

The background of the cover is a dark, night-time photograph of a street lamp. The lamp is on the left side, and its light is turned on, creating a large, bright yellow cone of light that dominates the right side of the image. The sky is a deep, dark blue or purple, suggesting dusk or dawn. In the bottom left corner, there are several small, out-of-focus yellow lights, likely from other street lamps or buildings in the distance.

HOW NIGHT-TIME **STREET LIGHTING** AFFECTS REFUGEE COMMUNITIES

A population-based assessment of community lighting
in Northern Uganda's Rhino Camp refugee settlement

December 2017



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TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
What did refugees say?	6
What did we learn?	9
PART I: INTRODUCTION	12
Background	12
Methodology	13
Research Team	13
Data collection	14
Interview Protocol	15
Data entry, analysis and interpretation	15
Limitations	16
PART II: DO COMMUNITIES BENEFIT FROM STREET LIGHTS?	17
A. What did refugees say about lighting and night-time safety?	17
B. Factors other than street lights affecting village safety	23
C. Effects of sTreet lights on night-time activity	24
D. Are adults and adolescents who live closer to lit areas more likely to go to them at night?	29
PART III: WHAT DID WE LEARN?	30
A. For UNHCR in Arua and partner organizations in Rhino Camp	34
B. For UNHCR operations planning community lighting interventions	35
C. For UNHCR Headquarters	36
ANNEXES	37
Annex A: Where are streetlights installed in Ocea and Odobu?	37
Annex B: Map of Solar Light Locations in Ocea	38
Annex C: Demographic composition of respondents	38
Annex D: Household Survey Instrument	40
Annex E: Informed Consent Script	53



EXECUTIVE SUMMARY

Each evening at around seven, solar-powered street lights switch on in northern Uganda's Rhino Camp refugee settlement. UNHCR installed these lights in half of the 14 villages in 2015 with funding from the *Safe from the Start* initiative. Refugee communities worked with UNHCR to determine where to install lights both to prevent violence and facilitate productive community activity.

Rhino Camp is one of nine displacement contexts in the world where UNHCR has recently installed community lighting. To discern whether night-time lighting prevents violence and crime, improves safety, and encourages productive night-time activity, UNHCR conducted the population-based study described in this report.

The mixed-method assessment took place in late 2016 in Rhino Camp – a majority South-Sudanese refugee settlement. The study comprised a household survey on refugee perceptions of fear in

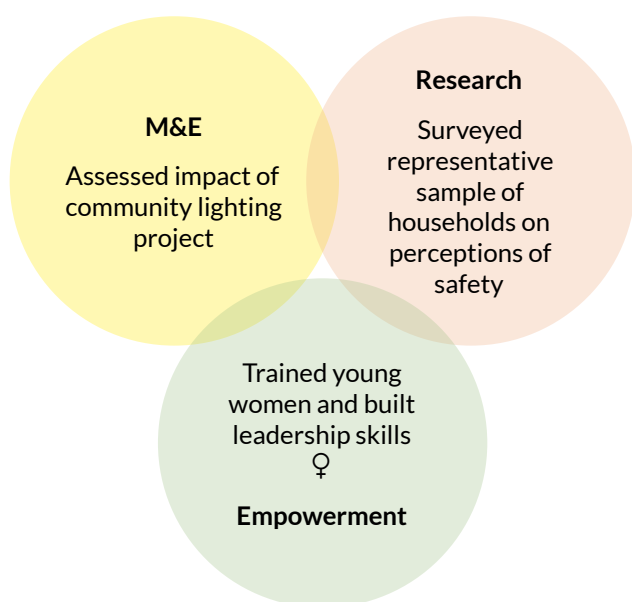
both lit and unlit locations, focus group discussions among refugees, as well as key informant interviews with community leaders, refugees, teachers, and police. The study represents the first known research on the protective effect of community lighting in a refugee settlement. In addition, the assessment utilized a participatory research approach in which refugees led data collection and analysis. Moreover, the assessment's focus on women's and youth empowerment contributed to the success of the overall project.

The assessment aimed to answer two main questions:

1. Does street lighting make communities safer at night?
2. How does street lighting impact community night-time activity?



Figure 1: The three components of the assessment



A research team of South Sudanese refugees living in Rhino Camp comprising 11 women and eight men aged 19-37 led the data collection. Each member of the team completed 60 hours of training over two weeks, covering survey methodology, interview skills, principles of ethical research, and informed consent. The group translated the 72-question survey into four local languages and adjusted the language and content of the survey to make it culturally relevant and applicable to the villages where it was conducted. Eight members of the team were trained to use handheld GPS devices, which they used to collect coordinates of each participant household, solar light post and other community structures. Statistical analysis was performed to determine the correlation between distance from home to light source and night-time activity.

The assessment comprised two phases:

➔ **Phase 1: Data collection from a household survey and focus group discussions (four weeks)**

The researchers conducted a survey among 171 refugee households; registration lists served as the sample frame on which systematic random selection was performed. Researchers interviewed the head of household and the oldest child of the same gender. A total of 267 refugees participated. Reflecting the gender composition of the entire camp, 86% of respondents were female. The households were selected among four villages – two without street lights (Katiku and Siripi) and two with lights (Ocea and Odoibu). In addition, 80 community members shared their opinions on the street lights in ten gender- and age-disaggregated focus groups.

➔ **Phase 2: Community-led data interpretation and key informant interviews (two weeks)**

The lead researcher returned to Rhino Camp in November 2016 to present preliminary data to four groups of six to ten refugees who reside in the four surveyed villages. Through interpretation provided by the local research team, residents collectively discussed and analyzed the preliminary findings. These community-based participatory data analysis sessions contextualized the quantitative data and demonstrated that community residents can best understand the data and the story it tells. The lead researcher also conducted seven semi-structured key informant interviews during this phase.

One notable challenge to assess the impact of lights on safety is the lack of baseline data prior to the installation of community lights. To account for this limitation, focus group discussions and key informant interviews aimed to gather refugee perspectives on night-time safety both before and after the installation of lights. Additionally, the survey instrument enabled a comparison between how often respondents experienced fear or had *something bad* happen to them during recent visits to lit locations and how often they experienced these in unlit locations. The phrase *something bad* is the English translation for the most commonly used expressions – in Nuer, Dinka, Bari, and Kiswahili – of being a victim of an aggressive act or encountering danger. Survey responses reveal that the *bad* experiences that respondents most commonly

fear are sexual and physical violence, theft, verbal harassment, injury, and encounters with animals.

WHAT DID REFUGEES SAY?

Through participation in household interviews, lively group discussions, and data interpretation sessions, refugees clearly state that solar-powered street lighting makes their communities safer and increases productive night-time activity.

QUESTION 1

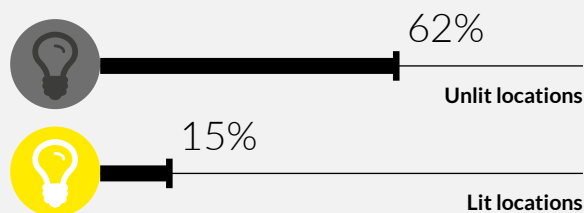
Does street lighting make communities safer at night?

The assessment measured safety by asking respondents their perceptions of fear as well as their actual experience. Qualitative data from focus group discussions and key informant interviews provided context for this quantitative data.

Rhino Camp residents believe night-time lighting makes their communities safer, prevents violence and theft, reduces fear, and prevents encounters with wild animals.

Refugees report that *something bad* happened to them during 31% of night-time visits to unlit locations, compared to 6% of visits to lit locations – a fivefold difference. Similarly, *something bad* happened to 37% of refugees who walked to unlit locations, making them nearly four times more likely to have a *bad* experience than people who walked to lit locations (10%).

Figure 2: Percentage of visits, by location, in which refugees fear *something bad* might happen to them



Residents and leaders of one village reported that after the installation of a solar-powered street light at a water collection point where night-time violence was common, such incidents have since stopped. The

Figure 3: Frequency of *something bad* happening to refugees, by location, at night

31%
Unlit locations



6%
Lit locations



If I remember 2014 before the lights, compared to 2015 and up to this day, cases of sexual violence have decreased because of these lights. Lights were installed in dark places where perpetrators went at night. When lights were put in those dark places, perpetrators ... no longer went to those places. They fear that they will be seen by other people. There has been a lot of great change.

Refugee Welfare Council Chairman, Ocea

Before the lights, SGBV was rampant... Solar lights help reduce SGBV at water points... Perpetrators feel ashamed. They fear to be exposed.

Female police officer, Rhino Camp

impact and protective effect of this one light cannot be over-stated, as many refugees are required to collect water at night, due to high day-time demand.

In addition to preventing physical assault or sexual violence at night, community lighting is strongly associated with higher perceptions of safety. In fact, refugees are four times more likely to fear *something bad* happening to them when they are in unlit locations (62%) than when they are in lit locations (15%). Fears of physical violence, sexual violence and theft are also lower in lit locations. In focus group discussions, adolescent girls, adolescent boys, adult women and adult men all agreed that community lighting makes them feel safe at night.

Focus Group participants across age and gender agreed on certain effects of lighting, including a reduction in the number of encounters with snakes and scorpions, and incidents of theft. Whereas men focused on how lights have reduced physical violence and deter cattle thieves, women and girls explained

how lights deter perpetrators of sexual violence, and shared concerns about night-time theft of food from inside their homes.

Even within villages that have installed community street lights, unlit areas remain a security risk. Some refugees explained that while violence does not happen in lit areas, it continues in areas without lights. For example, respondents walking along unlit pathways between home and lit locations fear *something bad* could happen to them in 60% of such trips. Thus, even when refugees go to lit locations, they acknowledge a degree of risk while walking in the dark.

When I am going to fetch water at evening, it is in the dark places that I fear. But when I reach the place where the water is, I will not fear because the light is there.

Adult female, Odobu

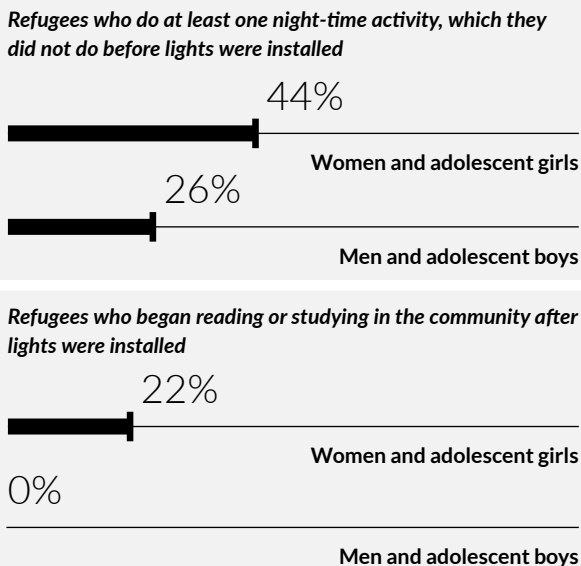
QUESTION 2

How does street lighting impact community night-time activity?

Since the installation of lights in Rhino Camp, productive activity in the seven villages with lights has increased compared to those villages without community lighting. More children play outside and more adolescents read and study under the light posts. Adults socialize and distribute food, and women's groups knit blankets underneath the solar-powered lights. Some female refugees have even generated a livelihood as a result of selling these blankets in nearby towns. Other pre-light-installation activities, such as choir practice, now have more participants.

Four out of ten refugees have begun a new night-time activity since community lighting was installed. In lit villages, 41% of respondents now do at least one night-time activity, which they did not do before the lights. The average respondent spends 49 minutes per night engaged in these new activities. More women than men have become productively active at night: 44% of women and adolescent girls in lit villages are doing at least one new night-time activity, compared to 26% of men and adolescent boys. The activity with the largest gender difference is reading or studying: 22% of women began reading or studying after lights arrived compared to 0% of men.

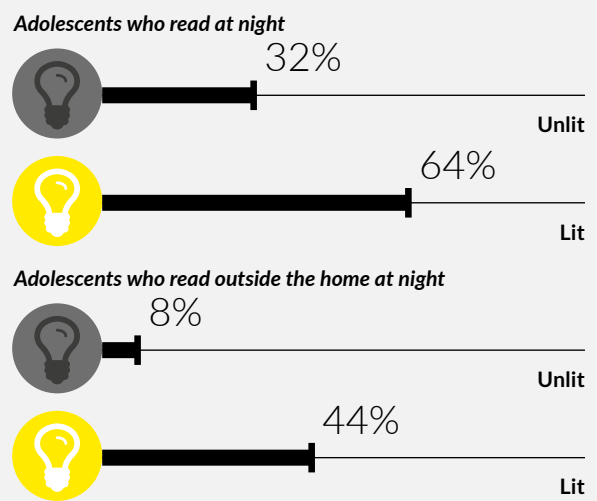
Figure 4: Percentage of refugees, by gender, who engaged in night-time activities since lights were installed



Lights enable adolescents to study at night.

Adolescents find the lights particularly useful for schoolwork and reading, as most do not have lanterns or light bulbs in their homes. Adolescents living in lit villages are twice as likely to read at night as their peers in unlit villages and more than five times as likely to read outside their homes. This added study time has directly impacted their grades; parents noted that their children's performance on school exams improved when they were able to study under community lights.


Figure 5: Percentage of adolescents, by location, who read or study at night



Lights attract edible insects. Nutritional benefits are one unexpected impact following the installation of community lights, as termites, which are a delicacy in South Sudanese households, are attracted to the lights. Residents regularly come to collect the termites, particularly after rainfall, as a food source.


Household proximity to lighting affects children's night-time activity. The research team collected GPS coordinates for each lamp post and surveyed household in order to discern whether people living closer to lights are more likely to walk outside at night compared to those living farther away from lights. Data reveal no variance among adults; however, children in Ocea village who go to the lit play area at night live on average 122 meters closer than those who do not venture outside at night. In the smaller village of Odoibu, children who go to the lit play area at night live on average 91 meters closer to it than those who stay home. Although the sample size of children who went to these locations does

not allow for statistically significant conclusions, this data supports qualitative evidence that proximity to lighting affects children's night-time activity.

 *The children play at evening. At first we don't want them to go outside when there was no solar light, but now there is a light here and the children can go and play.*

Adult female, Odoibu

Parents confirmed that they allow their children to leave the house at night only if their children go to a lit area close to the house. This underscores the finding that residents often feel unsafe when walking through unlit areas.

 *It is only when the solar light is near your home, you let her go. When the solar light has a distance, you will not allow her to go because in the middle you don't know what will happen to her.*

Adult female, Ocea

WHAT DID WE LEARN?

Through this community led assessment, Rhino Camp refugees demonstrate that solar-powered street lights prevent violence and stimulate productive night-time activity. Equally important as the lights themselves is the process by which community lighting is implemented. Establishing community-led management structures, prioritizing locations and walking pathways for lights, as well as real-time monitoring constitute good practices that derive from the Rhino Camp case study, and which may prove useful to other operations.

1. Community-based protection initiatives bolster the impact of community lighting.

Although community lighting has a protective effect (e.g., by deterring would-be perpetrators at night), lights alone do not obviate the need for other risk-mitigation initiatives. Residents of Rhino Camp

know that violence can still occur even after the installation of lights in their community. In fact, they express the importance of bolstering lighting with community-based protection, such as village water committees, night-time watch groups, and SGBV task forces. They also report the need for awareness-raising efforts, such as refugee-led SGBV community dialogues and youth-led peacebuilding initiatives with host communities.

