

## THE IMPACT OF SOLAR LIGHTING ON EDUCATIONAL OUTCOMES IN 8 PRIMARY SCHOOLS IN NORTHERN UGANDA



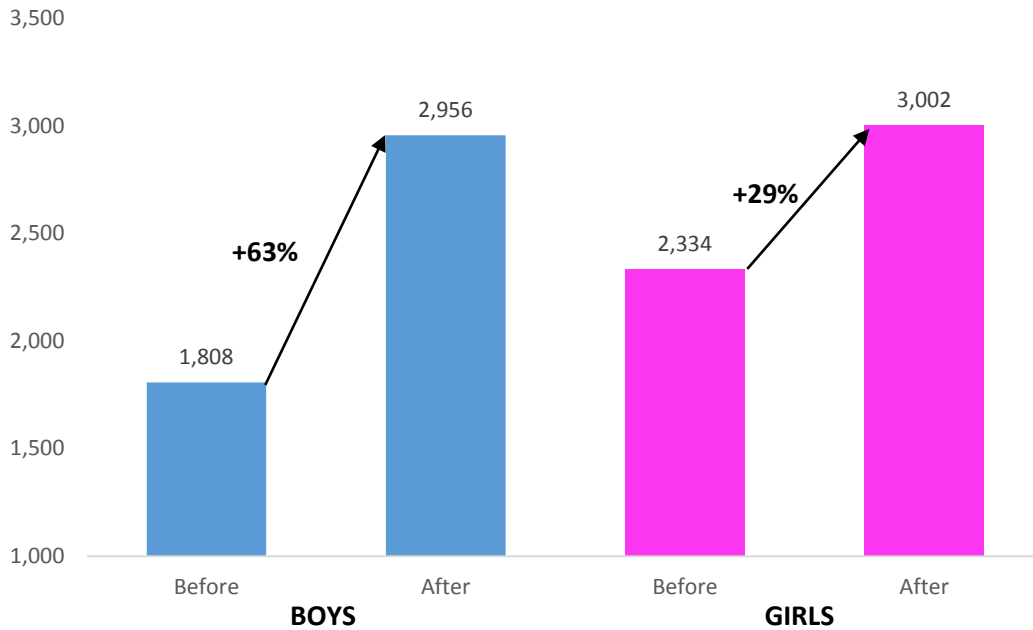
### Summary (by Andrew Kent, BBOXX)

In March 2014 **BBOXX** installed 51 solar systems to provide light in 8 primary schools in Kotido and Kaboong Districts of Karamoja, Northern Uganda, funded by War Child UK. In October 2014 War Child conducted an impact assessment, which found major improvements in key educational outcomes after the solar systems were installed, including:

- **Improved test scores:** the number of students earning highest marks on their Primary Leaving Exams doubled in some schools. According to War Child, expanded studying hours “has been reflected in the end of term performance, for example, Rengen Primary School had 6 pupils in division I in term I and 11 in term II, while Panyangara Primary School had 3 pupils in division I in term I and 7 in term II, this was even made better as the teachers conduct extra lessons and supervise night preps.”
- **Increased enrolment:** boys’ enrolment increased 63%, and girls’ enrolment increased 29%, likely attributable to improved student morale and safety (see Figure 1).
- **4 additional study hours per day:** students now read from 7pm to 10pm, and from 5am to 6am.
- **Greater feelings of safety at night:** the percent of students feeling “scared” or “unsafe” declined from 85% to less than 1%, while the percentage feeling “very safe” increased from 0% to 70% (see figure 2).
- **Improved hygiene:** students feel safer using latrines at night, reducing open defecation
- **Improved teacher performance and morale:** teachers spend more time preparing lessons and grading papers at night, feel safer, and save money on kerosene and charging their phones. Those with laptops are able to use them. According to War Child, “time management has greatly improved as teachers have enough time to prepare their lessons at night and come straight to class to conduct their lessons.”

