

PROMOTING AND EXPANDING THE SAYAUSÍ RURAL SEED BANK

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Promoting and Expanding the Sayausí Rural Seed Bank

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Report Submitted to:

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Abstract

Abstract

In 2021, Tania Peñaloza founded the Sayausí Rural Seed Bank, located in a parish of Cuenca, Ecuador. Today, the seed bank preserves local seed varieties but lacks community engagement that limits its expansion. In collaboration with our sponsor Marisol Peñaloza, we conducted surveys and interviews with Sayausí community members and an NGO. The team designed, produced, and evaluated a pamphlet that showcased local seed varieties, their uses and benefits, and traditional Ecuadorian recipes to help preserve Sayausí's cultural heritage. To help expand the seed bank, we also produced a pamphlet, a logo, a banner, and a framework for seed bank replication in other parishes. Lastly, the team provided recommendations and areas of future work for the seed bank to help further its community impact.



Resumen

Resumen

En 2021, Tania Peñaloza fundó el Banco Rural de Semillas Sayausí, situado en una parroquia de Cuenca (Ecuador). En la actualidad, el banco de semillas conserva variedades de semillas locales, pero carece de un compromiso comunitario que limite su expansión. En colaboración con nuestra patrocinadora, Marisol Peñaloza, realizamos encuestas y entrevistas a miembros de la comunidad de Sayausí y a una ONG. El equipo diseñó, produjo y evaluó un folleto que mostraba las variedades locales de semillas, sus usos y beneficios, y recetas tradicionales ecuatorianas para ayudar a preservar el patrimonio cultural de Sayausí. Para ayudar a ampliar el banco de semillas, también elaboramos un folleto, un logotipo, una pancarta y un marco para la reproducción del banco de semillas en otras parroquias. Por último, el equipo ofreció recomendaciones y áreas de trabajo futuro para el banco de semillas con el fin de contribuir a aumentar su impacto en la comunidad.



Acknowledgements

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We would like to express our gratitude to our sponsor, Marisol Peñaloza, and Tania Peñaloza for the opportunity to work on this unique project. Thank you for welcoming us with open arms and helping us during this process. We would also like to thank Professor Pollice and Professor Kinicki for advising us on this project. Thank you to the people of Sayausí who volunteered their time to assist in our investigation. Lastly, our team would like to acknowledge Worcester Polytechnic Institute and the Global Projects Program for this valuable opportunity to complete our Interactive Qualifying Project in Cuenca, Ecuador. We will treasure this experience and thank you again to everyone who helped us along the way.

Executive Summary

Executive Summary

Intro and Background

The United Nations reports that due to modern agricultural practices, 90% of crop varieties have disappeared from farmers' fields worldwide. Out of more than 300 maize varieties grown in Ecuador in the 1960s, only 50 varieties remain in circulation. As a megadiverse country, Ecuador can largely benefit from an increase of seed banks to help preserve biodiversity and traditionally valued crops.

Community seed banks act as a method of seed preservation to keep varieties from extinction. Seeds hold cultural value, as they are used in rituals and traditional dishes. However, the disappearance of native crops has led groups to lose facets of their cultural identity, as groups such as indigenous communities must find replacements to these crops or cease practicing traditions altogether.

In 2021, Tania Peñaloza founded the Sayausí Rural Seed Bank to preserve the local seed varieties that were at risk of disappearing. However, the seed bank currently lacks community engagement which inhibits it from expanding. The goal of this project was to collaborate with councilwoman for rural Cuenca, Marisol Peñaloza to expand the Sayausí Rural Seed Bank through developing promotional material and a set of recommendations to conserve local seed biodiversity and promote the local cultural heritage. The three objectives to achieving our project goal were:

- Assess the current state of the seed bank and its role in preserving culture and heritage.
- Identify prevalent issues the Sayausí Rural Seed Bank can address.
- Develop and get feedback on educational and promotional material for the Sayausí Rural Seed Bank.

Methods

To address our first objective, the team interviewed Tania Peñaloza (see Figure E.1), the Sayausí Rural Seed Bank manager, to gain information about the seed bank's progress since its founding and its seed contents.

To then gauge community seed usage and seeds' role in local traditions, we surveyed 20 local Sayausí community members. The team also conducted participant observation at the Pawkar Raymi festival and obtained valuable context about how community members use seeds for traditional practices in the parish.

Figure E.1
Interview with Tania Peñaloza



As part of the second objective, the team interviewed members of the Sayausí community including farmers and indigenous leaders. These groups helped the team identify issues they faced surrounding seed usage and cultural loss, among others. After learning about these issues, the team interviewed Javier Carrera, founder of Los Guardianes de Semillas, an Ecuadorian NGO experienced in seed bank support and community involvement methods. These methods gave the team the necessary background information and context before starting the deliverables.

Lastly, for the third objective we designed and evaluated promotional material for the seed bank in the form of a pamphlet.

The team worked closely with our sponsor to curate the pamphlet's contents. Through this process we developed a pamphlet that represents the values of the Sayausí people and serves as a basis for the seed bank to continue to develop. The team also gathered community feedback and conducted two rounds of assessment surveys with Sayausí community members. The project group then used this data to revise the pamphlet and create two subsequent versions.

This survey included short answer questions, ranking statements based on engagement measurement tools, and concluded with open response questions. After completing both rounds and obtaining our sponsor's approval, the team then created the final pamphlet version.

Design Considerations

This section explains the development of the educational seed bank pamphlet, as well as the team's design choices. Given that our sponsor aims to have the pamphlet serve as a template for future seed banks to create their own promotional materials, the team used Canva for its creation. The team first created four preliminary design choices and after receiving our sponsor's feedback, narrowed it down to one. After two rounds of assessment surveys and obtaining Sayausí community members' feedback, we created Version 1, 2 and 3. After receiving our sponsor's approval, we made final changes and produced the final pamphlet version.

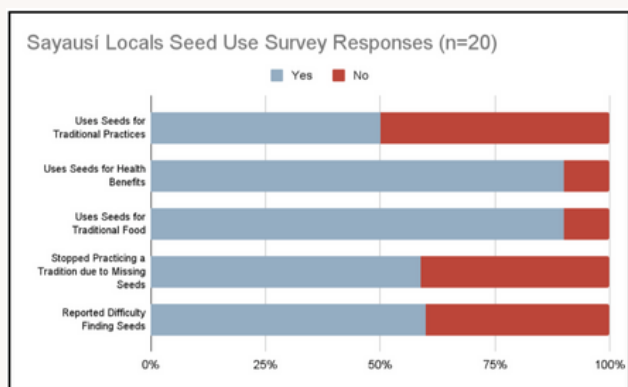
Findings

Through conducting surveys, interviews and observation the team identified five major findings which influenced our project deliverables. The five findings are as follows:

#1 The Sayausí locals place cultural importance on local seed varieties and use them for both traditional and health purposes.

The objective 1 survey responses, the interview with Tania Peñaloza, and participant observation at the Pawkar Raymi festival, highlighted the cultural importance seeds hold for Sayausí community members. Figure E.2 illustrates the results from the objective 1 survey in which 90% of respondents answered positively to using seeds for health benefits and to make traditional foods. During her interview, Tania Peñaloza emphasized the Aztec and Mayan history surrounding heritage seeds held within the seed bank. Additionally, the chakana ritual during the Pawkar Raymi festival exemplified how the local culture values seeds, as they are an integral part of the chakana and the festival.

Figure E.2
Sayausí Locals Seed Use Survey Responses



#2 The Sayausí people recognize there is a loss of seed varieties.

Interviews with farmers and indigenous leaders, and survey responses from Sayausí community members indicated that many Sayausí community members have experienced a loss of a type of seed or are aware of the loss of seeds in the area. During interviews, participants acknowledged the loss of seed varieties. In the survey, 59% of respondents confirmed they stopping practicing a tradition due to missing seeds and 60% of respondents reported experiencing difficulty finding seeds. Community members cited seed unavailability in the area, high costs, and a plague that had destroyed the crop in the area as causes for their difficulty in obtaining seeds.

#3 Seed exchanges would be beneficial to the community. However, the community would need more information about them.

In the interviews with Tania Peñaloza and farmers, both groups expressed similar sentiments about the benefits of participating in seed exchanges. The farmers demonstrated interest in seed exchanges and spoke about their benefits. However, all the farmers interviewed had never participated in a seed exchange. Two farmers recognized their lack of knowledge surrounding seed exchanges. One farmer inquired how she and other community members could start one of their own. She said she was told to participate in a seed exchange "in order to have better [crop] production" and knew of their benefits. All these comments suggest there is a lack of information about exchanges and while community members know they are beneficial, they do not have access to them.

#4 The team identified several areas of improvement for the Sayausí Rural Seed Bank.

Through conducting interviews with Tania Peñaloza and Javier Carrera, the team identified areas of improvement for the Sayausí Rural Seed Bank. Javier Carrera suggested the seed bank should frame itself as a secure place for farmers to keep their seeds to strengthen the seed bank's relationship with the community. He stated that by providing proper preservation for the farmers' seeds, the farmers would feel secure "knowing that at the time of sowing they will be able to ask the bank for those seeds back." Therefore, a stronger relationship with the community could facilitate the process of acquiring new seeds, as people would be inclined to make donations to the seed bank.

When asked what stakeholders and steps are necessary for the establishment of an impactful community seed bank, Carrera stressed that it is necessary to recall its purpose and the needs to be met. Carrera stated during his interview that

“a [seed] bank would have to be tied to a specific objective and be focused on the needs of the community, it [the seed bank] must be something that stems from them [community members]... and provide something useful that they [community members] could not otherwise obtain.”

Community members must actively benefit from the seed bank, such as gaining access to new seeds or having a place to preserve their seeds for future use. If community members see benefits from the seed bank, they will be willing to take on the responsibility of maintaining it. Otherwise, the seed bank will lose momentum and cease to exist.

#5 Sayausí community members found the team’s pamphlet deliverable to be useful and representative.

The assessment surveys for objective 3 aimed to rank the perceived usability of the pamphlet’s contents and whether respondents thought the pamphlet was representative of Ecuadorian culture. Through an analysis of the survey responses, the team found that all 21 participants found the pamphlet to be useful. In addition, after analyzing participants’ responses for questions regarding the pamphlets’ level of representation, all 21 stated they agreed. Respondents commented that not only were the pamphlet’s traditional Ecuadorian recipes representative, but they also recalled memories of when their own grandparents made these dishes for them. This result demonstrated the potential value the recipes have in eliciting a positive response from survey participants and more broadly, other community members as well.

Overall, these results suggested our pamphlet had strong potential to address the project’s goal in expanding the Sayausí Rural Seed Bank through our promotional material.

Deliverables

Our pamphlet design, seed bank framework and seed exchange guidelines were guided by the results and findings from the methodology. In addition, the team created logo and banner designs for the seed bank to use in their promotional efforts, and a template of our pamphlet for future works. The pamphlet consisted of English and Spanish sections detailing: the seed bank’s history (see Figure E.3), local seeds and their respective benefits (see Figure E.4), traditional Ecuadorian recipes (see Figure E.5), the seed bank framework, and seed exchange guidelines. Due to the pamphlet’s editable nature, it is convenient for future necessary changes. As the pinnacle of the team’s deliverables, the pamphlet was the culmination of all the work, research, and time the team dedicated to the project.

Figure E.3
Pamphlet seed bank history section



Figure E.4
Pamphlet seed benefits section for



Figure E.5
Sample from pamphlet recipe section



Recommendations and Conclusion

Additionally, the team proposed a set of five recommendations focused on helping the Sayausí Rural Seed Bank in its growth, and for future work in the rural parishes of the Cuenca canton.

The first recommendation is for the seed bank to establish a beneficiary program. This program would involve people or groups who can directly benefit from the seed bank including anyone interested in cultivating and maintaining their own seed supply.

The second recommendation is for the seed bank to open a seed collection system. In this way, community members can freely donate seeds and receive desired ones from the seed bank.

The third recommendation is for the seed bank to increase pamphlet accessibility in other parishes. By publishing it in various forms such as hard copy or on the internet, a wider group of people in other parishes would have the ability to obtain the pamphlet. In this way the seed bank can also publish the pamphlet on their own social media platforms to increase access as well.

The fourth recommendation is for the seed bank to organize seed exchanges for community members to attend and diversify their seed collection. It can also provide workshops using the team's seed exchange guidelines deliverable to teach community members how to organize their own seed exchanges.

The last recommendation is to use our seed bank framework and pamphlet template for the future establishment and promotion of seed banks in all 21 rural parishes of the Cuenca canton. This framework is included at the end of the pamphlet and contains specific guidelines for how to establish seed banks in other parishes.

Our sponsor was interested in helping expand the Sayausí Rural Seed Bank by creating promotional material and a framework to establish community seed banks in other rural parishes in the Cuenca canton. The project deliverables included a pamphlet which detailed information about different local seed varieties, traditional Ecuadorian recipes, guidelines for organizing a seed exchange, as well as the framework mentioned above.

Our results suggest that Sayausí is currently facing seed loss but the locals place importance on these varieties for traditional and health uses. Therefore, seed exchanges may provide one avenue for the community to contribute the support the seed bank currently lacks. This project and the team's set of recommendations have the potential to create a lasting impact on the Sayausí Rural Seed Bank and provide a foundation for future work. Ultimately, along with our sponsor and the Sayausí Rural Seed Bank, this project has taken strides in transforming the Sayausí community for the coming years.

Resumen Ejecutivo

Resumen Ejecutivo

Introducción y Antecedentes

Las Naciones Unidas reportan que, debido a las prácticas agrícolas modernas, el 90% de las variedades de cultivos han desaparecido de los campos de los agricultores en todo el mundo. De más de 300 variedades de maíz cultivadas en Ecuador en la década de 1960, solo 50 variedades permanecen en circulación. Como país megadiverso, Ecuador puede beneficiarse en gran medida de un aumento de los bancos de semillas para ayudar a preservar la biodiversidad y los cultivos tradicionalmente valorados.

Los bancos comunitarios de semillas actúan como un método de conservación de semillas para evitar que las variedades se extingan. Las semillas tienen valor cultural, ya que se utilizan en rituales y platos tradicionales. Sin embargo, la desaparición de los cultivos nativos ha llevado a los grupos a perder facetas de su identidad cultural, ya que grupos como las comunidades indígenas deben encontrar reemplazos para estos cultivos o dejar de practicar las tradiciones por completo.

En 2021, Tania Peñaloza fundó el Banco Rural de Semillas de Sayausí para preservar las variedades de semillas locales que estaban en riesgo de desaparecer. Sin embargo, el banco de semillas actualmente carece de participación comunitaria, lo que le impide expandirse. El objetivo de este proyecto fue colaborar con la concejala de Cuenca rural, Marisol Peñaloza, para expandir el Banco Rural de Semillas de Sayausí mediante el desarrollo de material promocional y un conjunto de recomendaciones para conservar la biodiversidad local de semillas y promover el patrimonio cultural local. Los tres objetivos para lograr la meta de nuestro proyecto fueron:

- Evaluar el estado actual del banco de semillas y su papel en la preservación de la cultura y el patrimonio.
- Identificar los problemas predominantes que el Banco Rural de Semillas de Sayausí puede abordar.
- Desarrollar y retroalimentar material educativo y promocional para el Banco Rural de Semillas de Sayausí.

Métodos

Para completar nuestro primer objetivo, el equipo entrevistó a Tania Peñaloza (ver Figura R.1), administradora del Banco Rural de Semillas de Sayausí, para obtener información sobre el progreso del banco de semillas desde su fundación y su contenido de semillas. Para luego medir el uso de semillas en la comunidad y el papel de las semillas en las tradiciones locales, encuestamos a 20 miembros de la comunidad local de Sayausí. El equipo también realizó una observación participante en el festival Pawkar Raymi y obtuvo un contexto valioso sobre cómo los miembros de la comunidad usan las semillas para las prácticas tradicionales en la parroquia.

Figura R.1

Entrevista con Tania Peñaloza



Estos grupos ayudaron al equipo a identificar los problemas que enfrentaban relacionados con el uso de semillas y la pérdida cultural, entre otros. Después de conocer estos temas, el equipo entrevistó a Javier Carrera, fundador de Los Guardianes de Semillas, una ONG ecuatoriana con experiencia en el apoyo a bancos de semillas y métodos de participación comunitaria. Estos métodos le dieron al equipo la información básica y el contexto necesarios antes de comenzar con los entregables.

Por último, para el tercer objetivo diseñamos y evaluamos material promocional para el banco de semillas en forma de un folleto. El equipo trabajó en estrecha colaboración con su patrocinadora para seleccionar el contenido del folleto. A través de este proceso desarrollamos un folleto que representa los valores de la parroquia de Sayausí y sirve como base para que el banco de semillas siga desarrollándose. El equipo también recopiló los comentarios de la comunidad y realizó dos rondas de encuestas de evaluación con miembros de la comunidad de Sayausí. Luego, usamos estos datos para revisar el folleto y crear dos versiones posteriores. Esta encuesta incluyó preguntas de respuesta corta, declaraciones de clasificación basadas en herramientas de medición de participación y concluyó con preguntas de respuesta abierta. Después de completar ambas rondas y obtener la aprobación de nuestro patrocinador, el equipo creó la versión final del folleto.

Consideraciones del Diseño

Esta sección explica el desarrollo del folleto educativo del banco de semillas, así como las opciones de diseño del equipo. Dado que nuestra patrocinadora quiere que el folleto sirva como modelo para el desarrollo de futuros bancos de semillas y para que creen sus propios materiales promocionales, el equipo utilizó Canva para su creación. El equipo primero creó cuatro opciones de diseño preliminares y después de recibir los comentarios de la patrocinadora, las redujo a una. Después de dos rondas de encuestas de evaluación y de obtener los comentarios de los miembros de la comunidad de Sayausí, creamos las Versiones 1, 2 y 3. Luego de recibir la aprobación de la patrocinadora, hicimos los cambios finales y producimos la versión final del folleto.

Hallazgos

Mediante la realización de encuestas, entrevistas y observaciones, el equipo identificó cinco hallazgos principales que influyeron en los resultados de nuestro proyecto. Los cinco hallazgos son los siguientes:

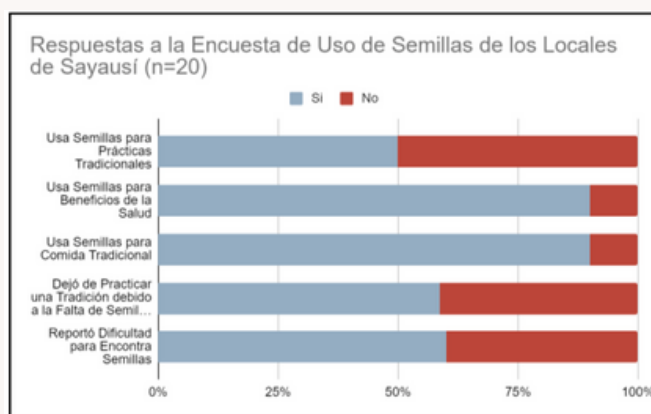
#1 Los lugareños de Sayausí otorgan importancia cultural a las variedades de semillas locales y las utilizan con fines tradicionales y de salud.

Las respuestas de la encuesta del objetivo 1, la entrevista con Tania Peñaloza y la observación participante en el festival Pawkar Raymi, destacaron la importancia cultural que tienen las semillas para los miembros de la comunidad de Sayausí.

La Figura R.2 ilustra los resultados de la encuesta del objetivo 1 en la que el 90 % de los encuestados respondieron positivamente sobre el uso de semillas para obtener beneficios para la salud y para elaborar alimentos tradicionales. Durante su entrevista, Tania Peñaloza enfatizó la historia azteca y maya en torno a las semillas patrimoniales que se encuentran dentro del banco de semillas. Además, el ritual de la chakana durante el festival Pawkar Raymi ejemplificó cómo la cultura local valora las semillas, ya que son una parte integral de la chakana y el festival.

Figura R.2

Respuestas de la encuesta de uso de semillas de los lugareños de Sayausí



#2 El pueblo Sayausí reconoce que hay pérdida de variedades de semillas.

Las entrevistas con agricultores y líderes indígenas, y las respuestas de la encuesta de los miembros de la comunidad de Sayausí indicaron que muchos miembros de la comunidad de Sayausí han experimentado la pérdida de un tipo de semilla o están al tanto de la pérdida de semillas en el área. Durante las entrevistas, los participantes reconocieron la pérdida de variedades de semillas. En la encuesta, el 59% de los encuestados confirmaron que están dejando de practicar una tradición debido a la falta de semillas y el 60% de los encuestados informaron tener dificultades para encontrar semillas. Los miembros de la comunidad mencionaron la falta de disponibilidad de semillas en el área, los altos costos y una plaga que había destruido el cultivo en el área como causas de su dificultad para obtener semillas.

#3 Los intercambios de semillas serían beneficiosos para la comunidad. Sin embargo, la comunidad necesitaría más información sobre ellos.

En las entrevistas con Tania Peñaloza y los agricultores, ambos grupos expresaron sentimientos similares sobre los beneficios de participar en los intercambios de semillas.

Los agricultores demostraron interés en los intercambios de semillas y hablaron sobre sus beneficios. Sin embargo, todos los agricultores entrevistados nunca habían participado en un intercambio de semillas. Dos agricultores reconocieron su falta de conocimiento sobre los intercambios de semillas. Una agricultora preguntó cómo ella y otros miembros de la comunidad podrían iniciar uno propio. Ella dijo que le dijeron que participará en un intercambio de semillas “para tener una mejor producción [de cultivos]” y sabía de sus beneficios. Todos estos comentarios sugieren que hay una falta de información sobre los intercambios y, aunque los miembros de la comunidad saben que son beneficiosos, no tienen acceso a ellos.

#4 El equipo identificó varias áreas para mejorar el Banco Rural de Semillas de Sayausí

A través de entrevistas con Tania Peñaloza y Javier Carrera, el equipo identificó áreas de mejora para el Banco Rural de Semillas de Sayausí. Javier Carrera sugirió que el banco de semillas debería enmarcarse como un lugar seguro para que los agricultores guarden sus semillas para fortalecer la relación del banco de semillas con la comunidad. Afirmó que al proporcionar una conservación adecuada a las semillas de los agricultores, los agricultores se sentirían seguros “sabiendo que al momento de la siembra podrán pedirle al banco que les devuelva esas semillas.” Por lo tanto, una relación más fuerte con la comunidad podría facilitar el proceso de adquisición de adquisición de nuevas semillas, ya que las personas quisieran hacer donaciones al banco de semillas.

Cuando se le preguntó qué actores y pasos son necesarios para el establecimiento de un banco comunitario de semillas impactante, Carrera enfatizó que es necesario recordar su propósito y las necesidades que se deben satisfacer. Carrera afirmó durante su entrevista que

“Entonces un banco realmente tendría que estar atado a un objetivo muy concreto que se base en las necesidades de la comunidad, y que surja de ellos... que realmente de algo útil que no podrían de otra manera obtener.”

