Barrier Analysis on Maize Harvest and Post-Harvest Practices

Final Report

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Mercy Corps Guatemala

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Executive Summary

Background

Stunting is the main nutritional problem in Guatemala and one of the most recalcitrant, having decreased only by 16% since 1995. Rates are higher in rural areas and among indigenous people. Exacerbating the challenge, is the fact that 53% of the 1.24 million farmers in Guatemala are subsistence farmers, thriving almost solely from maize and beans grown in small quantities. Traditionally, the main causes of malnutrition are considered to be inappropriate diet, disease and poor hygiene and health care. These are considered essentials for basic child health and nutrition practices.

A recent study by Guatemala's Secretary of Food Security and Nutrition (*Secretaría de Seguridad Alimentaria y Nutricional de Guatemala, SESAN*) found that sustained high malnutrition rates may be associated with the high consumption of local maize with high levels of mycotoxin contamination[1].

Two of the most frequent and toxic mycotoxins (aflatoxins and fumonisins) are predominantly present in maize crops in Guatemala. Their presence is mainly due to inappropriate harvest and post-harvest practices. With the generous financial support from the people from the United States through the Technical and Operational Performance Support (TOPS) Program, Mercy Corps Guatemala implemented a Barrier Analysis to understand the determinants that could be preventing vulnerable families from adopting practices that reduce mycotoxin levels in maize. Through this Barrier Analysis, Mercy Corps Guatemala is beginning efforts to identify, develop and promote low-cost practices that significantly reduce the contamination risk from mycotoxins through an improvement in harvesting, storage and consumption practices.

Methodology

The study was based on the methodology explained in the FSN Network recommended resource: A Practical Guide to Conducting a Barrier Analysis. The Barrier Analysis is a survey focused on identifying what is preventing the target group from adopting the behavior to be promoted; it also identifies facilitators or motivators of this behavior with the purpose of using findings as input for the design of a behavior change strategy.

The study began with a preliminary investigation required to identify the ideal behaviors to be promoted. As a result of this investigation, four behaviors were defined for this Barrier Analysis:

1. Corn producers bend cornstalks within one to three weeks prior to harvest
2. Corn producers sun-dry their grain at least three days before storing it
3. Corn producers store grain in silos before consuming it.
4. Women In Corn Producing Families Nixtamalize Their Corn by Boiling It in Water and Lime and then Rinsing it at Least Three Times With Clean Water

Upon the identification and design of behavior descriptions, the Questionnaires used for collecting field information were designed. Data collection work lasted 13 days; 27 communities were visited in 8 municipalities in Alta Verapaz and 1 municipality in Izabal. 386 people were interviewed, all of Q'eqchi' origin. Subsequently, the significant determinants that should be addressed in order to complete the

[1] Toxic secondary metabolites, with a varied composition, produced by organisms from the fungi kingdom, which include mushrooms, mildew and yeasts. Mycotoxins grow on grains, nuts, and other agricultural products.

frameworks for the Design for Behavior Changes were identified. Consecutively, an analysis workshop was conducted, where the Bridges to Activities were identified.

It is important to highlight that the results from this study may be used by Guatemala's governmental agencies, as well as by other interested agencies, as input to design their Behavior Change strategies. Representatives of the Ministry of Agriculture, the Secretariat of Food Security and Nutrition and non-governmental organizations were invited to a workshop to design the Activities proposed in this study.
The results will be disseminated among local and international communities, since they are considered valuable input for establishing a comprehensive and more effective strategy to attain the desired results in the fight against mycotoxin contamination.

Summary of Findings

Behavior 1: Corn producers bend cornstalks within one to three weeks prior to harvest.

- The majority of those interviewed said that they are capable of doing the practice with their knowledge, skills and current resources.
- Doers (those interviewed that practice the behavior) acknowledge more of the Positive Consequences than non-doers (those interviewed that do not practice the behavior).
- Doers did not identify Negative Consequences in the practice, while half of non-doers identified them.
- With regard to the perceived Social Norms, it was identified that elder people are a group with a strong influence against practicing the behavior.
- The vast majority of doers believe that such practice is efficient to prevent maize from developing mold, while only a small part of non-doers acknowledges it.
- A significant amount of interviewed people considers that God does not approve the practice.

Behavior 2: Corn producers sun-dry their grain for at least three days.

