Advancing energy-efficient cooking in Kakuma

A pilot with 40L electric pressure cookers

About SNV

SNV is a global development partner, deeply rooted in the countries where we operate. We are driven by a vision of a better world: A world where across every society all people live with dignity and have equitable opportunities to thrive sustainably. To make this vision a reality, we need transformations in vital agri-food, energy, and water systems.

SNV contributes by strengthening capacities and catalysing partnerships in these sectors. We help strengthen institutions and effective governance, reduce gender inequalities and barriers to social inclusion, and enable adaptation and mitigation to the climate and biodiversity crises.

Building on 60 years of experience we support our partners with our technical and process expertise and methodological rigour. We do this in more than 20 countries in Africa and Asia with a team of approximately 1,600 colleagues. By being adaptable and tailoring our approaches to these different contexts, we can contribute to impact at scale, resulting in more equitable lives for all.

About MECS

Modern Energy Cooking Services (MECS) is an eight-year research programme funded by UK Aid (FCDO). We are a geographically diverse, multicultural and transdisciplinary team working in close partnership with NGOs, governments, private sector, academia and research institutes, policy representatives and communities in 16 countries of interest to accelerate a transition from biomass to genuinely 'clean' cooking.

In seeking to spark a new approach to clean cooking, the MECS programme researches the socio-economic realities of a transition from polluting fuels to a range of modern fuels. Whilst the research covers several clean fuels, the evidence is pointing to the viability, cost effectiveness, and user satisfaction that energy efficient electric cooking devices provide. Significant progress has been made in access to electricity in the last decade, but these gains are sometimes disconnected from the enduring problem of clean cooking. By integrating modern energy cooking services into the planning for electricity access, quality, reliability and sustainability, MECS hopes to leverage investment in renewable energies (both grid and off-grid) to address the clean cooking challenge.

About the pilot study

This case study examines the Institutional E-Cooking Pilot, a transformative initiative by SNV Kenya and the Modern Energy Cooking Services (MECS) Programme, supported by Energising Development (EnDev) and UK Aid.

Conducted in Kakuma Refugee Camp and the Kalobeyei Integrated Settlement, the project addressed the severe challenges posed by firewood dependency, which fuels deforestation, exacerbates environmental degradation, and endangers health. Over 50 social institutions in these areas, including schools and healthcare facilities, rely on firewood, consuming up to 100 metric tons monthly. The pilot introduced 40-litre and 20 litre Electric Pressure Cookers (EPCs), powered by solar energy, to reduce firewood use, cut operational costs, and improve health outcomes by eliminating harmful indoor smoke. Beyond these immediate benefits, the pilot explored the scalability of EPCs as a sustainable cooking solution, aligning with global efforts to promote clean energy and environmental resilience.

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Author: Marion Ambani (SNV), Karlijn Groen (SNV), Christine Uluma (SNV) Hannah Mwangi (SNV)

Contributors: James Etoot, John Njogu (SNV), Beryl Onjala, Jon Leary (MECS), Irene Mutisya, Maryanne Wanjiru