Residents emphasize that these community policing and awareness-raising initiatives improve their safety, while empowering them through meaningful engagement and ownership of projects that impact their lives so directly. Previous UNHCR research on community-led policing and sensitization campaigns in South Sudanese refugee communities demonstrate their effectiveness in increasing both SGBV awareness and community involvement in SGBV response.¹ In addition, those who take part in such initiatives develop leadership and community mobilization skills.

2. Additional lighting along walkways and at water collection points provides additional protection.

Rhino Camp residents explained that many refugees can only collect water at night, due to high demand for limited water sources during the day. 57% of respondents collect water at night, constituting the only night-time activity many respondents do.

Despite having no community lighting, Katiku has the highest proportion of respondents who collect water at night (73%) – 35% of whom fear being physically or sexually attacked while doing so. In this and other villages, walking to collect water requires people to travel along unlit pathways, which residents consider unsafe; 38% of refugees who collect water at night fear being physically or sexually attacked while walking between their home and water collection areas.

¹ *Impact Assessment of the Community Watch Groups and Youth Trained Using the Pyramid Model in Adjumani, Uganda*, UNHCR Division of International Protection (2016).

As police, village leaders and community members explain, lights at water points have reduced violence. Refugees – most notably women and adolescent girls – point out the need for additional light posts along walkways to water points in order to further improve their safety.

3. Ongoing community leadership and engagement in the lighting initiative ensures better protection outcomes.

From assessment and implementation to monitoring and evaluation, ongoing community leadership and participation in this lighting project has led to increased security in villages. Decisions around the placement of light posts, how to safeguard them against vandalism, ensuring their maintenance, and monitoring their impact were all community-led. Before the light installation, village-level committees determined the locations for light posts based on a risk mapping exercise. Community members continually review where lights would be most beneficial, which resulted in the relocation of two lights in Agulupi village. Residents there conduct nightly patrols of lit areas. Where these patrols take place, none of the lights has been vandalized. Residents of other villages also observed that lights located at the edges of the community do not create the same feelings of safety as those in central areas, because central areas tend to attract more people, and being around other people increases perceptions of safety. Refugees also ensure the upkeep of light posts. In response to early vandalism of lights and theft of panels, community committees began patrolling lit areas at night. In two instances, patrols caught thieves attempting to steal solar panels.

Additionally, refugees led the research upon which this report is based. All 19 members of the UNHCR research team demonstrated strong commitment (many worked despite having malaria) and quality of work. They remarked on the skills and confidence they gained; since the assessment concluded, two team members worked as data collectors for another organization's research project, and two others became Rhino Camp youth representatives.

Recommendations

A. For UNHCR in Arua and partner organizations in Rhino Camp

1. Build community engagement and ownership of the lighting intervention; ensure that it leads in the assessment, planning, implementation, maintenance, monitoring, and evaluation of the lighting project
2. Work with communities to assess if lights are in the most effective locations, and relocate existing lights if community consultations suggest doing so
3. Continue to support formation and engagement of community-led policing and awareness-raising groups and include these groups in discussions on lighting
4. When more lights become available, consult communities about equipping lights with solar-powered mobile phone charging stations, which create income generating opportunities for residents
5. Institute scheduled meetings among UNHCR, partners, and village committees managing lights and charging stations
6. Increase availability of handheld solar lanterns for residents
7. Seek further opportunities for refugee youth to lead data collection or research initiatives
8. Consider expanding lighting coverage to host communities

B. For UNHCR operations planning community lighting interventions

1. Conduct a pre-assessment
2. Create a project management team
3. Engage the community in all phases, building refugee capacity
4. Develop a monitoring plan that measures achievement of desired outcomes
5. Support formation of community-led initiatives that enhance protection

C. For UNHCR Headquarters

1. Advocate for country operations to include community lighting as part of a comprehensive protection and SGBV prevention strategy
2. Ensure community lights are available in contexts where they cannot be obtained locally
3. When selecting new sites for camps or settlements, assess the geographical features that determine the feasibility of installing community lights, such as direct access to sunlight (in the case of solar lights) and soil conditions
4. Seek partnerships with, private, public and inter-governmental entities or foundations interested in supporting lighting initiatives

UNHCR and refugee community leaders must ensure that lights are installed in locations where they minimize, not introduce, protection risks

The results of this assessment show that:

1. Respondents in communities with lights often go to lit areas at night. Collecting water and reading/studying are the most common activities.
2. Respondents are frequently afraid that *something bad* might happen to them when they are walking along unlit pathways on the way to lit areas at night. Many of these unlit areas are deemed unsafe by community leaders and residents.

When examined together, these observations raise the question of whether lights cause refugees to incur protection risks that they otherwise would not. To answer this question, it is necessary to place people who go to lit areas at night into two categories:

Category 1: People who leave their homes out of necessity

As noted, water collection is the most common night-time activity, one that refugees must do at night, because they are unable during the day. For people collecting water at night, lights reduce protection risks by illuminating the areas where they collect water. The risk would be further reduced if lighting were installed along walking pathways to water points.

Category 2: People who leave their homes because lights enable them to engage in activities they otherwise wouldn't do

41% of respondents began a new night-time activity in the community after lights were installed. Assuming lights are bringing these people out of their homes, it is likely that while walking through dark areas, they face greater protection risks than they would if they stayed home. Residents are aware of these risks and take measures to mitigate them, in order to pursue activities they value, such as reading/studying. Among those who began reading/studying at night after the lights were installed, 60% walk to the reading/study area with other people, including 70% of women and adolescent girls. Because of the importance of reading and studying in the lives of Rhino Camp residents, many will continue to do so at night, even if they incur risk in the process. This risk would be reduced with the installation of lighting along walking pathways, or with greater availability of handheld lanterns, which would allow refugees to read and study in their homes.

The above reinforces the importance of (1) assessing, with community leaders, the perceived benefits versus the potential protection risks before implementing a lighting initiative, (2) installing lighting along walking routes refugees use at night and (3) conducting real time monitoring of the protection outcomes related to lighting, to ensure that lights are most effectively utilized to reduce protection risks.

PART I:

INTRODUCTION

BACKGROUND

In 2015, UNHCR crowd-sourced suggestions among staff, partners, and refugees for projects to prevent sexual and gender-based violence (SGBV). A multi-sectoral UNHCR team reviewed all submissions and selected four pilot projects to implement, including the installation of community street lighting in a refugee setting. Through support from the U.S.-funded *Safe from the Start* initiative, UNHCR installed 110 solar-powered community lights in three refugee settlements² in northern Uganda between April and June 2015.

Located in rural northern Uganda, Rhino Camp is home to more than 80,000 refugees³ – mostly South Sudanese who fled since July 2016. Other Rhino Camp residents come from the Democratic Republic of Congo, Rwanda, Sudan, as well as the host Ugandan community. 74% of all heads of household are women,⁴ and Rhino Camp is one of a growing number of refugee settlements across nine UNHCR operations where solar street lamps are in use. Between April and June 2015 UNHCR installed some three dozen community lights in 50% of Rhino Camp's 14 villages.⁵

² Uganda employs a refugee settlement model, under which refugees have freedom of movement and receive a plot of land from the government upon which to build a home or grow crops. This model differs from an encampment policy, under which refugee movement may be restricted. The settlement where this assessment took place, Rhino Camp, is composed of villages with residential areas and services. Roads connect the villages, which are several kilometers apart.

³ Rhino Camp site plan, 7 Feb. 2017

⁴ Food ID list, June 2016, Office of the Prime Minister

⁵ Since the conflict in South Sudan escalated in July 2016, the population of Rhino Camp has grown from 21,704 to over 80,000. 12 new villages have been constructed.

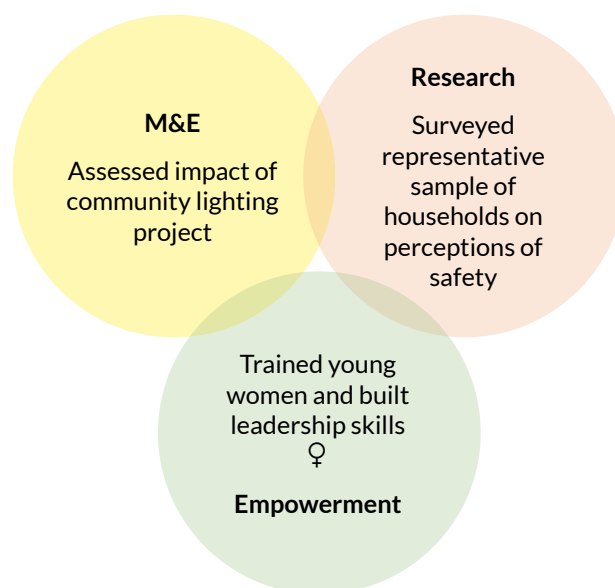


Figure 6: The three components of the assessment

As demand for community lighting far exceeded available funds, UNHCR worked with the refugee community and its partner the Danish Refugee Council to prioritize the strategic placement of lights within villages. The partners jointly selected locations where (1) refugees were prone to night-time violence, theft or other safety risks, and (2) lights would promote constructive night-time activity. (See Annex A: Location of Lights in Ocea and Odoibu.)

The installation of community lighting is still relatively novel in refugee settlements. To date, a desk review revealed no published research on the protective effects of street lighting in a refugee context; thus, UNHCR designed a research project to assess the impact of night-time lighting on refugee protection and community safety. Equally important as the results of this assessment, UNHCR designed this assessment as a youth and women's empowerment project, as described in this report.

METHODOLOGY

The assessment aimed to answer two questions:

1. Does street lighting make communities safer at night?
2. How does street lighting impact community night-time activity?

To answer these research questions, UNHCR employed four methodological approaches:

Household survey

Using a 72-question survey, researchers asked respondents what day- and night-time⁶ activities they and their children do, and whether they do these activities in lit or unlit locations. Researchers then asked respondents if they feared or had been victims of *something bad* while doing these activities. The phrase *something bad* is the English translation for the most commonly used expressions – in Nuer, Dinka, Bari, and Kiswahili – of being a victim of an aggressive act or encountering danger. Survey responses reveal that the *bad* experiences that respondents most commonly fear are sexual and physical violence, theft, verbal harassment, injury, and encounters with animals. The survey instrument (see Annex D: Household Survey Instrument) covered nine domains of inquiry:

1. Respondent demographic information
2. Household members
3. Sources of household lighting
4. Day-time respondent activities
5. Perceptions of fear during day-time activities
6. Night-time respondent activities
7. Perceptions of fear during night-time activities
8. Children's night-time activities
9. Perceptions of night-time safety

⁶ To ensure consistent understanding of terms, researchers clarified the definition of day as “when there is light in the sky” and night as “when the sky is dark”

Focus group discussions

Across ten focus group discussions, 80 refugees shared their perspectives on lighting, community safety and night-time violence and crime. At the suggestion of community leaders, separate discussions were conducted among adult men, adult women, adolescent boys, and adolescent girls.

Table 1: Overview of focus group discussions

Language	Composition (and number) of Focus Groups
Nuer	adolescent boys, adult men, adolescent girls, adult women (4)
Dinka	adolescent boys, adult men, adolescent girls, adult women (4)
Arabic (mixed ethnicities)	adolescent boys and adult men, adolescent girls and adult women (2)

Key informant interviews

The lead researcher conducted seven semi-structured interviews, averaging 40 minutes, with Refugee Welfare Council leaders, police, NGO partner staff and school teachers.

GPS data

The UNHCR research team collected GPS coordinates of each household that participated in the survey and each solar lamp post in order to discern whether people living closer to lights are more likely, compared to those living farther, to 1) walk to lit areas at night and 2) feel safe at night.

RESEARCH TEAM

A dedicated team of refugees from South Sudan, comprising 11 women and eight men aged 19-37, led the assessment. After an open call for applications and selection process, the team completed 60 hours of in-person training over two weeks, covering survey methodology, interview skills, principles of ethical research, and informed consent. The group translated the 72-question survey into four local languages and adjusted the language and content of the survey to make it culturally relevant and applicable to the villages where it was conducted.



Researchers earned work certificates for completing the training and field work. These certificates are valuable as proof of experience when team members apply for jobs. Photo: Dan Karlin



The UNHCR research team in the community during survey piloting. Photo: Emilia Bretan

One Dinka and one Nuer researcher back-translated the survey into each language. Back translation for Kiswahili and Bari was not possible, as community leaders explained that there are very few residents who are literate in Kiswahili or Bari and fluent in English.

UNHCR researchers to compare the prevalence of respondent fear and the occurrence of bad incidents in lit locations to those in unlit locations. The two villages without solar street lighting served as a control group.

DATA COLLECTION

UNHCR researchers conducted the household survey from 17 August – 6 September, 2016. After receiving informed consent from each household participant, researchers administered the survey through in-person interviews in respondents' homes in four of Rhino Camp's 14 villages: two unlit (Katiku and Siripi) and two lit (Ocea and Odoibu). Surveying households in both unlit and lit villages enabled

Sample frame

The Office of the Prime Minister (OPM) provided UNHCR a numbered list of the names of all heads of household in each village. To ensure a representative sample among these four villages, 15% of households across all villages was selected using a random number generator. The UNHCR research team conducted interviews in 171 households. (38% of selected households were not able to be found due to outdated registry lists, and 1% did not consent.)

Among the 171 randomly selected households, researchers conducted 267 individual interviews: 86% of respondents were female and 39% were adolescents. (See Annex C: Respondent Demographics.)



During the two-week training, the UNHCR research team practiced delivering the survey in mock interviews. Photo: Emilia Bretan

Table 2: Results of household and individual interviews

	Village type					
	Lit		Unlit		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Total Households (HH)	1,185	100%	710	100%	1,895	100%
HH randomly selected	98	8%	75	11%	173	9%
HH that participated	97	8%	74	10%	171	9%
HH response rate		99%		99%		99%
Population	5,850	100%	3,726	100%	9,576	100%
Population of selected HH	541	9%	428	11%	969	10%
Individuals reached	162	3%	109	3%	271	3%
Individuals who participated	160	3%	107	3%	267	3%
Individual response rate		99%		98%		99%

INTERVIEW PROTOCOL

To minimize bias, researchers were trained on the following protocol:

1. Before all interviews, obtain informed consent from the respondent. Read an informed consent script (see Annex E: Informed Consent Script) to respondents who are given the option to refuse consent.
2. Interview only members of the same gender.⁷
3. Conduct interviews only with members of randomly selected households.
4. Conduct interviews only with the registered head of household and the oldest child of the same gender as the head of household. Do not interview anyone else in the household.
5. Exclude anyone under age 13.
6. Conduct interviews in the respondent's mother tongue.

⁷ Community leaders believed that respondents would be more comfortable if interviewed by someone of the same gender, and suggested that UNHCR follow this protocol.

DATA ENTRY, ANALYSIS AND INTERPRETATION

A locally-recruited data entry clerk input survey data in to a database using CPro software. Statisticians cleaned the data, exported it to spreadsheets and organized it into tables, using SAS and R data analysis software. The tables displayed frequency and percentage values for responses to each survey question, and statisticians created additional tables to disaggregate data by gender, village and age.

