



ECOCO



Universidad Veracruzana

Business Model
Innovation

Round
2

Universidad Veracruzana, Región Veracruz

Members: Irineo Ramírez María José
Lázaro González Karime Lisseth
León Antonio Montserrat
López López Jennifer Yaret
Rivera Juárez Giovanna Lizbeth

06 / 14 / 2024



A. Social Business Design

- A1. Social mantra one-liner

“Transforming coconut waste into sustainable goods while empowering communities for a greener and better future.”

What Ecoco is?

Ecoco was born in the state of Veracruz, Mexico. Veracruz is a highly touristic state due to its beaches, hot climate and gastronomy. The coconut is a fruit widely consumed by the inhabitants of the state because there are many palm trees, so it is very common to find coconut remains. This observation led to the idea of creating an enterprise using this abundant and sustainable raw material, producing 2 products:

1. Pots: made of coconut fiber and an organic paste.



2. Mosquito repellent: created with 70% coconut fiber and 30% wood sawdust, with citronella essence to repel mosquitoes.



How do we contribute to the Sustainable Development Goals of the 2030 agenda?



SDG 13 Climate Action: By making our products, we save coconut shells from ending up in landfills and dumps to be burned. In this way, we give them a second chance by turning them into sustainable items, mitigating coconut waste.

SDG 12 Responsible consumption and production: Our biodegradable products become substitutes for products that are very popular in the community, products that are harmful to the environment and to health. In addition, during Ecoco's production process, resources are optimized responsibly.

SDG 8: In two years, we will create jobs in the production process for women members of the Instituto Municipal de las Mujeres de Veracruz, an organization that helps women in vulnerable situations.

Misión	Visión
We are a company that collects discarded coconut shells, transforming them into products for daily use, creating a network of contributions to the environment and minimizing pollution.	In two years we will be a company that minimizes coconut fiber waste, creating sustainable products and generating jobs.

- **A2: Product/service presentation**

The production process begins with the collection of the raw material with our stakeholder, El Rey del Coco. Afterwards, we transport the discarded coconut shells to our production plant, where they are introduced into a shredding machine to obtain only the fiber, which will be mixed with a specific paste for each product. Finally, from the creation of this paste, the pot and repellent are molded, finalizing the process.

The pots have the size of 3x3 inches, are resistant and above all, by the properties of the coconut fiber helps the plants in their growth. On the other hand, we have the mosquito repellents, they are cone-shaped and have a height of 3 cm, which are created with different ingredients, but with the protagonism of 2: coconut fiber and citronella; citronella is an essence that due to its properties can repel mosquitoes, but the most important thing is that it is natural.

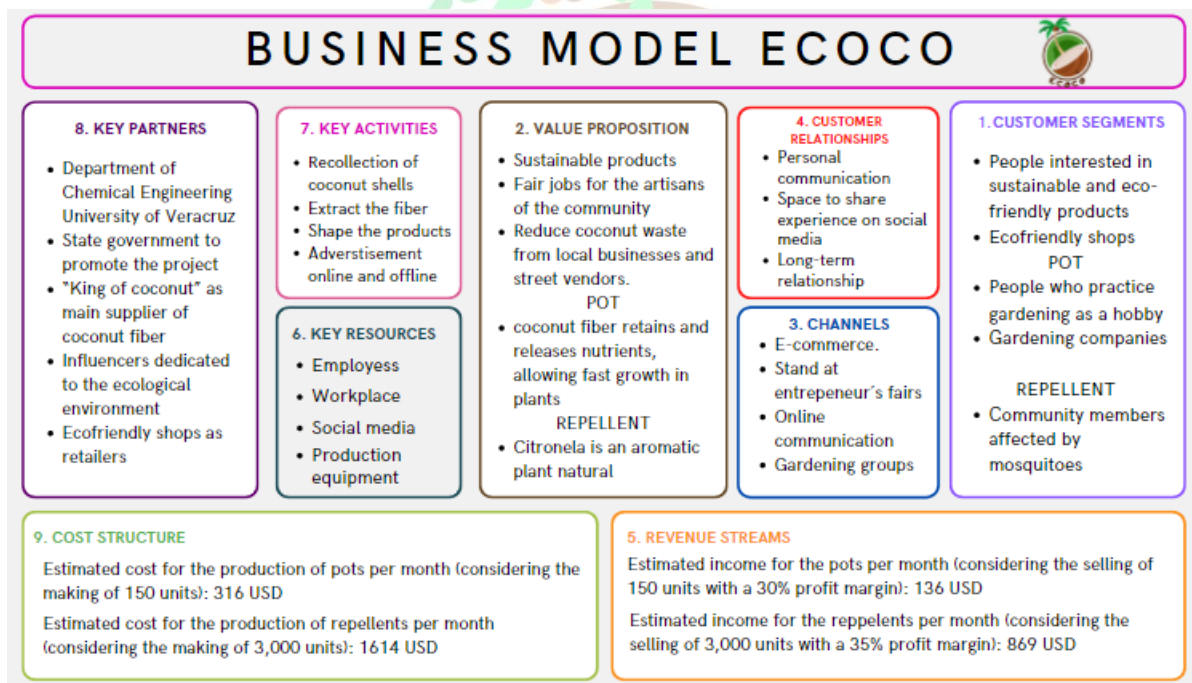
For both products, we created a small card where we describe step by step how to use our products, and some suggestions that we provide to the customer to know how to use our products.