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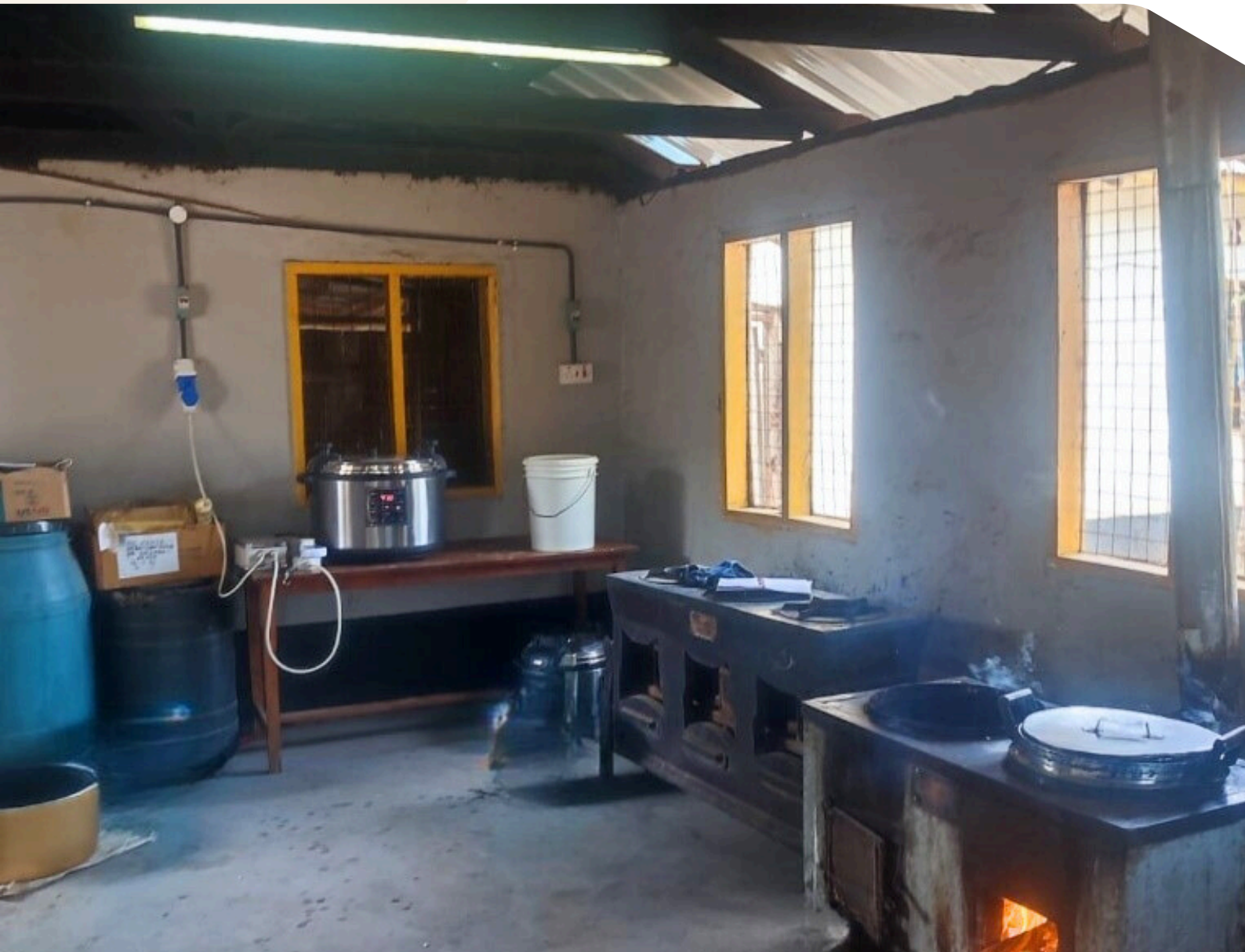
This initiative underscores SNV's mission to enable systemic transformation by empowering communities and fostering local ownership. It supports Sustainable Development Goals (SDGs) 7, 13, and 3 by advancing affordable energy access, mitigating climate impacts, and improving health and well-being.

Summary of key findings

- **Efficiency gains -** Cooking time and energy costs were significantly reduced, with staple meals like githeri requiring half the energy of firewood stoves.
- **Financial savings -** Institutions experienced substantial cost reductions, enhancing long-term sustainability.
- **Water conservation -** The sealed cooking mechanism retained moisture, reducing water usage critical in water-scarce areas like Kakuma.
- **Training needs -** Cooks required time and support to adapt to EPC pressure settings and avoid overcooking.
- **Scheduling adjustments -** The extended pressure release process occasionally delayed meal preparation, requiring better planning.
- **Infrastructure challenges -** Reliable electricity was essential, highlighting the need for investment in power supply for scalability.
- **Health improvements -** Eliminating firewood reduced smoke-related respiratory issues and improved kitchen safety.
- **Enhanced food quality -** Meals retained their natural aroma and nutritional value, improving the dining experience.
- **User acceptance -** While some initially preferred firewood-cooked food, most appreciated the convenience and health benefits of EPCs.



Introduction

Kakuma Refugee Camp and the Kalobeyei Integrated Settlement in northwest Kenya host thousands of people and institutions that depend heavily on firewood for cooking. This reliance leads to widespread deforestation and health issues, especially among cooks exposed to prolonged smoke inhalation in poorly ventilated spaces. These challenges highlight the urgent need for cleaner, more sustainable cooking methods.

Recognising this, SNV Kenya and the MECS Programme launched the Institutional E-Cooking Pilot. The project sought to evaluate the effectiveness of EPCs in addressing these interconnected issues.

By transitioning from biomass to electric cooking, the initiative aimed to reduce environmental and health burdens while empowering communities with sustainable energy solutions. This effort is part of SNV's broader commitment to fostering climate resilience, inclusive governance, and systemic transformation in vulnerable regions.

The Pilot Initiative

The pilot focused on demonstrating the feasibility of EPCs in institutional kitchens, which require large-scale meal preparation. 4 social institutions (3 in Kakuma refugee camp and 1 in Kalobeyei integrated settlement) were selected as the pilot sites due to their access to a standalone solar photovoltaic system.

Kapooka Hospital in Kakuma was selected as the pilot site. This infrastructure allowed for reliable electricity, a critical factor for testing EPCs in a controlled environment.
At its core, the initiative sought to empower communities by highlighting a cleaner, safer, and more cost-effective alternative to traditional cooking methods. This approach aligns with SNV's strategy of addressing root causes of poverty and inequality while fostering equitable access to energy.

