Solving the problem of economic insecurity among Nicaraguan farmers.

Robyn Thompson
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I. Executive Summary

Nicaragua is the second poorest country in the Western Hemisphere and 76% of Nicaraguans live on less than $2 per day. 48% of Nicaraguans live in rural areas and farm for a living.

Most farmers in Nicaragua own small farms and are subject to volatile market price fluctuations on crops. Because most farmers do not have access to reliable and affordable storage for their crops throughout the year, they are forced to sell their crops immediately after harvest time when the market is flooded and the price is lowest.

Depósito de Confianza offers community-based silos for grain storage to farmers in rural communities. After immediately selling the crop that they need for cash, farmers bring their red beans, which experience market fluctuations of an average of 21% throughout a season, to the silos at harvest time. Beans are graded using traditional low-cost methods and farmers receive a receipt of their deposit from the local manager. Depósito de Confianza provides market data knowledge of past annual prices to farmers as well as current prices to encourage farmers to independently sell their beans right before the next harvest when the price is highest. Once farmers sell their crop, they will give 5% of the sale price to Depósito de Confianza to pay for the storage.

An initial investment of $6,000 will fund a year-long pilot program in the village of La Trinidad outside of San Isidro, Nicaragua. If this pilot is successful, earnings will be reinvested to help Depósito de Confianza expand to 12 rural communities around Managua, Nicaragua in the following year. Depósito de Confianza will allow farmers to get better prices for their crops, increase income security, and promote a better quality of life for Nicaraguan farmers.
II. The Story of Carlos

Carlos, along with his wife and four children, owns a 120 acre transitional farm in San Isidro, Nicaragua. He has 15 farmhands and limited access to credit. Carlos, like the majority of the 111,000 transitional farmers in Nicaragua, does not belong to a producer’s organization or have much access to technological assistance although he does have access to water. Carlos harvests 17,637 pounds of maize and 22,046 pounds of beans per year. He knows he could make more money if he sold his excess beans once the market increases during the non-harvest time, but he has no current way of storing beans for several months. He has seen larger commercial farmers use silos to store their beans until the market increases, but Carlos does not have any access to the capital needed for the purchase of a silo which would cost him the equivalent of 20 days of work.

III. Problem Statement

*How might we most effectively promote income security among transitional Nicaraguan farmers?*

IV. Problem Context

Nicaragua is still recovering from its violent history of autocratic government and civil war. There is very little infrastructure, which helps makes Nicaragua the second poorest country in Latin America.¹ In rural Nicaragua, people live an average of about 150 km from the nearest road. About 60% of the country lives in rural communities, and over 80% of those people farm for a living. These farms tend to be much less efficient in terms of their yield compared to the global average and surrounding countries, despite rich volcanic soils.

Despite their low productivity, small and medium-sized farms produce 90% of the food consumed in Nicaragua.²

Our geographic focus is on the communities outside Managua in western Nicaragua, the country’s capital and largest city. Farmers in the rural eastern part of the county tend to be subsistence farmers who live off the food they grow whereas farmers in western Nicaragua tend to be transitional farmers who have excess crop to sell at market.

Many farms around Managua are transitional family farms. The World Bank defines transitional family farms as farms where most production is for self-consumption, but surpluses are bartered or sold on the market³. Because these farmers lack storage capability, they are forced to sell almost immediately after the harvest. Beans are harvested three times per year and the market peaks right

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before each harvest. Immediately after the harvest, prices are typically at their lowest because of the high supply of crops on the market. Being forced to sell at these low prices significantly limits farmers’ incomes.

There are storage options available, but most of them are either ineffective or too expensive to be utilized. Many farmers use woven plastic sacks to store grain, which are inexpensive but leave the crop susceptible to pests and moisture. It is estimated up to 30% of crops are lost throughout the supply chain and 12-18% of crops are lost or damaged during the storage process alone⁴. There are more reliable storage options available, such as silos, but these are more expensive, costing around $100, which is equivalent to 20 days of work for the average farmer.

Since few farmers have storage or transportation options, they are highly susceptible to the demands of middlemen who buy their crops at the lowest prices right after the harvest and transport them to larger cities to sell. Farmers do not have the bargaining power to demand higher prices because they have relatively small quantities of grain to sell without an option to wait to sell due to storage constraints.