How are the products used?

Pot	Repellent
<ol style="list-style-type: none"> 1. Have the plant we want ready. 2. Pour some soil or substrate to grow plants. 3. Place our plant in the pot. 4. Finish filling the pot with soil or substrate. 5. Finally add a little water. <p>Do not forget that this pot is only for external use.</p>	<p>To use the fly repellent we must light the tip with the help of a match until it starts to smoke a little and let it burn out.</p> <p>The repellent must be changed once burned.</p>

B. Business Model

- B1: Business Model Overview



- B2: Economic value for customers

Target Markets:

- **Gardening:** This market is made up of people who practice gardening, either as a hobby or professional horticulturists.



- **Environment:** People with an interest in the environment, looking for ecological and biodegradable products are considered.
- **Population affected by mosquito infestations:** People residing near rivers or lagoons, who are affected by the presence of mosquitoes and wish to maintain a clean, safe and pest-free environment, looking for natural and non-toxic solutions.
- **Ecofriendly shops:** Stores that aim to sell sustainable products

How do we create value for our pots customer?

A loyalty program to encourage consumers to purchase pots in greater volume.

- On the purchase of 3 packs of 10 pots, seeds of a plant of choice and soil will be given away.
- Conduct gardening workshops and events where instructions on how to use a coconut pot will be shared.
- Personalization of pots, in color, engravings and sizes.
- Constant contact with the customer to solve their doubts and provide instructions for use.

In this point, it is important to mention that fibercoco pots are not new in the market, but at least in Veracruz these kind of pots were not well-known. Of a sample of 85 persons, 84% expressed they hadn't heard about pots made of coconut fiber, 88% consider themselves as persons interested in ecological and sustainable products and finally, 80% said it's too probably to they buy a coconut fiber pot, considering its benefits.

Our last potential customer segment is made up of outdoor tourist destinations, where mosquitoes are present at nightfall. To this end, we must take into account the magnitude of the social and health problem caused by mosquitoes.

The mosquito represents a threat to half of the world's population. The World Health Organization (WHO) estimates that 725,000 people die each year from mosquito-borne diseases.

According to the Pan American Health Organization, the diseases that threaten the health of 1 out of every 2 people in the Americas are: dengue, malaria and yellow fever. Chikungunya, lymphatic filariasis and West Nile virus.

Some data regarding the diseases transmitted by mosquitoes are also presented in relation to the Texas Department of State Health Services and the Pan American Health Organization:

1. Chikungunya

This disease is caused by the chikungunya virus, which is generally found in tropical and subtropical areas. Most cases in the United States occur in travelers and immigrants returning from countries where local transmission of the disease is common. The virus is spread by mosquitoes that are most active during the day, but may also be active at night. The same mosquitoes that transmit chikungunya can also transmit Zika and dengue viruses.

As of March 2014, it spread to Anguilla, British Virgin Islands, Dominica, French Guiana, Guadeloupe, Martinique, St. Barthelemy, St. Martin (French part) and St. Martin (Dutch part). Aruba reported only one imported case.

2. Dengue

Dengue and the *Aedes Aegypti* mosquito are present throughout the continent except in Canada and continental Chile. There are no cases in Uruguay, but there are mosquitoes.

The four dengue viruses are transmitted by mosquitoes that are most active during the day, but can also be active at night. These same mosquitoes can also transmit Zika and chikungunya viruses. Dengue is not transmitted from person to person, and pets and livestock do not become ill after becoming infected with dengue.

Severe dengue has life-threatening complications. There is no vaccine to prevent the disease and no specific drug to treat dengue. If someone suspects they have dengue, they should take pain relievers containing acetaminophen and avoid taking those containing ibuprofen or aspirin.

3. Eastern Equine Encephalitis (EEE)

Eastern equine encephalitis (EEE) is a viral disease transmitted through the bite of an infected mosquito. The virus is closely related to western equine encephalitis and Venezuelan equine encephalitis viruses.

EEE symptoms:

- Fever

- Chills
- Joint and muscle aches and pains.

The disease may worsen and cause:

- Headache
- Vomiting
- Diarrhea
- Disorientation
- Convulsions
- Coma

EEE is one of the most serious mosquito-borne diseases in the United States, with a mortality rate of approximately 33% and significant brain damage in most survivors.