- All the doers stated that they are capable of doing the practice, compared with 26% of the non-doers.
- Having the time to do the practice is identified as a facilitator, just as the lack of time is considered as a significant barrier.
- Doers identified that grains maintain their healthy aspect when they are sun-dried.
- The loss in weight of the sun-dried grain and their belief that dried grains are not good to be used as seeds for the following harvest, are significant concerns among producers.
- Doers consider that the nuclear family to be the only group that approves the behavior, whereas a significant amount of non-doers think that the nuclear family doesn't approve of it.
- Producers have the perception that it is difficult to have access to the materials required to practice the sun-drying of maize.
- Those interviewed considered it hard to remember the time and the way for performing the promoted drying process.
- Most of non-doers and almost half of doers perceived that God does not agree with this practice.

Behavior 3: Corn producers store their maize in silos before consuming it.

- The totality of the doers responded that it is possible do the behavior, versus 62% of non-doers who stated likewise.
- Having the support of the family for the different stages of the process was identified as a significant facilitator.
- Two barriers resulted significant upon analyzing the responses from the non-doers: the lack of knowledge and having small amounts of maize grains.

- Almost all the interviewed persons said that they do not know of any policies that facilitate or limit storing maize grains in silos.

Behavior 4: Women in corn producing families nixtamalize their corn by boiling it in water and lime and washing it at least three times with clean water.

- The identified negative consequence refers to the incorrect implementation of the practice. Interviewed persons mentioned that leaving residues of lime in the grains causes diseases in the family.
- Interviewed persons declared that it is difficult to have access to clean water.

Summary of recommendations

By considering the analyzed information, the investigation team prepared the framework for Behavior Change Design, which suggests Activities that could be included upon designing nutrition, health, and economic development programs. (See Annex 1)

Producers declared that the opinion from others is very important to decide if they should carry on with the practices or not; thus, it is recommended to include Influence Groups when planning interventions.

It is recommended for the implementing organization to consider designing their strategy by integrating all four behaviors, in order to increase the likelihood of obtaining the desired result. Also, implementers should take into consideration their own objectives and resources in order to be able to develop a feasible, efficient and sustainable strategy.

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1. Introduction

Guatemala's government, international organizations and people in general acknowledge that chronic malnutrition is a huge problem that seriously affects the country's development. In spite of more than 50 years of Title II activities in Guatemala and coordinated efforts to improve health, nutrition, and food practices through several strategies and interventions, Guatemala continues having the highest prevalence in growth delay in children in Latin America (49.8%) and is sixth worldwide[2]. However, there is an increasing interest in the role mycotoxins[3] may play in causing malnutrition.

There is evidence of a strong correlation between mycotoxins contamination in staple food and stunting in children under five years of age. Even though at this time no causal relationship has been determined, research specialists in the subject agree that it is necessary to take action in order to reduce mycotoxin levels in staple food, such as maize. Some harvesting and post harvesting practices are key to reducing such contamination in the food chain (for example: drying maize grains below 14% humidity and storing the grains in airtight silos in order to prevent mildew growth, infestation, and damage from rodents.)

With the generous financial support from the people from the United States through the Technical and Operational Performance Support (TOPS) program, Mercy Corps Guatemala implemented a Barrier Analysis to understand the determinants that could prevent vulnerable families from adopting practices that reduce mycotoxin levels in corn. Through this Barrier Analysis, Mercy Corps Guatemala is beginning efforts to identify, develop and promote low-cost practices that would significantly reduce the risk of mycotoxins contamination through improved practices in harvesting, storage, and food preparation.

The Barrier Analysis was performed from August 2014 to February 2015. Fieldwork was carried out in seven municipalities of Alta Verapaz and in one municipality of Izabal, both departments located in the northern part of Guatemala; target population was Q'eqchi'. A preliminary research was performed to learn about current agricultural practices, with the purpose of identifying the ideal behavior that should be promoted. As a result, four behaviors were identified related to harvest and post-harvest practices:
1. Bending cornstalks within one to three weeks prior to harvest;
2. Sun-drying maize grains for at least three days;
3. Storing the grains in silos; and
4. Cooking maize in water and lime and washing it at least three times with clean water (nixtamalization).
This report shows the results from these analyses. It includes a brief introduction to the methodology of Barrier Analysis, describes the fieldwork and proposes Activities that fill in the identified gaps.

