

# **SOLAR COOKER PROJECT**

## **EVALUATION**

Iridimi Refugee Camp, Chad

*October 2007*

*The evaluation team appreciates the willingness of the women of the Iridimi refugee camp to speak openly, share their experiences and express their opinions about solar cooking.*

*Gratitude goes to the Tchad Solaire team for their assistance in arranging the logistics for the evaluation.*

**Solar Cooker Project Evaluation report prepared by Brie Loskota**

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*Woman wind-proofing her solar cooker with tether and stone in Iridimi refugee camp*



*Solar cooker and heat-retention baskets*

## **Executive Summary**

Women and girls who live in the Iridimi refugee camp in Chad face attack and rape by the local population, bandits, and the Janjaweed militia when they leave the camp to gather firewood for their cooking needs. In 2005, “CookKit” solar cookers were introduced in the Iridimi camp as part of an effort to reduce reliance on firewood and in turn improve the safety of the refugee women by lessening the need to leave the camp to collect wood. In October of 2007, a team of 15 people from eight organizations conducted an evaluation of solar cooking in the camp. The evaluation was undertaken over five days and included interviews with 121 refugees. The team assessed the demographics of those who use the solar cookers, the advantages and the challenges of solar cooking, and the overall effectiveness of the project in the camp. Below are key findings from the evaluation process:

- Women are the primary users of the solar cookers.
- Most solar cookers are used by families of three to eight members, using two to three cookers.
- Solar cookers are capable of cooking the customary food that would have been made with a wood-burning stove in the past.
- Very few women still use a three-stone fire, which represents a significant shift in previous cooking practice.
- Since the cookers were introduced, food rations are rarely sold or exchanged for firewood.
- Solar cooking provides low-maintenance food preparation and allows for increased time to do other tasks and activities.
- Solar cookers are safer than wood-burning stoves, which can burn the women who use them as well as unattended children.
- Health issues related to smoke produced by a fire, such as coughing, running noses, and eye irritation, are reduced.
- Solar cooking is slower than wood-burning methods and requires advance planning.
- Weather, primarily rain, can affect the ability to use the cookers, as well as their lifespan—currently two to three months. However, new cookers with added weather protection features are reported to last longer.
- Before solar cookers, many women left Iridimi every day or every other day to collect firewood; since solar cookers, outings from the camp have been reduced by 86%.
- Solar cooking, and the resulting reduced reliance on firewood, has improved personal security and safety, as well as reduced conflicts with neighbors over resources.
- Many respondents requested more cookers and pots, especially those with larger families.

## **Solar Cooker Project Background**

In 2004, Derk Rijks, PhD, a volunteer for a solar cooking organization known as KoZon, trained fifteen women in N'Djamena, Chad, to solar cook. In 2005, after receiving approval from the United Nations High Commissioner for Refugees (UNHCR), he returned to Chad to start a solar cooker demonstration project at the Iridimi refugee camp, one of the camps hosting Darfuri refugees. The camp is home to 17,587 refugees who rely on traditional firewood-burning cooking methods to meet the food needs of their families. However, firewood in Iridimi is scarce and refugees are forced to leave the relative safety of the camp to collect wood, exposing them to rape and attack by the Janjaweed militia, bandits, and the local population which resents having to share its meager wood resources with thousands of refugees.

The CookKit, a low-cost panel cooker developed by Solar Cookers International (SCI), was introduced in Iridimi in 2005 to combat the need to travel outside the camp and risk attack as well as to alleviate the need for scarce firewood. Marie-Rose Néloum, who had been trained in solar cooking in 2004, joined with Rijks to train refugee women to use the solar cookers. An NGO, Tchad Solaire, was formed to run the solar cooking operation on the ground in the Iridimi camp, and to expand the program to other camps. Jewish World Watch, brought into contact with KoZon through long-standing partner SCI, began to support this work in May 2006 and soon became the primary financial supporter. JWW continues to play a role in the project administration and oversight as the North American coordinator of the project. To date, more than 15,000 solar cookers have been distributed in the Iridimi camp, at least two for every family, with more to larger families.

Currently the project is supported by Jewish World Watch, USA; Solar Cookers International, USA; Stichting Vluchteling, The Netherlands; The UN High Commissioner for Refugees, Switzerland; Stichting KoZon, The Netherlands; Tchad Solaire, Chad; Agrometeorological Applications Associates, France.

## **Evaluation Methodology**

In October 2007, representatives from KoZon, Solar Cookers International, Jewish World Watch, Tchad Solaire, Bureau Consult Internationale, the Chadian Ministry of the Environment, the environmental unit of the United Nations High Commissioner for Refugees (UNHCR), and CARE International undertook a five-day evaluation of the effectiveness of solar cooking in the Iridimi Refugee Camp (see *Appendix I: Evaluation Staff Roster*). The evaluation staff was divided into four teams made up of four to five members and the teams conducted interviews throughout the camp. The camp itself is divided into 10 zones with 49 blocks; each team visited several zones over the course of the evaluation so that some zones were visited multiple times though the same blocks were not.

