

FINDINGS FROM A QUALITATIVE ASSESSMENT BY THE  
INTERNATIONAL CENTER FOR RESEARCH ON WOMEN



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**SOLAR SISTER:  
EMPOWERING WOMEN THROUGH  
CLEAN ENERGY ENTREPRENEURSHIP**

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Research conducted by **International Center for Research on Women** with  
support from wPOWER, a U.S. Department of State Initiative  
Design and photographs by **Solar Sister**

# INTRODUCTION

**Solar Sister** is a social enterprise that combines the life changing power of clean energy access and women’s enterprise. Solar Sister is building a network of women entrepreneurs who sell and deliver clean energy to their communities in rural Africa.

In 2015, the **International Center for Research on Women (ICRW)**, a global research institute that seeks to empower women, advance gender equality, and fight poverty in the developing world, conducted a qualitative assessment in Tanzania to better understand whether and how being a Solar Sister clean energy entrepreneur impacts women’s and men’s lives at the individual, family, and community levels. A secondary focus of the study was to reveal initial insights about the benefits experienced by customers as a result of using Solar Sister’s clean energy products. ICRW’s data collection took place in four regions of Tanzania: Mara, Mwanza, Manyara, and Arusha. Sites for data collection were selected based on the large number of entrepreneurs in these regions and the socio-economic diversity among the four regions. **This report presents a summary of ICRW’s research findings.**

Photos and captions in this report come from ICRW’s PhotoVoice Project: PhotoVoice is an innovative Participatory Action Research methodology that allows people to use photography and/or video to capture the social, economic, political, and psychological changes they experience and share them with others. It is unique in that it provides participants with the power to decide for themselves what kind of information and representation they want to share and provides them with a dynamic medium to speak out and be heard. For this qualitative assessment, ICRW taught a group of female Solar Sister Entrepreneurs (SSEs) how to use digital cameras, and then asked them to go out into their communities and visually capture how being a part of Solar Sister has changed their lives. The photos included throughout this brief were produced through this process and were taken by the SSEs.

*Cover Photo: © Basila Thomas 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice  
“Solar Sister Grows Strong Women in the Community” | Basila writes a receipt for a customer, a skill she learned through Solar Sister. The caption the SSE chose for this particular photo demonstrates how women entrepreneurs have gained an increased sense of self-confidence as a result of their involvement with Solar Sister.*

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# SOLAR SISTER BACKGROUND

## THE MODEL:

### MANUFACTURERS

...Produce durable, affordable lights and cookstoves, but need a way to get them to their customers in the last mile.



sells products to Solar Sister

### SOLAR SISTER TEAM

...Provides the backbone of the women's enterprise by recruiting, training, and supporting clean energy entrepreneurs.



recruits, train, support clean energy entrepreneurs

### SOLAR SISTER ENTREPRENEURS

...Earn an income by building independent, clean energy businesses and bring energy access to their communities.



sells and deliver products directly to the doorstep

### COMMUNITIES

...Benefit from solar lights and efficient cookstoves. This creates ripple benefits for home finances, education, health, and more!



©Moshi Mohamed 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice "Solar Sister, Go Solar Sister Go!" | This customer has purchased 3 solar lamps to aid her work at night as a tailor.

## ENERGY ACCESS • INCOME OPPORTUNITY • WOMEN

Putting income and energy in women's hands can have powerful economic and social impacts on women's lives, as well as the lives of their families and communities. Evidence shows that the income of self-employed, rural women who have access to energy is over twice that of their counterparts without access to energy. For rural women, access to energy is correlated with 59% higher wages.<sup>1</sup> Moreover, research suggests that as women earn higher wages, there is a cascade of potential benefits to their social and economic well-being, translating to better educational, nutritional, health, and productive outcomes for their families and communities.<sup>2</sup>

The mission of Solar Sister is to eradicate energy poverty by empowering women with economic opportunity. Solar Sisters taps into the power of women's social networks to bring energy access to the most hard-to-reach communities. Solar Sister helps local women launch clean-energy businesses and earn an income. Each Solar Sister entrepreneur buys her lights and cookstoves from Solar Sister, then sells and delivers them -- woman-to-woman -- to her family, friends, and neighbors.