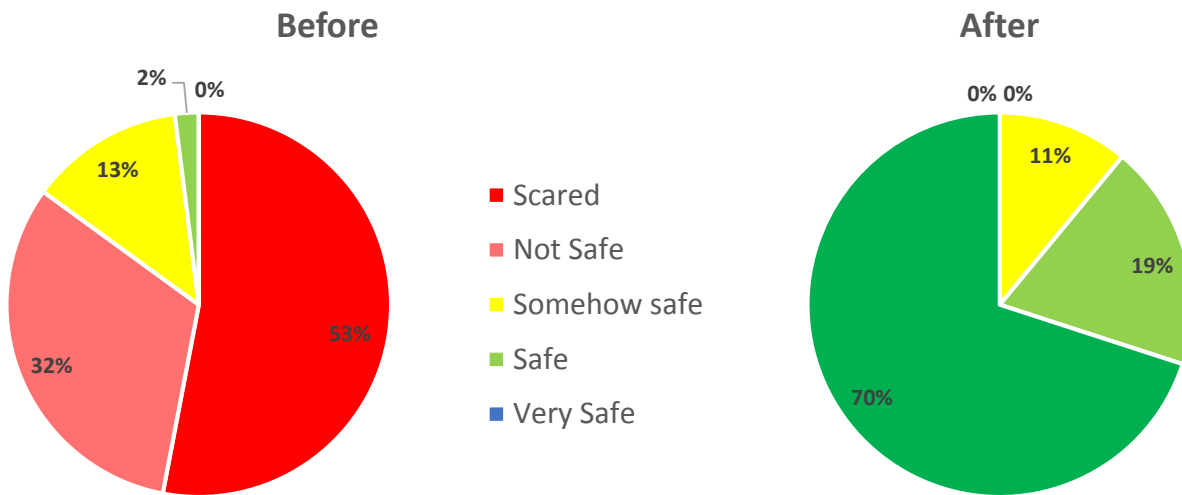
The charts on the following page highlight some of these improvements.

**Figure 1: Enrollment at 8 Primary Schools, Before and After Solar Lighting Systems**



Source: War Child UK, Impact Assessment, Oct 2014

**Figure 2: Students' Feelings of Safety, Before & After Solar Lighting**



Source: War Child UK, Impact Assessment, Oct 2014



*Cages around the battery boxes (right) and locked frames for the panels (below) reduce the risk of theft while allowing users to operate the system, and technicians to access the system for repairs*



The full, original impact assessment by War Child is contained in the following pages.

**Impact Monitoring & Evaluation Report Submitted to War Child UK October 2014**

**Project title;** Solar lighting for Schools in North Eastern Uganda

**Location;** Kotido and Kaabong Districts; Karamoja-Uganda

**Evaluation time frame:** 5<sup>th</sup> to 16<sup>th</sup> October 2014

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## Introduction and background

Solar lighting was installed in 8 Primary Schools of Kotido (4) and Kaabong (4) with the aim of improving learning environments for children in the remote districts of Kaabong and Kotido in North Eastern Uganda, through the provision of solar powered lighting. This would enable boarding pupils to study in the evenings and would make school buildings including classrooms, dormitories and sanitation facilities safer, resulting in improved school performance and a reduced likelihood of children dropping out. The solar lighting was then installed by BBOX between March and May 2014

## Methodology

2 focused group discussion was conducted in each of the 8 Schools and designed questionnaire was used to grade the safety levels before and after the solar lighting, a total of 74 Children participated, Key informant interview was conducted with 2 chairpersons of School management Committee and 19 teachers (13 Male and 6 Female) were also interviewed, Physical observation was also done and the findings of the of the evaluation are here below

## Results

The project targeted 4,868 pupils as beneficiaries, from the evaluation conducted, the total number of children who have benefited from the project is 5,958, (2,956 boys and 3,002 girls) the table below gives comparison of the enrolment figures before and after the project

School	Enrolment after the project for boys	Enrolment before the project for boys	Enrolment after the project for girls	Enrolment before the project for girls	Total enrolment after the project	Total enrolment before the project	Total increase
Panyangara	472	273	284	254	756	527	229
Nakapelimoru	430	251	229	119	659	370	289
Rengen	429	212	219	115	648	327	321
Kacheri	285	272	168	144	453	416	37
Kamion	276	148	143	72	419	220	199
Pajar	592	317	531	542	1,123	859	264
Komkuny girls	5	5	1,137	880	1,142	885	257
Kakamar	467	330	291	208	758	538	220
<b>TOTAL</b>	<b>2,956</b>	<b>1,808</b>	<b>3,002</b>	<b>2,334</b>	<b>5,958</b>	<b>4,142</b>	<b>1,816</b>

The table indicates an increase of 1,816 pupils (1,148 boys and 668 girls)

The pupils are now able to read extra hours in the night, in most Schools, they read from 7:00pm to 10:00pm and in the morning from 5:00am to 6:00am, this has been reflected in the end of term performance, for example, Rengen Primary School had 6 pupils in division I in term I and 11 in term II, while Panyangara Primary School had 3 pupils in division I in term I and 7 in term II, this was even made better as the teachers conduct extra lessons and supervise night preps

The pupils also use the light for co curricular activities such as Music, dance and drama, and debate in the night, a number of topics are debated including academic discussions



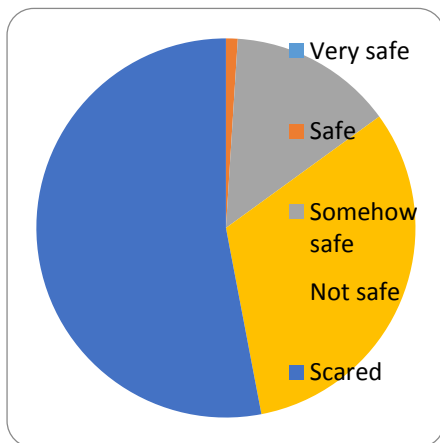
There is improved hygiene and sanitation in all Schools with solar light as pupils no longer fear to go to the latrine at night, faeces and urine is no longer damped anywhere as it was before the lights were installed, this has also reduced on incidences of diseases such as diarrhoea

