DRINK UP BOBONARO

IMPACT ASSESSMENT

BY IMELDA WANG• KOPERNIK FELLOW • JULY 2015

KOPERNIK
SERVING THE LAST MILE

HADEER
HAMETIN ASAUN DEZENVOLVIMENTO EDUKASAUN NO EKONOMIA RURAL
NEON NA'IN LIMAN BADAEN

Espasu Reabilitado no Ekipado
ho apoiu husi Uniaun Europeia no Koperasaun Portuguesa

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Executive Summary

The Drink Up Bobonaro project in Timor-Leste started in August 2014 when Kopernik partnered with local partner, Hemetin Asaun Dezenvolvimento Edukasaun no Ekonomia Rural (HADEER), to distribute 480 Nazava water filters in Bobonaro district. The Nazava ceramic water filters remove micro-organisms from the water and reduce the level of harmful chemicals, such as pesticides and chlorine. After filtration, the water is safe to drink and has a pleasant taste.

In June 2015 while the distribution was still ongoing, a Kopernik fellow, Imelda Wang, visited Maliana in Timor-Leste to conduct an impact assessment. By conducting household surveys, she identified the impact of the use of water filters on the lives of people who bought them. The impact assessment involved interviews with 54 water filter buyers (from a total of 115 buyers when this report was composed).

The interviews were conducted over a two-week period and the impact can be summarised as follows:

- **Health** – The use of water filters improved people's health**, with 62 percent of respondents indicating a reduction in health problems**, such as coughing, diarrhoea, and headaches.
- **Economic** – On average, **up to US$18 per month can be saved by using the water filter.**
- **Time saved and productivity** – By using the water filter, **households can save up to 90 hours per month**, by not having to boil water or travel to a well. Furthermore, **76 percent of respondents stated their productivity increased significantly after using the water filter**.
- **Lifestyle** – Using the water filter increased the amount of water intake significantly, with **57 percent of respondents stating that they drink more water because it tastes better and it is easier to obtain.**

While the positive impact was undeniable, this impact assessment raised some questions regarding who should be targeted to purchase the water filter. Customers in the city of Maliana, needed and could afford the product, but those located in last mile communities, perhaps needed the technology most, but had more trouble affording the technology due to their lower income levels. HADEER also had more trouble providing access to the products to people located outside of Maliana city due to higher transport costs.

Project Background

Project Objective

In Timor-Leste waterborne illnesses such as diarrhoea, cholera, and typhoid are common and caused by drinking contaminated water. A water quality study conducted by the Timor-Leste Ministry of Health in 2010 found that 70 percent of the examined water sources were microbiologically contaminated.[1]

According to WHO and UNICEF, an improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is likely to be protected from outside contamination, in particular from contamination with faecal matter.[2] In Timor-Leste:

- 28 percent of households only have access to non-improved sources of drinking water, such as unprotected dug wells and springs, and surface water. [3]
- the methods most commonly used to make water safe to drink are boiling and straining water through a cloth.
- Approximately 20 percent of households do not treat their water prior to drinking it. Reasons for this include long-term habits, and insufficient resources to treat the water.[4]

In rural Bobonaro, a district bordering Indonesian West Timor, most families collect water from sources near their homes, but drinking this water is making people sick. Twenty-one percent of children under the age of five had diarrhoea in the two weeks before the census was conducted in 2010, which is among the highest rates in Timor-Leste.[5] Sometimes people drink less, because the available water tastes bad, or they are unable to pay for a sufficient amount of drinkable water.

1 Water Quality Study, Democratic Republic of Timor-Leste, Ministry of Health, Environmental Health Division, May 2010

2 http://www.wssinfo.org/definitions-methods/

3 http://data.worldbank.org/country/timor-leste

4 Fellow estimates based on observations in the field.

5 Highlights of the 2010 Census main Results in Timor-Leste, 2010

By introducing Nazava water filters, families no longer need to collect water from faraway water sources, and will be able to quickly and conveniently filter and store clean drinking water at home. Moreover, they will save money and resources that are usually spent to treat or buy treated drinking water.

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. Donors fund the initial costs of introducing technologies and creating micro-business opportunities in remote communities. The money raised from product sales is then reinvested in more technology for the last mile.

Local Partner – Hemetin Asaun Dezenvolvimento Edukasaun no Ekonomia Rural (HADEER)

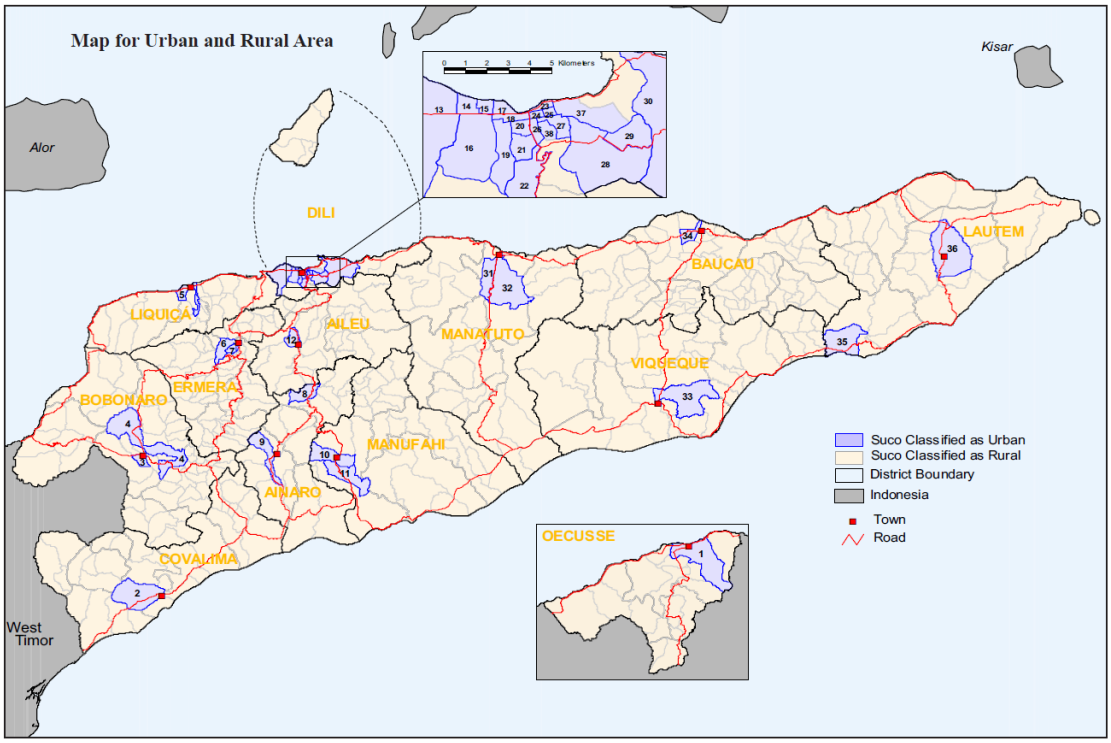
Image 1. HADEER workers

HADEER is a locally registered non-government organisation in Bobonaro. HADEER provides micro-economic empowerment, agricultural assistance, informal education, and village-scale infrastructure programs. Abel Pereira

Mauricio founded HADEER in 2006. The office is located in Ritabou Village, Maliana, Bobonaro District.