4. Malaria

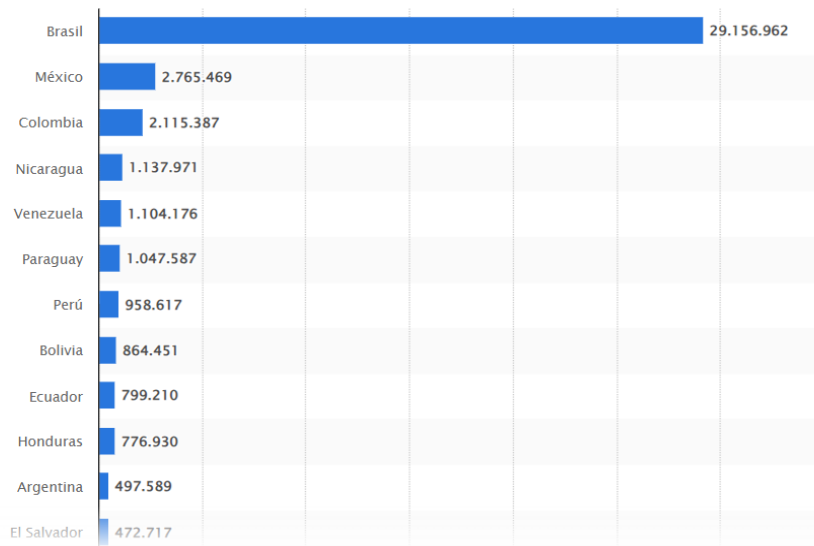
Malaria, transmitted by mosquitoes, is a serious and sometimes fatal disease. It is caused by the spread of parasites by infected mosquitoes. About 1,700 cases of malaria are diagnosed each year in the United States. Present in 21 countries in the Americas.

Síntomas de la malaria

5. Zika


Zika virus is spread to humans primarily through the bite of certain types of mosquitoes. Most cases in the United States occur in travelers and immigrants returning from tropical and subtropical countries where local transmission is common.

Ranking of the 20 Latin American countries with the highest number of dengue cases reported from 1980 to March 2024.



Statista, 2024.

Dengue cases by state in week 31



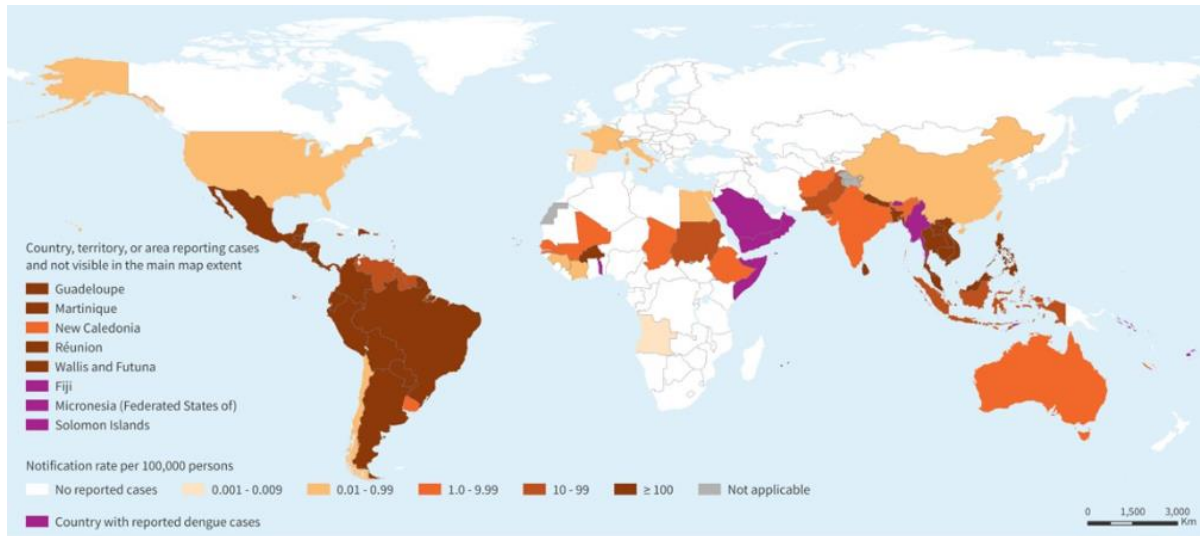
ESTADO	DNG	DCSA	DG	TOTAL
QUINTANA ROO	950	811	45	1,806
YUCATÁN	651	705	36	1,392
MORELOS	269	353	27	649
VERACRUZ	1,065	405	28	1,498
GUERRERO	131	263	23	417
PUEBLA	501	195	22	718
COLIMA	35	50	1	86
OAXACA	200	222	18	440
TABASCO	155	82	10	247
CHIAPAS	235	233	20	488
CAMPECHE	42	24	0	66
SAN LUIS POTOSÍ	84	3	0	87
SINALOA	40	27	3	70
MICHOACÁN	57	32	2	91
BAJA CALIFORNIA SUR	8	2	5	15
NAYARIT	10	11	2	23
TAMAULIPAS	34	15	0	49
HIDALGO	27	2	2	31
GUANAJUATO	45	1	0	46
JALISCO	19	18	1	38
NUEVO LEÓN	10	5	2	17
SONORA	1	7	1	9
DURANGO	2	1	0	3
COAHUILA	2	0	1	3
MÉXICO	1	1	0	2
AGUASCALIENTES	0	0	0	0
BAJA CALIFORNIA	0	0	0	0
CHIHUAHUA	0	0	0	0
CD MÉXICO	0	0	0	0
QUERÉTARO	0	0	0	0
TLAXCALA	0	0	0	0
ZACATECAS	0	0	0	0
TOTAL	4,574	3,468	249	8,291