Los miembros de la comunidad deben beneficiarse activamente del banco de semillas, como obtener acceso a nuevas semillas o tener un lugar para conservar sus semillas para uso futuro. Si los miembros de la comunidad ven los beneficios del banco de semillas, estarán dispuestos a asumir la responsabilidad de mantenerlo. De lo contrario, el banco de semillas perderá impulso y dejará de existir.

#5 Los miembros de la comunidad de Sayausí encontraron que el folleto del equipo era útil y representativo.

Las encuestas de evaluación para el objetivo 3 tenían como objetivo clasificar la usabilidad percibida de los contenidos del folleto y si los encuestados pensaban que el folleto era representativo de la cultura ecuatoriana. A través de un análisis de las respuestas de la encuesta, el equipo encontró que los 21 participantes encontraron útil el folleto. Además, después de analizar las respuestas de los participantes a las preguntas sobre el nivel de representación de los folletos, los 21 dijeron que estaban de acuerdo. Los encuestados comentaron que no solo eran representativas las recetas tradicionales ecuatorianas del folleto, sino que también recordaron memorias de cuando sus propios abuelos les preparaban estos platos. Este resultado demostró el valor potencial que tienen las recetas debido a la respuesta positiva de los participantes de la encuesta.

En general, estos resultados sugirieron que nuestro folleto tenía un gran potencial para abordar la meta del proyecto de expandir el banco de semillas de Sayausí Rural a través de nuestro material promocional.

Entregables

El diseño de nuestro folleto, el modelo para establecer un banco de semillas y las sugerencias para un intercambio de semillas se guiaron por los resultados y hallazgos de la metodología. Además, el equipo creó diseños de logotipos y pancartas para que el banco de semillas los use en sus esfuerzos de promoción, y una plantilla de nuestro folleto para trabajos futuros. El folleto constaba de secciones en inglés y español que detallan: la historia del banco de semillas (ver Figura R.3), las semillas locales y sus respectivos beneficios (ver Figura R.4), recetas tradicionales ecuatorianas (ver Figura R.5), el modelo para establecer un banco de semillas y sugerencias para el intercambio de semillas. Debido a la naturaleza editable del folleto, es conveniente para futuros cambios necesarios. Como el pináculo de los resultados del equipo, el folleto fue la culminación de todo el trabajo, la investigación y el tiempo que el equipo dedicó al proyecto.

Figura R.3

Sección en el folleto sobre la historia del banco de semillas



Figura R.4

Sección en el folleto sobre beneficios de las semillas de maíz



Figura R.5

Ejemplo de la sección de recetas del folleto



Recomendaciones y Conclusiones

Adicionalmente, el equipo propuso un conjunto de cinco recomendaciones enfocadas en ayudar al Banco Rural de Semillas de Sayausí en su crecimiento, y para el trabajo futuro en las parroquias rurales del cantón Cuenca.

La primera recomendación es que el banco de semillas establezca un programa de beneficiarios. Este programa involucraría a personas o grupos que pueden beneficiarse directamente del banco de semillas, incluida cualquier persona interesada en cultivar y mantener su propio suministro de semillas.

La segunda recomendación es que el banco de semillas abra un sistema de recolección de semillas. De esta manera, los miembros de la comunidad pueden donar semillas libremente y recibir las deseadas del banco de semillas.

La tercera recomendación es que el banco de semillas aumente la accesibilidad de los folletos en otras parroquias. Al publicarlo en varias formas, como una copia impresa o en Internet, un grupo más amplio de personas en otras parroquias tendría la posibilidad de obtener el folleto. De esta forma, el banco de semillas también puede publicar el folleto en sus propias plataformas de redes sociales para aumentar el acceso también.

La cuarta recomendación es que el banco de semillas organice intercambios de semillas para que los miembros de la comunidad asistan y diversifiquen su colección de semillas. También puede proporcionar talleres utilizando las pautas de intercambio de semillas del equipo para enseñar a los miembros de la comunidad cómo organizar sus propios intercambios de semillas.

La última recomendación es utilizar nuestro modelo para establecer un banco de semillas y plantilla de folleto para el futuro establecimiento y promoción de bancos de semillas en las 21 parroquias rurales del cantón Cuenca. Este marco se incluye al final del folleto y contiene pautas específicas sobre cómo establecer bancos de semillas en otras parroquias.

Nuestra patrocinadora estaba interesada en ayudar a expandir el Banco Rural de Semillas de Sayausí mediante la creación de material promocional y un marco para establecer bancos comunitarios de semillas en otras parroquias rurales del cantón Cuenca. Los entregables del proyecto incluían un folleto que detalla información sobre diferentes variedades de semillas locales, recetas tradicionales ecuatorianas, sugerencias para organizar un intercambio de semillas, así como el modelo mencionado anteriormente

Nuestros resultados sugieren que Sayausí se enfrenta actualmente a una pérdida de semillas, pero los lugareños dan importancia a estas variedades para usos tradicionales y de salud. Por lo tanto, los intercambios de semillas pueden proporcionar una vía para que la comunidad contribuya con el apoyo del que actualmente carece el banco de semillas. Este proyecto y el conjunto de recomendaciones del equipo tienen el potencial de crear un impacto duradero en el Banco Rural de Semillas de Sayausí y proporcionar una base para trabajo futuro. Junto con nuestra patrocinadora y el Banco Rural de Semillas de Sayausí, este proyecto ha avanzado mucho en la transformación de la comunidad de Sayausí para los próximos años.

Authorship Table

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Introduction

1. Introduction

The variety of plant life biodiversity underpinning the food systems on our planet is in decline, putting the future of our livelihoods, health, and environment under severe threat. As seen in the mid-20th century, the Panama Disease devastated banana plantations across Latin America, and put the entire species at risk of extinction (Ordonez et al., 2015). Any one disease can rapidly wipe out these popular grocery store items. The United Nations reports that over 90% of crop varieties have disappeared from farmers' fields.

Ecuador is home to the Andean Highlands, one of the richest biodiversity hotspots on Earth, and the Food and Agriculture Organization of the United Nations recognizes it as one of the 17 megadiverse countries in the world (Castillo et al., 2017). However, climate change, globalization, and modern agricultural practices threaten this biodiverse ecosystem and the communities that call it home. Traditional methods of agriculture promote biodiversity and place an emphasis on the cultural appreciation for certain crops.

Indigenous communities respect and value the environment, and practice traditional farming as a part of their sustainable management of natural resources and integration of their traditional knowledge. Traditional forms of agriculture promote biodiversity and place an emphasis on the cultural appreciation for crops that people use in rituals and traditions. However, growing globalization has diminished the supply of native seeds and in turn a loss of culture. A great variety of native crops remain present in Ecuador thanks to the traditional agricultural practices that the country's indigenous communities maintain.

Seed banks are one of the most successful methods of preserving biodiversity and traditionally valued crops. They act as a reservoir for seed storage and serve as a protective measure in keeping species from extinction (Lennon et al., 2021). They range in size from global to small-scale seed banks. Community seed banks maintain local seed biodiversity and local members of the community manage them. These seed banks handle both major and minor crops, such as corn and nuts. They also include endangered and underused seed varieties, allowing for increased accessibility to these.

Rural activists seek to help farmers and communities regain and maintain control over the seeds they use by connecting communities to develop

systems of seed preservation. Marisol Peñaloza, councilwoman and activist, and the project sponsor, aims to engage Sayausí community members to participate in the Sayausí seed bank. She intends to expand the Sayausí seed bank and use it as a model for future rural seed banks in Cuenca. Sayausí is one of the largest of the 21 parishes in the Cuenca canton in Ecuador. All 21 parishes practice traditional agriculture and subsistence farming to maintain their livelihoods. Sayausí preserves local seed varieties important to the local culture through its community seed bank but for the past two years, the parish has not prioritized it. By working with our sponsor, our goal was to expand the Sayausí seed bank by developing a promotional pamphlet showcasing the history of the seed bank and its seed varieties, along with a framework for future seed banks. By emphasizing the cultural and practical importance of the seed bank, we also demonstrated its role in cultural preservation. In order to conduct this research the team investigated seeds banks, traditional seed use and agriculture, and maintaining traditional knowledge. Through our methods, the team discovered that Sayausí community members found our pamphlet to be useful and has the potential to serve as a model in creating future seed banks in other parishes.

Background

2. Background

This chapter provides information to facilitate a deeper understanding of how different communities use seed banks to protect biodiversity and increase awareness about local cultures and heritage. It also details topics influencing this project such as traditional seed use and agricultural practices, how seed exchanges support seed circulation and local biodiversity, as well as the importance of maintaining traditional knowledge and its role in community-based tourism initiatives. It concludes with a discussion of seed banks in Latin America and the factors contributing to our project.

2.1 Seed Banks

Plants are essential to the human diet as they account for over 80% of what humans consume and just 30 varieties account for 95% of human food energy needs (McNally, 2013). According to the Food and Agriculture Organization (FAO) under the United Nations, in the 20th century farmers worldwide who transitioned to genetically uniform, higher-yielding crop varieties contributed to about 75% loss of crop genetic diversity. These farmers abandon local species for higher yields (McNally, 2013). In particular, the seed industry has had significant development towards concentrated ownership of production technologies and homogenized crop systems. Transgenic seeds, a form of Genetically Modified Organisms (GMOs), dominate commercial plant breeding and it is unknown to what extent this process accelerates biodiversity loss or other negative impacts on the environment (Rótolo et al., 2015). Climate change and other human-centric forms of biomass degradation make it necessary to preserve remaining plant life, which make up 80% of all biomass (Bar-On, 2018). As the world transitions into more advanced technological methods of farming, heirlooms, otherwise known as seeds from traditional agricultural varieties are at higher risk of extinction due to this type of commercial agriculture (Wight, 2020). Therefore, there has been a recent increase in seed preservation methods across the world (Vernooy et al., 2017 B). One preservation method is seed banks.

Seed banks exist in many different forms and function as a space for seed storage to preserve their genetic diversity and maintain the cultural heritage of different groups across the world. They also act as a catalog to map the agricultural evolution for their regional locations (Tanksley and McCouch, 1997). On an ecological timescale, they represent biodiversity reservoirs and have a positive impact on local seed population persistence and biodiversity

preservation (Vandvik et al., 2015). Without seeds, Earth would not have the genetic diversity it has today.

2.1.1 Seed Bank Classification and Types

Experts classify seed banks based on their type of conservation. Ex-situ conservation is the “conservation of selected plants and animals in selected areas outside their natural habitat” and “involves the transfer of genetic material away from the location where it is found” (Jaisankar et al., 2018). Conversely, in-situ conservation is “the conservation of species in their natural habitat or natural ecosystem.” In the process, “the natural surrounding or ecosystem is protected and maintained so that all the constituent species (known or unknown) are conserved and benefited” (Maxted, 2013). Most seed banks fall under ex-situ conservation as growers physically move seeds from their natural habitat to a storage site and store them in areas far from where they originate as well. For seeds specifically, ex-situ conservation is a more convenient, cost-effective, and wider-used method of conservation (Malhotra et al., 2019).

Once growers add seeds to a bank, they characterize the seeds by factors such as the length of their storage times. The three main categories for determining storage lengths are transient, short-term persistent, and long-term persistent. Table 1 illustrates the three categories and their respective storage lengths. Transient seeds are species that can survive in the bank for less than one year, short-term persistent for between one to five years, and long-term persistent for at least five years. Long-term persistent seeds are unique in that they can help regenerate destroyed plant communities in the framework of restoration ecology (Bakker, 1996).

Table 2.1

Seed storage classification and their respective storage lengths

Storage Category	Storage Length
Transient	Less than 1 year
Short-term persistent	1-5 years
Long-term persistent	More than 5 years

Seed banks vary in size, shape, and location. For example, the Svalbard Global Seed Vault (see Figure 2.1) is a storage facility that acts as a seed bank. Built in 2008 in Svalbard, Norway the vault currently houses over 1 million samples and has the capacity to store 4.5 million varieties of crops. It is part of a global effort to preserve crop diversity for future generations and houses over 5,000 different species (Asdal & Guarino, 2018). While this seed bank operates on a large scale, others are smaller and more local.

Community seed banks (CSBs) are locally governed institutions that aim to maintain seeds for local use (Vernooy et al., 2017 B). Some CSBs only focus

on conservation of agricultural biodiversity including reviving lost local varieties, while others give priority to conservation, access, and availability of diverse types of seeds and planting materials for various agro-ecological areas (Vernooy et al., 2017 B). For example, in South Africa, villages aim to conserve local varieties while restoring ones that have disappeared from the area in recent years. In the northeastern part of the Limpopo province, 20 women farmers both manage and operate the Gumbu village CSB (see Figure 2.2). It safeguards seeds inherited from the women’s parents and prior generations. However, changing rainy seasons due to climate change threatens the seed bank. The women contend that the rains “have not come for a long time” and it has become harder to maintain seeds of traditional varieties as a result. The rains force families to consume the remaining traditional varieties before reproducing them, leading to further losses (Vernooy et al., 2017 A).

2.1.2 Seed Banks and Fostering Culture

Seed banks are important for keeping the cultural heritage and traditions of indigenous groups alive (Swiderska and Argumedo, 2022). Many members of the Cherokee Nation cultivate traditional crops and they have been formally practicing seed conservation for almost two decades. (Wight, 2020). The Cherokee Nation Seed Bank is a cultural preservation program dedicated to storing traditional seed varieties. According to Pat Gwin, senior director of the Cherokee Nation’s Environmental Resources Group, the seed bank preserves over 100 different types of seeds and as of 2019, distributed around 10,000 seed packages to growers in the US (Wight, 2020). Its founders started the program in 2006 and took inspiration from the Svalbard Seed Vault. Many of the seeds within the program are multipurpose and the Cherokees used them ceremonially, for crafts and sustenance. These seeds include the “Trail of Tears” bean and dent corn also known as the Cherokee White Eagle. For Cherokees across the US, the seeds serve as a connection to their culture and provide a source of comfort through their planting (Wight, 2020).

Figure 2.1

Global Seed Vault in Svalbard, Norway



Note. From Inside the ‘Doomsday’ Vault, J. Duggan, 2018 (<https://time.com/doomsday-vault/>)

Another example is the Quachuu Aloom seed bank in Guatemala (see Figure 2.3). Quachuu Aloom, which translates to Mother Earth, is an agricultural development non-governmental organization (NGO) that aims to improve farmers' traditional and agroecological farming practices while helping to preserve native seeds. It accomplishes this by providing the raw materials for the circular gardens and raised beds at their main seed farm outside of Rabinal, Guatemala (Wight, 2020). The seed bank has around 500 active members. Similar to the Cherokee Nation seed bank, Quachuu Aloom enforces and sustains cultural practices that large-scale banks such as Svalbard Seed Vault cannot do. They aid farmers and community members by providing traditional varieties to sustain their families and serve as the glue holding these indigenous groups together (Wight, 2020).

Figure 2.2

Women inspecting seeds for the Gumbu community seed bank



Note. From *Sharing diversity: establishing and supporting community seed banks in South Africa*. (Tjikana et al., 2016)

Figure 2.3

Quachuu Aloom Seed Bank



Note. The seed bank holds seeds from indigenous families throughout the Baja Verapaz region of Guatemala. (Wight, 2020)

2.2 Traditional Seed Use and Agriculture

Indigenous culture has long influenced traditional agricultural practices. Latin America's worldview underpins the traditional agriculture in Latin America today. Worldview synthesizes centuries of accumulated knowledge of the ecosystem and climate in which they live (Parraguez-Vergara et al., 2018). Worldview knowledge has a direct correlation to a civilization's belief system and consequently shapes it. Belief systems and worldview knowledge continue to influence agricultural practices in Latin American countries in the twenty-first century (Parraguez-Vergara et al., 2018). Table 2.2 displays the worldview considerations that Latin American countries apply and culturally value while farming.

Table 2.2*Traditional practices according to context of study in Latin America*

Practices	Chile	Peru	Ecuador	Colombia	Guatemala	Mexico Totonacas Papantla	Mexico Mayas Yucatan
Season	X	X	X	X	X	X	X
Lunar phase	X	X	X	X	X		
Month	X	X	X	X	X	X	X
Time of day	X	X			X	X	X
Emotional state	X	X	X		X		
Woman			X		X	X	X
Offerings to nature	X	X	X		X	X	X

Note. (Parraguez-Vergara et al., 2018)

Indigenous communities participate in traditional practices directly related to their connection to the Earth, including making offerings to nature and gods, as well as planting seeds at specific phases of the lunar cycle and specific seasons. To help predict the success of a harvest, farmers consider the time of day, their emotional state, and a woman's fertility phase when sowing seeds. An Andean case study shows that a community's culture plays a key role in fostering agro-biodiversity, a subset of general biodiversity pertaining to agriculture (Skarbø, 2014). Agricultural communities that strongly identify with their local indigenous cultural traditions, and those who practice farming to meet their own needs, grow the most diverse crop fields (Skarbø, 2014). Indigenous families who prepare and consume traditional foods tend to lean towards growing a larger variety of crops due to their dependency on their own crop production (Amaya-Castellanos et al., 2022). This highlights the importance of appreciation for cultural and agricultural heritage, as these are pivotal factors for the conservation and cultivation of agro-biodiversity in an area.

Latin-American countries that experience a decline of indigenous people due to cultural change and migration suffer a loss of traditional knowledge and agricultural practices. Additionally, natural resource exhaustion and native crop replacement fuel the decreasing consumption of ancestral foods in indigenous communities. As of 2018, Colombia reported having only 35 ethnic groups surviving out of 102 originally present (Parraguez-Vergara et al., 2018). Changes in farming practices led indigenous communities in Colombia to make ancestral food differently or less frequently (Amaya-Castellanos et al., 2022). In turn, indigenous groups have lost facets of their cultural identity due to difficulty in finding the local ingredients needed to make these traditional dishes. The preparation of ancestral foods requires inherited knowledge and in turn contributes to cultural identity (Amaya-Castellanos et al., 2022). The loss of seed varieties has resulted in people

finding less nutritious replacements for traditional dishes, or ceasing to practice traditions altogether. Therefore diminishing indigenous populations combined with reduced local seed varieties have negatively affected the preservation of belief knowledge, and has led to a loss of traditional practices associated with food production (Parraguez-Vergara et al., 2018).

2.2.1 Seed Exchanges

Farmers exchange seeds with neighbors, relatives, and others, thereby moving crop genetic diversity across farming units (Pautasso et al., 2012). Although it is more common for farmers to exchange seeds with neighbors and relatives due to proximity, occasionally exchanges occur with distant villages and markets. These more widespread networks, in contrast to the local ones, facilitate the spread of new varieties throughout a region, thus making seed systems more resilient to environmental changes. To keep existing crop varieties from disappearing, farmers from different regions must participate in seed exchanges (Pautasso et al., 2012).

Rural Latin American communities have started to reconstruct, and expand their own community networks in order to facilitate seed exchanges for native seed varieties (Borja & Oyarzún, 2016). Seed exchanges are events in which people gather to trade seeds (see Figure 2.4).

Figure 2.4

Two women exchanging a local bean variety



The seeds exchanged include locally saved seeds, excess seeds, or even some from other regions. This method of seed circulation among farmers is key to conserving local biodiversity in order to slow the disappearance of varieties with historical origins and cultural significance. Through seed exchanges, participants can build extensive seed collections, which result in diverse crops. However, maximizing the range and quantities of seeds available at seed exchanges requires collaboration. Creating complex networks for seed exchange, participation from botanical gardens, farmers, government agencies, indigenous people, NGOs, and seed companies must occur in order to increase biodiversity (Pautasso et al., 2012). Whether the aim of a seed exchange is for personal use or conservation, there exists a growing consensus that seed use and conservation are interdependent (Pautasso et al., 2012).

2.3 Maintaining Traditional Knowledge

Traditional knowledge is at the core of indigenous identity, culture, and heritage. Its transmission from generation to generation must be protected to ensure these are not forgotten. In an effort to preserve traditional knowledge, Latin American countries use community-based tourism and education (Oviedo et al., 2007).

2.3.1 Education

The loss of traditional knowledge is a persistent problem for almost every indigenous community. Favoring Western knowledge damages and devalues the communities' traditional practices and knowledge (Oviedo et al., 2007). Within the scope of indigenous knowledge lies the understanding of the value of certain native seeds, how to properly take care of them, and how to treat the local land to maintain its fertility (Oviedo et al., 2007). However, due to Western and colonial influences, among other factors, this knowledge has fallen to the wayside or forgotten completely. The speed of traditional knowledge erosion is a result of the social climate that the indigenous group lives within and the importance they place on their culture and heritage. Communities can be susceptible to loss of culture through schools teaching Western ideology, the introduction of foreign markets competing with traditional economies, lack of opportunities to transmit culture to younger generations, and ecological and social changes (Oviedo et al., 2007). Due to the significant variation in the levels of erosion and the varying influences in each type of community, those who wish to better the situation must use different methods of slowing traditional knowledge erosion.

In general, the most effective method of reversing and slowing tradition knowledge erosion is through education. Originally elders approached this through oral tradition, whereby elders pass down their knowledge to the younger generation by telling stories about their traditions rather than writing it down (Oviedo, et al., 2007). However, with the introduction of regulated schooling that favors Western knowledge, the opportunities to pass down traditional knowledge have decreased. When elders do pass down their knowledge to the younger generations, they often forget or undervalue this knowledge (Benyei Peco et al., 2020). The most effective approach to reduce the loss of traditional knowledge is to reform school curricula to include indigenous ideas, practices, and other knowledge (Benyei Peco et al., 2020).

2.3.2 Community Based Tourism

One avenue of maintaining traditional knowledge is through rural, or community-based tourism (CBT). Communities can maintain local culture, while also empowering and strengthening traditional values. This form of tourism has become increasingly popular in developing countries due to the flexibility of these initiatives and tactics, as well as the ability to provide jobs in unemployed areas and help diversify local businesses by making them more profitable (Yfantidou, Matarazzo, 2017). Small rural communities are in a unique position in which they must work cooperatively to maximize their to

attract tourists. Community-based tourism refers to this aspect of tourism. CBT is a tourism model characterized by local businesses supporting other local businesses (Ruiz-Ballesteros, 2011). Studies have linked CBT with creating a higher level of socio-economic resilience (Ruiz-Ballesteros, 2011), which is “the capacity of a system to experience shocks while retaining essentially the same function, structure, feedback and therefore identity” (Walker et al., 2006). The case study of the town of Agua Blanca, Ecuador shows, having a culture of CBT helps remind the community about their collective memories that were on the brink of being lost (Ruiz-Ballesteros, 2011). This remembrance was largely due to the community spreading their culture and traditions with tourists (Ruiz-Ballesteros, 2011). CBT helped the community begin to remember aspects of their local culture that were almost lost (Ruiz-Ballesteros, 2011).