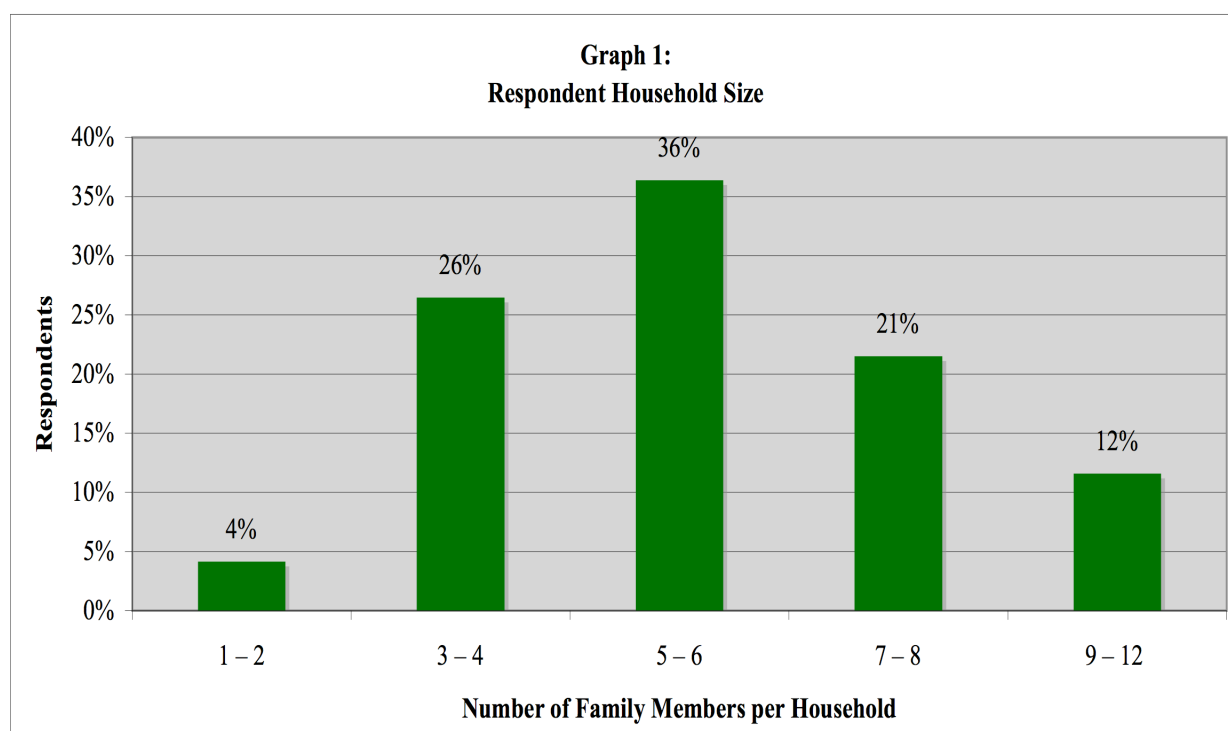
The evaluation team conducted 121 in-person interviews. Respondents included 119 women and two men. Respondents were selected at random during the teams' visits to the camp zones and asked to participate in an interview about solar cooking. No one approached declined to be interviewed by any of the teams. The interviews were conducted in the homes of the

respondents in either Arabic or Zaghawa and translated into French or English for the evaluation teams. The evaluation teams recorded extensive field notes during each interview; the process lasted between 30-45 minutes.

The interviews were comprised of ten qualitative and quantitative questions meant to assess the impact of solar cooking in the camps, illuminate the demographics of those who use the cookers, and understand the benefits and challenges of the Solar Cooker Project in the Iridimi camp (see *Appendix II: Key Questions for Solar Cooker Evaluation Interviews*).<sup>1</sup>