Snapshot of Location

Figure 1. Map of Timor Leste, classified by Urban and Rural area



Source: Priority Tables for Bobonaro District. National Statistics Directorate and United Nations Population Fund, 2008

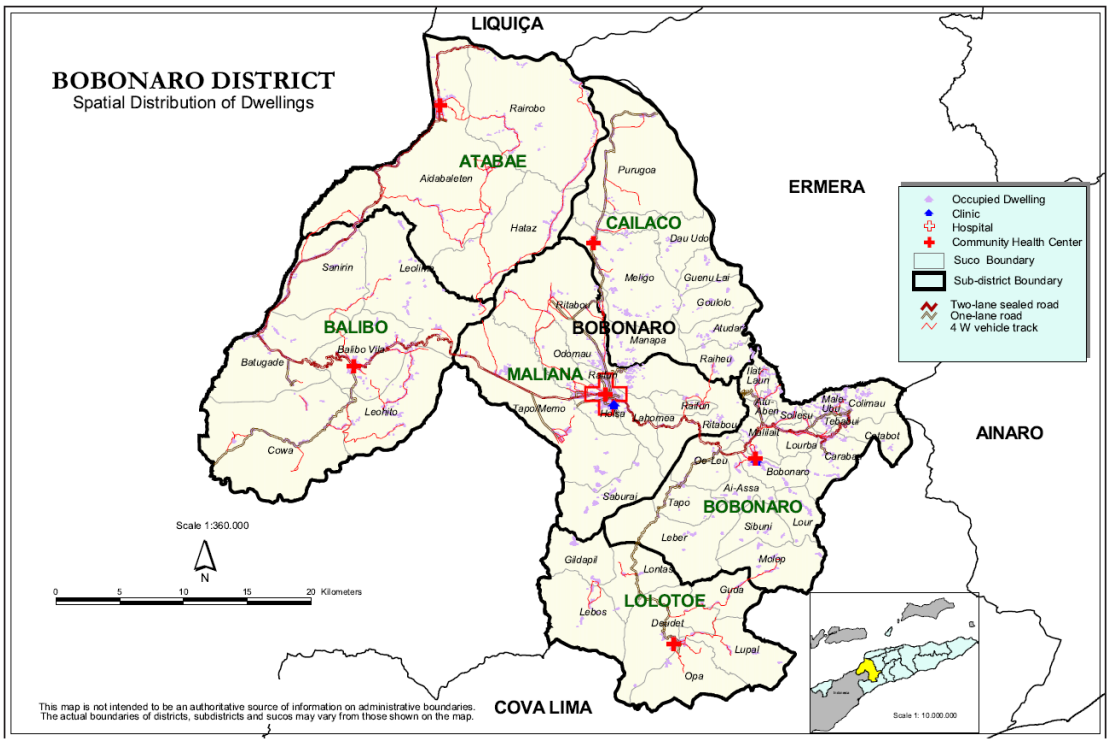
Geographic Aspect

Bobonaro is one of the thirteen administrative districts of Timor-Leste, and covers an area of 1,381 square kilometres. It consists of six sub-districts: Maliana, Atabae, Balibo, Bobonaro, Cailaco, and Lolotoe. The capital of Bobonaro, Maliana, is Timor-Leste's fourth largest city. [6] Based on Government data from 2013, the population in Bobonaro is 97,496 persons. Eighteen percent of Bobonaro is classified as an urban region, while the remaining is

[6] Timor-Leste in Figures 2013, Ministerio das Financas, 2013, available from www.statistics.gov.tl

classified as a rural area (based on the density of the population).[7] The Drink Up Bobonaro project is mostly focused around Maliana town.

Figure 2. Map of Bobonaro, with special distribution of dwellings



Source: Priority Tables for Bobonaro District. National Statistics Directorate (NSD) and United Nations Population Fund (UNFPA). 2008

Demographic Overview of Bobonaro

Based on the data from the latest census, the population 67,217 and equally split between female and male.[8] Just over 40 percent are between the ages of 0 to 14. The overall population growth rate of 2.41 per cent per annum is high and makes the population young, with lots of demands.[9]

The majority of people (77 percent) work in agriculture and their main crops are rice, maize and cassava. The main religion in the area is Catholicism, representing 95 percent of the population. The education level of the population is 32 percent for primary school, 21 percent for secondary school education and 18 percent for no formal education. The remaining 29 percent have

[7] Ibid.

[8] Timor-Leste in Figures 2013, Ministerio das Financas, 2013, available from www.statistics.gov.tl

[9] Highlights of the 2010 Census main Results in Timor-Leste, 2010

obtained tertiary education.[10] Bobonaro is one of the districts that has high illiteracy rate after Ermera, Aileu and Liquica. The majority of houses (68 percent) in the district are built with soil floors and 70 percent of the area of Bobonaro district is not connected to the electricity grid.[11]

Economic aspect

Half of the population within Timor-Leste lives on US$40 or less per person per month. [12] The average household income and expenditure is substantially higher in urban areas than rural regions of Timor-Leste, as summarised:

- The average monthly household income was US$378 (urban: US$634, rural US$292).
- on the expenditure side, the average monthly household expenditure was US$297 (urban: US$532, rural US$219),
- while taking into account household sizes, average per capita expenditure comes to US$49 (urban: US$78, rural US$38). [13]

[10] Priority Tables for Bobonaro District. National Statistics Directorate (NSD) and United Nations Population Fund (UNFPA). 2008

[11] Priority Tables for Bobonaro District. National Statistics Directorate (NSD) and United Nations Population Fund (UNFPA). 2008

[12] Timor-Leste Household Income and Expenditure Survey 2011, National Statistics Directorate General Directorate for Analysis & Research Ministry of Finance Timor-Leste

[13] Ibid.

Common Practices Related to Technology

Image 2. People queuing to collect water in the morning in Maliana town, Bobonaro

Access to Water

Approximately half the households in Bobonaro obtain water from a public well or an external freestanding pipe that provides running water, while another 20 percent use uncovered springs as their main source of drinking water.[14] The water is available for only a few of hours a day (usually from 8am to 10am) and people have to come early to queue. The number of jerry cans required by households varies from three to 20 per day, depending on the family size and how they use it (for drinking, cooking, bathing, or other sanitation purposes). When households are unable to obtain water, they have to rely on water from the drain or the river. During the wet season, most people rely on rainwater, as this is considered safe for drinking and easy to obtain during this season.

In Maliana city, the fellow was told that there is only one unprotected spring that has been claimed safe for drinking purposes. This spring is located in the middle of a rice field, and people have to travel between 30 minutes to two hours to reach this location.

14 Fellow observations based on experience in the field.

Project Implementation

The Technology

Nazava markets and assembles affordable water filters for low-income households. The filters eliminate bacteria, viruses and parasites, and produces fresh tasting water with no odour. Furthermore, the filters are easy to assemble and use. For many remote communities, using these water filters replaces the need to burn wood for boiling water, which in turn reduces carbon emissions.

Nazava's water filters are composed of ceramic and are impregnated with silver. The filter core contains activated carbon and can filter 7,000 litres of water before it needs replacement. The containers are made of food grade plastic that does not leave a taste or odour to the water. All filters have a product life span of at least 1.5 years with a one-year warranty.

There are four types of Nazava water filters that were distributed in this project:

	Bening Small	Nazava Bening 1	Nazava Bening 2	Nazava Bening XL
Number of filters	1	1	2	3
Filter rate	3 litres per hour	3 litres per hour	6 litres per hour	9 litres per hour
Size of containers	6 litres	13.5 litres	13.5 litres	27.5 litres
Capacity	6 people per day	12 people per day	12 people per day	20 people per day

Note: Calculated based on adult daily consumption of 2 litres of water daily

Distribution Mechanism, Pricing & Payment

Image 3. Abel (Head of HADEER) transporting a Nazava Bening 1 to a local household

When distributing products, HADEER prioritised the area of Maliana city and its surroundings for two reasons. Firstly, because the only mode of transportation that is available is motorbike, and it costs around US$2 per trip to deliver the technology so they wanted to keep distances low. This transport cost is currently covered by the local partner's revenue from the project.