Solar Sister serves as the backbone of women's enterprise, decreasing the risks and costs women face in starting independent businesses in the clean energy sector. Management staff train and recruit **Business Development Associates (BDAs)**, who are locally hired field staff and Solar Sister's direct link to entrepreneurs. In turn, each BDA recruits, trains, and supports a group of 1-25 self-employed women entrepreneurs (**Solar Sister entrepreneurs or SSEs**). Since establishing operations in 2010, **Solar Sister has empowered 2,000 entrepreneurs in Uganda, Nigeria, and Tanzania, who have in turn provided solar and clean cooking solutions to over 370,000 beneficiaries.**<sup>3</sup>

1 Household Energy Networks. (2015). Women, Energy and Economic Empowerment. Available at <http://energia.org/wp-content/uploads/2015/07/BP66-Women-Energy-and-Economic-Empowerment-compressed.pdf>. Accessed 11/12/15.

2 Morrison, A., Raju, D. & Sinha, N. (2007). Gender Equality, Poverty and Economic Growth. Policy Research Working Paper 4349. Washington, D.C.: The World Bank Group.

3 Solar Sister Website. Available at <https://www.solarsister.org>. Accessed 11/12/15.

# IMPACT SUMMARY

## WOMEN • CLEAN ENERGY ACCESS • INCOME OPPORTUNITY

*Solar Sister's unique model of recruiting, training, and supporting female clean energy entrepreneurs creates a ripple of benefits for the individual, their household, and their community.*

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">                 &gt;&gt;&gt; WOMEN'S EMPOWERMENT &gt;&gt;&gt;             </p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">INDIVIDUAL IMPACTS</p>		<p><b>INCOME AND AUTONOMY</b></p> <p>Income from clean energy businesses allows women to contribute to household earnings, gain confidence, financial independence, and respect from their families, and play a larger role in household decision-making.</p>
			<p><b>BUSINESS SKILLS AND LEADERSHIP</b></p> <p>From trainings and ongoing mentorship support, entrepreneurs gain important skills like marketing, financial management, communication, and product knowledge. As a result, women gain confidence and the ability to serve as role models and change agents in their communities.</p>
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">FAMILY IMPACTS</p>		<p><b>EQUALITY AND COMMUNICATION</b></p> <p>By practicing their communication and negotiation skills and contributing to household income, female entrepreneurs are empowered to speak up. They find their voices are now heard more at home and in the community.</p>
			<p><b>HOUSEHOLD HEALTH AND STABILITY</b></p> <p>Income from clean energy businesses and money saved on fuel increases household economic stability. Solar lanterns and improved cookstoves produce fewer emissions, reducing respiratory and eye problems in the home.</p>
			<p><b>EDUCATION</b></p> <p>Having access to solar light allows students to reliably study later into the evening. Solar lights also save families money on kerosene or candles that can be redirected to school fees and school supplies.</p>
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">COMMUNITY IMPACTS</p>		<p><b>WOMEN'S MOBILITY AND STATUS</b></p> <p>By introducing innovative technology and clean energy products to their communities and contributing to their societies' knowledge and understanding of the health and environmental impacts associated with solar energy, Solar Sisters showcase their confidence, leadership abilities, and communications skills, and benefit from an increased sense of status.</p>
			<p><b>BUSINESS GROWTH</b></p> <p>Having access to income and safe sources of lighting allows entrepreneurs to expand into new business ventures and keep businesses open later into the evening with solar lights</p>
			<p><b>SISTERHOOD</b></p> <p>Solar Sister entrepreneurs support each other, exchanging best practices, working together to increase sales, and supporting each other personally and professionally. Sisterhood increases the sustainability and success of each business.</p>
			<p><b>COMMUNITY SAFETY</b></p> <p>Solar lights make nighttime activities-- like traveling, farming, caring for livestock, and using outhouses-- safer for community members. Fewer open flames mean fewer household fires, causing families to feel more comfortable leaving children home alone in the dark.</p>

# INDIVIDUAL LEVEL IMPACTS

## INCOME



© Basila Thomas 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice “Using Solar Lanterns to Support Other Income-Generating Activities” | Female SSEs and their customers, like the one pictured in the photo above, use solar lanterns to help weave baskets and other household items at night.