## **Findings**

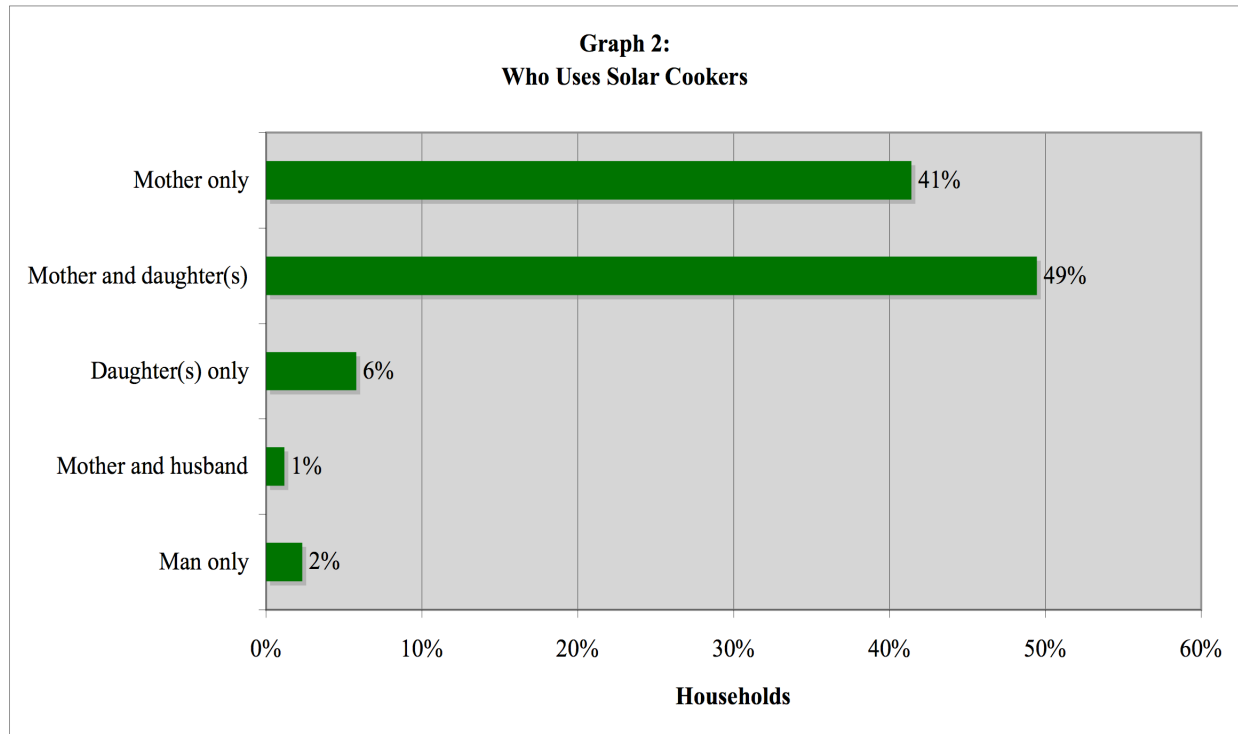
The solar cookers, also called CookKits, are meant to serve the cooking needs of the families in the Iridimi camp and reduce the use of and reliance on wood-burning cooking methods. Respondents who use the cookers are members of households ranging from a single individual to more than twelve people in size. Most solar cookers are used by families of three to eight. See *Graph 1: Respondent Household Size*.<sup>2</sup>



<sup>1</sup> Interview participants were asked every question, though respondents did not always answer each question. The results reported are based on the total responses received for each question but do not always equal the total number of interviews (121 interviews total).

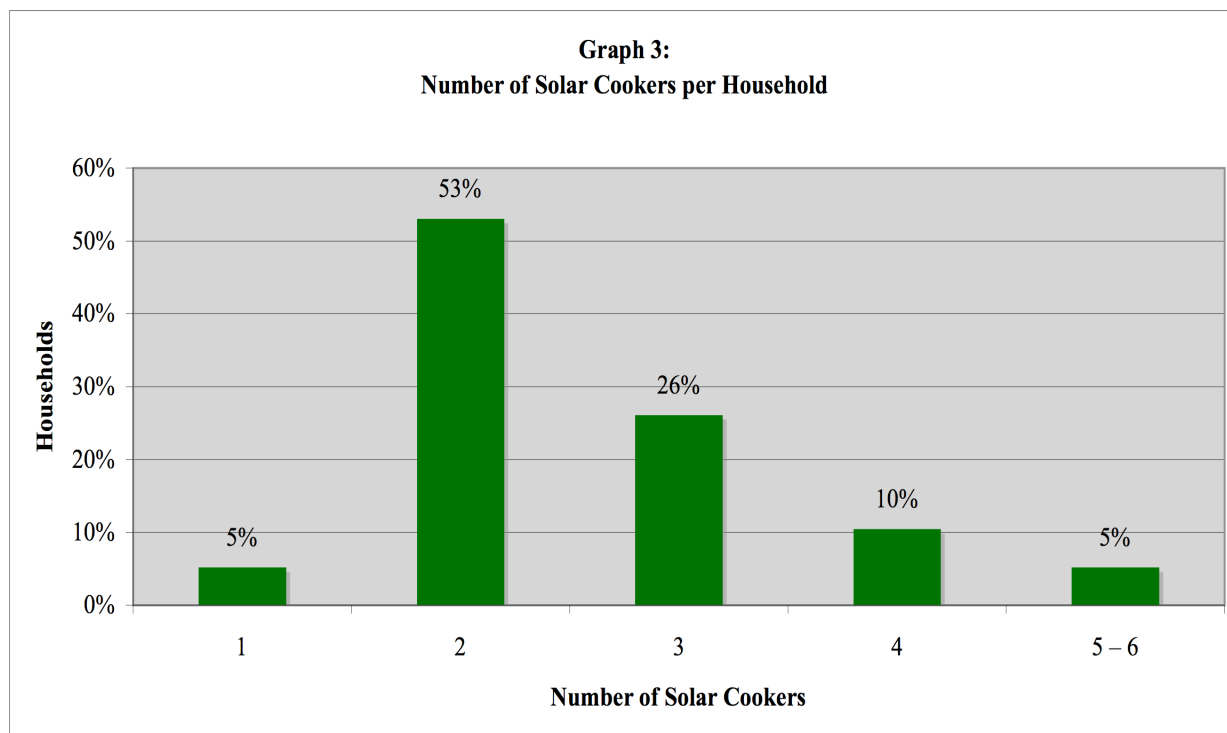
<sup>2</sup> The graph values are rounded to the nearest whole number percent and thus some graphs total slightly above or below 100%.

