



CleanAirSIG e-conference:

16 – 27 July 2007

**“Taking ACTION to rid the world of Indoor
Air Pollution”**

Status: Draft

IAP Monitoring in a Refugee Setting: The Experience of Gaia
Association at Kebribeyah Refugee Camp, Eastern Ethiopia

Fiona Lambe – Gaia Association

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Mother and child take part in stove use training

Background

Based on the success of an initial pilot study, Gaia Association, a registered Ethiopian NGO, was formed to work as an implementing partner to the UNHCR-RLO in Ethiopia, with the objective of fully supplying Kebribeyah refugee camp with ethanol fuelled CleanCook (CC) stoves. This scale up is partially financed by the UNHCR, and partially by donor funding sought by the Gaia Association. As of December, 2006, the Gaia Association had placed approximately 800 CC stoves to households at the camp. Ethanol is supplied regularly (every ten days) to each of the participating families.

Kebrebeayah Refugee Camp, established in 1991, holds approximately 17,000 Somali refugees representing various clans. The population of the camp continues to rise steadily due to the recent conflict between Ethiopia and Somalia. Upon arrival at the camp, refugees typically receive a basic ration kit containing food and some basic materials. This kit does not include cooking fuel, so refugees are forced to rely solely on fuelwood for gathered from the areas surrounding the camp for their cooking needs. Prolonged exposure to IAP from burning fuelwood indoors has a detrimental impact of the health of refugee women and children. Addressing the problems associated with fuelwood gathering is paramount to improving the lives of refugees in the UNHCR Kebrebeayah Camp.

The introduction of the clean cooking technology has replaced the use of fuelwood for cooking among participating households, a change which has brought far reaching benefits to these families.

