BRIEFING NOTE SERIES: TOWARDS A THRIVING ECOOK MARKET IN TANZANIA

7/7: EPC Design and Use-Case Insights After Long-Term Use in Tanzania

MECS Modern Energy Cooking Services

Over the last three to four years the use of electric pressure cookers (EPCs) in Tanzania (although still nascent) has begun to increase, and those earliest of early adopters have been using EPCs for multiple years. This briefing note describes the design and use-case insights drawn these 'long-term' EPC users, as they reflect on what learning and best practices they have uncovered over that time, and how this relates to EPC design and sustained use of EPCs in Tanzania. The early adopters who contributed to these insights are all based in Dar es Salaam.

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ESMAP Energy Sector Management Assistance Program

TaTEDO TANZANIA TRADITIONAL ENERGY DEVELOPMENT ORGANIZATION Centre for Sustainable Modern Energy Expertise

TWO POTS

Over the course of the Thriving Market project a particular piece of feedback has been received across different market segments. It is common for users to request a second pot for EPCs or to ask for a design that can accommodate more than one pot at a time. Some request for spare pots without the non-stick coating – the EPCs currently commonly vended in Tanzania mostly have a non-stick coating to the cooking pots. EPCs can be used with stainless steel pots or with pots with a non-stick coating, and there are advantages and disadvantages to each:

Stainless steel pots

Good for beans because it is easy to clean using a stiff washing material like steel wool
People worry that non-stick coatings might react with the food but no one is worried about the stainless-steel pot
Is durable, doesn't corrode, is rust proof
Colour doesn't fade out easily

Non-stick pots

Easy to clean as food doesn't stick
Better for foods that will otherwise stick like Ugali
Cheaper

Stainless steel pots

Harder to clean, as food sticks on the surface

Non-stick pots

Bicarbonate of soda will wear non-stick coating away – and is used in some regions
Abrasive cleaning can wear the non-stick coating away so customers might think it's less durable and so less desirable – though careful washing maintains the coating
End users sometimes worry that the coating might react with food – although this is not true and the coating is not at all dangerous, it can be good to be able to offer an alternative to those worried about this

A two-pot package is of course more expensive than one pot – in Tanzania an additional non-stick pot would be around 11 USD, and an additional stainless-steel pot would be around 15 USD (this depends on the type). However, there are clear advantages in convenience and flexibility to having both types of pots at home.

Recommendation for those selling EPCs:

Sell a two-pot package for optimum end-user convenience where affordability is less of a barrier. For rural areas, where it might be harder to take care of the non-stick coating, stainless steel is recommended.

ONE SIZE DOES NOT FIT ALL

The availability of different sized EPCs is going to be important for consumer uptake and SESCOM frequently gets requests for sizes other than the standard 6L EPC. The size required broadly varies by size of household (or how many are being cooked for each meal) and is also influenced by whether the household is in a rural or urban setting. The EPC sizes available depend on the brand, but the most common sizes found in the Tanzanian market are 4L, 6L and 8L. A rough guide of household size and EPC size, using these EPC sizes and a larger one, is given below, disaggregated by rural and urban contexts.

Table 1: *EPC size and household size in urban and rural contexts, from authors' experience.*

EPC size (litres)	Household size (number of people)	
	Urban	Rural
4	1-3	1-2
6	3-6	2-4
8	6-10	3-6
10+	12+	6-10

Further factors which affect the size of EPC that a household might prefer are:

- Local cuisine and meal arrangements – what dishes are commonly cooked and how meals are constructed. Some contexts may cook more single dish meals than others, and some prefer to cook once a day and eat the food for several meals.
- Livelihood activities undertaken – a household engaged in manual activities (such as agriculture in rural areas) will have larger meal sizes than those who do office-based work during the day.
- Some may commonly host more people than the few who live in the household, for example for special occasions or at weekends, and require larger sizes for this special occasion cooking, such as at Christmas.

What does this mean for Tanzania?

There isn't very recent data about the distribution of household size in Tanzania, but looking back to the 2004-05 Demographic and Health Survey provides useful insight (National Bureau of Statistics and ORC Macro 2005). Figure 1 shows the distribution of household size in Tanzania, separating urban and rural contexts, from the 2004-05 data. The sizes of EPCs that best correspond to the household size brackets have been added. More recent data indicates that rural households are indeed on average larger than urban households (an average household size of 4.9 in rural areas compared to 4.3 in urban areas (Ministry of Finance and Planning and National Bureau of Statistics 2020)). A limitation of the data is that it does not disaggregate household size above 9 people, so it is not clear how many households in Tanzania are within the larger household size brackets in the table.