Using Google Earth software and GPS data, the UNHCR research team created a map that calculated the distance of each respondent's home to each light in their village. Two epidemiologists supporting the assessment used the statistical program R to conduct hypothesis tests⁸ to determine if people living closer to lights are more likely, compared to those living farther, to 1) walk to lit areas at night and 2) feel safe at night. The lead researcher returned to Rhino Camp in November 2016 to present preliminary data to four groups of six to ten refugees who reside in the four surveyed villages. During these sessions, members of the research team showed participants the survey and explained the purpose of the research. The team also presented and described tables of survey data on the locations where respondents were most and least afraid at night. Through interpretation provided by the local research team, residents collectively

⁸ Analysis was done using a two-sample t-test with a one-sided alternative at a 5% level of significance.

discussed and analyzed the preliminary findings. These community-based participatory data analysis sessions contextualized the quantitative data and demonstrated that community residents can best understand the data and the story it tells.

LIMITATIONS

The data collection team adapted to numerous challenges during the assessment. The team met regularly to discuss and identify ways to mitigate these challenges. This was a valuable leadership development experience for team members. Nonetheless, there were limitations to this assessment that were beyond the team's control.

1. It is a challenge to assess the impact of lights on safety given the lack of baseline data prior to the installation of community lights. To account for this limitation, focus group discussions and key informant interviews aimed to gather refugee perspectives on night-time safety both before and after the installation of lights. Additionally, the survey instrument enabled a comparison between how often respondents experienced fear or had *something bad* happen to them during recent visits to lit locations and how often they experienced these in unlit locations.
2. To prevent or mitigate possible trauma, researchers did not gather detailed information on the nature of respondents' *bad* experiences. Further, respondents would be unlikely to share experiences of victimization with people whom they do not know and trust. Therefore, the survey did not produce data enabling comparison between the occurrence of violence in lit and unlit locations. To account for this, focus group discussions with refugees and semi-structured interviews with key informants, including a police officer and a village leader, provided opportunities to discuss whether lighting has had a preventive effect on violence. Additionally, the survey produced data on the effect of lighting on fears of violence.
3. To determine the effects of lights, this assessment compares how frequently respondents feel fear and have *bad* experiences in lit locations to how frequently they report these fears and experiences in unlit locations. Prior to the installation of community lighting, many refugees considered the areas that eventually received lights to be the least safe in their communities. It could therefore be argued that equivalent levels of fear or reports of *bad* experiences in lit and unlit locations would demonstrate that lights are effective in reducing violence and crime, because such incidents were previously more prevalent in areas that received lights. Because of this disparity, numeric data alone cannot tell the degree to which lighting affects night-time safety. Again, information obtained in focus group discussions and interviews helped address this gap.
4. While the research team sought to conduct as many surveys as possible, the survey sample in villages with and without lights may not be large enough to be true representative samples of the whole populations of these villages. To avoid sampling bias, a computer program randomly selected households from a list of people registered to receive food, and researchers conducted interviews only at these households. Although the heads of household were listed as living in Rhino Camp, many of them, particularly men, were living in the nearest town or another village in the camp when researchers sought them. Researchers lost time searching for people they were assigned to interview, only to learn that many of them had left the village. Additionally, because the registration lists were not reflective of the true population of each village, the degree to which the sample represents the total population is uncertain. Because of the lost interviews, UNHCR conducted a second round of random household selection. To avoid the same issue, village leaders reviewed randomly selected names and removed those who were absent before researchers went to conduct interviews. Nonetheless, if the population were more stable, researchers would have reached a larger sample of residents.

PART II:

DO COMMUNITIES BENEFIT FROM STREET LIGHTS?

SECTION I:

DOES STREET LIGHTING MAKE COMMUNITIES SAFER AT NIGHT?

A. WHAT DID REFUGEES SAY ABOUT LIGHTING AND NIGHT-TIME SAFETY?

Survey data confirms that refugees both feel safer and are less likely to be victims of bad incidents in lit locations than unlit locations. Additionally, in interviews and focus group discussions, refugees, NGO staff and community leaders credit lighting with preventing night-time SGBV and theft, enabling people to avoid animal bites, reducing fears and deterring criminals, as detailed in the paragraphs below.

Lights prevent SGBV.

UNHCR worked with the community to pinpoint where SGBV was prevalent at night and installed lights in these locations. Since lights were installed, leaders of Rhino Camp's SGBV prevention and response initiatives are convinced that lights are preventing SGBV.

A Refugee Welfare Council leader, who refers survivors to SGBV services, explains the change he has seen since lights were installed.

If I remember 2014 before the lights, compared to 2015 and up to this day, cases of sexual violence have decreased because of these lights. Lights were installed in dark places where perpetrators went at night. When lights were put in those dark places, perpetrators ... no longer went to those places. They fear that they will be seen by other people. There has been a lot of great change.

The SGBV Monitoring Officer at the Danish Refugee Council agrees. He works with Rhino Camp communities on mitigating SGBV and documents reports of SGBV. He also sees a reduction in night-time SGBV in lit areas.

[SGBV] incidents were happening in that same point, almost every week, but because solar lights have come, issues are no longer there.

A female police officer in Ocea also sees reduced SGBV at lit water collection points.

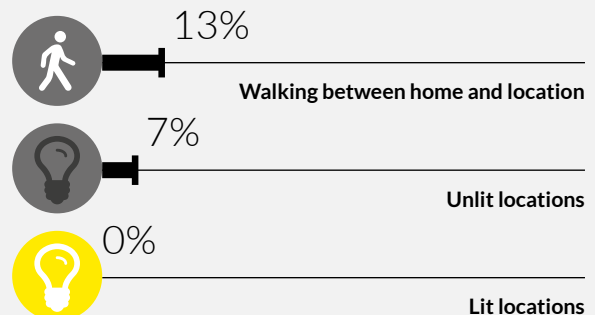
Before the lights, SGBV was rampant... Solar lights help reduce SGBV at water points... Perpetrators feel ashamed. They fear to be exposed.

This improved safety at water points benefits many residents, as water collection is the most common night-time activity in all four villages surveyed – 60% of women and adolescent girl respondents, and

34% of men and adolescent boy respondents collect water at night. Water collection generates more fear of sexual violence⁹ than any other night-time activity, because, as focus group participants explained, taps and boreholes are often located in dark and isolated areas. Although no men or boys report fearing sexual violence when collecting water (or any other activity), 10% of women and girls who collect water at night fear being victims of sexual violence while at the water collection point. Refugee women who collect water from lit water points at night advocated for the installation of more lights at water collection points, citing the sense of safety lights bring.

Survey responses confirm that women and adolescent girls fear sexual violence in unlit areas at night, but that lights eliminate this fear.

Figure 7: Percentage of visits, by location, in which female refugees fear sexual violence



Although women fear sexual violence in 7% of their night-time visits¹⁰ to unlit locations and 13% of the time when walking between home and the location of the activity, none fears sexual violence in lit locations. Women detailed why lights protect them from sexual violence.

When I am going to fetch water at evening, it is in the dark places that I fear, but when I reach the place where the water is, I will not fear because the light is there.

Adult female, Ocea

A woman who collects water at night in Ocea said that rather than go to an unlit water point near her house, she and her neighbors walk to a lit water collection point further away.

The borehole near me has no light, and is bushy, so I fear.

When a man gets you alone in a dark place, he does what he wants to you, but they now fear the place where the solar [light] is.

Adult female, Odobu

Links between darkness and fear of sexual violence emerged in women's and girls' focus group discussions.

Because when you are moving at night, then someone can also disturb you on the way, talking to you like this. When you run away, they try to rape you also.

Adolescent female, Ocea

¹⁰ Respondent reports of fear in lit and unlit locations are compared as percentage values. These percentages were obtained using the number of "yes" responses to the question "do you think something bad could happen to you when doing the activity?" and the total number of reported activities. For example, if survey respondents went to lit locations a total of 100 times, and were afraid *something bad* could happen to them in 20 of those visits, it can be said that respondents experienced fear in 20% of their visits to lit locations. The percentage does not represent the proportion of *people* who feared *something bad*. Using the example above, a total of 100 visits could occur if 100 people each visit the location once, if 50 people visit the location twice each, or other combinations.

⁹ Although police and community members working to prevent it use and understand the term SGBV, it was not used in the household survey both because there is no commonly used equivalent phrase in the languages of the community and because it is an unfamiliar term to most residents of Rhino Camp. Instead of SGBV, the survey uses Nuer, Dinka, Bari and Kiswahili expressions for sexual violence and physical violence.

Community members also cite the preventive effect of lights on physical violence.

We can approach people we see fighting and tell them to stop. People don't want to fight under lights.

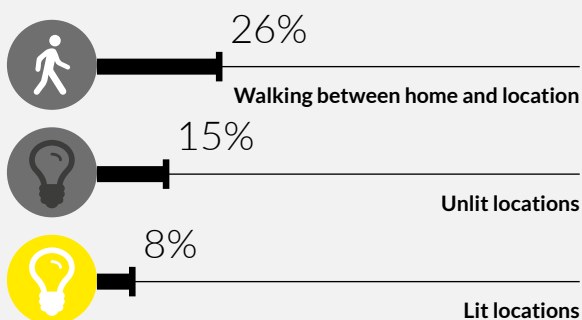
Adult male, Ocea

Before the lights, women going for water at night-time feared violence because it is too dark, but now that this light is here [the perpetrators] fear because they will be known.

Refugee Welfare Council leader, Ocea

Survey data also demonstrate that people are less likely to fear being physically attacked in lit locations than in unlit locations or on unlit walking pathways.

Figure 8: Percentage of visits, by location, in which refugees fear physical violence



Respondents are nearly twice as likely to fear being victims of physical violence in unlit locations as they are in lit locations. Further, the difference in fear of victimization is more than threefold between when respondents are walking on unlit pathways and when they are in lit locations. In addition to the difference in lighting, this disparity may exist because walking pathways go through isolated parts of the villages.

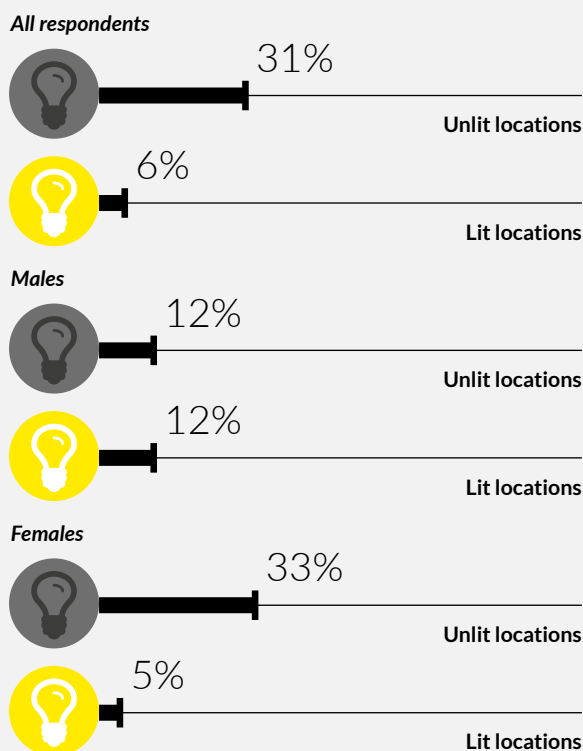
In a men's focus group discussion in Ocea, participants debated whether lighting causes violence to migrate to other areas or prevents it altogether. They noted that physical fighting occurs when disputes escalate, and had observed people leave a lit area to settle a dispute by fighting outside of public view. However, several participants

believed that while physical fights still happen, lights reduce their frequency, because many people do not want to be seen escalating disputes to the point of violence.

Refugees are victims of fewer *bad* experiences in lit locations.

Respondents who went to unlit locations at night were five times as likely to report that *something bad* happened to them as those who went to lit locations.¹¹ As mentioned, the *bad* experiences that respondents most commonly fear are sexual and physical violence, theft, verbal harassment, injury, and encounters with animals.

Figure 9: Frequency of *something bad* happening to refugees by location and gender



There is a significant difference between the experiences of male and female respondents. While men and adolescent boys are equally likely to be victims of *something bad* in lit or unlit areas, women and adolescent girls are between 6 and 7 times more

¹¹ As part of maintaining a safe environment for the interview, researchers did not ask the nature of the incident

likely to be victims of *something bad* in unlit areas than in lit areas. Because respondents did not detail what happened, survey data does not explain this gender disparity, but information from focus groups and interviews indicates that women are more likely to experience sexual violence and verbal harassment.

Although the safety of a village is a product of several factors, this data suggests that lights prevent bad experiences, particularly given that the community selected the areas that were least safe at night to receive lights. That is, prior to the installation of lighting, the frequency of *bad* incidents in these areas would likely have been higher than that of unlit locations.

Lights prevent theft.

Rhino Camp residents reported that theft is common at night, as thieves take food from distribution sites, steal cattle, or rob people.

However, in lit villages, male and female adolescents and adults agreed that lights prevent theft, and discussed different types of theft that affect them.

A woman who distributes food explained:

In the time when there is no light the people come, they take the sorghum. When you go to follow up they will beat you with the stick, you will not get them. When these people bring the solar light, we are distributing up through evening and there is nothing bad which can happen.

Adult female, Odoibu (lit)

Conversely, in areas without lighting, food theft continues.

They will wait for you to move away of your house. They will come inside your house, grab all the food inside your house and take, because you have no light. People are stealing because no light in the community.

Adult female, Siripi (unlit)

Adolescents focused on reduced personal robbery.

There are thieves that can attack people but they don't come to you when there is light.

Adolescent male, Ocea (lit)

Adult men in Odoibu (lit) spoke in a focus group discussion about cattle theft. Because cattle graze on fields, light from streetlights usually does not reach them. However, one participant stated that lights enable him to patrol cattle at night, while others requested additional lights in order to do the same.

In addition to preventing theft, lights reduce fears of theft. Survey respondents fear being robbed in 26% of their night-time visits to unlit locations, compared to 4% in lit locations.

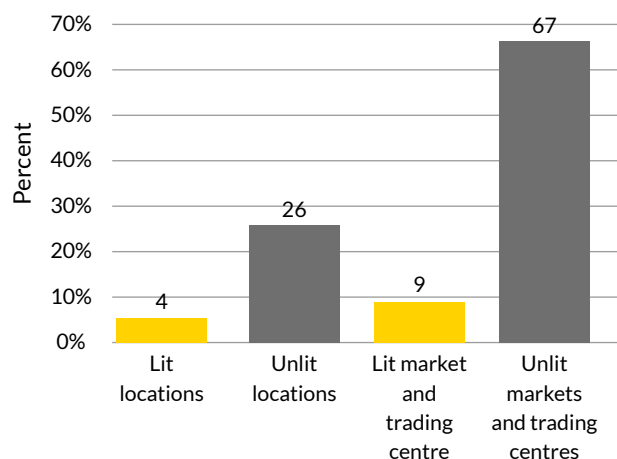


Figure 10: Percentage of visits, by location, in which refugees fear being robbed (n=108 [lit locations], n=203 [unlit locations], n=23 [lit market and trading centre], n=61 [unlit markets and trading centres])

Furthermore, people who go to unlit markets and trading centers at night are more than seven times more likely to fear being robbed (fear of being robbed in 67% of visits) than those who go to the lit market and trading center in Ocea (fear of being robbed in 9% of visits). All seven adolescent male focus group participants in Ocea agreed that since lights were installed they are less fearful of being robbed at night.