(National

Committee for Epidemiological Surveillance).

Countries, territories and areas reporting
November 2022

to autochthonous dengue cases from
November 2023).



(World Health Organization, 2023).

Why choose Ecoco over other mosquito repellent brands?

Ecoco Repelente is natural, as our product is composed of strong, dry filaments from coconuts that are discarded by mass production in Veracruz. We know that the location of Veracruz influences the sale and distribution of coconut by-products, leaving aside its waste.

However, what are the benefits of Ecoco Repellent? They are listed below:

- **Natural:** As mentioned above, the repeller is made of 95% dry coconut fiber (brown color), it does not contain substances harmful to health when inhaled. On the contrary, the repeller is combined with citronella which is a natural insecticide, from the said plant.
- **Size/presentation:** It is more practical, the other presentations of other repellents or repellents are spacious in bags, or spaces inside homes, as well as they are also very flammable since at least the aerosol ones, cannot be exposed to the sun, but our repeller can. In small and compact, it is easy to use and does not give off unpleasant odors.

- Chemical compositions:

- Raidolito:

Morelia, Michoacán, July 9, 2017.- The Ministry of Health of Michoacán (SSM), through the State Commission for the Protection against Health Risks (Coepri), calls on the population to prevent intoxications from the improper use of mosquito repellent inserts, as they can cause chronic damage such as allergies and pneumonia.

In addition to being toxic, many of these substances are persistent and bioaccumulative and are a cause of major concern due to their high negative impact on human health and the environment. Therefore, when you apply an insecticide to kill flies, ants, spiders, cockroaches or other insects in your home, you are using some type of poison.

Among the most commonly used insecticides to prevent mosquito bites are the igniting coils known as raidolites, whose health damage is compounded when they are routinely used in enclosed rooms and to "protect" children and adults from mosquitoes. The active ingredients in raidolites and most household insecticides are pyrethroids, toxic substances that harm health and the environment.

- **Effectiveness:** The contrast between the effectiveness of citronella and other repellents such as DEET is a wide margin, however, they all involve chemical processes that can be counterproductive in the long run. For example, it is recommended that it not be applied more than once a day, as well as other recommendations for use by children.
- **Duration:** Everything will depend on the size, it works like an incense, only the smell it gives off is to scare away.

- Biodegradable

Thanks to you buying these incenses, we collect more coconut shells!

Why do we use citronella? What other plants work as repellents?



Citronella is a plant from Sri Lanka and India, characterized by its strong lemon scent. It is known for its ability to repel mosquitoes due to its high content of natural compounds such as citronellal, caryophyllene and geraniol, natural insect repellent agents. When mosquitoes approach the citronella plant, they perceive its scent and react negatively to the compounds in the oils. Whether in candles, sprays or bracelets, citronella keeps mosquitoes away, in fact; according to Gran Farma, 2023, mosquitoes can perceive the scent at a distance of 50 meters. Notably, citronellal interferes with the mosquitoes' nervous system and receptor cells, causing a reaction to stay away.