Women are the primary users of the CooKit cookers. The cookers are used almost exclusively by mothers, or mothers along with one or more of her daughters. The two instances in which men are the sole users, both are widowers and have no additional family. See *Graph 2: Who Uses Solar Cookers*.



Most households have two to three solar cookers available for their use. Those with four or more cookers often have one or more daughters who have also been trained to use the cooking tool and received an additional CooKit. See *Graph 3: Number of Solar Cookers per Household*.





### ***Utilization***

All of the respondents use the solar cooker to meet the cooking needs of their families. The respondents all indicated that they could use the CookKit for all of the food preparation they would otherwise prepare with a wood-burning stove. Respondents were universally satisfied with the training they received in the use of the cookers and were appreciative of the training staff's continued support. Those who needed assistance after training found that their needs were generally met, though one noted being dissatisfied with the speed of service with which she was provided.

Using the CookKit, individuals are able to prepare the variety of foods they are accustomed to cooking. Respondents use cookers to make rice, macaroni, *la boule* (traditional millet or maize-based meal), *la bouillie* (porridge), millet, wheat, beans, lentils, yellow peas, sweet potatoes, meat, sauces and tea. Some noted that they had trouble cooking *la boule* and *les beignets* (pancakes).

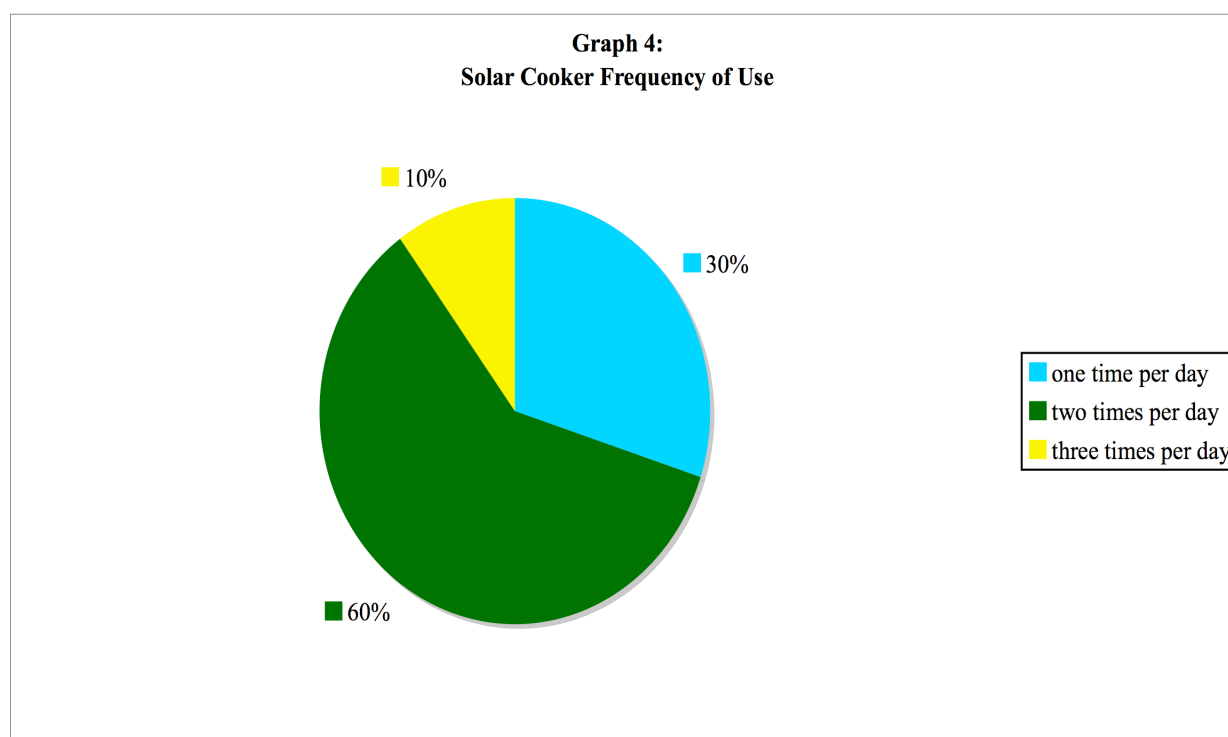
In addition to the CookKit, 95% of respondents also use the improved “Banco” (mud) stove.

The “Save 80,” an improved stove that uses twigs and is made of stainless steel, saves up to 80% of firewood. Though not widely available, it has been distributed to families of five or more and is used by those 42% who have access to it.

Very few women still have and use a three-stone-fire, which represents a significant change in traditional cooking habits.



