




# Market Survey Findings Report 2021

SolarWorks! & SunDanzer

Powered by:  Gaia



Mozambique possesses an enormous potential for fishing as it has a 2,515 km long coastline. The fishing industry is very important to the Mozambican economy as it contributes to roughly 40% – 50% of the country's foreign exchange earnings and about 85% of the exports by value are resultant of industrial shallow water shrimp fisheries.

There are three main fishing sectors namely: industrial, semi-industrial and artisanal, the largest sector being artisanal, seeing, as it is not only used as a source of income but also as a source of sustenance. Artisanal fishing is mostly practiced in rural areas with no access to electricity and therefore no refrigeration, which means that if the catch is not immediately sold or consumed, either it goes to waste or it is dried and salted, thus losing some of its value.

In an effort to elevate the standard of living of the artisanal fishermen and traders as well as seize the untapped off-grid refrigeration market in Mozambique, Sundanzer in partnership with SolarWorks! seeks to perform a baseline market study in rural off-grid fishing communities in the Southern region of Mozambique. The refrigeration systems may be equally beneficial for other economic activities such as, selling cold beverages and conserving agricultural goods.

This initiative aims to identify potential locations for project installation as well as the products that would be well suited for the market. Moreover, the results from the study will serve as a baseline reference to measure the impact of the introduction of said refrigeration systems.

Fieldwork was carried out from the 14<sup>th</sup> of June 2021 to the 24<sup>th</sup> of June 2021, covering 3 districts in Inhambane Province, namely, Vilankulos, Inhassoro and Massinga, and Manjacaze district in Gaza Province. The data collection team was comprised of 3 enumerators from Gaia who received support from SolarWorks! representatives in the field to locate the off-grid fishing communities.

The questionnaire was developed in collaboration with Sundanzer. It included questions regarding:

- General demographic information
- Current fish/food conservation methods
- Expected impact with the introduction of a refrigeration system

The device that was presented to the respondents was a 160L Sundanzer solar powered fridge/freezer (presented in the next slide), which is able to light up to 4 lamps and charge cellphones and radios. In addition, the system comes with a 2 year guarantee and technical support.

The initial proposed market price for the refrigeration system was 180,000 MZN (once-off) or PayGo with a deposit of 50,000 MZN and a monthly payment of 6,500 MZN for 2 years. This price was presented to the respondents from 15/06/2021 to 16/06/2021. Starting from 17/06/2021, up to 24/06/2021, the proposed market price changed to 150,000 MZN (once off) or PayGo with a deposit of 40,000 MZN and a monthly payment of 5,850 MZN for 2 years.

The data collection software used, on the tablets, in the field was Kobotoolbox. Kobotoolbox is a robust offline data collection and storage tool which can be used on various devices such as, phones and tablets. Excel 2013 and SPSS (a statistical software) were used to perform data clean-up and quality control. Meltwater, a media monitoring software, was used to develop the SHS impact demographics section of the report. Finally, Google Data Studio and Powerpoint were used to produce reports.

SunDanzer DC-Powered Refrigeration

# DCR/F160

SISTEMA DE REFRIGERAÇÃO MOVIDO A ENERGIA SOLAR



 Sistema completo (unidade, sistema solar doméstico e painéis solares)

 Suporta iluminação opcional e carregamento de telefone

 Garantia de 2 anos, suporte local

 Projetado e desenvolvido nos estados unidos

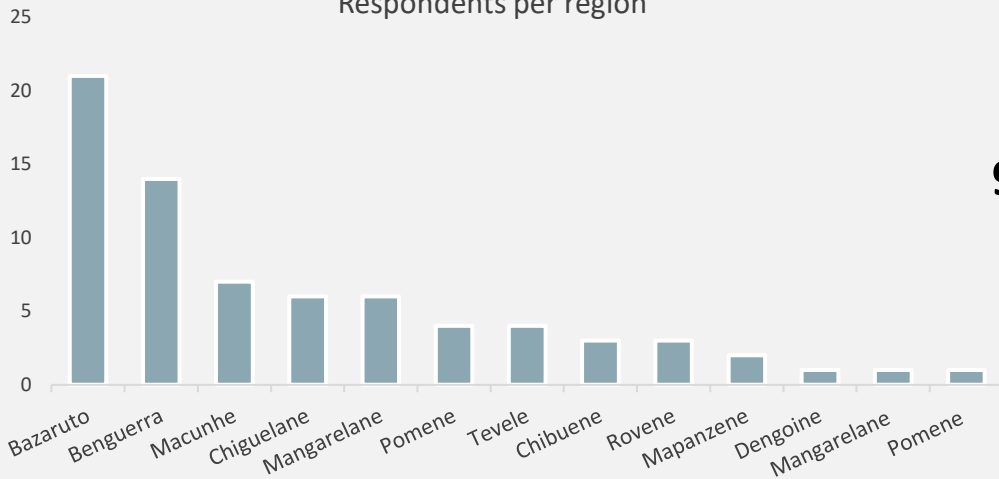
 160 litros (tamanho médio), pode ser geladeira ou congelador

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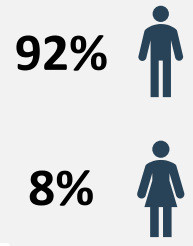
**solarworks!**  
sua energia, seu futuro

Linha do cliente  
+258 87 00000 87 / 84 4000  
[www.solar-works.co.mz](http://www.solar-works.co.mz)

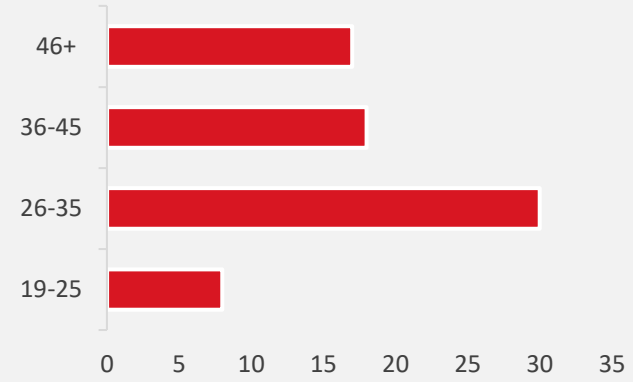
Respondents per region



Gender



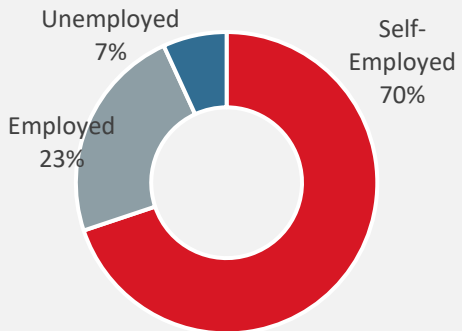
Age Demographics



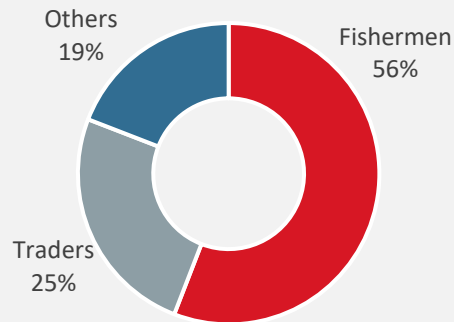
## Summary

1. There was a total of 73 respondents, 92% of which were male and only 8% were female. This disparity was due to cultural restraints which do not allow women to speak without their husband's consent/awareness.
2. 54% of the respondents resided in continental communities.
3. In terms of age, most of the respondents were between the ages of 26-35 years old.
4. The great majority of respondents were self employed, with only 7% being unemployed.
5. 56% of the respondents were fishermen.
6. The regions with the greatest number of respondents were the Islands of Bazaruto (21) and Benguerra (14) respectively, which will be further developed on Slide 13 and 14.

Employment Status

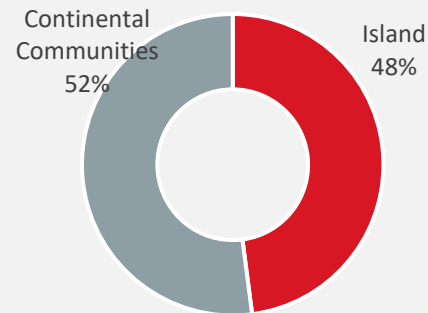


Occupation

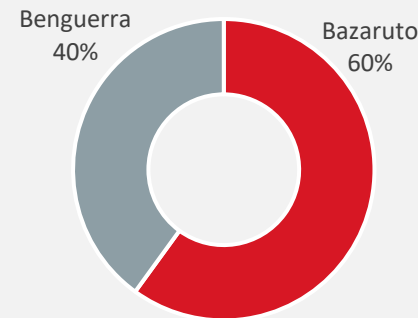


\*Other occupations include security, barman, ship captain etc.

