

## Summary of a Comparison Study of Three Cooking Methods in a Bhutanese Refugee Camp

Since 1998 has Dutch/Nepali foundation Vajra been providing parabolic solar cookers to refugee groups in one of the seven refugee camps of Bhutanese refugees accommodated in Nepal. By 2005, almost 75% of the population of the camp had been offered the opportunity to use solar cookers (VFN, 2004). Ralph Lindeboom and René Goverde, students at Utrecht University, wrote a report, "Towards Sustainable Relief-Assistance: Applicability of the sunny solution," to discuss the success of this solar cooking project.

Bhutanese refugees traditionally cook with firewood over a small clay stove built over a pit, called a chula. The United Nations High Commission for Refugees (UNHCR) has promoted the use of kerosene stoves among the refugees to reduce local deforestation. A parabolic solar cooker called the SK-14 has recently been distributed one for each two or four families to complement the other cookers along with a haybox, built from bamboo and plastic, to keep food warm until meal time.

The report conducts an environmental analysis of all three ways of cooking, looking at expense, energy efficiency, resources consumed, and carbon dioxide released. The refugees' attitudes and acceptance of each method were also examined.

The data showed that solar cooking, even assuming the need for a kerosene backup stove 45% of the time, was 43% more energy efficient than the kerosene stove and 89% more energy efficient than the chula. Overall, in fact, using this solar cooker reduces about half the environmental impact compared to the kerosene stove when considering energy use and carbon dioxide emissions.

Since the refugees gather their own wood, the out of pocket costs for cooking over firewood are zero, while the expense for the UNHCR per meal was found to be 7.6 € on the kerosene stove and 4.4 € on the solar cooker. This shows the financial advantage to using even a relatively expensive parabolic solar cooker.

Analysis of the refugees' responses to questionnaires showed a slight preference for the kerosene stoves, mostly because they require less effort than either of the other cooking methods and the users did not have to share kerosene stoves with other families.

The final analysis combined all data and demonstrated a clear advantage to the solar cooker. Currently, improvements to the project, such as expanding the number of cookers available and reducing the cost of the parabolic panels, should further encourage the use of solar cookers in the refugee camps.