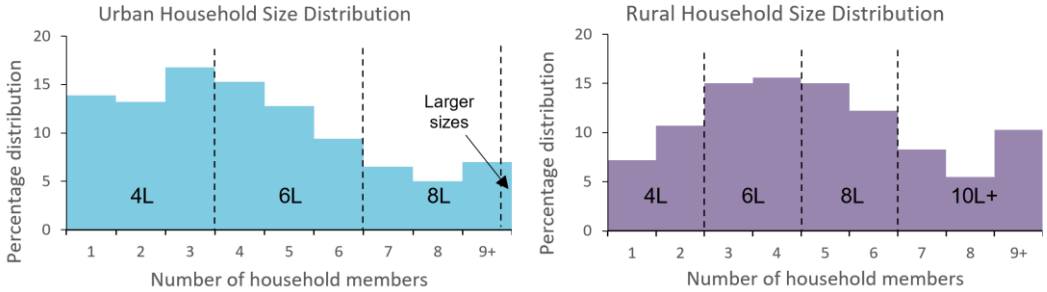

Figure 1: *Household size distributions for urban (left) and rural (right) with suitable EPC sizes overlaid.*

The household size trend shown in the figure suggests that the rural market segment will be more in need of the larger than standard (6L) EPC sizes. This should be taken into account when targeting these market segments. Conversely, the smaller EPC size of 4L is likely to be more appropriate to market to urban market segments who more commonly live in smaller sizes households and tend to do less physical work in their livelihoods.

In the near term, it is likely worth focusing on urban markets for energy efficient electric cooking (eCooking) appliances as there is a higher rate of electricity access in urban areas – 73.3% of urban households are connected to electricity as opposed to 24.5% (World Bank 2022). Therefore, efforts should be made to increase the availability of 4L and 6L EPCs and marketing materials designed to reflect that. Later, as rural electrification increases (as it rapidly is in Tanzania) larger EPCs should be procured and marketing materials for rural market segments reflect the larger sizes available to cater for their needs.

Inference can also be drawn about the size of the markets. In 2012, the number of households in Tanzania was reported to be about 9.4 million (Bureau of Statistics and Ministry of Finance 2013). According to Statista, it is estimated that the total number of households in 2022 will reach 12.5 million. Taking this estimate, and using previously reported electricity access statistics, nearly 5 million households have an electricity connection but are not using it for cooking. Most of these households will be in urban centres, and most with smaller household sizes, so concentrating on the standard 5-6 L size and the 3-4 L size is likely to satisfy a large percentage of the market, while bringing in small numbers of larger EPCs meets the needs to larger families and those who prefer larger pots for other reasons. This gives an indication on the large potential market for energy efficient eCooking appliances if awareness raising and supply chain support is undertaken.

More market research can shed even more light on the size preferences of end users, and further insight will also be gained as SESCOM begins to vend larger sized EPCs in response to customer requests.

POWERCUTS ARE A PROBLEM – BUT NOT AS OFTEN AS YOU THINK

There's a common perception than eCooking just isn't feasible on grids which have the occasional power cut. The truth is more nuanced –see the experience of Katarina on the right.

The experience in Dar es Salaam in the last year or so is that unexpected power cuts are of course irritating, but don't affect cooking as much as the long planned outages that occur when the grid network is undergoing maintenance. Unplanned outages are not usually as long, and don't necessarily coincide with cooking times. When they do, if an EPC has reached pressure, they don't much affect the cooking outcome for quicker dishes. TaTEDO incorporates that into EPC training – if the power goes down, trainees are told not to rush to open the lid and check the food, but to leave the EPC to depressurize naturally – and then to check on the food. Participants are usually surprised at how cooked the food is.

Of course, sometimes a cooking event is really disrupted – in these cases, cooks will usually transfer the food to another stove and continue the process. But due to this very issue, MECS and TaTEDO are currently trialing battery-supported eCooking with various households around Dar es Salaam, and will be reporting on how battery storage affects the cooking experience in the coming months.

> When you are cooking something like rice - I experienced it last week - it had just reached pressure, and the electricity went off. I thought maybe it would not have cooked properly but I just left it with the pressure inside, and when I came to check, it was well cooked. So power cuts affect more the foods like beans and kande that cook for some time, rather than quick dishes.
>
> ***Katarina, Dar es Salaam***

NEEDING TO DEEP FRY AND BBQ IS LEADING TO TECH INNOVATION AND DISSEMINATION

Deep frying is not the most common cooking process in Tanzania but children and young people really enjoy it. This age group in urban areas enjoy eating deep fried chips, chicken, and snacks like Maandazi. By barbequing, people mostly refer to dishes such as beef, chicken, pork, that are laid on top of a grill on a charcoal jiko. Below are estimates based on the cooking cultures of particular regions/ town.