Although no widespread research solidifies the effects seed banks have on rural and community-based tourism, CBT efforts often include seed banks. One example of this is Turismo Joya Hermosa, a tourism-focused cooperative between three towns in Guatemala. The cooperative focuses on sustainable tourism using agritourism and offers guided tours to farms and artisanal businesses in the area. One of their main stops is the local seed bank that contains multiple varieties of different crops and a clonal garden with 52 varieties of potatoes. While the seed bank’s effect is mostly secondhand, research shows it improves related indigenous knowledge and increases local biodiversity (Vernooy et al., 2017 B). This improvement has a positive effect on tourism demonstrated by the Joya Hermosa cooperative.

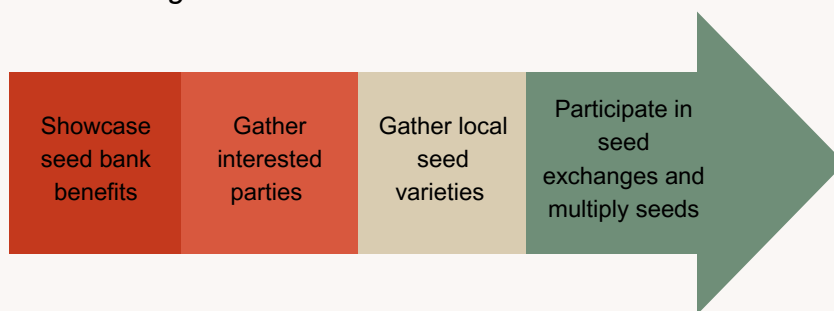
2.4 Seed Banks in Latin America and Our Project

2.4.1 Colombia Seed Bank Case Study

Danilo Fino carried out a research study to design a viable community seed bank in the town of Ubaque, Colombia. Beyond a successful design, he aimed to benefit the local community and further the sustainable development of the town as a response to the declining biodiversity and food sovereignty (Fino, 2014). He created a guide to help other communities establish seed banks. This detailed guide contains steps to follow to establish a seed bank, ensuring careful collection of the seeds in order to protect the biodiversity of the area. The major steps in the establishment process are as follows (see Figure 2.5).

Figure 2.5

Process for establishing a seed bank



1

Local government officials, NGO's, and community members interested in the project should hold a collective meeting. An individual interested in establishing a local seed bank must demonstrate the benefits associated with the seed bank compared to current practices in place for the involved stakeholders. An example includes the positive impacts it may have on the local biodiversity. Community members must support the establishment of the seed bank to secure a promising future for it.

2

To launch this initiative into action, the seed bank needs participation from the stakeholder groups mentioned above. High community involvement is necessary to ensure the seed bank continues to expand year by year. Community members with expressed interest in the seed bank can further participate by becoming coordinators that help manage the preservation and exchange of the seeds in the seed bank.

3

Following this step, native seed acquisition from the area begins, keeping in mind the proper methods of collection and methods of distribution that will lead to a future multiplication of seeds. The seeds collected must look physically healthy and be in the best possible state. The seeds must also represent the best batch of the crops. These conditions will ensure that the seeds last up to a year or more in the seed bank.

4

To continue the expansion of the seed bank a beneficiary program is essential. The seed bank can supply beneficiaries with a fixed number of seeds each harvest season. The beneficiary will sow the seeds in a timely manner so that the seeds do not lose their vitality, and after the harvest the beneficiary will return double what the seed bank initially requested. The bank must possess sufficient seeds to satisfy all beneficiaries as the bank expands. The involved community members can also attend seed exchanges to share and exchange seeds, knowledge, traditions, preservation methods, and strengthen ties with other communities to further seed bank and seed exchange networks. It is important to consider the seed bank as a community initiative that strengthens community ties and shares knowledge and traditions in respect to sustainable agricultural practices.

Quito, Ecuador Seed Bank

Currently in Quito, Ecuador, there exists el Banco de Germoplasma del Instituto Nacional de Investigaciones Agropecuarias (INIAP) (see Figure 2.6), which is a joint effort between Los Guardianes de las Semillas (RGS) and the Ecuadorian government. This national seed bank stores native seeds that contribute to the agro-biodiversity of Ecuador. RGS, a nonprofit organization that focuses on seed collection and distribution, works to find and recover seed varieties to add them into Banco de Germoplasma. Meanwhile, scientists from INIAP research methods to improve these seed varieties. This seed bank houses a variety of grains and tubers, some of which are at risk of disappearing. El Banco de Germoplasma currently contains 20,000 ecotypes and 320 plant species, including all 25 maize varieties found in Ecuador (Erazo, 2010). The goal of this seed bank is to safeguard food sovereignty, as well as protect and conserve the country's genetic heritage.

Figure 2.6

Worker in Quito, Ecuador Seed Bank



Note. From “Arca de Noé de semillas preserva biodiversidad en Ecuador,” *El Universo*, 2011.

Cuenca, Ecuador Seed Bank

Located in the Azuay Province (see Figure 2.7), in the city of Cuenca, Ecuador, la Casa de Semillas Nativas is a seed bank (see Figure 2.8) with the objective to rescue, conserve and preserve native seeds. The Association of Agroecological Producers of Azuay (APA Azuay), the Ministry of Agriculture and Livestock (MAG), and the Heifer Ecuador Foundation, inaugurated the first seed bank in the province in 2021. Currently, the seed bank contains 150 different crop varieties, thus becoming a reserve of genetic diversity that farmers can access through seed exchanges and seed multiplication (El Mercurio, 2021). To recognize the work of farmers participating with the seed bank and contributing to the country's food

security, la Casa de Semillas has accredited participating farmers as producers of la Agricultura Familiar Campesina (El Mercurio, 2021). This title recognizes them as accredited farmers which allows them to commercialize and start their own agricultural business.

Figure 2.7

Map of Azuay Province Seed Banks



Figure 2.8

Worker in la Casa de Semillas



Note. From “El Mercurio” 2021.

Sayausí Seed Bank

The Sayausí seed bank sits inside Sisay Pacha, a local organic store. What began as a family project in 2016, has now grown to become a community seed bank for the Sayausí parish. Tania Peñaloza, the seed bank manager, began preserving local seed varieties with her family as they noticed the diminishing varieties of crops from their own family farm. The once colorful fields of red and purple corn became filled with only one white variety of corn (see Figure 2.9). Peñaloza saw the growing decline of local seed varieties as not just a family problem, but as a problem on a national level. In 2021, she launched the seed bank on a community level, and that is when the seed bank became part of the Sisay Pacha organic store. The seed bank currently holds 42 local seed varieties, ranging from beans to corn. Peñaloza has collected the seeds found in the Sayausí area through seed exchanges. There currently is no method to donate or take out seeds from the seed bank due to the low quantities the seed bank has of each variety. The current goal of the Sayausí seed bank is to generate awareness for the recollection and conservation of ancestral seeds and to incentivize community members to participate in local seed exchanges.

Figure 2.9

Colorful local corn varieties inside the Sayausí Rural Seed Bank



Our Project

In Cuenca, Ecuador subsistence farms occupy 41% of total agricultural land area (Minga et al., 2014). Communities engage in rural agriculture, tourism, and cultural sustainability. Sayausí, one of the largest parishes in Canton Cuenca is involved in the above activities through their seed bank. On top shelves lay glass jars with a variety of seeds from local produce from the region gathered through local farmers and seed exchanges (see Figure 2.10 and 2.11). For the past two years, the seed bank has been inactive due to lack of prioritization. However, the seed bank has the potential to expand upon its current

42 seed varieties - ranging from beans to sunflower seeds - while also creating awareness amongst community members about diminishing seed varieties and cultural loss. The seed bank safeguards the community's culture and contributes to the livelihoods of local farmers and families, as it holds seeds important to the Sayausí culture as they use them in rituals and traditional food.

Figure 2.10

Sisay Pacha Seed Bank shelves



Figure 2.11

Jar of the mecube rojo corn variety in the Sayausí seed bank



This project aimed to expand the Sayausí Rural Seed Bank through developing promotional material and a set of recommendations to conserve local seed biodiversity and promote the local cultural heritage. Our team worked towards this goal with our sponsor Marisol Peñaloza, councilwoman for rural Cuenca. By speaking to various stakeholder groups including Sayausí locals, community leaders, an Ecuadorian NGO, and our sponsor, we hoped to accomplish our methods outlined in the following chapter.

Methods

3. Methods

The goal of this project is to expand the Sayausí seed bank by developing promotional material and a set of recommendations to conserve local seed biodiversity and promote the local cultural heritage. To achieve the project goal, the team developed three objectives:

1

Assess the current state of the seed bank and its role in preserving culture and heritage.

2

Identify prevalent issues the Sayausí seed bank can address.

3

Develop and get feedback on educational and promotional material for the seed bank.

This chapter describes the approach that the team (see Figure 3.1) took towards obtaining information about the seed bank's current state and its role in cultural preservation, documenting local seed varieties and their traditional significance, creating and receiving feedback on educational material, and addressing our three project objectives.

Figure 3.1

Team picture with sponsor



3.1 Assess the current state of the seed bank and its role in preserving culture and heritage.

The seed bank in Sayausí acts as a safe storage place for the parish's seeds and a cultural repository and resource to support the livelihoods of community members. Through understanding the traditions and seeds of Sayausí locals' values, the team made connections between the local culture and heritage.

3.1.1 Semi-structured Interview of Tania Peñaloza

The team had to first gather information about the current state of the seed bank, and its cultural influence. To understand the inner workings of the seed bank, in terms of its seed preservation, suppliers, and cultural role, the first step was to interview Tania Peñaloza, the Sayausí seed bank manager (see Figure 3.2). The team scheduled the interview at the Sisay Pacha store, which lasted approximately 30 minutes. The semi-structured nature of this interview facilitated a conversational exchange of information (Beebe, 2014). Topics discussed during the interview included the seed bank's history, the seed varieties it holds, its community relationship, and possible areas for growth. For the full list of interview questions, refer to Appendix A. We photographed the seed bank to improve our understanding of its state and gather content for the promotional material. The team asked for permission to record the interview and took field notes of key points made during the interview. After concluding the interview, the team transcribed the interview, located in Appendix H.

Figure 3.2

Interview with Tania Peñaloza



3.1.2 Survey of Sayausí Community Members

To gauge the traditions and seeds valued by locals, the team utilized surveys. The team asked Sayausí locals from different age groups questions regarding their use of seeds in their daily life, health, and traditional use. The survey also included questions regarding lost practices and the feasibility of finding distinct seed varieties. For all survey questions, refer to Appendix B. The team used convenience sampling to gather subjects and walked along a main street, Avenida Ordoñez Lasso, due to its heavy vehicle traffic and numerous pedestrians. As the bus stops along this street were hotspots with people waiting, they were a convenient location for the team to execute the survey. We administered the survey through Google Forms by reading the survey questions and recording the respondents answers. After collecting data, the team conducted a statistical analysis of the survey responses. The team sorted through the responses using Excel and visually represented the findings using bar graphs, and a word cloud showcasing the seeds commonly used by Sayausí locals.

3.1.3 Participant Observation of Pawkar Raymi Festival

The Pawkar Raymi festival, a celebration of the gifts from Pachamama, mother nature, took place the week of March 19th in multiple locations across the Cuenca canton. The team attended events in both Victoria del Portete and Cuenca, and took note of the cultural meaning behind the festivals and its celebrations in relation to seeds and traditions. The notekeeping template is in Appendix C. The team participated in a chakana (Inca cross) ritual (See Figure 3.3). This is a Kichwa ritual with offerings welcoming success and warding off bad energy. We also took part in a pampa mesa, a potluck meal in which community members share food typically made with crops from the harvest. Through these events, the team saw firsthand the importance of heritage seeds in traditional rituals and their role in the local culture, and gained an understanding of community values. Appendix I presents the field notes the team took.

Figure 3.3

Chakana ritual during the Pawkar Raymi festival



3.2 Objective 2: Identify prevalent issues the Sayausí Rural seed bank can address

The Sayausí seed bank is vital in protecting local seeds which community members have been using over generations. To better address the community's needs and include relevant information in the pamphlet deliverable, the team spoke with several community members and an NGO. These interviews allowed us to identify issues these groups faced surrounding seed usage and cultural loss, among others. After learning about these issues, the team interviewed a representative from an NGO experienced in seed bank support and community involvement methods. This helped the group raise awareness about the seed bank's cultural importance and role in preserving seed biodiversity.

3.2.1 Semi-Structured Interviews of Farmers, Indigenous Leaders, and NGO

The team conducted semi-structured interviews with local farmers, indigenous leaders, and an Ecuadorian NGO, Los Guardianes de Semillas (see Table 3.1).

Figure 3.4

One of the farmers from Sayausí the team interviewed



The first group the team interviewed were local farmers in Sayausí. The team used convenience sampling to select five farmers to interview across Sayausí (See Figure 3.4), and the Pawkar Raymi festivities. See Table 3.1 for details about when and who the team interviewed each week for the following sets of interviews. Since farmers use seeds for subsistence farming and can directly benefit from seed banks, we hoped they could provide us with insights about how they interact with seeds and problems they face. We asked these farmers questions about the types of seeds they cultivate, their methods of seed conservation, and their personal experiences regarding seed loss and seed exchanges. For the full list of questions refer to Appendix D. These questions aimed at uncovering seed related issues the farmers face and gathering more information about how a seed bank could address these issues.

Each interview began by asking for informed consent as well as permission to record any footage for data analysis afterward. The team designated a lead interviewer and a note taker for the entirety of every interview in case

our recording failed. Team members rotated through these positions for each interview throughout all three groups in this objective. Next, the group transcribed the entirety of the recording and typed this transcription into a central document. See Appendix J for the farmer interviews transcriptions. the team coded the transcriptions to determine common themes between each interview and identify relevant patterns in our interviewees' responses (Beebe, 2014). The group used this analysis process for the following two interview groups.

Table 3.1

Date and Interviewee for Interviews

Date	Interviewee(s)
Week 2: 25/03/2023	Indigenous Leader 3
Week 2: 25/03/2023	Farmer 4 and 5
Week 3: 30/03/2023	Indigenous Leader 1 and 2
Week 3: 30/03/2023	Farmer 1, 2, and 3
Week 5: 12/04/2023	Javier Carrera

The next set of interviews focused on taitas and mamas, indigenous leaders (See Figure 3.5) who possess traditional knowledge. The team interviewed three indigenous leaders during the Pawkar Raymi festival and asked them questions about cultural issues specifically pertaining to seed usage and their viewpoint on generational participation in local traditional practices. See Appendix E for the full list of questions. By speaking to them, the team hoped to learn about local traditions and practices as well as techniques community members have used that are intertwined with local culture. The interviews inquired about these cultural issues and why the indigenous community values seeds in traditional practices. The intent of the outcomes from these interviews was to provide culturally relevant information in the pamphlet deliverable and include impactful quotes from our interviews. These interviews provided information from a cultural standpoint and were unique in that respect. See Appendix K for a transcription of the indigenous leader interviews.

Figure 3.5

Two indigenous leaders from Sayausí the team interviewed



Lastly, the team gathered input from Javier Carrera, founder of Los Guardianes de Semillas, an Ecuadorian NGO, to gain insight from an organization that has experience and expertise working with rural parishes. To accomplish this we conducted a semi-structured virtual interview with Carrera (see Figure 3.6). After conducting interviews with the previous two groups, the purpose of this final interview was to obtain an NGO's perspective on how they have dealt with effectively addressing communities' needs. We knew Los Guardianes de Semillas had previously worked with a variety of diverse parishes and towns throughout Ecuador, and we hoped they could provide guidance on how to incorporate Sayausí's needs into our deliverables. Los Guardianes de Semillas also has experience working with seed identification, local seed usage, and could provide advice on how to approach the framework section of the pamphlet to effectively replicate the Sayausí seed bank in other parishes. The interview questions asked about the challenges and benefits to a seed bank, its potential cultural impacts, and future seed bank replication (see Appendix F). For a transcription of Carrera's interview see Appendix L.

Figure 3.6

Virtual interview with Javier Carrera



3.3 Objective 3: Develop and get feedback on promotional educational material for the Sayausí Rural Seed Bank

Promotional material must take into consideration its target audience. For this project, the target audience is the community members of the Sayausí parish. To ensure that the people of Sayausí valued the promotional material, the team gauged the opinions of the community to better inform the development of our pamphlet.

3.3.1 Creating Pamphlet Designs

Having collected stories, photographs, and benefits of seeds in the Sayausí seed bank, the team began curating the content for the educational pamphlet. We worked closely with Marisol and Tania Peñaloza to make the pamphlet. Our team met on a weekly basis with Marisol Peñaloza. We reviewed our progress and discussed our pamphlet designs and contents. The team evolved the pamphlet design through continual feedback from our sponsor. We focused on creating a pamphlet that would be representative of the values of the people of Sayausí and serve as a basis for the seed bank to continue to develop. As this was a lengthy process of gathering feedback and revising which would distract from the methods discussed in this section, we provided a detailed breakdown of our pamphlet design considerations in Chapter 4.

3.3.2 Pamphlet Community Feedback

To best evaluate the usability and cultural accuracy of the pamphlet the team gathered community feedback. Through the communities' feedback, the team developed subsequent iterations based on both community feedback assessment surveys and our sponsor's feedback. To produce the largest number of pamphlet iterations within the project's time constraints, the team decided to conduct two rounds of pamphlet assessment surveys. We followed the process detailed below for both rounds and surveyed 10 respondents in the first round and 11 respondents for the second round. The team conducted these two assessment surveys on the main street in Sayausí and sampled 21 random community members in total (see Figure 3.7).

Figure 3.7

Eliciting design feedback from a Sayausí woman



The team administered this activity through Google Forms which allowed us to record answers and transfer data onto an Excel spreadsheet for analysis. This survey included short answer questions, ranking statements based on engagement measurement tools, and concluded with open response questions. The assessment survey began with the short answer section which included questions about respondents' demographics and general knowledge about the Sayausí Rural seed bank. See Appendix I for the full survey contents.

The survey asked respondents to read through the pamphlet and upon finishing, rank statements based on three distinct categories. The team developed the three categories: aesthetics, satisfaction, and perceived usability based on the UES (User Engagement Scale). The UES is a survey-based measurement tool for user engagement (O'Brien & Toms, 2009). It

asks respondents to rank statements based on the three categories mentioned above based on the Likert scale. The team chose to use the following scale: (1) Strongly Disagree; (2) Disagree; (3) Neither Agree nor Disagree; (4) Agree; (5) Strongly Agree. The group chose to assign numbers, where high numbers indicate agreement and low numbers indicate disagreement with a statement (Wiebea, 2013). The first UES category, aesthetics, gauges the pamphlet's visual appeal at first glance. The aesthetics statements aimed to target graphics, their organization, and the colors in the pamphlet. The next category, satisfaction, aimed to gauge users' general curiosity to further explore the pamphlet and fulfillment while interacting with it. The final category, perceived usability, focused on other emotional reactions respondents had while interacting with the pamphlet. For example, statements (see Appendix G for full list of statements) involved the level of confusion, frustration, and mental strain that had potential to hinder respondents and prevent them from fully engaging with the material. Analysis of the data involved calculating means of responses to each of the statements, and then taking the average of those numbers. This final mean represents the score for each category. With respect to the Likert scale, larger scores close to 5 indicate higher levels of overall engagement while smaller scores close to 1 indicate lower levels.

Additionally, in the last open-ended survey section, we used the Framework developed by the National Science Foundation to assess the emotional impact of the pamphlet. The Framework is a measuring tool for user-engagement with the purpose of asking respondents to discuss their rankings at the end of the survey (Teller, 2007). Through this procedure, we asked respondents open-ended questions adapted from the Framework intended to capture their overall emotions while interacting with the pamphlet. The survey gave respondents the opportunity to point out a section that resonated the most with them, as well how the contents of the pamphlet had influenced them. To analyze the data collected from the open response questions, the team looked for patterns amongst the participants' responses. Additionally, we calculated the number of respondents who indicated they would find a pamphlet showcasing local seeds and their uses as useful, not useful, or provided an ambiguous answer for quantitative analysis.

The project group then used this data to revise the pamphlet and create two subsequent versions. Ultimately, the team conducted two rounds of assessment surveys over the course of one week, and during each round the team presented an updated version. After completing and analyzing these surveys, we then received our sponsor's approval of our most updated version and finalized all desired changes based on our sponsor's feedback to develop our final version.

Design Considerations

4. Design Considerations

This section explains the development of the educational seed bank pamphlet, as well as the team's design choices. Given that our sponsor aims to have the pamphlet serve as a template for future seed banks to create their own promotional materials, the team used Canva (canva.com) for its creation.

Canva is a free online graphic design tool that specializes in creating social media graphics. Its user-friendly interface provides users with a range of templates and tools to create professional designs. Additionally, Canva allows for collaboration with as many others, allowing for large groups to design together. Since the Sayausí Rural Seed Bank intends to edit the pamphlet to accurately represent the seed bank as it continues to expand, Canva makes this feasible.

Preliminary Designs

Our sponsor emphasized creating a visually appealing pamphlet and to present multiple options, the team decided each team member would create at least one pamphlet design. This enabled each team member to have complete creative liberty and consequently present more diverse designs. These preliminary designs included sections focusing on the seed bank's history, seed exchanges, seed loss, the seed bank's seeds and their health benefits. We also included relevant information gathered from Sayausí locals, pictures taken of the seed varieties at the seed bank, as well as quotes from local farmers for the pamphlet's contents.

After developing four distinct preliminary pamphlet designs (see Figure 4.1, 4.2, 4.3, and 4.4), we showed them to our sponsor and received feedback. She requested adding five recipes using local seeds found in the seed bank to the pamphlet, as well as a section with a framework for establishing a rural community seed bank. Our sponsor selected two of our preliminary designs that she preferred. She suggested merging the organization of Figure 4.3 with the green color scheme of Figure 4.2. In addition, she requested distinct divisions among each of the sections of the pamphlet.

