

# UPDATE OF ENERGY SOURCE CONSUMPTION AND TRENDS ANALYSIS IN JAMAM AND GENDRASSA REFUGEE CAMPS

MABAN COUNTY, UPPER NILE  
STATE, SOUTH SUDAN  
APRIL 2013



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## EXECUTIVE SUMMARY

This report is the result of a series of interviews with refugees and the host community conducted at the end of March by the REACH Assessment team. It updates the existing information regarding the current energy situation (including expanding the report to include Gendrassa camp) and major changes in the energy use trends over the past year. This report makes initial recommendations for interventions focusing on the issues surrounding energy use.

Concerning forestry resources, the 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 35 metric tons of wood (firewood and charcoal) per day, or approximately 1,050 MT of wood per month. This consumption has continued a dramatically accelerated depletion of scarce forestry resources in the area surrounding the Jamam and Gendrassa refugee camps. Nearly all interviewees reported increased walking times to collection areas; a strong proxy indicator for resource depletion. Competition for scarce resources causes conflict between host and refugee communities and the increased walking time is a drain on household resources. Initial recommendations for this issue include (1) to undertake activities focused on increasing fuel efficiency in cooking and (2) to continue reforestation efforts.

### RAPID ASSESSMENT OBJECTIVES:

1. Gain an updated 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 continue to be met through firewood. Charcoal is mainly used by the host community; refugees use it only for heating coffee and teapots because it is expensive to purchase.
- 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 35 MT per day (approximately 1,050 MT per month), representing a tenfold increase compared to pre-crisis rates.
- iii. Refugees have a strong understanding of areas where they know they will face harassment from the host community. There is a tacit understanding of a demarcation between where host community and refugee community members gather firewood.
- iv. Collecting firewood represents a large time burden for refugees. The average time spent gathering firewood is nearly 4 hours every two to three days and is completed almost entirely by women.
- 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. Refugees continue to use inefficient cooking methods. They choose not to use energy efficient stoves even when available because they are expensive and break easily.

## BACKGROUND

The first version of this report was published in March of 2012 to analyze the challenges faced in an area where the population was multiplied by 12 in a three-month period. The massive influx of refugees into Maban County in South Sudan's Upper Nile state caused challenges for both refugees and host community members in an area which was already struggling with limited water and fragile forestry resources. In January 2012, over 36,000 refugees settled near Jamam village. Due to flooding and limited water availability, approximately 15,000 of those refugees were later relocated to Gendrassa camp 40 kilometers away between May and October 2012. While the reduced population of Jamam relieved some of the pressure on nearby resources, additional challenges have been created with the creation of the Gendrassa camp.

## METHODOLOGY

This assessment was carried out between March 4 and March 31, 2013. The methodology used during this assessment consisted of focus group discussions, direct observations, and mapping of firewood collection areas.

A series of questions were prepared to gather both qualitative and quantitative data on household food preparation techniques and materials, fuel sources, and livelihoods activities among the refugee 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.

Focus groups of between five and fifteen women for a discussion of firewood collection and between five and fifteen men for a discussion of charcoal production were conducted in six villages in Jamam camp, six villages in Gendrassa camp, two villages in the Gendrassa host community, and three villages in the Jamam host community. The ages of women included in the focus groups varied widely. Women who engage in collecting firewood for their families and men who produce charcoal for consumption or sale were asked to answer a brief questionnaire.

Transect walks were conducted separately in three villages in Jamam camp and three villages in Gendrassa camp to observe cooking methods. During these transect walks, the surveyors observed the cooking methods used and discussed cooking methods with the individual preparing food. Villages were sampled from different geographic sites within the camp to compare the situation across camp locations.

REACH<sup>1</sup> surveyors also accompanied firewood collectors to map the areas from which firewood is collected in both camps. GPS tracks were taken of the path to the collection area and an estimate of the total area of collection was made. Finally, surveyors examined the total area of deforestation around the camps to help estimate how far both refugee and host community members must travel to find wood.

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<sup>1</sup> REACH is a joint initiative of [IMPACT Initiatives](#) and [ACTED](#) and the United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Program ([UNOSAT](#)) in order to promote and facilitate the development of information products that enhance the humanitarian community's decision making and planning capacity for emergency, reconstruction and development contexts.