Table 2: *Preference in consumption of deep frying and barbeque dishes in the cities.*

Place	Deep frying (% dishes)	BBQ-ing (%dishes)
Dar es Salaam	17%	0%
Dodoma	18%	7%
Morogoro	40%	4%
Kilimanjaro	24%	0%
Lake Victoria Islands	7%	1%
Lake Victoria (Kagera)	11%	0.5%

(Data sources: Dar es Salaam: (Leary et al. 2019)*; Morogoro:* (SESCOM, Nexleaf, and TAFORI 2021)*; Lake Victoria Islands and Lake Victoria (Kagera):* (Jones, Scott, and Clements 2021); *Dodoma and Kilimanjaro: the reports associated with this briefing note series.)*

Although these cooking methods are occasional rather than happening every day a week, they are still an important part of Tanzanian cuisine. In response to this and the general burgeoning awareness that appliance manufacturers have of the huge potential of the eCook market in East Africa, manufacturers are starting to offer other devices to importers and distributers.

SESCOM, who distribute EPCs through Dar es Salaam, has a new EPC which will have deep frying capability – this has the potential to increase the capacity of EPCs to cook even more of the Tanzanian menu.

Figure 2: *Air fryer with chips and chicken).*

In addition, SESCOM and some early adopters have been trying air fryers. Made up of just a heating coil and a fan, the experience of early adopters has been very positive in terms of air fryers being a great alternative to barbequing with charcoal or even deep frying. They are fast, clean, very convenient, and appeal to health-conscious end users for their lack of oil – though of course the cooked food is not the same as produced if deep fried, it is a very palatable alternative. The main feedback has been size – current samples are too small.

These two emerging products have the potential to provide an eCooking alternative for that part of the cuisine which has thus far not been accessible, and particularly the air fryer is a hit with those who have transitioned to eCooking, but who have so far continued to BBQ on charcoal.

COOKING IS AN INNOVATION ACTIVITY

As EPC use and uptake is growing, some of the users have come up with different innovative ways of utilising the EPC, and others explore social media channels to try new things. Some feedback has been very interesting. Users have tried to bake cakes, scones, and make chapati and chips. In Kilimanjaro three families reported trying to fry chips, although the result was not a crisp finish as expected when deep fried, and the chips were slightly soggy (they did not have the new upgraded SESCOM EPC that has a deep-frying mode).

In Morogoro two families reported baking scones using EPCs without using the small internal rack stand, which is the usual method for baking. The scones were baked directly in the pot with no rack, which worked, but halfway through they realised they had to turn the scone upside down to get the browning on both sides.

Cooks have also tested out cooking two dishes at a time. 'Pot-in-pot' cooking, inspired by Instant Pot's YouTube channel, proved to work well with meat and peas. The peas are placed in the EPC pot, the rack placed in the pot, and a second pot with the meat placed on the rack. It was found that if the two dishes to be cooked have different cooking times, it's simple to set a timer for the shorter dish, remove it after the allotted time, and then continue to cook the second longer dish.

Social media can be a great way for sharing innovative cooking methods, and this could be another area of future development to help cooks transition Tanzanian cuisine to energy efficient eCooking appliances.

SOCIAL MEDIA CAN BE A GREAT WAY FOR SHARING INNOVATIVE COOKING METHODS

REFERENCES

Bureau of Statistics, and Ministry of Finance. 2013. "2012 POPULATION AND HOUSING CENSUS: Population Distribution by Administrative Areas." Dar es Salaam.

Leary, J, N Scott, S Sago, A Minja, B Batchelor, K Chepkurui, and E Sawe. 2019. "ECook Tanzania Cooking Diaries." http://www.sussex.ac.uk/spru/research/projects/lct.

Ministry of Finance and Planning, and National Bureau of Statistics. 2020. "Tanzania Mainland Household Budget Survey 2017/18: Final Report." Dodoma, Tanzania. http://www.nbs.go.tz.

National Bureau of Statistics, and ORC Macro. 2005. "Tanzania Demographic and Health Survey 2004-05." Dar es Salaam, Tanzania. www.measuredhs.com.

SESCOM, Nexleaf, and TAFORI. 2021. "Piloting Innovative Business Models for Accelerating Uptake of Efficient Electric Cooking Appliances in Morogoro, Tanzania." Modern Energy Cooking Services Programme.

Jones, Tom, Nigel Scott, and Anna Clements. 2021. "A2EI Mini-Grid Cooking Diaries Data Analysis Bezi & Mavota (Tanzania)." Modern Energy Cooking Services Programme.

World Bank. 2022. "World Bank: Access to Electricity (% of Population) - Tanzania." Database. 2022. https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=TZ.

This briefing note is part of the 'Towards a Thriving eCook Market in Tanzania' series, published by TaTEDO and MECS as outputs of the 'Thriving Markets' project (2020-2022), funded by UKAid through MECS. Briefing note 5/7.

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This material has been funded by UK aid from the UK government; however, the views expressed do not necessarily reflect the UK government's official policies