

From Firewood to Fortune:

How Efficient Charcoal Baking Ovens Are Transforming Livelihoods Across Coastal Tanzania

Across the coastal districts of Tanzania and Ruvuma Landscape, a quiet but powerful transformation is under way. Women's groups, youth entrepreneurs, and small food vendors are turning **efficient charcoal baking ovens** into profitable micro-enterprises reducing fuel costs, conserving forest resources, and opening new income streams for hundreds of families. This is not a pilot experiment. It is a proven, replicable model tested in twelve districts over seven years, and the results speak for themselves.

**200+ Women & Youth
Trained**

12 Districts Reached

**Charcoal costing TZS
1,000 = 24 Loaves of
Bread baked**

The Technology That is Making the Difference

At the heart of this initiative is a deceptively simple device: the improved charcoal baking oven developed and promoted by TaTEDO-Sustainable Energy Services Organization (TaTEDO-SESO). Designed with high-quality, heat-retaining materials, this oven delivers performance that traditional firewood stoves and normal pots simply cannot match.

"The improved oven can bake up to 30 loaves of bread, 72 cupcakes, or 60 scones using 750 grams of charcoal — a powerful tool for income generation that protects forests at the same time."

Unlike traditional methods, which rely on firewood or coconut shells that generate ash, inconsistent heat, and poor product quality, the efficient charcoal oven:

- ▶ Conserves heat through a well-insulated baking chamber
- ▶ Uses a precision air-inlet control to regulate temperature
- ▶ Produces clean, ash-free baked goods — improving appearance and hygiene
- ▶ Allows baking of bread within 30 minutes
- ▶ Requires only 750 grams of charcoal to bake 12 standard 400-gram loaves of bread
- ▶ Performs reliably in off-grid, rural environments without electricity



Efficient Charcoal Baking Oven

Field measurements across multiple training sites confirmed the dramatic efficiency gains. In Bagamoyo, approximately 2 kilograms of charcoal costing only TZS 1,000 baked 24 loaves of bread and 16 scones in a single session. In Kisarawe and Rufiji, each production cycle consumed charcoal worth TZS 2,000–3,000 — far less than the cost of equivalent firewood or coconut shell fuel. For community groups operating on tight margins, this difference is transformative.

Seven Years, Twelve Districts, Hundreds of Lives Changed

TaTEDO-SESO's charcoal baking oven programme has evolved from early collaborations with WWF, Vodacom Tanzania Foundation and European Union (EU) into a central pillar of the Integrated Sustainable Charcoal Value Chain Promotion Project (ISU-CHAVPRO) and Leading the Change Project (LtC) implemented across twelve districts of the Pwani (Coastal), Lindi, Mtwara and Ruvuma Regions. The reach and depth of these projects is remarkable.

Rufiji, Kilwa, Lindi and Masasi District — 2018- 2020

Groups trained under the WWF/SIDA 'Leading the Change' programme

TaTEDO-SESO organized Trainer of Trainers (ToT) baking and entrepreneurship sessions in Rufiji, Kilwa, Masasi and Lindi Districts for 52 participants — 35 women and 17 men. Participants included community-based organization members, district council representatives, school staff, and individual entrepreneurs. Ovens were distributed to motivated participants on a revolving loan basis, with repayments designed to create a self-sustaining fund to reach more entrepreneurs. Facilitators noted that the baked goods market in Kilwa, Utete, and Mtwara was still largely unsaturated — a significant commercial opportunity waiting to be seized.

Shungubweni, Mkuranga — October 2021

Mishemishe Women Group & Mchakamchaka Group

Under the WWF-Vodacom Tanzania Foundation Project, TaTEDO-SESO trained two women's groups — Mishemishe and Mchakamchaka — at Shungubweni in Mkuranga District. Before the training, these women baked scones using charcoal in normal pots, a process that took up to 8 hours and produced inconsistent results.



Baking practiced by the facilitated groups before TaTEDO-SESO intervention

After just two days of practical training, participants



Business premise for Kiluvya Youth Baking Group in Kisarawe District

committed to pooling resources to purchase efficient ovens, expand to bread and cake production, and market products to neighbouring villages where no such services existed. The groups also practiced cake decoration for the first time, discovering a new premium market segment.