There is reduced incidence of accidents in the dormitories at night as they no longer knock themselves on beds and tables in the dormitories

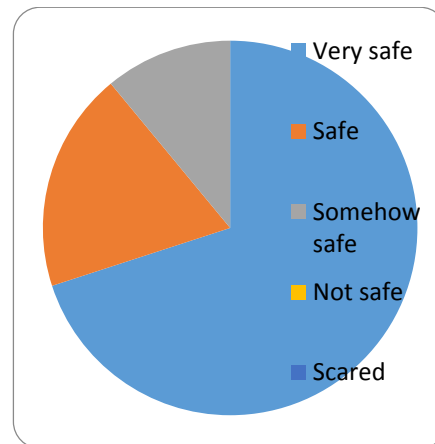
The pupils have increased morale and interest in studies as reflected in the increased enrolment in boarding especially for those in Primary 7

The pupils now feel safe and secure from snakes and thieves who had been a big threat in all the Schools visited, there had been rampant breaking of the School food store and administration office to steal food and other items from the school, due to the security light installed, they no longer attack the school

Out of 74 pupils interviewed (37 boys and 37 girls), 53% said they were scared while 32% said they were not safe before the installation of the solar light, on the other hand, 70% of the pupils interviewed said they were now very safe while 19% were safe the pie chart below shows the percentages before and after the solar was installed



Before the solar installation



After the solar installation

Teachers have been able to charge their phones, torches and radios, this has greatly reduced on costs previously incurred, the savings can now be used to meet other domestic expenses, 2 teachers in Kamion have been able to buy phones since there is a charging system in place, previously those who had phones would travel approximately 20 Kilometers in order to charge their phones

Teachers now feel safe and secure; they have been able to supervise night preps and other co curricular activities without fear,

The solar light installed has greatly improved on team work among the teachers as they are able to make consultations at night, they have used this time to discuss challenging tasks especially in mathematics, this has improved on their performance and confidence in teaching

The teachers with computers are now able to use them to do their work,

The teachers now have enough time for lesson preparation at night, they are no longer idle at night, in some cases it has been noted that there is great reduction in drunkenness among the teachers as they get occupied in lesson preparation, discussion and supervising night preps

There is improvement in time management especially for marking and compiling results of examinations conducted in the school.

The teachers with solar lights in their houses feel so motivated, as they make savings from kerosene previously used, their children are also able to read at night under their guidance, one teacher said he will not need transfer anymore because he will lose a lot of privileges he is getting now due to the solar system in his house

The table below shows the number of teachers in the 8 schools before and after the solar lighting was installed

S/N	Name of the school	Number of Teachers						% retention
		Male		Female		Total		
		After	before	After	before	After	before	
1	Panyangara P/S	6	7	6	6	12	13	92
2	Nakapelimoru P/S	7	7	3	3	10	10	100
3	Rengen P/S	5	5	3	3	8	8	100
4	Kacheri P/S	7	7	2	2	9	9	100
5	Kamion P/S	6	6	0	0	6	6	100
6	Pajar P/S	7	7	4	5	11	12	92
7	Komukuny P/S	10	10	3	3	13	13	100
8	Kakamar	6	6	3	3	9	9	100
	Total	54	55	24	25	78	80	97.5

1 male teacher of Panyangara PS died and has not yet been replaced, while 1 female teacher of Pajar PS joined an NGO

Teachers' transfers are always done at the beginning of the academic year, so the impact on teacher retention could not be established

The rate of teachers' absenteeism before and after the project has also remained constant though time management has greatly improved as teachers have enough time to prepare their lessons at night and come straight to class to conduct their lessons

Out of the 8 Schools, only Kamion primary School was able to raise 30,000UGX at the beginning, but as the community was given the solar system by OXFAM, they stopped charging phones of outsiders at a fee, they have also used the equipment to build good relationship with the community

There is community negative attitudes towards paying a fee for charging their phones as they need free services, schools intend to sensitize the community during parents day which is always at the end of the year to pay for the service for sustainability purpose

Many schools declined to charge outsiders phones fearing the risks associated with the loss of these phones, meanwhile in most communities around the school, there are such facilities own by local business people

Accepting outsiders into the school compound to charge their phones has also been identified as a potential risk to the pupils and school property especially in the girls school, so they have not tried to charge outsiders phones

For the sustainability of the solar equipments, the School management committee have agreed to charge a fee for lighting on all children in boarding so that it supplements the UPE grants under operation and management which is always used for maintenance of school equipment