SWITCH ON KALIMANTAN

IMPACT ASSESSMENT

BY REISKY HANDIKA • KOPERNIK FELLOW • JANUARY 2014

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Executive Summary

We connected 180 d.light S250 solar lights with people in Galinggang, an off-grid village on the banks of the Katingan river in Central Kalimantan. We partnered with Yayasan Puter Indonesia to make the solar lights available to buy in instalments.

Six months after people began using the solar lights, Kopernik Fellow Reisky Handika visited Galinggang to explore the impact of the technology on people's lives. This impact assessment report is a result of Reisky's work in the field in Galinggang from September to November 2013.

Reisky concluded that:

- People who purchased the d.light S250 solar lights are **saving a significant amount of money each month** on lighting expenses;
- **Almost 44 percent** of people say their health has improved since buying their solar light (although the cause of this may not be solely attributed to reduced exposure to kerosene smoke);
- On average, students are not studying longer at night, but report that they are **now studying more effectively and efficiently** using the d.light S250;
- The **average time dedicated to cooking dinner is now much shorter** than before; and
- **Fishing at night has not been affected** much by the distribution of the d.light S250.

Families are very happy with their solar light purchases, and are keen to buy more d.light solar lights to eliminate dependence on kerosene.

Project Background

Snapshot of Location

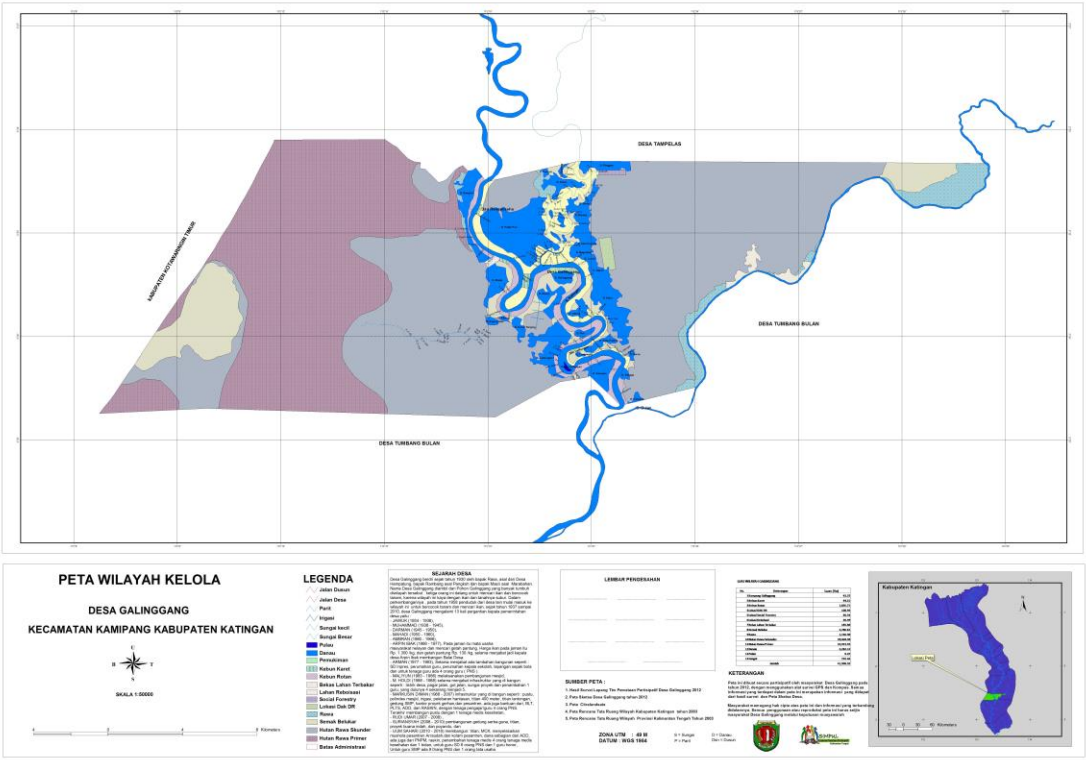
Galinggang is one of nine villages situated in Kamipang sub-disctrict, Katingan district, Central Kalimantan, Indonesia. To reach Galinggang, you have to fly to Palangkaraya, the capital city of Central Kalimantan and then take a two-hour car-trip to the city of Kasongan. From Kasongan, you take a boat ride down the Katingan River for around seven to eight hours before finally arriving in Galinggang.

Galinggang is a big village with 424 households. Each household is part of a *rukun tetangga* (RT) and there are 10 in this village. *Rukun tetangga* is a group

of several households grouped based on their proximity to each other. Your RT is determined and agreed by the government and the people of the village. RT 01 until RT 08 are located in Galinggang, RT 09 and RT 10 are situated in Lantungan and Rangan Seha respectively. Lantungan and Rangan Seha can be considered as sub-villages, but still lie under the administration of Galinggang village.

Galinggang's local government authority is the *Badan Permusyawaratan Desa* (BPD). The BPD has the same level of power as the chief of the village and therefore they work in coordination with one another. The BPD also has the right to monitor and evaluate the performance of the village chief. In a village that has less than 1,000 people, the BPD consists of five members. If a village has more than 1,000 people, the BPD consists of seven members. The BPD submits a mandatory annual report to monitor and evaluate the performance of the village chief.

One of the problems in Galinggang is the absence of electricity. To light up their houses the people in Galinggang still use kerosene lamps, solar panels, or generators. To address this problem, Kopernik worked together with their local partner, Yayasan Puter distributed solar lights to this village. In March 2013, 180 units of d.light S250 were distributed to Galinggang. This report identifies the positive effects the solar lights have had in Galinggang.



Picture 1. Map of Galinggang

Kopernik

Kopernik is a non-profit organization that focuses on distributing life-changing technology to last mile communities. Kopernik balances a philanthropic and business approach to distributing technology. Our donors fund the upfront costs of introducing technologies and creating micro-business opportunities in remote communities. The money raised from product sales is reinvested in more technology for the last mile.

Local Partner: Yayasan Puter Indonesia

Yayasan Puter Indonesia specializes in the field of community planning activities. Puter is committed to helping NGOs, community groups, private sector and governments to plan specific programs or projects, within a comprehensive and complete framework. Puter Indonesia acts more as a community-planning consortium rather than as an institution. Puter Indonesia's mission is to help with the implementation of the Indonesian society's role in

order to establish, develop, achieve, enjoy and maintain the best quality of life through empowerment efforts with the community.

Project Implementation

The Technology

The d.light S250 solar light is a dual-purpose solar light and solar mobile charger. The d.light S250's bright white light illuminates a room similarly to a 3 to 5 Watt CFL lamp and is up to 50% more energy efficient. It provides 10 times more light than a kerosene light. The d.light S250 also charges most mobile phones on the market. It keeps personal mobile phones fully charged even when AC power is unavailable or inconvenient. The selling price for each unit of d.light S250 is Rp.350,000 (US$30.95). The solar light has four different levels of brightness as well as the cellphone-charging feature.

Distribution Mechanism, Pricing & Payment

In March 2013, Yayasan Puter distributed 180 units of d.light S250 in Galinggang. Beforehand, they conducted surveys to list potential customers who were interested in purchasing the solar light. As a part of the distribution process, Yayasan Puter also aimed at empowering local women in Galinggang through the formation of a small local microfinance scheme called *Kelompok Swadaya Masyarakat (KSM) Mahaga Lewu*. This microfinance scheme is Yayasan Puter's "signature program" that they implement in every site they work in.

After identifying 180 households interested in buying the d.light S250, Yayasan Puter submitted a proposal to Kopernik. Kopernik then fundraised for the purchase and upfront costs associated with sending 180 solar lights to Yayasan Puter to be sold to people in Galinggang. The selling price for each d.light S250 in Galinggang was Rp.250,000 (US$22.14). This was a subsidized price from the original selling price of Rp.350,000 (US$30.99) that was provided by Mazars Starling Resources. This subsidized price was also agreed by the people of Galinggang and perceived as the ideal price considering Galinggang people's economy level. The customers paid for their solar light in six installments, an initial payment of Rp.100,000 (US$8.86) and five repayments of Rp.30,000 (US$2.66).

The solar lights were sold to customers rather than given to community members for free to create a sense of ownership and to contribute to the sustainability of the project. If people need to purchase the technologies, they will only invest in it if they truly believe it will improve their lives and not just use it because it was a present. Having the ability to purchase the technology also provides a sense of empowerment to last mile communities whom are the focus of Kopernik's projects. The revenue raised by this project will also be reinvested into a phase 2 of the project so more technologies can be connected with those who really need them.

KSM Mahaga Lewu collected the repayments for the solar lights purchased and then passed the revenue on to Yayasan Puter. All of the customers were content with this payment method. *KSM Mahaga Lewu* itself was established to help locals borrow money to start up small-scale businesses. All members of *KSM*, and even non-members enthusiastically welcomed this initiative. So far, numerous members of *KSM* have utilized this scheme to help them start up a small business or simply fulfill basic household needs. The impact of this microfinance scheme for community members will be further explored in the. 'results of impact assessment' section of this report.

Yayasan Puter was actively involved in the project from beginning to end, from drafting the initial proposal, to facilitating the establishment of *KSM Mahaga Lewu*, to distributing the technology to the end users. Pak Andaman Muthadir

was the person in charge of the distribution of the d.light S250 in Galinggang. Meanwhile, other Officers from Yayasan Puter, Pak Mambang Rena and Pak Aji, were also involved as Galinggang's local facilitator and project facilitator respectively. As the local facilitator, Pak Mambang acted as a bridge between Yayasan Puter and Galinggang's local government and was also responsible for teaching the local people about the benefits of the solar light and the microfinance scheme. Meanwhile, Pak Aji, the program facilitator, was responsible for developing the distribution plan and identifying the list of potential buyers in Galinggang. Pak Aji also helped Galinggang's women to understand financial management and other technical aspects related to the *KSM* scheme by holding a series of training sessions. This was done to prepare Galinggang's women to manage the initiative long term without any direct involvement from Yayasan Puter.

Impact Assessment

Process & Methodology

To produce this impact assessment, the Kopernik fellow with the assistance of Yayasan Puter staff interviewed 90 respondents (half of the total customers who bought the d.light S250 solar light). They asked 94 questions covering topics from household income and expenditure to qualitative aspects of the usage of the solar light, such as the health impact of the technology. The list of questions asked during interviews is attached as an annex to this report.

Demographically, the respondents of this impact assessment came from 10 different RTs in Galinggang. The distribution of respondents based on their address can be seen in the chart below:

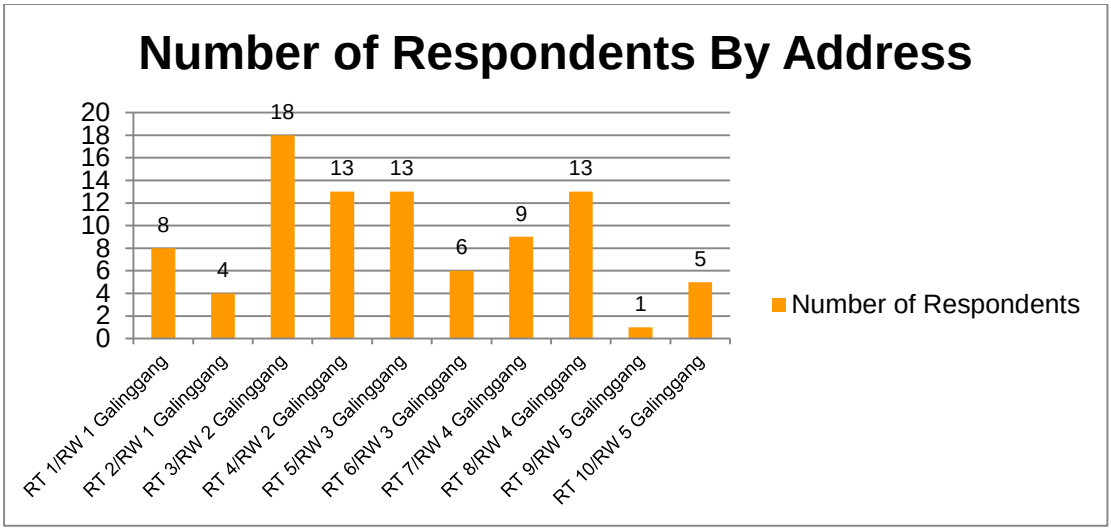


Chart 1. Number of interview respondents by address (n=90)

The respondents interviewed for this research came from households of different sizes. More than one third of the total respondents came from four-member family households, while 18 came from three-member households and 14 came from five-member families. The number of the respondents' family members can be seen in the chart below:

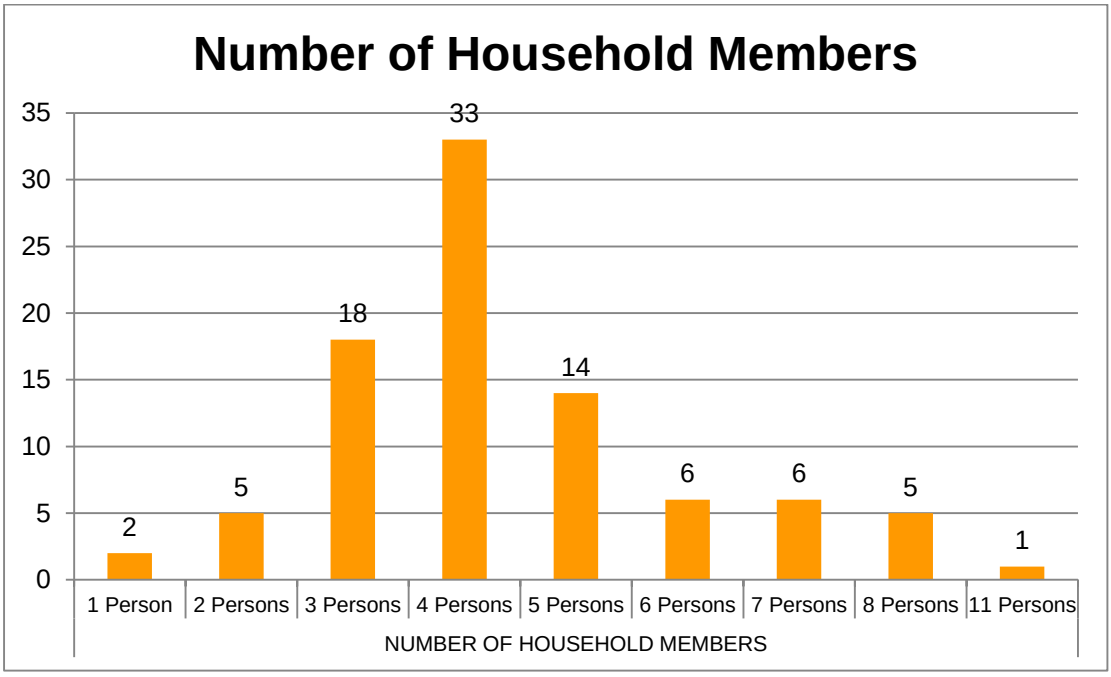


Chart 2. Number of household members of the households interviewed (n=90)

Out of 90 respondents, 92 percent of them are married. Regarding their level of education, 72 percent of them only reached primary school level.

