

Expanding Clean Cooking in Tanzania's Public Institutions

How TaTEDO-SESO and SEEEO are Transforming School Kitchens with High-Efficiency Firewood Stoves

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Tanzania is making tangible progress in transforming how its public institutions cook. TaTEDO-Sustainable Energy Services Organization (TaTEDO-SESO) and SEEEO have led a major intervention that is already delivering measurable results by replacing inefficient, smoke-filled three-stone fires with scientifically validated high-efficiency institutional firewood stoves in primary schools and training centres across the country.

Supported by the Cambridge Education Foundation Limited and WWF, this initiative represents a convergence of proven technology, field experience, and national policy ambition, contributing directly to Tanzania's National Clean Cooking Strategy (2024 to 2034) and its climate and forest conservation commitments.



SeTA Institutional Stove cooking food for students in the school

77

Stoves Deployed (Current Intervention)

Up to 55%

Thermal Efficiency (Hot Start)

3 to 4 Times

Efficiency vs. Three-Stone Fires

From Pilot to Nationwide Footprint

The current phase of the programme has fabricated and installed 77 modern institutional firewood stoves in two capacity configurations (50L and 100L) in public primary schools across Pwani and Katavi regions. Each school received one stove of each size, providing the flexibility to efficiently manage varying meal volumes.

This latest deployment builds on a much broader cumulative track record. TaTEDO-SESO and SEEEO have installed institutional stoves across multiple regions of Tanzania, including:

- **Pwani Region:** Mkuranga, Kisarawe, and Rufiji Districts
- **Katavi Region:** Mpanda MC, Mlele, Nsimbo, Tanganyika, and Mpimbwe Districts
- **Southern Regions:** Lindi, Mtwara, and Ruvuma
- Training institutes and secondary schools in multiple zones

Field verification of the most recent installations (2024 to 2025) confirms a near 100% operational status, with kitchen staff reporting that the stoves are used daily for preparing school meals.

Where the Stoves Are Making a Difference

Pwani Region

- Kazole, Dundani, Mkiu, Kiguza (Mkuranga District)
- Kibasila, Kanga, Kurui Mzenge, Mtunani, Kilimani, Jokate Mwigelo (Kisarawe District)
- Ukombozi, Umwe, Mohoro, Mapinduzi (Rufiji District)

Katavi Region

- Kamsisi (Mlele District)
- Mgombe, Kakese, Kivukoni (Mpanda MC)
- Itenka A, Katesunga (Nsimbo District)
- Kasekese, Kayenze (Tanganyika District)
- Kakuni, Makuyugu (Mpimbwe District)

Ruvuma Region

Namtumbo Community-Based Conservation Training Centre (Namtumbo DC)

Lindi Region

- Mnolela and Milola Secondary School
- Kilwa Masoko (Kilwa DC)

Mtwara Region

- Mtawanya FDC, Naliendele Agricultural Institute (Mtwara DC)
- Masasi FDC (Masasi DC)

Dar es Salaam.

- Agness Michael Pre and Primary School, Kimara, Ubungo DC,
- Legend Pre and Primary School, Goba Ubungo DC,
- Macedonia Nursery and Primary School, Bonyokwa, Ilala DC.

Across all these locations, field teams have confirmed that stoves are functioning properly and are used daily, a strong indicator of genuine adoption and sustained utility.



Students and Tutor of Mtawanya FDC are admiring the SeTA institutional stove when delivered to their college

Scientifically Validated Performance

The SeTA institutional stoves are not simply improved versions of traditional models. They are rigorously tested and scientifically validated. Performance testing conducted by the Tanzania Industrial Research and Development Organization (TIRDO) demonstrates the following thermal efficiency results:

Test Type	Condition	Efficiency
Evaporation	Cold start	49.46%
Evaporation	Hot start	54.82%
Evaporation	Hot start (repeat)	48.42%
Boiling	Cold start	44.83%
Boiling	Hot start	48.57%

Fire power range: 4.0 kW – 5.76 kW

By comparison, traditional three-stone open fires typically operate at 10 to 15% thermal efficiency. The SeTa stoves deliver three to four times that efficiency, translating to estimated firewood savings of 50 to 70%, a transformation with profound economic and environmental implications.

Engineering Features That Drive Performance

The SeTa stoves incorporate a suite of advanced design features that work together to maximise combustion efficiency and minimise waste:

- **Insulated combustion chamber (5 cm ceramic fibre):** Retains heat and reduces energy loss during cooking.
- **Optimised pot skirt design:** Maximises heat transfer from flame to cookware.
- **Controlled air inlet system:** Enables efficient, regulated combustion with less excess air.
- **Integrated chimney:** Channels smoke away from the kitchen, dramatically improving air quality.
- **Firewood magazine:** Enables measured, controlled fuel feeding rather than unregulated loading.