Figure 4.1

Preliminary pamphlet design 1



Figure 4.2

Preliminary pamphlet design 2



Figure 4.3

Preliminary pamphlet design 3

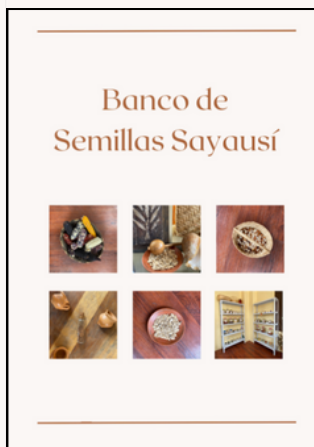


Figure 4.4

Preliminary pamphlet design 4



Version 1

As a result, our Version 1 design kept the template we made for preliminary design 3 (see Figure 4.3) and applied the green color palette used for preliminary design 2 (see Figure 4.2). The team also included five traditional Ecuadorian recipes into this version. Doña Nydia Vasquez, Cuencan Councilwoman, kindly donated her traditional recipes from her book *Ashanga, cocina morlaca* (Vazquez et al., 2015), for use in our pamphlet. Out of over 200 recipes, we narrowed down and ultimately chose five recipes, each containing a different main seed variety ingredient to represent each pamphlet section. See Figure 4.6 for an example of these recipes. To address our sponsor's request for distinct section divisions, we included pages titled with the name of the upcoming section (see Figure 4.5) in Version 1.

Figure 4.5
Version 1 section page



Figure 4.6
Version 1 recipe page



Version 2

To produce Version 2 of the pamphlet, the team used the community feedback gathered in assessment survey round 1. Feedback received for Version 1 of the pamphlet included: more lively colors, more pictures, a more attractive cover, a more detailed design, sturdier binding, and fewer words. For this reason, we added an Incan-style pattern to the borders, white vine detailing, red colored font, pictures of locals and farms in Sayausí, as well as inverted the colors of our cover (see Figure 4.7 and 4.8) to address the community members' suggestions.

Figure 4.7
Version 2 cover page



Figure 4.8
Version 2 content page



Version 3

Following assessment survey round 2 gathered for Version 2 and a meeting with our sponsor, the team applied their suggestions to create Version 3 of the pamphlet. From the feedback gathered from community members and our sponsor the changes made were the following: center-aligned text, bigger font size, and a smaller paper size (see Figure 4.9). Additionally, the team decided to include an acknowledgement section at the end of the pamphlet thanking those that helped inform the contents of our pamphlet, as well as our sponsor (see Figure 4.10). The final step was to print an A5 sized version of our pamphlet, as requested by our sponsor, to allow for increased portability and convenience (See Appendix M for a complete version of the final pamphlet).

Figure 4.9
Comparison of version 2 and version 3 print sizes

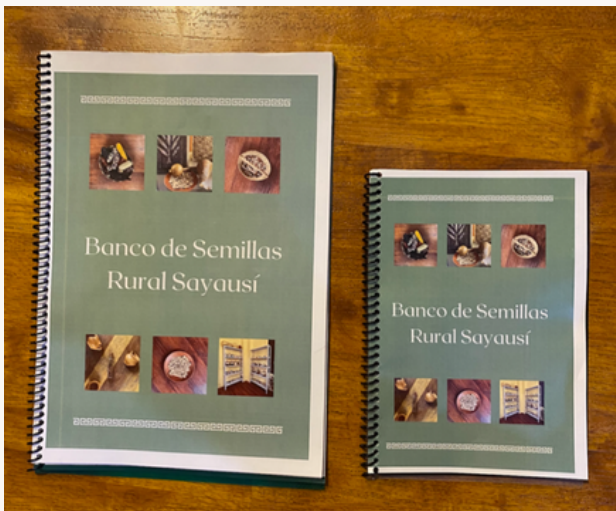


Figure 4.10
Version 3 acknowledgement page



Findings

5. Findings

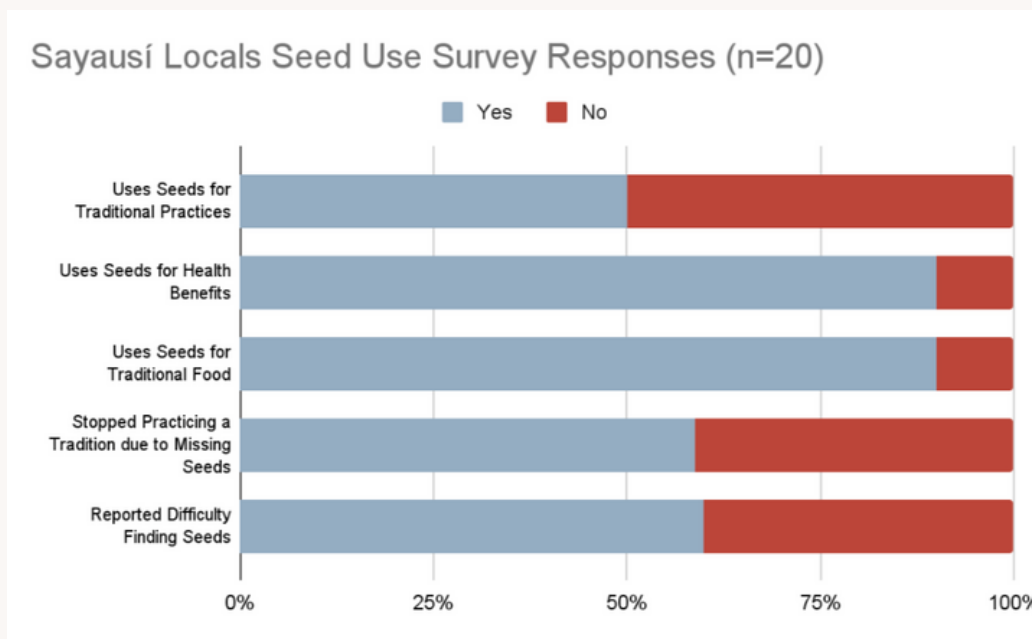
The goal of this project is to expand the Sayausí Rural Seed Bank through developing promotional material and a set of recommendations to conserve local seed biodiversity and promote the local cultural heritage. This chapter details the findings from applying the methods the previous chapter articulated to meet this goal. We identified these findings through coding and analyzing the qualitative results from interviews, and two surveys.

5.1 Finding 1: The Sayausí locals place cultural importance on local seed varieties and use them for both traditional and health purposes.

As the background chapter previously discussed, communities use local seeds for a variety of reasons including maintaining traditional practices and for health benefits. The group conducted a survey on the main street of Sayausí with 20 community members and asked a variety of questions to determine different types of seed usage. Figure 5.1 illustrates the results from the survey in terms of the five questions included in the survey. The second question shows that out of the 20 total people surveyed, 90% of respondents answered positively to using seeds for health benefits. These benefits include but are not limited to using seeds for brewing tea or directly ingesting them to relieve symptoms. Similarly, the third question shows that 90% of the respondents said they use seeds to make traditional foods. This indicates that the majority of Sayausí locals surveyed choose to use seeds for both traditional and health reasons and that they place cultural importance on these practices. Therefore, the team identified similarities between our initial research on traditional seed usage, their importance to communities, and our survey results.

The team also conducted an interview with Tania Peñaloza, the seed bank manager. This interview gave us valuable insight from someone who identifies as a Sayausí local and interacts with community members on a daily basis. She specifically stressed the seed bank's role in protecting its seeds to maintain Sayausí's culture. One of her goals is to safeguard the bank's heritage seeds the community's ancestors used. According to Peñaloza, her ancestors "stored the best quality seeds in a place where they were safe from contamination and... [at] the right time in September, according to the months of the moon, they [would] sow [these seeds]" to later harvest, consume, and use for practices such as rituals. She worries

Figure 5.1
Sayausí Locals Seed Use Survey Responses



that these same seeds are in danger of disappearing forever, taking the local customs along with them. She mentioned they remain in use today for traditional practices, such as rituals in the parish.

One local cultural event is the Pawkar Raymi festival, held each year to celebrate the harvest and Pachamama or Mother Earth. The team participated in a *chakana* ritual which includes all four classical elements: earth, wind, fire, and air. Figure 5.2 shows community members gathered around the *chakana* which uses traditional seeds to represent Earth, one of the elements. The ritual emphasized the seeds' importance to the local culture and how the participants value these types of traditional practices passed down through generations. If these seeds disappear, the *chakana* and other practices will disappear as well.

Figure 5.2
A chakana ritual during the Pawkar Raymi festival Reforestation event



5.2 Finding 2: The Sayausí people recognize there is a loss of seed varieties.

Through surveying, our team was able to infer that many Sayausí community members have experienced a loss of a type of seed or are at least aware of the loss of seeds in the area. The fourth and fifth sets of responses, shown in Figure 5.1 demonstrate this sentiment, 59% of respondents stopped certain practices due to the lack of seeds according to the fourth question. The fifth question asked if there were any seeds they had difficulty obtaining and 60% of respondents reported they experienced difficulty obtaining seeds. The community members cited unavailability in the area, high costs, and a plague that had destroyed the crop in the area as the cause for their difficulty in obtaining seeds.

Our team further identified this acknowledgement of seed loss during our interviews. When we asked Tania Peñaloza about her reason to start the seed bank, she responded with

“...the red corn had been lost, the tomatoes had been lost, in other words there was an incredible variety of colors, and there no longer were any [colorful varieties], only white corn.”

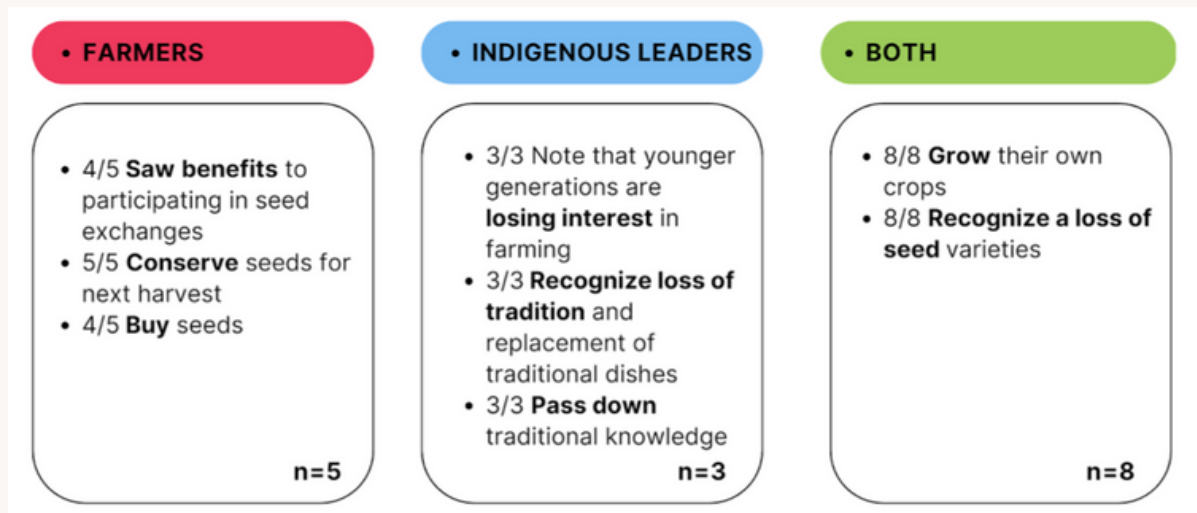
“...the red corn had been lost, the tomatoes had been lost, in other words there was an incredible variety of colors, and there no longer were any [colorful varieties], only white corn.”

- Tania Peñaloza

In support of Peñaloza’s statement, all eight interviewees acknowledged the loss of seed varieties, as seen in the column labeled “Both” in Figure 5.3. When interviewed, one farmer reported he imports genetically modified seeds from Europe which compete with local varieties. The team noted this importation of foreign seeds as a possible contributing factor to the disappearance of local varieties. Peñaloza’s mission is to preserve and protect local seed varieties from threats, such as the ones mentioned above.

Figure 5.3

Ideas expressed during interviews of farmers and indigenous leaders



Note. The team identified common ideas through coding detailed in Objective 2 of the method section.

5.3 Finding 3: Seed exchanges would be beneficial to the community. However, the community needs more information about them.

The Sayausí Rural Seed Bank currently holds 42 local varieties, and Tania Peñaloza has acquired all these varieties through seed exchanges. Peñaloza indicated that the seed bank does not have any community seed providers, such as farmers or governmental support, and depends solely on seed exchanges. However, due to the seed bank's low quantities of each variety, Peñaloza expressed that at times, obtaining new seeds comes at a cost. Peñaloza reported having to pay for new seed varieties on occasions as she had insufficient seeds to exchange. Consequently, she hopes to incentivize other rural parishes to participate in seed exchanges. She stated that "it would be useless if only in Sayausi there are [seed exchanges]... [people from rural parishes] would have to travel from places far away from their community."

In the interviews with Tania Peñaloza and the five farmers, both groups expressed similar sentiments about the benefits of participating in seed exchanges. The farmers demonstrated interest in seed exchanges and spoke about their benefits. One farmer acknowledged that through a seed exchange he could gain access to the different variety of seeds available throughout Ecuador. The farmer then stated, "in the Sierra region there is a large variety of corn and beans" that he could obtain through a seed exchange.

All of the farmers interviewed had never participated in a seed exchange. Two farmers recognized their lack of knowledge surrounding seed

exchanges. When we asked one farmer if she could see benefit from a seed exchange, she said did not know as she had never participated in one before. Additionally, another farmer inquired how she and other community members could start one of their own. She said she was told to participate in a seed exchange “in order to have better [crop] production” and knew of their benefits. All these comments suggest there is a lack of information about exchanges and while community members know they are beneficial, they do not participate in them.

5.4 Finding 4: The team identified several areas of improvement for the Sayausí Rural Seed Bank.

Through conducting interviews with Tania Peñaloza and Javier Carrera, the team identified areas of improvement for the Sayausí Rural Seed Bank. We recognized that the seed bank needs to go beyond using seed exchanges as a method of acquiring seeds and seek stable seed providers in order to expand. The Sayausí Rural Seed Bank could benefit from building a stronger relationship with its community or an NGO. During Tania Peñaloza’s interview, when asked what aspects could the seed bank improve, she responded with community member involvement. To develop recommendations for the Sayausí Rural Seed Bank to continue growing, the team interviewed the founder of Los Guardianes de Semillas, Javier Carrera. This Ecuadorian NGO has experience working with seed banks and protecting local seed varieties.

To strengthen a seed bank’s relationship with the community, Carrera suggested the seed bank frame itself as a secure place for farmers to keep their seeds. He stated that by providing proper preservation for the farmers’ seeds, the farmers would feel secure “knowing that at the time of sowing they will be able to ask the bank for those seeds back.” Therefore, a stronger relationship with the community could facilitate the process of acquiring new seeds, as people would be inclined to make donations to the seed bank. This would develop a constant flow of seeds for the seed bank, and it would not have to rely solely on seed exchanges.

When asked what stakeholders and steps are necessary for the establishment of an impactful community seed bank, Carrera stressed that it is necessary to recall its purpose and the needs to be met. He recalled instances in which communities built seed banks due to expressed community interest and acquired governmental funding. However, these same seed banks closed due to lack of engagement and attention. Carrera stated during his interview that

“a [seed] bank would have to be tied to a specific objective and be focused on the needs of the community, it [the seed bank] must be something that stems from them [community members]... and provide something useful that they [community members] could not otherwise obtain.”

Community members must actively benefit from the seed bank, such as by gaining access to new seeds or having a place to preserve their seeds for

“a [seed] bank would have to be tied to a specific objective and be focused on the needs of the community, it [the seed bank] must be something that stems from them [community members]... and provide something useful that they [community members] could not otherwise obtain.”

- Javier Carrera

future use. If community members see benefits from the seed bank, they will be willing to take on the responsibility of maintaining it. Otherwise, the seed bank will lose momentum and cease to exist. This interview contributed to the team’s development of a framework for the creation of community seed banks in parishes of rural Cuenca. For more details about the seed bank framework refer to Chapter 6.

5.5 Finding 5: Sayausí community members found our pamphlet to be useful and representative.

We conducted our first round of assessment surveys using Version 1 of our pamphlet design (see Figure 5.4). As shown in Table 5.1, after asking respondents to rank each of the statements as shown below, the team calculated the average scores for each category. These values, 4.83, 4.56, and 4.7 reflect the Likert scale and demonstrate the overall level of engagement they experienced in the context of each category. Since numbers closer to 5 indicate agreement, the three scores suggest respondents experienced a high level of engagement with the pamphlet. In particular, the first two statements in the aesthetics category had the highest means indicating users reacted most positively to the pamphlet’s graphics, visuals, and appearance at first glance. The last statement in the satisfaction category had a mean of 5, which represents that all 10 respondents ranked the highest possible value (where 5 indicates strong agreement with the statement) and thought the time spent exploring the pamphlet was worthwhile for them. This mean value revealed the time each respondent spent interacting with the pamphlet was useful. Lastly, both the first and second statement in perceived usability had a mean of 5, indicating respondents agreed strongly that they did not feel discouraged or annoyed while interacting with the pamphlet. This suggests, like the previous category’s results, users felt the pamphlet was worthwhile and an important use of their time.

Figure 5.4

Cover page of Version 1 of the pamphlet

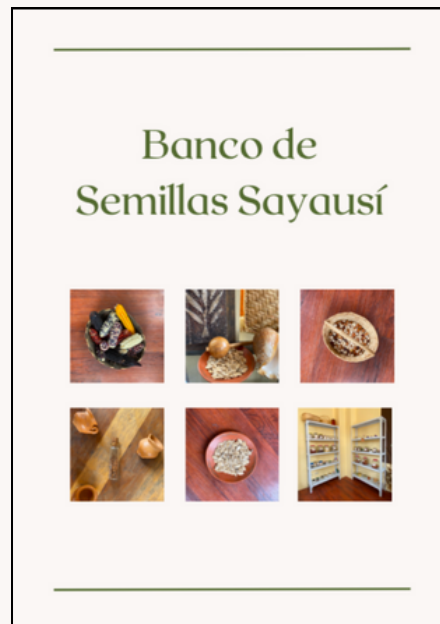


Table 5.1

Summary of response data from first round of community feedback assessment survey

Category	Statement	Mean (n=10)
Aesthetics	The experience appealed to me visually	4.9
	I liked the graphics and visuals used in the pamphlet	4.9
	I liked the layout of media elements in the pamphlet	4.8
	The pamphlet was aesthetically appealing	4.7
	Score for Aesthetics	4.83
Satisfaction	I was drawn into exploring the pamphlet	4.7
	I was moved by the experience	4.4
	I was curious to explore more about the contents of the pamphlet	4.4
	I would recommend this pamphlet to others	4.3
	The time I spent exploring this pamphlet was worthwhile	5
	Score for Satisfaction	4.56
Perceived Usability	I did not feel discouraged while interacting with the pamphlet	5
	I did not feel annoyed while interacting with the pamphlet	5
	The pamphlet was not mentally taxing	4
	I did not find the pamphlet confusing to navigate	4.8
	I did not feel frustrated during the pamphlet	4.7
	Score for Perceived Usability	4.7

To develop Version 2 of the pamphlet the team used the feedback gathered from the assessment surveys of round 1. From the first round of assessment surveys common suggestions made by community members included: more lively colors, more pictures, a more attractive cover, a more detailed design, sturdier binding, and fewer words. After applying these edits, the

next step was to conduct a second round of assessment surveys using Version 2 (see Figure 5.5). Table 5.2 details the scores for the three categories from this round. Similar to the first round, these scores: 4.69, 4.73, and 4.96 indicate high levels of engagement with the pamphlet. The second feedback round using pamphlet Version 2 had higher scores in both satisfaction and perceived usability than the first round. This suggests users had more engagement with these two categories compared to Version 1 used in round 1. The third statement in the aesthetics section had the highest mean of 4.82. Users responded more positively to the layout of media elements in the pamphlet than the first round, one of the common feedback topics we noted from round 1. For the satisfaction category, the fourth statement regarding recommending the pamphlet to others had a mean of 4.91. This result was also different from the highest ranked statement in round 1 and suggests users found the pamphlet useful enough to recommend to others. Lastly, the perceived usability category had the highest number of 5 ranked statements out of all three categories in both survey rounds. 4 out of 5 statements had a mean of 5 which were about users' feelings of discouragement, annoyance, confusion, and frustration while interacting with the pamphlet. Compared to the first round, only 2 out of 5 statements had a mean of 5. The results from the second round suggest that users had a higher level of engagement with 2 out of 3 categories compared to the first round and reacted positively to the design of Version 2. Finally, in both survey rounds, the team asked if a pamphlet showcasing the Sayausí seed bank's seed varieties and their uses would be useful and all 21 respondents agreed with this statement.

Figure 5.5

Content page of Version 2 of the pamphlet

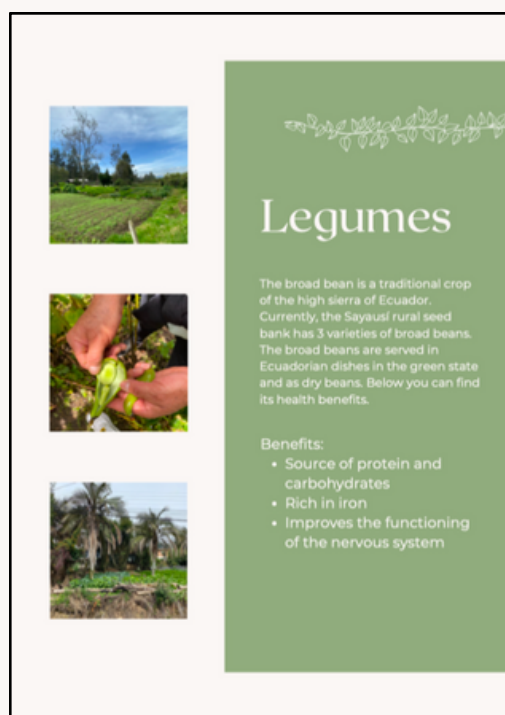


Table 5.2

Summary of response data from second round of community feedback assessment survey

Category	Statement	Mean (n=11)
Aesthetics	The experience appealed to me visually	4.64
	I liked the graphics and visuals used in the pamphlet	4.73
	I liked the layout of media elements in the pamphlet	4.82
	The pamphlet was aesthetically appealing	4.55
	Score for Aesthetics	4.69
Satisfaction	I was drawn into exploring the pamphlet	4.64
	I was moved by the experience	4.55
	I was curious to explore more about the contents of the pamphlet	4.73
	I would recommend this pamphlet to others	4.91
	The time I spent exploring this pamphlet was worthwhile	4.82
	Score for Satisfaction	4.73
Perceived Usability	I did not feel discouraged while interacting with the pamphlet	5.00
	I did not feel annoyed while interacting with the pamphlet	5.00
	The pamphlet was not mentally taxing	4.82
	I did not find the pamphlet confusing to navigate	5.00
	I did not feel frustrated during the pamphlet	5.00
	Score for Perceived Usability	4.96

Beyond ranking the perceived usability of the pamphlet, the team also aimed to accurately reflect Ecuadorian culture within the content of our pamphlet. The open response section in the assessment survey addressed this goal. Through an analysis of the respondents' answers for these questions, the team recognized that all 21 said the recipes included in the pamphlet were representative of Ecuadorian culture (see Appendix G for the full set of questions). Respondents commented that not only were these recipes representative, but they also fondly recalled memories of when their own grandparents made these dishes for them. This demonstrates the potential value the recipes have in eliciting a positive response from survey participants and more broadly, other community members. Ultimately, these results suggest the pamphlet has strong potential to address the project's goal in expanding the Sayausí Rural Seed Bank through creating promotional material.