The other reason why HADEER chose Maliana city as their first distribution point is because many households in this area have family and friends outside the city, who they thought could become sales agents and increase their reach organically. This outreach strategy has proven to be successful as most people who bought the product, have already recommended this technology to their family in other sub-districts and it is HADEER’s intention to take advantage of these networks in their continuing distribution.

Initially HADEER promoted the water filters by handing out brochures of Nazava in person and door-to-door for a month. As several households showed

an interest in seeing the real product, HADEER requested five product samples. After receiving the samples, they continued the promotional activities by bringing the samples to houses, farms, schools and churches. During these activities, they were able to begin to list the people who were interested in buying a Nazava water filter once they became available and revisited them to make the sale.

Product Pricing

In consultation with Kopernik and the local community, HADEER introduced the following pricing scheme:

- **Bening Small** - US$25
- **Bening 1-** US$30
- **Bening 2** – US$35
- **Bening XL** – US$40

Seventy six percent of the 54 respondents said that this price was affordable. It must be noted however, that the buyers to date are considered upper-middle class by socio-economic standards in Timor-Leste, with only 16 percent of 54 respondents recording an income below US$34 per week. One buyer was not able to afford the price listed and in this case, HADEER subsidised the price using revenue from other sales to allow them to purchase the product at a discount.

HADEER's sales plan in their proposal incorporated a portion of their overall sales revenue being used in this way, to subsidize the cost of the products for poorer households, to cover the cost of delivering products to households, to pay staff salaries and to invest back into HADEER's other projects. This accounted for the higher than cost price placed on the products by HADEER.

Repayment Scheme

There were two types of payment methods offered by HADEER: up front full payment in cash and instalments. The instalment method accounts for 76 percent of sales so far. Households paid in three instalments and on average

paid US$15 for the down payment, which could be adjusted based on the household's financial status. At the time of writing this report, HADEER had obtained 37 percent of the full repayments from all instalments. Every technology buyer signed HADEER's 'credit contract' with detailed information on when the repayments were due to avoid any misunderstandings on the customers' payment obligations.

Using this distribution and payment scheme, HADEER was able to sell more than 100 out of 480 units within three months and made their first repayment to Kopernik in July 2015.

Ongoing Distribution Strategy

Regarding the remaining water filters, HADEER is planning to expand their distribution area to the other sub-districts of Bobonaro. To this end, HADEER is planning to engage agents to manage sales and instalment collections outside Maliana city. Official agents selected by HADEER will have to sign an 'agent agreement', which will define their responsibilities to HADEER, including the amount of commission they will receive. Slightly different from the original payment system implemented by HADEER in Maliana city, these agents will use a layaway system, where the agent provides the customer with the water filter only after full payment has been received (through instalments).

HADEER is planning to set the agent's commission at five percent of the selling price with an additional product bonus (one unit of Nazava Bening Small given to the agent for more than 30 units sold or one unit of Nazava Bening 1 for more than 50 units sold). HADEER also plans to introduce an additional fee of:

- US$1 for every month that the repayments are not made
- US$2 for the delivery of water filters to households to cover HADEER's transport costs.

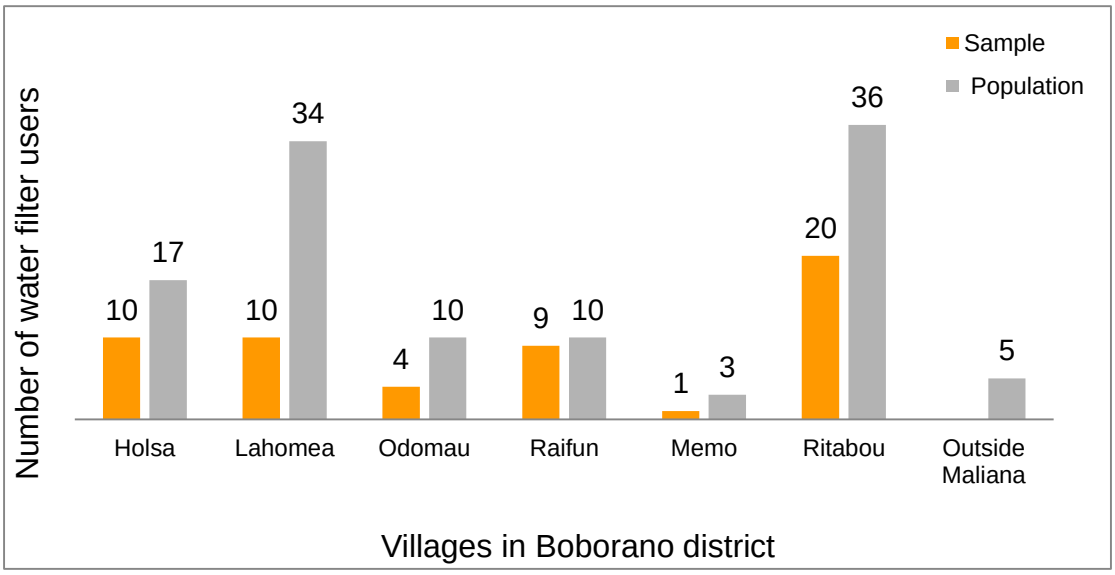
Impact Assessment

Process & Methodology

The fellow collected data through interviews with households that own and use a Nazava water filter purchased from HADEER. Interviews were conducted with a sample of 54 product owners out of 115 products sold from six locations, as seen in Figure 3. This sample of buyers represented 47 percent of the total number of buyers, across the four different sizes of the filter.

	Total units	Sample size
Bening Small	168	3
Bening 1	240	25
Bening 2	36	14
Bening XL	24	12
Total	**480**	**54**

Figure 3. Geographic distribution of the interviewed sample

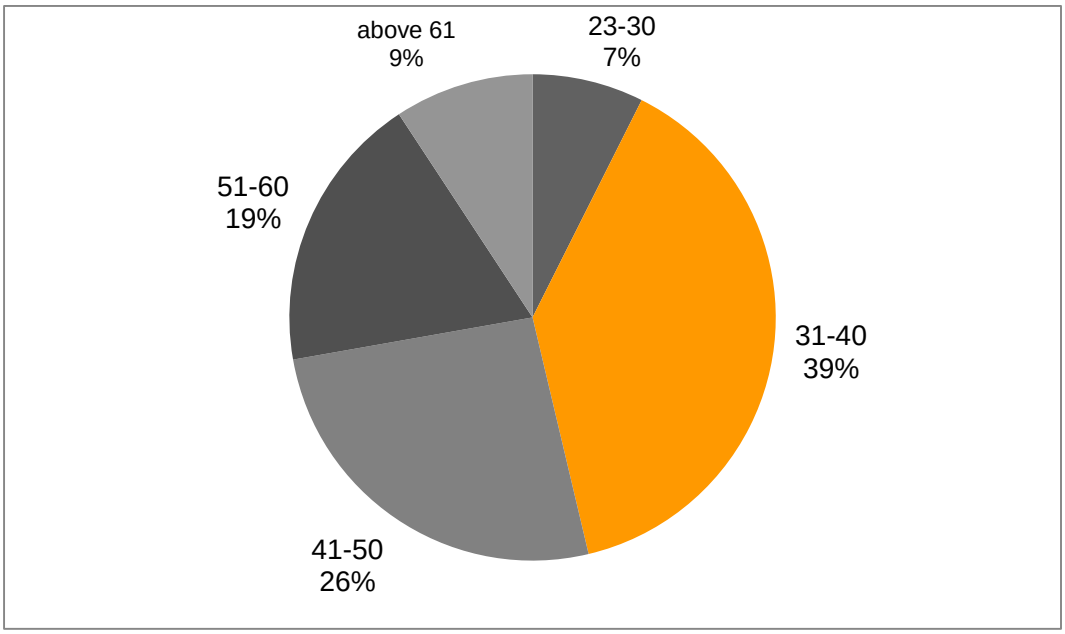


The interviews were conducted over a two-week period and covered a range of topics, such as household income, the usage of the water filter, and the perceived health impact of the technology. The languages used in the

interviews were Bahasa Indonesian and Tetun. HADEER staff acted as translators during the interviews.

