



GENDERED DESIGN IN STEAM



Ojo,
Lagos State,
Nigeria

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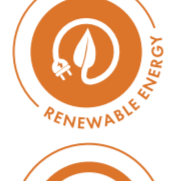
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Developing a hybrid fish dryer to improve processing for small-scale female processors in Lagos, Nigeria



In Lagos State, Nigeria, fish processing is a female-centric occupation dominated by traditional smoke-drying technologies that exhibit occupational hazards and fuel inefficiencies. Among fish processors in the small-scale fisheries sector, there has been limited success to introduce home grown technologies for adoption. Campaigns against the use of firewood and switching to charcoal have not been successful. Barriers to the adoption of improved fish smoking practices and sustainable energy use are influenced by cultural biases, socio-economic and psychological factors. Additionally, the energy crisis has added another barrier to the adoption of charcoal due to increasing costs. Based on the identified challenges, this project adopted a transdisciplinary approach conducting surveys and training workshops with fish processors, fishermen and other stakeholders to design a modernized fish dryer prototype and to evaluate the adoption of alternative biomass sources for fuel.



Dr. Abiodun-Solanke explaining the working of an integrated solar-biomass drying during the 2-day training workshop.

Outcomes

- Designed a functional modernized hybrid solar-biomass fish drying prototype. The prototype is made of two separate components; 1) a modern smoking kiln with a chimney and a charcoal pot in the smoking chamber (source of fuel: biomass), and 2) a parabolic dish solar collector with a fish drying chamber (source of fuel: solar energy). The modern kiln component is designed to use charcoal, gas and briquettes.
- Production of briquettes with charcoal fines, sawdust, and water-hyacinth obtained locally. They produced both carbonized and non-carbonized briquettes.
- Based on sensory evaluation, fish processors exhibited willingness to try briquettes as alternative biomass source to firewood. The briquette-smoked fish was indistinguishable from charcoal and firewood, which was a major factor in breaking the cultural barrier to using alternative biomass sources.



Top to bottom: Modern smoking kiln with charcoal pot in smoking chamber and chimney at the top; Parabolic Dish Solar Collector with Fish Drying Chamber open to show Copper Plate at the base.

Methods

- The team conducted a survey to assess the perceptions of small-scale fish processors to the adoption of fish drying technology in Lagos State. They surveyed 22 communities across 4 of the 5 divisions in Lagos State (Badagry, Epe, Ikorodu, Lagos) known for high level of artisanal or small-scale fishing activities. They surveyed 412 women fish processors.
- They then designed a hybrid fish dryer prototype which would combine both solar energy and biomass fuel to dry and smoke fish.
- Next, the team produced briquettes with charcoal fines, sawdust, and water-hyacinth obtained locally. They also analyzed the physical, chemical, microbiological, sensory parameters, and economical feasibility of briquettes.
- Lastly, the team ran a 2-day training workshop with 12 fish processors and 2 fishermen that focused on training and raising awareness on alternative energy sources. The first day involved smoking fish with the hybrid fish dryer prototype and briquettes, the second day involved a sensory test to evaluate the developed fish drying technologies.



Left to right: Water-hyacinth (*Eichhornia crassipes*) at the jetty on Ojo Creek, used for the production of briquettes; Picture of one of the first hybrid fish dryer prototypes combining both solar and biomass fuel in one component; Mixing of biofuel materials with cassava starch for briquette production.

"Fish processing in Nigeria is largely female-centric in the sense that women are the largest player in this value chain."

— Ayojesutomi Abiodun-Solanke

Lessons & Future Directions

- Peer-peer learning and 'influencers' among the fish processors played important roles in the social process of adopting briquettes.
- Adopting briquettes and smoking technology built on local skills will enhance well-being and contribute to sustainable incomes of small-scale fish processors.
- The team has planned a dissemination workshop to communicate findings to policymakers and the public in September 2022.
- The team is in the process of developing a low-cost modernized drum kiln designed the suit the circumstances and financial capacity of small-scale fish processors.

Learn more



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