Deliverables

6. Deliverables

Due to the nature of the project, the team created six deliverables to satisfy our sponsor's mission. These deliverables include our pamphlet design (Appendix M), a template version of our pamphlet design (Appendix R), a framework for future seed banks (Appendix N), a guideline for seed exchanges (Appendix O), and digital promotional banners (Appendix P) and promotional logos (Appendix Q). We created these deliverables for the Sayausí Rural Seed Bank to use in their expansion efforts as well as for any future seed banks or project groups.

Sayausí Rural Seed Bank Pamphlet

The team's pamphlet, which can be found in Appendix M, consists of English and Spanish pages displayed side by side. These pages detail the seed bank's history, local seeds and their respective benefits, traditional recipes, and a section about the loss of seeds. Embedded within the pamphlet is the team's seed bank framework and seed exchange guidelines to allow for easy public access. As the pinnacle of the team's deliverables, the pamphlet was the culmination of all work, research, and time that the team dedicated to the project.

As a separate deliverable, the team created a blank version of the pamphlet with suggestions for image and text placement. This blank version is to act as a template for future seed banks to use and create their own pamphlet. Within the document the team has left, the cover page, the table of contents, an example of a section divider, an example of a content page; these pages all contain suggestions on figure and text placement. We have also left the sections including the seed bank framework, seed exchange guidelines and seed loss discussion untouched. The team chose to do this to help spread awareness and information. This template can be found in Appendix R.

Seed Bank Framework

One of the main deliverables our sponsor wanted was a seed bank framework. The intention of this framework is to assist in the creation of future seed banks. This framework contains a brief explanation of Finding 4 found in Chapter 5, and four main points and considerations when creating a seed bank. Our interview with Javier Carrera and our case study in Chapter 2.4 (Fino, 2014) guided the development of these considerations. The seed bank framework can be found in Appendix N., and four main points and

considerations when creating a seed bank. Our interview with Javier Carrera and our case study in chapter 2.4 (Fino, 2014) guided the development of these considerations. The seed bank framework can be found in Appendix N.

Seed Exchange Guidelines

As previously stated in Finding 3 of Chapter 5, the community needs more information about seed exchanges to make full use of the concept. As such, our team created a seed exchange guideline to facilitate an increase of seed exchanges. This guideline contains an explanation of the benefits of seed exchanges as well as testimonials from Sayausí community members claiming benefits of participating in a seed exchange. The guideline also provides recommendations for holding a seed exchange. The team based the recommendations on the results and findings from the methodology. The seed exchange guideline can be found in Appendix O.

Promotional Banners and Logos

Our sponsor also requested the creation of promotional materials for the Sayausí seed bank. These materials include logos (see Figure 6.1) and digital banners (see Figure 6.2) to be used for the seed bank’s social media. The team’s banner designs are in Appendix P and the logo designs can be found in Ap the seed bank’s social media. The team’s banner designs are in Appendix P and the logo designs can be found in Appendix Q.

Figure 6.1

An example of the team’s logo designs



Figure 6.2

Two examples of the team’s banner designs



Recommendations and Conclusion

7. Recommendations and Conclusion

7.1 Recommendations

This section provides final recommendations from the project team to the Sayausí Rural Seed Bank for its future improvement efforts, and for future work in the rural parishes of the Cuenca canton. The team developed this set of recommendations based on our findings in Chapter 5.

The Sayausí Rural Seed Bank should establish a beneficiary program

A beneficiary program involves people or groups who can directly benefit from the seed bank. These types of people can include anyone interested in cultivating and maintaining their own seed supply. This program should bring together a wide and diverse network of community members. If the community establishes connections with other surrounding parishes, then this program should expand to incorporate them as well. The more widespread this network of beneficiaries is, the more engagement and awareness for the seed bank there will be. Note, not all beneficiaries will desire one type of seed variety. The more often they participate in donating and receiving seeds, the wider the range of seeds circulating there will be. This in turn will increase the local seed biodiversity and allow beneficiaries to obtain seeds they otherwise would not be able to access. As part of the program, the beneficiaries can also receive a fixed number of seeds from the bank each harvest season. They can plant and then return double the seeds each season to keep expanding the seed bank while harvesting the resulting crops for their own use. This program will help maintain not only the local seed varieties, but the seed bank itself.

The Sayausí Rural Seed Bank should open a seed collection system

To help the Sayausí seed bank satisfy communities' needs, it must provide the community members with seeds. Hence, the seed bank must have stable sources of seeds and it can accomplish this using various strategies. One such approach is to open a seed donation system in which community members can donate seeds to the seed bank. To maintain the integrity of the seed organization of the seed bank, the seed bank managers should gather the variety and crop information about the seed donated. A second method for seed gathering is through recruiting seed providers.

A seed provider would be a farmer who agrees to provide any excess seeds to the seed bank. These changes would allow the seed bank to diversify its collection and strengthen ties with community members.

The Sayausí Rural Seed Bank should increase pamphlet accessibility in other parishes

To make the pamphlet accessible for other interested parishes, it must be published in various forms. For example, printing it out and creating hard copies for distribution may be useful for people without access to a cellular device, internet, or computer. Therefore, circulating both hard copies and publishing the pamphlet online can maximize access to as many people as possible. For digital access, Canva gives users a shareable link to projects and with this URL, it is convenient to share projects to anyone with internet access. Community members can spread this link throughout various social media platforms such as Facebook, Instagram, and email for example. Similarly, the Sayausí Rural Seed Bank can use this method of online publicizing to post the pamphlet on its own social media platforms as well. Canva also permits users to print directly from the website to obtain a hard copy. For people without access to a printer or internet, we recommend placing hard copies of the pamphlet in their parish's seed bank or parish center. To spread awareness by word of mouth, parish leaders or local politicians can speak to community members about the pamphlet and its contents during town hall meetings or large events.

The Sayausí Rural Seed Bank should organize seasonal seed exchanges

For the seed bank to increase its presence in the Sayausí community, it should host community events such as seed exchanges. The seed bank should widely market these exchanges to ensure a variety of people attend, including those from other parishes. Beyond granting the seed bank access to an increased variety of seeds, this would allow for an increased circulation of seeds in the community. These events would create a place for farmers to share seeds and exchange knowledge while promoting the conservation of native seed varieties. By hosting these seed exchanges seasonally, the Sayausí seed bank would allow for the exchange of different seeds as different crops grow in different seasons. People could participate multiple times a year or, if they missed an exchange, have the chance to attend another.

The Sayausí Rural Seed Bank should use the seed exchange guideline our team developed to organize workshops, in which community members learn about seed exchanges. During these workshops, community members can learn about seed exchange benefits and how to organize their own. In turn, increasing the seed circulation in the parish and preserving the local biodiversity.

Other parishes should use our seed bank framework and pamphlet template

To establish a seed bank in all 21 parishes of the Cuenca canton, community members interested should use the seed bank framework our team developed (see Appendix N). By taking into consideration the framework's suggestions, the newly established seed bank can ensure it addresses the community's needs and preserves the local biodiversity. Additionally, the new seed bank should use the pamphlet template our team created to promote the contents of the seed bank and engage the community. By utilizing our template, the seed bank can efficiently develop a pamphlet to print and share.

7.2 Conclusion

Our sponsor was interested in creating promotional material and a set of recommendations to help the Sayausí Rural Seed Bank in its expansion efforts and in turn, conserve local seed biodiversity and promote the local cultural heritage. To address this goal, the team developed a series of deliverables, most notably a pamphlet detailing the different seed varieties in the seed bank and a framework for future seed bank replication, among others. Each stakeholder group that interacted with our pamphlet expressed that it was useful and provided relevant details to both our project and meeting the Sayausí community's needs.

This project and the team's set of recommendations have the potential to create a lasting impact on the Sayausí Rural Seed Bank and provide a foundation for future work. The seed bank framework, seed exchange guidelines, and pamphlet template all serve as buildable models for the seed bank and future project groups to utilize as well. By using our team's process, we expect other project groups can continue building upon our work. We also hope that the other 21 parishes in the Cuenca canton will continue to work towards establishing their own community seed banks and shape them around meeting their communities' needs. Ultimately, along with our sponsor and the Sayausí Rural Seed Bank, this project has taken strides in transforming the Sayausí community for the coming years.

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Appendices

Appendix A: Interview Questions for Tania Peñaloza

Objective 1: Semi-structured interview

The goal of this interview is to understand the Sayausí Rural Seed Bank's history, the seed varieties it holds, its relationship with the community, and possible areas for growth.

Informed Consent: You are being invited to participate in an interview part of a published research project at WPI. The purpose of the interview is to gain knowledge about how other seed banks function in the context of their respective community and how their managers have interacted with community members. This interview will last approximately 30 minutes and any published results of individual responses will be anonymous and identifiable information such as age and address will not be shared. We will ask interviewees for consent to record them before interviews begin. All interviews are voluntary and if any of these questions make you uncomfortable, you may skip any of them as they are optional. You may also withdraw at any time during the interview. Interviewees may ask any questions about the interview or project before we begin the process. For further questions or concerns please contact:

Researchers: Andrew Troup, Eugena Choi, Joselin Barbosa
gr-Cultivate-D23@wpi.edu

Project Advisors: Gary Pollice and Robert Kinicki
gpollice@wpi.edu and rek@wpi.edu

Interview Guide

Sisay Pacha seed bank manager (Taina Peñaloza)

1. General questions to ease into interview: How long have you been running the store/seed bank for? How did you start your business and what was that process like?
2. How did the seed bank become part of Sisay Pacha? Could you tell us about its history?
3. How would you say the seed bank contributes to the community? What kind of relationship do you think it has with community members?
4. Are there areas where you think your seed bank could be improved? If so, could you tell us more about them?
5. Do you think the seed bank holds any cultural importance?
 - a. If so, what aspects of culture do you see in it?

- b. If not, how do you think culture can be incorporated into it?
 - c. Does the dirt/growing medium for the plants hold any cultural importance? If so, why do they have meaning?
6. Are there areas where you can see more community engagement with the seed bank?

Appendix A.2 Interview Questions for Tania Peñaloza in Spanish

Objetivo 2: Entrevista semiestructurada

El objetivo de esta entrevista es conocer la historia del banco de semillas Sayausí Rural, las variedades de semillas que alberga, su relación con la comunidad y las posibles áreas de crecimiento.

Consentimiento informado: Se le invita a participar en una entrevista que forma parte de un proyecto de investigación publicado en WPI. El objetivo de esta entrevista es comprender y contextualizar cómo funcionan otros bancos de semillas en el contexto de su respectiva comunidad y cómo han interactuado sus gestores con los miembros de la comunidad. Las entrevistas durarán aproximadamente 30 minutos y los resultados publicados de las respuestas individuales serán anónimos y no se compartirá información identificable como la edad y la dirección. Se pedirá a los entrevistados su consentimiento para ser grabados antes de comenzar las entrevistas. Todas las entrevistas son voluntarias y, si alguna de estas preguntas le incomoda, puede saltárselas, ya que son opcionales. También puede retirarse en cualquier momento de la entrevista. Los entrevistados pueden hacer cualquier pregunta sobre la entrevista o el proyecto antes de que empecemos el proceso. Si tiene alguna duda o pregunta, póngase en contacto con

Investigadores: Andrew Troup, Eugena Choi, Joselin Barbosa
gr-Cultivate-D23@wpi.edu

Asesores del proyecto: Gary Pollice y Robert Kinicki
gpollice@wpi.edu y rek@wpi.edu

Guía de entrevista

Gerente del banco de semillas de Sisay Pacha (Taina Peñaloza)

1. Preguntas generales para facilitar la entrevista: ¿Cuánto tiempo llevas al frente de la tienda/banco de semillas? ¿Cómo empezaste tu negocio y cómo fue el proceso?
2. ¿Cómo llegó el banco de semillas a formar parte de Sisay Pacha? ¿Podría hablarnos de su historia?
3. ¿Cómo dirías que contribuye el banco de semillas a la comunidad? ¿Qué tipo de relación crees que tiene con los miembros de la comunidad?
4. ¿Hay aspectos en los que cree que su banco de semillas podría mejorar? Si es así, ¿podría hablarnos más de ellas?
5. ¿Cree que el banco de semillas tiene alguna importancia cultural?
 - a. En caso afirmativo, ¿qué aspectos de la cultura ve en él?

- b. Si no es así, ¿cómo cree que puede incorporarse la cultura en él? ¿Existen áreas en las que pueda verse un mayor compromiso de la comunidad con el banco de semillas?
 - c. ¿Tiene la tierra/el medio de cultivo de las plantas alguna importancia cultural? En caso afirmativo, ¿por qué tienen significado?
6. ¿Hay áreas en las que se puede ver una mayor participación de la comunidad con el banco de semillas?

Appendix B: Survey Questions for Sayausí Locals

Objective 1: Survey

The goal of the survey is to gather information about which traditional practices and seeds are valued by the Sayausí locals.

Informed Consent: You are being invited to participate in a survey for a published research project at WPI. The purpose of this survey is to gather information about which traditional practices and seeds are valued by the Sayausí locals. The survey will last approximately 5 minutes. Any published results of individual responses will be anonymous and identifiable information such as age and address will not be shared. The entirety of this survey is voluntary. If any of these questions make you uncomfortable, you can skip the question as all are optional and can withdraw from the process at any time. Participants can ask any questions about the survey or project before the survey begins.

For further information about this project or about your rights as a research participant, please contact any of the involved below:

Researchers: Andrew Troup, Eugena Choi, Joselin Barbosa
gr-Cultivate-D23@wpi.edu

Project Advisors: Gary Pollice and Robert Kinicki
gpollice@wpi.edu and rek@wpi.edu

Demographic Questions:

1. Indicate your age group (0-17, 18-34, 35-50, 51-69, 70+)
2. What gender do you identify with? (Female, Male, Nonbinary, Prefer not to say)
3. What ethnic group do you identify with? (Ex: Mestizo, Kichwa)

Survey Questions:

1. Do you use seeds to conduct traditional practices?
2. Do you use seeds for health benefits?
3. Do you use seeds to make traditional foods?
4. Have you stopped practicing certain traditions because you no longer have access to a certain seed? If so, which?
5. Is there a seed that you can no longer find? If so, which?
6. What type of seed do you use the most?

Appendix B.2 Survey Questions for Sayausí Locals in Spanish

Objetivo 1: Encuesta

El objetivo de la encuesta es recopilar información sobre qué prácticas tradicionales y semillas son valoradas por los lugareños de Sayausí.

Consentimiento informado: Se le invita a participar en una encuesta para un proyecto de investigación publicado en WPI. El propósito de esta encuesta es recopilar información sobre qué prácticas tradicionales y semillas son valoradas por los locales de Sayausí. La encuesta tendrá una duración aproximada de 5 minutos. Todos los resultados publicados de respuestas individuales serán anónimos y no se compartirá información identificable como la edad y la dirección. La totalidad de esta encuesta es voluntaria. Si alguna de estas preguntas lo hace sentir incómodo, puede omitir la pregunta ya que todas son opcionales y puede retirarse del proceso en cualquier momento. Los participantes pueden hacer cualquier pregunta sobre la encuesta o el proyecto antes de que comience la encuesta.

Para obtener más información sobre este proyecto o sobre sus derechos como participante de la investigación, comuníquese con cualquiera de los involucrados a continuación:

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Preguntas demográficas:

1. Indique su grupo de edad (0-17, 18-34, 35-50, 51-69, 70+)
2. ¿Con qué género se identifica? (Mujer, Hombre, No binario, Prefiero no decirlo)
3. ¿Con qué grupo étnico se identifica? (Ej: mestizo, kichwa)

Preguntas de la encuesta:

1. ¿Utiliza semillas para realizar prácticas tradicionales?
2. ¿Utiliza semillas para obtener beneficios para la salud?
3. ¿Usas semillas para hacer comidas tradicionales?
4. ¿Has dejado de practicar ciertas tradiciones porque ya no tienes acceso a cierta semilla?
Si es así, ¿cuál?
5. ¿Hay alguna semilla que ya no puedas encontrar? Si es así, ¿cuál?
6. ¿Qué tipo de semilla usas más?

Appendix C: Participant Observation Template for Note Keeping

Objective 1: Participant observation

This observation method will be used to obtain information about the cultural meaning behind the local festivals and its celebrations in relation to seeds and traditions. The following demonstrates a template for note keeping: At these festivals, the team will look at the importance of seeds.

Topics:	Notes:
Participants	
Traditions	
Seed usage	
Rituals	

For further information about this project or about your rights as a research participant, please contact any of the involved below:

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Appendix D: Interview Questions for Farmers

Objective 2: Semi-structured interview

The goal of this interview is to learn about how the farmers utilize seeds from an agricultural standpoint.

Informed Consent: You are invited to participate in an interview for a published research project at WPI. Semi-structured interviews will be used to understand the current state of the Sayausí seed bank and methods of community engagement with it. Interviewees will be asked a set of questions to lead into an open-ended discussion. The goal of these interviews is to learn about seed usage, and seed suppliers. The interviews will be with Sayausí farmers. The semi-structured interviews will last approximately 30 minutes. The first half of the interview will be structured by six questions, which will then lead to an open discussion. Any published results of individual responses will be anonymous and identifiable information such as age and address will not be shared. Interviewees will be asked for consent to be recorded before interviews begin. The entirety of these interviews is voluntary. If any of these questions make you uncomfortable, you can skip the question as all are optional and can withdraw from the process at any time. Interviewees can ask any questions about the interview or project before the interview begins.

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Interview Guide

Farmers

1. What kind of crops do you grow?
2. Where do you get the seeds you use?
3. Is there a crop that you would like to grow but don't have the seeds for?
4. Do you recover your seeds? If so, what do you do with them?
5. Have you participated in a seed exchange?
6. Could you benefit from a seed exchange? Why or why not?

Appendix D.2 Interview Questions for Farmers in Spanish

Objetivo 2: Entrevista semiestructurada

El objetivo de esta entrevista es conocer cómo los agricultores utilizan las semillas desde un punto de vista agrícola.

Consentimiento informado: está invitado a participar en una entrevista para un proyecto de investigación publicado en WPI. Se utilizarán entrevistas semiestructuradas para comprender el estado actual del banco de semillas de Sayausí y los métodos de participación de la comunidad en él. A los entrevistados se les hará una serie de preguntas para conducir a una discusión abierta. El objetivo de estas entrevistas es aprender sobre el uso de semillas y los proveedores de semillas. Las entrevistas serán con agricultores de Sayausí. Las entrevistas semiestructuradas tendrán una duración aproximada de 30 minutos. La primera mitad de la entrevista estará estructurada por seis preguntas, que luego conducirán a una discusión abierta. Todos los resultados publicados de respuestas individuales serán anónimos y no se compartirá información identificable como la edad y la dirección. A los entrevistados se les pedirá su consentimiento para ser grabados antes de que comiencen las entrevistas. La totalidad de estas entrevistas es voluntaria. Si alguna de estas preguntas lo hace sentir incómodo, puede omitir la pregunta ya que todas son opcionales y puede retirarse del proceso en cualquier momento. Los entrevistados pueden hacer cualquier pregunta sobre la entrevista o el proyecto antes de que comience la entrevista.

Para obtener más información sobre este proyecto o sobre sus derechos como participante de la investigación, comuníquese con cualquiera de los involucrados a continuación:

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Guía de entrevista

Agricultores

1. ¿Qué tipo de cultivos cultiva?
2. ¿De dónde saca las semillas que usa?
3. ¿Hay algún cultivo que le gustaría cultivar pero para el que no tiene las semillas?
4. ¿Recupera sus semillas? Si es así, ¿qué hace con ellos?
5. ¿Ha participado en un intercambio de semillas?
6. ¿Podría beneficiarse de un intercambio de semillas? ¿Por qué o por qué no?

Appendix E: Interview Questions for Indigenous Leaders

Objective 2: Semi-structured interview

The goal of this interview is to learn how seed usage impacts local traditions.

Informed Consent: You are invited to participate in an interview for a published research project at WPI. Semi-structured interviews will be used to understand the current state of the Sayausí seed bank and methods of community engagement with it. Interviewees will be asked a set of questions to lead into an open-ended discussion. The goal of this interview is to learn how community leaders encourage locals to participate and engage in traditions, and local events. The interviews will be conducted with indigenous leaders. The semi-structured interviews will last approximately 30 minutes. The first half of the interview will be structured by five questions, which will then lead to an open discussion. Any published results of individual responses will be anonymous and identifiable information such as age and address will not be shared. Interviewees will be asked for consent to be recorded before interviews begin. The entirety of these interviews is voluntary. If any of these questions make you uncomfortable, you can skip the question as all are optional and can withdraw from the process at any time. Interviewees can ask any questions about the interview or project before the interview begins.

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Interview Guide

Indigenous Leaders

1. How are seeds involved in local traditions and cultural practices?
 - a. Do you personally use seeds in this manner?
 - i. If so, can you describe how?
2. Have you seen a decline in people participating in traditional or cultural practices?
 - a. If so, why do you think this is happening?
 - b. If not, why do you think so?
3. Do you think people are losing their culture due to a lack of seed varieties?
 - a. If so, how do you think we can help keep it alive?
 - b. If not, what do you think can be done to continue improving this?
4. What seeds do you consider important in your culture?

Appendix E.2 Interview Questions for Indigenous Leaders in Spanish

Objetivo 1: Entrevista semiestructurada

El objetivo de esta entrevista es aprender cómo influye el uso de las semillas en las tradiciones locales.

Consentimiento informado: está invitado a participar en una entrevista para un proyecto de investigación publicado en WPI. Se utilizarán entrevistas semiestructuradas para comprender el estado actual del banco de semillas de Sayausí y los métodos de participación de la comunidad en él. A los entrevistados se les hará una serie de preguntas para conducir a una discusión abierta. El objetivo de esta entrevista es aprender cómo los líderes comunitarios alientan a los lugareños a participar y participar en las tradiciones y eventos locales. Las entrevistas se realizarán con líderes indígenas. Las entrevistas semiestructuradas tendrán una duración aproximada de 30 minutos. La primera mitad de la entrevista estará estructurada por cinco preguntas, y luego se convertirá en una discusión abierta. Todos los resultados publicados de respuestas individuales serán anónimos y no se compartirá información identificable como la edad y la dirección. A los entrevistados se les pedirá su consentimiento para ser grabados antes de que comiencen las entrevistas. La totalidad de estas entrevistas es voluntaria. Si alguna de estas preguntas lo hace sentir incómodo, puede omitir la pregunta ya que todas son opcionales y puede retirarse del proceso en cualquier momento. Los entrevistados pueden hacer cualquier pregunta sobre la entrevista o el proyecto antes de que comience la entrevista.