Results from another survey question demonstrate that residents of lit villages do not feel that theft is as great a threat to the safety of their villages as do residents of unlit villages. 19% of respondents in lit villages think theft is the greatest threat to the safety of their villages, compared to 31% of those in unlit villages.

Lights decrease encounters with dangerous animals.

According to several refugees, community lighting enables people to avoid dangerous animals.

We can now move to the latrine without fear. We used to have to walk through darkness and there were scorpions.

Adolescent male, Odoibu

They help me avoid stepping on broken glass, scorpions and snakes.

Adult male, Odoibu

An adolescent male in Ocea (lit) notes that after the light at the church collapsed, many people stopped coming due to fear of animal encounters.

People don't come to the church at night now, because there are snakes, which people fear when they can't see them coming.

Lights act as a deterrent to perpetrators.

Through interviews and focus group discussions, refugees repeatedly cited lighting as a deterrent to criminals.

Light exposes wrong people to be known.

Female community volunteer,
Danish Refugee Council

We used to see cases of fighting every night. People would wait in the dark and throw stones at people who got water. With light here, we can see who has done this. People are now afraid to do this because of lights and security.

Light chases away thieves.

Adult female, Ocea

Refugees are less fearful in lit areas.

Respondents were four times more likely to fear that *something bad* could happen to them in unlit locations at night (respondents were afraid in 62% of visits) than they were in lit locations (respondents were afraid in 15% of visits).

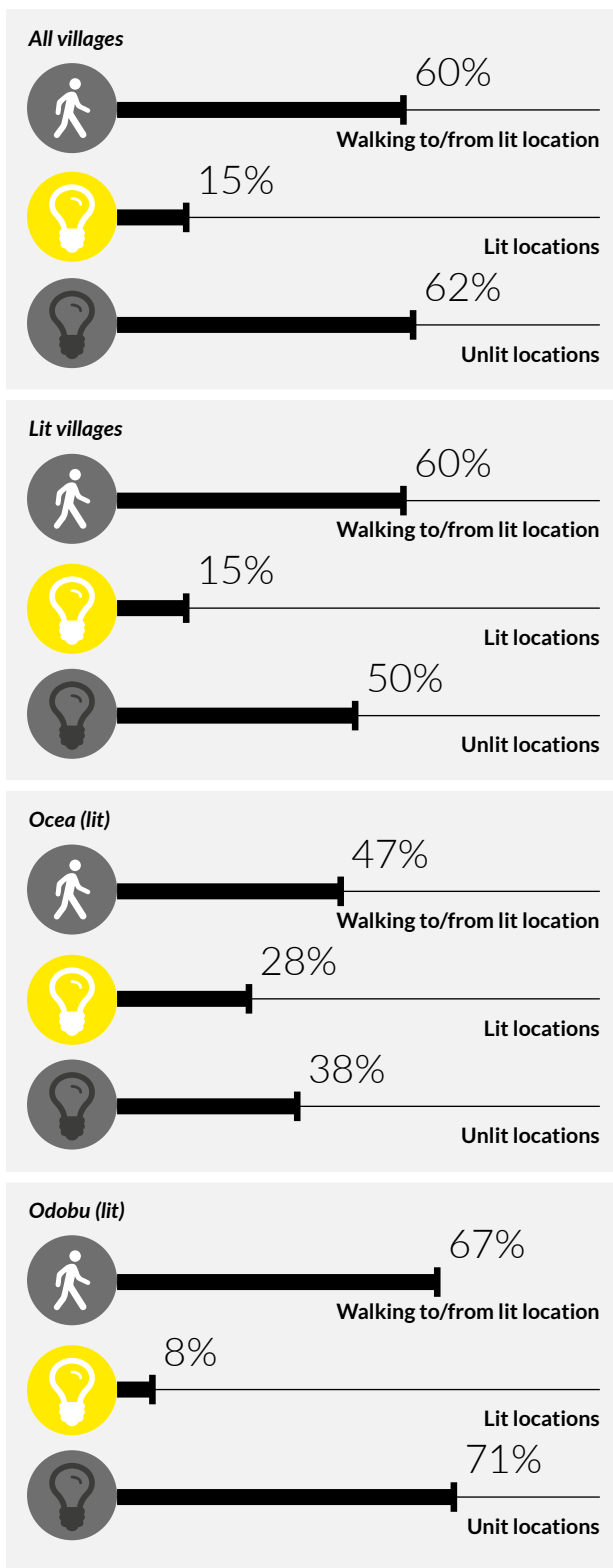
A focus group participant put these numbers into words.

Where there is light, you can feel safe.

Adult female, Ocea

Another set of data leads to the same conclusion. Because going to lit areas entails walking on unlit pathways, the survey asked respondents whether they feared *something bad* could happen to them when walking between their home and their destination. Comparing the prevalence of fear at two stages- 1) when walking through unlit areas, and 2) when in lit areas- it is apparent that residents of villages with lights feel safer when in lit locations than when walking on unlit pathways.

Figure 11: Percentage of visits, by location, in which refugees fear something bad might happen to them



In Odobu, respondents were more than eight times more likely to be afraid while walking through darkness than while in lit areas. Refugees from both villages explained the discomfort they feel when walking through darkness and the difference lights make.

When we reach the trading center it is OK, but moving there is not comfortable because of the lack of light.

- Adolescent male, Ocea (lit trading center)

We women come for prayer to church very early, like four AM up to morning here in church. When [you are] coming you will feel there is something, but when you are there (at the church) you feel ok.

Adult female, Odobu (lit church)

In focus group discussions and interviews, respondents explained that lights enable them to identify potential perpetrators from a distance, which creates a sense of safety.

Light is good because you can see people coming and they cannot harm you.

Adult male, Ocea

The above quantitative and qualitative data show that lights have a protective effect. To go a step further, UNHCR sought to determine if this protective effect extends beyond areas illuminated by lights, into nearby residential blocks. The UNHCR team calculated the distance from 93 of 97 surveyed households¹² in the two lit villages to the nearest street light, and statisticians supporting the assessment used this data to test the hypothesis below.

Hypothesis: The closer residents live to solar lights, the more likely they are to feel safe **outside** their homes at night.

¹² Researchers collecting GPS data could not confirm the location of four households, as they were unable to locate the heads of household.

Table 3: Average distances from household to the closest light among refugees who feel safe and do not feel safe at night

	Closest household	Furthest household	Feel safe outside home	Do not feel safe outside home	Mean difference	
Distance (meters)	15	347	149.0	122.9	26.1	t-stat=1.6 p-value=0.95

Responses to the survey question ‘Do you feel safe outside your home at night?’, to which respondents answered yes or no, were used to determine refugee perceptions of night-time safety. The test result does not indicate that living closer to street lights increases respondents’ perceptions of night-time safety. Respondents who feel safe outside their homes live an average of 26 meters *further* from lights than those who do not feel safe outside their homes.

When considering this data, it is important to recognize that most respondents live in completely unlit areas (see Annex B: Map of Solar Light Locations in Ocea), and even households closest to lights may be outside, or only partially in, the range of illumination (on average, respondents live 129 meters from the nearest light). As noted, respondents tend to feel less safe in unlit areas than in lit areas. Additionally, focus group participants explained that they frequently encounter snakes and scorpions near their homes. The risk of these encounters likely contributes to feelings of fear outside the home, even among respondents who live close to lights. Hence, the results of the hypothesis test suggest that while lights have a protective effect, this effect may not extend into nearby unlit areas.

B. FACTORS OTHER THAN STREET LIGHTS AFFECTING VILLAGE SAFETY

In community-based participatory data analysis sessions, refugees provided context to survey findings. They explained that while community lighting has a protective effect, there are several other factors that affect village and individual safety. These factors, detailed below, also emerged in interviews, focus group discussions and survey data.

Community policing and SGBV awareness-raising groups improve safety.

In conjunction with the lighting initiative, Rhino Camp communities established refugee-led groups to improve SGBV prevention and response.

(Awareness-raising campaigns) have been making people open up, especially young people (young girls). They are coming out more, reporting more.

Adult resident of Ngurua village

Table 4: Refugee-led SGBV prevention groups in Rhino Camp

Group	Function
Water committees	Water committees comprise community members who monitor water points during the day and at night. They intervene to prevent misuse of taps or interpersonal conflicts, and report incidents to community leadership.
SGBV task force	A group of people who follow up on reports of SGBV. They identify cases through home visits, then document and refer cases to watch groups. The task force conducts SGBV awareness dialogues in villages and attends quarterly meetings with SGBV partner organizations.
Watch groups	Watch groups have five members: two village leaders, a female youth, a leader of a women’s group and a security secretary. They link communities and implementing partners by following up on SGBV cases with police, health centers and courts. They report monthly to partners on SGBV activities and recommend topics for SGBV community dialogues. They patrol solar lights at night, and ensure that lights are maintained and cleaned.

Water committees, the SGBV task force and watch groups work in concert to both prevent SGBV, through raising SGBV awareness and patrolling the community at night, and strengthen SGBV response.

Village demographics affect perceptions of safety.

The population of Odoibu (lit) is 100% Dinka. This ethnic homogeneity creates a sense of community and trust. Only five percent of survey respondents in Odoibu stated that *something bad* happened to them in the previous 30 nights, compared to 21% in Siripi (unlit), 29% in Ocea (lit) and 49% in Katiku (unlit). Residents explained that due to the village's strong leadership and sense of community, none of the solar lights was vandalized or had panels stolen. Residents of other villages also understand the sense of safety linked to living in ethnically homogeneous areas. An interviewee in Ocea explained, "*If you are one tribe, you cannot fear.*"

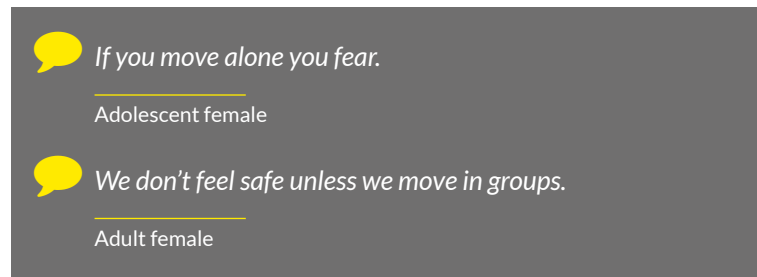
In villages with ethnically mixed populations, residents mentioned distrust or fear of either Ugandan nationals or members of other ethnicities. The history of animosity between the South Sudanese Nuer and Dinka is apparent, as village leaders discouraged the UNHCR research team from holding inter-ethnic discussions, and UNHCR and Danish Refugee Council staff suggested that interviews in South Sudanese households be conducted by a researcher of the same ethnicity as the respondent.

Using handheld lighting reduces perceptions of fear.

Respondents who carry handheld lights (flashlights, lanterns or phones) when walking at night are less likely to feel afraid than those without light. Across all villages surveyed, respondents who bring handheld lights fear *something bad* could happen to them in 67% of trips between their homes and locations of night-time activity, compared to 77% of trips among people who don't bring handheld lights. Community members explained that handheld lights enable them to avoid stepping on scorpions or snakes.

Refugees walk in groups for protection at night.

Whether going to collect water, to the market, or to study under street lights, refugees stated that they feel safer when walking in groups. Participants in focus groups explained:



Peacebuilding activities improve village dynamics.

In many villages a strained dynamic exists between members of rival ethnic groups or Ugandan nationals and refugees. However, in Siripi (unlit), residents lead peacebuilding activities that bring together refugees and Ugandan nationals for sport, singing and socializing. A Ugandan woman living in Siripi explained that these activities build familiarity and trust between refugees and Ugandan nationals, and improve village safety.

SECTION II: HOW DOES STREET LIGHTING AFFECT COMMUNITY NIGHT-TIME ACTIVITY?

C. EFFECTS OF STREET LIGHTS ON NIGHT-TIME ACTIVITY

In addition to providing safety, lighting can alter night-time village dynamics. Lights have the potential to stimulate night-time activity, such as studying, but they can also have negative effects, such as attracting stinging insects, that prevent people from engaging in night-time activity. Therefore, this assessment examined what effects lights have on night-time community activity.

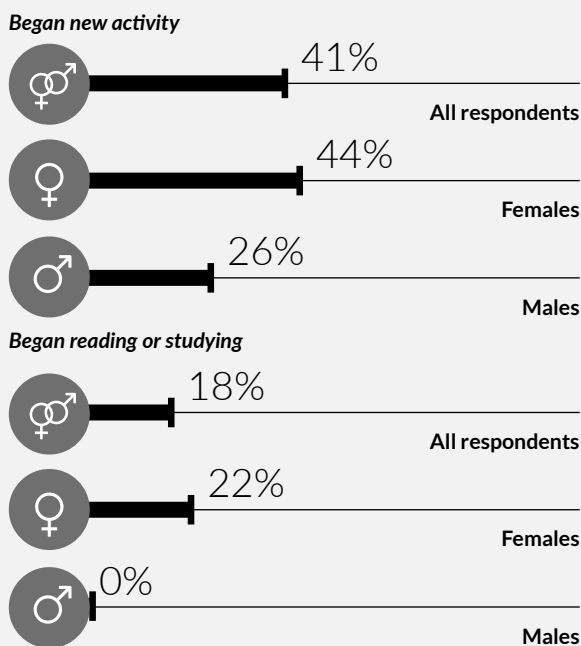
Survey and qualitative data indicate that lights stimulate night-time activity in Rhino Camp. Lighting 1) brings additional people to existing activities,

such as cultural events or night markets, and 2) enables people to engage in new activities that require quality light, such as reading, studying, playing and knitting. These two outcomes appear in 1) refugee comparisons of their current night-time activities, and those prior to June 2015 (when UNHCR installed lights), and 2) the proportion of respondents who read, study, play and knit at night, and how much time they spend doing so, in villages with lighting compared to those without lighting. The sections below present these comparisons.

Four out of ten refugees have begun a new night-time activity since community lighting was installed.

Night-time activity in lit villages increased after UNHCR installed lights. In these villages, 41% of respondents now do at least one night-time activity, which they did not do before the lights. The average respondent spends 49 minutes per night engaged in these new activities. More women than men have become productively active at night: 44% of women and adolescent girls in villages with lights are doing at least one new night-time activity, compared to 26% of men and adolescent boys. The activity with the largest gender difference is reading or studying: 22% of women began reading or studying after lights arrived compared to 0% of men.

Figure 12: Percentage of refugees, by gender, who have begun new night-time activities since community lighting was installed



Refugees also said that presence of light determines whether they use latrines at night.

We are not going outside for urinating, you bring your basin in to urinate.

Adult female who lives near an unlit latrine

We don't go to the toilet (at night). If you don't have light, you won't go there.

Adult male, Odobu

I live near a latrine that has a light, so I can move there without fear.

Adolescent male, Odobu

Lights enable refugees, particularly adolescent girls, to read and study at night.

Refugees explained that community lights enable students and teachers to work, and others to read books or the bible.

Among survey respondents in lit villages, close to one in five (18%) reports that since lights arrived, they have begun going into the community to read or study at night. An adolescent girl who reads underneath the light at night noted that previously, she “(couldn't) read at night because of no solar light.” Women and girls and adolescents are the beneficiaries: 100% of those who began reading or studying at night after lights were installed are female, and 76% are adolescents. These women and girls devote significant time to night-time reading or studying. In the 30 nights prior to the survey, they spent approximately 1150 person hours, or 79 minutes per person per night reading or studying in the community.