V. Our Solution

We offer reliable bulk storage for beans to medium-sized farming communities in Nicaragua. We supply several two ton silos to the community and rent out storage space. This simple storage solution has been tested and proven within Nicaragua through a World Bank Implementation Study. The World Bank stated in a report following their efforts that “The improved storage has helped farmers [in Nicaragua] obtain higher prices since they do not need to rush to make sales at harvest time when prices tend to be at their lowest.”
VI. Value Proposition

Community silos enable farmers to store their crops throughout the season and to sell when the market price is at its peak instead of when there is an abundance of beans right after harvest. Farmers increase their income while we help support communities and obtain a percentage of the farmers’ sale price.

After each harvest, farmers in the community will come to us with whatever amount of excess crop they choose. If they need cash right away, they can sell some of their crop to the middlemen at that time. We will record both the amount and quality of the crop they store with us and issue them a receipt. Farmers will maintain ownership of their grain throughout this entire process. When the farmer chooses, they can independently contract with a local middleman to sell the crop at market. We will encourage sales at maximum prices by providing market data knowledge about current and past prices and suggesting times to sell based on our analysis of national markets. While this process can work with many crops, our initial focus will be on red beans, since they are commonly grown and also have high price volatility. Red beans have fluctuated in price in the past five years an average of 21% throughout the season. After they sell, we will collect 5% of their sale price as commission to pay for their storage use.

We will work closely with local farmers to make the process work. We will also purchase silos from local tinsmiths, and transport them with hired pickup trucks. Pictured is Rene, a retired silo maker who has informed us silos cost $80-$100 depending on size. We will hire a local manager to collect crops, to oversee them while they are stored, and to keep records.

Initially, we will own the silos and simply rent out storage. Silo ownership will transfer over to the local community of farmers or cooperative within two years. Individual farmers will earn shares of the silos every time they utilize them until full ownership is transferred to the community. The local manager will remain an employee; however, he will work for the community rather than the company once ownership has transferred. Next, is a detailed account of what will occur after the end of Carlos’ growing season:
Carlos’ Process:

1. Carlos harvests 7,350 pounds of beans in August
2. Carlos sells 3,675 pounds of beans to the middlemen right away in August to cover cash expenses at 11 Cordoba/pound and earns 40,425 Cordoba
3. Carlos brings 3,675 pounds of beans to our silo for storage and we grade the beans and give him a receipt to collect them from the appropriate silo
4. Carlos comes back to us in November to get his beans out of the silo to sell to a middleman who will then sell his beans at market
5. The price of his beans has increased by 18% so the price is now 13 Cordoba/pound and Carlos earns 47,775 Cordoba
6. Carlos gives us 5% of 3,675 pounds * 13 Cordoba/pound which is 2,389 Cordoba
7. Carlos makes 45,386 Cordoba instead of 40,425 Cordoba which he would have if he sold the second half of his beans at harvest. His profits increased by 4,961 Cordoba (12%) for this harvest alone.

VII. Alternatives We Considered

There are many possible solutions to increasing farmer income security. It is possible that in the future Depósito de Confianza will offer other added-value processes including drying, shelling, quality seeds, or fertilizer, among other things. We will start by offering storage because it is one of the simpler processes that is still extremely necessary. Of various possible revenue models, we decided to take a percentage of the sale price because it is the lowest risk for our company. Taking a percentage of the increase in profits for the farmer or buying the crops at a premium at harvest and selling them ourselves later both involve the company taking on the farmers’ risks.

VIII. Social Value Proposition

With our model, farmers will be able to make more money with the same amount of crop and only slightly more work. This will upset the equilibrium that keeps farmers and communities poor, and allow them to reduce debt, grow their production, and invest in the community.

Besides Depósito de Confianza providing market information, the process should eventually be entirely autonomous. We will work with community leaders to shift the model from one that fuels our business to a cooperative model where those who use the silos also own them and can use them rent free or as they decide after two years of usage. With a cooperative model, there is not the risk of potential monopolistic behavior or storage conflict from a single micro-entrepreneur.