Profile of Survey Respondents

Figure 4. Age range of surveyed respondents (n=54)

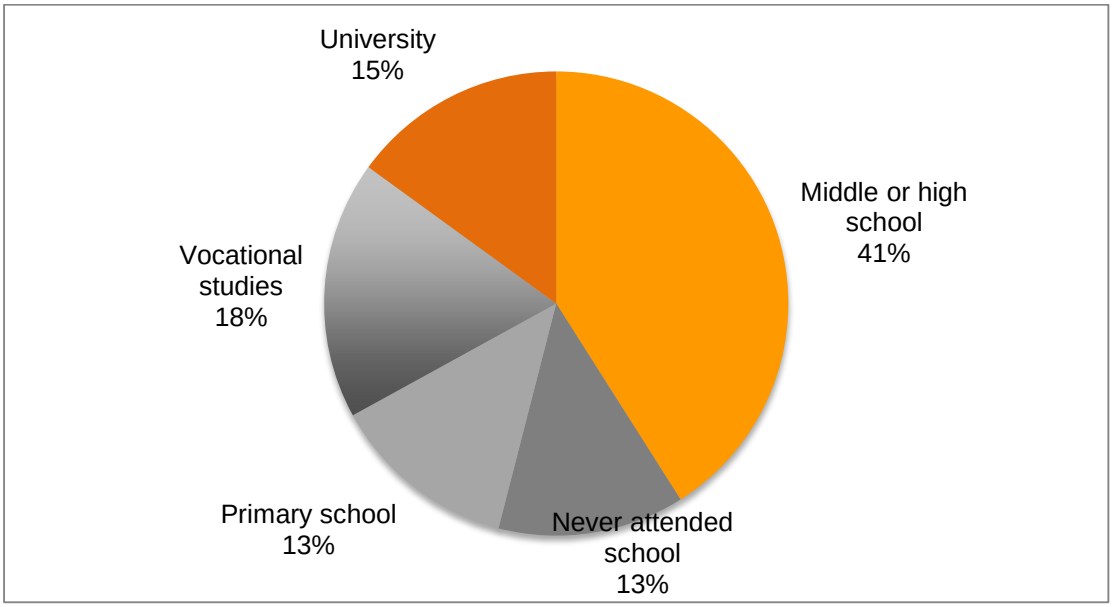


All 54 respondents were married, and the majority were between 31 and 40 years of age (see Figure 4). The average number of household members was 7.85, including 3.5 children under the age of 18 years. In the sample of 54 people surveyed, the number of people recorded as benefitting from the use of the water filter was 424 people, including 192 children. Twenty two percent of the respondents did not have access to tap water in their houses, but all households had access to electricity.

The decision-making process to purchase the product was split equally (50 percent) between husbands and wives. Based on the fellow's observation, the household expenditure was generally managed by both husband and wife as a couple.

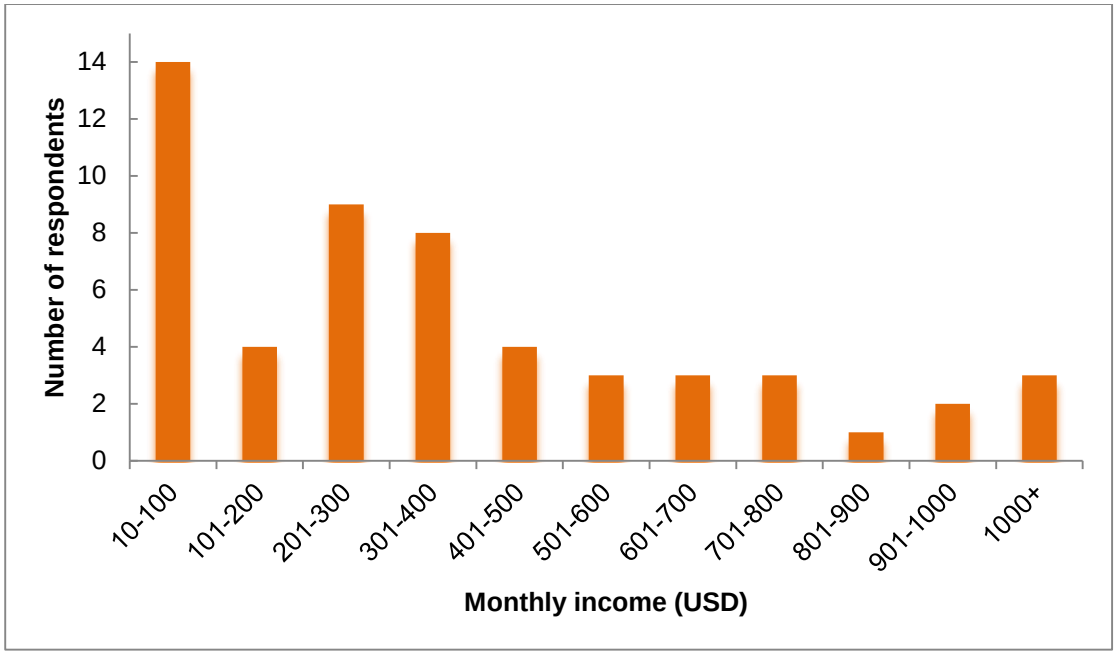
As seen in Figure 5, most customers who bought the water filter were educated beyond middle school (74 percent).

Figure 5. Education level of respondents (n=54)



While the monthly income of the sample ranges from US$15- $2,000 per month (see Figure 6), based on the average monthly income of the sample (US$481), we can conclude that the majority of current customers tended to come from middle-upper class socio-economic backgrounds, which is plausible since HADEER distributed the water filters mainly around Maliana city.

Figure 6. Distribution of monthly income (n=54)



The impact assessment found that 10 percent of all households interviewed still drank unboiled water before purchasing the Nazava water filter. These households tended to be poorer, have a lower average monthly income, and were less educated, which may have resulted in the lack of awareness of the risk of drinking untreated water.