## 1. CURRENT ENERGY TRENDS IN JAMAM AND GENDRASSA CAMPS

Similar to a year ago when the initial data for this report was gathered, refugees complain of long walking distances for firewood collection and the risk of harassment from host community members. Deforestation, particularly around Jamam camp, continues to be a major concern, although walking times have not increased significantly.

### 1.1. CURRENT FIREWOOD CONSUMPTION AND TRENDS IN JAMAM

#### *CURRENT FUEL SOURCES FOR JAMAM AND GENDRASSA REFUGEES*

Consistent with one year ago in Jamam, all refugee households in both Jamam and Gendrassa surveyed responded that wood was the only fuel used to cook meals. A small number of households (mainly in Jamam) said that those households who produce charcoal occasionally use it for cooking coffee or tea. Those families who cannot produce their own charcoal prefer not to purchase it, as it is too expensive. Charcoal is preferred to avoid charring the coffee or tea pots.

#### *CURRENT CONSUMPTION TRENDS OF JAMAM AND GENDRASSA REFUGEES*

The rate of firewood consumption has not changed in the past year and is consistent across the Jamam and Gendrassa camps. The average household consumption of firewood is estimated at one bundle of 30 sticks per day, based on an average household size of 5 people.

The current population of Jamam camp is approximately 16,056, therefore the monthly firewood consumption rate of the camp is estimated at approximately 96,336 bundles of sticks. Although it is difficult to estimate the volume of wood in a bundle, as this depends on the distance walked and carrying ability of the person fetching firewood, 4.25 kg per bundle is considered a conservative estimate. At this average rate, the camp is consuming approximately 409 metric tons per month.

The population of Gendrassa is currently estimated at 15,600 and the monthly firewood consumption rate of the camp is estimated at approximately 93,600 bundles of sticks. Using the same estimation of volume per bundle of 4.25 kg, the camp is consuming approximately 397.8 metric tons.

Very few households use charcoal and when they do, it is only for tea and coffee. Less than 30% of households report using any charcoal and the majority of those using charcoal use less than 1 kg per week (source: ACTED Market Survey of Mud Stove Marketing Opportunities). Generally, those households who participate in producing charcoal are able to access charcoal for heating water. Respondents reported that due to falling charcoal prices (because of the large number of people engaged in production) and the distance to collection points, production per



*Figure 1: Women collecting firewood near Gendrassa camp (Source: REACH Assessment)*

person of charcoal has decreased in the past three months. However, even with the falling prices, refugees are still not able to purchase charcoal. Producers are able to produce two to ten large bags of charcoal with a heap of wood, depending on the ability of the producer to transport wood. Each large bag of charcoal requires approximately 50 kg of wood; this depends on the density of the gathered wood (much of the wood gathered in Maban is soft and light wood, making it less efficient).

#### *CURRENT TIME SPENT ON FIREWOOD COLLECTION AND SECURITY RISKS*

The time spent collecting firewood depends on the location of the village within the camp. As there are specific areas that refugees choose or are forced to collect wood from, some villages are disadvantaged in their location relative to firewood