Para obtener más información sobre este proyecto o sobre sus derechos como participante de la investigación, comuníquese con cualquiera de los involucrados a continuación:

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Guía de entrevista

Líderes Indígenas

1. ¿Cómo participan las semillas en las tradiciones y prácticas culturales locales?
2. ¿Utiliza usted personalmente las semillas de esta manera?
 - a. En caso afirmativo, ¿puede describir cómo?
3. ¿Ha observado un descenso en la participación de la gente en prácticas tradicionales o culturales?
 - a. En caso afirmativo, ¿por qué cree que está ocurriendo?
 - b. En caso negativo, ¿por qué cree que es así?
4. ¿Cree que la gente está perdiendo su cultura debido a la falta de variedades de semillas?

- a. En caso afirmativo, ¿cómo crees que podemos ayudar a mantenerla viva?
 - b. Si no es así, ¿qué crees que se puede hacer para seguir mejorándola?
5. ¿Qué semillas considera importantes en su cultura?

Appendix F: Interview Questions for Los Guardianes de Semillas (NGO)

Objective 2: Semi-structured interview

The goal of this interview is to gain knowledge about methods of community involvement through an NGO lens.

Informed Consent: You are being invited to participate in an interview part of a published research project at WPI. The purpose of the interview is to gain knowledge about methods of community involvement through an NGO lens. This interview will last approximately 30 minutes and any published results of individual responses will be anonymous and identifiable information such as age and address will not be shared. Interviewees will be asked for consent to be recorded before interviews begin. All interviews are voluntary and if any of these questions make you uncomfortable, you may skip any of them as they are optional. You may also withdraw at any time during the interview. Interviewees may ask any questions about the interview or project before we begin the process. For further questions or concerns please contact:

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Interview Guide

NGO's

1. General questions to ease into interview: How long have you been with the NGO? How did you become involved in it?
2. Do you actively collect and document seeds?
 - a. If so, what is your process for doing so?
 - b. What are some challenges you've faced?
 - c. Have you seen any community impacts from this process?
 - d. Do you document their cultural significance?
 - i. If so, how?
3. Do you know the seed bank in Quito called the Banco de Germoplasma?
 - a. If so, how are the Seed Guardians involved with it?
4. How do the Seed Guardians get involved with community seed banks?
5. What impact do you think a better promotion of a seed bank will have in the community? More specifically, what steps and what people are needed to establish a community seed bank in rural parishes?

Appendix F.2 Interview Questions for Los Guardianes de Semillas (NGO) in Spanish

Objetivo 2: Entrevista semiestructurada

El objetivo de esta entrevista es conocer los métodos de participación comunitaria desde el punto de vista de una ONG.

Consentimiento informado: Se le invita a participar en una entrevista que forma parte de un proyecto de investigación publicado en WPI. El objetivo de esta entrevista es conocer los métodos de participación comunitaria desde el punto de vista de una organización no gubernamental. Las entrevistas durarán aproximadamente 30 minutos y los resultados publicados de las respuestas individuales serán anónimos y no se compartirá información identificable como la edad y la dirección. Se pedirá a los entrevistados su consentimiento para ser grabados antes de comenzar las entrevistas. Todas las entrevistas son voluntarias y, si alguna de estas preguntas le incomoda, puede saltárselas, ya que son opcionales. También puede retirarse en cualquier momento de la entrevista. Los entrevistados pueden hacer cualquier pregunta sobre la entrevista o el proyecto antes de que empecemos el proceso. Si tiene alguna duda o pregunta, póngase en contacto con:

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Asesores del proyecto: Gary Pollice y Robert Kinicki
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Guía de entrevista

ONG

1. Preguntas generales para facilitar la entrevista: Preguntas generales para facilitar la entrevista: ¿Cuánto tiempo lleva con los Guardianes de las Semillas? ¿Cómo se involucró con la organización?
2. ¿Usted recoge y documenta activamente las semillas?
 - a. En caso afirmativo, ¿cómo lo hace?
 - b. ¿Cuáles son algunos de los retos a los que se ha enfrentado?
 - c. ¿Ha observado algún impacto de este proceso en la comunidad?
 - d. ¿Documenta su significado cultural?
 - i. En caso afirmativo, ¿cómo?
3. ¿Conoce el banco de semillas en Quito llamado el banco de Germoplasma?
 - a. En caso afirmativo, ¿cómo están los Guardianes de las Semillas involucrada con el?
4. ¿Como los Guardianes de las Semillas se involucran con bancos de semillas comunitarios?

5. ¿Qué impacto cree que tendrá en la comunidad una mejor promoción de un banco de semillas? ¿Más específicamente, qué pasos y qué personas son necesarios para establecer un banco de semillas comunitario en parroquias rurales?

Appendix G: Assessment Survey for Sayausí Community Members

Objective 3: Community Feedback

The goal is to gather data about and to improve the team's pamphlet for promoting the Sayausí seed bank. This survey is used for both rounds of assessment.

Informed Consent: You are being asked to participate in an object response as part of a published research project conducted by a group of WPI students. The goal of the object response is to gather data and better inform the development of the team's possible promotional strategies in promoting engagement in relation to the Sayausí seed bank. Your participation is voluntary and you may choose to stop the interview at any time. If at any time you feel uncomfortable answering a question you may decline to answer or end the interview. This data collection will last 10 minutes at most. With your permission the interview will be recorded. Any given personal information will be kept confidential and not be shared with the project's findings. Interviewees may ask any questions about the interview or project before we begin.

For further information about this project or about your rights as a research participant, please contact any of the involved below:

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Survey Questions

1. Ethnicity: Kichwa, Mestizo, other
2. Age Category: 0-17, 18-34, 35-50, 51-69, 70+
3. Do you know about the Sayausi seed bank?
4. Do you think a pamphlet showing its seed varieties as well as their uses and benefits would be useful to you?

Likert Scale Questions

(1) Strongly Disagree; (2) Disagree; (3) Neither Agree nor Disagree; (4) Agree; (5) Strongly Agree.

Aesthetics

1. The experience appealed to me visually. (likert)

2. I liked the graphics and visuals used in the pamphlet. (likert)
3. I liked the layout of media elements in the pamphlet. (likert)
4. The pamphlet was aesthetically appealing. (likert)

Satisfaction

1. I was drawn into exploring the pamphlet. (likert)
2. I was moved by the experience. (likert)
3. I was curious to explore more about the contents of the pamphlet. (likert)
4. I would recommend this pamphlet to others. (likert)
5. The time I spent exploring this pamphlet was worthwhile. (likert)

Perceived Usability

1. I felt discouraged while interacting with the pamphlet. (likert)
2. I felt annoyed while interacting with the pamphlet. (likert)
3. The pamphlet was mentally taxing. (likert)
4. I found the pamphlet confusing to navigate. (likert)
5. I felt frustrated during the pamphlet. (likert)

Short Answers:

1. What is the goal of this pamphlet?
2. What 3 emotions would you use to describe your experience with this pamphlet?
3. Do you feel there is something missing in the pamphlet? If so, what changes would you suggest?
4. Is there a specific section that impacted you?
 - a. What about that section stuck out to you?
5. Do you think the recipes we included are representative of traditional Ecuadorian culture?
6. Has this pamphlet influenced you to do any of the following?
 - a. Participate in a seed exchange

Appendix G.2 Object Response for Sayausí Community Members in Spanish

Objetivo 3: Comentarios de la comunidad

El objetivo es recopilar datos y mejorar el folleto del equipo para la promoción del banco de semillas de Sayausí.

Consentimiento informado: Se le pide que participe en una respuesta de objeto como parte de un proyecto de investigación publicado realizado por un grupo de estudiantes de WPI. El objetivo de la respuesta objetiva es recopilar datos e informar mejor el desarrollo de las posibles estrategias promocionales del equipo para promover el compromiso en relación con el banco de semillas de Sayausí. Su participación es voluntaria y puede optar por detener la entrevista en cualquier momento. Si en algún momento se siente incómodo al responder una pregunta, puede negarse a responder o finalizar la entrevista. Esta recogida de datos tendrá una duración máxima de 10 minutos. Con su permiso se grabará la entrevista. Cualquier información personal proporcionada se mantendrá confidencial y no se compartirá con los resultados del proyecto. Los entrevistados pueden hacer cualquier pregunta sobre la entrevista o el proyecto antes de comenzar.

Para obtener más información sobre este proyecto o sobre sus derechos como participante de la investigación, comuníquese con cualquiera de los involucrados a continuación:

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Preguntas para cada pieza de material promocional

1. Etnicidad: Kichwa, Mestizo, otra
2. Age Category: 0-17, 18-34, 35-50, 51-69, 70+
3. ¿Conoce usted sobre el banco de semillas Sayausi? Si, No
4. ¿Cree que le sería útil un folleto en el que se mostraran las variedades de semillas, y sus usos y beneficios? Si, No, A lo mejor

Preguntas de la Escala de Likert

(1) Totalmente en desacuerdo; (2) en desacuerdo; (3) Ni de acuerdo ni en desacuerdo; (4) de acuerdo; (5) Totalmente de acuerdo.

Estética

1. La experiencia me atrajo visualmente. (likert)

2. Me gustaron los gráficos y elementos visuales utilizados en el folleto. (likert)
3. Me gustó la organización de los elementos visuales en el folleto. (likert)
4. El folleto era estéticamente atractivo. (likert)

Satisfacción

1. Me atrajo a explorar el folleto. (likert)
2. La experiencia me ha conmovido. (likert)
3. Sentí curiosidad por saber más sobre el contenido del folleto. (likert)
4. Recomendaría este folleto a otras personas. (likert)
5. El tiempo que he dedicado a ver este folleto ha merecido la pena. (likert)

Usabilidad percibida

1. Me sentí desanimado/a al interactuar con el folleto. (likert)
2. Me sentí molesto/a al leer el folleto. (likert)
3. El folleto me exigió mucho mentalmente. (likert)
4. El folleto me resultó confuso. (likert)
5. Me sentí frustrado/a durante la lectura del folleto. (likert)

Respuestas cortas:

1. ¿Cuál es el objetivo de este folleto?
2. ¿Qué 3 emociones utilizaría para describir su experiencia con este folleto?
3. ¿Cree que falta algo en el folleto? En caso afirmativo, ¿qué cambios sugeriría?
4. ¿Hay alguna sección específica que lo haya impactado?
 - a. ¿Qué le ha llamado la atención de este folleto?

Appendix H: Tania Peñaloza Interview Transcription

Objective 1: Semi-structured interview of Tania Peñaloza

The following is the English translation of the transcription of the interview with Tania Peñaloza.

0:00

Andy: The first question...How long have you been in front of the seed bank?

0:19

Tania: From the seed bank? We are about 2 years.

0:25

Andy: And how did you start your business and what was the process like?

0:31

Tania: It started through me wanting to be independent, helping more people. How we helped different women because I was working for a pharmaceutical company. So all the opposite of what I do now. So medicines, chemicals, health, then as I studied in the jatay ausaiguasi, then my feeling is more than everything that I know that I feel and I know that we have to do this seed rescue. Seven years ago we started with my family, when we harvested the grains, especially corn. The red corn had been lost, the red corn had been lost, the tomatoes had been lost, in other words there was an incredible variety of colors, and there was no longer only white corn. So we didn't ask what happened, that's why we started to investigate the transgenics and we started to harvest. For the last 7 years, we started like this. If there was a red one, we took it. But we didn't do it as we do now by isolating, it was like a personal family project. And we realized that it doesn't have to be only a family project, because this is a problem in Ecuador. It is only because of the big transgenics that are dominating the genes, so we have to...this goes beyond something of the family, if not of Ecuador, nationally and internationally.

2:02

Eugena: And how would you say the seed bank contributes to the community? And what kind of relationship do you think it has with the members of the community?

2:16

Tania: The Sisay Pacha seed bank contributes to this seed rescue so that the women can save their seeds and also bring seeds that they do not have. So, we do a seed exchange to rescue seeds. Our mission is to rescue seeds and that people who do not have them, for example: sometimes some people say "I don't have any" so she takes what she doesn't have and gives us something that she has that is the best. And how does it help the community? We help the women, the

barons, the families, so that through these seeds they can make great crops and rescue and have the active ingredients to feed us correctly and also to be healthy.

3:23

Andy: How did the seed bank become part of Sisay Pacha?

3:30

Tania: More than anything it started as a family project. I started and I said I want to help people with therapies and my sister was with all the rural warmis helping and everything, and I said let's merge. So, it was through a conversation and I said if this goes hand in hand and we are happy that the seed bank is there, apart from the healthy food and the therapies. So it gives a plus and it is also a service, which is what Sisay Pacha emphasizes: serving the community.

4:10

Andy: Are there areas where you think the seed bank could improve?

4:14

Tania: Yes, we need the support of the different communities such as collecting the best seeds that they have in each community. Because many people have good seeds and use them all. So generate this awareness. We also need to motivate the warmis, the women more than anything else, because almost in most of the countryside the women are the collectors, but also the men collectors. So I was referring to the fact that people can have this initiative to the rescue because we no longer have these seeds on a large scale, in quantity, the variety of active principles.

5:00

Tania: So our mission would be to motivate all the communities and even our mission would be the international communities, not only here because this problem is worldwide, it seems to be at the family, local level but it is worldwide.

5:29

Eugena: And do you think the seed bank has any cultural significance? And if so, what aspects of culture do you see in it?

5:39

Tania: It has a lot of cultural importance because our ancestors collected the ancestral seeds, as the name says, it was the way to select. That is the way in which even our ancestors after the harvest classified, before the indigenous people, they classified the best seeds in a place so that they would not be contaminated and those best seeds have that the right time which is the sowing

time in September according to the months of the moon, they sow it and to rescue that. So this has been lost because everyone wants to study, everyone wants to migrate from the countryside to the city, these cultural traditions have been lost and our mission, our duty is to generate awareness of cultural rescue.

6:36

Eugena: I'm going to talk in English but, are there seeds that are ancestral or heritage?

6:47

Joselin: There are some seeds that are ancestral or so like kind of years ago that are still here?

6:59

Tania: Yes, the ancestral seeds are the ones that have different colors but the typical one that is dominating is the white one. That is the one that is now, but it is already like a dominant gene, because before we had the golden black, the pearl, the canguelito, then an infinite variety, infinite variety of corn, seeds, beans, broad beans, everything everything, because before they only fed themselves with that, there was no rice because also as we say the part of the highlands, they had to migrate or transport on horses for the rice to come here, they fed with the grains in range and they were healthy, very healthy. Grains, type of meat, from the fields, everything from the fields, so they were very healthy, they did not have any type of cancer, intoxications, so that is why this motivation. Besides, we are going to collect these seeds that are ancestral, those of different colors, these are ancient, ancient, ancient. That our Aztecs, our Mayas, our Indians, Incas, had these seeds. And that is our mission because they are being lost.

8:20

Eugena: So do these seeds, ancestral seeds, do they come from the ones you have in the seed bank, do they come from different parishes and places

8:29

Tania: Yes

8:30

Eugena: and Ecuador?

8:31

Tania: Yes. There are different rural areas, rural parishes, and towns where we have collected. We do exchange fairs. And that is what we want to do with you, we are also going to do some fairs. For example, we invite all the rural parishes, we have a central fair, and each one has the duty - homework - to bring their best seed, and that day we exchange. "And I have this one which is the best, what do you have? I have this which is the best, isn't it the same? What if it's

the same? No" Then I go to somebody who doesn't have, and we go and do this exchange, but I exchange what I don't have. So this is our mission.

9:20

(Marisol enters the room, Interview is paused)

10:04

Joselin: Do you think there are areas in which the seed bank could improve in cultural terms?

10:11

Tania: Yes

10:14

Joselin: And how?

10:16

Tania: I think that this project is a project that we are starting in roots. We have to... (Marisol and Tania talking about something)... (Marisol and Tania talking about something)...

10:53

Joselin: ...In what cultural aspects could the bank grow?

11:00

Tania: In cultural aspects, more than anything else I think that we should encourage all the rural parishes because in rural areas is where all the people sow that each parish has its seed bank, because it would be useless if only in Sayausi there are seeds when they have to travel from Cañar, they have to travel from places far away from the community. It would be better to look for an area, a space like the parish councils so that they can save their seeds and be able to exchange them. For example, you live in the United States, Boston, California, but in California I have my seed bank and I exchange seeds.

11:43

Andy, Joselin, Eugena: Mhmmmm

11:44

Tania: For here in the same way to replicate in the other parishes there are only two places. One of the MAG that is in Miraflores that more than anything else is something of how the government more and this is a project for the community, but we are starting and we want this to replicate because it is a problem that we have in the different parishes.

12:05

Joselin: Earlier you said that all the seeds that the seed bank has now, you have obtained them in containers from true exchanges, there is no farmer that is your supplier or something like that?

12:17

Tania: No, no suppliers at all. It has only been from the communities to the fairs in which we have participated and we see how nice "see this! let's change?" and sometimes we say we have not been able to change if we don't buy it. The question is not to lose it. It doesn't matter if it costs me a value, let's say exchange or economic, but what is valuable is like a treasure, it's like having a gold in seeds, something we want to do.

12:45

Joselin: And in the seed bank, the seeds that you have there now are sold or just to treasure them?

12:54

Tania: Right now the ones we have are for exchange.

12:56

Joselin: To exchange.

12:57

Tania: To exchange, not to sell. We only sell things from the store. Seeds are not sold at all.

13:03

Joselin: We don't sell, we don't sell.

13:04

Tania: No, but in this case let's say the lentils, the grains that are common.

13:08

Joselin: They are common

13:09

Tania: Yes, yes, quinoa. But that there, the grains there are for exchange. It's exclusively exchange fairs, yes.

13:17

Joselin: And when you exchange them they give them in piles or in packages?

13:25

Tania: In packages of a few bags that are approximately representative. Because the two that I sow are not going to be representative because the others will dominate them. It would have to be approximately twenty seeds that represent or one more whole corncob that there are already about...it depends...twenty, thirty, forty seeds or even one hundred seeds from a single cob, so it would be more than a small cob.

13:47

Joselin: So the purpose of our-...one of the objectives of our project would be to generate foyetos that are educational?

13:58

Tania: Educational, so that people know about the problem, it would be to generate awareness of the collection and conservation of ancestral seeds in the different rural communities, it would be like an objective.

14:25

End

Appendix H.2: Tania Peñaloza Interview Transcription in Spanish

Objective 1: Semi-structured interview of Tania Peñaloza

The following is the transcription of the interview with Tania Peñaloza

0:00

Andy: La primera pregunta... Cuánto tiempo lleva en frente del banco de semillas?

0:19

Tania: Del banco semillas? Estamos alrededor de 2 años.

0:25

Andy: Y cómo empezó su negocio y como fue el proceso?

0:31

Tania: Empezó a través de que quise ser independiente, ayudar a más personas. Cómo ayudamos a diferentes mujeres porque yo trabajaba para una farmacéutica. Entonces todo lo opuesto a lo que hago ahora. Entonces medicinas, químicos, salud, entonces como estudié en la jatay ausaiguasi, entonces mi sentir es más que todo que yo se que siento y sé que tenemos que hacer este rescate de semillas. Hace 7 años atrás empezamos con mi familia, cuando cosechamos los granos, el maíz sobre todo. Los maíces rojos se habían perdido, los puntones se habían perdido, los tomates, osea había una variedad increíble de colores, y ya no había solo había el blanco. Entonces no preguntamos que paso, por eso es que los transgénicos empezamos a investigar y empezamos a recolectar. Desde hace 7 años, empezamos así. Si había una roja, la cogíamos. Pero no hacíamos como ahora hacemos aislando, si no era como un proyecto personal de familia. Y nos dimos cuenta que no tiene que ser solo de familia, porque esta es una problemática a nivel del Ecuador. Solo es por los grandes transgénicos que están dominando los genes entonces tenemos que... esto va más allá que algo de familia, si no del Ecuador, nacional e internacional.

2:02

Eugena: Y cómo diría que contribuye el banco de la semillas a la comunidad? Y qué tipo de relación cree que tiene con los miembros de la comunidad?

2:16

Tania: El banco de semillas de Sisay Pacha contribuye a este rescate de semillas para que las mujeres puedan guardar sus semillas y también llevar semillas que ellas no tengan. Entonces, hacemos un cambio e intercambio de semillas para de esta forma rescatar las semillas. Nuestra misión es el rescate de semillas y que las personas que no tengan por ejemplo: a veces a unas que dicen "es que no tengo" entonces ella lleva lo que no tiene y nos da algo que ella tenga que sea el mejor. ¿Y cómo ayuda a la comunidad? Ayudamos a las mujeres, barones, a las familias, para

que a través de estas semillas ellos puedan hacer grandes cultivos y rescatar y tener los principios activos para alimentarnos correctamente y también tener salud.

3:23

Andy: ¿Cómo llegó el banco de semillas a formar parte de Sisay Pacha?

3:30

Tania: Más que todo empezó este como un proyecto de familia. Yo empecé y dije quiero ayudar a las personas con terapias y mi hermana estaba con todas las warmis rurales ayudando y todo, y dije fusionemos. Entonces, fue a través de una conversación y dije si esto va de la mano y nosotros gustosos de que esté el banco de semillas aparte la comida saludable y las terapias. Entonces le da un plus y aparte es un servicio que es lo que recalca en Sisay Pacha: servirle a la comunidad.

4:10

Andy: Hay aspectos en los que cree que el banco de semillas podría mejorar?

4:14

Tania: Si, necesitamos el apoyo de las diferentes comunidades como el recopilar las mejores semillas que tengan en cada comunidad. Porque muchas personas tienen buenas semillas y las usan todas. Entonces generar esta conciencia. También motivar a las warmis, a las mujeres más que todo, porque casi en la mayoría del campo las mujeres son las recolectoras, pero también a los hombres recolectores. Entonces me refería a que las personas podamos tener esta iniciativa al rescate debido a que estas semillas ya no tenemos en gran escala, en cantidad, la variedad de los principios activos.

5:00

Tania: Entonces nuestra misión sería motivarles a todas las comunidades e incluso nuestra misión sería las comunidades incluso internacionales, no solo aquí porque esta problemática es a nivel mundial, parece que fuera a nivel familiar, local pero es mundial.

5:29

Eugena: Y ¿Cree que el banco de semillas tiene alguna importancia cultural? Y en caso que si, ¿que aspectos de la cultura ve en el?

