



ACTED

Agency for technical cooperation and development.

INITIAL ANALYSIS OF ENERGY SOURCE CONSUMPTION AND TRENDS IN JAMAM REFUGEE CAMP



**Jamam Area, Maban County
Upper Nile State, South Sudan**

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With technical support from



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EXECUTIVE SUMMARY

In the context of the massive influx of Sudanese refugees into Maban County, over 36,000 refugees have settled just one kilometer from Jamam village in Maban County, Upper Nile State. As Jamam village previously consisted of 3,000 inhabitants, the **population of Jamam has been de facto multiplied by 12 over the course of three months**. This presents an obvious challenge for an area which is already struggling with limited water and fragile forestry resources.

Concerning forestry resources, our field survey has clarified that the refugee population, like the host community, relies almost exclusively on local wood for their energy needs. The refugee population is estimated to consume over 33 metric tons of wood (firewood and charcoal) per day, or approximately **1,000 MT of wood per month**. This consumption has inevitably resulted in a dramatically accelerated depletion of the scarce forestry resources in this area to the extent of approximately **10 times the pre-crisis rates**. This presents a major risk of destabilizing the delicate balance of sustainable utilization. As has been acknowledged, "fuel scarcity can cause the regeneration of (violent) conflicts between refugees, returnees, and host populations. Environmental security should have the same weight as food security, to ensure that future livelihoods and human security are not endangered."¹

This report, resulting from a series of interviews with refugees and the host community at the end of March by the ACTED/Impact team, attempts to give an initial vision of the current energy situation and trends to stakeholders in order to develop an improved understanding of the issues at play. In collaboration with other actors, ACTED aims to identify viable solutions for the conservation of these natural resources.

RAPID ASSESSMENT OBJECTIVES:

1. Gaining an initial understanding of the impact of refugee presence on the forestry resources in the area.
2. Review current energy use, techniques and consumption trends.

KEY FINDINGS

- i. The overwhelming majority of energy needs for cooking are met through firewood, while charcoal is only occasionally used for tea and coffee, for both the refugee and the host community.
- ii. According to our survey estimations, an average refugee household consumes approximately 4.25kg of firewood per day. Taking into account occasional charcoal consumption, the refugee population in Jamam consumes roughly 33 MT per day (approximately 1,000 MT per month), representing a massive increase compared to pre-crisis rates.
- iii. Mapping of current firewood sources indicates that refugee and host community are both utilizing forestry resources in the South and South East direction of the camp (approximately 1-2 hour walk by foot from settlement area) and that this overlap has been already a reported source of tension between the two communities.
- iv. Collecting firewood represents a significant time burden for refugees, who spend an average of 4 hours per trip, with some spending up to 8 hours per trip. This situation will only be aggravated over time, further increasing distance traveled and thus the potential security risks for the young girls primarily responsible for firewood collection.
- v. In addition to their personal energy needs, some refugees have reverted to selling charcoal and firewood in Jamam village. This oversupply has been reflected in the drastic decrease of charcoal prices over the last 2 months.
- vi. Some of the stove types and primary food preparation methods currently used in the camp require ample cooking fuel; survey results suggest the implementation of more efficient cooking techniques or improved stoves could result in a significant reduction in household fuel consumption.

¹ *Dealing with Energy Needs in Humanitarian Crisis Response Situations*, Institute for Environmental Security, September 2009

METHODOLOGY

This rapid survey was carried out over three successive assessment periods on March 13th, 30th and 31th 2012. The methodology used during this assessment consisted of two elements:

1. HOUSEHOLD SURVEY AND TRANSECT WALKS

A series of questions were prepared to gather both qualitative and quantitative data on household food preparation techniques and materials, fuel sources, and income generation activities amongst both the refugee community and the host community. For refugee households, the questionnaire also aimed at comparing current habits with those prior to displacement in order to highlight changes in behavior and coping strategies.