The results from this study may contribute to the achievement of the Zero Hunger Pact goals (Pacto Hambre Cero), a presidential initiative of the government of Guatemala (response from the government to the appeal from the United Nations Secretary General to eradicate hunger by 2025). Concurrently, the United States Agency for International Development (USAID) has asked its Title II programs in the western region in Guatemala to introduce mycotoxin mitigation measures in their work plan. The results of this Barrier Analysis will be shared with government agencies and international organizations that implement Title II programs, with the expectation of providing valid documentation to introduce the promotion of the best agricultural practices upon designing their activities, with the purpose of reducing mycotoxin consumption.

[2] UNICEF 2012 Annual Report for Guatemala, TACRO
[3] Toxic secondary metabolites, with a varied composition, produced by organisms from the fungi, which include mushrooms, mildew, and yeasts. They grow on grains, nuts, and other agricultural products.

2. Barrier Analysis

2.1 Explanation of the Barrier Analysis Methodology

A Barrier Analysis is a survey that focuses on identifying the factors that are preventing the target group from adopting a preferred behavior; it also identifies the facilitators or motivators to adopt the behavior. With the purpose of identifying key barriers and motivators, a series of questions were asked to the Priority Group (see definition below), in order to identify up to 12 potential Determinants that could prevent people from taking action.

The following terms are specific to Barrier Analysis:
Behavior: A specific action carried out by members of the Priority Group to address a problem they face. A Behavior is also frequently known as a "practice". The statement shall be drafted mentioning all the details of the Behavior, such as the place where it will be carried out, its frequency and duration. The statement must be very specific, measurable and observable.

Priority Group: People that practice the behavior or that may guarantee and/or supervised that the behavior is being practiced with a minor child.

Influence Group: Those that have an influence on the Priority Group regarding the behavior; they might support or prevent the adoption of the positive behavior by the Priority Group.

Determinants for Behavior Change: Twelve factors have been proven to encourage or block the adoption of a behavior by a group of people. These 12 determinants are: perceived Self-Efficacy/skills, perceived Social Norms, perceived Positive Consequences, perceived Negative Consequences, access, cues for action/reminders, perceived susceptibility, perceived severity, perceived Divine Will, policies and culture.

Bridges to Activities: Specific description of the change that is being promoted; they address the findings of the investigation. Usually they begin with a directional verb (e.g., increase, decrease, improve, reinforce).

Activity: A set of tasks that, when implemented altogether, address the Bridges to Activities.

Framework for Behavior Change Design: A tool composed by the five main decisions from the Barrier Analysis, which are: Behavior, Priority Group and Influence Group, Determinants, Bridges to Activities and Activities.

2.2 Methodology for the Barrier Analysis in Harvest and Post-Harvest Practices

Preliminary Research

During the months prior to the execution of the Barrier Analysis, a preliminary research was conducted with people from the Priority Group. The purpose of the interviews was to know the current agricultural practices in order to determine which would be the behaviors they would investigate. The interviews consisted of a series of open questions made to 100 persons among producers, grandparents, and wives.

Behavior Definition

On the basis of current agricultural practices, four key practices were identified to limit the proliferation of mycotoxins in maize:

- **Behavior 1: Corn producers bend cornstalks within one to three weeks prior to harvest.**
  To ensure that maize matures well prior to harvest, many producers in Central America bend the cornstalks downwards. By bending the cornstalk correctly the maize matures faster and the ear is less susceptible to damage from water and birds.

It is worth mentioning that susceptibility to water and/or bird damage depends in great part on the maize variety and the seed selection process. There are maize varieties that produce more and larger corn husks which protect the ear better against water or bird damage. In some areas, farmers are not used to bending cornstalks prior to harvest; instead, they bend them at the time of the harvest, to show that the maize has been collected. In some other regions they do bend the cornstalks, but often times they keep it bent for more than one month. In this case, the maize grain is more exposed to water damage from rain and dew, which increases the probability of fungi growth and damage from the environment.

Based on the preliminary survey performed to identify important behaviors, it was determined that the optimum time between the bending of the cornstalks and their harvest is within one to three weeks. It is important to consider that, through different experiments, it was identified that in order to be able to bend the corn stalks, the cob's stem must have reached a certain degree of maturity. If it not mature enough , the stalk does not bend well and maize does not dry.