5:39

Tania: Tiene mucha importancia cultural debido que nuestros ancestros recopilaban las semillas ancestrales, como su nombre lo dice, era la forma de seleccionar. Esa es la forma en la que incluso nuestros ancestros después de la cosecha clasificaban, antes de que los indígenas,

clasificaban las mejores semillas en un lugar para que no se contaminen y esos mejores semillas tienen que la época justo que es de la siembra en septiembre de acuerdo con los meses de la luna, le siembran y para rescatar eso. Entonces eso fue perdiendo debido que el hombre todos quieren estudiar, todos quieren emigrar del campo a la ciudad, estas tradiciones culturales se han perdido y esa nuestra misión, nuestra deber es generar conciencia de rescate cultural.

6:36

Eugena: I'm going to talk in English but, are there seeds that are ancestral or heritage?

6:47

Joselin: Hay unas semillas que son ancestrales o así como tipo de años de atrás que siguen aquí?

6:59

Tania: Si, las semillas ancestrales son las que tienen diferentes colores pero en cambio, la típica están dominando es la blanca. Esa es el que ahorita, pero ya esta como un gen dominante, porque antes teníamos la negra dorada, la perla, la canguelito, entonces una variedad infinita, infinita de maíz, de semillas, de porotos, de habillas, todo todo todo, porque eran antes solo se alimentaban sólo con eso, no existía el arroz porque también como digamos el parte de la sierra, tenían que emigrar o transportar en caballos para que el arroz venga acá se alimentaban con los granos en alcance y eran saludable, muy saludables. Granos, tipo de carnes, de campo, todo de campo, entonces eran muy saludables, no tenían ningún tipo de cáncer, intoxicaciones, entonces por eso esta motivación. A parte que vamos a recolectar estas semillas que si son ancestrales, las de diferentes colores, estas son antiguas antiguas antiguas. Que nuestros aztecas, nuestros mayas, nuestros indigenas, incas, tenían estas semillas. Y esa es nuestra misión porque se esta perdiendo.

8:20

Eugena: So do these seeds, ancestral semillas, do they come from the ones you have in el banco de semillas, do they come from different parroquias y lugares

8:29

Tania: Yes

8:30

Eugena: and Ecuador?

8:31

Tania: Yes. Hay diferentes áreas rurales, las parroquias rurales, y pueblos en las que hemos recolectado. Hacemos ferias de intercambio. Y eso es lo que queremos hacer con ustedes también vamos a hacer unas ferias. Por ejemplo hacemos la invitación a todas las parroquias rurales, hacemos una feria central, y cada uno tiene de deber - de homework - traer su mejor

semilla, y ese día cambiamos. “Y yo tengo esta que es la mejor, tu que tienes? Yo tengo esto que es lo mejor, no es igual? Y si se parece? No” Entonces me voy a alguien que no tenga, y vamos y hacemos este intercambio, pero yo cambio lo que no tengo. Entonces esta es nuestra misión.

9:20

(Marisol enters the room, Interview is paused)

10:04

Joselin: Usted cree que hay áreas en la que podría mejorar el banco de semillas en términos culturales?

10:11

Tania: Si

10:14

Joselin: Y como cuales?

10:16

Tania: Yo pienso que este proyecto es un proyecto que estamos empezando en raíces. Tenemos que... (Marisol and Tania talking about something)...

10:53

Joselin: ...En que aspectos culturales podría crecer el banco?

11:00

Tania: En aspectos culturales, más que todo yo pienso que deber sería incentivar a toda las parroquias rurales porque en las áreas rurales es donde todas las personas siembran que cada parroquia tenga su banco de semillas, porque de serviría que solo en Sayausi haya cuando tengan que viajar de Cañar, tengan que viajar de lugares lejanos de la comunidad. Mejor sería lo importante de buscar una área, un espacio como podría ser la juntas parroquiales para que ellos puedan guardar sus semillas y poder intercambiar. Por ejemplo, usted vive en Estados Unidos, Boston, California, pero yo en California tengo mi banco de semillas y cambio.

11:43

Andy, Joselin, Eugena: Mhmmmm

11:44

Tania: Para aquí de igual forma replicar en las otras parroquias solo hay dos lugares. Uno del MAG que está en Miraflores que más que todo es algo de cómo el gobierno más y este es un

proyecto para la comunidad, pero estamos empezando y queremos esto replicar porque es una problemática que tenemos en las diferentes parroquias.

12:05

Joselin: Anteriormente dijo que toda las semillas que ahorita tiene el banco de semillas las ha obtenido envase de intercambios verdad, no hay ningun como granjero que sea su proveedor o algo asi?

12:17

Tania: No, proveedores nada. Solo ha sido de las comunidades a las ferias en las que hemos participado y vemos que lindo “ve esta! cambiemos?” y a veces digamos no hemos podido cambiar si no lo compramos. La cuestión es que no se pierda. No importa si me cuesta un valor, digamos de cambio o económico, pero lo valioso es como un tesoro, es como tener un oro en semillas, algo que queremos hacer.

12:45

Joselin: Y en el banco de semillas, las semillas que tiene ahí ahorita se venden o nada más para tesorarlas?

12:54

Tania: Ahorita las que tenemos son para intercambiar.

12:56

Joselin: Intercambiar.

12:57

Tania: Intercambiar, no vender. Se venden solo las cosas de la tienda. Las semillas ninguna se venden.

13:03

Joselin: No se vende, no se vende.

13:04

Tania: No, pero en este caso digamos ya lo que son las lentejas, los granos que son comunes

13:08

Joselin: Son comunes

13:09

Tania: Si eso si la quinoa. Pero eso de ahí, los granos de allí es de intercambio. Es exclusivamente ferias de intercambio, si.

13:17

Joselin: Y como cuando las intercambia las dan como en montoncitos o en empaques?

13:25

Tania: En empaques de unas bolsitas que aproximadamente sea algo representativo. Porque dos que siembre no va a representar porque las otras las van a dominar. Tendría que ser aproximadamente unas veinte semillas que represente o una más mazorca entera que hay vienen ya como unas...depende...veinte, treinta, cuarenta semillas hasta cien semillas de una sola mazorca entonces sería más que una mazorquita.

13:47

Joselin: Entonces el propósito de nuestro-...unos de los objetivos de nuestro proyecto sería generar foyetos que sean educativos?

13:58

Tania: Educativos, para que la gente sepa la problemática, sería generar conciencia de la recopilación y conservación de las semillas ancestrales en las diferentes comunidades rurales, sería como un objetivo.

14:25

End

Appendix I: Participant Observation Field Notes

Objective 1: Participant Observation of Pawkar Raymi Festival

The following is field notes taken about a ritual related to the Pawkar Raymi Festival

- Ritual of Benedictions and welcoming
- Chacana means “ladder” in Kichwa symbolizing a bridge
- This is an offering done to give thanks and to ward off bad vibes, symbolizes new beginnings
- 4 elements - earth wind fire water
- Chacana - square mantle, each corner had a maize rose, seed spiral in middle, each side had their unique items representing the 4 elements
 - Person 1 represented water went first, talked about what water represented in their own life, then separated the two water jugs to create an opening to the center
 - Person 2 fire (Andy) goes, explains what fire represents to them, then places incense into a burner
 - Person 3 wind (Joselin), the same as before, separated a drum, a stuffed bird, maraca, and a water gourd, to create an opening to the center
 - Person 4 earth (Eugena), the same as before, separated 3 baskets of seeds to create an opening to the center.
 - Openings in between objects symbolize letting in good energy
 - Each person would then grab a handful of incense with their left hand, place it over their forehead and their heart, making a prayer or asking for guidance while doing so
 - The incense would then be placed into the burner; the person would use their hand to collect the produced smoke to their forehead, hearts, and abdomen
 - An oil was then placed into the participant’s hand, massaged around, smelt 3 times, rubbing their hands each time
 - The participants would then rub the oil onto their forehead, neck and then embrace yourself, rubbing their hands each time
 - The ritual then was finalized

Appendix J: Farmer Interview Transcriptions

Objective 2: Semi-Structured Interviews of Farmers, Indigenous Leaders, and NGO

The following are English translations of 5 farmer interview transcriptions.

Farmer 1:

J: What kind of crop do you grow?

F: Like what kind of cultivation?

J: Like corn, carrot

F: I mean, vegetable plants...broccoli, lettuce...those, cabbage, cilantro.

J: And where do you get the seeds you use? From the same plant?

F: They are imported seeds.

J: Imported from where?

F: They come from Europe

J: From Europe? And do you buy them wholesale?

F: Sure! That is so because here I have the seeds of Ecuador, which are corn, beans, peas, everything that is grass is from here Ecuador. But instead what are lettuces, as the hybrids come from Europe

J: Is there a crop that you want to grow but don't have the seeds?

F: Mmm...well, the different thing that does not occur here is like varieties of beans because imagine in other countries there are beans of all colors and flavors and here we only have 3 types.

J: 3 types? Which are?

F: I think it's the butter, the standing one... and I don't remember the other one

J: And do you recover the seeds that you sow or?

F: Of course he recovers! What is corn, is left to dry.

J: Dry it?

F: You have to dry to be able to re-sow

J: And have you ever participated in a seed exchange?

F: No

J: And do you think you could benefit from a seed exchange? Why or why not?

F: Well, it could benefit because there is a different variety throughout Ecuador and there are in some areas of the mountains where there is a huge variety of seeds. varieties, such as different varieties of corn and beans as well.

Farmer 2:

J: Okay the first question is what types of crops do you grow?

F: the vegetable

J: The vegetable? Like which?

F: The lettuce, the cabbage, the broccoli, all the vegetables, the fresh ones, the fresh lauritas, the corn, the potatoes , everything that is possible now that I am old I am no longer worth doing anything. The field is always a lot. When I was young there the field was more beautiful. The land was cultivated there.

J: And where do you get the seeds you use? Do you buy them or do you have someone who passes them on?

F: I buy them right here, like lettuce, garlic, onion... well, the seeds are removed from the corn.

J: So is there a crop that you would like to grow but don't have access to or don't have the seed for?

F: I only sow what I only find as seed and what I can't find, I don't sow.

J: And do you recover the seeds of what you sow to sow them again or?

F: Like the corn, the beans, the broad beans, I sow that from the same. The green beans too.

J: And have you ever participated in a seed exchange?

F: No, I just bought them.

J: And do you think you could benefit from a seed exchange?

F: I don't know. I don't have the experience. Since now they sell the big plants, just like that you put water on them and take care of them and that's how they grow.

Farmer 3:

J: what types of crops do you grow?

F: Garlic, onion, coriander, and celery, chamomile, cabbage, broad beans

J: And where do you get the seeds?

F: I buy the plants here

J: Is there a crop that you would like to plant but don't have the seeds for?

F: No because that doesn't last.

J: And you recover the seeds of your crop?

F: Yes, as with the chamomile, the seed falls and is born right there. And nothing else and also the cabbages and the green beans

J: And have you ever participated in a seed exchange?

F: No

J: And do you think you would benefit from a seed exchange?

F: Yes, I sometimes pass the cilantro to my neighbors when I have.

Farmer 4:

J: What types of crops do you grow at home?

F: Vegetables, lettuce, cabbage, potatoes

J: And where do you get the seeds from? Do you buy them or?

F: I buy them

J: And is there a crop that you would like to grow but can't find the seed for?

F: I don't remember what is missing

J: And do you recover the seeds to use them for the next harvest or do you not recover the seeds?

F: never

J: And have you participated in a seed exchange?

F: No

J: Do you think you would benefit from participating in a seed exchange?

F: Yes, right now it would be good because in the summer I couldn't sow.

J: May I ask how old are you?

F: 50 years

Farmer 5:

J: We are doing a project with councilor Marisol Peñaloza with a seed bank to preserve seeds and for culture not to be lost

F: We also want to do that, which is why we have some organizations with the youth of the municipality. We have meetings and we receive plants, seeds, we learn not to use these fertilizers, chemicals, we want to have fertilizers and have organic fertilizers. That is what we were learning with some young people from the municipality who gave us some talks, courses, on how to do it, on how to make organic fertilizers because that is healthy. And the chemical fertilizers are no longer useful only for diseases. We have also received bakery courses to make buns.

J: To sell them?

F: Yes to sell them. We do every 15 each in the community of Chillo.

J: how did you say?

F: The community of Chillo. It is below San Vicente. That is the community of Chillo. We make bread there because we have a project, that is, we have a group of older adults. That we have. I am the representative of all the older adults and we work with them there. First of all, they gave us a quintal of flour. So from there we go making and selling and buying among ourselves and for others and so we go about making money to be able to buy what is necessary to make the bread again. And that's what we do. And that we since 2009 have started with the elderly. And we are already with the vestry. The parish council also gives us therapies so that we can exercise for all the elderly. That's what we have there in the community of Chillo.

J: Do you grow at home?

F: Yes, we each have crops in their little houses. What we grow is corn, broad beans, beans, peas, if applicable. And we don't grow wheat because we have stopped growing it because there are more crops that we knew how to harvest, but now we don't grow it anymore. We plant corn every year, and beans.

J: Do you buy these seeds or do you eat them...?

F: No, we sow and cultivate and have enough for the year. The nickname is what doesn't sustain the entire year, corn, that's what we cook and eat the nickname.

J: Have you ever participated in a seed exchange?

F: No, we haven't done that. We haven't done seed exchanges or anything. That is what they were telling us that we should do in order to have better production. That is what they have told us that if we should do that.

J: And you don't do it because you don't have access or why?

F: Because we do not dedicate ourselves to doing that at all. How could you ask for that? Is there someone who can help us with those seeds or how?

J: I have only heard that sometimes in the parish meetings you mention it but sometimes it is in certain parishes in Sayausí. You have to go all the way to participate and bring your seeds.

F: If I wanted you to come here to our community of Chillo. If they can come too. Now we were asking him to provide us with a tractor so that we could break up and sow our land. Because in order to sow we have to prepare from the ground. But when there is money, we get a tractor.

Right now the tractor charges us for the land, which is, for the lots, it is no longer by the hour.

Before, they charged \$15 per hour for the tractor. \$40-60 a lot they say that we have to pay. That is why we ask the municipality, the young people who come to talk with us, why can't they help us with the tractor. When they charge us less, but that's something.

Appendix J.2: Farmer Interview Transcriptions in Spanish

Objective 2: Semi-Structured Interviews of Farmers, Indigenous Leaders, and NGO

The following are transcriptions of 5 farmer interviews.

Agricola 1

J: Que tipo de cultivo usted cultiva?

F: Como que tipo de cultivo?

J: Como maíz, zanahoria

F: O sea plantas vegetales...broccoli, lechuga...esas, col, culantro

J: Y donde usted saca las semillas que usa? De la misma planta?

F: Son semillas importadas

J: Importadas de donde?

F: Vienen de Europa

J: De Europa? Y las compra por mayoreo?

F: Claro! Eso es así porque yo aquí tengo las semillas del ecuador lo que son maíz, frejol, arvejas, todo lo que son gramíneas son de aquí ecuador. Pero en cambio lo que son lechugas, como las híbridas vienen de Europa

J: Hay un cultivo que usted quiera cultivar pero no tiene las semillas?

F: Mmm...bueno lo diferente que no se da aquí es como variedades de porotos porque imagínese en otros países hay porotos de todos los colores y sabores y aquí solamente tenemos 3 tipos

J: 3 tipos? Cuales son?

F: Creo que es el mantequilla, el parado...y el otro no recuerdo

J: Y usted recupera las semillas que usted siembra o?

F: Claro se recupera! Lo que es el maíz se deja secar

J: Lo seca?

F: Hay que secarse para poder re-sembrarse

J: Y usted alguna vez a participado en un intercambio de semillas?

F: No

J: Y usted cree que se podría beneficiar de un intercambio de semillas? Porque o porque no?

F: Bueno se podría beneficiar porque hay diferente variedad en todo el ecuador y hay en algunas zonas de las sierra donde hay una variedad enorme de semillas aquí es lo que padecemos a veces como la papa lo que no tenemos mucha variedad y podemos agarrar así mas variedades, como diferentes variedades de maíz y porotos también

Agricola 2:

J: Okay la primera pregunta es que tipos de cultivos usted cultiva?

F: La verdurita

J: La verdurita? Como cual?

F: La lechuga, el col, el broccoli, toda la verdura, los fresquitos, las lauritas frescos, el maiz, las papas, todo lo que se puede ahora que estoy vieja ya no valgo para hacer nada. Siempre es mucho el campo. Cuando era joven ahí el campo era mas lindo. Ahí se cultivaba el terreno.

J: Y donde saca usted las semillas que usa? Las compra o tiene alguien que se las pasa?

F: Las compro yo aquí mismo como la lechuga, el ajo, la cebolla...bueno al maíz ahí se le saca la semillas de el mismo.

J: Entonces hay un cultivo que usted le gustaría cultivar pero no tiene acceso a o no tiene la semilla de?

F: Yo solo siembro lo que solo halla de semilla y lo que no encuentro pues no lo siembro.

J: Y usted recupera las semillas de lo que siembra para sembrarlas otra vez o?

F: Como lo que es el maíz, los porotos, las habas eso lo siembro de vuelta de lo mismo. La chaucha también.

J: Y usted alguna vez a participado en un intercambio de semillas?

F: No, solo las he comprado.

J: Y usted cree que se podría beneficiar de un intercambio de semillas?

F: No se. No tengo la experiencia. Como ahora venden las plantes grandecitas, así nadamas uno les pone agua y las cuida y así crecen.

Agricultor 3:

J: que tipos de cultivos usted cultiva?

F: Ajo, cebolla, culantro, y apio, manzanilla, coles, habas

J: Y usted donde consigue las semillas?

F: Compro las plantitas aquí

J: Hay algún cultivo que le gustaría sembrar pero no tiene las semillas para?

F: No porque eso no dura.

J: Y usted recupera las semillas de su cultivo?

F: Si como con la manzanilla la semillita cae y ahí mismo nace. Y nadamas y también las coles y la chaucha

J: Y usted alguna vez a participado en un intercambio de semillas?

F: No

J: Y usted cree que se beneficiaria de un intercambio de semillas?

F: Si, yo a veces le paso el culantro a mis vecinos cuando tengo.

Agricultor 4:

J: Usted que tipos de cultivos cultiva en casa?

F: Verduritas, lechugas, coles, papas

J: Y las semillas usted de donde las agarra? Las compra o?

F: Las compro

J: Y hay algún cultivo que a usted le gustaría cultivar pero no encuentra la semilla de?

F: No me acuerdo que falta

J: Y usted las semillas las recupera para usarlas a la siguiente cosecha o no recupera las semillas?

F: No nunca

J: Y usted ha participado en un intercambio de semillas?

F: No

J: Usted cree que se beneficiaría de participar en un intercambio de semillas?

F: Si, ahorita sería bueno porque en el verano no pude sembrar yo.

J: Podría preguntar qué edad tiene usted?

F: 50 años

Agricultora 5:

J: Nosotros estamos haciendo un proyecto con la concejal Marisol Peñaloza con un banco de semillas para preservar semillas y para la cultura no se pierda

F: Eso también queremos hacer nosotros tener por eso tenemos unas organizaciones con los jóvenes del municipio. Tenemos reuniones y recibimos plantas, semillas, aprendemos a yo no ocupar esas abonos, químicos, nosotros queremos tener ya propiamente abonos tener abonos orgánicos. Eso es lo que estuvimos aprendiendo con unos jóvenes que nos daban del municipio unas charlas, cursos, de como se puede hacer, de como se hace los abonos orgánicos porque eso es saludable. Y los abonos eso químicos ya no sirven solo para enfermedades. También hemos recibido cursos en panadería para hacer los pancitos.

J: Para venderlos?

F: Si para venderlos. Hacemos cada 15 cada quien en la comunidad de Chillo.

J: Como dijo?

F: La comunidad de Chillo. Es mas abajo de San Vicente. Ahí es la comunidad de Chillo. Ahí hacemos el pan porque nosotros tenemos un proyecto de, o sea tenemos un grupo de adultos mayores. Eso tenemos nosotros. Yo soy la representante de todos los adultos mayores y ahí trabajamos con ellos. Nosotros nos primeramente nos regalaron un quintal de harina. Entonces de ahí vamos haciendo nosotros y vendiendo y comprando entre nosotros mismos y para otros y así andamos haciendo platita para poder comprar las necesarias para volver hacer el pan. Y eso hacemos nosotros. Y eso nosotros desde el año 2009 hemos comenzado con los adultos mayores. Y ya estamos con la junta parroquial. La junta parroquial también nos da terapias para que nosotros hagamos ejercicios a todos los adultos mayores. Eso tenemos nosotros ahí en la comunidad de Chillo.

J: Usted cultiva en su hogar?

F: Si nosotros tenemos cultivos cada unos en sus casitas. Nosotros tenemos lo que cultivamos es el maíz, las habas, el frijol, la arveja, si se da. Y el trigo no sembramos porque ya hemos dejado de sembrar ya hay mas pronto si sabemos cosechar pero ahorita ya no. El maíz ese si cada año sembramos, y las habas.

J: Esas semillas usted las compra o como las...?

F: No, nosotros sembramos y cultivamos y tenemos para el año. El mote es lo que no sostiene todo el año entero, el maíz, eso cocinamos y comemos el mote.

J: Usted alguna vez a participado en un intercambio de semillas?

F: No, eso no hemos hecho. No hemos hecho los intercambio de semillas ni nada. Eso nos estaban diciendo a nosotros que debíamos de hacer para poder tener mejor producción. Eso es lo que nos han dicho que si debíamos de hacer eso.

J: Y no lo hace porque no tiene acceso o porque?

F: Porque no nos dedicamos a hacer eso nada. Eso como se podría pedir? Hay alguno que nos ayude con esas semillas o como?

J: Yo nadamas he escuchado que como a veces en las juntas parroquiales a veces lo mencionas pero a veces es en ciertas parroquias en Sayausí. Uno tiene que ir hasta ya a participar y llevar sus semillas.

F: Si quisiera que vengan para aca a nuestra comunidad de Chillo. Si pueden venir también. Ahora estuvimos pidiendo que nos facilite un tractor para que nosotros podíamos romper y sembrar nuestra tierras. Porque nosotros para poder sembrar tenemos que desde la tierra preparar. Pero ya cuando hay la plata, conseguimos un tractor. Ahorita el tractor nos cobra por las tierras que es, por los lotes, ya no es por las horas. Antes cobraban por las horas \$15 la hora del tractor. \$40-60 el lote dicen eso que tenemos que pagar. Por eso nosotros pedimos al municipio, a los jóvenes que vienen a conversar con nosotros, que porque no pueden ayudarnos con el tractor. Cuando que nos cobren menos, pero ya es algo.

Appendix K: Indigenous Leader Interview Transcriptions

Objective 2: Semi-Structured Interviews of Farmers, Indigenous Leaders, and NGO

The following are 2 English translations of indigenous leader interview transcriptions.

Indigenous Leader 1 and 2:

J: How do you think natal seeds are part of local cultural traditions and practices?

I1: Here she grows vegetables, corn, beans, broad beans, cabbage, broccoli, coriander, garlic, flowers

J: And does she use them for herself or sell them or what does she do with them?