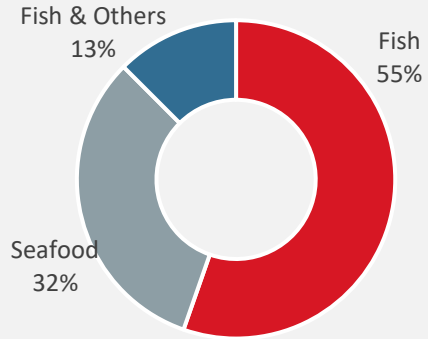
Continental Communities Vs Island



Benguerra Vs Bazaruto

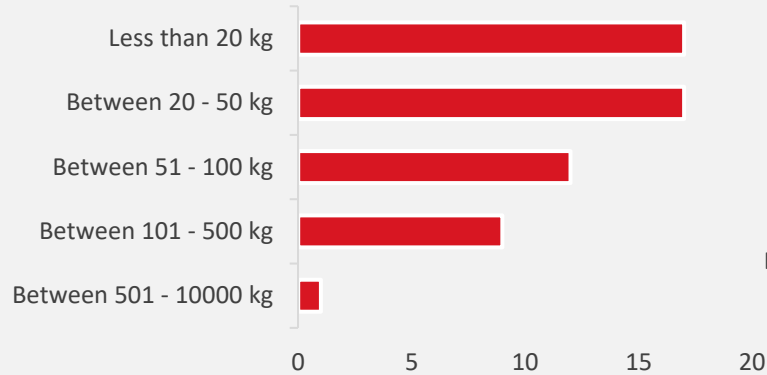


Perishable items

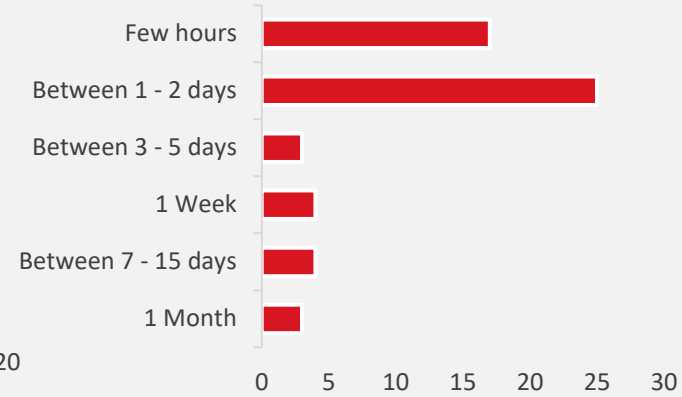


\*Other items include meat, dairy and vegetables

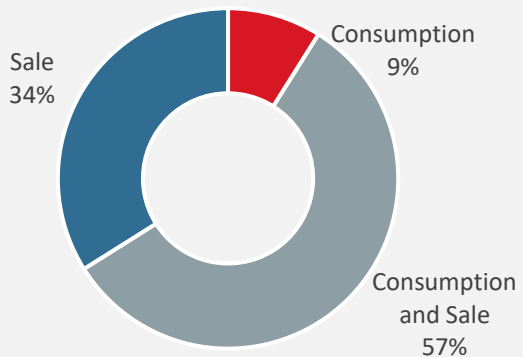
Quantity of products stored



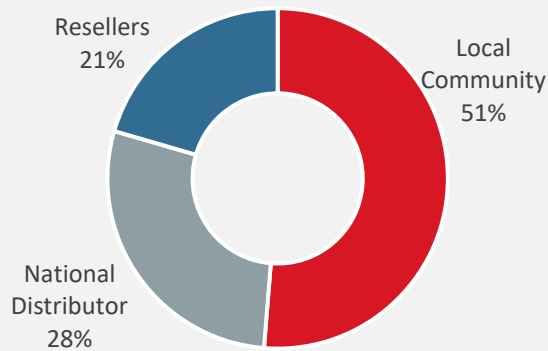
Duration of storage



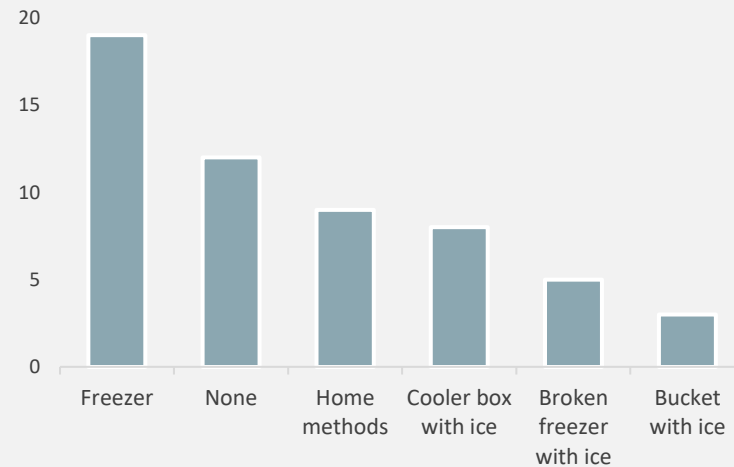
Purpose of storing products



Who do you sell to?



Preservation methods for products



\*Home methods include drying the fish, salting techniques to preserve or frying.

## Summary

1. Fish was the most common perishable good that was conserved..
2. A great number of respondents conserve between 1-50 kg of goods at a time and normally store the goods for a few hours up to 2 days. This is mostly due to the fact that they do not have the means to store more quantities either because it is expensive or because they will spoil.
3. 57% of the respondents sell and consume their goods. Of the sold goods, 51% are sold within the local communities while the remainder is sold to resellers and national distributors.
4. The main methods/equipment of conservation were freezers and home methods which involve drying and salting the goods. About 16% of the respondents didn't use any method of conservation.

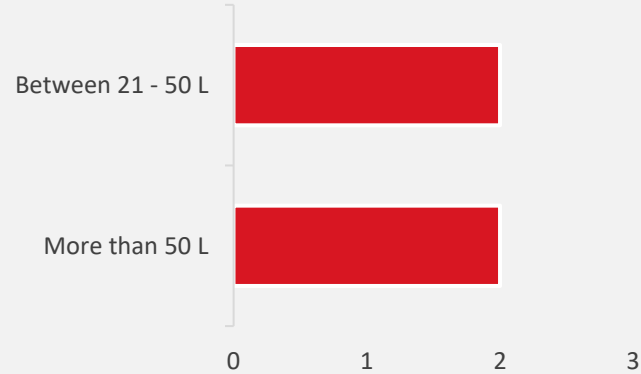
## Non-perishable items



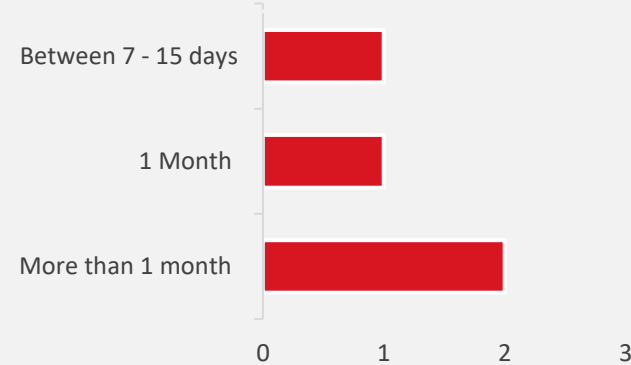
**24%**

Said they store drinks

## Quantity of products stored



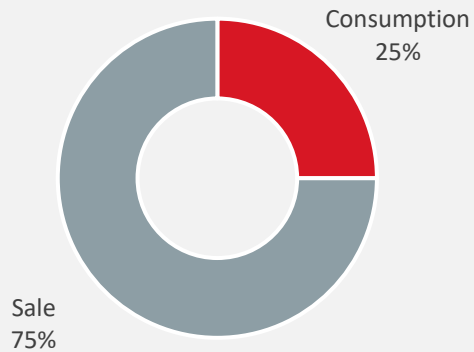
## Duration of stored



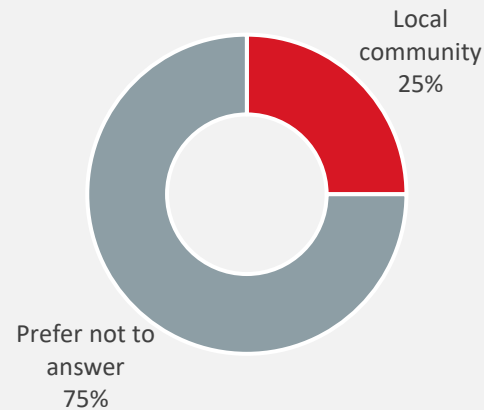
## Summary

1. Of the respondents that did not conserve perishable goods, 24% store drinks such as soda and beer.
2. The respondent store between 21L to more than 50L of drinks at a time.
3. It is important to note that the respondents who store drinks, store them for much longer than the respondents who store perishable goods, which is because they have a higher shelf life.
4. The purpose of these drinks is mainly for sale (75%).
5. 25% of the respondents sold their drinks to the community.
6. The equipment used to store the drinks are broken freezers with ice, freezers and buckets with ice.