Project implementation

To evaluate the EPCs, the project team conducted controlled cooking tests at Kapooka Hospital. These tests compared the performance of EPCs with traditional firewood stoves across several parameters: cooking time, energy consumption, costs, and user experience.

Culturally relevant dishes porridge, githeri, rice, and yellow split peas were prepared using both methods to reflect real-world conditions.
The cooks participating in the pilot underwent training to familiarise themselves with EPC operations.

This included managing pressure settings and adapting traditional recipes to suit the precise cooking nature of the innovative technology. Feedback from cooks was actively sought to understand their experiences and to identify any challenges or areas for improvement.

The tests demonstrated how EPCs could fit seamlessly into institutional settings. Beyond quantitative data, the project also captured qualitative insights into the cooks' adaptation process and their overall satisfaction with the innovative technology.

Findings and insights

The introduction of EPCs yielded significant benefits. Cooking time and energy costs were drastically reduced. For instance, preparing githeri, a staple maize and bean dish, required half the energy and significantly less time compared to traditional firewood stoves. This efficiency translated into substantial monthly savings, enhancing the financial sustainability of institutions like Kapooka Hospital.

Water conservation emerged as another critical advantage. EPCs' sealed cooking mechanism retained moisture, reducing the amount of water needed for meal preparation. In water-scarce environments like Kakuma, this efficiency has far-reaching implications for resource management and sustainability.

The impact on health and working conditions was profound. Traditional firewood stoves produce significant amounts of smoke, causing respiratory issues and eye irritation for cooks. By eliminating these emissions, EPCs created safer and more comfortable kitchens, aligning with global clean cooking initiatives. This change directly improved the quality of life for kitchen staff, demonstrating the broader health benefits of transitioning to modern cooking solutions.

Beyond operational benefits, EPCs enhanced food quality. Cooks noted that meals retained their natural aroma and nutritional value, offering a superior dining experience. While some individuals initially preferred the taste of firewood-cooked meals, most appreciated the improved convenience and health outcomes associated with EPCs.

Challenges

The pilot faced several challenges that highlighted the complexities of transitioning to modern cooking technologies. Cooks needed time to adapt to the precise operation of EPCs, particularly managing pressure settings and avoiding overcooking. This learning curve required dedicated training and support to ensure a smooth transition.

The extended pressure release process occasionally delayed meal preparation, necessitating careful scheduling. Additionally, reliable electricity was essential for optimal EPC performance. In settings without consistent power supply, the scalability of this technology could be constrained.

These challenges underscore the importance of investing in infrastructure and capacity-building to ensure the successful integration of EPCs in similar settings.

Broader implications

The success of the Institutional E-Cooking Pilot highlights the potential of EPCs to transform cooking practices in Sub-Saharan Africa. By reducing reliance on firewood, EPCs alleviate environmental pressures while addressing health and economic challenges. Their scalability, particularly in areas with renewable energy access, makes them a promising solution for other humanitarian and institutional contexts.

The time and energy savings associated with EPCs also have social implications. Women, often the primary cooks, can redirect their time toward education, economic activities, or community engagement. This contributes to gender equality, a core focus of SNV's work. Additionally, the reduced environmental impact supports global efforts to combat climate change, reinforcing the need for clean energy solutions in vulnerable regions.

Recommendations

To maximise the impact of EPCs, comprehensive training programmes are essential. These should cover not only the technical aspects of EPC operation but also recipe adaptations and safety protocols.

Community engagement is equally important to ensure widespread acceptance and to address any resistance to change.

Investing in reliable electricity infrastructure, particularly through partnerships with energy providers, is critical for scaling this technology.

Regular monitoring and evaluation will help refine implementation strategies, ensuring that EPCs continue to meet the needs of their users while delivering sustainable results.

SNV can help replicate this success across other regions by fostering multi-stakeholder collaborations and emphasising local ownership. This approach aligns with SNV's mission to create systemic transformation and deliver long-lasting impact.

Conclusion

This contributes to gender equality, a core focus of SNV's work. Additionally, the reduced environmental impact supports global efforts to combat climate change, reinforcing the need for clean energy solutions in vulnerable regions.

The success of the E-Cooking Pilot in Kakuma shows that clean energy solutions like EPCs can cut costs, improve health, and reduce firewood reliance paving the way for a more sustainable and equitable future.

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Contact us: SNV Kenya P. O. Box 30776-00100 Nairobi, Kenya Ngong Lane, Off Ngong Road Tel: +254 724 463 355 | +254 735 177 992
Email: kenya@snv.org

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