Kiluvya and Msanga, Kisarawe April 2021

Kiluvya Youth Baking Group & Singoinema Group

Two trainings on how to bake with efficient charcoal oven were carried out in Kiluvya and Msanga Villages in Kisarawe District. The targeted participants of the trainings were entrepreneurs in the bakery sector, food vendors, community-based groups (CBOs) and other individuals with interest in baking business. The trainings involved 60 people (50 Women and 10 Men). Out of the 60 participants, 6 were representatives from CBOs, 5 District council representatives, 14 youths and 35 entrepreneurs.

Bagamoyo District — September 2024

Jitegemee Lishe Group (Magomeni Ward) & Tujijenge Group (Nianjema Ward)

Bagamoyo is among Tanzania's most historically rich towns, and it is proving to be a vibrant market for baked goods. Two groups — Jitegemee Lishe, supplying a primary school community, and Tujijenge, specializing in buns and loaves — received intensive four-day training covering baking techniques, business planning, and cake decoration for premium markets. Within one week of training, Jitegemee Lishe had secured supply contracts with four local shops and two schools during examination periods. Tujijenge fulfilled its first catering order: 21 small cakes and one large cake for a Standard Seven graduation ceremony. The transformation from informal vendors to contracted suppliers took less than two weeks.



Efficient Oven with Baked Products

Kisarawe District — October 2024

Nendeleni Group (Chole Ward) & Tukizahila Tukipata Group (Masaki Ward)

Kisarawe presented a unique entrepreneurial landscape: charcoal is readily available and inexpensive, but baked products like bread and scones were not yet part of the local eating culture. TaTEDO-SESO trained 23 participants from two groups, combining baking skills with intensive marketing strategy sessions to help participants penetrate a new market. The Nendeleli Group, already experienced in solar drying of vegetables and Moringa, integrated baking into a diversified clean-energy enterprise. Follow-up visits confirmed that bread from Nendeleli group was already being produced and sold an encouraging demonstration of rapid business adoption. Kisarawe also challenged gender stereotypes: men actively participated in all baking



Men and women during training session at Masaki ward Kisarawe District

tasks alongside women, proving that baking entrepreneurship is an opportunity for everyone.

Mkuranga, Kibiti & Rufiji Districts — January/February 2025

Nduli, Upendo & Amani, Kileo, Maendeleo, Queens, Nyota Ndogo Groups

The most recent training cycle covered three districts simultaneously, training six groups and 41 participants across Mwandege, Mkuranga, Kibiti, Ikwiriri, and Mkongo wards. Groups ranged from women selling wholesale chicken (Upendo & Amani) to dedicated baking cooperatives (Maendeleo Group, Kibiti) already sourcing speciality cake accessories. In all three districts, TaTEDO-SESO's field teams confirmed that charcoal was cheap and readily available keeping production costs extremely low. Groups were encouraged to diversify beyond baking by roasting bananas, sweet potatoes, and groundnuts using the same oven, maximizing the asset's utility and income potential throughout the day.

Outcome and impact of the baking and entrepreneurship trainings

A case of the trained TOTs, for instance Ms. Grace Mkorwe of Kilwa Masoko who received trainings in July 2018 and was among the participants who bought the efficient charcoal baking oven. She was using the oven to produce about 100 loaves of bread every day which were sold in Kilwa Masoko and some were taken to Somanga market. To meet the growing market for her products, Ms. Grace purchased another efficient charcoal oven and managed to establish another bakery at Somanga Njia Nne Township. She also purchased a mixer machine which enabled her to produce high quality loaves of breads and cakes. Currently on average she sale more than 200 loaves of bread every day at a price of Tshs1000/- and 500 depending on size. She also produces cakes by order for various events such as Birthdays, wedding ceremony etc.