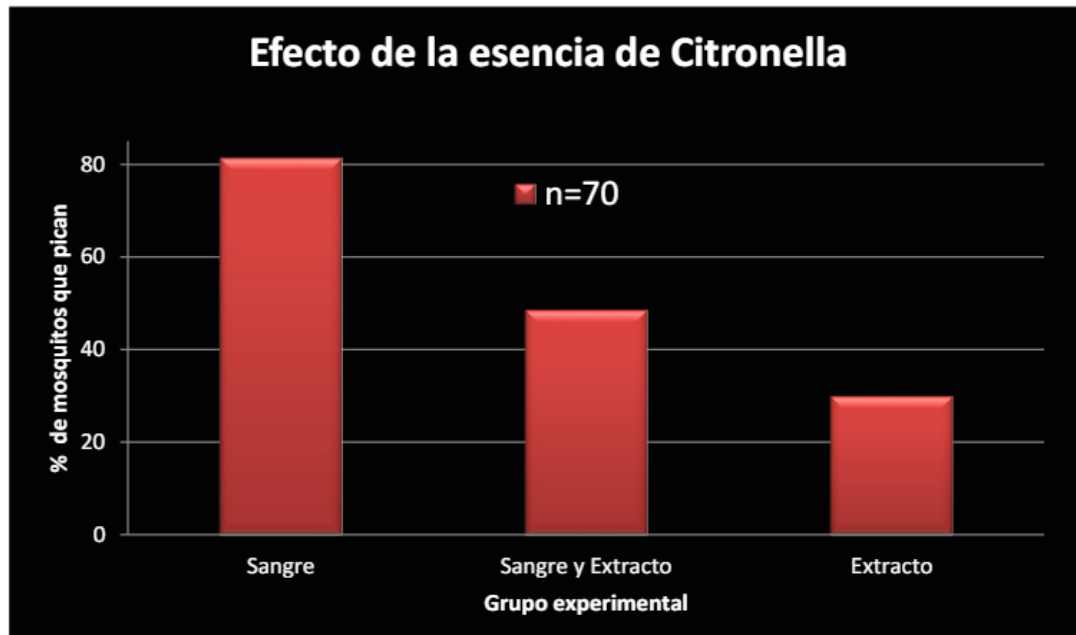
The scent of citronella works by masking other odors that are attractive to insects and thus the insect does not approach (Marnys, 2022).

A research conducted by students of the Universidad del Valle de Mexico, and published by UNAM, showed that citronella has a repellent effect in the extract, conducting an experiment with 210 mosquitoes, dividing them into 3 experimental groups, keeping them in three plastic bottles with cotton balls, one impregnated with fresh beef blood, another impregnated with blood and citronella extract and finally, a cotton ball with only extract.



(Marnys, 2022).

A research conducted by students of the Universidad del Valle de Mexico, and published by UNAM, demonstrated that citronella has a repellent effect in the extract, conducting an experiment with 210 mosquitoes, dividing them into 3 experimental groups, keeping them in three plastic bottles with cotton balls, one impregnated with fresh beef blood, another impregnated with blood and citronella extract and finally, a cotton ball with only the extract.



Explanation: 81% of 70 mosquitoes bit the blood cotton for feeding, of the second group, 49% of the sample bit the cotton with blood and citronella extract, finally, 30% of the sample approached the citronella cotton.

The use of insect repellent plants has long been documented by various cultures. Plants such as citronella, basil and clove are approved mosquito repellents. The use of natural repellents is an economical and above all safe option compared to chemical repellents. In addition to being environmentally friendly, citronella oil has shown similar efficacy to chemical repellents (Mechaca-Armenta, I., 2020).

Espe cie	Nombre común	Familia
<i>Cymbopogon citratus</i>	Té limón	Poaceae
<i>C. nardus</i>	Citronela	
<i>Curcuma aromatica</i>	Cúrcuma aromática	Zingiberaceae
<i>Pogostemon cablin</i>	Pachulí	Lamiaceae
<i>Ocimum americanum</i>	Albahaca	
<i>Syzygium aromaticum</i>	Clavo	Myrtaceae

Plants with mosquito repellent action. (Tisgratog, 2016).

- B3: Target Social Impacts

Repellent Social Impact

Recent studies suggest that in some Latin American countries, such as Mexico, Peru, Paraguay, Ecuador and Bolivia, rural transmission of dengue fever occurs (Connors R. Road access linked to dengue fever risk in rural Ecuador. ASTMH 57th Annual Meeting, New Orleans, December 7-11, 2008) (24-28). In Colombia, according to a study carried out in Urabá (Antioquia), 17.2% of the cases came from rural areas (29) and, according to the National Institute of Health, 9.6% and 10.7% of the cases of dengue and severe dengue fever registered in the country are from rural areas (30).

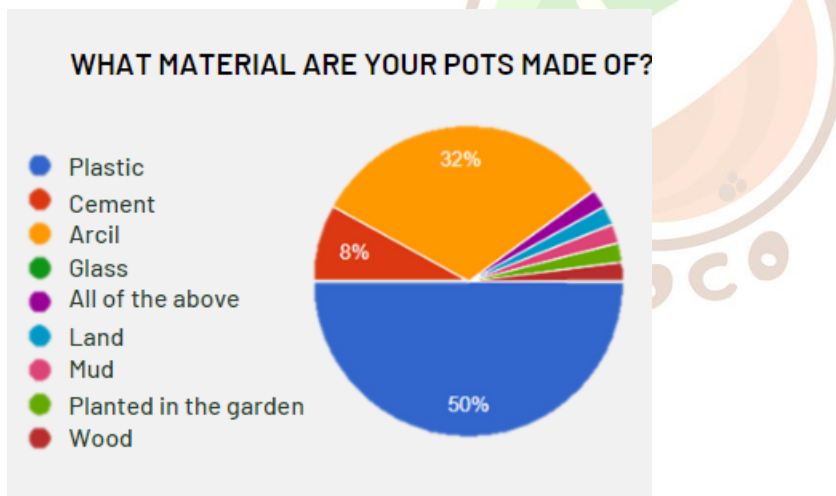
Continuing with some of the problems that have arisen, we have the incidence of dengue cases in Mexico, which according to Forbes have increased 468% annually, this problem is serious due to the places where it occurs (as well as the situation of the same), and the changes in temperatures with which we have been affected in recent times.