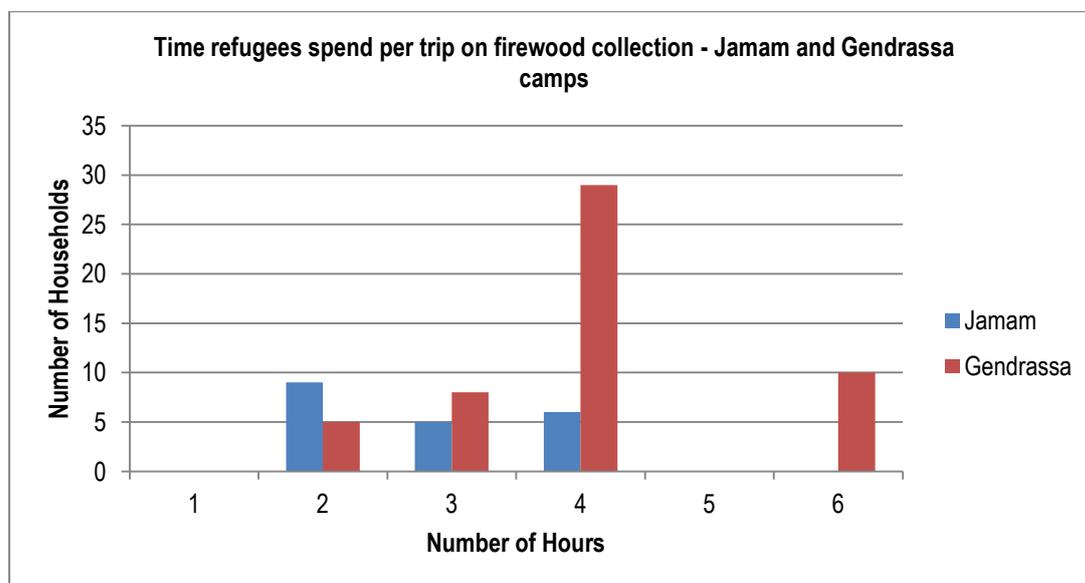
collection areas. Those interviewed stated that six months ago, they were able to collect firewood within the camp. However, now they must walk two to four hours total (one to two hours each way) in Jamam and two to six hours (one to three hours each way) in Gendrassa, due to deforestation and limited collection points, as defined by the host community. The frequency of collection of firewood depended on the distance traveled to the collection point and the family member collecting. In Jamam, collection ranged from daily to once every two to three days, but the majority of respondents reported collecting daily. In Gendrassa, the range was also daily to once every two to three days, however the majority of respondents reported collecting every two to three days. This may be because most families face longer walks on average in Gendrassa and prioritize sending more family members so that they do not have to collect as frequently. Most frequently, the family member assigned to firewood collection is a girl or young woman. A large bundle of firewood can last a family two to three days, however young children or adults walking long distances are not able to carry larger bundles. Small bundles must be collected daily.

Approximately three quarters of the focus group participants reported either that they frequently face harassment from the host community while collecting firewood or that they only face harassment if they venture outside the agreed camp collection areas. One group in Jamam reported that they can only transport small quantities of firewood because the host community will not allow them to transport large amounts. Approximately 50% of respondents in Gendrassa report that the host communities control the amount of wood that they can transport, both in shared collection points and agreed upon refugee collection points.

In Jamam, villages reporting that they face harassment are located on the west side of the camp (Mak, Pudurubel, Belmat, Kemer), while those reporting that they do not face harassment are on the east side of the camp (Kuruba, Soda Amol). In Gendrassa, villages from all areas of the camp reported harassment from host communities.

During the focus group discussions, respondents indicated that frequency of firewood collection depended on number of household members available for collection at that time, distance to collection point, and carrying capacity of those fetching firewood. The frequency ranges from once a day to once every three days. The time spent collecting firewood weekly ranged from 6 hours per week to 25 hours per week. Women leave their household duties to fetch firewood, straining their ability to seek income generating activities or seek medical care. As children are also frequently involved in obtaining firewood, this time has the potential to limit their ability to attend school regularly. In addition, this is a protection concern as women and girls are frequently unaccompanied outside the camp boundaries and are vulnerable to attack. A Gender-Based Violence (GBV) assessment, completed by the Danish Refugee Council in September 2012, showed that women report threats, beatings, extortion, and sometimes rape while collecting firewood (*Sexual and Gender-Based Violence Assessment*, Danish Refugee Council, September 2012).

Figure 2: Refugees' per trip firewood collection time



*Source: REACH Assessment team*

Generally, the time spent on collecting firewood in Gendrassa was higher than the time reported spent in Jamam. This is largely due to the fact that in Jamam, refugees have multiple collection areas to choose from on two sides of the camp. In Gendrassa, there is a single collection point. The collection point is approximately 3 km from the camp for the closest village, however those villages on the other side of the camp are 4-5 km from the collection area. This results in longer travel times for some of the households in Gendrassa.