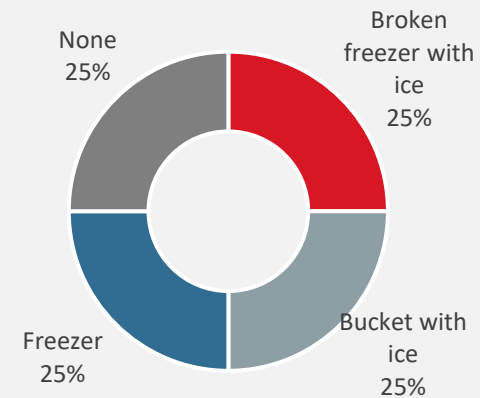
## Purpose for storing products



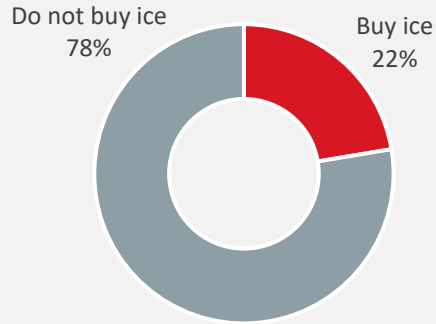
## Who do you sell to?



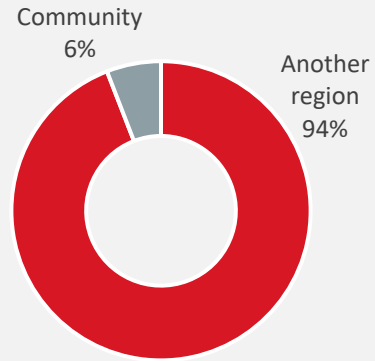
## Preservation method for products



Do you buy ice?

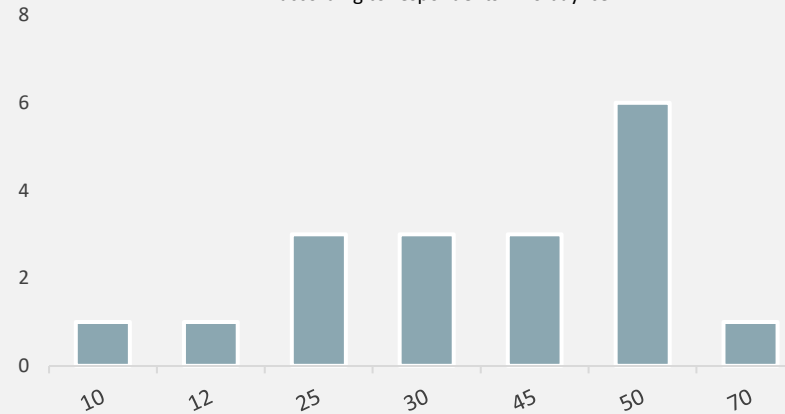


Where do you buy ice?

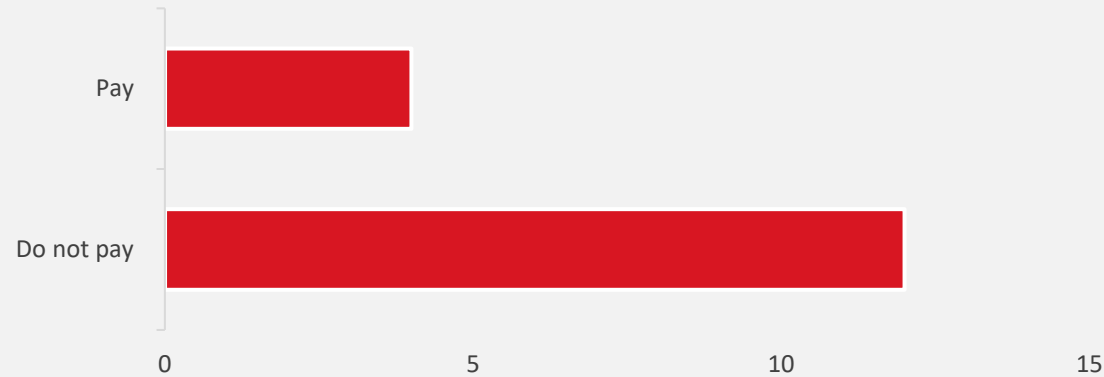


Price of ice bag per unit

\*according to respondents who buy ice



Fridge users who pay to store their products



## Summary

1. Of the respondents that conserve perishable goods, 22% buy ice to conserve their goods.
2. Of the respondents that buy ice, 94% purchase it from another region because there is no access to electricity to produce ice in their region.
3. The average price of ice across all regions is 38.44 MZN. However, the majority of the respondents buy ice which costs between 25 - 50 MZN. 50 MZN was the most common response.
4. Of the respondents that have access to freezers, the majority (12) do not pay for storage.



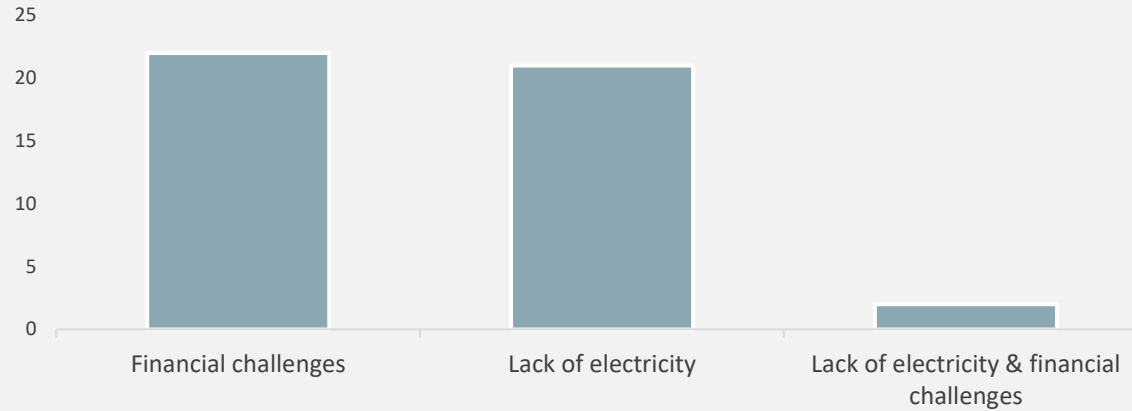
Is one fridge enough?



**100%**

Said one fridge is enough

Challenges faced when buying a freezer



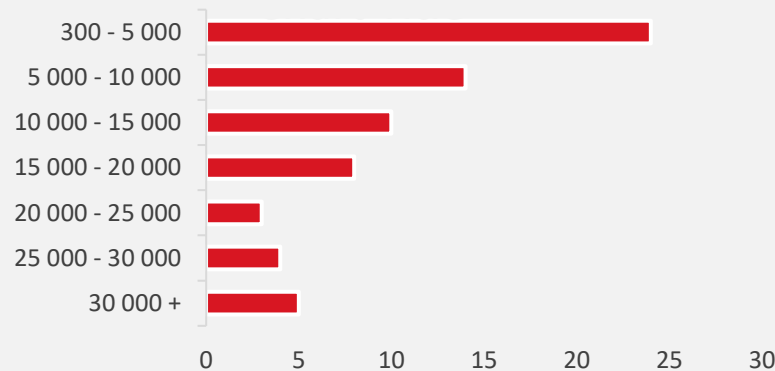
## Summary

1. All of the respondents are satisfied with 1 fridge/freezer.
2. Financial challenges and lack of electricity were the main obstacles for the respondents to obtain a freezer.
3. The most common reasons for why the respondent's revenue would increase were:
  - Being able to sell their fish at larger quantities;
  - Starting a business, which meant that they could catch, sell and trade their goods;
  - Preserving their fish to sell later and not risk it rotting or having to dry/salt it, which reduces its price.
4. Roughly 60% of the respondents estimate a monthly revenue increase of 5,000 MZN to 25,000 MZN
5. 60% of the respondents were interested in knowing more about the freezer.