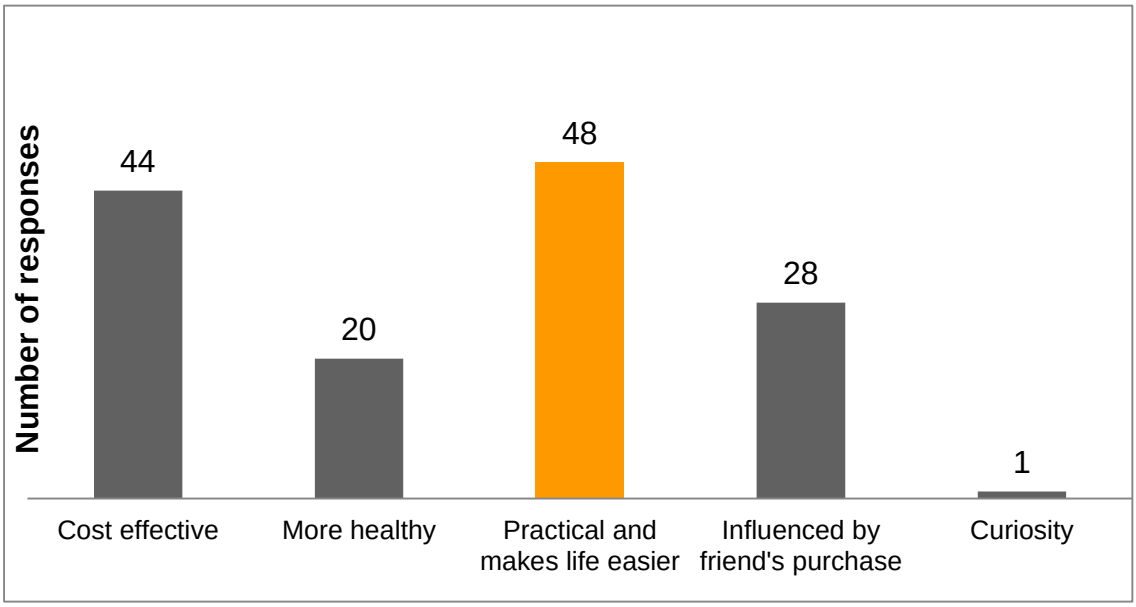
The remaining 90 percent of the respondents either drank boiled water (58 percent) or refilled water gallons (32 percent). As expected, households who drank boiled water or refilled gallons both had higher education levels and higher monthly incomes (with average monthly gross income of US$416).

Purchasing Decision

While the water filters provide the community with healthier drinking water, this surprisingly was not the most appealing factor in the buying decision. Most of the customers bought the water filters initially because they reduced the time taken to collect and boil water, as shown in Figure 8. Others purchased the water filter because it saves them money or because their friend or neighbour had bought it. The latter is plausible because Maliana city is a close-knit community and family bonds are strong, which assisted HADEER to promote the water filters. Furthermore, HADEER's head of organisation, Abel, is an

influential person in the community, with a strong grass-roots network who respected his recommendation of the product.

Figure 8. Appealing aspect of the water filters (n=54)



Note: Respondents can select multiple responses

Results of Impact Assessment

The main question the fellow focused on is whether having this water filter created a significant impact on people's lives, and if yes, in what way? If no, the fellow investigated what could be the cause. In the sections below, the fellow will discuss in detail the findings from the interviews conducted with the technology users.

Socio-economic impact

THERE IS A TANGIBLE ECONOMIC BENEFIT AS PEOPLE CAN SAVE UP TO US$18 PER MONTH ON AVERAGE

Respondents were asked about their expenses specifically related to drinking water. Before using the Nazava water filters, households would spend on average US$18 per month on buying wood or US$6 per month on electricity to

boil water. Needless to say, households still buy or collect wood for cooking but they no longer buy as much wood as before.

Before using the water filter, 35 percent of surveyed households purchased at least two refilled gallons at US$1 per gallon every week, and spent on average US$14 per month in total. After using the water filter, they no longer have to spend this money to obtain safe drinking water.

Stories from the Field

Maria Theresa and her family are no longer purchasing gallon water after using the Nazava water filter, enabling them to save up to US$24 per month.

"...MY KIDS REALLY LIKE THE TASTE COMPARED TO THE REFILLED GALLONS AND THEY DRINK MORE THAN BEFORE."

Image 4: Maria Theresa and her family with their Nazava water filter

Maria Theresa sells tempe (*(fermented soybean cakes)* as her family cannot rely solely on her husband's income.

"During the dry season, the weather is very hot and my family drinks a lot more water. As the source of clean water is far and I don't have time to get it, I decided to use refilled gallons as the price went down from US$3.50 in 2009 to US$2, with more and more gallon refill gallon kiosks located here in Maliana. For our five-member family, we usually buy 12 gallons every month, which costs me US$24 per month. It is not a small amount of money for me (three percent of my income). I heard about a similar product (Pure It) sold in Indonesia, but I have not had access to that product. This is why, I was so happy to hear the Nazava water filter is now available. My kids really like the taste compared to the refilled gallons and they drink more than before."

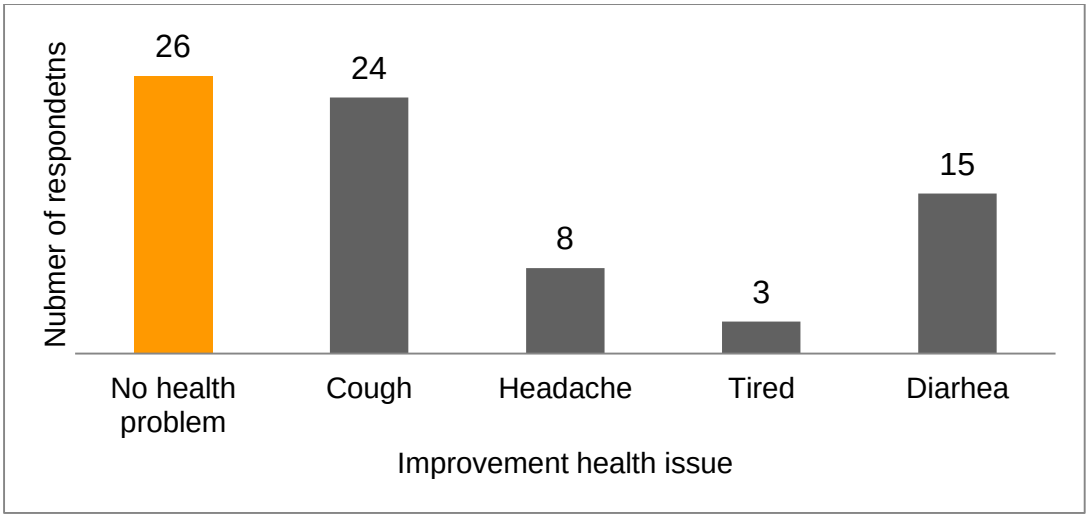
Maria Theresa, merchant owner, 39 years old, Raifun village, Maliana, Timor-Leste

Health impact

The most common health problems that is directly associated with drinking untreated water are waterborne illnesses, such as diarrhoea.[15] However, when respondents were specifically asked about their health condition before and after they using the water filter, some households claimed that health issues such as coughing right after drinking water (32 percent), diarrhoea (20 percent), and headaches (10 percent) have reduced in occurrence.

Figure 9. Areas of improved health after using the water filter (n=54)

[15] Dhiarreal Disease Messaging.



Note: Respondents can select multiple responses

Please note that further studies are needed to explore the link between drinking clean water and illness other than waterborne diseases. In addition, coughing and headaches may be caused by dehydration or a range of other causes.

Stories from the Field

"AFTER I HAVE THIS WATER FILTER, NOT ONLY DO I FEEL THE WATER TASTES A LOT BETTER, BUT ALSO FEEL SO RELIEVED THAT I AM FREE FROM MY COUGH."