#### *IMPACT ON FORESTRY RESOURCES AND HOST COMMUNITY RELATIONS*

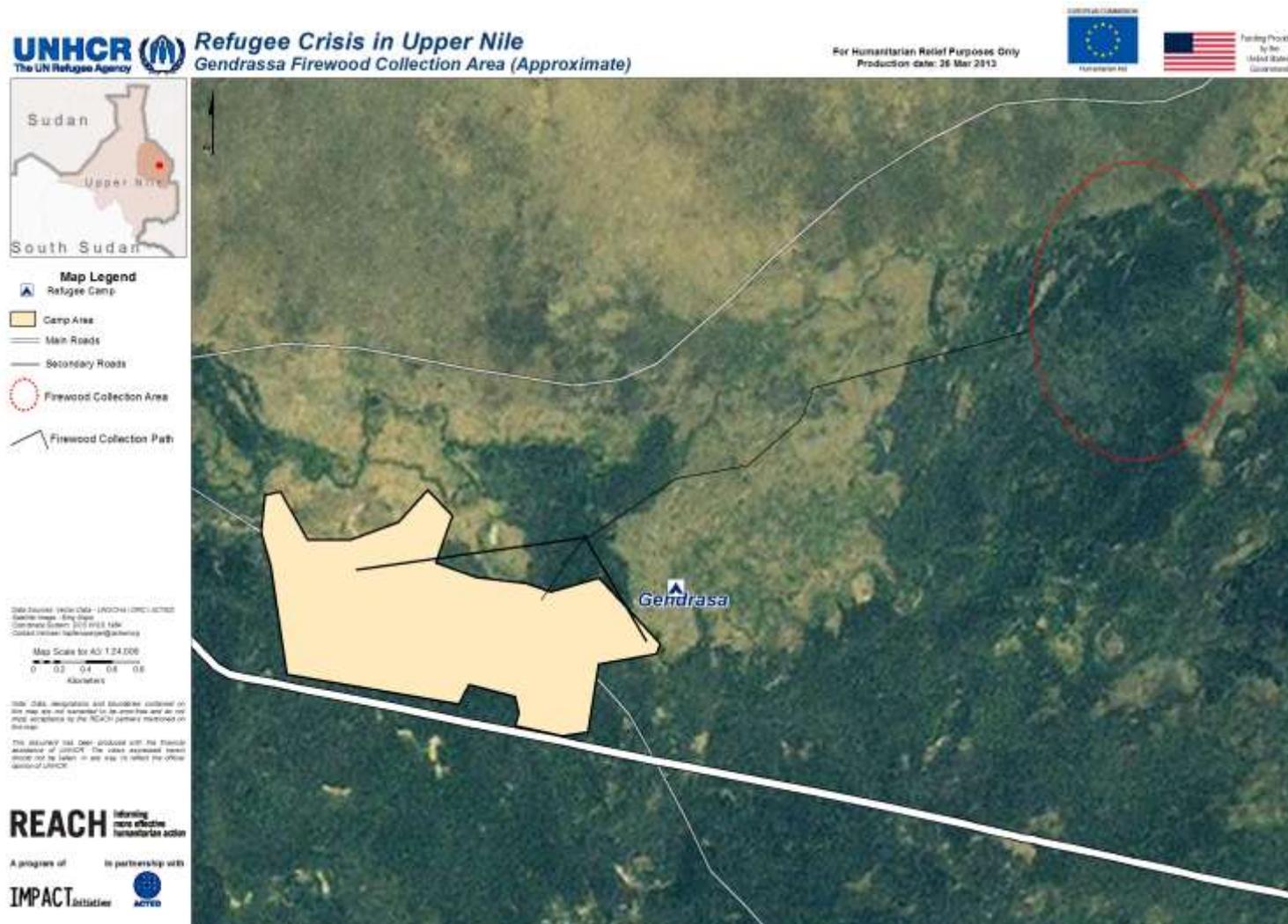
The map below shows collection areas focus groups reported using for firewood collection in Jamam and Gendrassa. Refugees state that if they collect wood outside of these areas, they face potential harassment from the host community. As previously discussed, in Jamam camp, the villages on the west side of the camp (closer to Jamam village) report more harassment from the host community than those on the east side of the camp.

Figure 3: Firewood collection areas around Jamam camp.



Source: REACH Assessment team

Figure 4: Firewood collection point around Gendrassa camp



Source: REACH Assessment team

According to households interviewed in Jamam and Gendrassa, if they are discovered collecting firewood by host community members, their firewood is confiscated and they are chased away. Respondents reported that on a few occasions the host community confiscated axes and knives used to cut the firewood. As households are allowed only to collect dead wood for firewood, interviewees reported that the punishment for cutting a live tree is either a fine or imprisonment.