IX. Solution Benefits

The solution has several benefits. The direct benefit is an increased income for the farmer, which will lead to higher returns, better education, and healthier communities. The increase in income will decrease the farmers’ debts and allow for higher efficiency in storage methods. The storage we provide will include crop insurance. This means that if the crop gets damaged while in our silos, the farmer will be reimbursed for the value of the crop as of when they deposited it in our silo. This will
build community trust and support. Additionally, the model will create an opportunity for the community to gain ownership of the silo over time and increase their capital. Furthermore, silos will decrease typical crop waste that occurs when crops are stored in sacks.

X. The Market

With the existing agricultural model in Nicaragua, there are two main transactions in the value chain: the farmers, who sell to the middlemen, and the middlemen who then sell to the wider market. Our storage would exist as an intermediary between the farmers and the middlemen. Community based silos would provide accessible, long term storage to the local farming community; thus, giving the farmers the freedom to buy and sell throughout the year and henceforth more selling power when interacting with the middlemen.

![Red Bean Price in Managua (5 year average, Cordobas/lb)](image)

Our target market segment is transitional farmers like Carlos, who produce more than subsistence farmers but are not commercial farmers. Of the 110,000 transitional farmers in Nicaragua, their farms average about 120 acres. In San Isidro, Nicaragua, transitional farmers grow primarily beans and maize; however, Depósito de Confianza offers storage only for beans due to greater market price fluctuations. Farmers harvest about 22,046 pounds of beans annually which is spread between three harvests. This sweet spot of sorts between farm sizes, means that while these farmers have a surplus at the end of harvest, beyond their own dietary needs, they do not have access to the large amounts of capital needed to invest in a silo of their own. We are providing a service to this specific market and filling the need for long term storage by investing in a community storage system. While we are looking to start in a single community, we hope to build relationships with the farmers and continue to expand the storage system to other communities. To build relationships, we have already begun reaching out to local leaders and farmers, asking for their input and interest in the project so that we may best serve them. Furthermore, through our services such as crop insurance we will distinguish ourselves from other middlemen and establish a basis of trust within the community. Finally, through proven results and farmer monetary gains with the silos we hope to further develop the storage system throughout Nicaragua.

XI. Assumptions

1. *Farmers will pay for storage*

Farmers lose 12-18% of their crop every year due to lack of effective and affordable storage. According to our in-country contact, farmers in the rural communities of Santa Rosa, Las Pencas, and La Trinidad seemed “very interested” and “loved the idea of storing crops together.” Our pilot will test whether farmers are actually interested enough to pay for storage when presented with the opportunity.

2. *Middlemen will continue taking the same percentage of the sale price*

Part of our business offering is market data knowledge. We will advertise market prices through a large sign and radio as well as have past market data available for farmers to become more educated about price fluctuations. Our calculations assume that middlemen will adjust prices linearly instead of increasing the percentage of the yield that they take when the market price increases. This is important because we are assuming that farmers will be able to make more money even after we take a percentage of their sale price. This will be tested through our pilot.

3. *Enough price fluctuation between harvest and non-harvest that farmers will still make more even after paying for storage*

Over the past five years, the price of red beans has increased an average of 21% throughout the year between harvest and non-harvest. Our calculations assume similar price patterns in the coming years. However, normal price patterns could be impacted by a variety of factors, including natural disasters and the distribution of crops planted. Our business model would be resistant to decreases in price as our business model is based on a percentage of sale price, rather than the increased proceeds from storage.

4. *Futures and hedging our losses*

As a community silo service, we will provide farmers with access to affordable long-term storage options, as well as current and up to date market information. Therefore, farmers are left with the option to choose when to sell as well as how much. However, there is the possibility that farmers will choose to sell at inopportunite times or that the market price may decrease. In order to minimize our potential risk, we will receive 5% of crop sales so that regardless of market behavior we are able to cover costs and break even as a company. While this system may cause tensions with farmers if an unexpected market decrease does occur, these feelings are mitigated by the fact that the silo ownership will be transferred to the community within two years.

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5 Interview with Karla, date: 11/14/17
XII. Pilot

Our pilot will include the purchase and construction of three silos in the village of La Trinidad near the city of San Isidro. Throughout our first two years of operations, we will offer storage within the silos for 5% of the crop sales per farmer. After two years, we hope to fully transfer ownership of the silos to the community which has already formed a legal cooperative, creating a self-sustaining business within La Trinidad. There are about 20 farming families in this community and we are hoping 10 farmers will participate. We have communicated with this community and learned they are “very interested about the concept of community storage.”