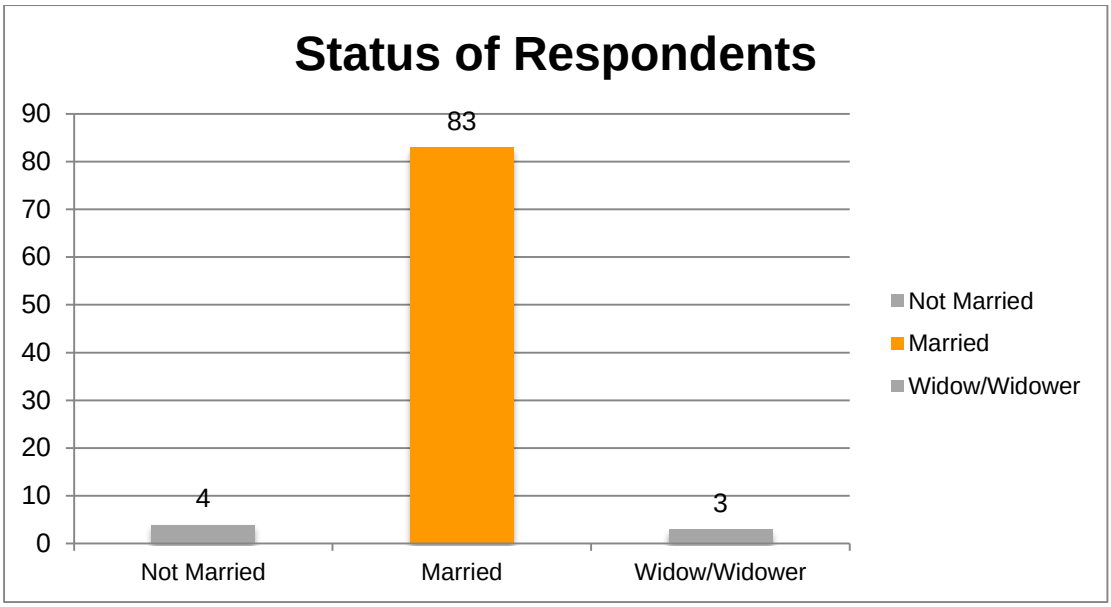


Chart 3. Marriage status of the respondents (n=90)

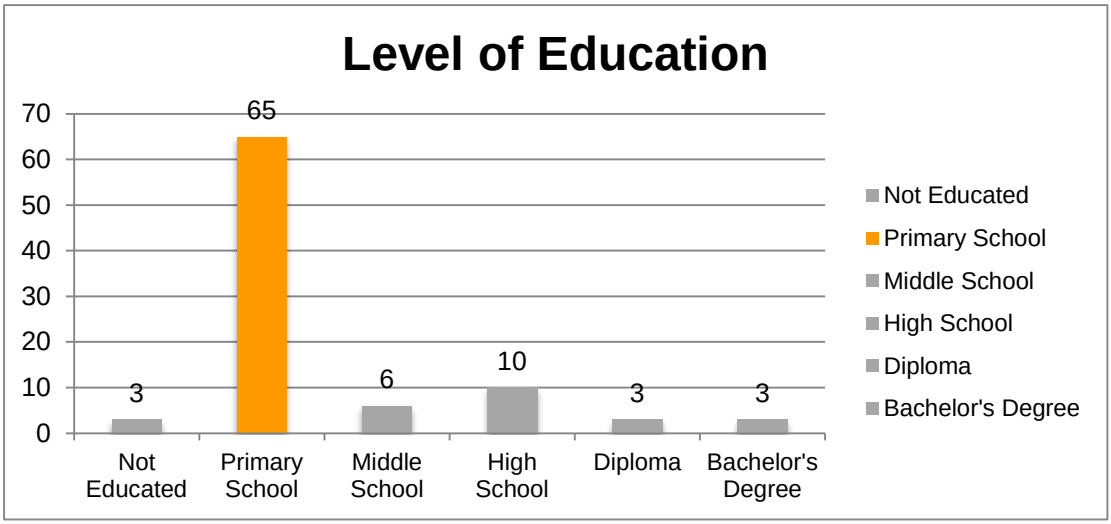


Chart 4. Education level of the respondents (n=90)

In 2013, 1,503 people were recorded living in Galinggang, 757 men and 746 women. There are two main tribes that are inhabiting the village: Dayak Kahayan and Banjar. The Dayak Kahayan people come from the upstream area of Katingan river, while Banjar people come from Banjarmasin in South Kalimantan. Many people from this ethnic origin are now working in Kasongan, the capital city of Katingan district. All villagers in Galinggang are Muslims, except for two people who are not locals. More than 90 percent of Galinggang people work as fishermen, although many of them also work other jobs in order to ensure their income during dry season. Some of these alternative jobs

include bird hunter, small-scale entrepreneur (small kiosk, phone top-up seller, etc) and gold miner. People in Galinggang earn Rp.2,077,444 (US$183.97) per month on average, although these people do not work routinely but generate this income on a day to day basis.

After collecting data, the Kopernik fellow conducted quantitative data analysis to create the charts and graphs presented in this impact assessment report. Qualitative data is presented in the five case studies in the report. The case studies cover the stories of d.light S250 customers before and after using the technology. These case studies are expected to serve as testimonials depicting the importance and positive effects the d.light S250 have had on the lives of the Galinggang people.

This impact assessment supports that Kopernik's expected changes in the community due to the distribution of the solar lights, did in fact take place. The distribution of the d.light S250 was expected to trigger changes in households' savings, health condition, children's education, and other aspects of life (the conduct of daily activities such as cooking, fishing, going to the field, etc). The Kopernik fellow's hypotheses were that the distribution of solar lights would create savings in each household, that they would contribute to better health (mainly concerning respiratory-related diseases), and that the academic performance of students would improve due to the longer duration of studying at night. Regarding people's daily activities, it was expected that cooking would be done much faster, people would go out fishing and to the field more often or with much longer duration, they would walk around the village more often, and spend more time with the family at night.

Results of Impact Assessment

Before Solar Lights

In Galinggang, there were basically four modes of lighting before the d.light solar lights were distributed. Those four modes of lighting were, kerosene lamps, flashlights, generators, and solar panels. The charts below show the usage of each mode of lighting by a number of households in Galinggang.

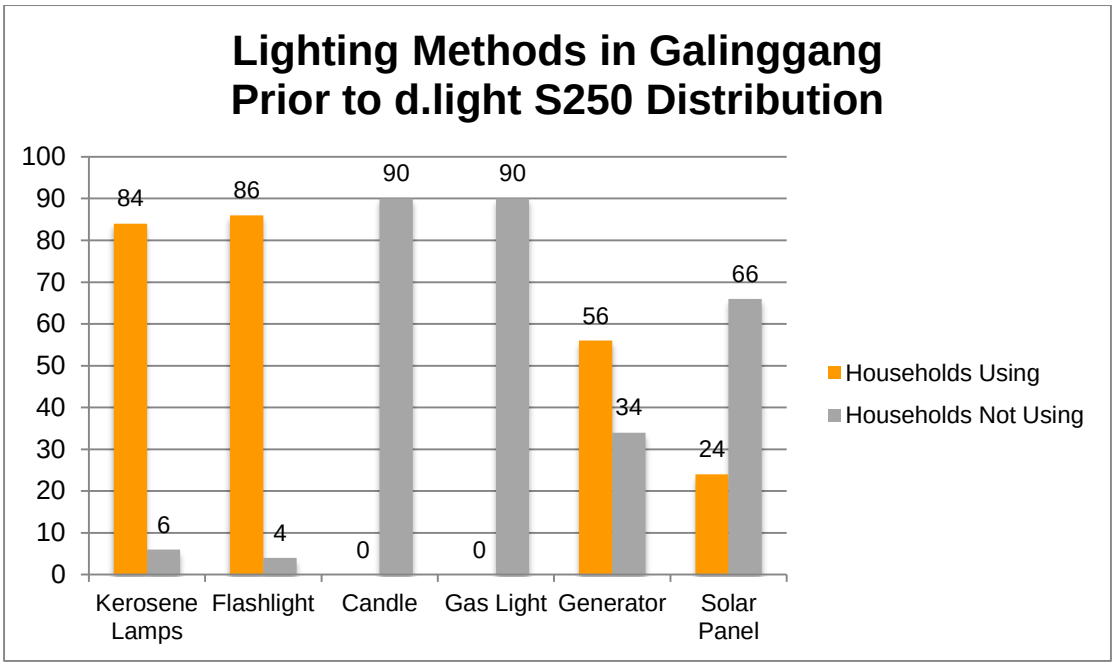


Chart 5. Lighting methods in Galinggang prior to d.light S250 distribution (n=90)

Kerosene Lamps

Kerosene lamps were the most used lighting source for households in Galinggang. Simple kerosene lamps were made from used cans or bottles, which were filled with kerosene and a wick added to light the fire. The size of this lamps varied, but generally the people used small tin cans that had to be refilled every day.

Each household used various quantities of kerosene lamps, ranging from one to six units. The table below shows this data.

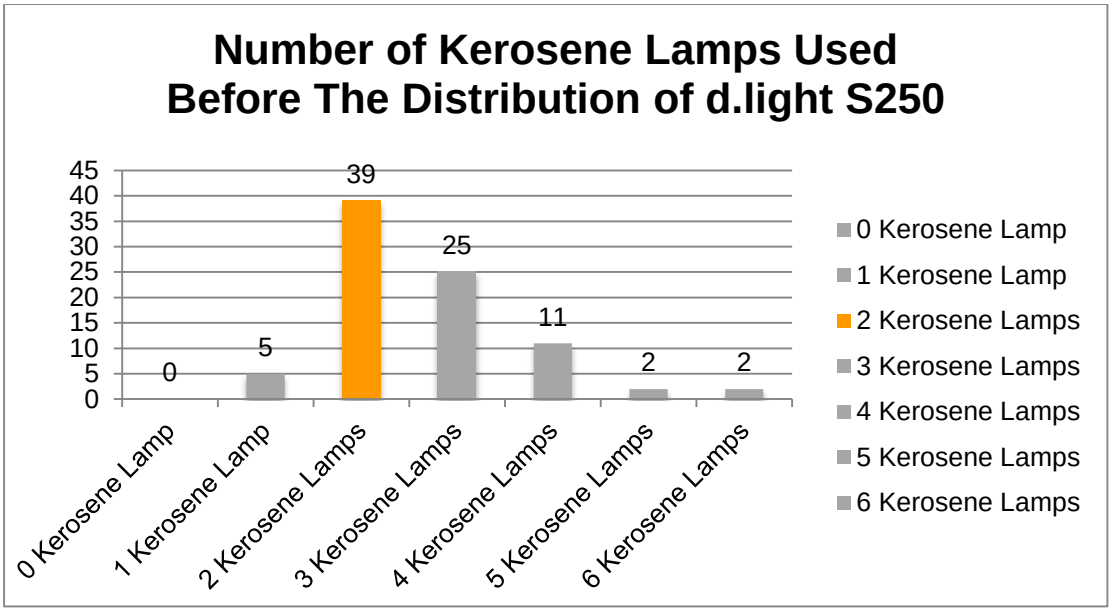


Chart 6. Number of kerosene lamps used before d.light S250 distribution (n=84)

The table above shows that most households (39) used two kerosene lamps in their houses and two households actually used six kerosene lamps each night before purchasing the d.light S250.

90 percent of users reported that they did not like using the kerosene lamp. From 84 respondents who were using kerosene lamps, only three of them said that they actually liked this lighting method.

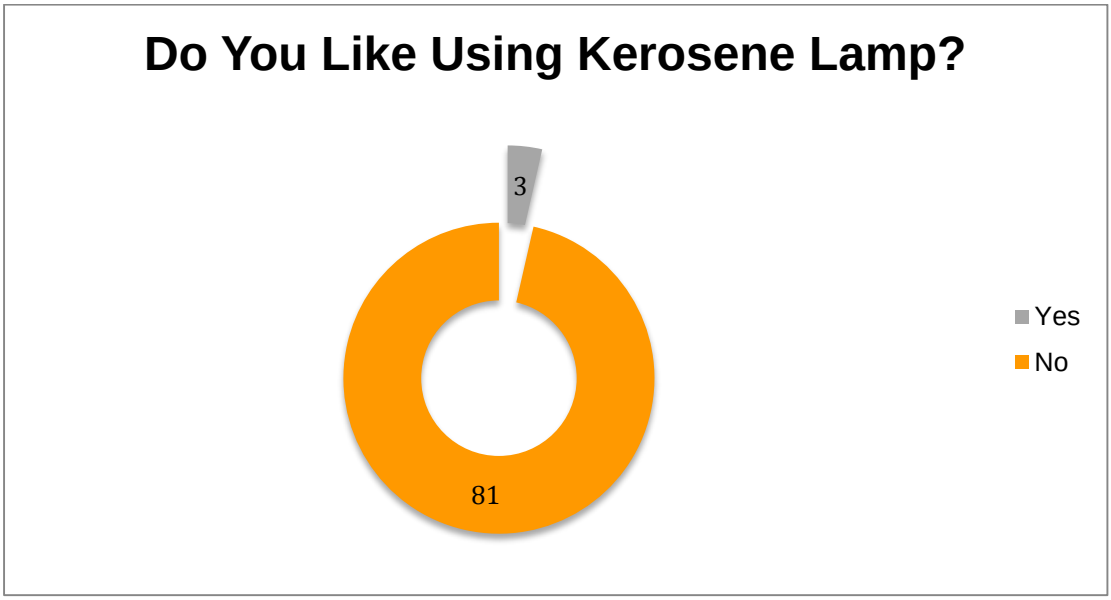


Chart 7. People's preference toward kerosene lamps (n=84)

The chart below shows the reasons for their dislike for this method of lighting.

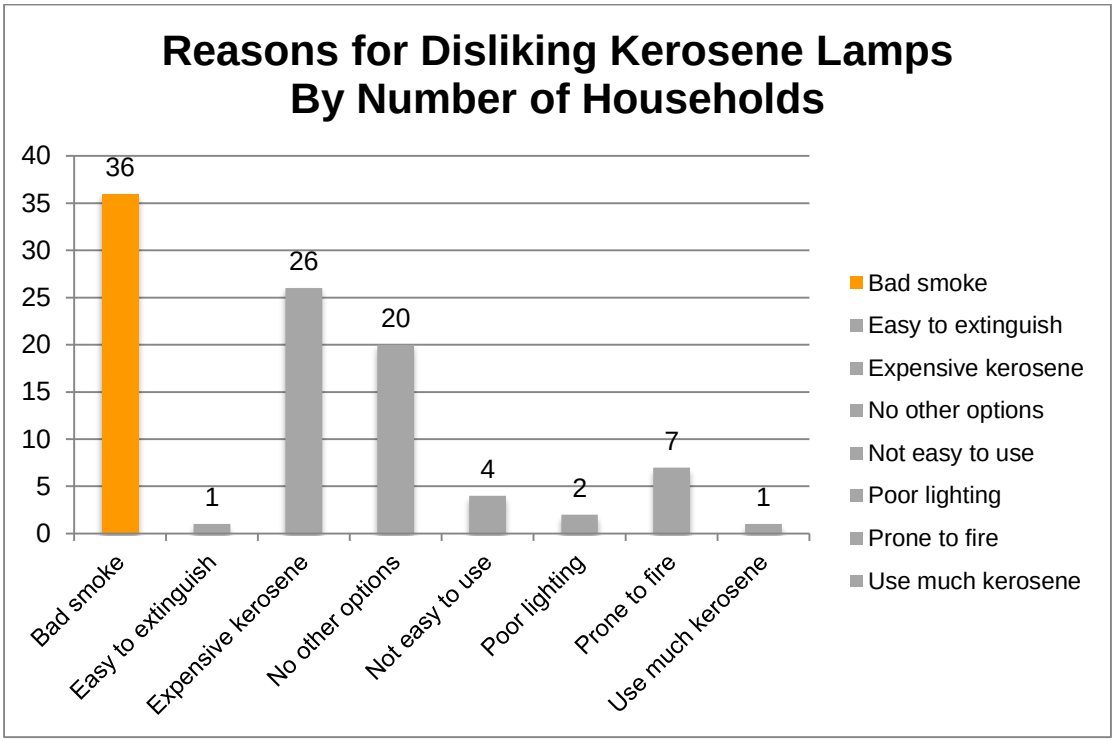


Chart 8. Reasons for disliking kerosene lamps by number of households (n=81)

The chart above shows that bad smoke is the number one reason why people in Galinggang do not like using kerosene lamps. The second and third reasons are the expensive price of kerosene and because there are no other good options that can be used as a substitute for the kerosene lamp.

