

Nigerian bakeries need support to shift to clean energy, researchers say

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Many bakeries are unaware of the extent of deforestation linked to their ovens.
Credit: Hassana Sulaiman Salisu and Professor Tanimu Abubakar Salisu

Bakeries in Nigeria which use traditional open ovens fueled by hardwood cut from local forests are contributing to rapid deforestation

and climate change, according to a study from academics working in Nigeria and from the University of York and UCL.

Improved awareness of alternative energy sources, better training and policies to address the issue are now urgently needed, according to the researchers.

The study involved researchers from York, UCL and Bayero University Kano in northern Nigeria. The paper, titled "The forgotten bread oven: Local bakeries, forests and energy transition in Nigeria," is [published](#) in the journal *Regional Environmental Change*.

It examined bread production by commercial bakeries close to forested areas in the Nigerian states of Kaduna and Nasarawa, and Abuja, the Federal Capital Territory. It investigated the energy sources used, the communities who were engaged in the forest fuel trade, the changes to forests over time, and the factors that could enable bakeries to transition toward cleaner energy sources.

It found bakers often collected their wood directly from the forest, or purchased it from local female suppliers, or bigger wood retailers and wholesalers. Bakeries in Nigeria most commonly use African Birch wood, mainly due to its burning quality and easy availability. Charcoal and other local hardwoods are often used to fuel baking too.

The researchers worked together on an ambitious qualitative and quantitative study using mapping techniques, surveys, questionnaires, interviews and assessments of forest plots to complete the research. Remote sensing data looking across the three study sites shows declines in forest cover from 71% (56,157 km²) in 2000 to 49% (38,756 km²) in 2020.

Research lead author Abubakar Tanimu Salisu explained the work was

timely as the popularity of bread in Nigeria is increasing, but baking methods remain very traditional, with many bakeries being unaware of the extent of deforestation linked to their practices.

He said, "Most bread is baked in small scale, local and traditional ways. In fact, the process of baking bread in Nigeria has changed little over time. It is still baked in large masonry ovens, also known as black or Roman ovens, heated by burning wood, which is removed before the dough is put in to bake."

Energy shift

His colleague, Professor Aliyu Salisu Barau, explained it was vital that policymakers pay close attention to small scale industries in Nigeria. He said, "This research has allowed us to highlight the role of the baking industry in the deforestation challenge for the first time.

"And it is clear there is a compelling case for bakeries to shift to cleaner energy sources and technologies. Nigeria's Energy Transition Plan for achieving carbon neutrality by 2060, and its broader decarbonization strategies, currently misses these smaller industries."

Professor Lindsay Stringer from the University of York, explained there are both local and global impacts. She said, "This research is important because it provides clear evidence that bakeries are directly contributing to Nigeria's deforestation, as well as adding to both localized air pollution and to global [climate change](#). While [climate policy](#) tries to reduce the impact of household [energy use](#), the trends in energy use in small scale commercial premises are rarely considered."

There has been a push towards cleaner cooking stoves at a household level, but ovens used by micro, small and medium scale enterprises were being missed by the current policy, Professor Stringer explained. She

said, "This problem is getting worse despite three decades of policies discouraging biomass cooking in Africa. In fact, the use of local hardwoods and biomass fuels is actually increasing and with the United Nations predicting Nigeria's population will continue to grow at a rapid pace, it is clear policymakers need to act urgently."

By 2050 the United Nations estimates that Nigeria will be the fourth most populous country in the world, with a population of 375 million, roughly equivalent to that of the U.S.. Today, Nigeria is Africa's second-largest greenhouse gas emitter after South Africa, and its economy is heavily reliant on oil and gas exports, but domestically, biomass is by far the largest energy type consumed—accounting for 76% of energy consumption.

This reliance on biomass and firewood is a driver of deforestation within Nigeria, contributing to a nationwide 12% loss in tree cover since 2000 according to Global Forest Watch 2023.

Energy transition

There is some good news, as the research team has mapped out clear recommendations that support a clean energy transition.

Professor Rob Marchant, from the University of York, explained a transition to low carbon alternatives could have clear economic benefits too: "Research participants in our study sites indicated a willingness for their bakeries to shift to alternative, cleaner energy sources and technologies."

Professor Marchant added, "But more needs to be done to raise awareness of alternative energy sources, to train people working in the industry on how to replace fuelwood and charcoal, how to use the new technologies that shift will bring. It is important too that policymakers

consider the entire fuel wood supply industry from the forest to the fire, to support just and equitable transitions. There are multiple potential economic benefits from this transition, such as scaling production and associated efficiencies, so it makes sense to begin the process as soon as possible.

"It is vital that further research engages with bakeries and all the other stakeholders throughout the fuelwood value chain- including the women wood sellers and other groups whose livelihoods will be affected during the energy transition. Co-development approaches will help actions to reflect local bakery and consumer needs, while making sure other stakeholders' needs are addressed."

More information: Abubakar Tanimu Salisu et al, The forgotten bread oven: local bakeries, forests and energy transition in Nigeria, *Regional Environmental Change* (2024). [DOI: 10.1007/s10113-024-02194-8](https://doi.org/10.1007/s10113-024-02194-8)

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