"We just recently built this house from saving some money every month. This is our small house with five people in it. There is not much water available, as the water pipe is not working. People in the upper area manipulated the water flow for their private interest. Sadly, there is no more water from the pipe available for us. Thus, we have to rely solely on the water from the well. We used to use it for drinking but I used to have a cough when drinking it, even if it is boiled. I don't really mind about that but I assumed the water contains a lot of lime in it. After I have this water filter, not only do I feel the water tastes a lot better, but also feel so relieved that I am free from my cough."

Lucio Madeira, Carpenter, 27 years old, Holsa village, Maliana, Bobonaro, Timor-Leste.

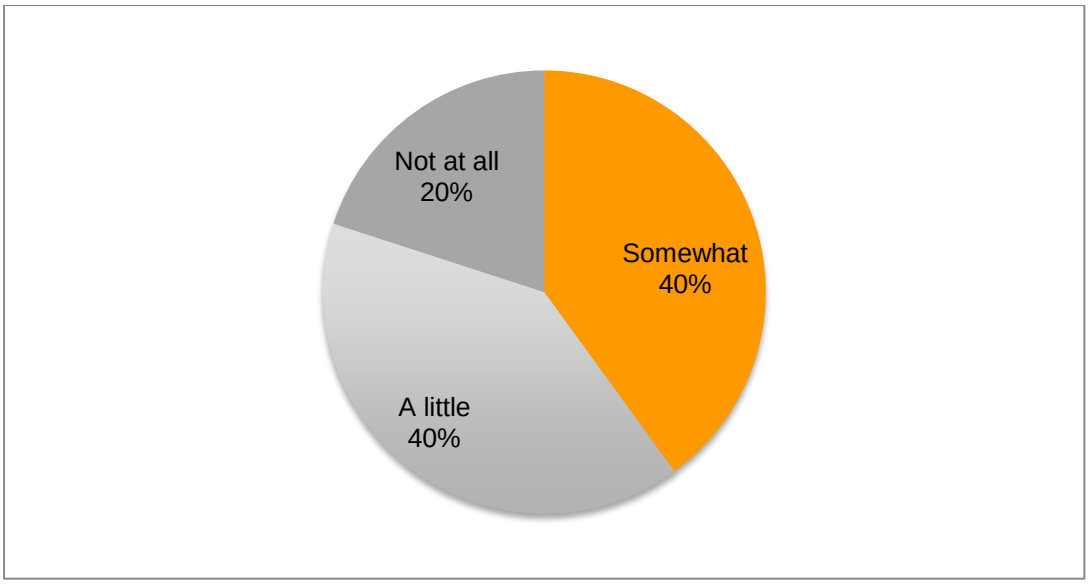
Image 5. Lucio and his family with their Nazava water filter

Improved Safety

Respondents were asked about their awareness of fire hazard risks from burning wood. The burning of wood often creates a lot of smoke, thus families said they usually burn it in an open air room. Some households created a simple building consisting of three walls with one side open so that the smoke can easily escape. Even with these specially built rooms, the risk from fire hazards is still high as most houses are built from wood and/or bamboo (*rumah bebak),* and can easily catch fire.

Using the Nazava water filter reduces the need to boil water and thus the frequency of household fires. From the 45 respondents who use wood to boil their water, 40 percent said they are somewhat aware of the reduced risk. Another 40 percent said they are a little aware of the risk and the remaining said they do not consider the risk of fire as they have been using this method for many years and nothing has ever happened.

Figure 10. Perceived reduced risk of fire hazard (n=45)



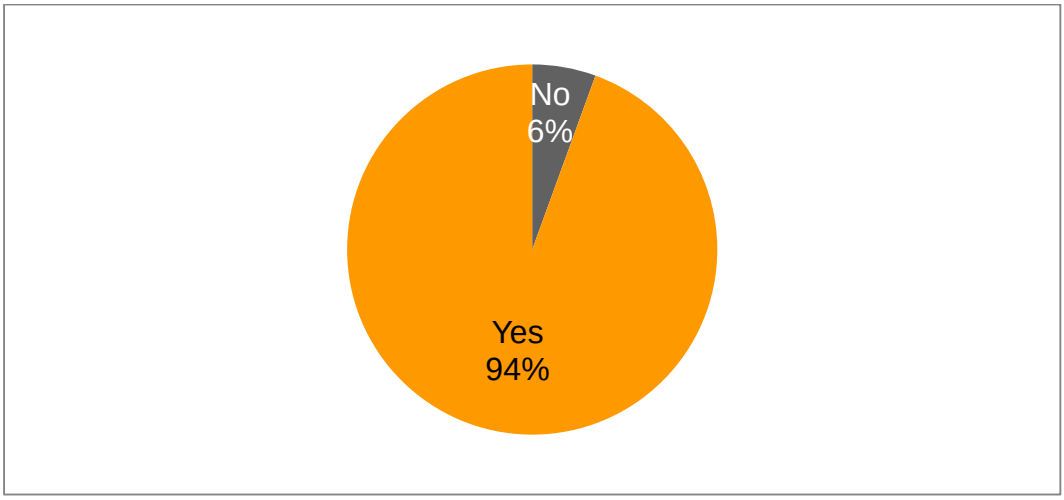
During the course of the impact assessment, the community told us that in the last two years, there had been two cases of houses burning down due to fires. It is suspected that these accidents were caused by the mixture of an unattended fire, a wooden house, and wind as most of the *'rumah bebak'* owners use wood to cook rather than kerosene or electricity. Using the water filter might not eliminate the total risk of fire, but it does decrease the frequency of burning wood inside to boil water.

Time Saving and Productivity Impact

"PEOPLE CAN NOW SAVE TIME AND USE IT FOR SOMETHING MORE MEANINGFUL."

Respondents were asked whether they have saved time by using the water filter. As seen in Figure 10, the vast majority (94 percent) reported that they were saving time. The remaining 6 percent claimed they did not save time as they prefer to still boil water even when it is filtered. These respondents indicated that they are not used to drinking unboiled water and it is their habit to boil it even though it doesn't need it after being filtered by the Nazava.

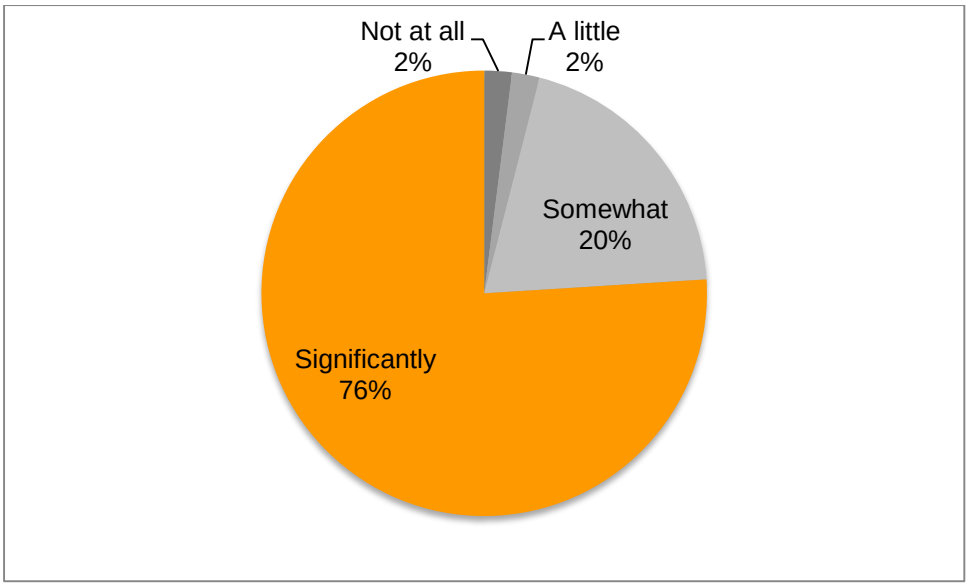
Figure 11. Percentage of respondents who saved time since using the filters (n=54)



Before using the water filter, households needed to boil pots of water up to three times every day, which is the equivalent to 1.5-3 hours of boiling time a day, or 90 hours per month. By using the Nazava water filter, households no longer have to boil water and are able to save time in collecting or buying wood, which on average saves at least 4 hours per month (depending on location). On average, households in Bobonaro consumed 18 big bundles of wood per month just to boil water, at an average cost of $US18 per month.