At the most basic level, women’s engagement with Solar Sister as entrepreneurs and employees provides them with access to new productive capital and income generation opportunities.

Some of the female entrepreneurs interviewed mentioned that their engagement with Solar Sister was their first opportunity to work and to have access to their own source of income and savings.

When asked about their favorite part of working with Solar Sister, nearly half of the SSEs interviewed listed the income earned and personal benefits experienced through increased income and product use, as shown in **Figure 1**.

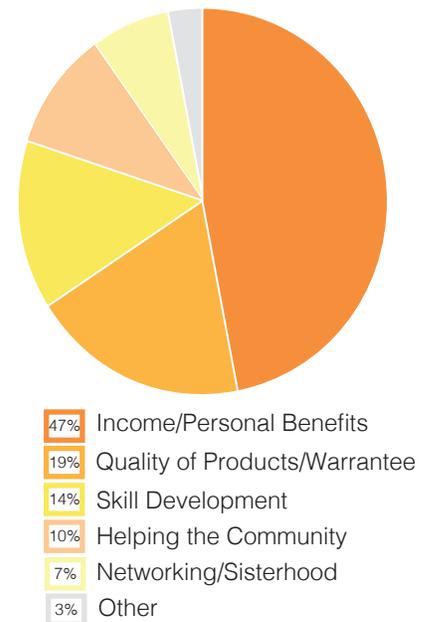
One BDA described how Solar Sister has impacted the lives of the SSEs:

**“They’ve [SSEs] changed their lives a lot. Now, they are able to send their kids to school; they are able now to get food; they can save money for other issues. So it’s a big impact... The majority of them are able to support their family, especially women.”**

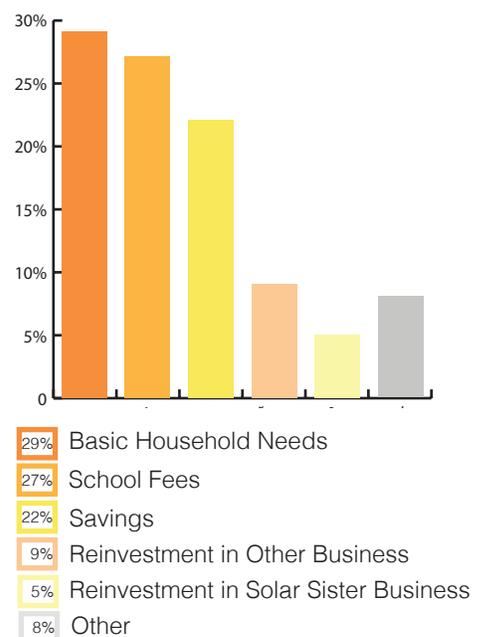
As shown in **Figure 2**, the majority of SSEs surveyed, both male and female, reported spending their earnings on basic household needs, school fees, and savings.

In addition to supporting their families, female entrepreneurs who were interviewed said that they were investing their Solar Sister profits in productive assets including land for farming, animals, like chickens and goats, and machinery, like sewing machines. Male entrepreneurs, on the other hand, said they invested most of their profits in their existing shops, through buying more inventory.