Almost always in rural communities of difficult access is where there is more probability of mosquito proliferation and more when no actions are taken from the public level, which leads to a rise in cases, and that people acquire "raidolitos" or other products, and mistakenly are used for a long time and in many cases indoors, which as we have seen, can bring some reactions in the short term, or lead to the development of some diseases in the long term.

It is for all these reasons that as a team we propose the development of mosquito repellents that are 100% organic, that have no impact on the health of the consumer and that are environmentally friendly. Therefore, we propose the production of these repellents from coconut fiber by adding some natural components that help to repel mosquitoes.

In addition to this, we propose to carry out regular campaigns to inform the population about the benefits of this product, its impact, its use and the correct way to dispose of it, and above all, sharing information that will help to prevent diseases caused by mosquito bites.

Pots



As we can see in the result, out of 85 people, 50% mentioned that they mostly have plastic pots.

According to what we consulted on the website of Barin, a Spanish company dedicated to the aspiration of toxic gases, we found that "polypropylene is a plastic that is safe until it is heated or excessively heated or melted because it decomposes and can not only contaminate what is in

contact with it (for example, food) but can

also generate small toxic particles very dangerous if they come into contact with our skin or if they end up in our eyes".

Another very common problem is that, being a type of plastic, it tends to be a waste that we can find in many places, and this in turn brings problems, from direct contamination of ecosystems, damage to wildlife by consuming some plastics, in some cities and even rural communities there are problems of flooding in rainy seasons due to the excess of these materials that are often discarded without any precaution. As mentioned in the article on the Coplastic website, "it is important to note that polypropylene is difficult to degrade, which can pose environmental problems if it is not properly managed. Although it can be recycled, not all recycling systems accept polypropylene and its decomposition in landfills can take hundreds of years." Following this information, we must remember that many times all this waste reaches bodies of water that in turn lead to rivers or even the sea, which again has havoc on the flora and fauna of the ecosystem.

- **B4: Feasibility**

Mosquito repellent

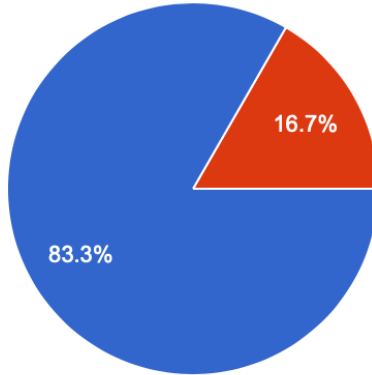
Our first step has been to conduct a market study that would allow us to know the knowledge and trend about sustainable products, and through some instruments applied, mainly through surveys, we could observe that there are people who do seek to acquire products that are more respectful with the environment. In 2023 Mercado Libre published a study entitled "Online consumption trends with positive impact", which shows that at least in e-commerce the demand for sustainable and ethical products has increased, in this scenario, Mexico is one of the main consumers.

From the total number of surveys about the mosquito repellent made from coconut fiber, we found that at least in Veracruz and according to the documentary research, in other places, the problem of mosquitoes is very common, and for some it is a problem they live with daily, and to combat it they use products such as repellent spray or raidolitos. Some of the answers that are closely related to the problems we are trying to diminish are the effects produced by this kind of products, which produce almost immediate reactions, but have negative results in the long term.

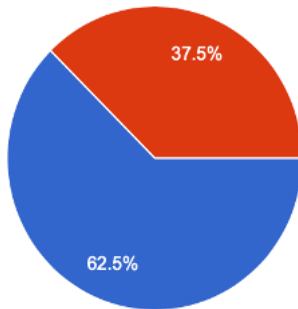
Some of the questions that allowed us to measure the trend of environmentally friendly products, we obtained that:

measure the trend of environmentally

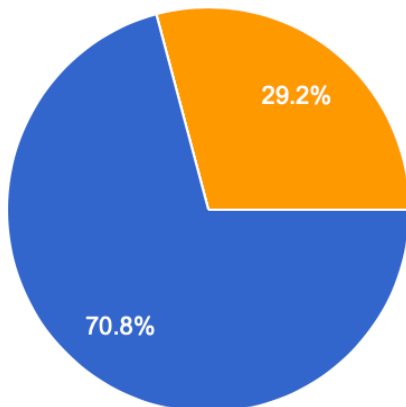
83.3 % of the respondents are interested in sustainable and ecological products:



While 62.5% already buy biodegradable products as shown:



Likewise, 70.8% of those surveyed stated that they would like to purchase our mosquito repeller, the remaining 29.2% would consider purchasing a natural product:



Our project is built on 4 fundamental pillars:

- Ability to address a problem
- Potential alliances
- Transparent communication from our work team to our clients.
- Ability to measure our results

Ability to address a problem

At Ecoco we address three problems:

- The burning of coconut shells.
- The use of pots made of materials that are highly contaminating
- Diseases transmitted by mosquitoes

To reduce the impact of these problems, Ecoco decided to produce our two main products, flower pots and mosquito repellents made from coconut fiber extracted from discarded coconut waste.