Before the d.light S250 solar lights were distributed to Galinggang, people were using one kerosene lamp for an average of 74 hours each week, using an average of 12.5 litres of kerosene each month, and spending an average of Rp.126,601 (US$11.21) to purchase kerosene each month. The selling price of kerosene in Galinggang varied between one kiosk to another and ranged from Rp.5,000 (US$0.44) to Rp.12,000 (US$1.06) per litre.

Flashlights

Another common lighting method in Galinggang before the distribution of solar lights was a flashlight. There were 86 households recorded who stated to have one or several flashlights in their house. The quantity of flashlights owned by a

single household before the distribution of d.light S250 varied, illustrated in the chart below:

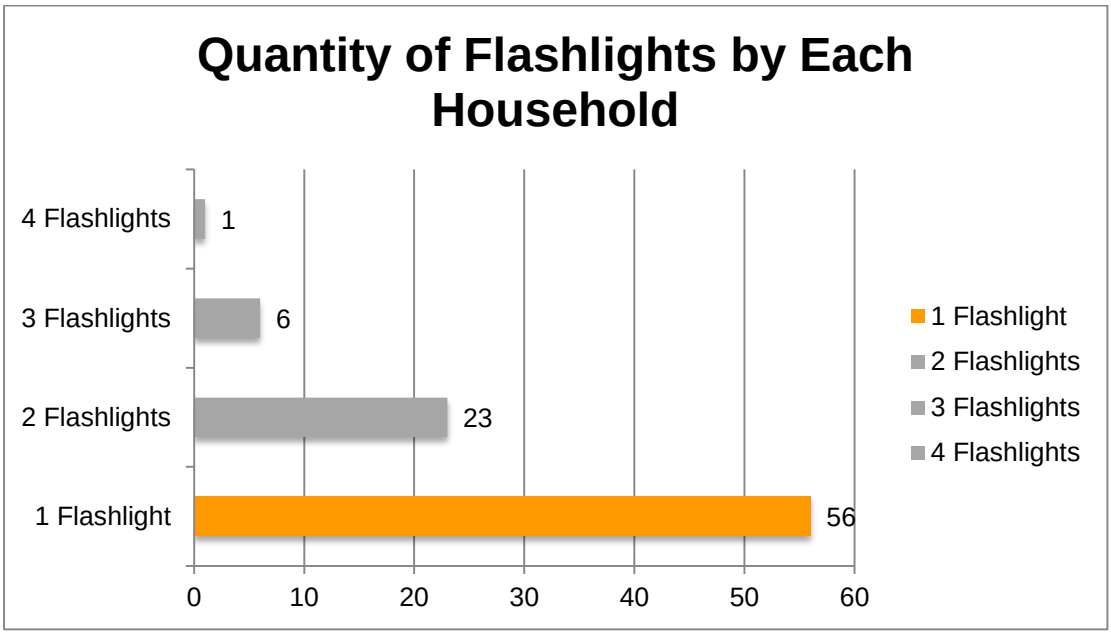


Chart 9. Quantity of flashlights by each household (n=86)

Out of these 86 flashlight users, almost half of them expressed their liking towards using flashlights. This is evident in the chart below.

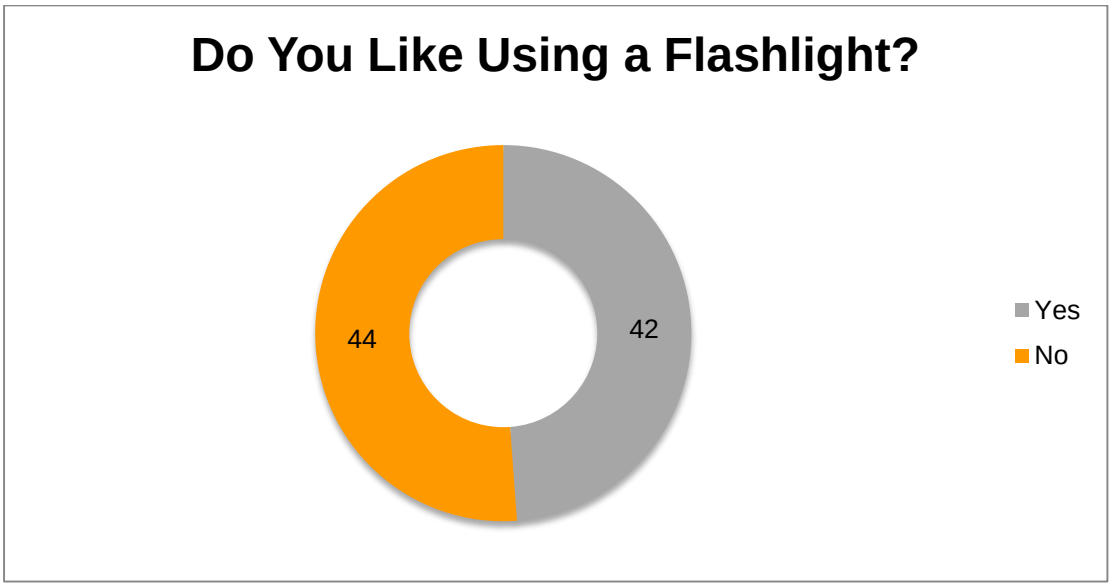


Chart 10. People's preference toward flashlights (n=86)

The reasons why people liked or disliked using flashlights can be seen in the following charts.

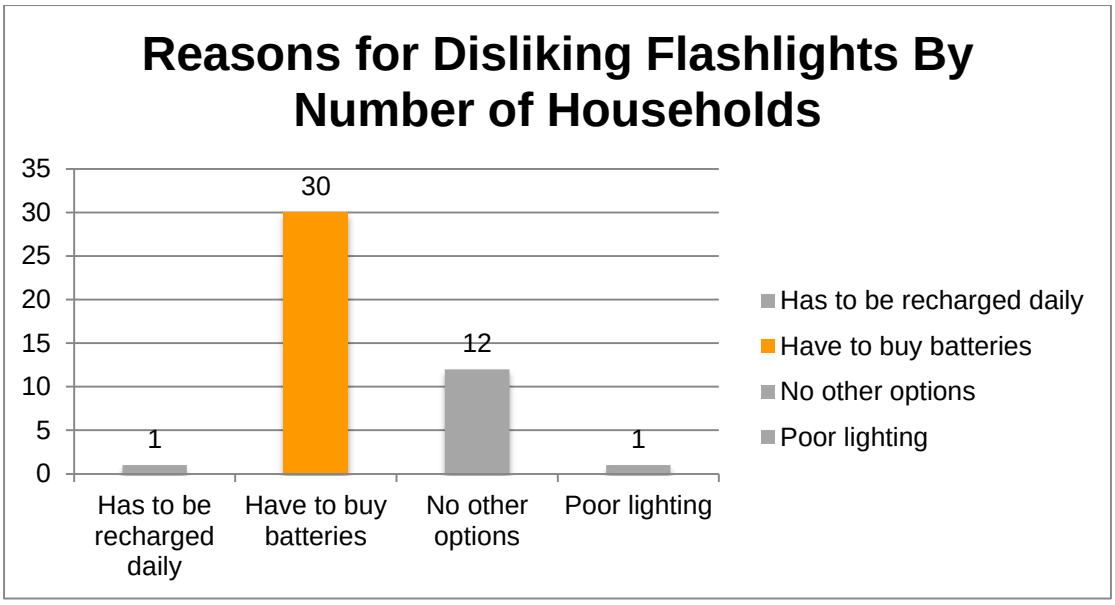


Chart 11. Reasons for disliking flashlights by number of households (n=44)

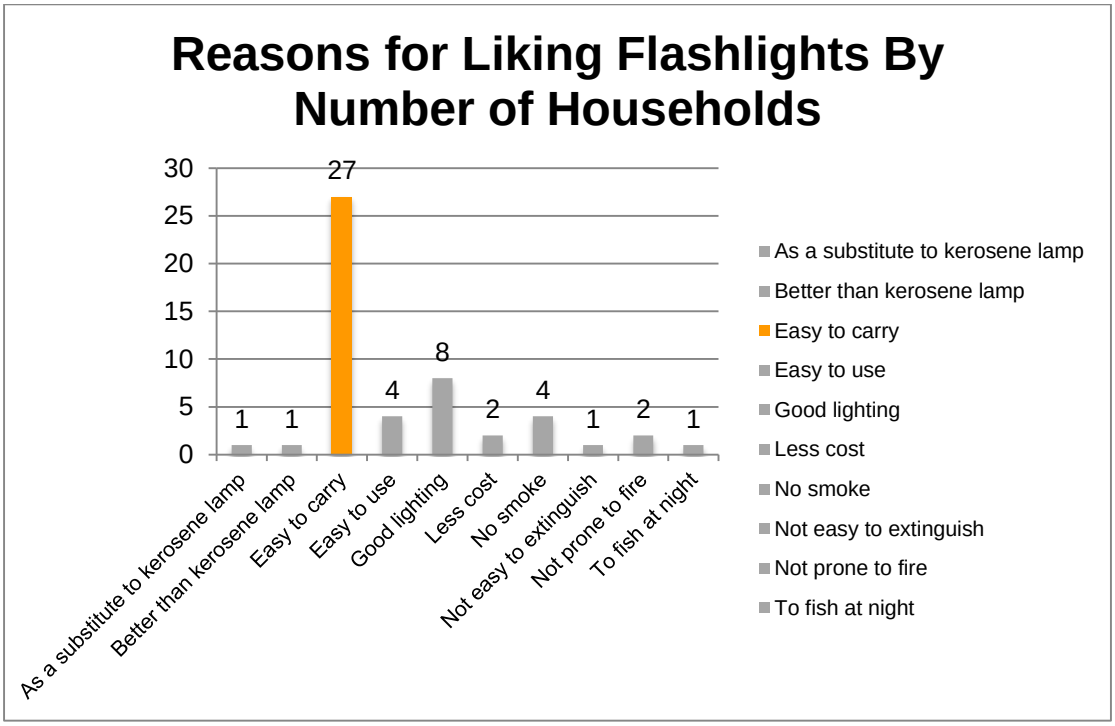


Chart 12. Reasons for liking flashlights by number of households (n=42)

On average, flashlight users in Galinggang used 10 dry cell batteries each month which cost on average Rp.28,531.98 (US$2.53) every month. The dry cell batteries were sold individually or in a pack of 3. The prices varied depending on the size of the batteries and the kiosk they were sold at. In general, the price of small dry cell batteries ranged from Rp.5,000 (US$0.44) to

Rp.10,000 (US$0.89) for a 3-battery pack, or Rp.1,750 (US$0.15) to Rp.3,500 (US$ 0.31) for a single battery. For the bigger dry cell batteries, the prices ranged from Rp.4,000 (US$0.35) to Rp.6,000 (US$0.53) per battery.

Generators

Another lighting option in Galinggang was the generator. From 90 respondents interviewed, 56 households owned or could connect a generator to their house. The generator was not only used for lighting up their house, but also to switch on electronics such as televisions, refrigerators and other kitchen appliances. Generator usage in Galinggang was not significantly affected by the d.light S250 distribution because people used a generator for more than just light.

People spent on average 17 hours per week using the generator. People whose households do not have a generator or could not connect to a generator usually visit their friends that have or can connect to a generator to watch their favorite TV series at night. The generators were also switched on if there was an event in the village where women had to cook lunch for a large number of people. The generator was then needed to switch on kitchen appliances, such as blenders and mixers.

To use the generator, people on average purchased 30 litres of gasoline or diesel solar oil each month, which cost on average Rp.236,027 (US$20.87) per month. When asked whether they liked using the generator or not, almost 70 percent expressed that they liked this energy method.

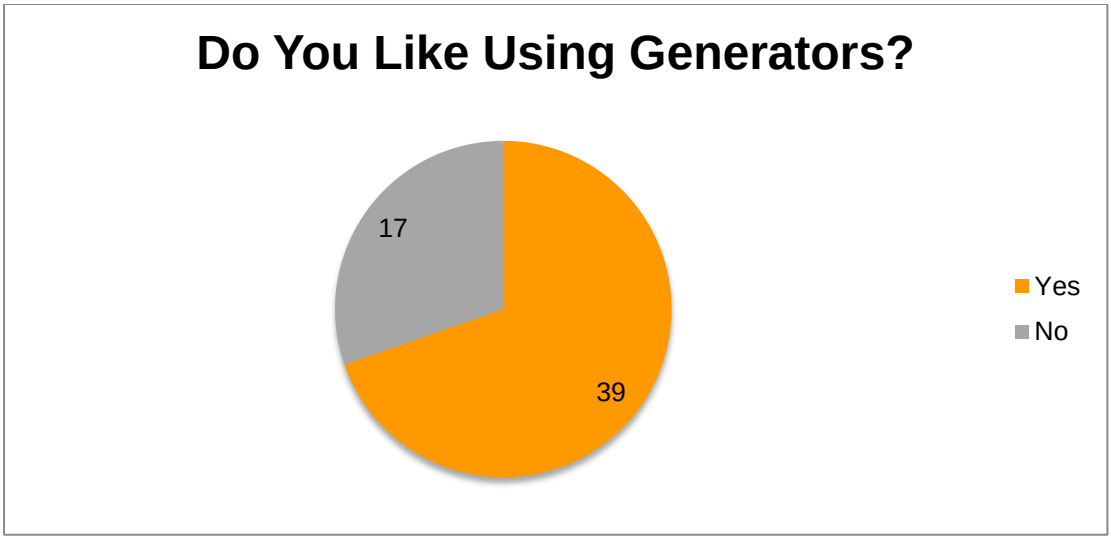


Chart 13. People's preference toward generators (n=56)

The chart below illustrates the reasons why people liked or disliked using generators in their houses.