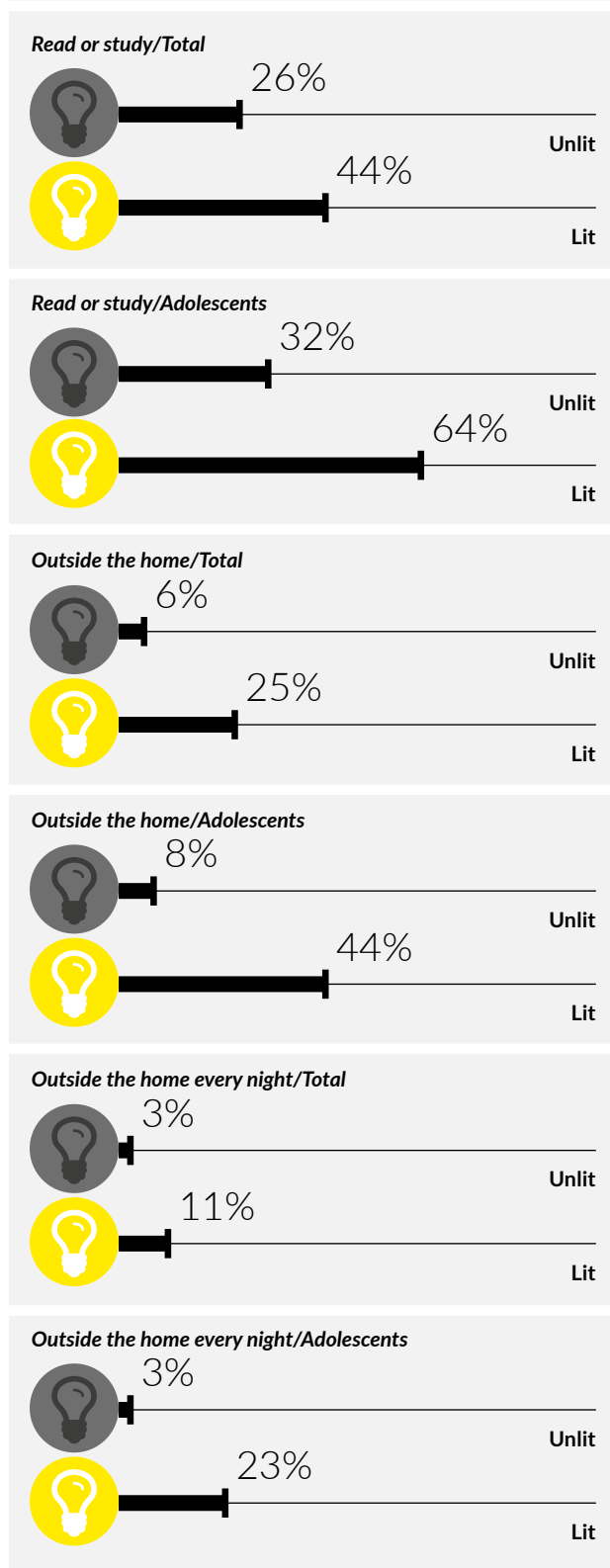
Survey data also shows that people in lit villages are more likely to read or study at night than people in unlit villages. One in four (25%) respondents from lit villages leaves his/her home at night to read or study in the community, and 11% read or study outside the home every night. In comparison, in unlit villages, 1 in 17 respondents (6%) goes into the community to read or study at night, with 3% doing so every night.

Many adolescents use the lights to read and study every night during the school year. Compared to

adolescent respondents in unlit villages, adolescents living in lit villages are twice as likely to read at night (64% / 32%), nearly six times as likely to read outside their homes at night (44% / 8%), and nearly eight times as likely to read outside their homes every

night (23% / 3%). Studying under street lights is so popular that crowding is an issue. A male focus group participant reported seeing adolescents argue over a space to read underneath a light in Ocea, because people were reading in all of the other lit space.

Figure 13: Percentage of refugees who read or study at night, by age and location



In a focus group discussion, adolescent boys in Odobu explained that they choose to read or study under the lights rather than at home, where they are “tempted to sleep”, or lack adequate lighting. Few respondents own solar lanterns or light bulbs, and although many own battery-powered torches or phones, they do not read with them due to the cost of purchasing batteries or charging phones.

Table 5: Sources of light refugees use at night

Light source	% of refugees (n=267)
Fire	74%
Battery-powered torch	42%
Mobile phone	38%
No light source	4%
Paraffin lantern	4%
Solar-powered lantern	3%
Solar-powered light bulb	2%
Candles	2%

Given these challenges, 64% of refugees in lit villages who read at night do so outside of their homes.

We don't have lights at home, so we need to read at the lights.
 Adult male, Odobu

A parent in Ocea (lit) said that one light, which was undergoing repairs at the time of the assessment, had made a significant impact on the school performance of children in her part of the village.

Our children last year passed examinations, but they have failed this year because the light is not there. It was so good when this light was here. Going back to school, children cannot forget things because last night they read, but this year our children failed because this light is not there.
 Adult female, Ocea



Members of the church choir group in Odobu practice in the early evening. When the sun sets, choir practice continues underneath the solar light. Photo: Emilia Bretan



Women display a blanket they knit under the solar lights, which will be sold in the nearest town. Photo: Emilia Bretan

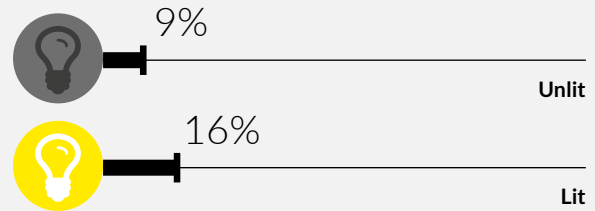
Lights increase community religious and social activity.

Since lights were installed, more residents participate in night-time religious activity such as church choirs and group dances. In lit villages, 13% of respondents began going to night time religious or cultural events after lights were installed, comprising 48% of all participants in the 30 nights prior to the survey.

Residents of lit villages who attend night-time religious events do so more frequently than residents of unlit villages. Among the people who participate in religious activity, 24% from lit villages do so nightly, compared to 7% from unlit villages.

Lights also enable people to socialize at night. Respondents in Odobu, where social gathering areas including the youth center and church are lit, are twice as likely to socialize¹³ at night (25%) than respondents in Katiku (13%), three times more likely to do so than respondents in Ocea (8%), and four times more likely to do so than respondents from Siripi (6%). Adolescents go to the youth center for dramas, and adults talk with neighbors at the church. Overall, 16% of refugees in lit villages socialize at night, compared to 9% in unlit villages.

Figure 14: Percentage of refugees who socialize at night, by location



The arrival of lights greatly increased night-time social activity in Odobu (lit). Among respondents who socialize at night, 68% began doing so since lights came to the village.

Women earn income by knitting underneath lights.

After lights turn on in Odobu, women gather knitting supplies and walk into the village, where they make blankets and bed sheets under the lights. The women earn income from the sale of these products in the nearest town. Of the nine respondents who knit at night in Odobu, six began doing so after lights arrived. All nine knit under community lights, and six of them knit every night. In comparison, two respondents in unlit villages knit at night, doing so in their homes.

¹³ Because there is no direct translation for to the English term 'socialize', researchers translated the term into local expressions for gathering with people to talk or drink tea.

Lights attract edible insects.

Nutritional benefits are one unexpected impact following the installation of community lights, as termites, which are a delicacy in South Sudanese households, are attracted to the lights. Residents regularly come to collect the termites, particularly after rainfall, as a food source. The Chairman of the Refugee Welfare Council in Ocea, observes:

During rainy season, because of that light, termites come. These people who eat them come and collect.

Chairman, Refugee Welfare Council, Ocea

Children in lit villages, particularly those who live close to lit areas, are more likely to read or play at night.

The benefit I am seeing from these lights, children go and read under those lights at night.

Chairman, Refugee Welfare Council, Ocea

Because children under 13 could not participate in the survey, heads of household detailed the night-time activities of each child living with them. In all four villages surveyed, reading/studying is the most common night-time activity among respondents' children. However, children in lit villages are more than twice as likely to read at night as children in unlit villages. 15% of respondents' children in lit villages read at night, compared to 7% in unlit villages.

While older children read or study at lights, younger children play.

The children play at evening. At first we didn't want them to go outside when there was no solar light but now there is a light here and the children can go and play.

Adult female, Odoibu

For some parents, the distance between their home and the nearest light determines whether they allow their children to leave the home. One parent explained:

GPS data suggests that other parents also are more likely to allow their children out of the house at night

It is only when the solar light is near your home, you let her go. When the solar light has a distance, you will not allow her to go because in the middle you don't know what will happen to her.

Adult female, Ocea

if a light is nearby. According to residents, the Early Childhood Development Center (ECD) in Ocea and the Distribution Center in Odoibu are areas where children study and play underneath lights at night. GPS data shows that children who go to the ECD at night in Ocea live an average of 122 meters closer to it than those who don't go, while in Odoibu, the children who go to the distribution center live an average of 90.8 meters closer than those who stay home.

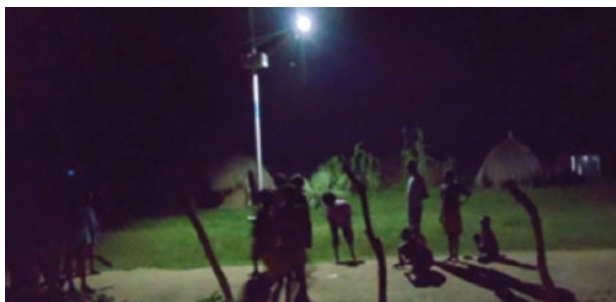
Although the sample size of children who went to these locations does not allow for statistically significant conclusions, this data supports qualitative evidence that proximity to lighting affects children's night-time activity.

Table 6: Mean distances (meters) from home to lit areas among children who went to lit play areas and those who did not go

Village	Location	Went to lit area	Did not go to lit area	Mean difference	
Ocea	Early Childhood Development (ECD) Center	320.9	442.9	122	t-stat = 2.6 p-value = 0.008
Odoibu	Distribution Center	120.3	211.1	90.8	t-stat = 1.8 p value = 0.06

People go to the lights because they are near to them, but when you are living far, you will not come. I have an advantage because my kids live near the distribution center [where there is a light] and my kids play there.

Adult male, Odobu



Children play underneath a solar light in Agulupi Village, Rhino Camp. Photo: John Jal Dak

Night-time activities that were difficult to do in darkness are now easier.

Lighting allows refugees to more easily take part in night-time activities, particularly collecting water. Many residents collect water at night due to heavy demand on limited water points during the day. A focus group participant detailed the difference light makes when he collects water.

Before the lights it was very difficult to see when fetching water but now it is easier. We request that the lights come to other parts of the community so that those people can get the benefits.

Adult male, Odobu

D. ARE ADULTS AND ADOLESCENTS WHO LIVE CLOSER TO LIT AREAS MORE LIKELY TO GO TO THEM AT NIGHT?

As detailed, children who live closer to lit play areas are more likely to go to these areas at night than children who live farther away. UNHCR also assessed whether adults and adolescents who live closer to lit areas are more likely to go to them.

For each light, the data analysis team tested the hypothesis that the average household-to-light distance among adults and adolescents who went is shorter than that of the adults and adolescents who did not go. That is, that the adults and adolescents who went to the lit area live closer to it, on average, than the adults and adolescents who did not go.

The test showed that for four of the five lights analyzed, the people who went to the light lived closer to it on average than the people who did not go. However, the differences in distance are relatively small (2-88 meters), given that each village has more than 500 households. Moreover, for the light at the school, where adolescents study at night, the people who went to the light lived an average of 46 meters further away from it than those who did not go. This data suggests that adults and adolescents who go to lights are not only those who live closest. Refugees walk long distances to lights, as evidenced by the average distance of 812.6 meters they walked to the school, where adolescents read and study underneath the light.

Table 7: Mean distances (meters) from home to lit areas among residents who went to lit areas and those who did not go

Village	Location	Went to lit area	Did not go to lit area	Mean difference	
Ocea	School	812.6	766.5	46.1	t-stat = 0.4 p value = 0.65
	ECD	346.5	434.6	88.01	t-stat = 0.98 p value = 0.19
Odobu	Church	109.9	137.2	27.2	t-stat = 1.8 p value = 0.04
	Distribution Centre	164.6	212.1	47.5	t-stat = 1.8 p value = 0.04
	ECD	345.9	348.0	2.1	t-stat = 0.13 p value = 0.55

PART III:

WHAT DID WE LEARN?

SECTION 1: WHAT MAKES A LIGHTING INTERVENTION SUCCESSFUL?

Through this community led assessment, Rhino Camp refugees demonstrate that solar-powered street lights prevent violence and stimulate productive night-time activity. Equally important as the lights themselves is the process by which community lighting is implemented. Establishing community-led management structures, prioritizing locations and walking pathways for lights, as well as real-time monitoring constitute good practices that derive from the Rhino Camp case study, and which may prove useful to other operations.

1. Community-based protection initiatives bolster the impact of community lighting.

Although community lighting has a protective effect (e.g., by deterring would-be perpetrators at night), lights alone do not obviate the need for other risk-mitigation initiatives. Residents of Rhino Camp know that violence can still occur even after the installation of lights in their community. In fact, they express the importance of bolstering lighting with community-based protection, such as village water committees, night-time watch groups, and SGBV task forces. They also report the need for awareness-raising efforts, such as refugee-led SGBV community dialogues and youth-led peacebuilding initiatives with host communities.

Residents emphasize that these community policing and awareness-raising initiatives improve their safety, while empowering them through meaningful engagement and ownership of projects that impact their lives so directly. Previous UNHCR research on community-led policing and sensitization campaigns in South Sudanese refugee communities

demonstrate their effectiveness in increasing both SGBV awareness and community involvement in SGBV response.¹⁴ In addition, those who take part in such initiatives develop leadership and community mobilization skills.

2. Additional lighting along walkways and at water collection points provides additional protection.

Rhino Camp residents explained that many refugees can only collect water at night, due to high demand for limited water sources during the day. 57% of respondents collect water at night, constituting the only night-time activity many respondents do.

Despite having no community lighting, Katiku has the highest proportion of residents who collect water at night (73%) – 35% of whom fear being physically or sexually attacked while doing so. In this and other villages, walking to collect water requires people to travel along unlit pathways, which residents consider unsafe; 38% of refugees who collect water at night fear being physically or sexually attacked while walking between their home and water collection areas.

As police, village leaders and community members explain, lights at water points have reduced violence. Refugees – most notably women and adolescent girls – point out the need for additional light posts along walkways to water points in order to further improve their safety.

¹⁴ *Impact Assessment of the Community Watch Groups and Youth Trained Using the Pyramid Model in Adjumani, Uganda*, UNHCR Division of International Protection (2016).