Figure 5: Deforestation around Jamam camp (Source: REACH assessment team)

The deforestation caused by firewood collection, particularly around Jamam camp, has many potential negative consequences for both refugees and the host community. The lack of trees has left Jamam camp without a wind barrier and the tents are therefore more prone to damage during windstorms. Deforestation has the potential to change the local climate and contribute to flooding due to the decrease in transpiration of water ("Global Deforestation," Global Change, University of Michigan,

<http://www.globalchange.umich.edu/globalchange2/current/lectures/deforest/deforest.html>.

Downloaded 13 April 2013).

#### FIREWOOD COLLECTION WITHIN JAMAM AND GENDRASSA HOST COMMUNITIES

Host community members in both Jamam and Gendrassa host communities report increased collection times for firewood. In both communities, interviewees report that they previously gathered firewood within their community. However, in Gendrassa interviewees report walking four to six hours to collect firewood and in Jamam interviewees report spending six to seven hours to collect firewood. Similar to refugees, host community members report using a large bundle of firewood in three to four days. All host community respondents report that they use firewood for household consumption and do not sell firewood in the market.

### 1.2. CURRENT COMMERCIAL TRENDS OF ENERGY SOURCES

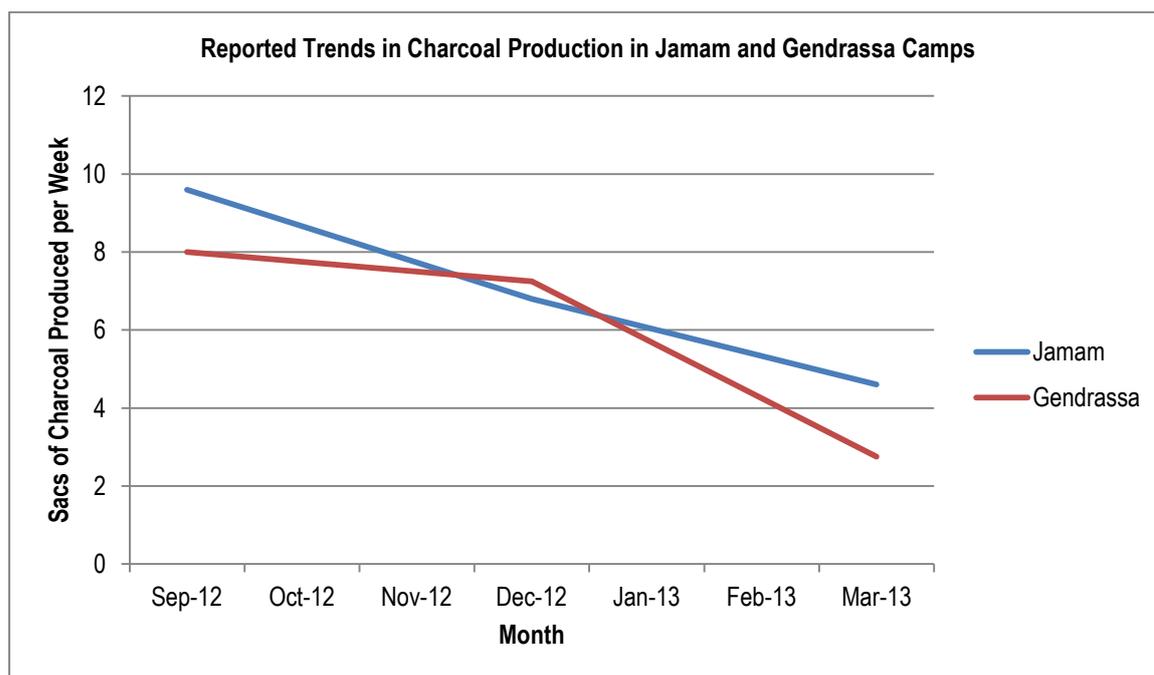
#### CURRENT SALE OF FIREWOOD BY JAMAM AND GENDRASSA REFUGEES

Very few of the women participating in the focus groups indicated that they sell firewood (approximately 15%). All firewood sellers are women and they sell only to the host community; refugees reported that they cannot afford to purchase firewood. Those not selling firewood stated that they are either unable to collect excess firewood to be able to sell or that it is culturally inappropriate for them to go to the market to sell firewood. The main markets for Jamam and Gendrassa camps are the Jamam village and MSF markets and the Gendrassa market.

