

**Kellogg-Kroc Undergraduate Research Grant
Project Report**

Fuelwood Production and Consumption in East Africa

Mary Feighery

In many lesser developed regions, the only cheap and efficient energy sources available are often unreliable. East Africa is one such area where the population must rely heavily upon such erratic energy supplies. Charcoal burning is one method many people use for cooking, heating, and for other production methods. Through this project, the researcher hoped to better understand the production and consumption processes of charcoal that are utilized in East African communities. By researching the use of charcoal in both urban and rural settings, the researcher hoped to get a rounded view of the implications that arise from the use of this energy source. The researcher also sought to understand the environmental effects of charcoal use and how the population of these areas is affected. Finally, the researcher sought to understand how available other energy methods are in East Africa and how these sources are implemented in such low income areas.

The researcher began her research in Kampala, the capital of Uganda, by learning about Uganda's environmental policies and by looking at past research done regarding charcoal and firewood use. 'Fuelwood' is the term used in East Africa to describe firewood and charcoal as used for energy purposes. It is also the energy source that is most used in Uganda, and in other developing countries. The National Environmental Management Authority, or NEMA, in Uganda helped the researcher to better understand particulars regarding the widespread use of charcoal and firewood. NEMA's library contains information regarding cookstoves, efficient wood burning methods, deforestation, and the global energy crisis. It also has extensive

information regarding environmental policy and laws in Uganda. For three weeks, the researcher sought to gain background knowledge of how and why charcoal and firewood are used as the main energy sources in many developing countries.

For the next three weeks, the researcher traveled to Kalebezo, a rural village near Mwanza, Tanzania. The village is situated adjacent to Lake Victoria, in a hilly area inhabited mostly by subsistence farmers. Due to the rural, impoverished nature of the area, people often use the cheapest energy sources available, which are firewood and charcoal. Most of the times, women collect firewood from the hills, and so do not have to pay at all, except in their personal labor of gathering the wood and bringing it home. A more expensive method is using charcoal, which is made in the hills. Charcoal burning, which is the process of turning trees into charcoal, is actually an illegal process in Tanzania and in other parts of eastern Africa, and so those who burn charcoal must do so surreptitiously. The researcher was able to go into the hills near Kalebezo and witness the charcoal burning process, which is against the law because of the huge problem of deforestation that many countries are facing. A huge number of trees are burned to satiate the widespread demand for charcoal, and communities do not replant as many trees as they should to replenish the supply. In one area the researcher visited, some villagers guess that charcoal can only continue to be made in some areas for about ten years, due to the rapidly depleting forests.

By observing the process of charcoal burning firsthand, the researcher was able to better understand some of the difficulties involved in such widespread charcoal use. First and foremost, the process heavily affects the woody biomass supply in these areas because the numbers of trees that are cut down are not reflected in the number that are meant to replace them. Also, the burning process can be very harmful to a person's health. When the wood is finished burning and

charcoal is made, thick black smoke is often released into the air and inhaled by people in the area. Local people know of many others who have had lung and throat problems, and also have gotten severe burns. These chronic illnesses often result in death because of limited health resources in rural areas.

The researcher's close observation of charcoal practices was both rewarding and challenging. It was thrilling to be able to see the processes and understand exactly how they are carried out, and especially to see how charcoal is burned in the bush. It was also very rewarding to interact with local people and to learn directly from them about traditional practices. The experience was also very humbling in that the researcher realized just how much she did not know, and because she learned that books cannot teach you everything there is to know about a particular subject. It was amazing to witness such an important traditional practice with the help of local translators. Such observation was also emotionally challenging because the researcher struggled to balance the conflicting notions of important traditional practices that can lead to so much human and environmental harm. It was also sometimes difficult for local translators to explain exactly what people were saying in a way that the researcher could understand. Another problem in the explanations was that the researcher was so unfamiliar with the burning process in general that it was difficult to understand concepts that were natural for the locals to understand.

For the rest of the time spent in Tanzania, the researcher learned about different types of cookstoves available and about the use of solar power in rural areas. She studied the *Handbook of Cookstoves for Tanzania*, by Janet M. Hackert, and was able to learn all about deforestation in Tanzania and the use of more efficient cookstoves to conserve trees, energy, and personal resources for residents of Tanzania. Although this particular book is directed specifically at

Tanzania, many of the ideas and practices can be applied to other nations in similar situations, particularly Uganda and other East African and developing countries. The researcher also interviewed Sr. Peg Donovan, an American Maryknoll missionary who has been living in Tanzania for 37 years and works with the local population. Sr. Peg's house and the school she runs are powered by solar energy, which helps to introduce the concept in rural areas and show its success. She explained that, although the initial cost is large, there is low maintenance for the equipment and it can last for a long time. The panels are very durable and successful in powering homes. The main difficulty involved with using solar energy in poorer places is that people cannot afford the initial costs involved, even if the energy is reliable and renewable. Still, the concept of renewable energy is not so far-fetched; grants can be given to villages to help them with the start up costs, and some governments are beginning to look in this direction to help deal with the problems of pollution and deforestation.

During the final three weeks of research, the researcher was able to perform follow-up research in Uganda. The researcher was able to travel to Mbale, a town in Eastern Uganda, to learn about charcoal production in a smaller region. Subsequent interviews showed that the process was very similar to what she observed in Tanzania. The researcher also interviewed members of NGOs, Makerere University faculty, and two fuelwood vendors in markets around Kampala. From NGO workers, the researcher learned about pollution created from charcoal use. These findings were different from what she had expected, because she learned that the effects of charcoal use are not a huge concern because there are so many other factors that cause extreme pollution levels in today's society, particularly from the modes of transport used. She also learned about the Mabira Forest strikes, which were in protest to the government's plan to sell areas of the forest for development, which would result in further deforestation. Faculty at

Makerere University supplied information regarding the government's National Biomass Study, which analyzed consumption levels of different fuels used in Uganda.

Finally, the researcher interviewed two fuelwood vendors, which proved to be a rather difficult task. Firstly, the vendors were hard to find because the researcher did not have sufficient local knowledge. Secondly, although a translator was employed, it was difficult to explain exactly what information the researcher required, and it was also difficult for the vendors to correctly convey the information they wished to supply. Ultimately, though, the researcher was able to grasp a good understanding of the role such vendors play in the continued use of charcoal and fuelwood in Uganda's society. These interviews showed how important charcoal use is to citizens of large cities, and how it is not just a rural phenomenon.

Through such extensive research, the researcher was able to obtain an adept view of the implications created by the use of fuelwood in developing countries. The researcher also was able to successfully understand the environmental effects of charcoal use and how the population of East Africa is affected. Finally, the researcher briefly examined the availability of other energy methods in East Africa and how these sources can be implemented in such low income areas. Overall, the researcher was very successful in undergoing different research methods in order to gain a complete grasp of fuelwood practices in Uganda and Tanzania. Hopefully, this information can be used to try to create more efficient cookstoves and to possibly implement more sustainable sources of energy in these areas.