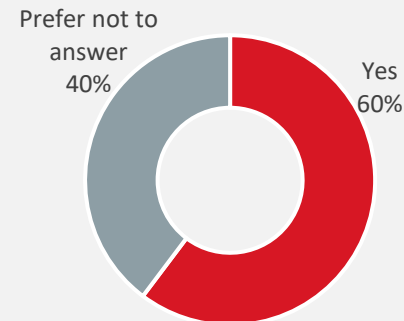
Common reasons to buy a freezer and increase revenue according to respondents



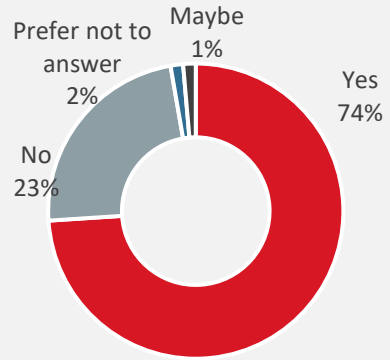
By how much will your monthly income increase if you buy a freezer



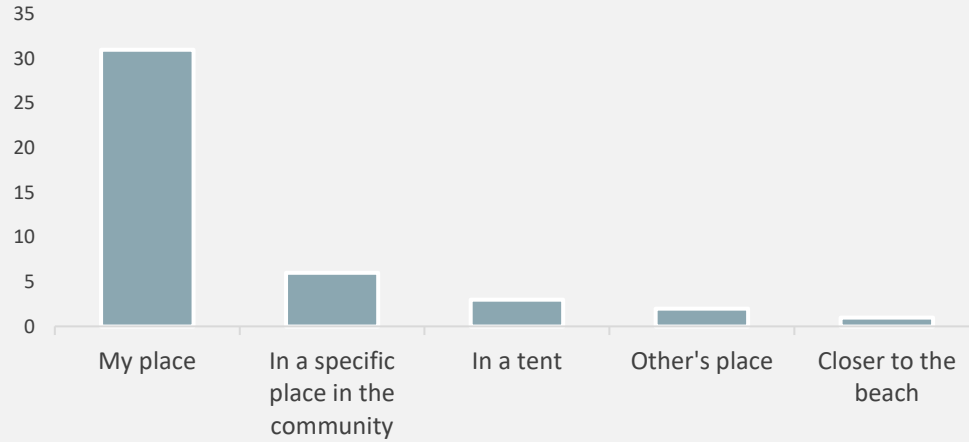
Are you interested to know more about fridge freezer?



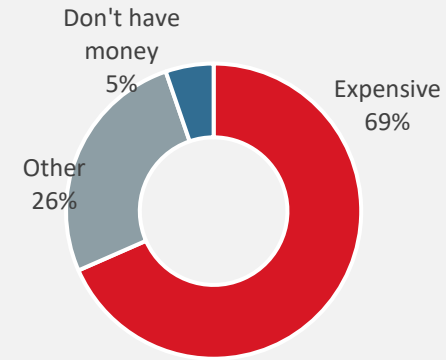
Would you buy our product?



If yes, where would you store the solution?



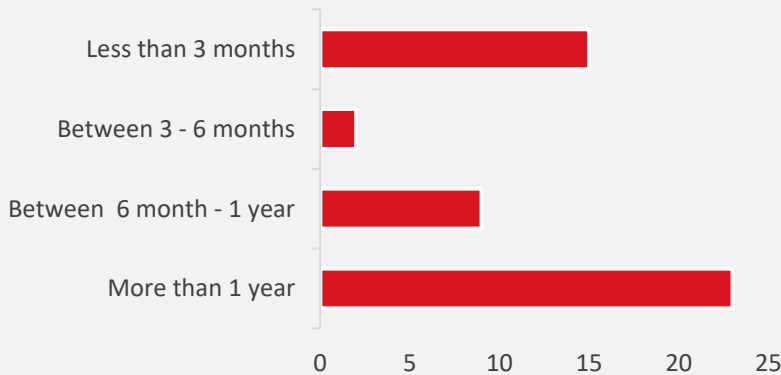
If no, what are your reasons not to purchase?



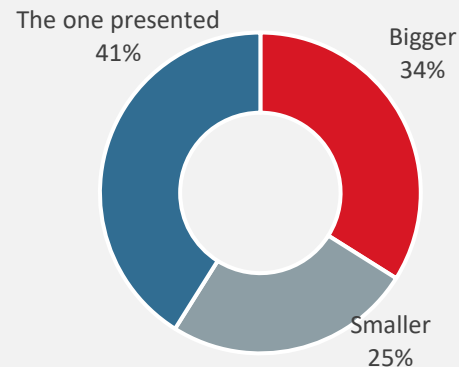
## Summary

- 74% of the respondents would purchase the freezer at the proposed market prices. Of those respondents, 31 would store the freezer in their home.
- The biggest reason for why the respondents would not purchase the freezer was because the presented price was too expensive.
- Of the respondents who would purchase the freezer, the majority would purchase it in more than a years time because they need to put together the money.
- Most respondents were satisfied with the presented freezer or preferred a bigger one instead.
- Some of the prevalent benefits of having a freezer were longer fish preservation, higher revenue and could sell other goods, such as sodas.

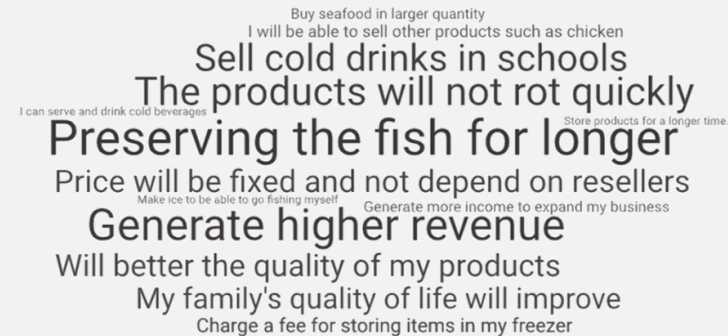
How long would you take to buy ?



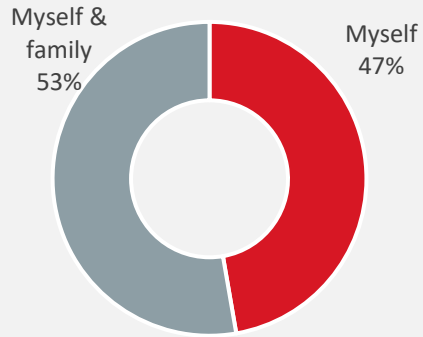
The preferred size of the solution



What are some of the benefits you will have?



Who would be the main users of the fridge, freezer?



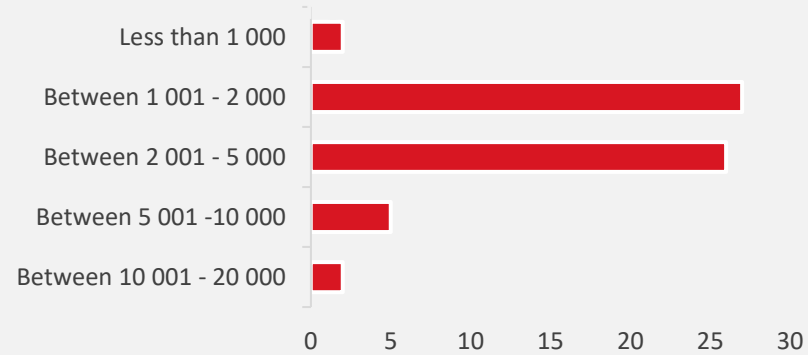
How would you pay ?  
Once-off or instalments



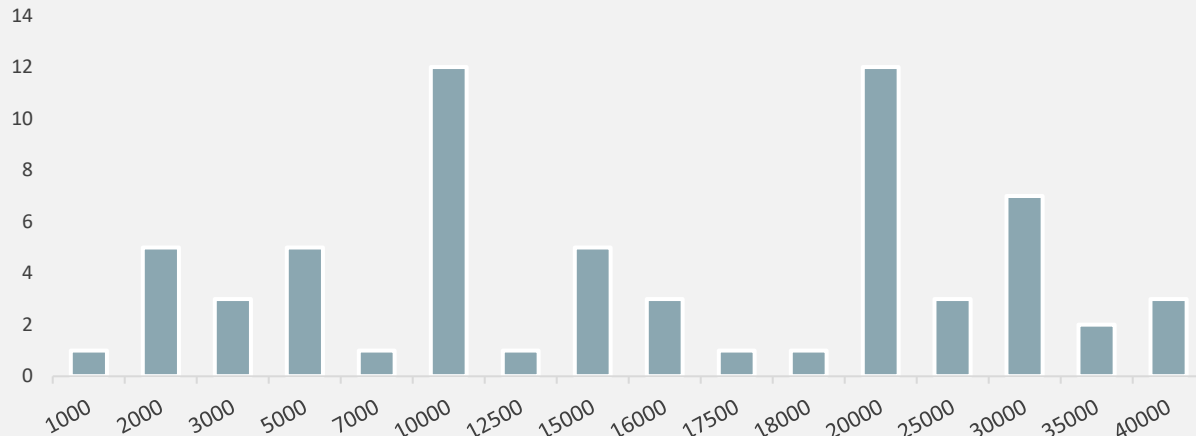
**100%**

Choose to pay instalments

How much are you willing to pay monthly?