Trained women entrepreneurs at Masasi District

Grace is earning a net profit of Tsh 35,000- 50,000 per day and is using that money to cover her daily household needs and contribute school fees for her child. She has also managed to purchase a piece of land (plot) at Kilwa Masoko at Tsh 2,000,000 and purchased 2 motorcycles (Boda boda). The two motor bikes are being used for transportation business in Kilwa, additional revenue stream.

Women's Empowerment at the Core

Throughout this programme, women have not been passive recipients of technology — they have been the driving force of its success. Of the more than 200 individuals trained across twelve districts, the majority are women. In many communities, women's groups used the training as a springboard to register formally, open group bank accounts, and develop collective business plans.

Groups like Nyota Ndogo (Mkongo) were established explicitly to reduce women's economic dependence on their families. Others, like Nendeleli (Kisarawe), already operated diversified clean-energy enterprises and used the baking training to add another revenue stream. In Bagamoyo, women who began as informal rice vendors are now contracted suppliers to schools and shops.

"The modality of working as a team was vivid through every step they took during training. Members mobilized themselves to purchase additional tools before the training had even ended."

TaTEDO-SESO's approach has also begun to shift deeply held cultural assumptions. In Kisarawe, men participated fully in baking training alongside women and took pride in doing so. This normalization of baking as a gender-neutral economic activity has the potential to multiply the programme's reach and impact significantly.

Environmental Impact: Protecting Forests Through Efficiency

Tanzania's forests face enormous pressure from charcoal production and firewood harvesting. The ISU-CHAVPRO project was designed with this challenge at its centre: by making charcoal use dramatically more efficient, TaTEDO-SESO's ovens reduce the total amount of charcoal consumed per kilogram of baked product — creating a direct, measurable link between household income generation and forest conservation.

The numbers tell a compelling story. Traditional baking in normal pots using firewood or coconut shells is not only slower and messier — it consumes far more fuel for equivalent output. Groups that used to spend hours coaxing heat from coconut shells now produce superior products in 30 minutes using a fraction of the charcoal. Scale this efficiency gain across hundreds of baking groups in five districts, and the cumulative reduction in biomass demand is significant.

By placing efficient ovens in the hands of women entrepreneurs, TaTEDO-SESO has aligned environmental sustainability with economic self-interest: the less charcoal a group burns per production cycle, the lower its operating costs and the higher its profit margin. Sustainability and profitability point in the same direction.

The Commercial Opportunity: Why Now Is the Right Time to Scale

Field evidence from across Pwani Region points to a compelling market opportunity. In Bagamoyo, the eating culture already embraces scones and buns as staple foods. In Kibiti and Rufiji, growing towns are generating demand for breads, cakes, and packaged snacks that local supply cannot yet meet. In Kisarawe, the market is still largely unserved — which means first-movers gain a lasting competitive advantage.

The efficient charcoal baking oven is ideally positioned to meet this demand because it offers:

ADVANTAGE	WHAT IT MEANS FOR YOUR BUSINESS
Ultra-Low Energy Costs	Charcoal worth TZS 1,000–3,000 can complete a full production cycle, keeping operating margins high even for micro-businesses.

Speed & Consistency	Bread baked in 30 minutes. Consistent oven temperature means consistent product quality — essential for building repeat customers and supply contracts.
Clean Products	No ash contamination. Better appearance and hygiene means higher customer satisfaction and premium pricing potential.
Off-Grid Capable	No electricity needed. Ideal for rural and peri-urban markets where power supply is unreliable or unavailable.
Multiple Revenue Streams	Same oven roasts groundnuts, bananas, and sweet potatoes — maximizing daily utilization and diversifying income.
Low Entry Cost	Accessible to women's groups and youth cooperatives, especially with revolving fund or group purchase arrangements.

Who Should Consider an Efficient Charcoal Baking Oven?

Experience across six districts has identified the segments that benefit most from this technology:

- ▶ Women's groups and cooperatives seeking scalable, low-capital income generation
- ▶ Youth entrepreneurs in peri-urban and rural areas without access to formal employment
- ▶ Existing food vendors and small bakeries looking to reduce operating costs and improve product quality
- ▶ Community-based organizations (CBOs) seeking productive-use assets for their members
- ▶ Schools and institutional kitchens involved in feeding programmes
- ▶ Agribusiness groups that want to add value to agricultural produce through baking and roasting
- ▶ Rural entrepreneurs in areas where firewood and charcoal are locally available and affordable

Critically, no prior baking experience is required. TaTEDO-SESO's training programme — combining practical baking sessions, business skills, and entrepreneurship coaching — is designed to equip complete beginners with everything they need to launch a viable baking business within days.