Noé is the cooperative’s leader as a young engineer and farmer with a university degree who has a very good relationship with our nonprofit partners at EOS International. He conducts weekly meetings and is currently working on improving agricultural practices within his community. We would hire him as our local manager and train him in grading and collecting grain, managing and securing the silos, and distributing the crop when it is time to sell as well as equipping him with market data knowledge.

This pilot will allow us to test our concept and the community’s demand for our offering within a single village. Additionally, it will allow for word of mouth to spread about Depósito de Confianza and the profits gained from our services. We plan to break even on our investment in La Trinidad in the first year and then reinvest the profits from the second year into community silos in new villages. If this test pilot yields profits for the farmers and has substantial demand from the community, we will move forward from the pilot into the official launch, franchising the silo system in other communities around Managua.

Although we are starting with simply grain storage offerings, with the growth of our company and profits, there is potential for us to expand into other offerings including fertilizer, added-value processes of drying and shelling, and transportation. After our initial launch, we plan to partner with local nonprofits and farming cooperatives to distribute start-up kits which will include a full detailed plan for how to implement community storage in a rural village. There are 110,000 transitional farmers in Nicaragua, mostly centered around Managua, so there is a large target market for Depósito de Confianza. If successful in many communities, market price fluctuation for food staples like beans will decrease which will increase food security for all Nicaraguans.
XIII. Appendices

Appendix A: Theory of Change

I. Problem we are trying to solve
How might we most effectively promote income security among transitional Nicaraguan farmers by helping them increase the price they receive for their crop?

II. Key audience
Our key audience is transitional farmers like Carlos in rural communities near Managua. Transitional farmers own about 120 acres of farmland and employ about 15 farmhands. They may have access to credit or technical assistance, but most do not belong to a producer’s organization. Transitional farmers produce enough to subsist and to sell their excess crops at market.

III. Entry point to reaching audience
Offering silos as a means of storage will give us a service to sell to farmers and allow farmers to receive higher prices for their crops.

IV. Steps needed
First, we will meet community members at their weekly meetings and hire a local manager who is well-known and trusted within the community to manage the silo and security. Then, we will offer community storage in our silos to our pilot community in La Trinidad outside San Isidro. We will follow the steps outlined above in our Value Proposition to implement our solution. Upon successful implementation of our pilot program, we will expand our business to other rural communities around Managua. After our business is substantially established, we will begin to offer other added-value processes such as drying services, seed sales, or fertilizer.

V. Measurable effects
Measurable effects of Depósito de Confianza include increased farmer income and financial stability, increased food security and health, decreased hunger and food waste, and decreased debt.

VI. Wider benefits
Wider benefits of our business include increased income allowing farmers to have enough to sustain themselves without acquiring additional land, increased health leading to more productive citizens, and increased community wealth allowing for buying products and technology that increase productivity. These wider benefits will all augment the economy of Nicaragua.

VII. Long-term change
Through our community silo system, we hope to increase the income of transitional farmers through the western part of Nicaragua. Beginning with a single village and spreading outwards from there, increased individual profits will aid in increasing the income levels of the community and country of Nicaragua. Additionally, with increased income there is shown to be a direct correlation with education levels and access to healthcare which will benefit the farmers and their families. Furthermore, with less crop loss due to ineffective storage, over time, this can aid in decreasing Nicaraguan dependence on foreign crop imports.
Appendix B: One Year Projected Cash Flow

<table>
<thead>
<tr>
<th>Income</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Bean Price in Managua (5 yr average, cordobas/ft³)</td>
<td>11.3</td>
<td>10.9</td>
<td>12</td>
<td>13.5</td>
<td>13.5</td>
<td>13.8</td>
<td>15</td>
<td>11</td>
<td>11.5</td>
<td>12.5</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Deposit value</td>
<td>1,449,250</td>
<td>277,550</td>
<td>1,449,250</td>
<td>277,550</td>
<td>277,550</td>
<td>277,550</td>
<td>277,550</td>
<td>1,449,250</td>
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<td>1,449,250</td>
<td>1,449,250</td>
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</tr>
<tr>
<td>Current market value of storage</td>
<td>C$ 1,329,817</td>
<td>C$ 1,443,750</td>
<td>C$ 1,500,000</td>
<td>C$ 2,006,200</td>
<td>C$ 2,006,200</td>
<td>C$ 3,000,000</td>
<td>C$ 3,000,000</td>
<td>C$ 3,000,000</td>
<td>C$ 1,987,697</td>
<td>C$ 1,987,697</td>
<td>C$ 1,987,697</td>
<td>C$ 2,084,339</td>
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<tr>
<td>Sale price</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Profit from 3% of sale price</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td>0</td>
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</tr>
<tr>
<td>Total income</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>