Solar Cooker use is highest before the middle of the day when almost all women use the cookers for the midday meal. This meal mostly includes beans, lentils or yellow peas. It is noteworthy that solar cooking is used for these foods, which would otherwise require a lot of wood in order to cook. Breakfast is prepared with the Banco and Save 80 stoves. The evening meal is most commonly cooked using a combination of Banco and Save 80 stoves (80% use) and the solar cooker with its heat-retention hay-basket (20% use). *See Graph 4: Solar Frequency of Use.* Those who use the solar cooker for the evening meal use it in combination with a heat-retention hay-basket to keep the food warm. These baskets have been distributed to about 25% of the refugees to date.<sup>3</sup> Additionally, the CookIt is used for making tea, often multiple times a day.



Solar cookers are used regularly, and many indicated their desire for additional cookers with corresponding pots. Several respondents noted a common sentiment: “We can do all the cooking on the CookIt, and if we had another CookIt, then we could use our improved wood stove less.” Respondents with larger families (six to eight members) also commented that they are in need of additional cookers and pots to ease the burden of cooking for such a large group.

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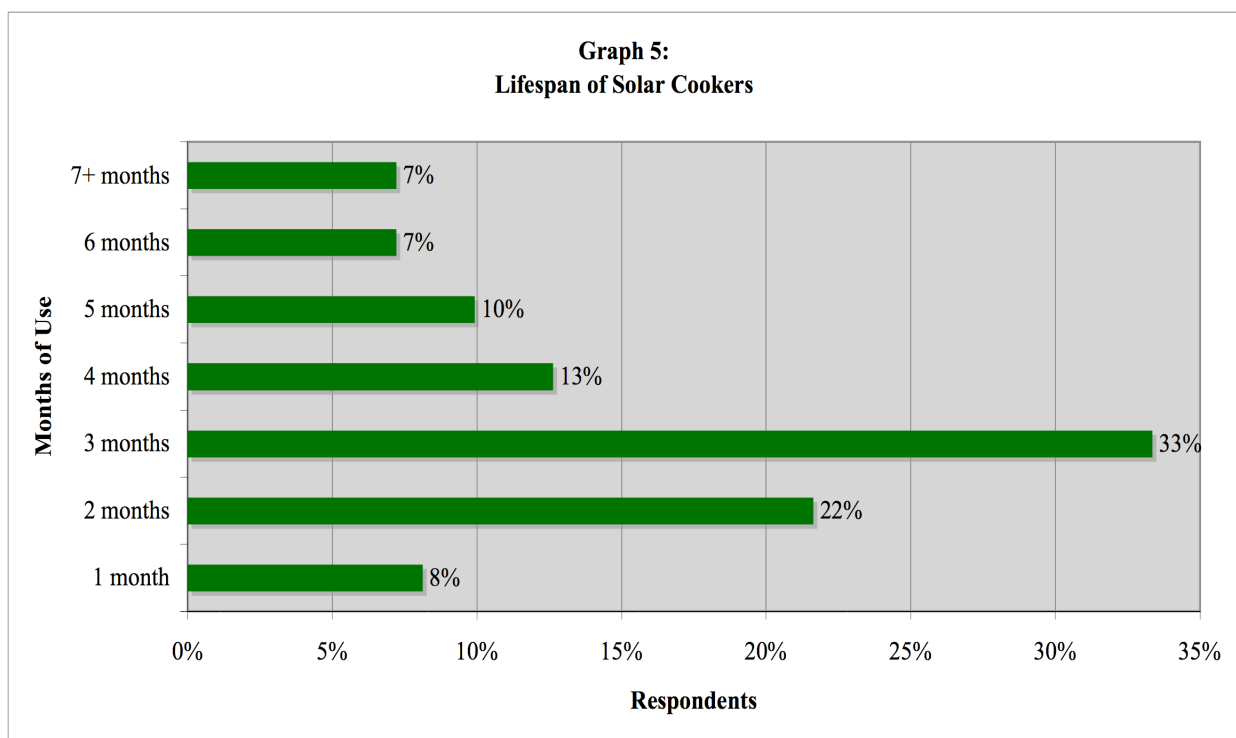
<sup>3</sup> It is reasonable to expect a rise in the use of the CookIt for the evening meal as the distribution of hay-baskets increases; with the ability to maintain the warmth harnessed by the CookIts earlier in the day until a later meal time, reliance on the alternative stoves for evening meals can decrease.

### Observations

While the benefits of solar cookers were universally appreciated, respondents were also asked to describe what challenges they associated with its use. Cooking meals with the cooker is time consuming and 25% of respondents expressed concern about their ability to prepare a meal in a timely manner when unexpected visitors arrive. Only two women noted that using the cookers requires patience and they had to wait longer for their food.