Products That Sell: What Baking Groups Are Producing

Trained groups across Pwani, Lindi and Ruvuma Regions are producing a wide range of commercially viable products, including:

- ▶ Loaves of bread (standard and specialty)
- ▶ Scones — a staple snack in coastal communities
- ▶ Buns — high-demand in schools and markets
- ▶ Cakes and cupcakes — lemon, orange, milk, and decorated celebration cakes
- ▶ Biscuits and cookies
- ▶ Banana bread

- ▶ Roasted groundnuts, sweet potatoes, and bananas (using the same oven)

This product diversity allows baking groups to serve multiple market segments simultaneously from daily bread buyers to schools seeking examination-period supplies, from wedding cake customers to institutional bulk buyers. Groups trained by TaTEDO-SESO have secured contracts with local shops, schools, and catering customers within days of completing training.



Baked products baked by participants of trainings in Lindi



Products baked by participants during training sessions in Rufiji and Kilwa

What TaTEDO-SESO Provides: A Complete Package for Success

TaTEDO-SESO's efficient charcoal oven programme is far more than a technology transfer exercise. Groups that participate in the programme receive:

Technology Package	Capacity Building
▶ Efficient charcoal baking oven ▶ Bread and cupcake tins ▶ Full set of baking accessories ▶ Illustrated operation manual with recipes	▶ Hands-on baking training (2–4 days) ▶ Entrepreneurship & business management ▶ Marketing strategy and customer development ▶ Costing, record keeping, and business planning

After training, TaTEDO-SESO field officers conduct follow-up visits to monitor progress, identify challenges, and connect groups to additional support where needed. This after-sales commitment is what turns a training session into a sustainable livelihood.

Scaling Up: The Road Ahead

The evidence base is clear. The technology works. The demand is real. The question now is scale. To accelerate market growth for efficient charcoal baking ovens and amplify the impact already demonstrated across Pwani Region, TaTEDO-SESO and its partners are pursuing a multi-pronged expansion strategy:

- ▶ Establishing revolving funds and group financing mechanisms for oven acquisition
- ▶ Linking baking groups to institutional markets: schools, hospitals, hotels, and catering firms
- ▶ Supporting product packaging, branding, and food hygiene certification
- ▶ Expanding refresher training and mentoring for established baking centres
- ▶ Strengthening after-sales support and local oven maintenance capacity

- ▶ Promoting the oven through demonstrations, trade fairs, and agricultural exhibitions
- ▶ Building local distribution networks for ovens and baking accessories
- ▶ Integrating baking centres with complementary productive-use technologies — solar dryers, electric cookers, and irrigation systems

Interested in Efficient Charcoal Baking Ovens?

Whether you are a women's group, a youth cooperative, a small bakery, or an NGO seeking to empower communities — TaTEDO-SESO can support you with technology, training, and ongoing guidance.

Contact TaTEDO-Sustainable Energy Services Organization

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Dar es Salaam, Tanzania | Over 35 Years of Sustainable Energy Leadership

About TaTEDO-Sustainable Energy Services Organization

TaTEDO-Sustainable Energy Services Organization (TaTEDO-SESO) is a Tanzanian non-governmental organization with over 35 years of experience in sustainable energy development. Working across renewable energy, clean cooking, productive-use technologies, gender empowerment, and environmental sustainability, TaTEDO-SESO partners with local communities, government agencies, and international donors to deliver practical, lasting change at scale.

Through SESCOM Ltd (Sustainable Energy Services Company Limited), a social enterprise, TaTEDO-SESO also deploys clean cooking appliances, electric pressure cookers, E-Mobility, solar driers, and digital energy solutions for communities and institutions across Tanzania.

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