What is the initial capital you are willing to pay.



Are you willing to show this solution to others?



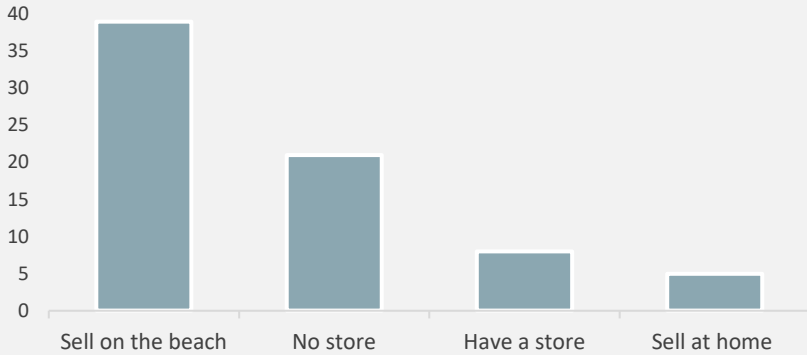
**100%**

Willing to demonstrate to others

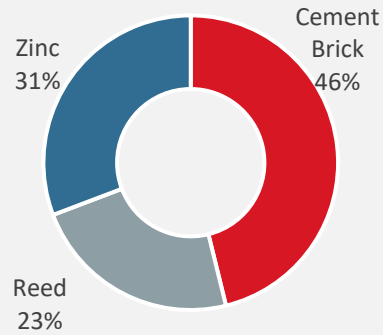
## Summary

- 53% of the respondents indicated that the main users of the freezer would be themselves and their family.
- All respondents who indicated that they are willing to buy the freezer, would rather pay in instalments.
- Most of the respondents demonstrated that they are willing to pay anywhere between 1,000 - 5,000 MZN per month.
- Potential consumers are willing to invest an initial capital between 10,000 – 20,000 MZN .
- All respondents who showed an interest in in the freezer, said that they are willing to show this solution to other people.

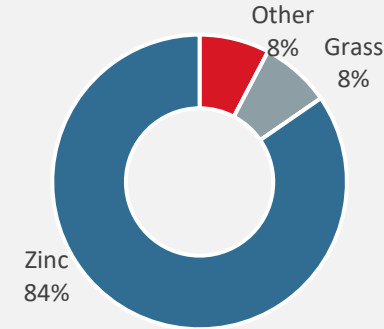
Do you have a store or do business at home?



If yes, what are the walls made of



If yes, what is the roof made of



## Summary

- 53% of the respondents indicated that they sell on the beach and do not have a physical store. Whereas, 18% either have a store or sell from their house.
- For the 18% who sell from either a store or their house indicated that 46% have walls made of cement bricks 31% have walls of Zinc and 23% of reed.
- Furthermore, 84% indicated that they have a roof made of Zinc, 8% grass and 8% of other material.
- From those who said that they have a store or sell on the beach, 60% of them indicated that there are robberies in their communities.
- Most respondents said that these robberies happen either a few times per year, or a few times per month.

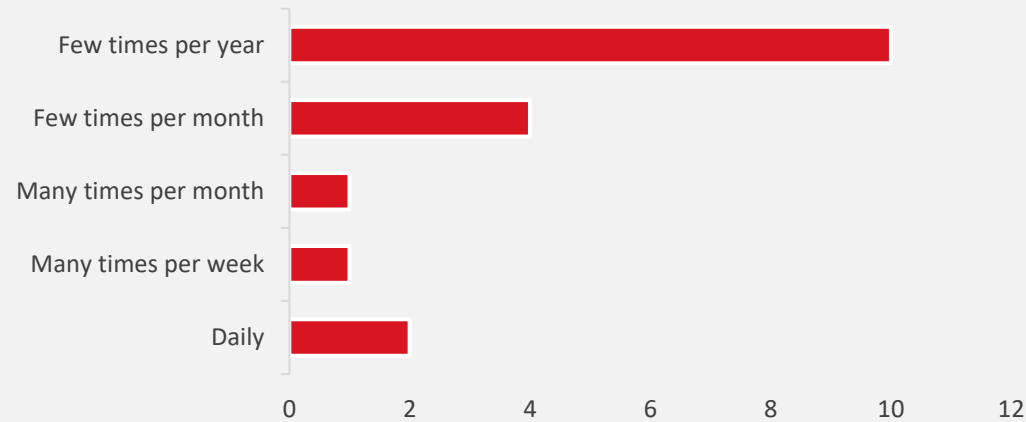
Are there any robberies?



**60%**

Said there are robberies

What is the frequency of robberies



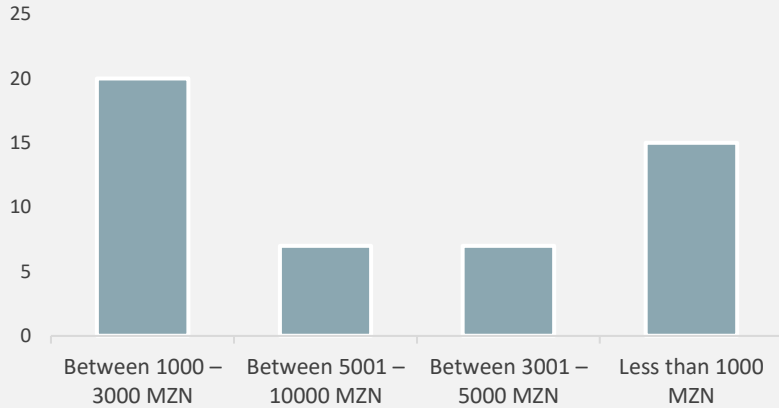
Are you part of savings group?



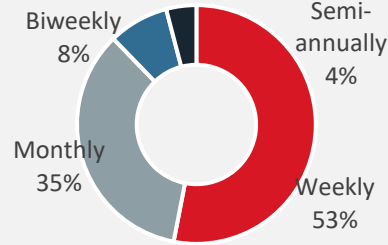
**67%**

Are part of savings group, the remainder are not.

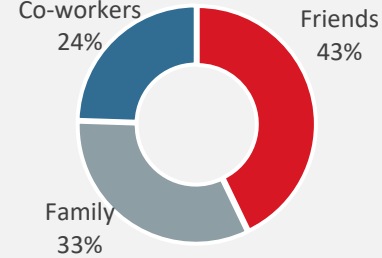
How much do you contribute



What is the frequency of meeting?



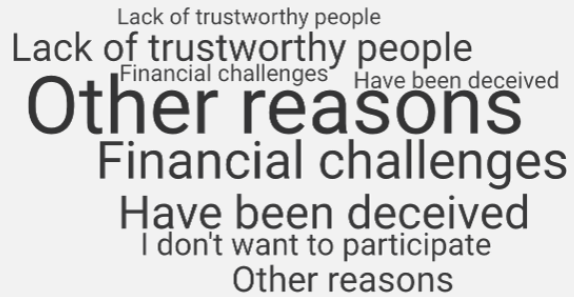
Who is part of it?



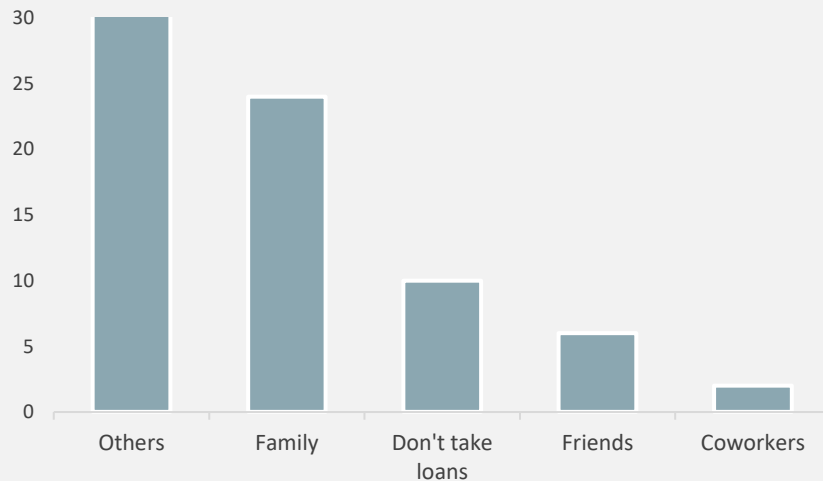
## Summary

- 67% of total respondents said they are part of a savings group, and the other 23% are not.
- From those who are part of the savings group, they contribute on average anywhere between 1,000– 3,000 MZN.
- Most of the savings group meetings either happen weekly or monthly, with only few happening biweekly or semi-annually.
- These savings groups are mostly made up of friends, family and co-workers.
- From the 23% of respondents who indicated that they are not part of a savings group listed financial challenges and deceit as the main reason of not being part of the group.
- The majority go to their family or other sources such as loan sharks or their friends when they are in need of money.
- 78% of the respondents indicated they have access to mobile money.