#### CURRENT CHARCOAL PRODUCTION BY JAMAM AND GENDRASSA REFUGEES

Refugees in both Jamam and Gendrassa camps report that the number of charcoal producers in the camps has greatly increased in the past three to six months. They report that this is typical during the dry season. Because of this, the competition for obtaining wood has increased and the prices for selling the charcoal have fallen. Reported charcoal production has decreased considerably in the past three months. The reasons for this include an increased distance to collection points, higher competition for resources and selling, and decreased price.

Figure 6: Reported trends in charcoal production over time



Source: REACH assessment team

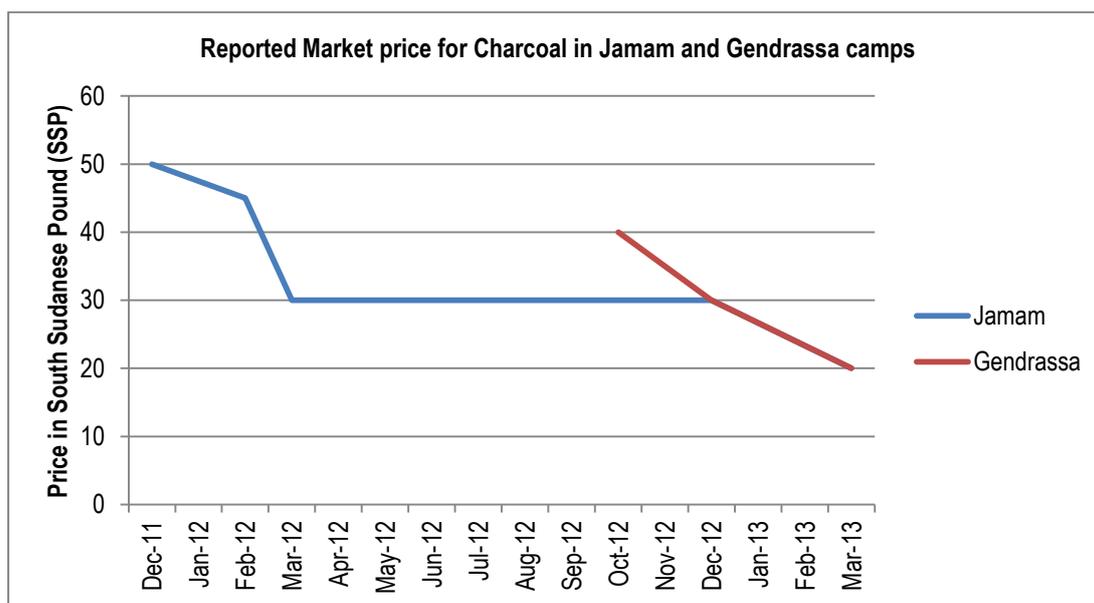
Charcoal producers described issues both with harassment from the host community and struggles with obtaining licenses from the payam authorities. Some villages report that a license from the payam authority is required in order to collect wood for charcoal and that only those producers who are able to pay the fee of 200 SSP per month or 300 SSP for two months are able to engage in the practice (others reported that this was only for large producers). In Midelik village, respondents reported that they are unable to obtain the license and therefore do not engage in charcoal production. Other respondents stated that if they are not able to purchase the license, they face the risk that their wood or charcoal will be confiscated by the police or that they will be arrested. Some respondents stated that without proof of the license for collecting firewood, they were not allowed to sell charcoal in the market. However, other respondents stated that they were allowed to sell in the market but had to pay a market fee of 2 SSP per sac of charcoal sold. One village in Gendrassa reported that they worked with host community members who had the license. They were allowed use of the license in exchange for a pre-agreed amount of the produced charcoal as payment. Respondents in Gendrassa reported more intensive harassment from the host community than did respondents in Jamam.

#### CURRENT IMPACT ON THE CHARCOAL MARKET

Charcoal is the main fuel source sold at the Jamam village and MSF market and the Gendrassa market; and occasionally in both camps in small quantities. The majority of charcoal is sold to host community. Charcoal vendors in all markets purchase their supply from both host community and refugees.