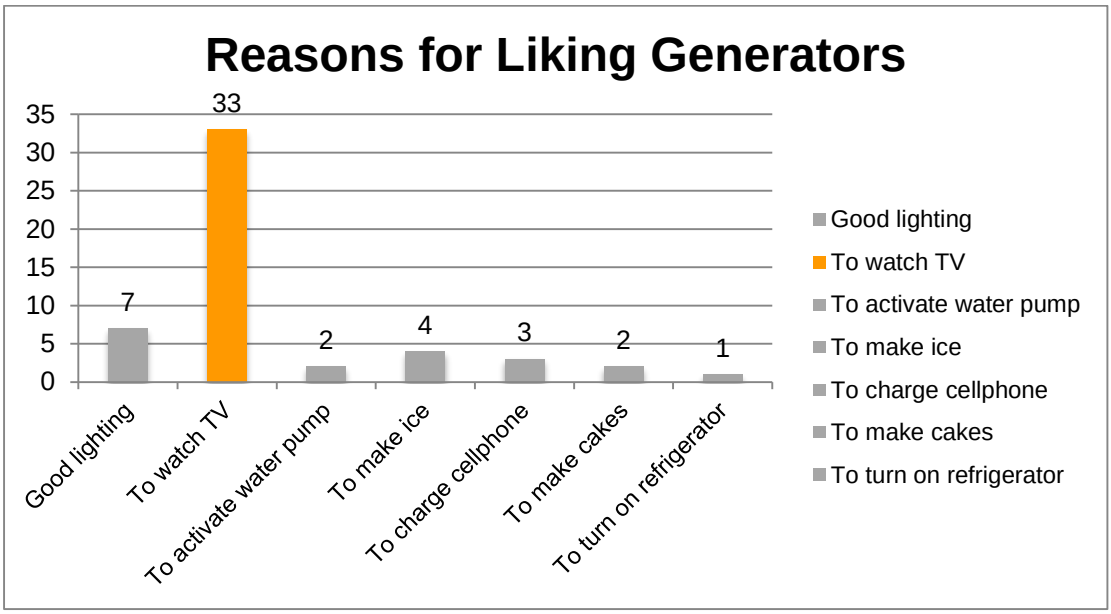


Chart 14. Reasons for liking generators (n=39)

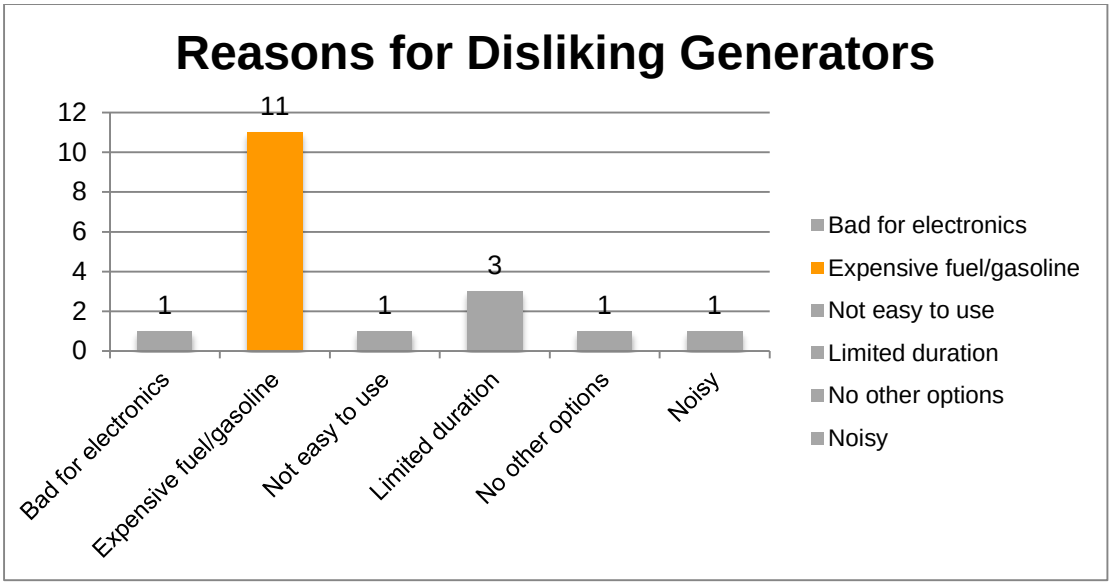


Chart 15. Reasons for disliking generators (n=17)

The price of gasoline or diesel solar oil varied between one kiosk to another. The price ranged between Rp.9,000 (US$0.80) to Rp.12,000 (US$1.06) per liter. Usually, diesel solar oil was slightly more expensive than gasoline, with Rp.1,000 (US$0.09) to Rp.2,000 (US$0.18) difference.

Solar Panels

The last lighting option in Galinggang is solar panels. Solar panels were distributed back in 2001 as a part of a government program. The government distributed 100 units of solar panels to the local government, which were given away later to households in Galinggang for free. According to the respondents, Galinggang's local government picked the recipients of the solar panel on a random basis. There were no specific criteria for a household to be eligible for the subsidized solar panel. The distribution of the solar panels was not based on finding people who needed the technology the most. RT 08 reported that none of their households were picked as recipient of the solar panel distribution.

The solar panels were installed on the roofs of their houses and was connected through cables to numerous electronic gadgets. It has been over 10 years since the solar panels were distributed and many of them do not work normally anymore. Some of them were also sold to other people both inside and outside

Galinggang. The recipients of the solar panels said that there was no monitoring and maintenance from the government for this solar panel distribution program.

The 56 users reported on average that they utilize their solar panels for 74 hours per week. Some houses also used inverters to increase their electrical power so they could use the panels to operate televisions and refrigerators. Other houses simply used the solar panel to switch on the lights at night. In order to store the electrical power from the solar panel, the users had to use an accumulator or battery, which meant they had to refill the battery acid regularly. The frequency of changing the battery acid did vary amongst these households with some houses refilling their battery acid once a month and some once in two months, once in three months, once in six months, or twice in a month. There was even one household who admitted to having never refilled or changed their accumulator's acid, whereas the average monthly cost for purchasing battery acid was relatively cheap. On average, each household spent on average Rp.7,926 (US$0.70) per month to refill their accumulator.

Daily Activities

Several activities were affected by the introduction of the d.light S250. The two main activities that were obviously affected were cooking and studying. Please note that the interview questions only addressed these two main activities and compared them prior to using the solar light and after using the solar light. Other activities were only reviewed after the distribution of the solar lights.

Cooking

Most people in Galinggang cook their meals during the day. It is not common for women to cook dinner at night, instead they usually cook dinner in the afternoon and eat the food later. By doing this, the food is not served hot. People in Galinggang usually just cook their rice right before they have dinner and serve that fresh and hot, while the meat, fish, or vegetables, and other side dishes will be cooked hours before dinner. The people of Galinggang said that this habit was formed due to the fact that Galinggang has no electricity and people couldn't cook in the dark.

Before solar lights came to Galinggang, most households who did for some reason need to cook their dinner after dark, used kerosene lamps or flashlights. Using kerosene lamps while cooking is a challenge in itself. Several respondents admitted they had to abandon their meals numerous times because they had accidently spilled kerosene in the dish. Wind is also an obstacle for these women as it often extinguishes the fire and they have to relight the kerosene lamp over and over again which is time consuming. Of those families who did cook after dark, on average they spent nine hours per week cooking in these difficult scenarios.

Studying

Studying in Galinggang was also a challenge. Due to the absence of electricity, students found it difficult to do their homework or read their school books at night. Kerosene lamps had been the preferred method of lighting to allow students to study at night. However, the dim light that the kerosene lamps produce as well as the high cost of kerosene and the unhealthy smoke they emit often hindered the student's study. In some cases the students spilled kerosene onto their books. In other cases, the students had to study in the kitchen because their mother also needed the kerosene lamp to help her cook. On average, before the d.light S250's had been distributed, a student spent eight hours per week studying at night throughout the week, or approximately an hour each night.

Comparisons

Below are explanations comparing the use of each lighting option before the distribution of the solar lights and after the distribution of solar lights.

Kerosene Lamps v. d.light S250 Solar Lights

Kerosene lamps are one of the lighting methods which is highly affected by the use of the d.light S250. The changes of quantities of kerosene lamp used before and after the distribution of the solar lights is significant, as shown on the chart below:

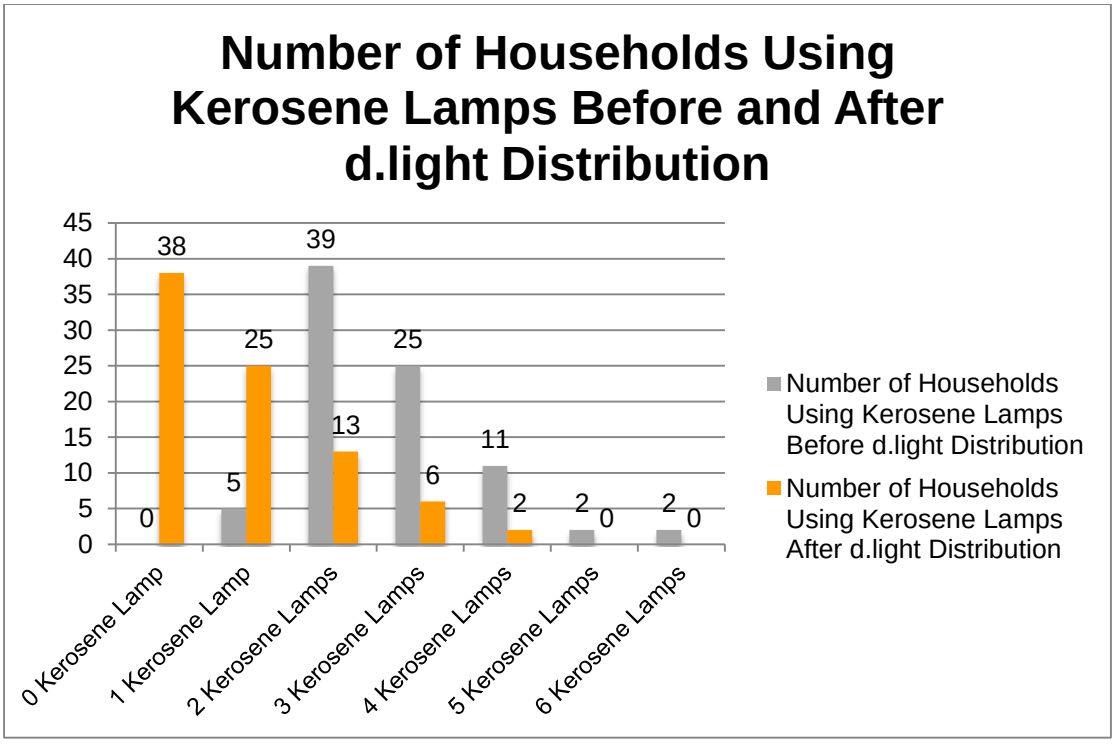


Chart 16. Number of households using kerosene lamps before and after d.light S250 distribution (n=84)

Moreover, the difference can be seen not only from the number of kerosene lamp units used, but also from the duration of kerosene lamp usage. The chart below illustrates the average hours per week of kerosene lamp use before and after the purchase of solar light d.light S250.

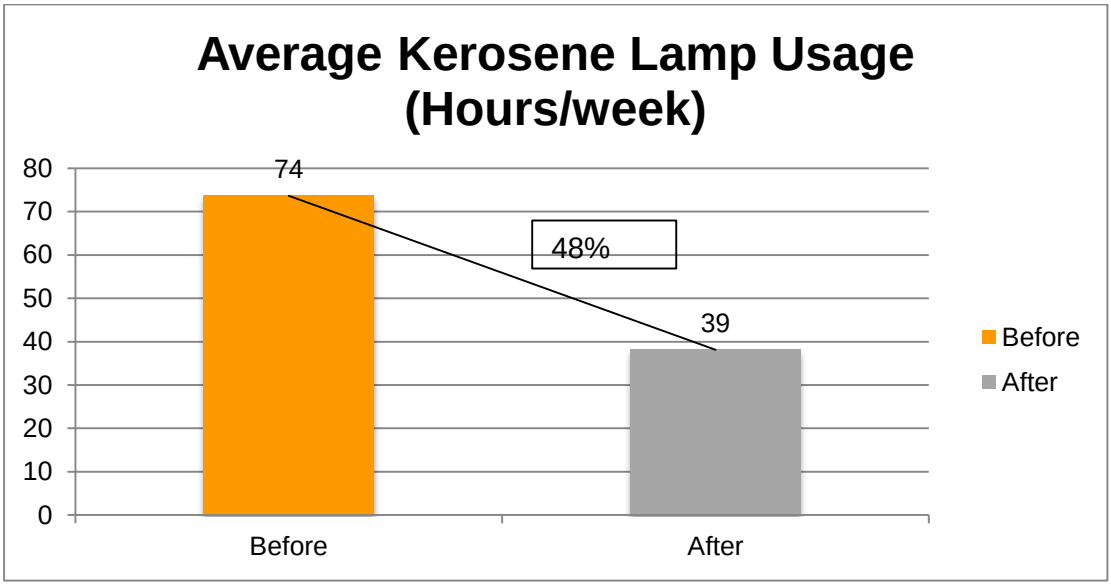


Chart 17. Average kerosene lamp usage (hours/week)

The reduced usage of kerosene lamps means a reduced amount of kerosene used. Kerosene usage after the d.light S250 distribution has in fact reduced by more than one-third.

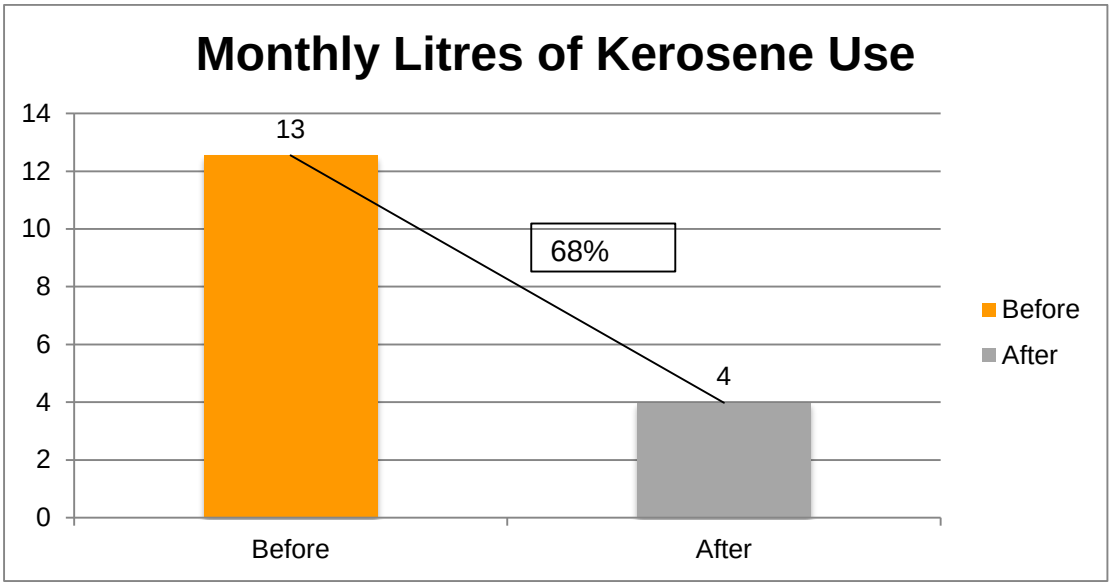


Chart 18. Monthly litres of kerosene use

This has in turn reduced expenditure on kerosene, meaning that households in Galinggang are now saving more money. Based on the information gathered during the surveys, there was an average saving of Rp. 85,994 (US$7.62) per month.

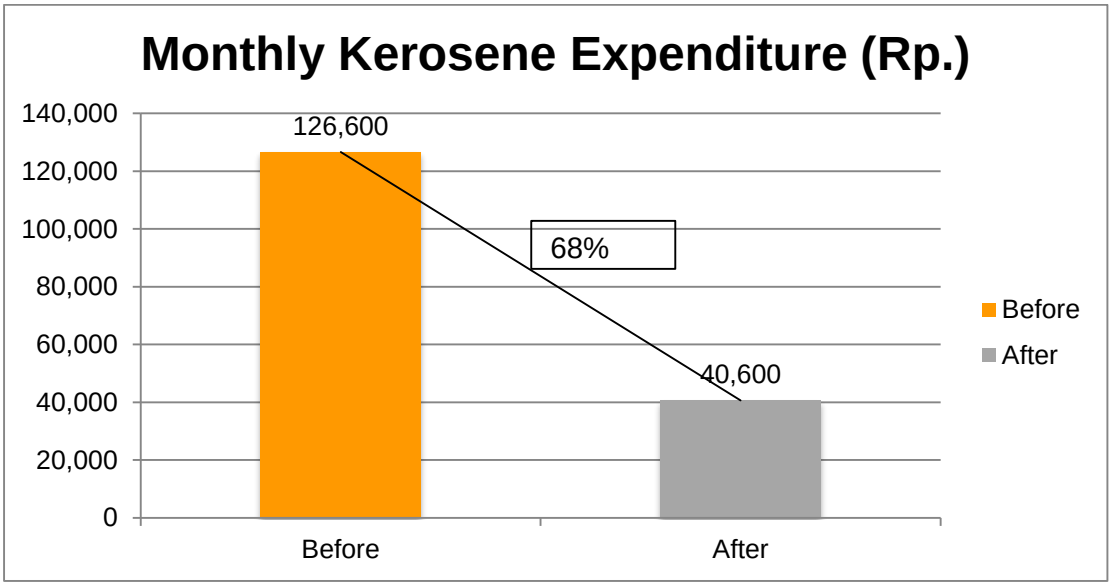


Chart 19. Monthly kerosene expenditure

Flashlights v. d.light S250 Solar Lights

Unlike kerosene lamps, the usage of flashlights is not significantly affected by the solar lights. Based on the number of flashlights units used in the village, the difference between units used before and after d.light S250 distribution is not significant. The difference can be seen through a chart below.