Transect walks during the typical hours of food preparation (between 3:30-6:30 pm) allowed the assessment team to collect information on fuel use and cooking techniques through direct observation. During these transect walks, households from the refugee community were selected to respond to questionnaire on their fuel consumption patterns and cooking methods. The assessment team selected households at random within the currently inhabited camp sites. As the refugee households in Jamam are generally grouped around their sheikh, or village chief, the survey was conducted at a sampling of geographical sites, allowing for a comparison of the different communities present in Jamam camp (see Map 1 for additional details on community settlement patterns). Households from the host community were also surveyed about their energy consumption patterns and cooking techniques as a basis for comparison.

Survey questions on cooking were typically aimed at females of various ages in the household, though male members of the household were encouraged to contribute to responses as well, particularly to questions regarding income generation.

2. MARKET SURVEY

A market survey was also conducted with fuel vendors in both Jamam camp market and Jamam village market:

- In Jamam village market, firewood vendors are concentrated in a single area; nine were present during the assessment period. 15 charcoal vendors are located at various points within the village market area.
- In Jamam camp, in the currently expanding market area, approximately 17 kiosks sell charcoal mostly in small quantities, along the main roads.

Vendors were questioned on trends in availability of fuel sources, changes in purchase and retail price, and the supply chain for these fuel sources. The market survey was extended outside of the village market area to include information on refugee vendors who sold fuel sources directly to households within Jamam village.

1. CURRENT ENERGY TRENDS IN JAMAM AREA

The mass arrival of over 36,000 Blue Nile refugees into the Jamam area has put major pressure on the already scarce energy sources. A heavy dependence on firewood to meet the majority energy needs, for both the refugee and the host communities, has resulted in a dramatic acceleration of the deforestation in the area, to the extent of approximately 1,000 MT of wood (firewood and charcoal) consumed per month. **The multiplication of the Jamam area population by 12 has resulted in firewood consumption rates 10 times higher than pre-crisis rates.** The depletion of these resources has not only impacted their accessibility, but has already caused tension between the host and refugee communities.

1.1. CURRENT FIREWOOD CONSUMPTION AND TRENDS IN JAMAM AREA

1.1.1. CURRENT FUEL SOURCES FOR JAMAM REFUGEES

All refugee households surveyed responded that **wood was the only fuel used to cook meals.** 30% of households said that they purchase charcoal on occasion to be used to cook coffee or tea. Charcoal is preferred to avoid charring the coffee or tea pots. Respondents indicated that firewood was used just for cooking needs.

1.1.2. CURRENT CONSUMPTION TRENDS OF JAMAM REFUGEES

The average household consumption of firewood is estimated at 4.25 kg per day, based on an average household size of 5 people. Given the current refugee population size of over 36,000 people, their monthly firewood consumption rate is estimated to exceed 918 metric tons. Based on these rates, the refugee population is estimated to have consumed 2,200 MT of firewood since their arrival in Jamam area (calculated according to progressive population increase with first registered arrivals on 19/12/2011).

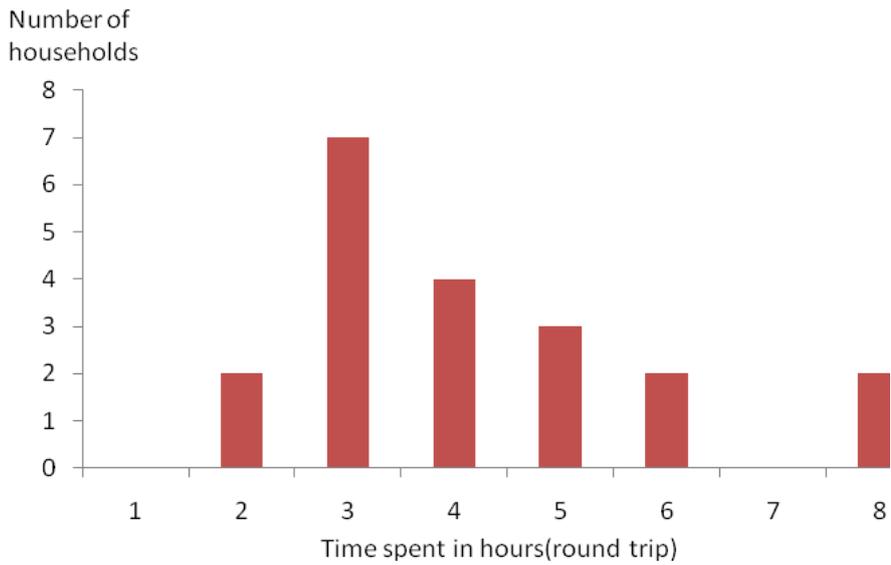
Based on household survey findings, an estimated 0.5 kg of charcoal is consumed per household per week, or which translates to an additional wood consumption of over 84 MT per month.