As the graph below shows, in Jamam camp, the price for charcoal has decreased over time since December 2011. This is in large part due to the entry of additional producers in the market and a relatively unchanged level of demand. In Gendrassa, the price of charcoal was initially higher than in Jamam when refugees were first resettled. However, over time, the price fell to the same level as in Jamam. In Jamam, some producers reported that they were saving the charcoal they are currently producing to sell during the rainy season when production will become more difficult and prices are likely to rise.

Figure 7: Reported market price for charcoal in Jamam and Gendrassa camps over time



Source: REACH Assessment team

In Gendrassa camp, charcoal producers reported that they were able to gather wood for charcoal production within the camp up until four months ago. However, it is no longer possible to collect the wood needed within the camp because of the limits on cutting trees imposed by camp sheikhs. Similarly, in Jamam, wood for charcoal production was being gathered within the camp up until six months ago. However due to deforestation in and around the camp, the charcoal producers now walk up to four hours away to collect wood for production. In both camps, wood is brought back to the camp to burn for safety. Because of these issues, respondents report that production has slowed from approximately two bags per day (14 per week) to one per day (seven per week).

Most refugee charcoal producers do not seek licenses for production, because they only produce in small quantities. Larger producers require a license. Generally, they choose to negotiate with a host community member who has a license. The refugee charcoal producer then collects the wood and produces the charcoal, providing the host community member a portion of the charcoal for use of the license. Refugees report that they are generally able to obtain the license, although a few stated that they had trouble getting the license in Jamam. However, for most, the license is prohibitively expensive. Without the license, refugees face potential for further harassment both from the host community and the police and they can also be barred from selling their charcoal in the market.

#### CURRENT CHARCOAL PRODUCTION BY JAMAM AND GENDRASSA HOST COMMUNITY MEMBERS

Host community interviewees report that before the influx of refugees, they sold charcoal in the market to large-quantity buyers from Malakal and Khartoum. During this time, they were able to burn charcoal near their home villages; currently they must walk three to five hours to burn charcoal and spend the night in that location. Due to the low price of charcoal, the difficulty of collecting wood and burning charcoal, and the lack of large-quantity buyers, they no longer engage in charcoal production. They report that the majority of sellers are refugees. This has left



Figure 8: Charcoal production near Jamam camp (Source: REACH assessment team)

many host community members jobless, although they do recoup some income by renting their tools to refugee producers.

Host community members also report difficulty in affording the licenses issued by the Ministry of Forestry. Interviewees stated that previously they did not need licenses at all, but now if they do not have a license they will be fined or arrested. In Gendrassa, interviewees report that the cost of the license depends on the size of the tree cut down; 50 South Sudanese Pounds (SSP) for a large tree to 2 SSP for a small tree. In Jamam, interviewees report that they pay 400-500 SSP for a license for two months. There does not seem to be consistency in the licensing process.

## 2. COOKING PRACTICES IN JAMAM AND GENDRASSA CAMPS

### 2.1. CURRENT SET UP OF COOKING AREA

Many of the observed households cook in a walled and/or roofed area. Households sometimes choose to cook inside their tent with the walls rolled up, other households create walled areas with grass or plastic sheeting. This is an indication that households are investing in their living area. It is also necessary, as the deforestation around the camps has exacerbated issues with wind. There are frequently reports of damaged or destroyed tents after wind storms.

Many households have both a three-stone stove setup and another stove. Respondents report that clay, metal, and wire stoves are only compatible with charcoal and cannot be used with firewood. They are not aware of stoves that use firewood, other than the three-stone setup. Because charcoal is only used for coffee and teapots and even then in a limited quantity

- 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 figure 8 below). It is entirely exposed to wind. This is by far the most common type of stove seen in the camps. A majority of households in both Jamam and Gendrassa have 3-stone stoves (up to 90% in both) even if they also use other stove types. Many households now have either grass walls or use plastic sheeting to create a roof or walls around their living area, including the kitchen. Most respondents reported that this cooking method was also used in their place of origin, but normally inside a walled area to protect it from wind.

In Gendrassa camp, some households reported being unable to find suitable stones for the 3-stone stove. These houses used bolts that are meant to tie down tents to elevate their pan above the fire. Similar to a 3-stone stove, this method is flat and therefore entirely exposed to wind.