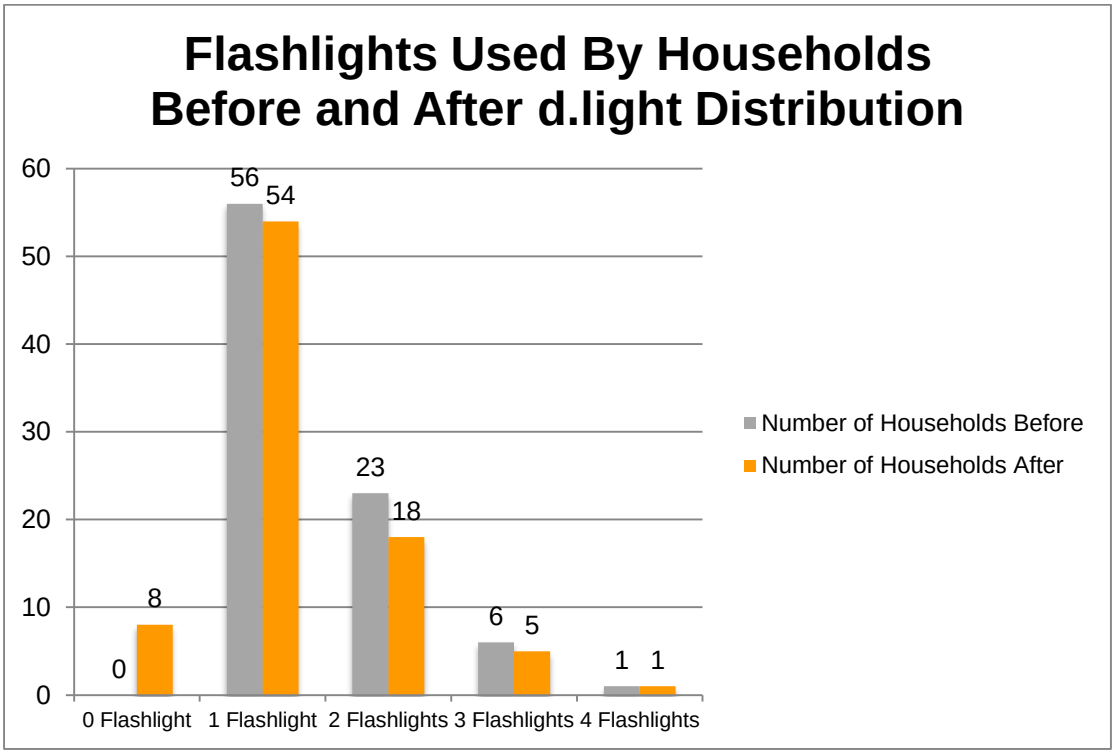


Chart 20. Flashlights used by households
before and after d.light S250 distribution (n=86)

This is explained by the inclination of the villagers to use a technology that is portable and easy to carry when they have to go to the lavatory or go out fishing at night. As well, since almost all households who purchased the solar light only bought one d.light S250, they are very protective towards this technology. They do not want this solar light to break and therefore try to limit its use only for indoor activities.

However, there has been a change in the usage of dry cell battery in Galinggang households due to the reduced use of flashlights. Before using d.light S250, each household purchased 10 batteries on average per month. Now, this number has dropped to 6 batteries each month.

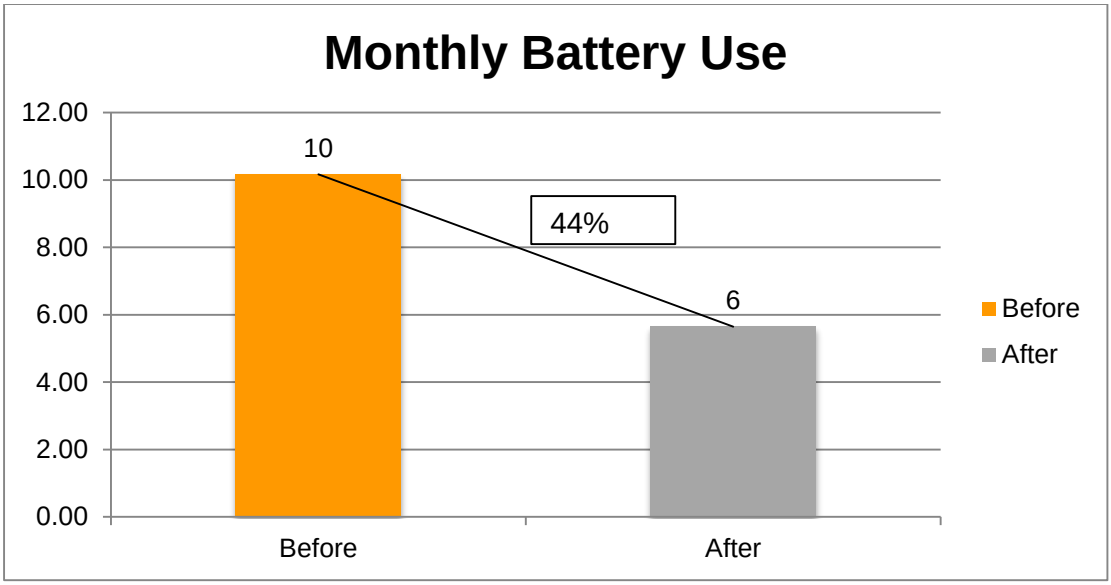


Chart 21. Monthly battery use

The reduced amount of batteries purchased means reduced expenditure on batteries. Prior to the d.light S250 distribution, each household spent on average Rp.28,530 (US$2.53) each month. Now, each household in Galinggang spends approximately Rp.15,650 (US$1.39) per month on dry cell batteries. That calculates an average saving of Rp.12,880 (US$1.14) per month on average, or equivalent to 45 percent, from reduced amount of flashlight use.

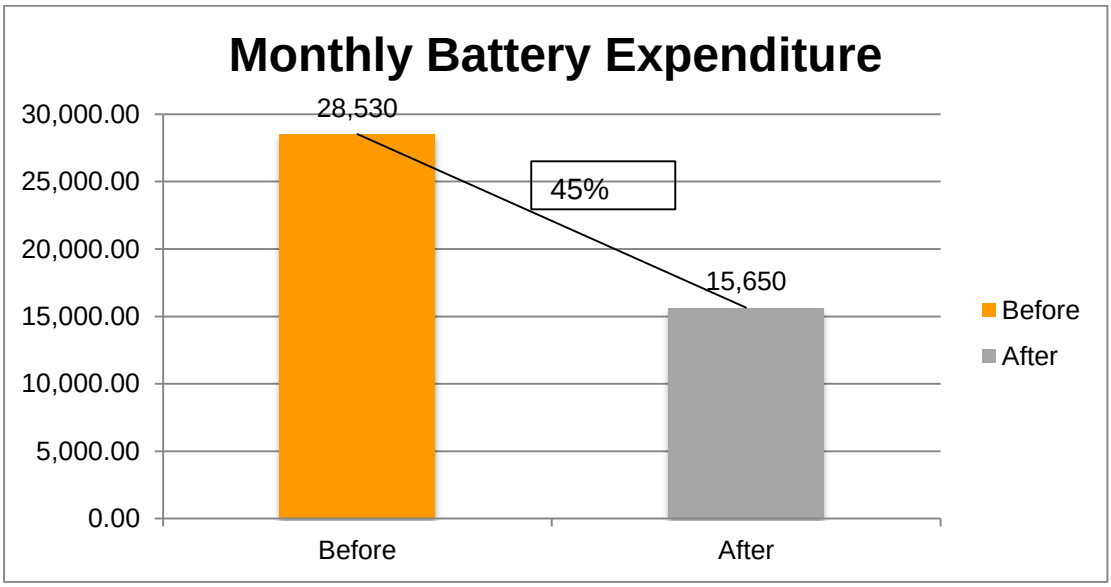


Chart 22. Monthly battery expenditure

Generators v. d.light S250 Solar Lights

Compared to the other two previous lighting methods, generator usage does not show any decrease. Contrary to the reduction in use of kerosene lamps and flashlights, generator use seems to be growing but only by a small amount, an hour or six percent per week.

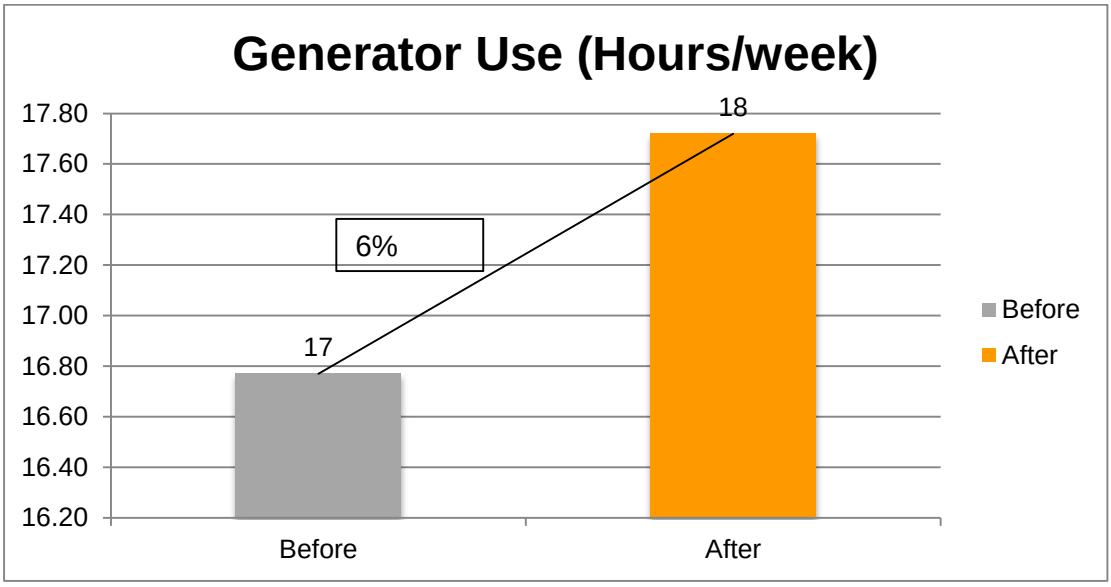


Chart 23. Generator use (hours/week)

The monthly fuel used by generators has therefore also increased by one litre or five percent per month.

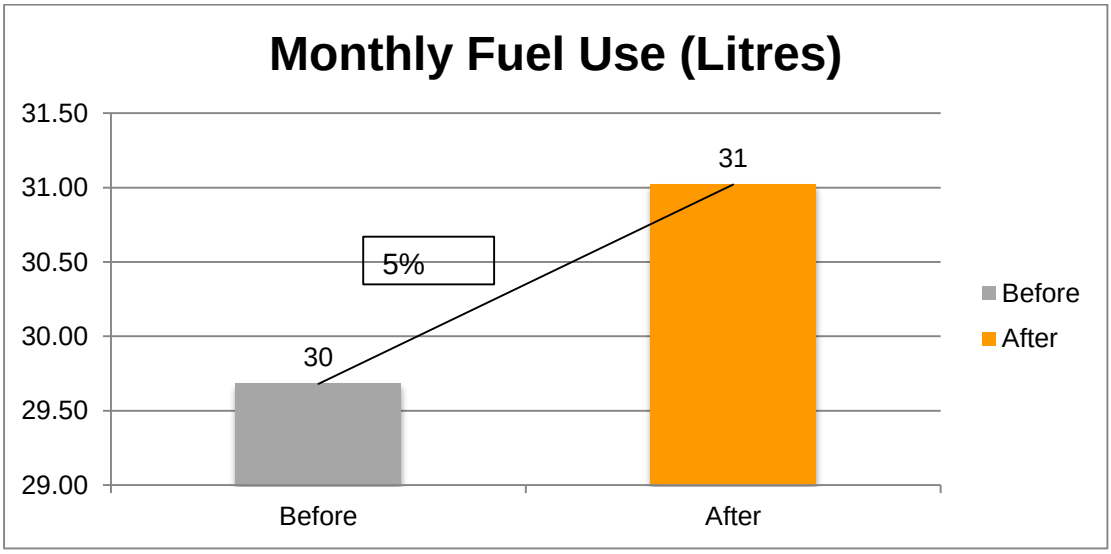


Chart 24. Monthly fuel use (litres)

However, the trend for monthly expenditure on generator fuel is not similar to the other previous two trends. Monthly expenditure for generator fuel shows a decrease by 0.8 percent as shown in the following chart.

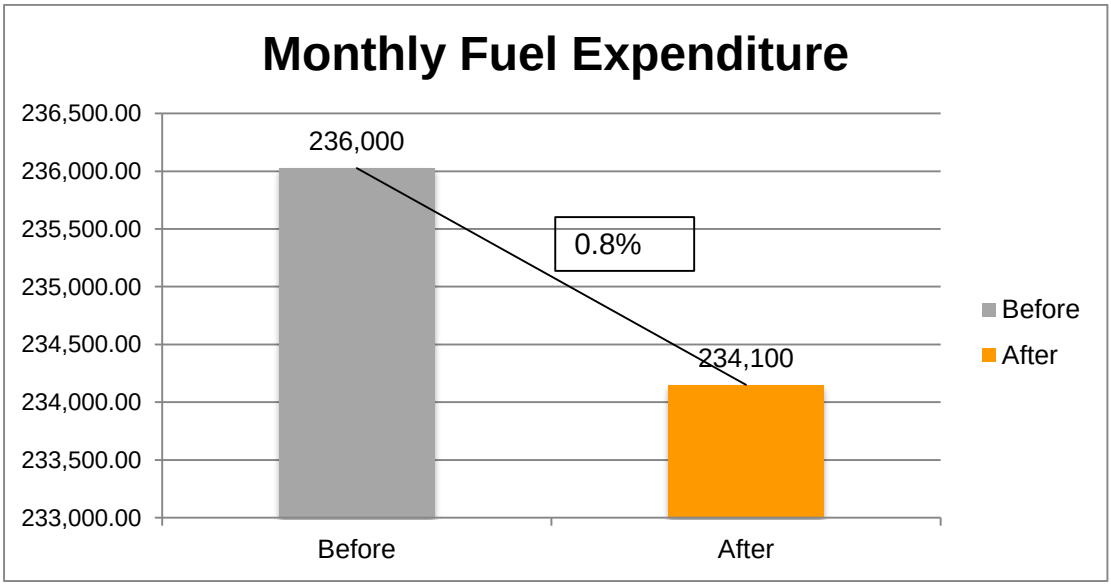


Chart 25. Monthly fuel expenditure

This inconsistent trend between the amounts of fuel consumed and the fuel expenditure results from one respondent who used to have his own generator and purchase his own fuel, whereas now he forms a group with other neighbors and shares the generator connection and the cost of fuel collectively. However, the research for this impact assessment failed to interview the other respondents involved in this new group so the data results for fuel consumption (in litres) and the total price of fuel consumed are showing different trends.