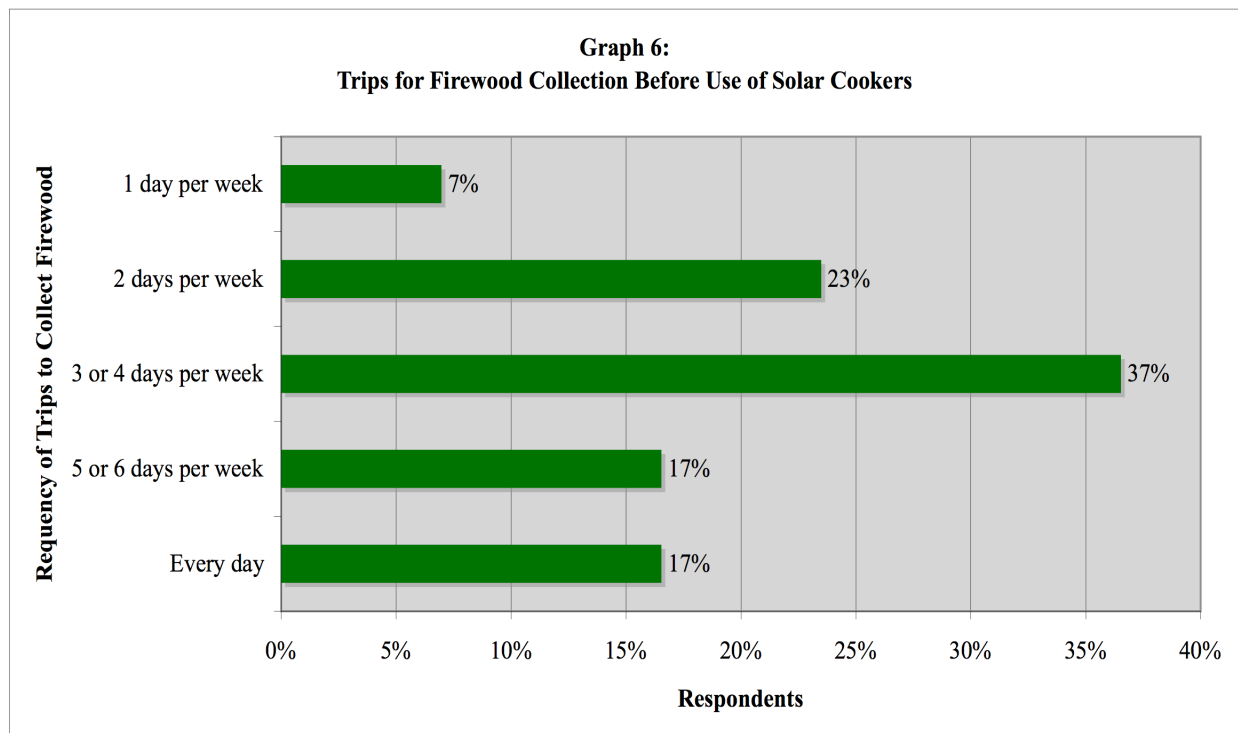
Weather can also impact two aspects of solar cooking:

- Strong winds, rain, and dust storms may inhibit the use of solar cookers. However, many women reported that the recent rainy season had not generally prevented them from solar cooking a midday meal, as most precipitation fell in the late afternoon. This is corroborated by meteorological data for the camp.
- The lifespan of the solar cookers can be affected by weather conditions, too, with most units currently lasting two to three months due to rain and wind damage. See *Graph 5: Lifespan of Solar Cookers*. Rain is the main reason for damage to the cookers, followed by wind, yet respondents reported that newer cookers, which have been retrofitted with rain and wind protection, last longer than those without the additional features.