I2: To sell and to eat. Because we work naturally, we don't add chemicals.

J: And have you observed that people no longer practice the traditions of before?

I2: Not anymore. Young people no longer want to work at all. They no longer want to know anything about land, farms, anything. Now they each look for another job.

J: And do you think that people are losing their culture due to the lack of local seed varieties? Or what do you think is adding to this dis-importance?

I2: I believe that time is already changing and youth no longer want to work on the land. And they want to work in the city.

I1: They already lose the ancient tradition. There are already so many new things that are seen. Excuse me for saying but the youth no longer want the cabbage soups, the bean soups, the soups of some old thing...they don't want them anymore. They only want vacuum rice.

I2: Rice with chicken

J: And do you think there is a way to keep traditions alive or is it just for families to instill them?

I1: For my part, I think that today's youth want to follow what is coming out now. Like the traditions before us... well now because of my illness I wear pants but we wear skirts...we can never give up what has been the old tradition. I never thought of wearing pants, I was ashamed, but now with my illness I had to wear pants but I tell my children that I wear pants and maybe God will heal me and I will go back to my skirt.

Indigenous Leader 3:

J: Do you think that the seeds have to do with traditions and cultural practices?

I: We do not forget to sow. Those crops that our parents have taught us. We sow, reap, and eat. Because our parents, see, how many years they have lived. The nickname, the broad beans, the beans, the zambo, all of that they ate. And now only the chicken, only the chicken, and that chicken is eating the balanced food... depending on what it is already serving.

J: Do you think there are fewer people who have participated in traditional practices? So how do the years go?

I: They are no longer following that tradition that they knew. Because we are still at it. But our grandchildren that you can see no longer want to pick, shred a corn, they no longer want to. So there everything is lost there. The cultures that our ancestors have had.

J: And how do you think one could advise young people to participate more in these traditions and pass them on to their next generations?

I: That culture I always, when we have something like that, some meetings, I always tell them... I make the chicha. I do the girl. They ask me for Victoria. They ask me here and I have to make the chicha. And there when we are in that... we must not forget that custom. Those habits that our parents have had. And that is more still it is not expensive as the queue sees. At a party there is a chicha dance, so what? It's more...how can you say...more...cheaper...economical. It's cheaper at a party...at a party, how many cans of cola can you see. But in a chicha it is not like that. And that is being forgotten... the habit is being left behind. But I always tell young people, my grandchildren, that this is how it is done and that is how one is taught. Because our moms had taught us. And well from there we continue back. Al when they don't want to, but we do and take. You see now the tail only gives diseases, so we must use... that is cheaper and easier to do. And it also holds for a party. Because the chicha is made from only the corn itself, the jora and panelas come out of the corn, you see they are not used. And now panelas are not being used much anymore, but they are used in chicha. That is. And the necessary ones that go in there like cinnamon, cloves, all of that goes into the chicha.

Appendix K.2: Indigenous Leader Interviews Transcriptions in Spanish

Objetivo 2: Entrevistas semiestructuradas de agricultores, líderes indígenas y ONG

Las siguientes son 2 transcripciones en español de entrevistas con líderes indígenas.

Líderes Indígenas 1 y 2:

J: Como usted cree que las semillas natales son partes de las tradiciones y practicas culturales locales?

I1: Aquí ella siembra hortalizas, maíz, porotos, habas, coles, broccoli, culantro, ajo, flores

J: Y esa las usa para si misma o las vende o que hace con ellas?

I2: Para vender y para comer. Porque nosotros trabajamos natural, no le metemos químicos.

J: Y usted a observado que gente ya no practica las tradiciones de antes?

I2: Ya no. Ya los jóvenes ya no quieren trabajar nada. Ya no quieren saber nada de tierras, de chacras, de nada. Ya ellos cada cual busca otro trabajo.

J: Y usted cree que la gente esta perdiendo su cultura debido a la falta de variedades de semillas locales? O usted que piensa esta agregando a esta dis-importancia?

I2: Yo creo que el tiempo ya esta cambiando y la juventud ya no quiere trabajar en la tierra. Y quieren trabajar en la ciudad.

I1: Ya pierden la tradición antigua. Ya le están tantas cosas nuevas que se ven. Disculpen el decir pero la juventud ya no quieren las sopitas de coles, la sopitas de habas, las sopitas de alguna cosa antigua...ya no las quieren. Ellos solo quieren arroz al vacio.

I2: Arroz con pollo

J: Y ustedes creen que haya una manera en mantener tradiciones vivas o nada más es de que las familias las inculque?

I1: De mi parte yo creo que la juventud de ahora ellos quieren seguir lo que va saliendo ahora. Como las tradiciones de mas antes de nosotros...bueno yo ahora por mi enfermedad me pongo pantalón pero somos de pollera...nunca podemos dejar lo que ha sido de la tradición antigua. Yo nunca pensaba ponerme un pantalón, a mi me daba vergüenza, pero ahora con mi enfermedad me tocó ponerme un pantalón pero yo le digo a mis hijos que yo me pongo el pantalón y ya quizás diosito me sane y vuelvo a mi pollera.

Lider Indigena 3:

J: Usted cree que las semillas tienen que ver con las tradiciones y las prácticas culturales?

I: Nosotros no olvidamos hacer siembras. Esas siembras que nuestros padres nos han enseñado. Nosotros sembramos, cosechamos, y comemos. Porque nuestros padres, vea, cuántos años han vivido. El mote, las habas, el frijol, el zambo, todo eso ellos comían. Y ahora solo el pollo, solo el pollo, y ese pollo esta comiendo el balanceado...según qué sirve ya.

J: Usted cree que hay menos gente que ha participado en las prácticas tradicionales? Asi como van los años?

I: Ya no van siguiendo esa tradición que ellos sabían. Porque nosotros todavía estamos en eso. Pero ya nuestros nietos que se ven ya no quieren piquiar, deshebrar un maíz, ellos ya no quieren. Entonces ahí se va perdiendo ahí todo. Las culturas que nuestros antepasados han tenido.

J: Y usted cómo cree que uno podría como asesorar a los jóvenes a que participen más en esas tradiciones y que las pasen a sus siguientes generaciones?

I: Esa cultura yo siempre, cuando tenemos algo así unas reuniones, yo siempre les digo...yo hago la chicha. La chicha hago yo. Me piden para Victoria. Me piden acá y yo tengo que hacer la chicha. Y ahí cuando estamos en esa...no debemos olvidar esa costumbre. Esos hábitos que nuestros padres han tenido. Y eso es más todavía no es costoso como la cola ve. En una fiesta se hace una bailada de chicha, entonces que. Es más...como se puede decir...más...más barato...económico. Más económico sale en una fiesta...en una fiesta cuántas latas de cola puede ver. Pero en una chicha no es así. Y eso se va olvidando...se va dejando las costumbres. Pero yo siempre les digo a los jóvenes, a mis nietos míos, que eso sí así es de hacer y así uno se enseña. Porque a nosotros nuestra mamitas nos habían enseñado. Y bueno de ahí nosotros de vuelta seguimos. Al cuando no quieran, pero nosotros hacemos y toman. Ya ve ahora la cola nada más da enfermedades ve, entonces debemos utilizar...eso es más económico y fácil de hacer. Y también aguanta para una fiesta. Porque la chicha se hace de solo el maíz mismo, del maíz sale la jora y las panelas, ya ve no se utilizan. Y ahora las panelas ya no se van utilizando mucho pero en la chicha se utilizan. Eso es. Y los necesarios que entran ahí como la canela, el clavo de olor, todo eso entra en la chicha.

Appendix L: Javier Carrera interview Transcription

Objective 2: Semi-Structured Interviews of Farmers, Indigenous Leaders, and NGO

The following is an English translation of the transcription of an Interview with Javier Carrera, Founder of los Guardianes de Semillas, farmer interview transcriptions.

Javier Carrera: What happens is that the seeds are something so interesting and so beautiful that people want to do something about it. And suddenly there are funds and it occurs to people to create a seed bank. But that's putting things backwards. Here they say the donkey behind the cart. Because in reality you first have to consider why you are going to establish the seed bank. What is the objective specifically? What need is being answered with the establishment of the seed bank? Because if not, what happens is that people are always going to say yes because something is coming, some machinery, equipment is coming, some resources are coming... then they are always going to say yes. But they are not necessarily going to get involved with the positions that the seed bank requires. So how is it going to be financed to ensure that the bank works for the future and if it is not through a salary, why are people going to assume the commitment to maintain the seed bank as a job? So the objective has to be clear and there may be the issue of people giving part of their seeds to the bank for security - we have tried to do it - knowing that at the time of planting they will be able to ask the bank for return those seeds. And that happens both with things that are typical of the area such as corn. But I have seen in many cases that people do not want to give themselves the job of taking the corn to the bank because they already have it stored in their homes - all of them. And they know that if they lack they will be able to ask the neighbor or someone to give them seeds, it is not a big problem. And we think that there is more interest in vegetable seeds in the areas where the vegetable is produced for commercial purposes, there may be interest there, and that is why we have been training seed growers. But in any case, this can be managed by the family and the seed growers independently, that is, as a seed grower I can produce carrots on my land and when someone needs it, they buy me. Why am I going to need a seed bank? What would be the help of that? So a bank would really have to be tied to a very specific goal that is based on the needs of the community, and stems from them. Since it really is something useful that they could not otherwise obtain. So, for example, an association of vegetable producers could be interested in maintaining a seed bank. And they should see as a group, community, company, how to financially support the people who are going to be there. One possibility could be if the bank is in charge of cleaning and storing the seeds. And removing that work from people who are at the family level, because it is a curious task. You have to clean, dry, eliminate pests, store properly. But that is work, and that work has a cost that must be paid. So unless the association, the community somehow thinks economically about the people who are going to be working on it, it's not going to work. And when one enters with a project, one must be very clear about what the future is. I financed a dream for two years, and what happens next? That already happened here with a lot of banks that I know. That they could have the bank for about 2, 3, 4 years, while there was a foreign cooperation project that

paid the salary of the woman who was in charge of it, but when the project ended, the seed bank closed. So those are the real difficulties that you are going through here.

Appendix L.2: Javier Carrera Interviews Transcription in Spanish

Objetivo 2: Entrevistas semiestructuradas de agricultores, líderes indígenas y ONG

La siguiente es una traducción al inglés de la transcripción de una entrevista con Javier Carrera, Fundador de los Guardianes de Semillas, transcripciones de entrevistas con agricultores.

Javier Carrera: Lo que pasa es que las semillas son algo tan interesante y tan bonito que la gente tiene ganas de hacer algo al respecto. Y de repente hay fondos y a la gente se le ocurre hagamos un banco de semillas. Pero eso es poner las cosas al revés. Aquí dicen el burro detrás de la carreta. Por que en realidad primero hay que plantearse para que se va a establecer el banco de semillas. Cual es concretamente el objetivo? Que necesidad se esta respondiendo con el establecimiento del banco de semillas? Porque si no lo que sucede es que la gente siempre va a decir si porque algo viene, viene algo de maquinaria, de equipo, viene algo de recursos...entonces siempre van a decir que si. Pero no necesariamente se van a involucrar con los puestos que el banco de semillas requiere. Entonces como se va a financiar para asegurar que el banco funcione por un futuro y si no es mediante un sueldo porque razon van las personas asumir el compromiso de mantener el banco de semillas como un trabajo. Entonces tiene que estar claro el objetivo y ahí puede ser el tema de que la gente por seguridad entregue parte de sus semillas al banco - nosotros lo hemos tratado de hacer - sabiendo que en el momento de la siembra van a poder pedir del banco de regreso esas semillas. Y eso ocurre tanto con las cosas que son propias de la zona como el maiz. Pero he visto en muchos casos que la gente no se quiere dar el trabajo de llevar el maiz al banco porque ya lo tiene guardado en sus casas - todos. Y saben que si les falta van a poder pedirle al vecino o a alguien que les de semillas, no es mayor problema. Y pensamos que hay mas interés en semilla de hortaliza en las zonas que se produce la hortaliza con fines comerciales, ahí puede haber interés, y por eso hemos estado formando semilleristas. Pero de todas maneras eso puede ser manejado por la familia y los semilleristas de forma autónoma, ósea yo como semillerista puedo producir zanahoria en mi terreno y cuando alguien necesita, me compra. Para que voy a necesitar un banco de semillas? Cual seria la ayuda de eso? Entonces un banco realmente tendría que estar atado a un objetivo muy concreto que se base en las necesidades de la comunidad, y que surja de ellos. Ya que realmente de algo util que no podrian de otra manera obtener. Entonces por ejemplo una asociación de productores de hortalizas podria tener interes en mantener un banco de semillas. Y deberian ver como grupo, comunidad, empresa, como sostener económicamente a las personas que van a estar ahí. Una posibilidad podria ser si el banco se encarga de la labor de limpieza y almacenamiento de las semillas. Y quitando ya ese labor a la gente que esta a nivel familiar, porque es un labor curiosa. Hay que limpiar, secar, eliminar las plagas, almacenar de forma adecuada. Pero eso es trabajo, y ese trabajo tiene un costo que debe ser pagado. Entonces a no ser que la asociación, la comunidad de algún modo piense economicamente sobre la gente que va estar trabajando en eso, pues no va a funcionar. Y cuando uno entra con un proyecto uno debe de tener muy claro cual es el futuro. Yo financió un sueño por dos años, y qué pasa después? Eso ya paso aquí con un monton de bancos que yo conozco. Que pudieron tener el banco por unos 2, 3, 4 años, mientras

habia un proyecto de cooperacion extranjera que pagaba el sueldo de la mujer que estaba delante de eso, pero cuando se acabo el proyecto, cerro el banco de semillas. Entonces, esas son las dificultades reales que se atraviesa aqui.

Appendix M: Promotional Sayausí Seed Bank Pamphlet

See attached file named AppendixMSeedBankPamphlet.pdf.

Appendix N: Seed Bank Framework

The following is a framework for future seed banks that the team designed as a deliverable.

Community seed banks are an efficient method of seed preservation. However, the seed bank must be actively engaged with its community to create an impact. In an interview with the founder of Los Guardianes de Semillas, Javier Carrera, he provided insights to expanding a seed bank's impact. During the interview, Javier Carrera provided recommendations on starting a community seed bank, based on his own experience. When asked what stakeholders and steps are necessary for the establishment of an impactful community seed bank, he stressed it being necessary to recall its purpose and the needs to be met. He recalled instances in which communities built seed banks due to expressed community interest and acquired governmental funding. However, these same seed banks closed due to lack of engagement and attention. Carrera stated during his interview that

“a [seed] bank would have to be tied to a specific objective and be focused on the needs of the community, it [the seed bank] must be something that stems from them [community members]... and provide something useful that they [community members] could not otherwise obtain.”

The following are suggestions for establishing a community seed bank in a rural parish:

1. Feasibility of the project
 - a. Gather interest and support from community members, politicians and non profit organizations
 - b. Have a location for the seed bank that is accessible and can withstand climate conditions
2. Emphasize what the seed bank's priorities are in terms of seeds most required for conservation and the community's needs
 - a. Gather knowledgeable and experienced community members about seed preservation techniques
 - b. Document and label seed varieties along with their uses and benefits
3. Meets and addresses the community's needs
 - a. Ensure seeds represent the local culture
 - b. Establish a seed donation system
 - c. Establish a beneficiary program for community members in order to ensure a continuous circulation of seeds in and out of the seed bank
4. Encourage community involvement with the seed bank for continuous success
 - a. Organize community seed exchanges
 - b. Publicize all seed bank events and activities to community members

- c. Develop an accessible platform to advertise the seed bank (website, social media, pamphlets)

Appendix N.2: Seed Bank Framework in Spanish

The following is a framework for future seed banks that the team designed as a deliverable translated to Spanish.

Los bancos comunitarios de semillas son un método eficiente de conservación de semillas. Sin embargo, el banco de semillas debe comprometerse activamente con su comunidad para crear un impacto. En una entrevista con el fundador de Los Guardianes de Semillas, Javier Carrera, brindó información para expandir el impacto de un banco de semillas. Durante la entrevista, Javier Carrera brindó recomendaciones sobre cómo iniciar un banco comunitario de semillas, con base en su propia experiencia. Cuando se le preguntó qué actores y pasos son necesarios para el establecimiento de un banco comunitario de semillas impactante, enfatizó que es necesario recordar su propósito y las necesidades que se deben satisfacer. Recordó instancias en las que las comunidades construyeron bancos de semillas debido al interés expresado por la comunidad y adquirieron fondos gubernamentales. Sin embargo, estos mismos bancos de semillas cerraron por falta de compromiso y atención. Carrera afirmó durante su entrevista que

“un banco [de semillas] tendría que estar atado a un objetivo específico y estar enfocado a las necesidades de la comunidad, [el banco de semillas] debe ser algo que nazca de ellos [los miembros de la comunidad]... y proporcione algo útil que ellos [los miembros de la comunidad] no podrían obtener de otra manera”.

Las siguientes son sugerencias para establecer un banco comunitario de semillas en una parroquia rural:

1. Practicabilidad del proyecto
 - a. Obtener interés y apoyo de miembros de la comunidad, políticos y organizaciones sin fines de lucro
 - b. Tenga una ubicación para el banco de semillas que sea accesible y pueda soportar condiciones climáticas
2. Recalca cuáles son las prioridades del banco de semillas en términos de las semillas más requeridas para la conservación y las necesidades de la comunidad
 - a. Reúna a miembros de la comunidad con conocimientos y experiencia sobre las técnicas de conservación de semillas
 - b. Documentar y etiquetar las variedades de semillas junto con sus usos y beneficios.
3. Satisface y ocupa las necesidades de la comunidad
 - a. Asegúrese de que las semillas representan la cultura local
 - b. Establecer un sistema de donación de semillas
 - c. Establecer un programa de beneficiarios para los miembros de la comunidad con el fin de garantizar una circulación continua de semillas dentro y fuera del banco de semillas

4. Anime la participación de la comunidad con el banco de semillas para un éxito continuo
 - a. Organizar intercambios comunitarios de semillas
 - b. Dar a conocer todos los eventos y actividades del banco de semillas a los miembros de la comunidad
 - c. Desarrollar una plataforma accesible para publicar el banco de semillas (sitio web, redes sociales, folletos)

Appendix O: Seed Exchange Guidelines

The following is a guideline for starting a seed exchange that the team designed as a deliverable.

We recognize the loss of native seed varieties, but what can be done? One way that seed circulation can be facilitated is through seed exchanges. A seed exchange is an instance in which neighbors, farmers, and even strangers come together to exchange seeds from their harvest in exchange for seeds they don't have. These instances allow an exchange of knowledge and give access to seeds that people would not otherwise have. In this way it is possible to preserve species that are at risk of being completely lost. In the Sayausí parish, farmers were interviewed about the way they harvest. All the farmers interviewed said that they save the seeds of each harvest, but none had previously participated in a seed exchange. 80% recognized that there are benefits to participating in a seed exchange. The following quotes reflect the benefits farmers noted.

“In order to have better [crop] production”

"I could benefit because there is a different variety [of seeds] throughout Ecuador and there are in the Sierra region a huge variety of seeds...that here [Sayausí] we don't have"

The 20% of farmers interviewed who did not see any benefit from participating in a seed exchange admitted that they could not recognize a benefit because they had no previous experience with seed exchanges. One farmer even asked how she could participate in an exchange. It is possible that more farmers could become involved in a seed exchange if they could find or organize one. The following is an outline of steps and suggestions to follow if you are interested in organizing a seed exchange.

1. Gather people with expressed interest to schedule a time and place for the seed exchange
2. Establish individual(s) to manage the planning process
 - a. It is better if the people leading have experience or are informed about seed exchanges
3. Properly advertise and encourage participation from different parishes
 - a. Use social media, town hall meetings, flyers
4. Encourage people to bring the best seeds from their harvest that are in good health
 - a. Remind to bring seeds in individual packaging to avoid contamination
5. Make a network and gain connections (participants, organizers, donors, NGOs, etc) for future seed exchanges every season

Appendix O.2: Seed Exchange Guidelines in Spanish

The following is a guideline for starting a seed exchange that the team designed as a deliverable translated to Spanish.

Reconocemos la pérdida de semillas nativas, pero que se puede hacer sobre esto? Una manera en la que se puede facilitar la circulación de semillas es a través de intercambios de semillas. Un intercambio de semillas es una instancia en la cual vecinos, agricultores, campesinos e incluso extraños se reúnen para intercambiar semillas de su cosecha a cambio por semillas que no tienen. Estas instancias permiten un intercambio de conocimiento y dan acceso a semillas que de otra manera la gente no tendría. De esta manera se logra preservar especies que están a riesgo de perderse por completo. En la parroquia de Sayausí agricultores fueron entrevistados sobre la manera en la que cosechan. Todos los agricultores entrevistados dijeron que preservan las semillas de cada cosecha, pero ninguno había antes participado en un intercambio de semillas. 80% reconoció que existen beneficios de participar en un intercambio de semillas. Las siguientes citas reflejan los beneficios que los agricultores notaron.

“Para poder tener mejor producción [de cultivo]”

“Se podría beneficiar porque hay diferente variedad [de semillas] en todo el Ecuador y hay en algunas zonas de la Sierra donde hay una variedad enorme de semillas...que aquí [Sayausí] no tenemos”

El 20% de agricultores entrevistados que no notaron algún beneficio de participar en un intercambio de semillas admitió que no podía reconocer un beneficio debido a que no tenía experiencia con intercambios de semillas. Incluso, una agricultora preguntó cómo ella podría participar en un intercambio. Es posible que más agricultores podrían llegar a participar en un intercambio de semillas si pudieran encontrar o organizar uno. La siguiente es una esquema sobre pasos y sugerencias a seguir si estás interesado en organizar un intercambio de semillas.

1. Reúna a personas con interés para programar una hora y un lugar para el intercambio de semillas
2. Designe a alguna(s) personas para dirigir el proceso de planificación
 - a. Es mejor si las personas al frente tienen experiencia o están informados sobre los intercambios de semillas
3. Anuncie adecuadamente y anime la participación de gente de diferentes parroquias
 - a. Use las redes sociales, reuniones en el ayuntamiento, folletos
4. Anime a las personas a traer las mejores semillas de su cosecha que estén en buen estado

- a. Recuerde a gente a traer sus semillas en envases individuales para evitar contaminaciones
5. Establezca contactos y obtenga conexiones (participants, organizadores, donantes, organizaciones no gubernamentales, etc) para futuros intercambios de semillas cada temporada

Appendix P: Seed Bank Banners

See attached file named AppendixPBanners.pdf.

Appendix Q: Seed Bank Logos

See attached file named AppendixQLogos.pdf.

Appendix R: Seed Bank Pamphlet Template

See attached file named AppendixRPamphletTemplate.pdf.