Solar Panel v. d.light S250 Solar Lights

The weekly use of solar panels also shows a decrease of almost 13 percent. Again, like the generator, solar panels are not only for lighting purposes, but also for switching on other electronics in the house. While there is a slight change in the usage of solar panels in Galinggang, the costs maintenance has not changed significantly. The amount of battery acid refills or battery changes still follows the same pattern as before the distribution of the d.light S250 solar lights.

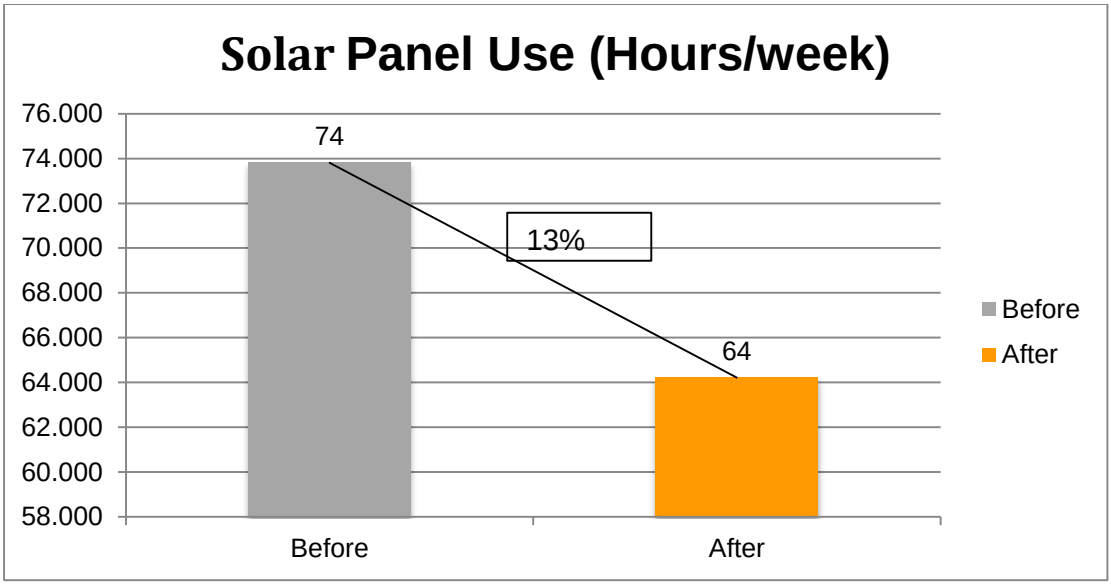


Chart 26. Solar panel use (hours/week)

Effect on Daily Activities

The introduction of the d.light S250 has triggered a change of pattern in how Galinggang people conduct their daily activities. Some of their activities now are enhanced and assisted greatly by the usage of the d.light S250. Below the tables and charts depict how the solar lights have been used for different activities.

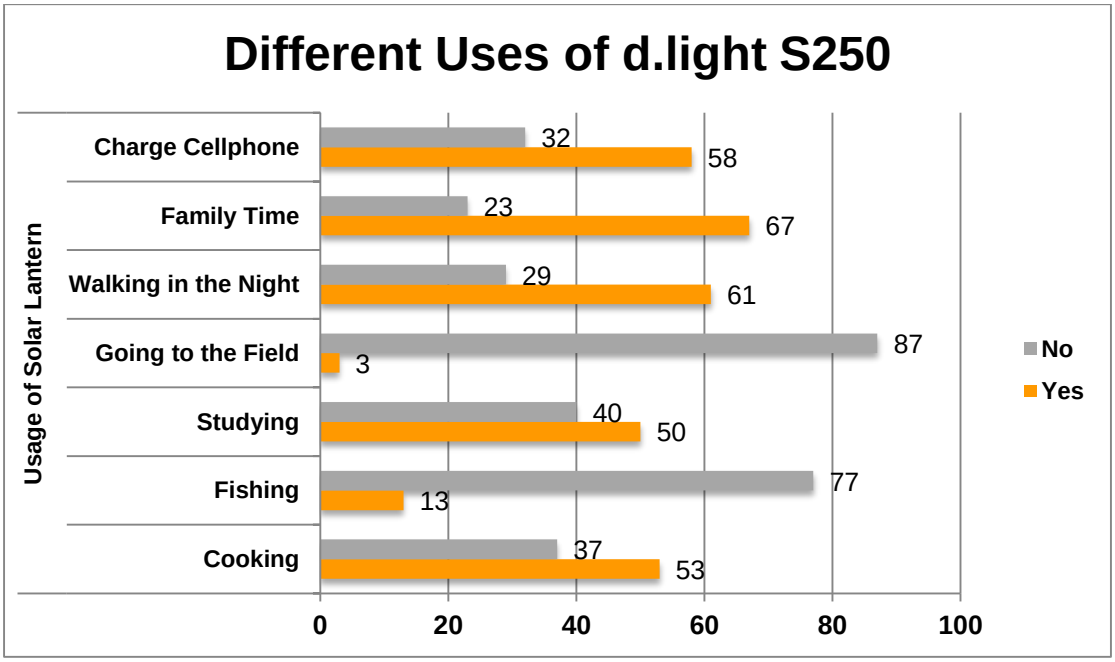


Chart 27. Different uses of d.light S250 (n=90)

Effect on Cooking

Due to the absence of electricity, people in Galinggang have the habit of cooking before dark. They usually cook their dinner at 3:00pm to 4:00pm even though they will not eat it until night. For some households, they did cook dinner at night using kerosene lamps. Now, they don't have to worry about the darkness anymore as they can use the d.light S250 to light their cooking spaces. Out of 90 respondents, 53 of them used their d.light S250 for cooking, while 37 others still cooked before dark or used other lighting sources to help them cook.

There were also changes in the duration of cooking for respondents who are using the d.light S250 to cook. Before using the solar light, households that cooked dinner after dark spent almost 9.5 hours each week preparing the meal. After they purchased the d.light S250, this was reduced by two hours per week.

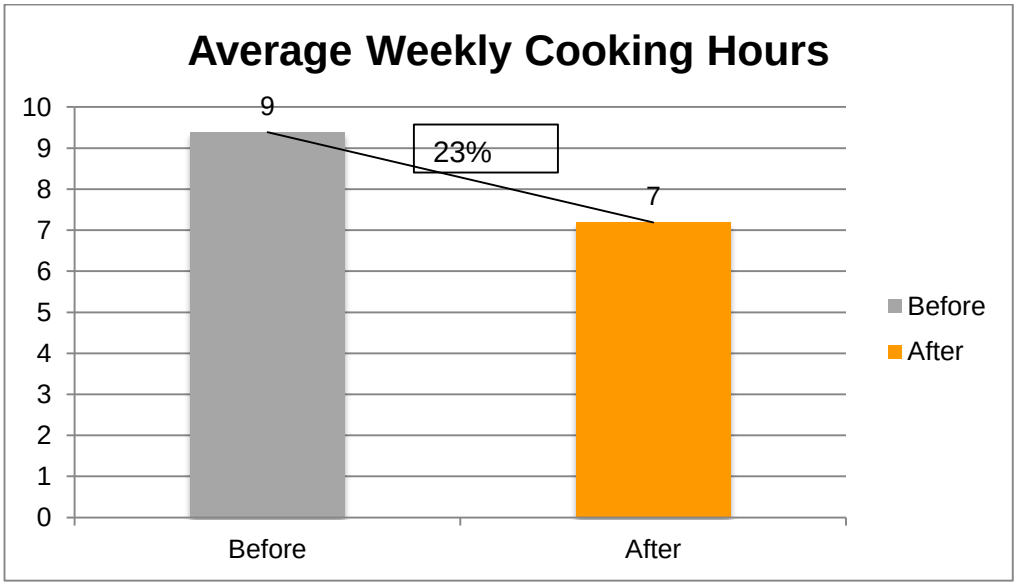


Chart 28. Average weekly cooking hours (n=53)

Effect on Studying

Studying is another daily activity that is affected by the introduction of the d.light S250. The amount of time dedicated to studying was slightly decreased by 30 minutes per week, however the students reported they studied more effectively and efficiently than before.

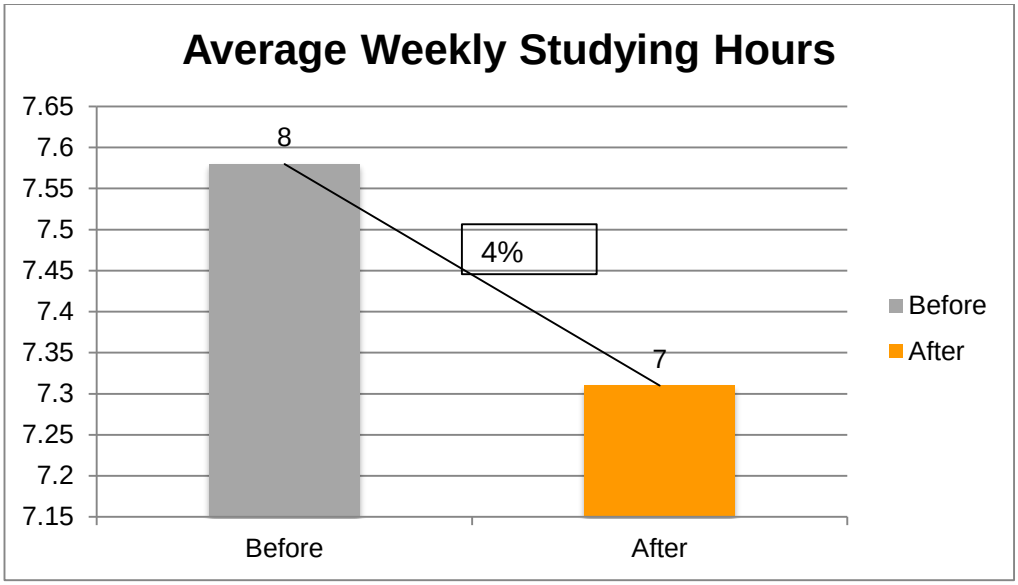


Chart 29. Average weekly studying hours (n=50)

Some students were interviewed to get their perspectives on the functions of the d.light S250. Rio, a fifth-grader, said that the d.light S250 is a good light and very helpful for him. Siti, another fifth-grader, also expressed a similar response. Moreover, Siti admitted that prior to having the d.light S250, she had never studied at night at all. Now, Siti does not have to worry if she needs to study or do her homework at night.

Effect on Fishing

Most people in Galinggang work as fishermen. Nevertheless, it is quite uncommon for them to go out fishing at night. From a total of 90 respondents, only 13 of them said that they used the d.light S250 to assist them with fishing at night. Night time fishing was not practiced every day and did not become a routine activity for the people of Galinggang. As well, when fishermen wanted to go out fishing at night, people still preferred using a flashlight or headlamp rather than using the solar light. This is because the headlamp is more portable and therefore better suited for fishing. Furthermore, many of the solar light owners do not want to accidentally drop their d.light S250 into the water during fishing.

Going to the Field

There are a significant amount of people who do not use their solar light to help them go to their fields. This is due to the fact that Galinggang people do not normally go to their field in the dark at night. Only three people said that they had brought their d.light S250 to the field and this was because they were afraid it would already be dark on their journey back to the village at the end of the day. In these cases, the solar light was not used while they were working in the field but only on the journey home. It was reported that people do not go to the field at night, because it is highly dangerous to go through rattan fields in the darkness due to the rattan's sharp thorns.

Going Out At Night

Galinggang people are more used to being indoors at night rather than outdoors. If they do need to go out at night, 29 people said they would usually use a flashlight or even sometimes the little light on their cellphone to help them walk from one place to the other. For the other 61 respondents, using the d.light S250 to walk at night was a viable option but they did it rarely because the rest of the family would need the light at home.

Family Time

Most of the people from Galinggang said that they did not allocate specific time to be spent with the family. After dark, before having the d.light S250 solar lights, they just went straight to bed (or watched television when they or their neighbors could switch on the generator). But now, 12 hours per week (or approximately 1.7 hours per day) is allocated by each household who owns a d.light S250 as family time. Now they often gather around in the living room after dinner, talking or discussing things together with other members of the family. It is also more common for the parents to accompany their children while they are doing their homework.

Charging Cellphones and Other Uses

In a place which has not been covered by the electrical grid, an alternative way to charge an electronic device is highly sought after. The d.light S250 solar light

can do this. The solar panel of the d.light S250 can be connected to a cellphone so that it can be recharged simply from power generated from the heat of the sun. A phone can also be connected to the solar light to gain the electricity from the charged light. Out of 90 households interviewed, 58 of them used this cellphone-charging feature frequently. Even so, they saw charging their cellphone as a secondary use of the solar light and preferred when possible to preserve the power so that the solar light could be used at night.

Some of the other households expressed other activities that they used the d.light S250 for, including baking cakes at night, filleting and cleaning fish, making fish traps, washing the dishes at night and even to help light up their chicken coops.

Health Impact

The d.light S250 solar light is expected to positively affect the health of its customers due to the reduced usage of kerosene lamps. The d.light S250 is mainly perceived as a substitute for a kerosene lamp. This theory was supported with the kerosene lamp being identified as the most reduced mode of lighting after the d.light S250 distribution.

All respondents were asked about their health problems. From a total of 90 respondents, 84 of them stated that they had health problems. Out of those 84 respondents, 57 of them said that coughs or respiratory problems frequently occur within their families. These problems are frequently caused by the smoke emitted from the kerosene lamps.

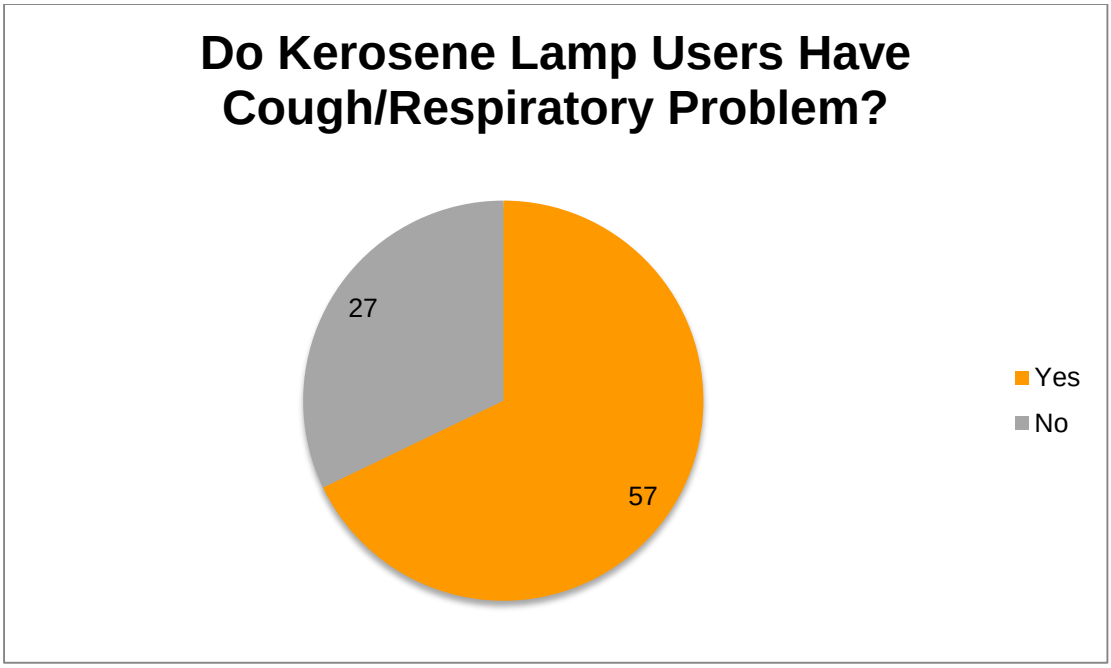


Chart 30. Cough/respiratory problem on kerosene lamp users (n=84)

Out of the 57 people who said they had frequent cough or respiratory problems in their families were asked whether they still had similar symptoms after they started using the d.light S250. Their responses are illustrated in the chart below.