**FIGURE 1: WHAT ARE THE SSEs’ FAVORITE PARTS ABOUT WORKING WITH SOLAR SISTER?**



**FIGURE 2: WHAT DO SSEs SPEND THE MAJORITY OF THEIR EARNINGS ON?**



## AUTONOMY & DECISION MAKING POWER

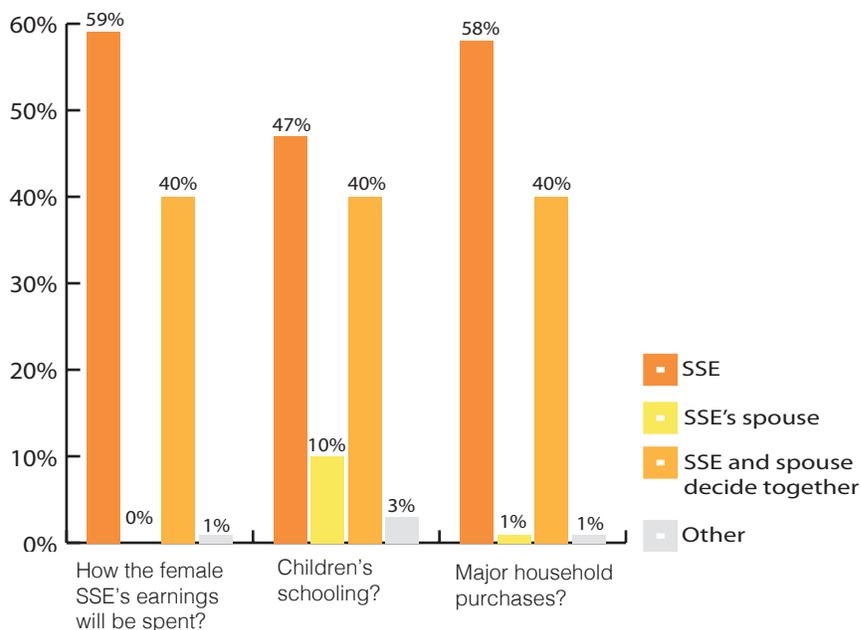
Female entrepreneurs expressed feelings of independence now that they can financially provide for themselves and their families. One female entrepreneur described a sense of “peace of mind” from the ability to support herself and her family; another entrepreneur expanded on this feeling:

***“Before I was waiting in my house for my husband to buy everything for the house. Now I can buy whatever I want.”***

Now that women are contributing to the household income, they play a larger role in deciding what proportion of the household budget is spent on themselves and their children, including for expenses such as school fees, children’s books, uniforms, food, soap, and clothing. One entrepreneur noted:

***“Now I have the confidence even to decide if I want to buy this, and if I need something I will go to buy it.”***

**FIGURE 3: (AMONG FEMALE SSEs) WHO MAKES DECISIONS ABOUT...**



Some women entrepreneurs noted feeling “proud” of having control over how to spend small amounts of cash or savings and happy that they had become a resource their children can rely on in case of a problem or a need.

**Figure 3** shows that the vast majority of female SSEs reported playing a

role in household decision-making, including making decisions around how the money they earn will be spent as well as decisions about their children’s schooling and major household purchases. These decisions were either made on their own or together with their spouse.

## BUSINESS, ENTREPRENEURSHIP, LEADERSHIP: KNOWLEDGE AND SKILLS

Most SSEs mentioned that they have participated in face-to-face Solar Sister trainings and sisterhood meetings and have received additional mentorship to continue to develop their business skills, including: communi-

cation, record-keeping, marketing, time-management, and knowledge about Solar Sister products. One manager mentioned how one of the most successful BDAs developed strong communication and language skills as a result of her engagement with Solar Sister. Entrepreneurs also learn how to separate personal expenses from their business expenses; many female entrepreneurs expressed how this practice has helped them to better manage their household expenses and to balance their capital and consumptions. **Figure 4** shows the skills that SSEs recalled developing through their involvement with Solar Sister.

Both the SSEs and the BDAs expressed leadership skills and op-

portunities as an important benefit of their participation with Solar Sister. BDAs gained leadership skills through working with groups of SSEs and some of the SSEs even became leaders of smaller groups of SSEs. In addition, female entrepreneurs proudly described how they have transferred their leadership skills to other roles within their communities. One female entrepreneur noted:

***“Now, even the men in the community listen to me more.”***

Others mentioned that they are now able to provide advice in their communities and to speak in public to many different types of people, both one-on-one and in groups.