Residents of Katiku (unlit) wait in line to use the water pump in the early evening. Photo: Gatluak Ganyang Lok



Residents of Agulupi village collect water from a lit water point. Photo: John Jal Dak

3. Ongoing community leadership and engagement in the lighting initiative ensures better protection outcomes.

From assessment and implementation to monitoring and evaluation, ongoing community leadership and participation in this lighting project has led to increased security in villages. Decisions around the placement of light posts, how to safeguard them against vandalism, ensuring their maintenance, and monitoring their impact were all community-led. Before the light installation, village-level committees determined the locations for light posts based on a risk mapping exercise. Community members continually review where lights would be most beneficial, which resulted in the relocation of two lights in Agulupi village. Residents there conduct nightly patrols of lit areas. Where these patrols take place, none of the lights has been vandalized. Residents of other villages also observed that lights located at the edges of the community do not create the same feelings of safety as those in central areas, because central areas tend to attract more people, and being around other people increases perceptions of safety. Refugees also ensure the upkeep of light posts. In response to early vandalism of lights and theft of panels, community committees began patrolling lit areas at night. In two instances, patrols caught thieves attempting to steal solar panels.

Additionally, refugees led the research upon which this report is based. All 19 members of the UNHCR research team demonstrated strong commitment (many worked despite having malaria) and quality of work. They remarked on the skills and confidence

they gained; since the assessment concluded, two team members worked as data collectors for another organization's research project, and two others became Rhino Camp youth representatives.

4. Residents of Rhino Camp appreciate solar lights and feel that additional lighting would further improve night-time safety.

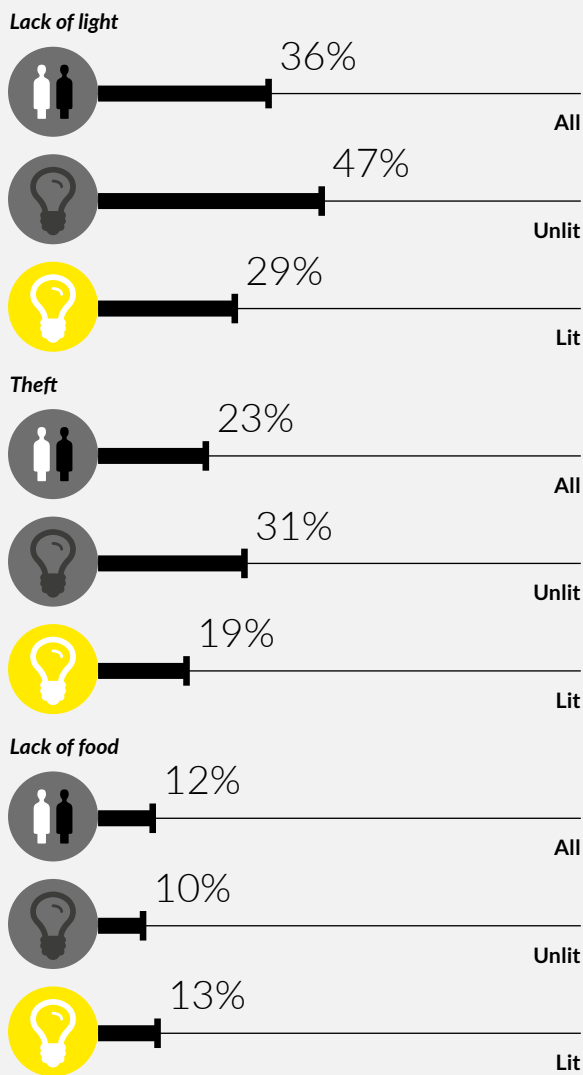
Rhino Camp residents frequently requested additional community lights. Respondents in all villages most commonly identified 'lack of light' as the greatest threat to the safety of their village.

Nonetheless, the proportion of respondents from lit villages who think 'lack of light' is the greatest threat to their village is 18 percent lower than that of unlit villages.

In interviews, focus group discussions and informal conversation, residents of all villages asserted that lighting (or additional lighting in villages where lights are already in place) would bring benefits, including improving night-time safety and enabling more people to feel comfortable leaving their homes in the early morning or at night. Expanded lighting coverage may also increase girls' school enrollment. Teachers explained that many girls do not attend secondary school¹⁵ because the distance they need

¹⁵ Windle Trust, UNHCR's education partner in Rhino Camp, reports that 23% of secondary-school-age girls in Rhino Camp are enrolled in school

Figure 15: Refugee perceptions of the greatest safety threat in their villages that they face



to walk, combined with the lack of light along the road to school (and at school) would force some of them to walk in darkness in the early morning or evening.

Given the above lessons learned, it is clear that UNHCR's lighting interventions must be carefully implemented, and community-led, to best serve the community's needs. In Rhino Camp, community lighting is one part of a strategy to prevent night-time violence and crime. However, villages with and without lights are not free of violence or crime. Further progress on addressing these issues will involve provision of additional lighting in prioritized locations selected by the community and continued community leadership of policing structures and SGBV awareness dialogues.

Therefore, this research does not conclude that lighting will suddenly and drastically improve protection outcomes everywhere. Rather, that lighting, when placed in accordance with the community's needs, is an important part of a comprehensive approach to community safety.

UNHCR and refugee community leaders must ensure that lights are installed in locations where they minimize, not introduce, protection risks

The results of this assessment show that:

1. Respondents in communities with lights often go to lit areas at night. Collecting water and reading/studying are the most common activities.
2. Respondents are frequently afraid that something bad might happen to them when they are walking along unlit pathways on the way to lit areas at night. Many of these unlit areas are deemed unsafe by community leaders and residents.

When examined together, these observations raise the question of whether lights cause refugees to incur protection risks that they otherwise would not. To answer this question, it is necessary to place people who go to lit areas at night into two categories:

Category 1: People who leave their homes out of necessity

As noted, water collection is the most common night-time activity, one that refugees must do at night, because they are unable during the day. For people collecting water at night, lights reduce protection risks by illuminating the areas where they collect water. The risk would be further reduced if lighting were installed along walking pathways to water points.

Category 2: People who leave their homes because lights enable them to engage in activities they otherwise wouldn't do

41% of respondents began a new night-time activity in the community after lights were installed. Assuming lights are bringing these people out of their homes, it is likely that while walking through dark areas, they face greater protection risks than they would if they stayed home. Residents are aware of these risks and take measures to mitigate them, in order to pursue activities they value, such as reading/studying. Among those who began reading/studying at night after the lights were installed, 60% walk to the reading/study area with other people, including 70% of women and adolescent girls. Because of the importance of reading and studying in the lives of Rhino Camp residents, many will continue to do so at night, even if they incur risk in the process. This risk would be reduced with the installation of lighting along walking pathways, or with greater availability of handheld lanterns, which would allow refugees to read and study in their homes.

The above reinforces the importance of (1) assessing, with community leaders, the perceived benefits versus the potential protection risks before implementing a lighting initiative, (2) installing lighting along walking routes refugees use at night and (3) conducting real time monitoring of the protection outcomes related to lighting, to ensure that lights are most effectively utilized to reduce protection risks.

SECTION 2: RECOMMENDATIONS

A) FOR UNHCR IN ARUA AND PARTNER ORGANIZATIONS IN RHINO CAMP

1. Build community engagement and ownership of the lighting intervention; ensure that it leads in the assessment, planning, implementation, maintenance, monitoring, and evaluation of the lighting project

Residents of lit villages displayed a sense of shared ownership of and communal responsibility for the lights, which come from being involved in all aspects of the process. Through their regular patrols, community members prevent vandalism of lights and stop thieves from stealing solar panels. The community should continue to have the final say on any actions related to the lights.

2. Work with communities to assess if lights are in the most effective locations, and relocate existing lights if community consultations suggest doing so

The topic of relocating lights arose in several community-level discussions. Qualitative and quantitative data indicate that refugees believe unlit water collection points, latrines and walking pathways between residential areas and locations of services or communal activity are the least safe areas in their villages, and should be lit. However, any decision on where to relocate existing lights or install new lights should belong to the community. UNHCR should conduct a safety mapping exercise with residents, to identify priority locations for lights, and initiate the process of relocation if the mapping identifies a need to do so.

3. Continue to support formation and engagement of community-led policing and awareness-raising groups and include these groups in discussions on lighting

As detailed, community-led protection structures including water committees, watch groups and SGBV task forces increase perceptions of safety in villages with and without lights. These groups address root causes of SGBV and complement the deterrent effect of the lights. Their members' knowledge of where SGBV is most prevalent will contribute to informed decisions on how to best utilize lights to prevent SGBV.

4. When more lights become available, consult communities about equipping lights with solar-powered mobile phone charging stations, which create income generating opportunities for residents

Though most lights in Rhino Camp are not equipped with charging stations, they have several benefits: 1) Youth explained that charging stations are social gathering areas, where youth talk while their phones charge; 2) When managed by community members, the stations increase community ownership of lights; 3) They enable people to charge their phones, including at night; 4) Income from a small usage fee can be re-invested into maintenance of the lights. As with lights, install charging stations only if a refugee-led committee will manage them.

5. Institute scheduled meetings among UNHCR, partners, and village committees managing lights and charging stations

Creating a regular forum for communication ensures that stakeholders can raise issues or ideas promptly, and that lights and charging stations remain in working order. At the time of this assessment, some lights needed maintenance to clear away insect nests near bulbs or clean solar panels, but committees were unable to perform maintenance because no ladder was available. Regular meetings would resolve such issues and extend the lifespan of lights.

6. Increase availability of handheld solar lanterns for residents

Many refugees own battery-powered torches, but do not use them due to the prohibitive cost of batteries. As survey data shows, people carrying lighting at night are less likely to experience fear than those who don't. Village leaders, youth and other residents requested solar lanterns, noting that lanterns inside their homes would stop thieves from entering and stealing their food, and that the lanterns would help them avoid snakes and insects in the village. At the time of the survey, three percent of households owned solar lanterns.

7. Seek further opportunities for refugee youth to lead data collection or research initiatives

Although most members of the research team had no research experience, they were committed and enthusiastic, and successfully administered a complex survey. They reported that the experience built their confidence and leadership skills and expressed interest in continuing to work in the community. Based on the experience of this assessment, recruitment of researchers should involve concerted outreach to women and adolescents.

8. Consider expanding lighting coverage to host communities

Refugees and UNHCR staff noted conflict and mistrust between refugee and host communities, but that peacebuilding initiatives help improve the inter-community dynamic. Provision of street lighting in host communities may enhance safety in host communities and improve refugee and host community relations.

B) FOR UNHCR OPERATIONS PLANNING COMMUNITY LIGHTING INTERVENTIONS

1. Conduct a pre-assessment

Community lighting interventions are costly, and require coordination with numerous stakeholders. The pre-assessment ensures that appropriate conditions to introduce lighting exist. A pre-assessment should gather information on proposed lighting initiatives, availability of local suppliers, availability and suitability of land where lights may be placed, required technical specifications for lights, and potential risks of introducing street lights. At this stage, UNHCR should define the reasons for introducing lighting.

2. Create a project management team

This team may include partners, UNHCR staff, community members and other stakeholders, but at least one member should have a protection focus. The team ensures that the intervention addresses the community's needs, from planning through implementation. The team should prompt the community to take ownership of the lights at the start of the intervention, and should thereafter communicate regularly with committees that manage the lights and charging stations.

3. Engage the community in all phases, building refugee capacity

The community should lead the planning process, and should take full responsibility for management, upkeep and monitoring of lights and charging stations. If comprehensive lighting of key points and walking pathways is not possible, the community should conduct a mapping exercise to determine priority areas for lighting. Through the mapping, the community should identify the busiest and most unsafe locations and walking pathways and prioritize them for lighting. UNHCR should hold consultations with a representative sample of the community, in gender and age disaggregated groups where appropriate, to identify additional perspectives

on where to install lights and, if desired, charging stations.

4. Develop a monitoring plan that measures achievement of desired outcomes

In alignment with the desired outcomes of the intervention, operations should create a simple monitoring framework and collect data. For example, where lights are installed with an aim to reduce violence, the monitoring plan can include a baseline and end line survey on respondent perceptions of night-time safety.

5. Support formation of community-led initiatives that enhance protection

In Rhino Camp, SGBV task forces, water committees and watch groups enhance SGBV awareness and response in villages with and without lights. While lighting acts as a prevention mechanism, such community structures also have a preventive role, through SGBV education and dialogue. They strengthen SGBV response by supporting survivors and communicating SGBV issues to partners. Although specific initiatives will differ depending on the context, community ownership and engagement in protection initiatives is universally important.

C) FOR UNHCR HEADQUARTERS

1. Advocate for country operations to include community lighting as part of a comprehensive protection and SGBV prevention strategy

As shown in Rhino Camp, community lights make people feel safer at night, prevent crime, and increase night-time activity. Prior to installing lights, each operation should ensure that the initiative is feasible and prudent.

2. Ensure community lights are available in contexts where they cannot be obtained locally

UNHCR should continue to maintain a stockpile of community lights that is available to emergency operations or those that do not have access to local vendors. Ensure that all operations, particularly those responding to emergencies, are aware of and can access the stockpile. Due to their limited lifespan, it may be necessary to order batteries once an operation requests lights.

3. When selecting new sites for camps or settlements, assess the geographical features that determine the feasibility of installing community lights, such as direct access to sunlight (in the case of solar lights) and soil conditions

Not all areas are conducive to community lights. In Rhino Camp, one light collapsed due to soil erosion, while another UNHCR operation determined that a lighting intervention was not feasible because trees would have prevented sunlight from reaching solar panels. Where possible, new sites should not pose natural restrictions to installing lights.

4. Seek partnerships with private, public, and inter-governmental entities or foundations interested in supporting lighting initiatives

The evidence in this report demonstrates that lights improve safety and increase night-time activity. However, providing community lighting to meet the need in all villages in Rhino Camp and other large settlements is beyond the scope of UNHCR's resources. External funding should be sought for this purpose.

ANNEXES

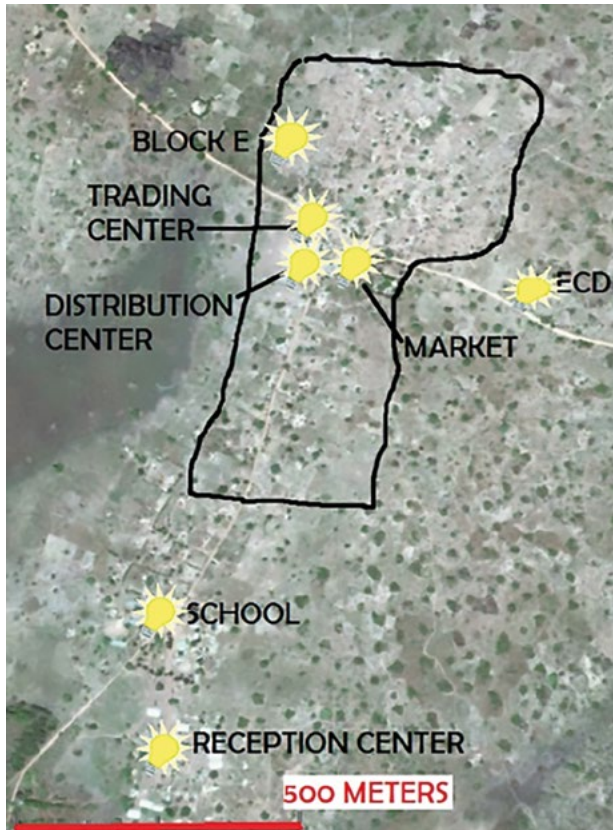
ANNEX A: WHERE ARE STREETLIGHTS INSTALLED IN OCEA AND ODOBU?