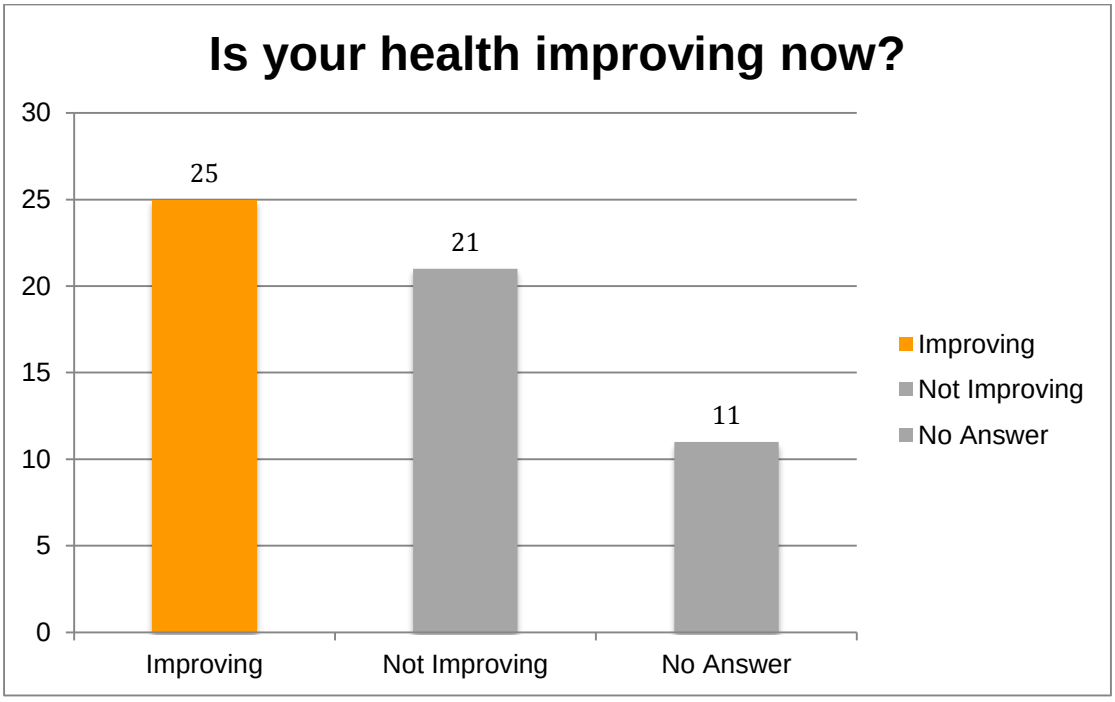


Chart 31. Health improvement of kerosene lamp users (n=57)

25 respondents, or 44 percent of all respondents that complained about having a cough or respiratory problems stated that they felt an improvement in their health. This data is inconclusive however regarding whether the improvement is definitely triggered by a reduced use of kerosene lamps or from other causes. 21 respondents answered there was no change in their health after using d.light S250 and the remaining 11 people did not respond to this question.

Based on our interview with Ibu Okta, Galinggang's local doctor, coughs and other respiratory problems could be caused by smoke from kerosene lamps, but it is not the sole cause. There are many other causes which can trigger coughs, asthma, and other respiratory-related diseases. Ibu Dina, the local midwife, also expressed a similar response. According to her, an unhealthy environment and inappropriate house designs that do not provide well-circulated air are also likely causes of respiratory problems. In other words, the true cause of coughs and respiratory problem occurring in Galinggang cannot be predetermined to be solely caused by kerosene lamps' smoke.

Kelompok Swadaya Masyarakat Mahaga Lewu

Yayasan Puter who coordinated the distribution of the solar lights in Galinggang, also helped to initiate the formation of *Kelompok Swadaya Masyarakat (KSM) Mahaga Lewu*. *KSM Mahaga Lewu* is a microfinance scheme initially created to empower women in Galinggang and assist them to purchase the solar lights. After they purchased the solar light back in March 2013, they were automatically included as members of *KSM Mahaga Lewu*. Our main respondents in this research were therefore women. Only two solar light customers in Galinggang were men, one was a widower and the other was a nurse from another village.

During the initial distribution of d.light S250 solar lights, 36 groups consisting of five people in each group were formed. When the solar light customers paid their first installment of Rp.100,000 (US$8.86) per person, a total of Rp.18,000,000 (US$1,593.98) was collected. This revenue was then distributed to one member of the first 18 groups of *KSM Mahaga Lewu*, meaning they received Rp.1,000,000 (US$88.55) each. The Rp.1,000,000 was a loan which would then be repaid through three-month installments with 5% interest. Later on as *KSM Mahaga Lewu* developed, the three-month installments were changed to five-month installments with 10% interest.

Yayasan Puter intended *KSM Mahaga Lewu* to develop into a soft loan scheme available to women in Galinggang to empower them through entrepreneurship. However, some respondents did admit that Rp.1,000,000 was too small an amount of money for the recipient to start-up a new small-scale business. Many of the women who already owned a small-scale business even expressed their reluctance towards borrowing money from *KSM Mahaga Lewu* because it was such a small loan. Many of the women perceived *KSM* as a ‘final resort’ and did borrow money from the group, but only to fulfill their household needs. These women borrowed money on a recurring basis and the initial purpose of the group was lost. For data regarding the recipients of the *KSM Mahaga Lewu* loans, please see the section titled, “List of *KSM Mahaga Lewu* Beneficiaries” in the Annex of this report.

Extra Savings

Based on the 90 interviews conducted in Galinggang for this impact assessment report, the Kopernik fellow found that 81 households would now save money after purchasing the d.light S250. Savings ranged from Rp.4,000 (US$0.35) to Rp.450,000 (US$39.85) per month, depending on how much kerosene, dry cell batteries, generator fuel, or battery/accumulator acid they reduced each month.

The average expenditure by Galinggang's households on lighting before and after the distribution of the d.light S250 can be seen in the chart below.

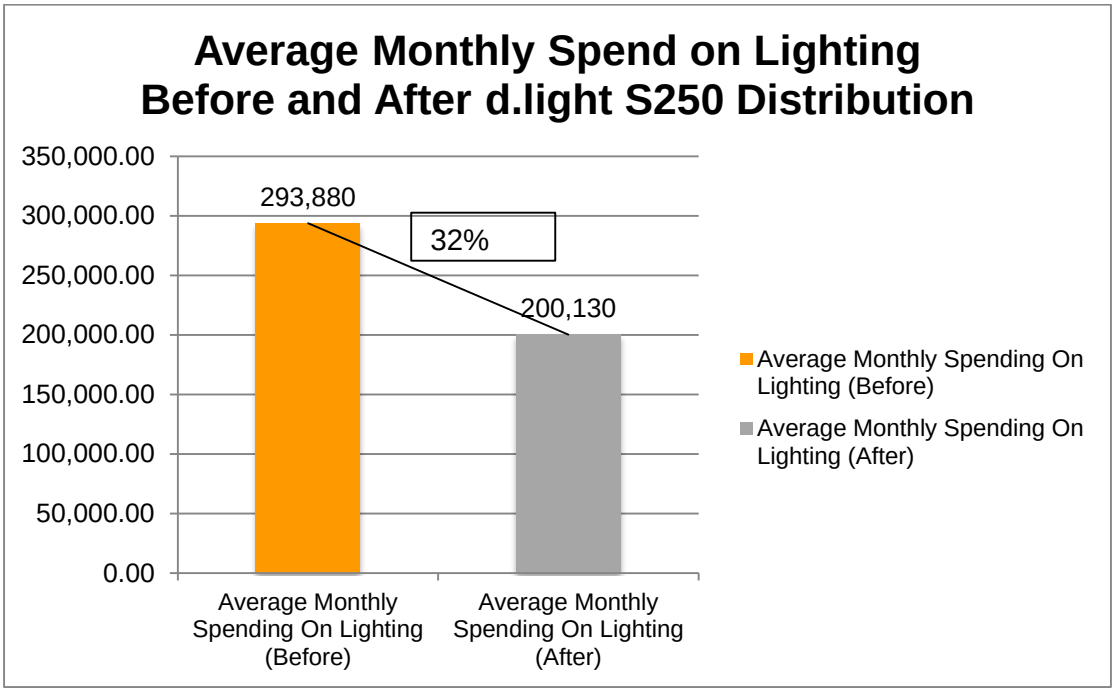


Chart 32. Average monthly spending on lighting before and after d.light S250 distribution

Before the d.light S250 was distributed, each household in Galinggang roughly allocated 17 percent of their total income to lighting. After the technology was distributed, this figure dropped to 12 percent. This has resulted in an average of 5.5 percent of total monthly income now being saved.

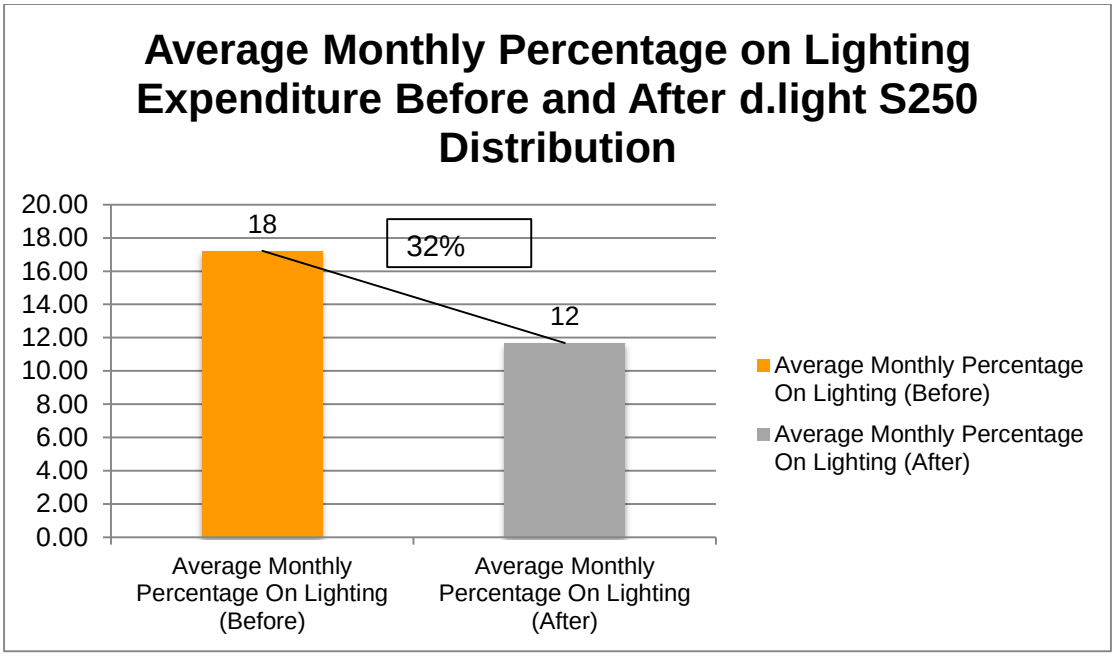


Chart 33. Average monthly percentage on lighting before and after d.light S250 distribution

These savings were used for various purposes, including:

1. *Arisan*, a form of Rotating Savings and Credit Association (ROSCA);
2. Small business stock supply;
3. Fuel and gas;
4. Milk;
5. Food (such as rice, herbs, vegetables, fruits, fish, etc.);
6. Snacks for the children;
7. Purchasing fish traps or purchasing the materials to make fish traps; and
8. Children's school needs.

Conclusion

For many people in Galinggang, solar lights are a viable solution to lighting problems. The d.light S250 is an appropriate technology for addressing the lighting problems related to the absence of electricity in the village. Strong enthusiasm for the solar lights means the prospects are good to continue this project into a second phase.

In relation to our expected outcomes highlighted in the first chapter of this report, we have concluded that:

1. The majority of people who purchased the d.light S250 solar lights in Galinggang now, on average, have an increased level of monthly savings;
2. Almost 44 percent of the people who purchased a d.light S250 solar light and reported having coughs or other respiratory problems, have now stated an improved health condition (although the cause of this improved health may not be solely attributed to a reduction in kerosene usage);
3. On average, the studying time allocated each night by students in Galinggang has not increased. Instead students report studying more effectively and efficiently now when using the d.light S250 (however an improvement in performance scores was not able to be researched);
4. The average time dedicated to cooking dinner is now much shorter than before; and
5. Fishing at night has not been affected much by the distribution of the d.light S250.

At the end of each interview, we also asked the respondents to rate the solar light with scores ranging from one to five (one being the lowest and five being the highest). On average, respondents gave the score of 4.6 for the d.light S250 solar light. This score expressed the respondents' level of satisfaction in using this technology.

Challenges

People in Galinggang work mainly as fishermen. They usually go out fishing at dawn and are back at home by the afternoon. At dawn they can need lighting to help them navigate in the dark, however, the shape and design of the solar light tends to be less portable than other lighting option which they consider be more practical, namely a headlamp.

During the last two weeks in Galinggang, the Kopernik fellow found a new lighting technology that was quickly becoming a new trend amongst the community. It was a LED light that had white, bright light and had a compact size and affordable price. Each LED light cost Rp.15,000 (US$1.33) when bought in the village. They are even cheaper in the city of Kasongan, where the

light can be bought for Rp.10,000 (US$ 0.89) or even Rp.8,000 (US$0.71) per unit after bargaining. One charge cycle of a small accumulator can supply electricity for seven LED lights nine hours a day, five days a week. The lamp looks like a small board that needs to be connected to an accumulator. This LED light is bright and cheap, but it is stationary and cannot be carried to different parts of the house or be used for outdoor activities.

Another lighting option that was becoming popular in Galinggang was the solar panel. Although 100 free solar panels were distributed by the government, years before, more recently the people of Galinggang had started to buy solar panels by themselves. According to one respondent, one of the big solar panel units cost Rp.1,100,000 (US$ 97.41) to Rp.2,000,000 (US$177.11) however it was hard to find a person or a shop that sold solar panels to verify this price. The Kopernik fellow only found solar panel units costing Rp.3-4,000,000 (US$ 265.66-354.22). If a household decides to install a solar panel in their house to switch on a variety of electronics such as a television or refrigerator, they will also need to purchase an inverter unit. A 700 watt inverter costs Rp.425,000 (US$37.64) and a 1,500 watt inverter costs Rp.1,000,000 (US$88.55).

While these two alternative lighting methods have recently become new trends in Galinggang, the solar light is still highly sought after and people are still enthusiastic about buying d.light S250 solar lights.

Suggestions

The Village

Overall, the village government of Galinggang was cooperative and very helpful during the distribution process of the d.light S250. Some village-level bureaucrats proved to be very accommodating of this project and the impact assessment process. The village data they kept was well-recorded and well-kept and directly influenced the success of the impact assessment's research. Building a stronger relationship and having better communication between the village government officials and other related stakeholders in the future (including our local partner) will encourage an even better outcome in the next phase.

The Partnership between Yayasan Puter and Kopernik

The “Lighting Up Rural Kalimantan’s Darkest Hours” project, known in Kopernik as “Switch On Kalimantan” is a promising project that benefits many people in Galinggang. The village is still an off-grid community with no access to the electrical grid. The need for solar lights is still high and, therefore a second phase of this project is viable. Yayasan Puter intends to work again with Kopernik to deliver phase two of this project. Early data of potential buyers have been made, listed by Pak Mardayan (Galinggang local) and a representative of Yayasan Puter. There are 300 interested households in Galinggang, Rangan Seha, Lantungan, and Muara Bulan villages.