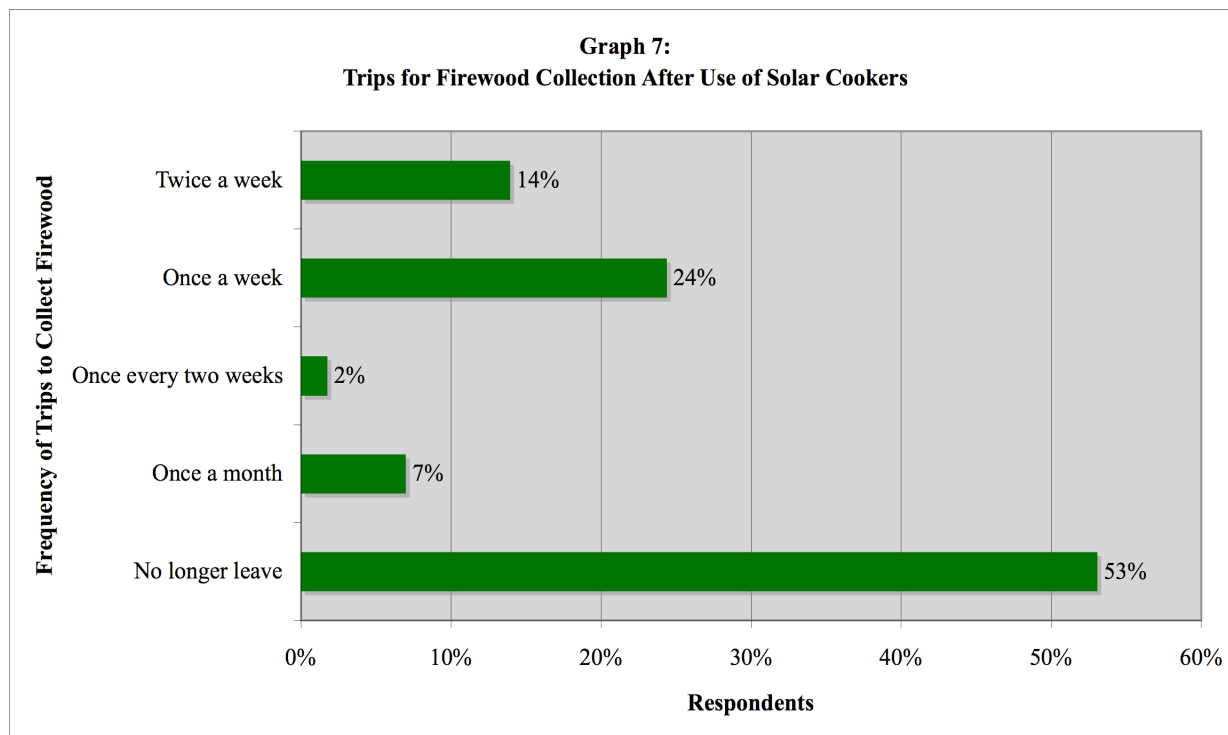


## Impact

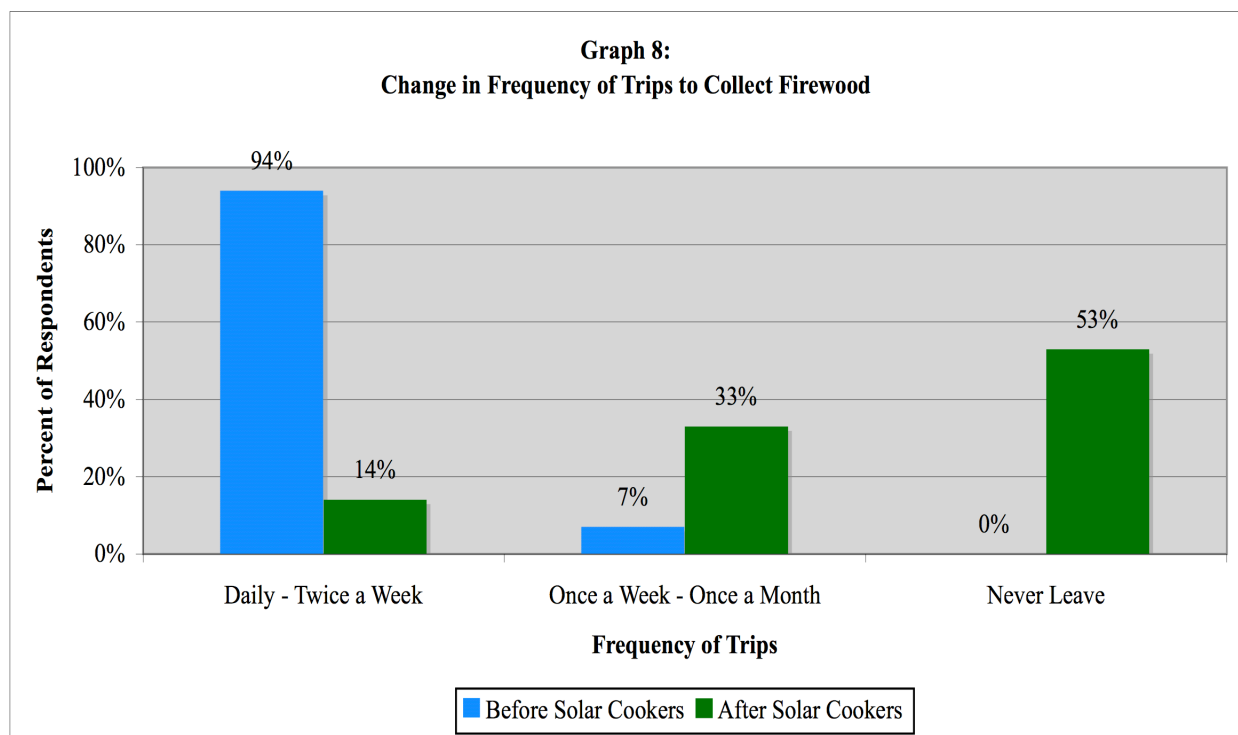
Before access to solar cookers, Iridimi camp residents relied on firewood to meet their cooking needs. The UNHCR distributes one bundle of firewood per month per family, which, according to the testimony of the respondents, is far from meeting their cooking needs. As a result, each family has to add to their allotment by collecting firewood outside of the camp. Before the introduction of solar cookers, many respondents left the Iridimi camp to gather firewood daily or every other day. Some individuals were able to make fewer trips with the assistance of family members or a donkey to carry additional wood. See *Graph 6: Trips for Firewood Collection Before Use of Solar Cookers*.



The introduction of the solar cookers has drastically reduced -- and in many cases eliminated -- the need to travel out of the camp for firewood. See *Graph 7: Trips for Firewood Collection After Use of Solar Cookers*. Respondents asserted that reducing the need to leave camp has directly improved their personal security and safety. One respondent noted that it had been over a year since she had to leave the camp.



Prior to the use of solar cookers, respondents took approximately 446 individual trips outside of the camp each week to collect firewood. After the introduction of the cookers, only 63 trips outside of the camp were made weekly, representing an estimated reduction in dangerous trips outside the Iridimi camp by 86%. 53% of respondents no longer need to leave the camp to collect firewood. See *Graph 8: Change in Frequency of Trips to Collect Firewood*.