	Ocea	Odobu
Tap	💡	💡
Borehole	💡 (Same light as tap)	X
Primary school	💡	X
Church	X	💡
Reception Centre	💡	N/A
Early Childhood Development Centre	💡	💡
Distribution Centre	💡	💡
Trading Centre	💡	X
Market	💡 (Same light as trading centre)	X
Residential block (one block has a light)	💡	X
Community oven	X	💡

💡 = Lit X = Unlit

ANNEX B: MAP OF SOLAR LIGHT LOCATIONS IN OCEA

Residential area outlined in black



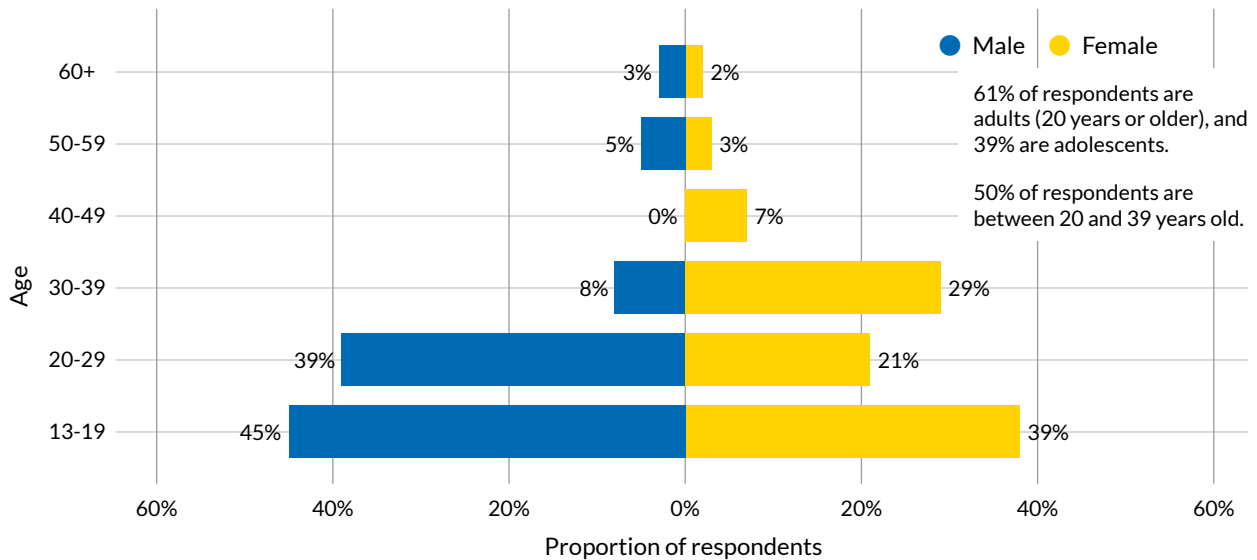
ANNEX C: DEMOGRAPHIC COMPOSITION OF RESPONDENTS

A. Gender, Country of Origin and Ethnicity

	Number	Percent
Gender		
Female	229	86%
Male	38	14%
Country of Origin		
South Sudan	255	96%
Democratic Republic of Congo	12	4%
Ethnicity (All villages)		
Dinka	123	46%
Nuer	121	45%
Kakwa	12	5%
Congolese	11	4%
Ethnicity (by village)		
Katiku (unlit)	55	100%
Nuer	38	69%
Dinka	17	31%
Siripi (unlit)	52	100%
Dinka	29	56%
Nuer	14	27%
Kakwa	9	17%
Ocea (lit)	83	100%
Nuer	69	83%
Congolese	11	13%
Kakwa	3	4%
Odobu (lit)	77	100%
Dinka	77	100%

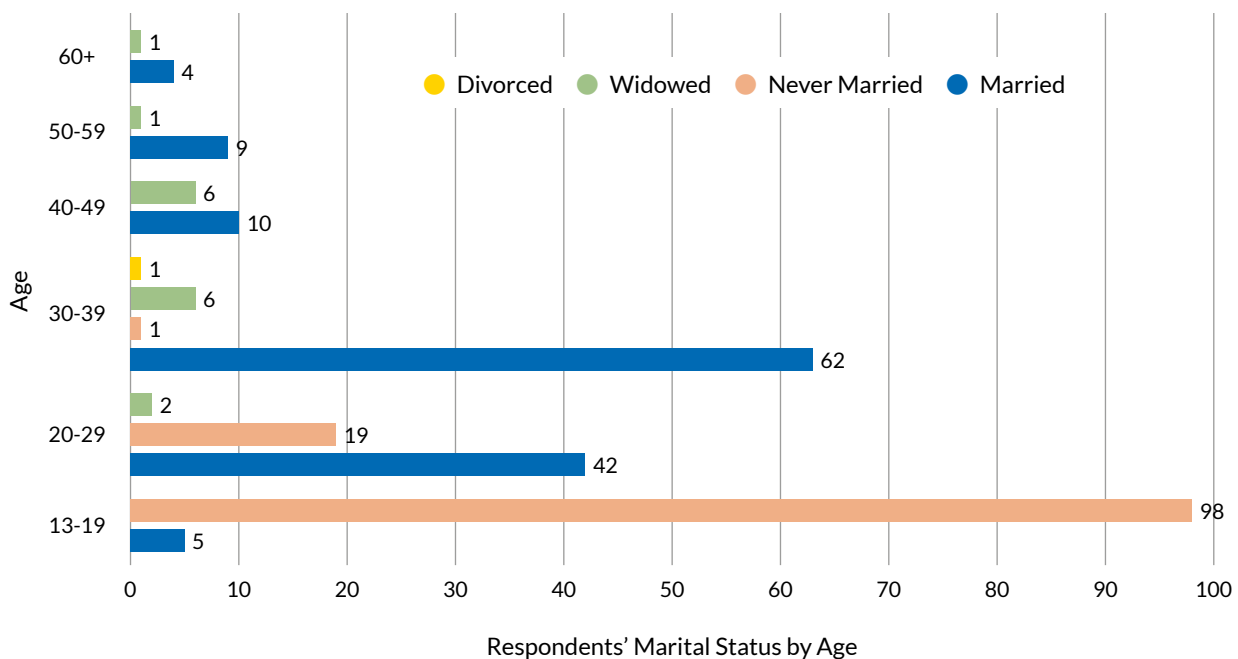
B. Age and gender

	Age range						Total
	13-19	20-29	30-39	40-49	50-59	60+	
Male	17	15	3	0	2	1	38
Female	86	48	67	16	8	4	229
Total	103	63	70	16	10	5	267



C. Marital status, gender and age

Gender	Age range								TOTAL
	Male	Female	13-19	20-29	30-39	40-49	50-59	60+	
Married	8	132	5	42	62	10	9	4	132
Never Married	30	88	98	19	1	0	0	0	118
Widowed	0	16	0	2	6	6	1	1	16
Divorced	0	1	0	0	1	0	0	0	1
Total	38	229	103	63	70	16	10	5	267



ANNEX D: HOUSEHOLD SURVEY INSTRUMENT

Section 1: Respondent background

I first will ask you general questions about your background.

1,1	<i>Which country are you from?</i>	1 = South Sudan 2 = Democratic Republic of Congo 3 = Burundi 4 = Sudan	7 = Other _____ 8 = DK 9 = NR
1,2	<i>Which tribal group are you from?</i>	1 = Nuer 2 = Dinka 3 = Kakua 4 = Morle 5 = Nuba	6 = Congolese 7 = Other _____ 8 = DK 9 = NR
1,3	<i>What is your age?</i>	1 = 0-12 2 = 13-19 3 = 20-29 4 = 30-39 5 = 40-49	6 = 50-59 7 = 60 or older 8 = DK 9 = NR
1,4	<i>Are you married?</i>	1 = Married 2 = Never married 3 = Widowed	4 = Divorced or separated 8 = DK 9 = NR
If respondent answers 1 (married), ask Question 1.41			
1,41	<i>Does your spouse live with you?</i>	1 = Yes 2 = No	8 = DK 9 = NR
1,5	<i>Which year did you arrive in this village?</i>	Write four digit year	8888 = DK 9999 = NR
1,6	<i>Have you lived in any other village since you arrived in Uganda?</i>	1 = Yes 2 = No	8 = DK 9 = NR
If respondent answers 1 (yes), ask Question 1.61			
1,61	<i>Which other village did you last live in?</i>	Write name _____	

Section 2: Other members of household

Note to enumerators: If you already have interviewed head of household and are now interviewing adolescent, skip this section and go directly to section 3

Now I would like to know a little more about who else lives in your household. Please tell me, one person at a time, who else lives here with you. List them from youngest to oldest. Start with the youngest member of the household.

	2,1 Relationship to respondent	2,2 Age in years	
Person 1			
Person 2			
Person 3			
Person 4			
Person 5			
Person 6			
Person 7			
Person 8			
Person 9			
Person 10			
Person 11			
Person 12			
Person 13			
Person 14			
Person 15			
Person 16			
Person 17			
Person 18			
Person 19			
Person 20			
01 = Daughter 02 = Son 03 = Niece 04 = Nephew 05 = Granddaughter 06 = Grandson 07 = Daughter of other person 08 = Son of other person 09 = Stepson 10 = Stepdaughter	11 = Brother in law 12 = Sister in law 13 = Sister 14 = Brother 15 = Cousin (female) 16 = Cousin (male) 17 = Mother 18 = Father 19 = Stepmother 20 = Stepfather	21 = Husband 22 = Wife 23 = Aunt 24 = Uncle 25 = Grandmother 26 = Grandfather 27 = Mother in law 28 = Father in law 29 = Friend 77 = Other _____	Write three digit number Examples: If child is 5 years old, write 005 If child is 10 years old, write 010 If child is less than 1 year old, write 000 888= DK 999 = NR

Section 3: Household Lighting

This part of the survey is about the types of light you or other members of your household have used in the past 30 days. Please tell me if you or anyone else in the past month has used the following to see better at night, in the past 30 days.

Ask about each of the below:			
3,11	<i>Candles?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,12	<i>Paraffin lantern?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,13	<i>Solar lantern?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,14	<i>Battery powered torch?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,15	<i>Phone?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,16	<i>Solar light bulb?</i>	1 = Yes 2 = No	8 = DK 9 = NR
3,17	<i>Fire?</i>	1 = Yes 2 = No	8 = DK 9 = NR
Review questions 3.11-3.16. for all responses of 1 (yes), ask Question 3.2. write the numbers in the right column above, 3.21-3.26			
3,2	<i>How many do you have?</i>		
3,3	<i>Do you have any other sources of light?</i>	1 = Yes I have _____ 2 = No	8 = DK 9 = NR

Section 4: Daytime activity

Next I will ask you questions about what you do during the day. Day means any time from 7am-7pm, when the sun is in the sky. Later, I will ask you about what you do at night, but these questions are only about what you do during the day.

4,11	<i>Have you collected firewood in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,12	<i>Have you collected water over the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,13	<i>Have you washed clothes in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,14	<i>Have you gone to the market in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,15	<i>Have you taken care of domestic animals (bird, pig, sheep, cow, or other) in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR

4,16	<i>Have you tended (dug) fields or gardens in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,17	<i>Have you played games with other people (dominoes, yet, weet, chess, kuteni, pool) in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,18	<i>Have you practiced a group song or dance (such as religious or cultural) in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,19	<i>Have you played sport in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,110	<i>Have you knitted or made crafts in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,111	<i>Have you gathered socially with other people (to talk or have a drink) in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,112	<i>Have you read or studied in the past 30 days (books, bible, schoolwork, magazines)?</i>	1 = Yes 2 = No	8 = DK 9 = NR
4,113	<i>Have you gone to the trading center in the past 30 days?</i>	1 = Yes 2 = No	8 = DK 9 = NR

Review Questions 4.11-4.113. If respondent answers yes (1) to any question, ask for each activity Questions 4.2 and 4.3, below. Write the responses in the right columns above 4.21-4.213 (for question 4.2) and 4.31-4.313 (for question 4.3).

4,2	<i>How often have you _____ in the past 30 days?</i>	1 = Once in the past 30 days 2 = 2-3 times in the past 30 days 3 = Once per week 4 = 2-3 times per week	5 = 4-6 times per week 6 = Every day 7 = More than once per day 8 = DK 9 = NR
4,3	<i>How much time does it take you to do _____?</i>	1 = Less than 1 hour 2 = 1-3 hours 3 = More than 3 hours	8 = DK 9 = NR

Review questions 4.11 – 4.113. Responses with 1 (yes) ask daytime follow up questions on the next page.

Section 5: Daytime activity follow up questions

Now I will ask you some questions about each of the activities that you said you have done during the past 30 days

Section 4 Reference #	5,11 <i>You said that you _____ during the day. Where do you do this?</i>	5,12 <i>Most of the times, do you walk there alone, or with other people?</i>	5,13 <i>When you are walking there or walking back from there, do you think that anything bad could happen to you?</i>	
4.11 Firewood				
4.12 Water				
4.13 Wash clothes				
4.14 Market				
4.15 Animals				
4.16 Dug fields				
4.17 Games				
4.18 Song/Dance				
4.19 Sport				
4.110 Knit/crafts				
4.111 Social gathering				
4.112 Read/study				
4.113 Trading Center				
	Next question: If respondent answers 1 (home), ask question 5.15 If respondent gives any other answer, ask questions 5.12-5.13	Next question: 5.13	Next question: If respondent answers is 1 (yes), ask question 5.14. If respondent gives any other answer, ask question 5.15	
	Only 1 per line. If respondent gives more than one place, ask where she/he most often does the activity			
	01 = Home 02 = Forest 03 = Tap 04 = Borehole 05 = ECD 06 = Trading center 07 = Marketplace 08 = Field/Garden 09 = Other person's home 10 = School 11 = Sport field 12 = Distribution center 13 = Church 14 = Reception center 15 = Pool / washing bay 77 = Other _____ 88 = DK 99 = NR	1 = Alone 2 = With other people 8 = DK 9 = NR	1 = Yes 2 = No 8 = DK 9 = NR	

Section 6: Nighttime Activity

Next I will ask you questions about what you do at night. Night means any time that the sky is dark. Try to remember the past 30 nights.

6,11	<i>Have you collected water in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,12	<i>Have you gone to the market in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,13	<i>Have you played games with other people (such as dominoes, yet, weet, chess, kuteni, pool) in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,14	<i>Have you practiced a group song or dance (such as religious or cultural) in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,15	<i>Have you played sport in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,16	<i>Have you knitted or made crafts in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,17	<i>Have you gathered socially with other people to talk or have a drink in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,18	<i>Have you read or studied in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR
6,19	<i>Have you gone to the trading center in the past 30 nights?</i>	1 = Yes 2 = No	8 = DK 9 = NR

Review Questions 6.11-6.19. If respondent answers yes (1) to any Question, ask for each activity Questions 6.2-6.3. Write the responses in the right columns above 6.21-6.29 (Question 6.2), and 6.31-6.39 (Question 6.3).

6,2	<i>How often have you done _____ in the past 30 nights?</i>	1 = Once in the past 30 nights 2 = 2-3 times in the past 30 nights 3 = Once per week 4 = 2-3 times per week	5 = 4-6 times per week 6 = Every night 7 = More than once per night 8 = DK 9 = NR
6,3	<i>How much time do you spend each time you _____ during the night?</i>	1 = Less than 1 hour 2 = 1-3 hours 3 = More than 3 hours	8 = DK 9 = NR

If respondent lives in Ocea or Odobu 1, ask Question 6.4. Write the responses in the right column above 6.41-6.49. If respondent lives in katiku or siripi, review Questions 6.11 - 6.19. Responses with 1 (yes), ask nighttime follow up questions on the next page.