23% not part of savings group – reasons they don't participate



When you need money where do you go?



\*Others include loan sharks, owners, neighbours etc.

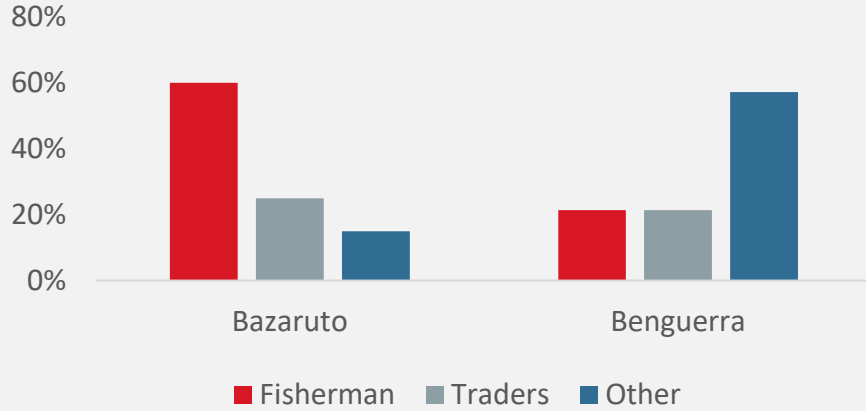
Mobile money users



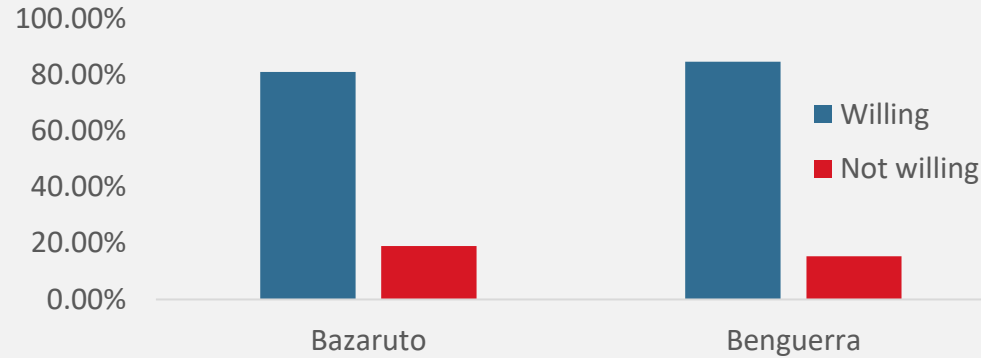
**78%**

Have access to mobile money

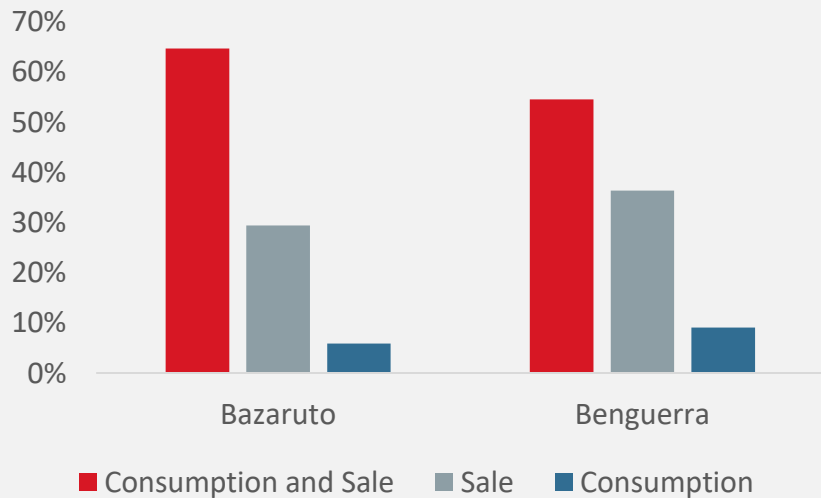
Occupation



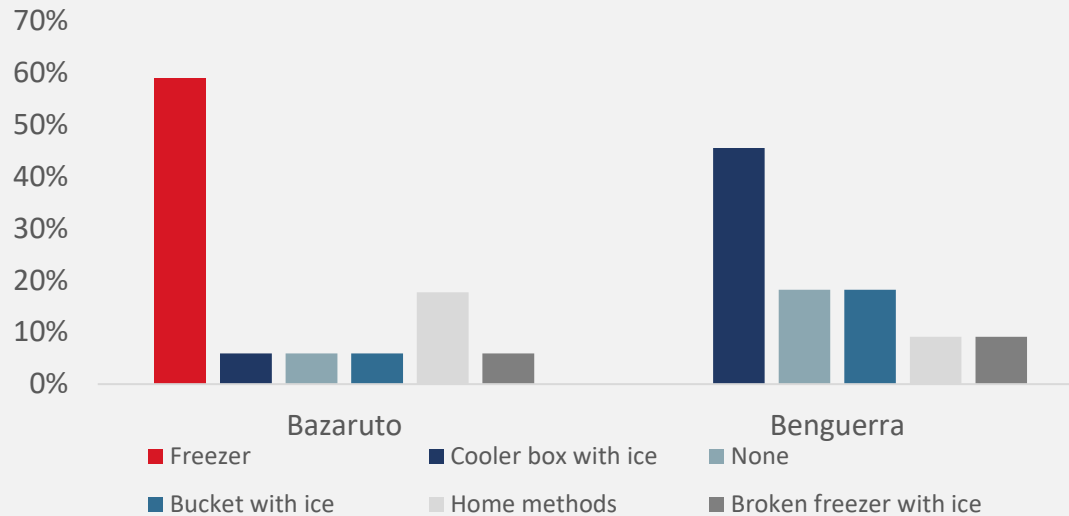
Willingness to pay the solution at market price



Purpose of storing products



Preservation methods for products



## Summary

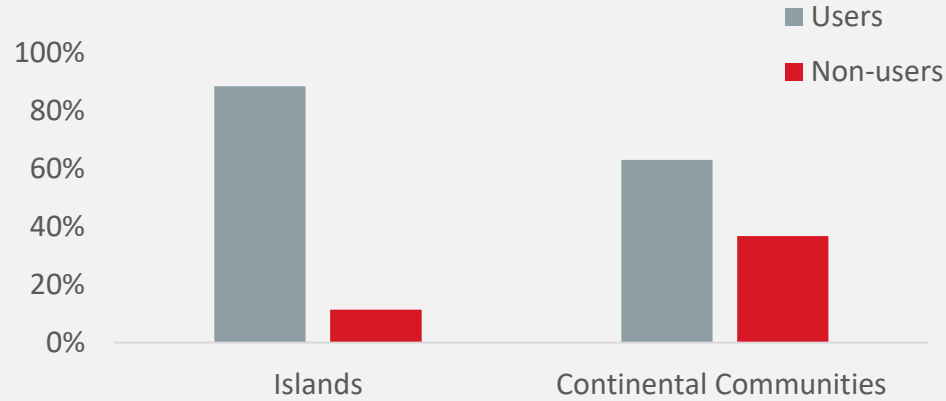
1. With regards to occupation, Bazaruto Island had more fishermen and traders while Benguerra Island had respondents with other occupations in addition to fishing.
2. On both islands, most of the respondents were comfortable with the market price. It is important to note that the respondents on Benguerra Island were proposed the initial market price while the respondents on Bazaruto were proposed the revised market price.
3. Both islands also demonstrated similarities with regards to the purpose of the conserved goods.

- On Bazaruto Island, most of the respondents use freezers, supplied by Anantara Resort (which uses generators to produce electricity), to conserve their goods. In return, the respondents sell their goods at a reduced cost to the Resort. It is important to note that this courtesy is not extended to all fishermen and traders on the island and that it is not a guaranteed deal. Therefore, this benefit can be taken away from them at any moment. On the other hand, Benguerra Island respondents rely on other methods which do not involve electricity.
- A key difference, amongst the islands, that was noted during the field visit was the advanced business mindset demonstrated on Bazaruto Island when compared to Benguerra Island. For instance, as the field team was explaining the project, a few of the respondents from Bazaruto expressed that they wanted to create a fishermen's cooperative, buy a few freezers and share the cost amongst each other. These same respondents also requested some help building a shelter for the freezers to be properly stored. It is believed that this mindset is resultant of their current access to freezers, which increases their awareness of the impact of a freezer on their income and livelihoods.
- Whereas, in Benguerra, the respondents had an idea of how impactful a freezer could be but a slight hesitance was sensed because they have never had access to a freezer.