Potential alliances

We have been in contact with some companies that sell plants or products related to gardening, as well as with some nurseries in the area to see if they would be willing to offer our products, with a positive response.

Transparent communication from our work team to our customers.

This part is a very important point to consolidate ourselves as a business that truly seeks to generate an impact, implementing this mission through stages in which we always have measured results, betting on a growth that allows us to achieve the attack to the different problems.

Ability to measure our results

For any project it is very important the implementation of performance indicators that allow us to know the results we are obtaining and we can measure them in the periodicity that we consider optimal, the indicators that we consider essential in our case are the following:

Salvage of discarded coconut fiber = $(\text{Discarded fiber} / \text{Fiber used in production}) \times 100$

Sales growth based on our two products = $(\text{Total monthly sales} / \text{Previous month sales}) \times 100$

Customer satisfaction = $(\text{Total number of customers} / \text{Satisfied customers}) \times 100$

Ecoco's participation with the community = $(\text{Activities} - \text{Fairs carried out based on environmental issues} / \text{Ecoco's participation}) \times 100$

Cost optimization, which allows for better production planning (this indicator seeks to compare costs based on product demand and thus develop better production plans, as well as to review the various areas of our project to know where improvements can be made in relation to costs).

Recognition or awards obtained by the project (this indicator gives Ecoco a better perception among consumers).

Operational feasibility

The two products produced have simple manufacturing processes, with a common step being the shredding and shredding of the coconut fiber, which will be done using a special machine, thus saving time, reducing labor costs and producing more products in less time.

After this step, the process that requires both the pot and the shooter is oriented towards a traditional production, this combined with the fact that our raw material is easily accessible, which allows us to meet the contemplated production.

- **B5: Profitability**

Our breakeven point counting our selling price, variable and fixed costs is 74 pots and 399 repellents.

According to our calculations, the monthly cost of producing 150 pots will be 316 dollars and 1,614 dollars for 3,000 repellents.

Our monthly profits for selling 150 pots and 3,000 repellents is 1,004 dollars.

Because we are a business that is starting, our production and profits are small, however we expect to grow in the future in production and revenues.

- B6: ESG Integration

Environmental Impact

- Our production is based on the use of coconut fiber, a natural and renewable material, contributing to the reduction of waste, minimizing environmental impact. Likewise, we contribute to give a second use to the raw material that is usually discarded and even burned.
- Ecoco mosquito repellents serve as an ecological alternative to chemical products, protecting local biodiversity and reducing the negative impact on the environment.
- Likewise, the pot acts as an alternative to moderate dependence on plastic pots, being so because they are economical and reusable.
- For one pot we are rescuing 1 coconut that could end up being discarded, and within 2 coconut shells 40 repellents are created.



Social Impact

- Future collaboration with the Municipal Institute of Women to provide employment opportunities for women in vulnerable situations (women who have been raped, single mothers, etc.), offering safe and fulfilling work spaces.
- The realization of a workshop in June-July in order to train IMMUVER women, with the objective of promoting their growth and economic self-sufficiency.
- Delivering school lectures promoting our project and ecological products, disseminating their benefits and positive impact on the environment, so that viewers become interested in substituting their usual products for ours, being natural and biodegradable.
- We contribute to mitigate cases of dengue-borne diseases, such as dengue and chikungunya.



Governance

- Transparency policies in the production process.
- Effort in the dedication to maintain constant and direct communication with our stakeholders and future investors.
- Warranty policies for both product lines.
- Collaboration with SEDEMA (Secretaría de Medio Ambiente) to promote our Project.