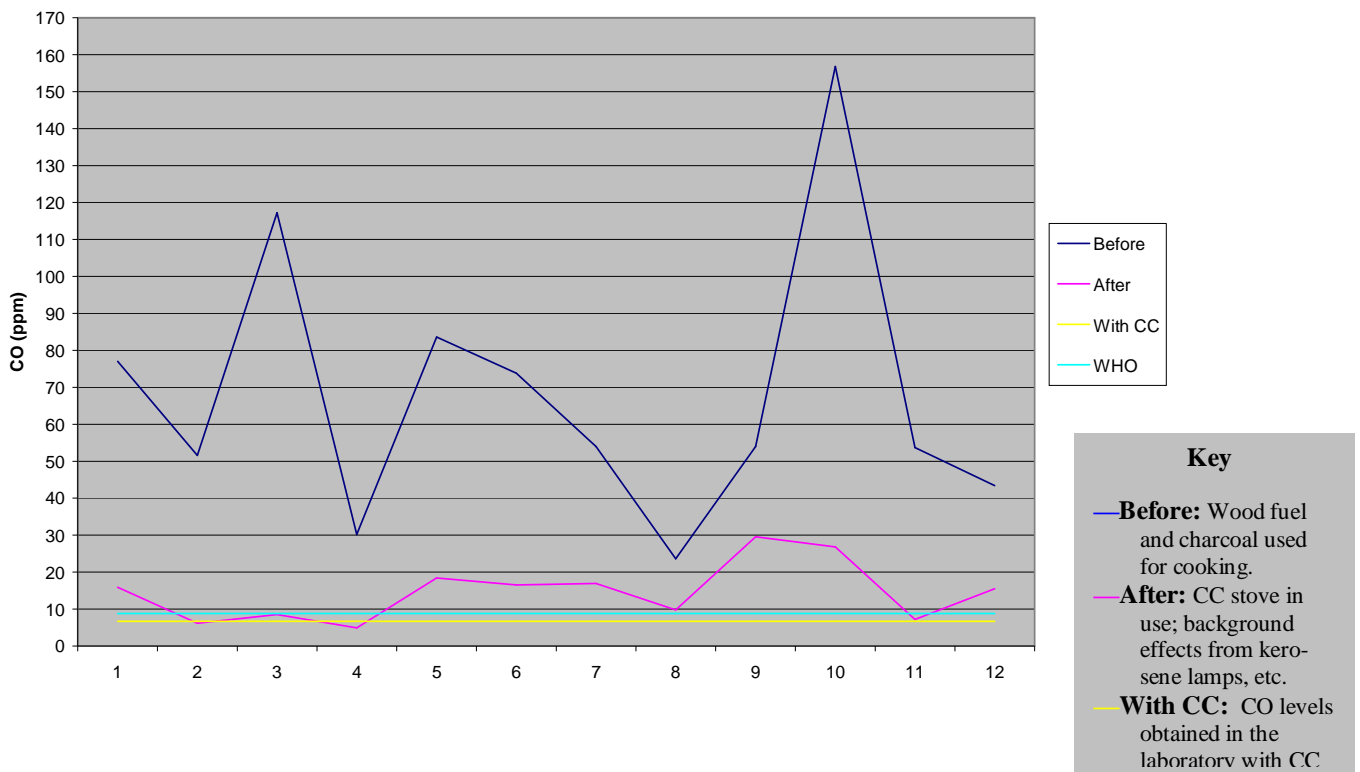
IAP Monitoring at Kebribeyah

Gaia Association, under the guidance of University of California Berkeley’s Center for Entrepreneurship in International Health and Development (CEIHD), commenced IAP monitoring at Kebribayah in 2006. To date, a total of 12 before and after (prior to and following the introduction of the ethanol fuelled CC stove) samples have been collected in 12 households at the camp. Levels of Particulate Matter (PM) and Carbon Monoxide were measured using UCB and HOBO monitors respectively.

Since ethanol burns cleanly with no smoke, the introduction of the CC stove and ethanol has removed the smoke from the cooking shelters associated with refugee households. Results show that the CC stove significantly reduced the levels of CO and PM to within the recommended WHO standards (see graph below illustrating CO reductions).

Average of CO (carbon monoxide) test in 12 households

Kebribeyah Refugee Camp IAP Test



The Benefits of IAP Monitoring

Air quality monitoring is an integral part of the overall energy program at Kebribeyah camp as it provides quantitative evidence of the efficacy of our intervention and, consequently, strengthens our case for an accelerated scale up of stoves at the camp. Impressed with the positive data generated, the UNHCR has more than doubled our annual budget for stove purchases to Kebribeyah and has emerged as a vocal campaigner for our project.

Challenges and Lessons Learned

IAP monitoring at Kebribeyah is not without its problems, both technical and logistical. The instruments used were designed for monitoring fuelwood smoke emissions, not ethanol emissions with the result that, although burning ethanol does not produce PM, the UCB monitors still recorded PM in the “after” study (after the introduction of the CC stoves). With some assistance from CEIHD, this problem was easily resolved by altering the particulate coefficient on the UCB monitor. The Gaia team has recognised that many controls are needed in order to compile quality data since outside factors (e.g. burning kerosene lanterns indoors, smoke from neighbours’ homes, etc.) can distort air quality readings.



IAP equipment installed in cooking area



**Infant exposed to fuelwood smoke
in cooking area**

Although the Gaia team has demonstrated conclusively that the introduction of the ethanol fuelled CleanCook stove reduces levels of CO and PM in Kebribeyah households, it remains a challenge to link this reduced exposure to an improvement in household health. Large scale health studies are expensive and time consuming, and may be inappropriate in a refugee setting. The challenge is thus, how to use the gathered IAP data to say something conclusive about household health in Kebribeyah.

Some difficulties were encountered while surveying refugee households. For example, it was found that the post monitoring survey was in many ways, not appropriate for a refugee population as many of the questionnaire sections were irrelevant. Gaia Association is considering a revision of the survey material to better suit the refugees' lifestyles and camp conditions.

More generally, the Gaia team has learned the importance of education and awareness raising during IAP monitoring periods. Households were often confused or threatened by the data collection process and the installation of unfamiliar equipment in their homes. We are working to strengthen the educational component of the IAP work to ensure a thorough understanding of the monitoring process and the rationale behind it.

We are constantly seeking new ways of enhancing community participation and interest both in the IAP work and in the stove scale up. We believe that the refugees themselves must drive this project forward to ensure sustainability of the program in Kebribeyah and must therefore be included in every stage of the process.