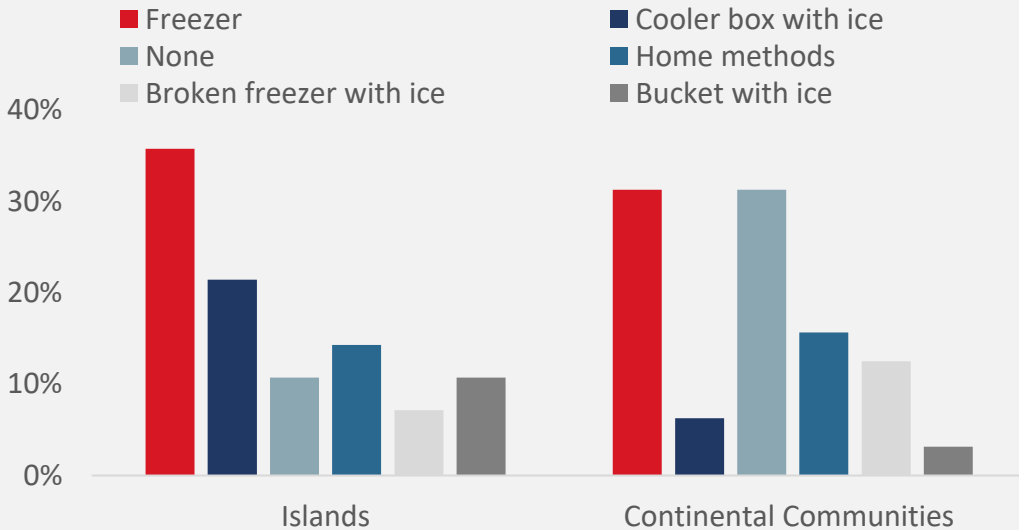
Employment



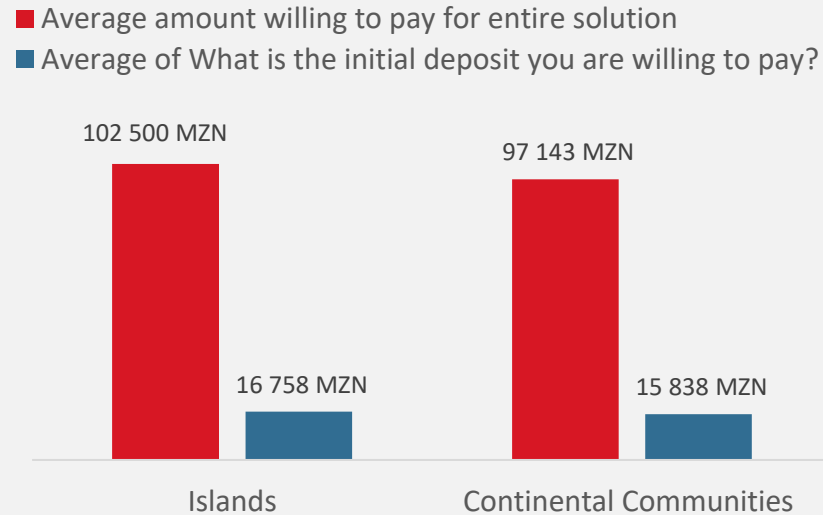
Solar home system users



Product preservation methods



Willingness to buy



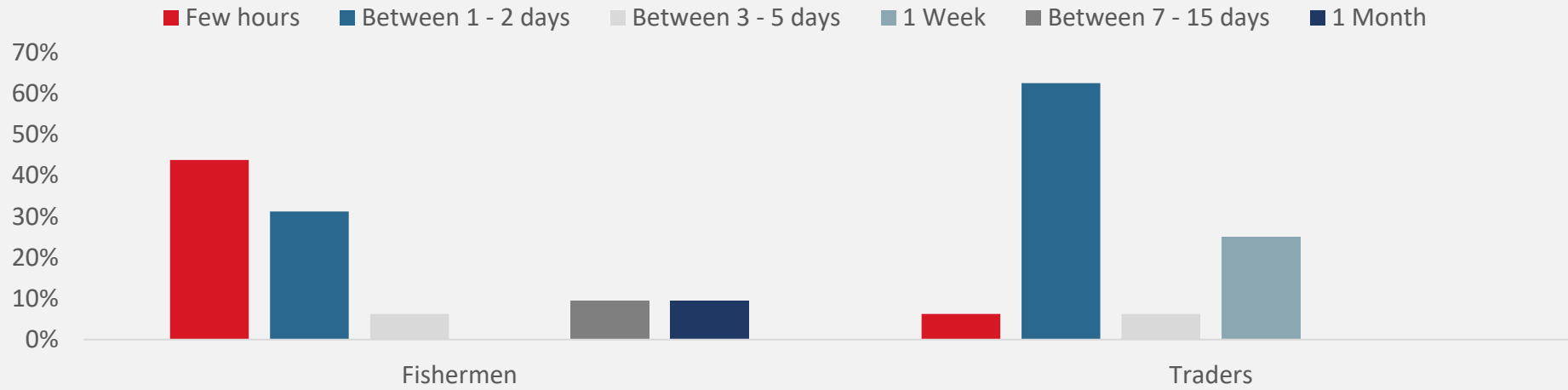
## Summary

1. On the islands there was almost an even number of self-employed and employed respondents and no unemployed respondents while on the continental communities there were more self-employed respondent and very little employed and unemployed respondents.
2. There were more respondents on the islands with SHS when compared to the continental communities. In fact, the SolarWorks! representatives mentioned that the island customers mostly purchase their bigger systems.

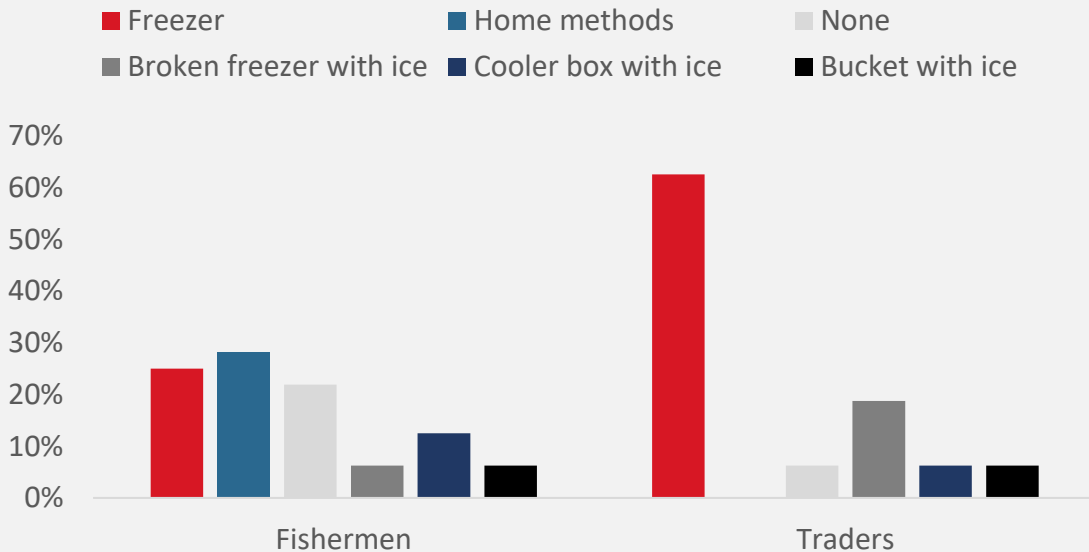


- The most used conservation equipment/methods used on the islands were freezers, cooler boxes with ice or buckets with ice while on the continental communities they commonly used freezer, home methods and broken freezers with ice. It is also important to note that a greater percentage of respondents on the continental communities do not use any method of conservation, when compared to the islands.
- On the islands the average once-off price the respondents were willing to pay was 120,500 MZN which is significantly higher than the average from the continental communities, of 97,143 MZN. Similarly, the continental communities' average deposit price of 15,838 MZN was slightly lower than the island's average, of 16,758 MZN.
- Another key difference that was sensed when comparing island communities to the continental communities was that there was a greater sense of necessity for the product on the islands because there is no access to grid electricity. Whereas in most continental communities, there were electrical transmission lines which, didn't directly provide them with electricity but, gave them a small sense of hope that eventually they will have electricity. This fact also affects their willingness to pay the presented market price because they have the possibility to compare the price of a regular freezer and perhaps opt to wait until the electrical supply line reaches their community to buy it since it is much cheaper.
- Aside from the accessibility to grid electricity, there was also the issue of access to clientele to sell their fish/seafood to seeing as the main method of transportation for the islands is by boat. For instance, on the island there is usually a boat to the mainland every other day. Conversely, in the continental communities, there are other options of transportation available which are often cheaper and more frequent.