C. Business model validation

C.1 Crowdfunding/crowdsourcing campaign

For our Crowdsourcing Campaign we met with Lic. Alejandro Díaz, he is a financial advisor and economist, who is interested in our project thanks to the dissemination on social networks and

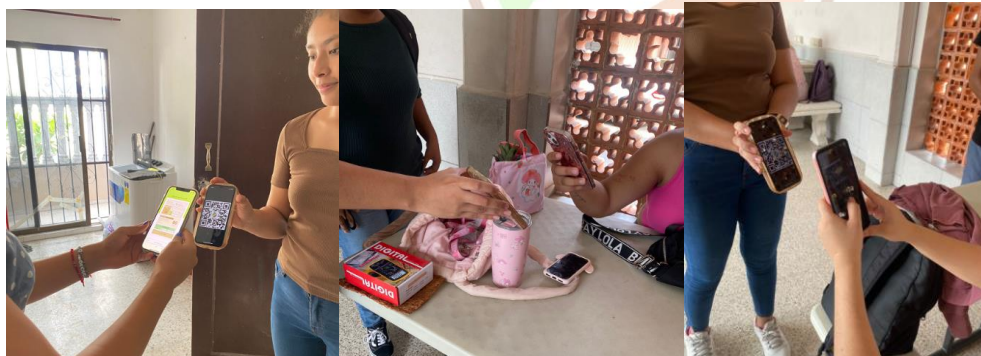


sample of the business model. He gave us improvement in the development of the cost structure.

suggestions on the business model and



In the other hand, for our online Crowdfunding campaign, we met with students from the Faculty of Administration for a short presentation talking about Ecoco and how it plans to develop products which have a social and environmental impact. On the other hand, we share an infographic with neighbors, students and the general public to publicize Ecoco



In our offline Crowdsourcing campaign, we gave a conference with our classmates to talk about the benefits of our Project.



C.2 Learning curve

Jennifer Yaret López López

The learning of round 2 has been satisfactory, understanding an environmental problem from the root in order to solve other social problems motivates me to continue promoting our Ecoco project.

Likewise, I learned the importance of stakeholders and how they add to our Ecoco project thanks to their career and experience in different areas.

María José Irineo Ramírez



This second round helped me a lot to learn about the benefits of citronella, the different places where there are diseases that are transmitted by mosquito bites, as well as taking into account the rates of people who are affected by these diseases. On the other hand, it allowed me to see how our products can help society and the environment.

Giovanna Rivera

Round two taught me how important it is to take into account the elaboration of a market study. Visualizing the opinions and suggestions of our potential clients clarified many ideas for executing the project.

Karime Lázaro

In this round I was able to understand how social businesses' business models seek for all economic, social and environmental value, and we were able to really print that on Ecoco. Also, our project had a huge branding and product growth since problem-solving abilities and experimentation has been something that's been improved in this round.

Montserrat León

Working on cost and revenues was a challenging experience. My learning curve was acquiring skills to determine the different costs and expenses we incurred to realize our products, allowing me to improve my ability to perform the Ecoco financial analysis.

Referencias

BBC News Mundo. (2016). 6 cosas que quizás no sabías sobre los mosquitos, la especie más mortífera del planeta.

<https://www.bbc.com/mundo/noticias-36527829#:~:text=El%20mosquito%20representa%20una%20amenaza,de%20475.000%20muertes%20a%20a%C3%B1o.>

OPS/OMS | Organización Panamericana de la Salud. (s. f.). Diez enfermedades transmitidas por vectores que ponen en riesgo a la población de las Américas. <https://www.paho.org/es/noticias/7-4-2014-diez-enfermedades-transmitidas-por-vectores-que-ponen-riesgo-poblacion-america#:~:text=Leishmaniasis%2C%20esquistosomiasis%20y%20fiebre%20amarilla,2%20personas%20en%20las%20Am%C3%A9ricas.>

Statista (abril. 2024). *Ranking de los 20 países de América Latina con mayor número de casos de dengue reportados desde 1980 hasta marzo de 2024.* <https://es.statista.com/estadisticas/1377218/ranking-de-paises-con-mas-infecciones-por-dengue/>

Tapia, A. (11 de agosto de 2023). *Se triplican los casos de dengue en México: ¿cuáles son los estados más afectados?* Infobae. <https://www.infobae.com/mexico/2023/08/11/se-triplican-los-casos-de-dengue-en-mexico-cuales-son-los-estados-mas-afectados/#:~:text=Por%20entidad%20federativa%20se%20tiene,se%20queda%20con%20649%20casos.>

Texas Department of State Health Services. (s. f.). | Enfermedades transmitidas por mosquitos <https://www.dshs.texas.gov/es/mosquito-borne-diseases/list-mosquito-borne-diseases>

Moctezuma, S., Rojas, C., Torres, O., & Valencia, K. (2013). *LA CITRONELLA CYMBOPOGON NARDUS FUNCIONA COMO PERFUME ANTIMOSQUITOS.* UNAM, Dirección General de Incorporación y Revalidación de Estudios. <https://vinculacion.dgire.unam.mx/vinculacion-1/Congreso-Trabajos-pagina/PDF/Congreso-Estudiantil-2014/Proyectos-2014-Area/Ciencias-Biologicas/biologia/1.8%20CIN2014A10213.pdf>

<https://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2011.02781.x#b10>

mm

<https://s-salud.hidalgo.gob.mx/contenido/informacion/gaceta/2020/4Repelentes.Gaceta-2020.pdf>