1.1.3. CURRENT TIME SPENT ON FIREWOOD COLLECTON AND SECURITY RISKS

The time spent collecting firewood varied widely according to place of settlement. Households surveyed reported spending between two and eight hours per trip to collect firewood, with an average time of over four hours. Frequency of firewood collection depended on how many household members were sent to collect. Those designated to collect firewood were primarily young girls, who usually complete this tasks in small groups of three to four people. Adolescent girls were most often reported responsible for cutting the wood, with younger children aiding in carrying the collected wood back to the settlement area.

Though female respondents indicated that they did not feel unsafe while they collect firewood, the long distances traveled and the many hours spent out of the range of adult supervision present a serious potential source of protection issues. These risks in refugee and IDP situations have been well documented, notably in the case of increasing reports of rapes and attacks during firewood collection outside of the Dadaab refugee camp in northern Kenya (*Beyond Firewood*, Women's Commission for Refugee Women and Children, p.12)

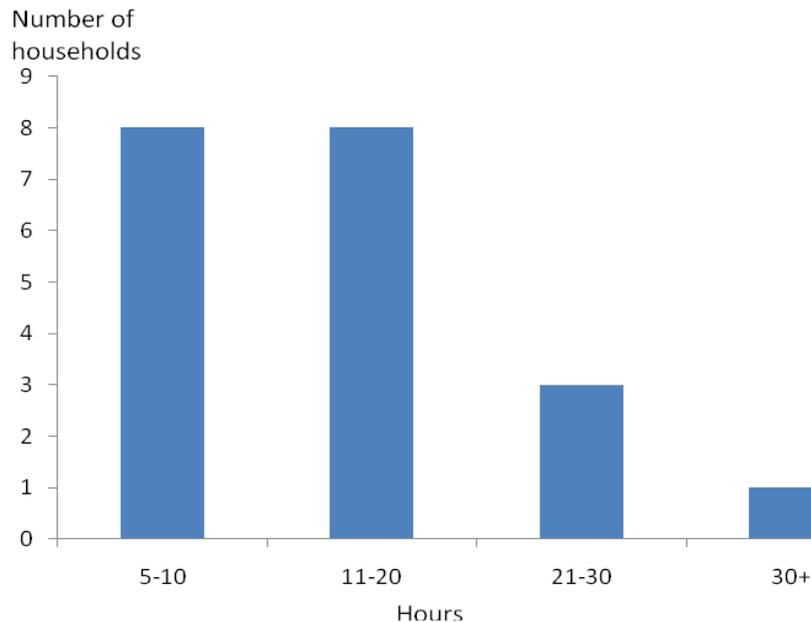
Figure 1: Time refugees spend per trip on firewood collection



Source : ACTED/Impact Assessment Team

During the household survey, respondents indicated that frequency of firewood collection depended on number of household members available for collection at that time, and ranges from once a day to once every five days. Surveyed households indicated that the time spent collecting firewood made allotting time for water collection or seeing to medical needs difficult. As children often participate in firewood collection, this large amount of time devoted to firewood collection has the potential to affect school attendance and participation as well.

Figure 2: Time refugees spend per week on firewood



Source : ACTED/Impact Assessment Team

1.1.4. JAMAM HOST COMMUNITY FUEL SOURCES

Host community households surveyed also responded that wood was the primary cooking fuel, and that it was typically collected from forest areas surrounding the village. On average, the household surveyed reported that at the time of assessment (dry season), they typically spend just 15 minutes to one hour collecting firewood for their cooking needs. However, according to survey results, **the host population now spends approximately 1 to 4 hours collecting firewood, approximately four times the time spent prior to refugee arrival.**

Households also indicated that they have more recently reverted to purchasing wood, given the increase in time necessary for collection and as mobile refugee vendors pass by their homes and sell at reduced prices (see Section 1.2.1: Sale of Firewood by Jamam Refugees). Charcoal is also used occasionally for heating coffee or tea, and is generally purchased from the village market.