Decreased reliance on wood has also diminished conflicts among neighbors, which are often related to disputes over firewood. Additionally, solar cookers are safer than wood stoves, which put children and women at risk of being burned. As a result, mothers can spend less time “worrying about [their children] getting too near the fire.” Moreover, respondents remarked that children are even able to help themselves to food when adults are not present.

As well as being a safer way of cooking, food preparation with the cooker requires less attention. The cooker can be set and left alone since the food needs no stirring as the heat is gentle and thus does not burn the inside of the pot. A neighbor or even children can assist their mothers by reorienting the cookers. Thus, respondents noted, the cookers provide time to do other things including looking after children, tending to household chores, visiting friends, going to the market and especially attending to their own appearances. Others noted they were able to use the additional time to learn or teach new things such as reading, knitting and basket making. As one respondent said, “I now have time to look properly after my husbands.”

In addition, the respondents commented that the cookers reduce some of the health-related issues associated with wood-burning stoves, such as coughing, running noses and eye irritation. Furthermore, solar cookers allow for the making of protein-rich pulses (beans, lentils, peas), which might otherwise be neglected due to the large amount of firewood necessary to prepare them. Prior to the introduction of solar cookers, it was common to see part of the distributed food rations sold or exchanged in order to obtain enough wood to cook the remaining food. Numerous women reported that they were able to end this practice since the introduction of the cookers. Of all the women interviewed, only four reported they still buy some wood.

The main advantages of the solar cookers, stated by 80% of the women, include:

- Improved security (due to decreased need to leave camp for firewood).
- Improved relations with neighbors.
- Ease of cooking.
- Free time to do other things (e.g. household chores, look after children, attend to appearance, etc.).
- Absence of smoke, leading to less coughing, and fewer eye problems and running noses.

Overall, the Iridimi refugee camp seems to have reaped enormous benefits from solar cookers and the introduction of solar cooking. As the evaluation team was conducting an interview, the chief of a camp zone stopped by and added, “There is more happiness, less violence, less insecurity, and I now eat three times per day [as a result of the solar cookers].”

### **Recommendations**

Support for the Solar Cooker Project is widespread within the Iridimi refugee camp. In order to maximize the impact of the cookers, the following recommendations should be implemented to:

- Increase the number of solar cookers and pots available to households, especially large ones.
- Upgrade and distribute newer solar cookers with the additional rain and wind-resistant features to increase the lifespan of each unit.
- Continue work on improving CookKit durability.
- Continue to provide assistance after the initial distribution and training in solar cooker utilization, including repairs, retraining in the use of the carrying bag, repositioning the cookers and preparation of *la boule*.
- Continue to provide heat retention hay-baskets to all the women in order to encourage cooking of the evening meal.
- Expand project to other refugee camps in Chad due to the great acceptance of the solar cooker project in Iridimi.

## **Appendices**

### ***Appendix I: Evaluation Staff Roster***

Rachel Andres, *Jewish World Watch*

Justin Daitangar, *Tchad Solaire*

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Mahamout Ngarbadjire, *Bureau Consult Internationale, Tchad*

Gilhoube Patallet, *Tchad Solaire*

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Daniel Roger Tam, *United Nations High Commissioner for Refugees, Sub Delegation of Abeche*

Nelngar Younane, *Regional Delegate of Chadian Environment Ministry, East Tchad*



***Evaluation team with some women who work in the Iridimi solar cooker manufacturing plant***



## ***Appendix II: Key Questions for Solar Cooker Evaluation Interviews***

1. How many members are there in the household?
  - a. How many cookers are used by your household?
  - b. Who is using the solar cooker (mother, daughters, fathers)?
  - c. How does the weather (rainy season) impact your use of the cooker?
2. What method of cooking do you use? Solar? Save80? Other?
  - a. How often do you use each one daily?
  - b. How often do you use each one weekly?
3. What is the benefit for you of using solar cookers (appearance, health, free time, security, less conflict with neighbors)?
4. What are the difficulties of using solar cookers?
  - a. What types of meals are you able to cook?
  - b. Are there types of meals you cannot cook?
  - c. Is there a problem with the amount of time it takes to cook the meal?
5. Did you feel that the training you received to use the solar cooker was adequate?
6. How did you acquire firewood before the solar cooker (buy it or collect for yourself) and how often?
7. How do you acquire firewood now (buy it or collect for yourself) and how often?
8. How long does your solar cooker last?
9. When the solar cooker needs repair or replacement, do you receive a timely and adequate response?
10. Do you share your experience of using solar cookers with other women in the camp? (Asked only on the first day.)

**The Solar Cooker Project is supported by:**

Jewish World Watch, Los Angeles, California, USA  
Solar Cookers International, Sacramento, California, USA  
Stichting Vluchteling, The Hague, The Netherlands  
The United Nations High Commissioner for Refugees, Geneva, Switzerland  
Stichting KoZon, Wageningen, The Netherlands  
Tchad Solaire, N'Djamena, Chad  
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