**FIGURE 4: KEY SKILLS AND KNOWLEDGE GAINED BY SSEs AND BDAs**

- **COMMUNICATION**
- **MARKETING:** how to market products and identify markets
- **RECORD KEEPING**
- **TIME MANAGEMENT**
- **MONEY MANAGEMENT**
- **PRODUCT KNOWLEDGE**
- **LEADERSHIP SKILLS**

# FAMILY LEVEL IMPACTS

## EQUALITY AND COMMUNICATION

Female entrepreneurs mentioned enhanced negotiation skills with their husbands and families as a result of their increased participation in the household earnings, as well as the new communication skills acquired through Solar Sister trainings and newfound confidence resulting from their role as an SSE.

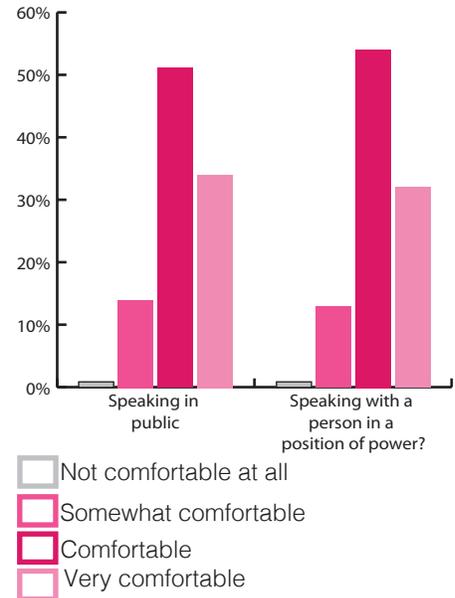
Female entrepreneurs explained how their voices are more heard in the house now that they are able to contribute some of their earnings toward household expenditures. BDAs also noted small changes in inter-household communication for female entrepreneurs, specifically between husbands and wives. One BDA explained that husbands

of female SSEs now respect their wives' opinions more—for example, related to building a house—because now they both contribute to covering household costs.

Participation in Solar Sister seems to also have a positive effect on SSEs' comfort level speaking in public and, in particular, with influential people in the community, like men, elders, and others in positions of power; speaking in public or with a person of power.

When asked whether SSEs felt comfortable speaking in public or speaking with a person in a position of power, the majority of SSEs reported feeling “comfortable” or “very comfortable”, as depicted in **Figure 5**.

**FIGURE 5: (AMONG FEMALE SSEs) DO YOU FEEL COMFORTABLE...**



## HOUSEHOLD HEALTH AND STABILITY



© Hilaria Pachal 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice  
**No title | Solar lamps allow cooking and cleaning to happen at night, leaving more time for other activities during the day.**

In addition to the income earned through solar lantern sales, entrepreneurs mentioned that having access to sustainable sources of lighting and cooking has helped them to enhance their economic stability at home.

Having access to solar light and improved cookstoves reduces families' fuel consumption, leading to savings on kerosene and charcoal expenditure, and environmental benefits through reduced use of wood and charcoal. Some of the female BDAs

and entrepreneurs mentioned the benefit of being able to create better, more sturdy homes for themselves and their families as a result of their increased income from Solar Sister. One BDA noted:

***“When I started to visit [the entrepreneurs], they lived in poor houses. Now they use bricks...They have painted their houses and now it is shining because the light they are using is not emitting smoke.”***

Female and male entrepreneurs described how the use of solar lights and clean cookstoves reduced emissions and dirty smoke, directly contributing to improvements in health outcomes such as eye and respiratory problems.

Furthermore, some of the SSEs described how they use solar lanterns to take better care of their livestock, enhancing their access to valuable animal protein and subsequently increasing their household's nutritional status. Many SSEs explained that the income they earned through Solar Sister has indirectly improved their health by enabling them to purchase more nutritious foods. This was especially important for SSEs who were HIV positive as they are now able to purchase their medicine and the proper food to keep them healthy. A BDA observed:

***“They can buy food and whatever. And if you talk to them before, some of them are HIV victims, so at least now they can buy medicine. They can buy food, not like before. But now they can at least eat a balanced diet.”***