The host community, with an estimated population of 3,000, consumes approximately 1.16 kg per person per day, or 105 metric tons per month. The multiplication of the Jamam area population by 12 has resulted in firewood consumption rates 10 times higher than pre-crisis (1.023 MT instead of 105MT/month before for firewood only).

1.1.5. IMPACT ON FORESTRY RESOURCES AND HOST COMMUNITY RELATIONS

As shown in the map of Jamam camp below, the refugee population in Jamam camp has generally settled according to their area of origin. The population is mainly grouped into two sites; the site to the North of the main road is identified as Jamam 1, while the area to the South is known as Jamam 0.

Map 1: Problematic areas for firewood collection in the Jamam area (circled in red)



Source : ACTED/Impact Assessment Team

Note: Jamam 1 is an inhabitable area, whereas Jamam 0 is located in a flood plain. Those currently settled in Jamam 0 must be relocated before the rainy season; Jamam 2 (in the South Eastern section of the camp area) has been identified as a potential relocation site.

All the residents surveyed in the Eastern area of Jamam 0 indicated that they encountered problems with the host community when collecting wood an estimated 5 km to the South East of their shelters. The majority of

the households in Western Jamam 0 also reported problems in the South Western area.

According to a few of the households interviewed, if they are discovered during firewood collection, host community members confiscate both the collected wood and the axe used for collection. Others responded that they are required to pay the value of the wood collected if they are seen with cut wood by the host communities. One household responded that refugees are only allowed to cut wood from dead trees, and that the person who cuts down a living tree will be sent to prison.

Further information gathering from the refugee community is necessary, focusing on the area where tension was reported. This information should also be cross-checked with the host community in order to identify overlap of resource areas. This may be particularly important for the communities from Jamam 0 which are expected to be moved to Jamam 2 (in the South Eastern area of the camp site) before the rainy season.



Image 1: Apparent deforestation around Jamam 1

A follow up study is now ongoing focusing more specifically natural resources in the area in order to have a more systematic review of availability and depletion patterns.

1.2. CURRENT COMMERCIAL TRENDS OF ENERGY SOURCES

1.2.1. CURRENT SALE OF FIREWOOD BY JAMAM REFUGEES

20% of refugee households surveyed indicated that their family sells firewood to Jamam village to generate income. Mobile vendors typically sell directly to host community households, and do not sell to Jamam village market vendors. One point was also identified within Jamam village where refugees come to sell collected firewood. This point is supervised by a village resident, who handles the transactions. Refugees come to collect money from sales regularly. Those identified practicing this income generating activity were all female, and started approximately two months ago. One of the refugees surveyed indicated that she and other refugees are required to sell it at a reduced price since the land that they collect from does not belong to them.

1.2.2. CURRENT IMPACT ON THE FIREWOOD MARKET IN JAMAM VILLAGE

Jamam village residents reported that mobile vendors are the primary providers of purchased firewood. Refugees sell 5 pieces of firewood for 1SSP, whereas 4 pieces of the same size are sold in the market area by Jamam village residents for the same price. This translates to a 20% reduction in price compared to firewood sold in the market area by Jamam village residents.

Wood vendors in Jamam village market reported that they collect their supply directly and do not purchase it from refugees. During the survey period, nine firewood suppliers/vendors were present in Jamam village market, but all but two had begun this activity within the last two weeks. They indicated that sale of firewood was very infrequent, and that previous firewood suppliers had abandoned the activity due to lack of sales. Two of the firewood suppliers in Jamam village market have been selling wood for three to four months; during the first month they reported selling three to four bundles per day, whereas currently they sell on average only one bundle every two days.

Host community households surveyed indicated that they normally collected firewood for their energy needs. However, since time spent on collection has reportedly increased and mobile refugee vendors sell directly to their homes for reduced prices, they have begun to purchase firewood more often from these refugee vendors.