6,4	<i>Did you do _____ during the night before the solar lights were here?</i>	1 = Yes 2 = No 9 = NR	3 = I did not live here before the solar lights were here 8 = DK
If respondent answers 1 (yes) to Question 6.4, ask Question 6.5. Write the response in the column above 6.51-6.59			
6,5	<i>Did you do _____ during the night less often, more often or the same amount as you do now?</i>	1 = Less often 2 = More often 3 = The same amount	8 = DK 9 = NR
Review questions 6.11-6.19. Responses with 1 (yes) ask nighttime follow up questions on the next page.			

Section 7: Nighttime activity follow up questions

Now I will ask you some questions about each of the activities that you said you have done during the past 30 nights

Section 6 Reference #	7,11 <i>You said that you have _____ in the past 30 nights. Where did you do this?</i>	7,12 <i>Most of the times, do you walk there alone, or with other people at night?</i>	7,13 <i>Most of the times, do you walk with light when you are going there at night?</i>	7,14 <i>When you are walking there or walking back from there at night, do you think that anything bad could happen to you?</i>	
6.11 Water					
6.12 Market					
6.13 Games					
6.14 Song/dance					
6.15 Sport					
6.16 Knit/crafts					
6.17 Social gathering					
6.18 Read/Study					
6.19 Trading Center					
	Next question: If respondent answers 1 (home), ask question 7.16 If respondent gives any other answer, ask questions 7.12-7.14	Next question: 7.13	Next question: 7.14	Next question: If respondent answers is 1 (yes), ask question 7.15. If respondent gives any other answer, ask question 7.16	
	Only 1 per line. If respondent gives more than one place, ask where she/he most often does the activity				
	01 = Home 02 = Forest 03 = Tap 04 = Borehole 05 = ECD 06 = Trading center 07 = Marketplace 08 = Field 09 = Other person's home 10 = School 11 = Sport field 12 = Distribution center 13 = Church 14 = Reception center 77 = Other _____ 88 = DK 99 = NR	1 = Alone 2 = With other people 8 = DK 9 = NR	1 = Yes 2 = No 8 = DK 9 = NR	1 = Yes 2 = No 8 = DK 9 = NR	

	7,15			7,16			7,17			7,18		
	What do you think could happen?			When you are there doing _____ at night, do you think that anything bad could happen to you?			What do you think could happen?			Please tell me only yes or no: Has anything bad happened to you when you were walking to or doing this activity at night?		
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	A	B	C				A	B	C			
	Next question: 7.16			Next question: If answer is 1 (yes), ask question 7.17 If respondent gives any other answer, ask question 7.18			Next question: 7.18					
	Up to 3 responses allowed						Up to 3 responses allowed					
	01 = A = A person could be physically violent to me 02 = B = A person could physically try to sleep with me 03 = C = A person could verbally bother or harass me 04 = D = I could get lost 05 = E = An animal could bite me 06 = F = I could get injured 07 = G = Someone could rob me (theft) 08 = H = It could rain 77 = I = Other _____ 88 = M = DK 99 = N = NR			1 = Yes 2 = No 8 = DK 9 = NR			01 = A = A person could be physically violent to me 02 = B = A person could physically try to sleep with me 03 = C = A person could verbally bother or harass me 04 = D = I could get lost 05 = E = An animal could bite me 06 = F = I could get injured 07 = G = Someone could rob me (theft) 08 = H = It could rain 77 = I = Other _____ 88 = M = DK 99 = N = NR			1 = Yes 2 = No 8 = DK 9 = NR		

Section 8: Children’s nighttime activity

Note to enumerator: If the respondent does not have children in the household (person from age zero to 17 years old), skip this section and go to section 9. If the respondent is not head of household, do not ask section 8 – move to section 9.

	Relationship to respondent (Example: daughter)	Child’s age in years	8,11 <i>In the past 7 nights, when it is dark, has your _____ left the house?</i>	
Child 1				
Child 2				
Child 3				
Child 4				
Child 5				
Child 6				
Child 7				
Child 8				
Child 9				
Child 10				
Child 11				
Child 12				
Child 13				
Child 14				
Child 15				
			Next question: If respondent answers 1 (YES), ask questions 8.12-8.15 If respondent answers 2 (NO), ask question 8.112 If respondent answers 8 (DK) or 9 (NR), ask about the next child	
	01 = Daughter 02 = Son 03 = Niece 04 = Nephew 05 = Granddaughter 06 = Grandson 07 = Daughter of other person 08 = Son of other person 09 = Stepson 10 = Stepdaughter 11 = Brother in law 12 = Sister in law 13 = Sister 14 = Brother 15 = Cousin (female) 16 = Cousin (male) 77 = Other 88 = DK 99 = NR	Write 3 digit number 888 = DK 999 = NR	1 = Yes 2 = No 8 = DK 9 = NR	

Section 9: Village Safety

This is the final section of the survey. I will finish with a few questions about safety in your village.

9,1	<i>Do you feel safe in your home at night?</i>	1 = Yes 2 = No	7 = Other _____ 8 = DK 9 = NR
9,2	<i>Do you feel safe outside your home at night?</i>	1 = Yes 2 = No	7 = Other _____ 8 = DK 9 = NR
9,3	<i>What is the greatest threat to your safety in this village?</i>	01 = Drunk people 02 = Violence 03 = Theft 04 = Lack of food 05 = Lack of light 06 = Sexual violence	07 = Lack of medical care 08 = Fire outbreak 09 = Lack of water 77 = Other _____ 88 = DK 99 = NR
9,4	<i>Where in this village do you feel least safe?</i>	01 = Forest / Bush 02 = Health center 03 = Borehole / Water point 04 = Playground 05 = Sports field 06 = Neighbourhood 07 = Field/garden	08 = Unlit places 09 = Market 10 = Along the river 77 = Other _____ 88 = DK 99 = NR
9,5	<i>Where in this village do you feel most safe?</i>	1 = Church 2 = Home 3 = Borehole 4 = Trading center	5 = ECD 6 = School 7 = Other _____ 8 = DK 9 = NR
9,6	<i>What would you change to make this village more safe at night? (Up to 2 responses)</i>	1 = Watch groups 2 = More police 3 = Less alcohol consumption 4 = More lighting 5 = More places to gather water	6 = Nothing 7 = Other _____ 8 = DK 9 = NR
9,7	<i>Would you feel safer at night if you had a handheld lantern?</i>	1 = Yes 2 = No	8 = DK 9 = NR

ANNEX E: INFORMED CONSENT SCRIPT

A. English

“Hi, I’m _____, from [name of village]. How are you?”

Can we talk?

Great! I’m helping UNHCR with this survey. We want to learn about the activities that people do during the day and during the night. We also would like to know how safe people feel when they do these things. You know that there are villages that have and don’t have solar lights, right? We are asking these questions in villages with and without solar lights, so we can compare the difference.

This survey is also happening in other villages of Rhino Camp and the information we collect will help UNHCR to better support the community. All the information we collect from you will be anonymous; that means everything you say to us will be kept confidential.

UNHCR has randomly selected a group of households in this village, and that is how I found you. You are free to participate or not – it’s voluntary, and there will be no penalty if you choose not to participate.

If you agree to talk with me today, I’m going to ask you some questions. If there is any question that you don’t want to answer, just tell me, and I will move on to the next question. You can also stop talking to me at any point, if you don’t want to continue.

I’ll write down your responses, but your name will not be disclosed to anyone. The only people that will see your answers are me, and the study team.

This interview will last approximately 40 minutes. Do you have any questions?

Would you like to respond to the survey?”

B. Nuer

“Maale, ε Xän _____, baa kä (ciööt dhoar). Male? Dee ruac ke ji?”

gɔa ε lɔŋ! Xän Luakä UNHCR ke lat thiēcni naath emε. Görko Xöö bako teke ɲac ke kuic lätni tin lät naath ke cāŋdäär ke ne wäär ke liw. kɔn görko Xöö bako je ɲac bā, mi lät naath ke ken lät titi ε thil dual kie mi jiäk mi car ken ε. Jin, ε Xän i ɲäci je en Xöö teke dhoɔr tji tē ke nuɔri kã teke tã thil nuɔri, cie jen? Thiecko ke ken thiēcni titi dhoɔri tin tēε ke nuɔri ke ne tin thil nuɔri ke Xöö baa dääkdien cu paar.

en thiēcni naath emε, jene latkenä dhoɔri tin kɔkien rey Rhino camp, kã ken ruacni tii gɔar ko ti, baa UNHCR luäk ke car kã Xöö ε ɲu mi dēre luäk ni yien ji dhɔaar ε gɔa. Ken ruacni diaal/tin thieca keji, Ke tēε kamã dan ε thil rami dɔŋ dien.

UNHCR ce cieerj ti tot kuany rey dhɔarun en wãne, ε jen duɔp in jiekã ji. eni ruac du en Xöö bã ji thieck kie ca ji bi thieck ke Xöö latke je loɔrã, thile mi jiäk mi baa lät kãji ε cãŋ cie loɔk i thiecke ji.

Mii cie nhɔk i bi ruac ke Xã en wale, Xän teke thiēcni ti bã thiēcniã ji. Mi teke thiēcni ti ci gɔr i bi loc, läri je Xã, bã wa nhiam ke thiēc in dɔŋ. Dēri thuɔke ruac nãke guath in ci gɔr, mi cie gɔɔr i bi ɲot ke wã nhiam.

Bã luɔc riēcni ku gɔar piny, duɔde Xöö ca ciöötdu bi ɲac ε rami dɔŋ. Keni ji gɔrã emε ke ne Xän ken tin ba luɔc thiēcni ku titi nen.

En thiēcniã du emε dɔŋ be kɔn naŋnã dãgiekni ti 40 ε juc. Tii ke thiēcni? Cie nhɔk i bi thiēcni titi loc?

C. Dinka

Looi ëdë, Xën ye cool _____, ku Xën rëër në (rin ke baai)

Cuku bë jam?

Apieth! Xën koony UNHCR në ee lonnë. A kɔɔr ku buk nyic në kã yī kɔc ke looi në akōlic ku wɔkɔou. Yen a kɔɔr ku buk nyic ëyadë ye kɔc rëër apieth të looi keek ë kakë. Yen nyic ë yadë kë nɔŋ bëëi cin yic ku jɔl ya bëëi nɔŋ yic nur ë tholar. Ce yii?

Wo ye thualë thiic në bëëi nɔŋ yic ku bëëi cin yic nur ë tholar, A goku wöc den nyic. Ë lonnë a looi rɔt në bëëi juic kɔk ke piny de Rhino Camp ku në wël juic yukku keek määt yic alëu bik UNHCR kony ku nɔŋ kë kuny ké kɔc ka akutnhom. Ke wël cuku keek määt yic ké, ëbën ë nɔŋ yin abë tɔ ëke kuɔm yen, kë ye luel, ké riëëc ëbën ca lëk wɔk abi tɔ kë nɔŋth ku. UNHCR aci akutnhiim kuany në baai nhom ë pannë, ku yennëke dhöl can yin yök. Yin laau ba gam ama ci bë gam – Ee gem ë rɔt, abi cin a wäac të cin gëm. Na gam en ba jam wenne Xën në ye kōlë, yin ba thiëc thual. Na nɔŋ thual ci koor ba dhuk nhom kë lëk ë xa, ku xën bë lo në thualdë. Yin lëu ba köc në jam wennë xën në dhöl dë, të cin n kɔɔr ba lo tuen. Xën bë gëmdu gät piny, awu rinku aci bë thiäak kennë raandë. kɔc bé juɔpdu tin ke pëëc aye wɔk, ku akutnhom deet keek yic.

Yen ë lonë abë dëgëkai ke thiër nuan jɔt abac.

Nɔŋ kë kɔɔr ba thiic? Nɔŋ piɔu ba lonnë gam?

D. Kiswahili

Ee, mimi ni _____, kwa (Jina la fasi unatoka). Habari yako?

Na tuna weza kuongea?

Salimia! Nina saidia UNHCR na kazi hii. Tuna taka kujua kazi yenye watu wanafanya kwa mchana na usiku. Tuna taka pia kujua kama watu wanaishi vizuri waki fanya kazi hii. Unajua kwa fasi zingine hakuna sola yak u waka, ndio? Tuna uliza swali hii kwa fasi zenye ziko na fasi zenye hakuna sola ya kuwaka.

Kazi hii itafanyikana kwa fasi zingine za Raino Kamp na mambo hii tuna chukua ku saidia UNHCR kusadia fasi yetu yak ku kaa. Mambo yote tuna chukua kwako haiwezi kusemwa inje. Hio ina onyesha kila kitu utasema hawezi kusemwa.

UNHCR ilichukwa nyumba moja moja kwa fasi hii na tuli ku – chukwa hivi. Unaweza kutupatia saa yako ama kutusaidia bure na unawezi kusema uwezi kutusaidia.

Kama umekubali kuongea na mimi leo, nita kuuliza swali hii. Kama kuna swali yenye uwezi kujibu, niambie tu nita endelea na swali zingine mbele. Utaweza kuni simamisha saa yeyote unataka kama utaki kuendelea.

Nitaandika majibu lako, lakini jina lako haiwezi kuonekana na mtu yeyete.

Watu wenye wata ona majibu lako ni mimi na watu wenye tuna fanya kazi pamoja.

Uko na swali yeyote?

Uta weza kusema majibu la kazi hii?

E. Bari

Adinyo nan lungu a _____ nan ponda _____. Do gbo adinyo.

Tinate nan ngarakinda UNHCR ku na kitade. ye yongo denda ngo ku kiteyes, na kon ngutulon paran ko kumude. Ye koti yongo denda ku ngutunlon kilo gbo alobut adinyo I konda na kene kiteyes. Dao aden naga adi kune pireton kene gboku kimang na solar kune kene baak ye pijaa kene piyesi ikene pirotan ling naga gboku ko naga baak kene anyen ye totojoju kuko I piret nageleng. Kilo pipiyes keti pipiyani kule ngutulon I kune pireton Rhino Camp ne leng UNHCR ngangarakin kene pireton keti. Kilo pipiyesi lopipinan dao kilo ko rukese koluuk kilo ti duur Inene piret kude lele ngutu kene ango naga gbo kang I didingit kudao.

UNHCR ngu gelunda ngutulon I kene pireton leng nye naga ma ye ko pujii dao dao baai rediki ye pijaa dao kudao nyanyar ku gbon kilo pipiyesi ngangarakinja ko UNHCR ngu yenga rukesi kasuuk kilo leng kete yoyongon ko taa.

Kudao ngu ruuk Jambuu ku nan lokolongi nan ngina tuut I pijaa na dao ku piyesi. Ku piyiet lele kata laga dao baai rugo dao jujukin kuya anyen nan tuut I lele piyiet.

nan wuwur rukese koluuk kilo kat lakine Karen kunuut kene baai peyie koke ngutulon laga memmeet rukesi koluuk kilo I nan ko ngutulon lo kita ku nan kilo kadee.

Dao gboku piyiet? Dao nyanyaar rugo na piyesi kilo.