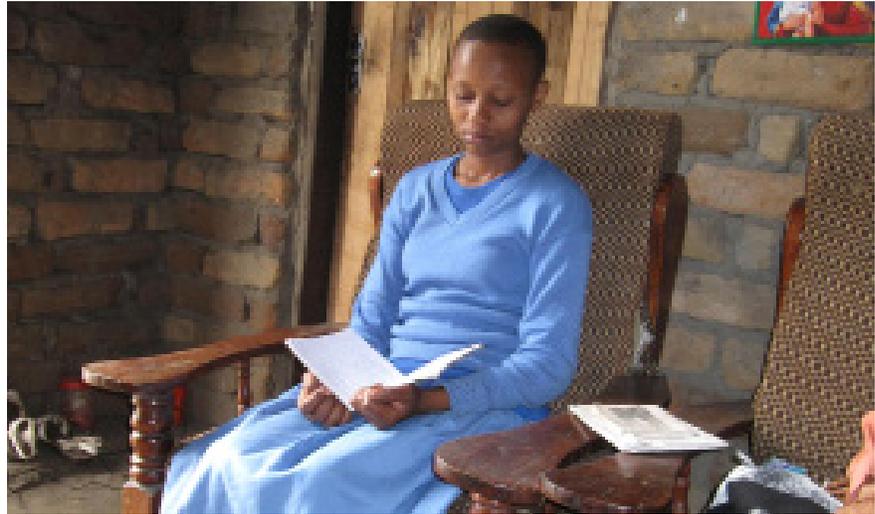
## FAMILY LEVEL IMPACTS CONTINUED

### EDUCATION

Having access to solar light allows students to study later into the evening and also enables families to save money on kerosene that can be redirected to school fees. One female entrepreneur mentioned that her children's grades have improved because they use solar lamps to study at night.<sup>4</sup>

Among SSEs surveyed in Solar Sister's quantitative 2015 Tanzania End of Year Survey:

**91% REPORTED THAT THEIR CHILDREN USED THE LIGHT FOR STUDYING**



© Hilaria Pachal 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice  
No title | Solar lamps allow children and families to study and read at night.

## COMMUNITY LEVEL IMPACTS

### MOBILITY

Mobility was an impact noted most prominently among BDAs. Many of the BDAs interviewed indicated that exposure to different places and cultures was a surprising benefit of be-

ing part of Solar Sister, and one that they really enjoyed. For BDAs, these experiences made them "more confident and courageous". According to one BDA:

***"I have met a lot of people. I have an exposure, I like traveling...I've met many people I never expected. And now at least even me, I have the courage..."***

### STATUS

SSEs and BDAs noted a change in the way they are viewed in their communities.

SSEs are seen as role models because of the positive effects the products they sell have on members of the community. In the group discussions, women described energetically how they are increasingly recognized as 'business women'

and that they feel more respected and appreciated. Moreover, the change in status of female entrepreneurs was further reinforced by the recognition that SSEs are viewed as agents of change in the community. The SSEs are bringing new, beneficial technology and energy products to their communities for the first time, and are also contributing to their societies' knowledge and un-

derstanding of the health and environmental impacts associated with solar energy. A BDA described this concept by saying:

***"They [SSEs] become popular in their communities! They are perceived as life saviors. They are bringing light to their communities. They got new friends."***

<sup>4</sup> This benefit is reinforced by the evidence from a recent study in rural Kenya that shows that children with access to solar lamps have improved math scores in school as compared to children who do not have access to light. Additionally, a study in Brazil found that girls who had access to electricity were 59% more likely to complete primary school by the time they were 18 than those who did not have access. Hassan, F. & Lucchino, P. (2014). Powering Education. EF Working Paper 17-20. Available at [https://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=NEUDC2015&paper\\_id=117](https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=NEUDC2015&paper_id=117). O'Dell, K., Peters, S., & Wharton, K. (2014). Women, Energy, and Economic Empowerment: Applying a gender lens to amplify impact. Deloitte University Press. Available at <http://dupress.com/articles/women-empowerment-energy-access/>

### BUSINESS GROWTH



© Petronila Gobi 2015 | Produced by ICRW and Solar Sister through the use of PhotoVoice  
**No title | A Solar Sister customer weighs out the cotton she has been able to harvest with the help of her solar lamp. She appreciates the light in her house as well as the decreased danger of her cotton catching fire now that she uses a solar lamp rather than kerosene lamps.**

Having access to electricity enables families to expand other businesses through using the solar light to stay open longer, produce more goods throughout the night, and attract more customers.