1.2.3. CURRENT CHARCOAL PRODUCTION BY JAMAM REFUGEES

Charcoal production sites can be seen on the outskirts of Jamam camp site along the surrounding forest areas. One charcoal producer indicated that he produces two 50kg bags of charcoal per

day, and sells an average of 10 bags to Jamam village market per week, or a wood consumption of 2 MT per producer per month. The producer interviewed indicated that only a few members of the refugee community are producing charcoal in large quantities.



Image 2: Production of charcoal to the North of Jamam 1

Approximately 17 small vendors set up along the main road in the burgeoning market are of the camp, selling individual bags of charcoal (approx. 2kg) for 1SSP. The majority of these vendors were supplied by refugee producers. Some households interviewed responded that others in their community had produced small amounts of charcoal for income generation, but none reported charcoal production by a member of their household. Some refugees may have been hesitant to admit using wood for income generation, possibly due to restrictions from the host community which were reported during household surveying.

1.2.4. CURRENT IMPACT ON THE CHARCOAL MARKET

Charcoal is main fuel source sold at the Jamam village market; charcoal vendors at the Jamam village market currently purchase their supply from both village residents and refugees, with the majority supplier being variable. Those that responded that refugees were their majority supplier had just recently begun charcoal vending for income generation within the last 2 months. The reason given for their recent adoption of charcoal selling activities was the recent increase in refugee supply of charcoal directly in the market, augmenting availability.

Figure 3: Fluctuation in Charcoal Prices (50kg) in Jamam Village Market



Source : ACTED/Impact Assessment Team

This increase in availability is reflected in trends in charcoal price. The price at which vendors purchase from suppliers as well as the retail price of charcoal has decreased by approximately 50% within the last three months (see figure 1). The average market price is reflected in this diagram. However vendors who recently entered the market reported retail prices for 50 kg charcoal bag as low as 15 SSP. The increase in availability can also be deduced from the decrease in sales per vendor. However, it must be noted that these figures have not been checked with market prices in other areas to determine if the reduction is part of a normal trend.

SOLAR ENERGY IN JAMAM CAMP

One of the kiosks set up in Jamam camp market utilizes solar panels to run charging stations along the main road of the camp, demonstrating an initial knowledge and experience with solar energy devices, although among a very limited number of camp residents. These service providers are hesitant to discuss their experience with solar energy, possibly due to the origins of solar power devices.

2. CURRENT COPING STRATEGIES FOR COOKING IN JAMAM CAMP

Some of the stove types and primary food preparation methods currently used in the camp require ample cooking fuel, putting additional stress on the scarce firewood sources in Jamam area. Survey results suggest the implementation of more efficient cooking techniques or improved stoves could result in a significant reduction in household fuel consumption. Programming targeted at reducing consumption need to integrate existing energy efficiency skills and techniques.

2.1. CURRENT SET UP OF COOKING AREA

Three types of stoves were observed for cooking meals. The stove types are variable in energy efficiency, from the least efficient flat 3 stone stove to the more efficient walled pit stove, and differed according to the location in the camp. Those currently settled in Jamam 0 must be relocated before the rainy season (please refer to note on p.6), and this anticipated move has made many reluctant to set up more permanent settlements. This can be noticed in the choice of a basic and less labor-intensive stove type in these areas.

- i. Flat 3 stone stove: This is a basic stove consisting of 3 stones or large clumps of earth which hold cooking pots above the fire on a level surface (see image 3 below). It is entirely exposed to wind. This type of stove was seen mainly in the eastern area of Jamam 1. Households can quickly build this type of stove upon arrival in a new area.



Image 3: Flat open stove in Jamam 1

As many households did not find proper stones for the stove, the support for the cooking pot has been made out of hard clumps of earth dug from the ground in the area surrounding their dwelling. Though these substitutes for rock are acceptable at the moment, this earth is expected to liquefy in the rainy season, rendering the stove unusable.

The majority of households indicated that if they used these stoves in their place of origin, the cooking area was typically inside a sheltered space. Respondents indicated that they are eager to

construct sheltered cooking areas for their homes in Jamam, particularly because of concerns over the impending rainy season. However, many are reluctant to do so, either due to a lack of materials or because they expect to relocate soon. Plastic sheeting was commonly requested during household interviews for sheltering the cooking area.