The combined effect is higher combustion efficiency, reduced emissions, improved safety, and a cleaner working environment for kitchen staff. These stoves are engineered to maximize combustion efficiency and heat transfer while prioritizing durability, safety, and local user needs.



Demonstrating the SeTA Institutional Stove to Schools in Mtwara Region

Real Impact on Schools and Communities

1. Significant Reduction in Firewood Consumption

Schools report meaningful decreases in firewood use, reducing operational costs and alleviating pressure on surrounding forests. For many schools, this translates into direct savings that can be redirected to other educational needs.

2. Healthier Kitchens and Better Working Conditions

The integrated chimney system and improved combustion substantially reduce indoor smoke. Cooks and kitchen staff report cleaner air, reduced eye irritation, and improved overall working conditions, benefits that extend to students who previously spent time in smoke-filled dining areas.

3. Faster, More Reliable Meal Preparation

Higher thermal efficiency means water boils faster and meals are prepared more quickly. Schools serving large student populations benefit directly from improved meal timing and more consistent cooking schedules.

4. Flexible Energy Use

In some institutions, the stoves function as the primary cooking system; in others, they serve as a reliable backup during LPG supply disruptions. This flexibility reinforces their value as a resilient, dependable solution.

Voices from the School Head Teacher and Kitchen

Head Teacher Wilfred Fortunatusi from Kazole Primary School, in Mkuranga District, said, “We have seen a reduction in firewood usage. This is helping the school save costs and protect our surrounding forest environment.”

Ms. Amina Waziri, School Cook from Kazole Primary School, in Mkuranga District, Pwani Region, said that before the installation of these stoves, we used a lot of firewood and cooking took much longer. Now we save both time and resources, and the kitchen feels like a proper workspace. “The new stove uses less firewood and produces less smoke. I can now cook comfortably without feeling exhausted or affected by smoke.”

This technology should be scaled up to more schools. It is very effective, and the students benefit from timely, properly cooked meals.

— District Education Officer

Challenges and Lessons Learned

No stove model of this scale is without challenges, and TaTEDO-SESO and SEECO have been deliberate in capturing lessons to inform future iterations:

- **Cookpot durability:** Some earlier models experienced cracking under sustained heat stress. This has since informed material and design improvements in newer stove generations.
- **Institutional policy shifts:** A small number of schools faced administrative constraints on firewood use, requiring advocacy and engagement with district education authorities.
- **Maintenance and capacity:** Sustained performance depends on ongoing training for kitchen staff and access to spare parts. Future programming will integrate structured maintenance plans from the outset.

These lessons are being actively incorporated into improved designs and into the planning framework for national scale-up.

Alignment with National Clean Cooking Goals

This initiative sits squarely within Tanzania's broader policy landscape. The deployment of SeTa stoves directly advances:

- **National Clean Cooking Strategy (2024–2034):** By transitioning institutional kitchens to higher-efficiency biomass solutions as a stepping stone toward cleaner fuels.
- **Climate change mitigation commitments:** Through reduced non-renewable biomass consumption and lower greenhouse gas emissions from institutional cooking.
- **Forest conservation:** By cutting firewood demand, estimated around 50 to 70%, the use of these stoves reduces pressure on Tanzania's forest resources, particularly in peri-urban and rural school catchment areas.
- **SDG alignment:** Contributing to SDG 7 (Affordable and Clean Energy), SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 13 (Climate Action).

A Scalable Model for Institutional Cooking Transformation

The SEECO SeTa stove programme has demonstrated that high-efficiency institutional cooking solutions can be successfully designed, manufactured, deployed, and sustained within Tanzania without dependence on imported technology.

This model is directly replicable across:

- Government primary and secondary schools
- Vocational training centres and colleges
- Prisons, hospitals, and other large public institutions
- Refugee and displacement camp facilities
- Medium to large food vending enterprises

With verified efficiency ratings of up to 55%, strong field performance data, and high rates of user adoption, the SeTa stove programme presents a compelling, evidence-based case for national scale-up and targeted donor and government investment.



Cooking Ugali at Namtumbo CBCTC

Conclusion

TaTEDO-SESO and SEECO's deployment of SeTa high-efficiency institutional stoves marks a critical step in transforming how Tanzania's public institutions cook. By combining robust engineering, rigorous laboratory validation, and hands-on field implementation, the SeTA Institutional stove is delivering real, measurable impact, improving the health and working conditions of kitchen staff, reducing operational costs for schools, and contributing meaningfully to Tanzania's climate and forest conservation goals.

The evidence is clear: this is a proven solution, ready to scale. Tanzania's schools and the communities they serve deserve nothing less.