One female entrepreneur mentioned that she was able to venture into new business opportunities, such as processing and selling cotton, now that she has access to safe light at home to store these cash crops. Previously, she feared storing the cotton in a room with a kerosene lamp that could start a fire and cause her to lose the crops.

### SISTERHOOD

The social connections created among female SSEs were strongly identified by both entrepreneurs and BDAs as a key impact of working with Solar Sister.

Solar Sister convenes sisterhood meetings through creating safe spaces where the entrepreneurs have the opportunity to connect with colleagues on both personal and professional issues, order inventory

and other business supplies, reinforce skills, and build trust. These formal interactions lead to informal interactions and lifelong friendships.

For the SSEs who reported increased networks and social support, these relationships seemed to have an extremely positive impact, both economically and socially.

One group of SSEs noted sharing

successful strategies for how to advertise their products to groups versus individuals. Another group of SSEs explained how they work together to keep their customers happy: if one SSE is out of a product, they will refer their customer to a fellow SSE, and in the future, that SSE will refer customers back to them. By sharing customers in this way, clients are able to get their desired products in a timely manner.

### COMMUNITY SAFETY

SSEs are bringing solar light to communities that were previously in the dark. This has the potential to make the communities safer for women and young community members, specifically at night.

Several female entrepreneurs and female customers mentioned that they feel more protected now that they can use their solar lanterns when they go outdoors to use out-houses at night. According to one respondent:

***“The young people use the product[s] for different late night ceremonies...for walking at night. Others are livestock keepers. They use that to make sure all the cattle is safe.”***

Entrepreneurs and customers emphasized the safety advantages of using solar products as compared to other fuels like kerosene. Specifically, women described a feeling of relief when leaving their kids at

home with solar lamps, even when they have to stay in the field late at night. One said:

***“Due to the presence of Solar Sister, it has reduced the number of deaths, because before when we were using the kerosene lamps it was very dangerous. Anything could catch fire, but now we are safe. The people are safe because they are using the solar.”***

# ADDITIONAL IMPACTS

Like SSEs and BDAs, Solar Sister customers also experience a variety of different benefits from using solar lanterns and clean cookstoves. These include:

- **Financial savings** from no longer having to buy kerosene for lanterns, as well as money saved on fuel from the use of more efficiently-burning cookstoves. According to customers, money saved from fuel expenditure is spent on school fees, household necessities such as water and nutritious food, and is invested in businesses.
- **Time savings** from more efficient cooking. Customers have used time saved in the kitchen to spend more time on other businesses and on their farms, enabling their livelihoods to flourish.
- **Enhanced safety** from no longer relying on kerosene to light their homes. One customer explained: ***“When using a kerosene lamp before, I didn’t feel safe leaving my children alone, but now I feel comfortable leaving them at the house [without me].”*** Customers also use the lamps to protect their families from dangerous insects, like scorpions, that may be found inside the house.
- **Health benefits**, such as reduced coughing, from reduced emissions. One customer explained: ***“[We are] happy because [we] no longer have to use the kerosene lamp, which was destroying the health of children and families.”***

## AS A RESULT OF USING CLEAN COOKSTOVES CUSTOMERS REPORTED SAVING:

- **1.6 HOURS** per week in time spent on fuel collection
- **\$1.92** per week in reduced expenditure on wood
- **\$2.41** per week in reduced expenditure on charcoal.

## AS A RESULT OF USING SOLAR LANTERNS CUSTOMERS REPORTED SAVING:

- **1.5 HOURS** per week from switching to solar lighting
- **1.7 HOURS** per week from switching to solar mobile charging
- **\$3.23** per week in reduced kerosene costs
- **\$2.69** per week in reduced mobile charging costs