This type of stove was also observed during the host community household survey, but was also either kept in a sheltered area or underneath a thatched roof.

- ii. A shallow cooking pit: This stove consists of rocks placed in a shallow pit, and thus it is partially protected isolated from wind. While not as well sheltered from the elements as a walled stove, this stove type allow for improvements on fire protection and heat insulation. This type was mainly seen in Eastern Jamam 0 (see image 4).



Image 4: Shallow cooking pit in Jamam 0

- iii. Walled cooking pits: mud or stone walls surround the cooking area, and it is large and deep enough to accommodate the person preparing food as well. The cooking space is well protected from wind and heat is better insulated than in the traditional flat stove or pit stove. This type was seen in the central and western end of Jamam 1.



Image 5: Kisera prepared in mud-walled stove

As the communities settled in these areas were the first to arrive, and this area has been validated for habitation, these families have invested time and effort into a more efficient and permanent cooking set up. Households who use this type of stove indicated that they used the flat three stone stove prior to displacement, but in a sheltered cooking space.

Though open flat stoves are adaptable and easy to use, open fires waste fuel since flames are focused poorly on the bottom of the cooking pot.

Typically only 15% of energy that is released from the cooking fuel actually enters the food or water in the pot

(*Cooking Options in Refugee Situations*, UNHCR, p.10). Additionally, fuel savings of 15-20% can be achieved by proper shielding of fireplaces from wind (*Cooking Options in Refugee Situations*, UNHCR, p.19). 20% of the households interviewed had constructed a shelter around their cooking area. Requests for materials such as plastic sheeting to shelter the cooking area, particularly to prepare for the rainy season, were frequent during household interviews. This is particularly necessary given the use of earth, which will dissolve in the rain, in the place of rocks for stoves.

Small earthen stove production was reported a common and frequent practice among the refugee population, both in Jamam and in Blue Nile State. Some households have produced these stoves and given them free of charge to their neighbors. These stoves (see image 6) are also available in Jamam camp market and cost 2SSP for the smaller size and 5SSP for the larger size. Refugees make these stoves by mixing earth and water, letting the mixture sit for one day, then sculpting the stove and letting it dry in the sun for 2 days.



Image 6: Stoves sold in Jamam camp market

- ❖ **Initial recommendation:** As mixing ratios

of mud stove components vary from place to place (*Cooking Options in Refugee Situations*, UNHCR, p.11), ACTED's energy efficiency programs could build on these existing stove making skills and mobilize those experienced in stove making to develop an adapted design and conduct trainings.

2.2. COOKING TECHNIQUES

All respondents indicated that they typically prepare sorghum for all meals, and occasionally beans. This should be expected given the heavy dependence on food distributions, which have included sorghum, oil and beans, to provide for basic food needs.



Image 7: Women milling sorghum in Jamam 0

Sorghum is often twice milled, usually by hand, and then cooked in thin pancakes called "kisera" on an open flat pan (see Image 4 and 5). The double milling and thinness of this common dish make cook time very quick, however many of the pancakes are needed for one meal. A thick porridge called "lugma" is also made with milled sorghum and water which is stirred while heated on the fire.

Whole grains of sorghum or beans are also prepared directly (without milling) in boiling water (see Image 5). Respondents indicated that this dish typically takes 3-4

hours to prepare. One woman commented on the fact that this preparation method takes a lot of additional water and fuel due to the long cook time.

Some respondents indicated that water used to cook sorghum must be thrown out half way through preparation and new water must be added. Not only does this method require additional water when this resource is already scarce, but it consumes additional fuel to reheat water to the appropriate temperature.

- ❖ **Initial recommendation:** Methods such as pre-soaking could reduce fuel consumption for the preparation of these kinds of dishes by up to 40% (*Cooking Options in Refugee Situations*, UNHCR, p.19).