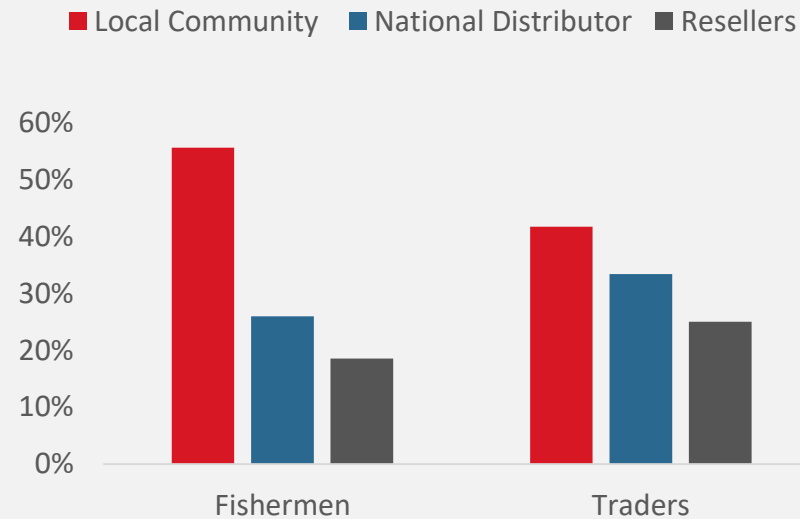
Duration for which products are preserved



Preservation methods for products



Whom do you sell to

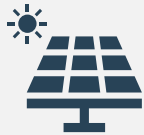


## Summary

1. Seafood traders normally take between 1/2 days up to a week to conserve their goods, while fishermen take between a few hours up to 1/2 days to conserve their goods, which is because the fishermen immediately sell to the traders and the traders have to sell to the fish distributors.
2. With regards to the conservation equipment/methods, the traders mostly use the freezer while the fishermen use the home methods.
3. When comparing whom the fishermen and traders sell to, the results are similar; however, the fishermen most notably sell within their local community while a higher percentage of trader sell to national distributors.

- Some key difference that were noted in the field between the traders and the fishermen were:
  - The traders had a more accelerated business mindset compared to the fishermen;
  - The traders had better economic and living conditions compared to the fishermen;
  - The traders had more difficulties when storing their goods when compared to the fishermen because, as mentioned in 1 of this section, the fishermen immediately sell their goods to the trader, the trader then has to find a distributor/reseller to buy their product.
  - The fishermen are currently at the mercy of the trader with regards to product pricing due to a lack of efficient product conservation.
  - The fishermen expressed a sense of uncertainty regarding how much fish/seafood they can catch and sell in a day because sometimes they can go out to sea and catch many fish while on other days they don't catch anything. They expressed that the freezer would really reduce that uncertainty and allow them to manage their sales better. They also expressed that the freezer would help them immensely during closed season, when only line fishing is permitted.
  - The traders expressed a similar sense of uncertainty regarding the conservation of all of the fish/seafood they purchase from the fishermen because sometimes there is a high demand for their products and other times there is low demand.
  - Both the traders and fishermen expressed that they are more interested in a freezer rather than a fridge because they want to freeze the fish/seafood and potentially make ice to use while their on the boats (in the case of the fishermen).
- Another key point that was noted on the field was that, although it is small, there is a dry fish market within the communities that would potentially be threatened with the introduction of the freezers.

## Solar Home System Users



**75%**

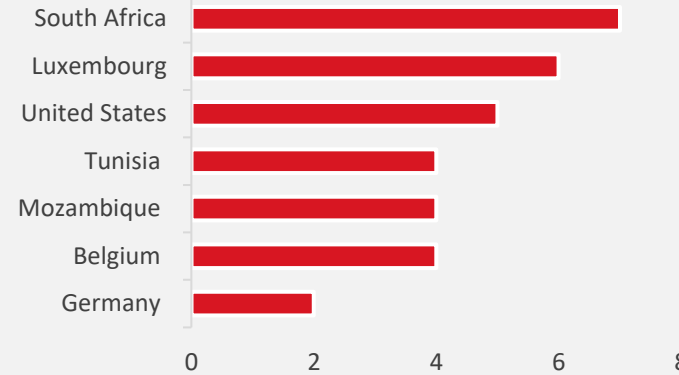
Respondents that have solar home systems

## Experience of SHS

Battery doesn't have a great capacity  
**I spend less money**  
**I had a good experience**  
**The SHS is not so good**  
 It is good, but it doesn't charge well in winter

## Global Brand Exposure

\*2021 Brand Exposure 1 Jan – 8 Jul 2021



## Summary

- 75% of the respondents indicated that they have a solar home system.
- The majority of the SHS users indicated that they had a good experience when using a SHS and that they spend less money.
- Only a few negative experiences were noted regarding the SHS's battery capacity and charging ability in winter.
- In terms of SolarWorks! Mozambique's 2021 global brand exposure it was interesting to see that the majority of the brand's mentions came from South Africa, Luxembourg and United States, mainly due to the following headlines:
  - Mozambique's seamstress who sews on a machine by SolarWorks!.
  - SolarWorks! and Power Africa fund 92 clinics in Sofala, Mozambique.

## Top mentions

Kris Peeters @peeters\_kris1  
LU | Jun 11 • 3:00 PM

RT @EIB: Meet Elisa: a #MozambiqueMz seamstress who sews on a machine powered by #SolarEnergy☀️. Thanks to **SolarWorks!** - a company supported by #TeamEurope & @giz\_gmbh - more households can benefit from #CleanEnergy. Discover this and more stories during #EDD21 t.co/D95EJrJYt3 t.co/dyKpdMXrpD

mozambique, Mozambique, SolarWorks

73.9k Reach Neutral ○

Afrik 21 - Jean Marie Takouleu , Jean Marie  
FR | May 20 • 1:47 PM

**MOZAMBIQUE: Funded by Power Africa, SolarWorks! solarizes 92 clinics in Sofala**

The United States Agency for International Development (USAID), which leads the Power Africa initiative, is providing SolarWorks! ... of solar photovoltaic systems in 92 health centres in the province. **SolarWorks! Mozambique** has been selected to carry out the work. In all

SolarWorks, Mozambique, MOZAMBIQUE

74.9k Reach Social Echo Neutral ○



# Limitations

Market Findings  
2021

Whilst in the field, the team faced the following challenges:

- Low adherence from women due to cultural restraints (not being allowed to speak without the husband's awareness/consent).
- Low fishermen/trader turn out due to:
  - Favorable weather - the fishermen would rather go out to sea instead of perform the interviews;
  - Difficulties contacting the community members or structures to set up the meeting for the interviews.
- The distance between the fishing communities as well as accessibility to those communities.
- A lack of authorization from local structures in the Dengoine community in Manjacaze district in Gaza province.

## Solutions

To mitigate these issues the team would:

- The enumerators would visit individual houses to find the specific fishermen/traders.
- When logistically possible, enumerators would wait until the fishermen would return from the sea to interview them.



# Recommendations

Market Findings  
2021

- Set up a show room on one of the Islands to showcase the freezer to the residents so they can have a better idea of the product.
- Manage the expectations of the communities who are aware that the freezers are coming because many communities mentioned that they've been waiting for this product from solar works for years.
- Lower the deposit price and increase the number of installments.
- Introduce workshops for fishermen and other productive use sectors to teach them how these refrigeration systems can impact their revenue streams and as a result impact their livelihoods.



# Conclusion

Market Findings  
2021

Based on the results from the survey as well as the behavior noticed in the field, the Sundanzer fridges/freezers, more so freezers than fridges, are highly desired by the off-grid fishing communities in Inhambane and Gaza provinces. Especially on the islands that have no access to grid electricity.

In addition, the results showed that the fishermen would potentially be more impacted by the introduction of these goods, seeing as they would be able to increase their sales and the cost of their goods.

The majority of respondents were comfortable with the presented market price but would prefer to pay a lower deposit, increase the number of installments and decrease the monthly payment amount.

This refrigeration system could not only aide the off-grid fishing communities with conserving their perishable goods, but it can also increase their revenue stream, which could raise their standard of living. Furthermore, other off-grid economic sectors could also be positively impacted by the introduction of this system.



Projected sales of main products in 2013



Distribution of market share among the major industry players



Distribution of market share among the major industry players: B & C and B & A. Total: 10% and 20% percent respectively. A further change in the economic situation in the market will be characterized by a more equal distribution of market share among players.

Solutions for a sustainable future can be defined through a number of pathways. Focusing on the balance between industry, environment, climate, and energy, may open opportunities for sustainable growth, creation of jobs, and innovative systems. Gaia offers tools and business analytics to help organizations with the right decisions at the right time.

We understand the data and its context. We are able to provide custom dashboards, visualizations, reports, charts and graphs that can help organizations make smart decisions. Our business intelligence unit is now supporting the energy and the environment and sustainability portfolios.

For more information contact us.

Projected sales of main products in 2013

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Maputo Mozambique

