

# Using a household energy technology to promote small scale enterprises in rural communities in Nigeria – The *egaga* stove experience

by Joe Obueh, Project Director, Centre for Household Energy and the Environment (CEHEEN), 54 Ngbeken Street, P.O.Box 1430, Agbor, Delta State, Nigeria. e-mail: ceheen@eudoramail.com

## Introduction

Nigeria, today, is reputed to be the tenth largest country in the world. Demographic data put 80% of the population as living in the rural communities, leaving the remaining 20% in the few urban centres that are already bursting at the margins.

Originally, Nigeria could boast seven distinct ecological zones; in the south, distinct regions of mangrove forest, fresh water marshland, mountain vegetation and rainforest, and moving into savanna regions comprising mainly grassland in the northern fringe. Today, the advancing desert and deforestation is continually pushing the limits of the derived savanna- the interface between the arid land and the forest belt- further into the rainforest region.

Forests and woodlands are estimated at 9.6 million hectares, representing 16% of the total land cover. This supplies two-thirds of the total energy need of Nigeria's household energy sector put at an equivalent of 263kg of coal per annum. The energy requirement is predominantly met by fuelwood, which supplies 80% of the total demand. The remainder is met by: kerosene 10%; LPG 4%; charcoal 3%; and other biomass 3%.

However, increased dependence on fuelwood, coupled with other unsustainable activities such as commercial logging, forest fires, massive urbanization, population pressure and desertification cumulatively created an annual deforestation of 450,000 hectares in the 1980s. Today, the country's forest reserves are put at only four times the annual consumption of fuelwood.

## L'utilisation de technologies pour l'énergie domestique afin de promouvoir les petites entreprises dans des communautés rurales du Nigéria : l'expérience du foyer *égaga*

La déforestation rampante au Nigéria a conduit au développement du foyer 'égaga' qui permet de conserver jusqu'à 60 % de la chaleur tout en étant approprié aux besoins des populations. Au total, 3274 foyers améliorés *égaga* ont été diffusés. Une autre innovation est la production de briquettes à partir de résidus de charbon de bois permettant des économies d'énergie pouvant atteindre 40 %. Ces deux technologies tendent à favoriser le développement de nouvelles entreprises. Un programme à l'échelle nationale pourrait être lancé.

To reverse this trend, the Centre for Household Energy and the Environment embarked on a two-year study into household energy situation in Nigeria with key emphasis on environment, health, gender and poverty. The two communities selected were; Oghara – a typical rural community, and Benin – a peri-urban community. Both are located in the rain forest ecological zone in the southwest Nigeria.

## Rural poverty and household energy in Nigeria

In the survey, encompassing 1270 individuals out of a population of over 8000, the reasons for so much dependence on biomass were cited as follows:

- Poverty was cited by 78% as the main reason; attributing this trend to lack of jobs, caused by the absence of small scale enterprises.
- Deforestation was identified by 12% as a major problem, where the loss of forest cover to subsistence agriculture and commercial logging operations is exacerbated by further extraction for fuelwood
- Cultural beliefs were mentioned 8% – these have to do with taste and preserving of

food, which they say is better when cooked with biomass, especially firewood.

- Only 2% of the respondents had no idea of the issue.

## The promotion of the improved energy-efficient *egaga* stove

The technical team suggested an intervention that:

- struck a balance between the short term welfare needs of the rural poor, whose livelihoods depend on access to the available forests, and the need to protect their health
- is helping to save fuelwood, and protect local biodiversity, in indigenous communities where strong cultural traditions and age-old conservation techniques rule the day;
- has a significant and measurable positive impact on the quality of life of resource-poor people through job creation, the emergence of small scale enterprises and improved health

*Egaga* is a local device used to support cooking pots over traditional open fires in parts of rural and urban Nigeria. Identifying the need to accommodate people's traditional beliefs, CEHEEN chose

a compromise which provided new, visible, significant advantages and also maintained key factors associated with smoke, tastiness and preservation of food. As an improvement on the crude tripod *egaga*, which is usually supported by stones, and into which can be fed uncontrolled amounts of fuelwood, the team developed a variant semi-enclosed *egaga* metal stove (Figure 1), which conserves up to 60% of the heat hitherto dissipated, while using limited



Figure 1: The CEHEEN improved *egaga* stoves

amounts of fuelwood. Before final adoption, two existing stove models were tested against the improved *egaga*: the fixed mud stove, and the conventional tripod *egaga* stove (Figure 2). The tests were based on; durability; portability; thermal efficiency; emission reduction; affordability; and replicability. In the test, the improved *egaga* scored above the other two models used in every way. While it took the improved *egaga* a record time of 12 minutes to bring 4 litres of water to boiling point, it took the fixed mud stove and open fire 18 and 19 minutes to perform the same task.



Figure 2: Cooking tests

Further tests comparing the improved *egaga* with the charcoal and sawdust stoves showed the improved *egaga* performed better than the sawdust and charcoal stoves in relation to environmental, emissions and cost-benefit criteria.

So far, a total number of 3,274 improved *egaga* stoves have been disseminated in the first phase of the pilot project in the two communities. The emergence of small scale agricultural and economic activities have been on the increase since the *egaga* stove promotion started in early 2000.

### Bringing small-scale businesses to the rural poor with the improved *egaga* stoves

One visible advantage that the beneficiaries of the improved *egaga* seem to be enjoying is the stove's potential in boosting people's spirit of enterprise. Every stage of the improved *egaga* stove production involves manpower in both formal and informal sectors. A socio-economic impact assessment revealed that since the dissemination of the improved stoves in the two pilot communities, up to 60% of the people have directly and indirectly gained employment.

Following a training programme organized by the centre for some women's group, six fabrication workshops have now been set up. In one of the workshops in Benin, a fabricator is making 3 to 4 stoves daily providing a monthly income of US\$196 (~24000 Naira).

As a way of further reducing fuelwood used in cooking, the technical team of CEHEEN introduced a simple technology that upgrades spent charcoal to briquettes, which can be used on their own, or burnt alongside fuelwood inside the same improved *egaga* stove. Training involves making hand-compressing presses, and mixing and applying binder to the ground charcoal dust. A study has shown

that the technology is capable of saving up to 40% of fuel used per cooking task. One particular cooperative group started commercial production of charcoal briquettes, which they are selling in the local market. Three workshops have now been set up, by some business-minded young men, for manufacturing simple hand presses for compacting briquettes. Such hand presses are now common wares in the community market. The real impact of these initiatives will manifest when the nation-wide intervention programme commences.

### Conclusion

The majority of the people who depend on biomass fuels for domestic energy are poor, so any intervention approach should aim at using the opportunity to improve the livelihoods of the beneficiaries.

One way forward is to ensure that the programme includes opportunities for economic empowerment. An improved stove programme can therefore be considered strategic to poverty alleviation as it provides income-generating opportunities, as well as providing linkages that enhance rural development. The improved *egaga* stove project is in its second year, and initial funding has been made possible by grants from the U.K based Ashden Trust for Renewable Energy and the Whitley Awards Foundation.

### References

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*Joe Obueh is the project director of the Centre for Household Energy and the Environment (CEHEEN). He is involved in a number of household energy projects, and has specific interest in gender, poverty alleviation, renewable energy and energy research issues.*