Figure 9: Three-stone stove within walled area in Jamam camp (Source: REACH Assessment Team)



Figure 10: Stove made from tent bolts, within walled area in Gendrassa camp (Source: REACH Assessment Team)

- ii. Metal and wire stoves: Approximately 75% of observed households in Jamam and 50% of observed households in Gendrassa are currently using metal stoves made from emptied oil barrels. In Jamam, few households have wire stoves; however, they are considered the most durable. They are very expensive, up to 25 SSP in the market. Both metal stoves are more efficient than the three-stone stove, but not as efficient as the clay stove. Wire stoves are considered more efficient than three-stone stoves, however it is difficult to control the air supply with a wire stove and any gained efficiency is likely more attributable to cooking shelters than to the stove itself.



Figure 11: Metal stove alongside three-stone stove within cooking structure (Source: REACH Assessment)



Figure 12: Wire stove in shared space (Source: REACH Assessment)

**Clay stove:** Half of observed households in Jamam and one third of observed households in Gendrassa have clay stoves. Households reported that they have experience with energy efficient clay stoves and recognize that they use less fuel than other stoves, however they report that clay stoves are expensive and not durable. Respondents felt that clay stoves were too fragile and liable to break, particularly during the rainy season.

Though open flat stoves are adaptable and easy to use, open fires waste fuel, because 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). Up to 40-50% of the households interviewed had constructed a shelter around their cooking area.

Nearly all interviewed women reported that they were familiar with the use of energy efficient clay stoves. However, the price of 2-5 SSP (depending on size) is still considered too high for a stove that is not durable. These stoves can be constructed within the camp using local materials and a collective of stove producers exists, however, they have not had success in selling stoves.

## CURRENT INITIATIVES

In 2012, ACTED has planted 4,500 seedlings around Jamam and Gendrassa camps and host communities and elsewhere in Maban County. In 2013, an additional 3,500 tree seedlings are planned to be planted. Although tree seedlings will not relieve the pressures of energy use in the immediate term, the tree seedlings will aid in reforesting Maban County in the long term.

In addition, energy-efficient stove making cooperatives have been formed in both Jamam and Gendrassa. Currently, these cooperatives are being trained and the structure of the cooperative is being established. In 2013, the 30 members of the cooperatives (15 women in Jamam camp and 15 women in Gendrassa camp) will be trained on various stove designs to see which is most energy efficient and durable. Finally, the cooperatives will receive business training to establish them as livelihoods activities for women in the camps. An additional 150 women in the two camps will be trained on efficient cooking practices and tips for saving energy to use at home.

## INITIAL RECOMMENDATIONS

- ❖ There are stove-making collectives in existence in the camps. However, there is no market for their wares. This is because the stoves are too expensive and they are considered too fragile for regular use. In order for the collectives to be successful, they will need to lower prices and convince users that the stoves are sufficiently durable for regular use.
- ❖ Stoves such as clay and metal models should be adapted to be used with firewood, not only charcoal. Refugees should also be informed that they can use both forms of fuel with their stoves. Firewood is by far the most common cooking fuel used. If more efficient stoves are only adopted to use with charcoal, the rate of fuel consumption will not be significantly impacted because charcoal is used so sparingly due to the high cost. However, if energy efficient stoves are used with firewood, because of common usage, the rate of fuel consumption may decrease.
- ❖ Incentivize or subsidize purchase of energy-efficient stoves. Because refugees are not currently expending income on energy, they may not feel any economic incentive to purchase a stove requiring less fuel. "...If energy is free then any money spent on a stove only replaces human labor-which tends to be undervalued, especially if it is women's labor." (*Cooking Options in Refugee Situations*, UNHCR, pg 17). However, encouraging refugees to construct cooking shelters or improving access to the materials to build cooking shelters could also increase fuel efficiency.
- ❖ Efforts are already underway to reforest the area. These efforts should be continued and accelerated where possible. Although this is far from an immediate solution, the long-term benefits of reforestation include reduced flooding and improved shade ("Global Deforestation," Global Change, University of Michigan, <http://www.globalchange.umich.edu/globalchange2/current/lectures/deforest/deforest.html>. Downloaded 13 April 2013). In addition, the effort of reforestation may decrease tensions even in the short term, as host community members see that a long-term investment is being made in alleviating the pressure on resources.