**Expenses**

<table>
<thead>
<tr>
<th>Expense</th>
<th>Cost (C$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silo construction costs</td>
<td>13,779.00</td>
</tr>
<tr>
<td>Wages for management/security</td>
<td>6,000</td>
</tr>
<tr>
<td>Crop Insurance costs</td>
<td>6,140</td>
</tr>
<tr>
<td>Total expenses</td>
<td>26,989.06</td>
</tr>
</tbody>
</table>

**Net Income - Expenses**

- Net Income: -3,528,928.06
- Net Income: -11,714
- Net Income: -12,533
- Net Income: -50,699
- Net Income: -65,692
- Net Income: -51,019
- Net Income: -140,925
- Net Income: -11,969
- Net Income: -12,594
- Net Income: -12,802
- Net Income: -57,698
- Net Income: -17,972

**Net Present Value**

- Net Present Value: 24,627

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**Revenue Stream**

- 5% of the final sale price
- One-time: silo construction costs ($150/silo)
- Wages for management and security (C$5000/mo)
- Crop insurance (.5% of stored value)

**Expenses**

- One-time: Silo construction costs
- Wages for management and security
- Crop insurance

**Revenue**

- Proceeds from increased sale price: 19,500

**Expenses**

- Silo construction costs
- Wages for management/ security
- Crop insurance costs

**Net Profit**

- Net Profit: 4,800

*Monthly revenue and operating expenses averaged over 1 year. Assumes 3 silos and 5400 bushel annual production (red beans).*
Appendix C: Our Team

Robyn Thompson is a sophomore at the University of Minnesota pursuing degrees in Finance and Political Science, with minors in Spanish and Business Law. She has extensive coursework experience through the University Honors Program in the culture and politics of Latin America and is nearly fluent in Spanish. Robyn also has experience with construction projects in Latin America as well as cultural exchanges pictured below. In her free time she loves spinning her flag with the Marching Band’s color guard team, leading a freshmen’s Bible study through her campus ministry, and drinking coffee with friends. Robyn is traveling to San Isidro, Nicaragua for three weeks in May with Megan Voorhes and an interdisciplinary team of students to start Depósito de Confianza. She will be living in Managua, Nicaragua for the remainder of the summer and interning for an organization supporting sustainable social and environmental ventures.

Depósito de Confianza has been working closely with Karla Noelia Castro and her team at EOS International, a nonprofit based out of San Isidro. Karla provides local knowledge and connects us with local farmers, engineers, and tinsmiths in order to help validate our assumptions. In December, the team got to meet Karla and Álvaro, EOS International’s cofounder, in person and collaborate with them on the business and pilot plan.
Appendix D: Primary Research

Throughout the Fall semester our team worked with Karla Noelia Castro, an employee of EOS International, who served as our contact on the ground in Nicaragua. Our primary communication was through Skype Calls, weekly meetings, and WhatsApp.

Karla provided local knowledge on the issues facing Nicaraguan farmers and the problems within the Nicaraguan agricultural system as a whole. She completed informal, verbal surveys throughout local villages, testing the interest in our business model. She connected us with a local tinsmith, Rene, capable of constructing the community silos for a competitive price. Most importantly, Karla provided us the ability to communicate with Walther, a Nicaraguan farmer who was able to openly speak with us about the issues he continually faces and what proposals would interest him and those in his community. We also consulted with prominent members of the farming community around the Twin Cities and world-renowned agriculture professors at the University of Minnesota to learn more about cropping systems, silos, and soils. Additionally, we consulted with Álvaro Rodriguez, Cofounder and Nicaragua Director of EOS International, and Wesley Meier, Cofounder and CEO of EOS International, to gain additional insight into the market of Nicaragua, to evaluate our project’s feasibility, and to finalize our business proposal.