in Africa for more than 30 years, supporting local partners and African governments to advance forest protection, landscape restoration, and sustainable cities, as well as to facilitate delivery of access to clean energy to underserved populations. WRI Africa generates actionable knowledge across three strategic pillars: vital landscapes, thriving and resilient cities, and institutional and economic transformation. The institute's Energy Program collaborates with policymakers, cities, companies, utilities, regulators, and development institutions to secure a clean energy future for everyone. Our commitment under the new strategy (2023–2027) is to contribute to the transformation of the energy systems by decarbonizing energy consumption; securing clean energy supply; delivering access to energy for equitable development; and energy, minerals, and circularity.

Strathmore Energy Research Centre (SERC) is an applied technology lab within Strathmore University. It was established in 2012 to carry out high-quality research and consultancy services, as well as to provide professional training, laboratory testing, and project development for the renewable energy sector in Kenya. SERC effectively offers services to the government, private sector, and the public.

The Charles Stewart Mott Foundation supports nonprofit organizations that are working to strengthen communities around the world. Under our 'Advancing Climate Change Solutions' portfolio, we work to increase the use of renewable energy in developing countries, where nearly 1 billion people lack access to electricity. We support practical solutions that increase the use of renewable energy at the community level in developing countries.

Good Energies Foundation is a Swiss-based philanthropic organization funding initiatives that work to reverse the impact of climate change in two key areas: access to clean energy and protection of tropical forests. Good Energies is part of Porticus, which manages the private philanthropic endeavors of the Brenninkmeijer family business owners with the aim of helping create a just and sustainable future where human dignity flourishes.

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