Since using the water filter, respondents indicated that they use this extra time to take care of their children, have quality time with their family, complete work tasks, and enjoy more time to rest. This impact on productivity is closely linked to the health benefit and time saved.

Figure 12. Perceived increased in productivity (n=54)



Story from the Field

"...I ALSO DO NOT HAVE TO BOIL WATER, THUS I HAVE A LOT MORE TIME TO SPEND WITH MY HUSBAND AND KIDS."

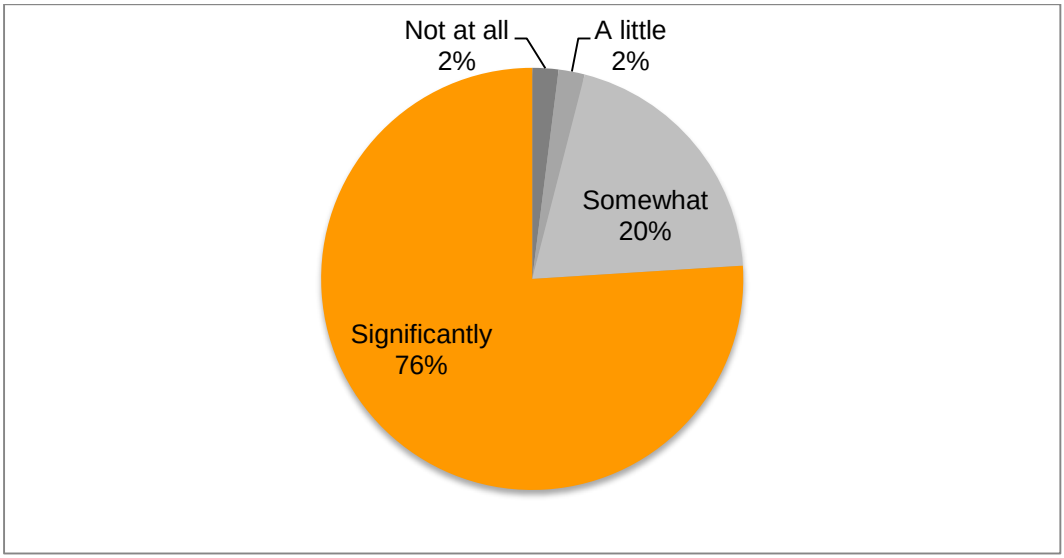
"We are connected with the pipe water in front of our house but drinking this water has caused my husband to have kidney stone problems even when we boil the water to drink. We think this might be caused by the lime contained in the water we used to use. Therefore, we stopped using this water and instead began to take water from a better source, which is from a fountain in the middle of a farm (this is the only source of clean water in Maliana). My husband has to carry two gallons each trip and it causes pain in his back. I sell cakes and jamu *(tonic made of medical herbs) house to house every morning. When I visited one of my regular buyers, she showed me this water filter. Then I managed to buy one for my home. Now we consume the filtered water daily and my husband neither has his kidney stone, nor his back problems. I also do not have to boil water, so I have a lot more time to spend with my husband and kids."*
Suwarni, Kiosk owner, 35 years old, Raifun village, Maliana]

Changes in Habits

PEOPLE DRINK MORE THAN BEFORE AS THEY DO NOT HAVE TO WORRY ABOUT THE COST

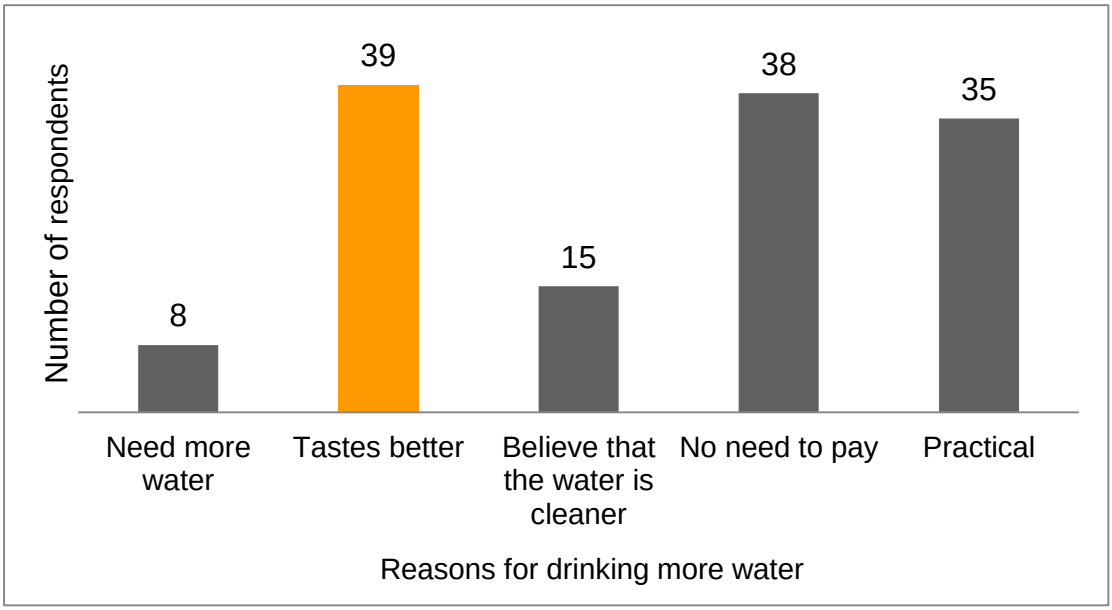
To prevent dehydration, adults need to drink two litres of water a day. Most of the households in Bobonaro are not aware of this and drink less than what they should due to a variety of reasons, including the water's bad taste, saving money, the water not being ready to drink or because the water is dirty. During the interviews, the fellow asked people whether they drink more water after using Nazava and they said they did.

Figure 13. Increase in water consumption after using the water filter (n=54)



The most important factors driving the increased water consumption were the better taste of the water and the lower costs.

Figure 14. Reasons for drinking more water (n=54)



Note: Respondents can select multiple responses

Story from the Field

"...MORE IMPORTANTLY I CAN DRINK AS MUCH WATER AS I NEED."

Image 6. Martino da Cruz now can drink more water using the water filter

"My family used to drink unboiled water. I was hospitalized due to kidney problems and the doctor suggested to me to drink branded water, as the refilled gallons had not been verified by the Health Department. While my family still drinks the unboiled water, I have to drink the branded water. I used to drink one bottle of water a day. I know I drink less water than I need, but my financial situation made me do so. With this water filter, I no longer have to pay for my bottle of water each day which costs 50 cents and more importantly I can drink as much water as I need."