In the Phase Two distribution preference should be given to those households who have not yet had the opportunity to buy a d.light S250 in the past. Clear criteria for determining potential recipients need to be established for ensuring the technology reaches the people who need it the most. The absence of strict criteria for potential buyers in the first phase was due to the experimental nature of the first phase of the project. Now so much more is known about the community, criteria can easily be established. Unfortunately because the price was subsidized by Yayasan Puter in the first phase this may prevent the technologies being sold at an unsubsidized price because people will consider it unfair if the price is not the same for phase two recipients. Yayasan Puter is currently looking for a donor to help them fund and distribute another 300 units of d.light S250 to Galinggang, Rangan Seha, Lantungan, and Muara Bulan.

Case Studies

Ibu Nanai

Photo 1. Ibu Nanai and her family

Ibu Nanai has been living in Galinggang for years in a small house with her husband, daughters, and grandchildren. Both Ibu Nanai and her husband, Pak Barak, are fishermen. Their oldest daughter, who got divorced a few years back, is now living with them and works as a fisherman too. Ibu Nanai's household used to use six kerosene lamps before purchasing a d.light S250. Now they only use one each night. The clean light of the d.light S250 is enough to illuminate the whole house during night time. Besides kerosene lamps, Ibu Nanai and her family also use flashlights and generators as modes of lighting in their house. Using flashlights or generators demands higher expenditure for purchasing dry cell battery and fuel.

Now, Ibu Nanai's house is not filled with bad smoke anymore. Two of her daughters, who are still students at the local primary school, can now study at night. Prior to using the solar light, they never studied after sunset. They said

that they only studied in the afternoon. Moreover, Ibu Fatmawati, Ibu Nanai's oldest daughter, is now able to provide Amel, her youngest daughter, with milk. During the interview The Kopernik fellow learnt that Ibu Nanai's household spent Rp.474,000 (US$41.97) per month for lighting purposes. Now, after purchasing the d.light S250, Ibu Nanai only spends Rp. 214,000 (US$18.95) per month for lighting purposes. The solar light helps Ibu Nanai save Rp.260,000 (US$23.02) per month.

Ibu Leny

Photo 2. Ibu Leny and her family

Ibu Leny lives with her husband and two children. Her husband works as a fisherman who during his spare time creates his own fish traps. Ibu Leny's husband told the Kopernik fellow that their household could not rely on fishing alone. During the period of a year, fishermen find it difficult to catch fish during the dry months. That is why Ibu Leny decided to open a kiosk at her house. She sells cigarettes, instant noodles, and other basic household needs (such as sugar, salt, herbs, and many more). On average, her kiosk takes Rp.150,000 (US$13.28) per day in sales. Once a month, Ibu Leny buys stock for the kiosk from the boat that stops in Galinggang and she spends approximately Rp.2,000,000 (US$177.11) each time.

Ibu Leny's household used to use two kerosene lamps every night prior to purchasing the d.light S250. Now, both of her kerosene lamps are not needed anymore. The savings generated from the omission of her kerosene lamps is Rp.110,000 (US$9.74) per month, which is allocated to purchase rice and fuel for her husband's boat.

Ibu Kiki Patmala

Photo 3. Ibu Kiki Patmala and Pak Sarkawi

Ibu Kiki is a teacher at Galinggang's primary school. She teaches first grade, while her husband works at the school's administration office. In March 2013, Ibu Kiki decided to purchase a d.light S250, and her household expenditure has since changed. She used to use two kerosene lamps each night before using the d.light S250, but now she has disposed of both kerosene lamps. In addition to kerosene lamps, she also used a generator once every three days and used a solar panel installed on her roof. Before having the d.light S250, Ibu Kiki spent Rp.123,000 (US$10.89) a month for lighting purposes. Now she only spends Rp.83,000 (US$7.35) per month, which means she can now save Rp.40,000 (US$3.54) per month.

Besides working as a teacher, Ibu Kiki has a small chicken farm in her backyard. Ibu Kiki and her husband have decided to use the d.light S250 as a light for her chicken barn as she can still use her solar panel inside her house. According to Pak Sarkawi, the chicken house needs to be bright all the time to

enhance the quality of the chickens. As a result of the solar light, their chicken production has increased. Prior to using the d.light S250, they made Rp.1,200,000 (US$106.27) every month from the chickens. Now, they can make over Rp.1,700,000 (US$150.54) in a month. The extra money they save from not purchasing kerosene is used to buy better quality for her livestock, hence the higher income from selling the chickens. Ibu Kiki and Pak Sarkawi expressed their need to buy more d.light S250 solar lights.

Ibu Ranti

Photo 4. Ibu Ranti and her children

Ibu Ranti lives at one end of the village next to the local middle school. Her house is also situated beside the village graveyard. The dimness of Galinggang the she and her family experiences every night encouraged her to buy a d.light S250. Every day, Ibu Ranti works to fillet fish, while her husband works as a fisherman. Since using the solar light she only needs to use two kerosene lamps instead of three. Ibu Ranti and her family hate the bad, thick smoke the kerosene lamp emits. Besides kerosene lamps, Ibu Ranti also uses a flashlight to go out at night. Even though she has the d.light S250, she continues using her flashlight as she prefers hanging the solar light in her house.

Ibu Ranti is able to save more money now thanks to the reduction of the amount of kerosene and dry cell batteries she purchases. Before, Ibu Ranti had to spend approximately Rp.177,000 (US$15.67) per month just for lighting in her house. Now, she only spends Rp.93,000 (US$8.24) per month, which means

she saves Rp.84,000 (US$7.44). With this extra money, she can buy her children extra snacks as well as buy extra food for her household.

Ibu Mirawati

Photo 5. Ibu Mirawati and Pak Mus Mulyadi

Ibu Mirawati and her husband, Pak Mus Mulyadi, live in RT 10 Galinggang, located in Rangan Seha sub-village. It takes approximately 30 minutes by boat to reach Rangan Seha from Galinggang. Every day Pak Mus Mulyadi works as a fisherman or bird hunter depending on the time of the year. During dry season, Pak Mus Mulyadi will go into the jungle with a group of men to hunt for birds.

Before having the solar light d.light S250 in her house, Ibu Mirawati used four kerosene lamps every night. Now she has thrown away all of them. This means she saves Rp.165,000 (US$14.61) every month from not having to buy kerosene anymore. Besides the kerosene lamps, Ibu Mirawati also uses a flashlight and a generator. The flashlight comes in handy when she or other members of her family have to go down to the toilet on the river at night. The generator is used so Ibu Mirawati and her family can watch their favorite TV series at night. In total, Ibu Mirawati is now able to save Rp.232,500 (US$20.59)

per month from her reduced use of kerosene, batteries, and fuel for the generator. Ibu Mirawati said the money she saves is used to provide for her children’s education and fuel for her husband’s boat. She really wants another solar light for her household.

Annex

List of Interview Questions

Personal Data

1. What is your name?
2. How old are you?
3. Where do you live?
4. What tribe are you from?
5. Are you married?
6. How many children do you have?
7. How many people live in your house?
8. What is the name of your spouse?
9. What do you and your spouse do for a living?
10. How much do you earn per month?
11. How much rice do you consume each day?
12. How much fish and vegetables do you consume each day?
13. What are you and your spouse's education level?
14. Do you have a "health card"?
15. Do you usually get coughs or respiratory problems?
16. If yes, has it been decreasing since you started using the d.light S250?

Kerosene Lamps

17. Do you have kerosene lamps? How many?
18. Before having the d.light S250, how many kerosene lamps did you use?
19. What time did you turn them on and turn them off each night?
20. How many litres of kerosene did you use? How much did you spend?
21. Now, after having the d.light S250, how many kerosene lamps do you use?
22. What time do you turn them on and turn them off each night?
23. How many litres of kerosene do you use? How much do you spend?
24. Are you happy using kerosene lamps? Why?

Flashlights

25. Do you have flashlights (with batteries)? How many?
26. What time did you turn them on and turn them off each night?
27. How many batteries did you buy every month? How much did you spend?
28. Now, after having the d.light S250, how many flashlights do you use?
29. What time do you turn them on and turn them off each night?
30. How many batteries do you buy every month? How much do you spend?
31. Are you happy using flashlights? Why?

Candles

32. Did you use candles?
33. What time did you light them and extinguish them each night?
34. How many candles did you buy every month? How much did you spend?
35. Now, after having the d.light S250, do you still use candles?
36. What time do you light them and extinguish them each night?
37. How many candles do you buy every month? How much do you spend?
38. Are you happy using candles? Why?

Gas Lamps

39. Do you have gas lamps? How many?
40. Before having the d.light S250, how many gas lamps did you use?
41. What time did you turn them on and turn them off each night?
42. How many litres of kerosene/gas did you use? How much did you spend?
43. Now, after having the d.light S250, how many gas lamps do you use?
44. What time do you turn them on and turn them off each night?
45. How many litres of kerosene/gas do you use? How much do you spend?
46. Are you happy using gas lamps? Why?

Generator

47. Do you have (access to) a generator?
48. Before having the d.light S250, how often did you use the generator?
49. What time did you turn it on and off each night?
50. How many litres of gasoline/diesel oil did you use? How much did you spend?

51. Now, after having the d.light S250, how often do you use the generator?
52. What time do you turn it on and off each night?
53. How many litres of gasoline/diesel oil do you use? How much do you spend?
54. Are you happy using a generator? Why?

Solar Panel

55. Do you have a solar panel?
56. Before having the d.light S250, how often did you use the solar panel?
57. What time did you turn it on and off each night?
58. How much battery acid did you use? How much did you spend?
59. Now, after having the d.light S250, how often do you use the solar panel?
60. What time do you turn it on and off each night?
61. How much battery acid do you use? How much do you spend?
62. Are you happy using solar panel? Why?

d.light S250

63. Are you using a d.light S250? How many?
64. How many hours per week do you use the d.light S250?
65. Are you happy using the d.light S250? Why?
66. Do you use the d.light S250 for cooking?
67. How long did you cook each day before purchasing the d.light S250?
68. Now, how long do you cook each day using the d.light S250?
69. Do you use the d.light S250 for fishing?
70. How long did you fish each day before purchasing the d.light S250?
71. Now, how long do you fish each day using the d.light S250?
72. Do you use the d.light S250 for studying (your children)?
73. How long did they study each day before purchasing the d.light S250?
74. Now, how long do they study each day using the d.light S250?
75. Do you use the d.light S250 for going to the field/doing field work?
76. How long did you work in the field each day before purchasing the d.light S250?
77. Now, how long do you work in the field each day using the d.light S250?
78. Do you use the d.light S250 for family time?

79. How long did you spend with family each day before purchasing the d.light S250?
80. Now, how long do you spend with family each day using the d.light S250?
81. Do you use the d.light S250 for walking at night?
82. Do you use the d.light S250 for charging your cellphone?
83. Do you use the d.light S250 for any other purposes?

Benefits from using d.light S250

84. Do you have extra savings now?
85. If yes, for what purpose do you use your savings?
86. Now that you have joined *KSM*, have you ever borrowed money from *KSM*?
87. For what purpose did you borrow money?
88. If for business, what kind of business do you have?
89. How does the *KSM* money affect your business?
90. How much profit did you earn prior to borrowing *KSM* money?
91. Now, how much profit do you earn?

Closing

92. How will you rate the d.light S250 (1 star – 5 stars)? Why?
93. Has your d.light suffered from any malfunction?
94. Do you have any suggestions to improve the solar light or any other feedback?

List of KSM Mahaga Lewu Beneficiaries

Name	Group	Purpose	Date	Duration	Interest
Ifah	Rafflesia	Business - Kiosk	15-Apr-13	3 months	5%
Ema	Nila	Business - Fishing	4-Jun-13	3 months	5%
Mimi	Walet	Business - Fishing	30-Jun-13	3 months	5%
Putir	Nuri	Business - Field	17-Apr-13	3 months	5%
Sunarti	Dahlia	Business - Gathering	15-Apr-13	3 months	5%
Fitriyah	Kaktus	Business - Fishing	29-May-13	3 months	5%
Masnian	Kumis Kucing	Business - Fishing	31-May-13	3 months	5%
Lela	Asoka	Business - Fishing	15-Apr-13	3 months	5%
Yaya	Kenari	Business - Kiosk	16-Apr-13	3 months	5%
Misna	Mawar	Business - Fishing	29-May-13	3 months	5%
Hikmah	Teratai	Business - Fishing		3 months	5%
Taniah	Gelombang Cinta	Business - Kiosk	16-Apr-13	3 months	5%
Dinah	Kacapiring	Business - Kiosk	15-Apr-13	3 months	5%
Kiki	Bakung	Business - Farming	29-May-13	3 months	5%
Hawiyah	Kalui	Business - Fishing	14-Apr-13	3 months	5%
Yati	Jalawat	Business - Fishing	14-Apr	3 months	5%
Dina	Bakung	Business - Medicine	15-Apr-13	3 months	5%
Norma	Melati	Business - Kiosk	15-Apr-13	3 months	5%
Ira	Bunga Matahari	Household needs	15-Apr-13	3 months	5%
Lisna	Bougenville	Business - Bird	16-Apr-13	3 months	5%
Imul	Kembang Kertas	Business - Kiosk	15-Apr-13	3 months	5%
Lela Wardeti	Kembang Sepatu	Business - Kiosk	16-Apr-13	3 months	5%
Ita	Tulip	Business - Bird	15-Apr-13	3 months	5%
Hawiyah	Putri Malu	Business - Kiosk	16-Apr-13	3 months	5%
Mira	Walet	Business - Fishing	7-Jul-13	6 months	5%
Neneng	Falui	Business - Kiosk		5 months	5%
Yati	Jalawat	Business - Kiosk		5 months	5%
Mukar	Kaktus	Business - Kiosk	11-Aug-13	5 months	5%
Kiki	Bakung	Business - Farming	11-Aug-13	5 months	10%
Noreni	Merpati	Business - Fishing	11-Aug-13	5 months	10%
Imul	Kembang Kertas	Business - Kiosk	11-Aug-13	5 months	5%
Iban	Merpati	Business - Fishing	11-Aug-13	5 months	10%
H. Jainah	Cempaka	Business - Kiosk	11-Aug-13	5 months	5%
Jurah	Tulip	Business - Kiosk	11-Aug-13	5 months	5%
Ayu	Mawar	Business - Kiosk	11-Aug-13	5 months	5%

Elisana	Kamboja	Business - Kiosk	11-Aug-13	5 months	5%
Ira	Bunga Matahari	Business - Kiosk	11-Aug-13	5 months	5%
Mira	Walet	Business - Fishing	11-Aug-13	5 months	10%
Agus	Bunga Bacong	Business - Fishing	11-Aug-13	5 months	10%
Taniah	Gelombang Cinta	Business - Kiosk	11-Aug-13	5 months	5%
Hawanah	Sedap Malam	Business - Kiosk	11-Aug-13	5 months	5%
Hikmah	Teratai	Business - Kiosk	11-Aug-13	5 months	5%
Hawiah	Putri Malu	Business - Kiosk	11-Aug-13	5 months	5%
Nuli	Melati	Business - Kiosk	11-Aug-13	5 months	5%
Ida	Anyelir	Business - Fishing	11-Aug-13	5 months	5%
Hj. Tina	Kacapiring	Business - Kiosk	11-Aug-13	5 months	5%
Yana	Anggrek	Business - Kiosk	11-Aug-13	5 months	10%
Amah	Lavender	Business - Fishing	11-Aug-13	5 months	10%
Lisna	Bougenville	Business - Kiosk	11-Aug-13	5 months	10%
Eda	Camelia	Business - Fishing	11-Aug-13	5 months	10%
Murniati	Asoka	Business - Kiosk	11-Aug-13	5 months	10%
Misah	Rafflesia	Business - Kiosk	11-Aug-13	5 months	10%
Imau	Dahlia	Business - Kiosk	11-Aug-13	5 months	10%
Aluh	Dahlia	Business - Kiosk	11-Aug-13	5 months	10%