Image 8: Whole grain sorghum boiling in Western Jamam

PRODUCTION OF “BADZAR”

10% of households surveyed indicated that they produce an alcoholic beverage called “badzar”, made with milled sorghum which they sell from their homes to generate income. This drink, reported similar to wine, is made by cooking milled sorghum for one hour in a pan, adding water and then letting it sit for a minimum of 24 hours. The mixture can then be distilled again by heating it on the fire. This product is only sold from the household and not in the Jamam camp or village markets. This practice was only observed in the Western end of Jamam O. One cup of badzar is sold for 3 SSP, but sales were reported as only occasional. This activity consumes additional firewood and generates a minimal amount of income for the producer.

Those who had been distributed UNHCR kitchen sets were utilizing them, but indicated that **flat pans for preparing “kissera” were needed**. Refugee households currently borrow pans from their neighbors who brought them from their place of origin. Only approximately 50% of the pots and pans used for cooking had lids, and only 10% of households observed during food preparation used lids during cooking. For boiling whole beans or sorghum, respondents indicated that it is possible to keep the pot covered during the entire process.

The majority of respondents indicated that they already practiced multi-family cooking techniques when other households in their community did not have enough firewood, but this was only an occasional occurrence due to necessity.

- ❖ **Initial recommendations:** Multi-family cooking could be encouraged on a more regular basis as a fuel conservation technique, particularly for small households (up to three people) whose fuel consumption for a single meal is significantly higher: estimated at 5.9 times more firewood consumed for a single person versus per person for a family of 9 (*Wood consumption in Bredjing and Tréguine refugee camps in Chad*, Premiere Urgence, 2010).

None of the households interviewed reported familiarity with ways to improve their fuel efficiency. All indicated that they would be willing to use different techniques or tools to improve fuel efficiency, but emphasized during interviews the need for training on these new methods or the use of different stoves.

ANNEX 1

INITIAL RECOMMENDATIONS FOR ACTED PROGRAMMING

At this stage, ACTED is not able to produce specific recommendations for the general forestry resource situation. The following recommendations reflect classic energy saving methods which could be integrated into programming for Jamam camp.

1. **Immediate collaboration with other actors is necessary address the issue of energy needs:** The results of this survey have illustrated that firewood resources are being depleted at a serious rate. This situation has already been a source of tension between the host community and refugee population, which can only be aggravated over time. Identifying solutions for fuel sources and reforestation needs to be a priority for humanitarian programming.

2. **Standard energy saving techniques should be integrated into current programming.**
 - i. **ACTED should work with small stove producers and women's committee to develop a proper design and standard for making energy efficient mud-stoves;** these stove producers should also be mobilized for training sessions. Innovations to initial design should be encouraged, and the importance of mud stove maintenance needs to be stressed, especially during the rainy season. Women representatives should also participate in design development in order to adapt the stove design to cultural preferences and multiple needs. Provision of proper materials needs to be ensured to protect these stoves during the rainy season.

 - ii. **Use of non-potable water for mud-stove activities:** the creation of mud stoves requires a great deal of water. As water sources in Jamam are extremely limited and already strained, non-potable water sources, such as the blue-green algae pond, should be utilized for the production of these stoves. Specific transportation materials for this water would need to be arranged, since this non-potable water cannot be transported in the bladders used for drinking water.

 - iii. **Sensitivity trainings on energy-saving cooking techniques:** simple and costless techniques to increase fuel efficiency can often have a far greater impact than the stoves themselves (*Cooking Options in Refugee Situations*, UNHCR, p.18). As part of community mobilization activities, training of trainers on energy efficient cooking techniques could be done, and then diffused to refugee communities.

The first phase of sensitivity training could be done through the women's committee which is in the process of being launched. Well-adapted techniques include covering cooking pots, properly drying firewood, "double-cooking" (stacking metal pots in fire to speed heating time), shielding the cooking area, and encouraging multi-family cooking for small households.

 - iv. **Look into biomass briquette procurement from Malakal or local production:** as part of an additional phase, ACTED could consider advocating for alternative fuel sources if forestry resources continue to be strained. Biomass briquettes are occasionally available in the market in Malakal. Producing these briquettes directly in Jamam could not only provide an alternative fuel source, but also function as an alternative income generation activity. Involving the refugee population in Jamam in the production of these briquettes would decrease the impact on the Jamam village market and allow households in the camp to halt production of goods (charcoal and badzar) which consume a high amount of energy sources in order to generate a minimal amount of revenue.