Martino da Cruz, retired, 68 years old, Raifun village, Maliana, Bobonaro, Timor-Leste

Meeting the Needs and Expectations of the Community

User Satisfaction and Technology Adoption

The overwhelming majority of users (94 percent) indicated that they did not encounter any problems using the Nazava water filter, while a small number (6 percent) experienced some problems. Some examples were that the water tasted weird when first passed through the filter, the filtration rate was slow, and the tap was broken. Kopernik discussed these problems with local partner directly and the local partner provided the buyers with after-sales services that solved their problems.

Evaluating the product usage in general, 70 percent of all respondent said they were very satisfied with their purchase.

Water filter feature	**Rating out of 5 stars (n=54)**
Water quality	4.95
Taste	4.88
Filtration speed	4.47
Container strength	3.89
Care and maintenance	4.86
Overall rating (average)	**4.61**

From 115 products distributed, only one of the buyers returned the product. In this case, the purchaser felt that the product was not durable enough and she was afraid children would break it. The people interviewed had only used their filters for less than four months so long-term durability has not yet been tested by them, but the quality of the plastic of the water filter's buckets and Kopernik's previous experience with this product has proven that the product is extremely durable.

Implications and Lessons Learnt

Local Partner and Project Implementation

At first, the head of the local partner did not believe that the "distance" of this project would work, with Kopernik operations based in Bali and the project location in Timor-Leste. However, even though communications with Kopernik was limited to phone and email, Abel felt that Kopernik's team was very helpful in assisting him with this project. He also thinks that Kopernik's visit to the project location was very helpful to motivate the HADEER team to complete this project successfully.

This is the first project where HADEER has sold products, and they have learned a lot from this. Abel has successfully delivered many past projects with donors and therefore had good experience in project administration and an established network in Timor-Leste, which contributed to the success of the project but had not implemented a project based on a social enterprise approach before. After collaborating with Kopernik, the HADEER team expressed that they had added to their knowledge on project administration, learning more about proposal preparation, simple budgeting and monitoring cash flow.

Abel is still expecting that upon completion of the project, the revenue from the project will provide some financial benefits for his staff. Currently, his staff are working voluntarily and not getting a salary or stipend to cover transportation

costs. He would like to repay them for their help by making them full time staff and would like to pay them a salary or stipend with future social enterprise projects.

HADEER reported that language was a challenge, as the team has very limited knowledge of English, but their fair knowledge of Indonesian language greatly helped them to communicate with Indonesian speakers at Kopernik so that this challenge was largely overcome.

Collecting Repayments

HADEER mentioned that the biggest challenge was collecting the repayments from customers as the travel costs involved were higher than expected. Currently the operational costs for distribution are 20 percent of the total sale due to the collection process being quite complicated, time consuming and transport costs being high. The process is described below:

1. Every credit buyer signs a 'credit contract' stating that they will pay off the product within one month from the date they received the product;
2. Every credit buyer is then visited by HADEER, usually two to three times in the period of one month (usually in the second week after the buyer receives the product, and then the third and fourth week) to collect the money.

HADEER indicated that the collection challenge was exacerbated by the buyer often not being there when staff visit for the instalment. In these cases, HADEER then has to send a message to the debtor and arrange another visit so three visits could become four or five.

Further monitoring of the repayment collection is needed as the fellow could only record limited information since only three months had passed since the first distribution. HADEER agreed to continue to discuss their instalment credit scheme with Kopernik and to consider these difficulties together. HADEER was considering prioritising full cash buyers over instalments if these problems persist, but what this doesn't take into account is providing access to the

products to those who perhaps don't have the higher income means to pay for the product up front, but really need the filter.

HADEER felt that up front full payment was a viable solution because HADEER's current market in Maliana city can afford the full upfront payment. However, this will be a different approach to the subsidy and instalment program for poorer households that they originally proposed to Kopernik.

The fellow also discovered that although their customers have the money, they still prefer to pay through instalments. From observation and discussion with locals, the fellow identified that this was due to household spending patterns. Unexpected costs often came up, there was a very limited habit of saving (they spend what they have), and a delay in selling their harvest could reduce their day-to-day income at any time, so for most customers, a flexible instalment payment scheme is preferable to an upfront full payment.

Unintended Impacts

Lack of Supervision in Managing Stock

HADEER reported that there was a two-week delay in beginning the distribution when the products first arrived in Bobonaro due to an issue with a misunderstanding with missing products. The technology arrived in March 2015 and HADEER signed that they had received all the products but they later reported that 18 Nazava Bening Small and 12 Nazava Bening Two products were missing from the stock. HADEER said they were lacking the experience of receiving a large package and did not know they had to check the items carefully before signing the acceptance receipt. When the fellow checked the stock however, there were no missing products and the total number of products received was as requested. This was a problem related to human error and inexperience which Kopernik has now addressed for all future local partners by providing a step-by-step guide on receiving stock. HADEER has learnt to count the boxes more carefully to make sure they accept the correct quantity of products before they sign the acceptance receipt for their next project with Kopernik.

Short Project Time

At the proposal stage, HADEER requested six months for the distribution of 480 units. Based on their performance to date (as at July 2015), they had sold only 26 percent of the products in the first three months. Even if they were able to move faster in the following three months, it is unlikely that they will complete the distribution of the products in the timeframe they applied for (completed by 31 September 2015).

To meet the deadlines of the repayments that HADEER initially agreed with Kopernik will mean that they have to hurry and will also encourage them to choose to prioritise upfront full cash payments over the credit scheme. Under this approach, it is likely that the project will then not be completed in its original spirit, and will exclude people who really need the product because they cannot pay upfront in cash.

A solution to be discussed further by Kopernik and HADEER will be to adapt and extend the project deadlines to give HADEER more time to meet their repayment commitments and remove that time pressure so that they can continue to target the last mile community customers with their remaining sales. This will of course mean that HADEER still need to resolve the higher than expected costs associated with instalment collections.

Recommendations

1. Kopernik should discuss with HADEER how to adjust their pricing model to cover the higher than expected transport costs associated with delivering the products to customers and collecting instalments and whether they want to continue the distribution to last mile communities offering the same conditions as originally proposed;
2. Kopernik should discuss further with HADEER whether the intention of the project is more about providing the technologies to those that need them most in last mile communities, who would require instalment payment plans or subsidies, versus those that have the money to afford the product upfront in the city;
3. Kopernik should provide more information to local partners to prepare them for the acceptance of stock when it arrives at their office; and
4. Kopernik should communicate more regularly with HADEER to ensure that the timeframes agreed at the beginning of the project are reviewed and adjusted if needed. This will ensure that there is not too much pressure on the local partner to collect repayments at the detriment of serving last mile communities.

Conclusion

The Drink Up Bobonaro, Timor-Leste project has made a positive and tangible impact on the economic, health, productivity and lifestyle of local communities. There is a potential saving of US$18 per month for those who use the filters on a regular basis. In addition, the occurrence of health problems has decreased, available time and productivity have increased, and the filters have helped to encourage a habit of drinking more water.

Even though the distribution process is still ongoing, and mainly focussed on the Maliana city area, if the local partner can expand the distribution to other districts and adjust sales margins and their distribution strategy to cover the higher than expected distribution costs, the project will continue to be a success.

Using the water filters has created positive impacts to at least 1,090 people in Bobonaro district. Overall, buyers were very satisfied with the technology and have been recommending the product to their friends and family throughout Timor-Leste.

Recommendations were proposed above, based on the fellow's observation in the field, which Kopernik will address to ensure successful implementation of the project. These include deciding in partnership whether targeting last mile communities who would benefit the most from these products, is preferable, rather than targeting just those that have a higher income and can pay more easily for the product to complete the project on time.