- **Behavior 2: Corn producers sun-dry their grain for at least three days.**
  This practice takes place before storage and ensures that the maize grain will have humidity lower than 14% prior to storing. For the grains to be dried, harvested corn ears must be threshed. Threshing was not a criteria considered in this behavior, though it is a requisite for drying the maize. However, through this Barrier Analysis, certain limiting factors connected to threshing, that could affect adoption of the promoted behavior, were identified which should be investigated separately. The ideal way for drying maize is by using an area in the yard of the house, preferably a leveled surface covered with plastic, where maize grain is spread out. Usually, farmers use homemade methods to know if maize is dry enough, like pressing the grains with their fingernails. These methods are not sufficiently precise to identify if maize is ready to be stored. The likelihood of fungi growth and rotting of the grain increases considerably when maize is stored at humidity levels above 14%. There are artisanal methods that are more precise for measuring the humidity of the grain, such as performing tests in a closed glass container with salt. A small amount of maize grains are put inside the container and it is shaken repeatedly. After leaving it rest for a few minutes, the container is turned upside down. If the salt adheres to the glass, it means that the maize is not dry enough.

- **Behavior 3: Corn producers store their maize in silos before consuming it.**
  When the threshed maize grains are dry, it is recommended to store them in a silo. The use of silos has been encouraged for many years by Guatemalan´s Ministry of Agriculture and by national and international NGOs. Their adoption has been limited, which made it an important behavior to be considered in this Barrier Analysis. The correct behavior consists of placing the adequately dried grain (humidity below 14%) in a silo, which is airtight sealed and is kept sealed for at least two months prior to consumption. When the grain is dry and airtight sealed, pests do not spread, neither do fungi nor bacteria. This way, grains preserve their initial quality during storage. The current tradition in Guatemala for storing maize is varied. Some producers leave the maize in the field and harvest on their use or sale needs. Others store maize, generally on the cob, inside a granary, which is a semi-enclosed structure. In other homes, they store maize by hanging it in the kitchen, where it dries with the smoke and heat from the fire they use to cook. Some families have storehouses in their homes, where they keep dry maize in the cob. In almost all cases, the threshing is made gradually, just before they use it or sell it. Also, the humidity level is hard to control; there is no method that provides an airtight environment

and the majority of people do not protect their grains against fungi, bacteria and pests like rodents or birds.

- **Behavior 4: Women in corn producing families nixtamalize their corn by boiling it in water and lime and washing it at least three times with clean water.**
  The nixtamalization process is a widespread practice that is used in the entire Mesoamerican region. It is used to prepare maize for the purpose of using it in different foods. The first step in the nixtamalization process consists of cooking maize grains in an alkaline solution (using lime) at a temperature that is close to the boiling point. After it has been cooked, maize is left inside the broth for a period of time. The length of time for cooking and soaking maize varies depending on the type of maize, the local traditions, and the type of food that will be prepared. During the cooking and soaking, a series of chemical changes occur to the maize; it loosens the hulls from the kernels and softens the corn. The grain is then hydrated and absorbs calcium and potassium throughout the whole process. Starches dissolve and form a gelatin; some starches melt away in the liquid. Certain chemical products from the seed are released, which allow an easier grinding of the soaked and cooked grain. The boiling produces changes in the maize's main protein, which makes the proteins and nutrients from the core's endosperm to be more digestible for the human body. Nixtamalization is especially important since it increases the availability of niacin, thus reducing the risk of developing pellagra referred in other parts of the world. Also, the chemical-mechanical processes used during boiling, releases the mycotoxins in the grains.

  After the grain is cooked, the alkaline broth is decanted and discarded. In order to know if the process was successful, one must be able to peal the grain easily between the fingers by rubbing. Grain must be washed to ensure there is no lime residue. The hulls are discarded and only the kernels are left. Grains must be washed at least three times with clean water, in order to ensure that any residue from the alkaline solution has been discarded. Then the grain is used whole or it is grinded to make corn flour. Washing the grains also eliminates the mycotoxins released from the cooking. One of the problems found in the field is the use of polluted water for the washing, as well as not being able to use enough water due to the lack of access to it. Both cases cause a poor washing, leaving residue of lime. Likewise, a poor washing does not discard the released mycotoxins.

  Therefore, the desired behavior includes cooking the grains with lime and the appropriate washing with clean water, and it is defined as follows: Maize cooked with water and lime and washed at least three times with clean water.

Questionnaires

Upon having established the behaviors, the corresponding questionnaires in Spanish, were designed. The translation to the local language - Q'eqchi' - was made by staff from Mercy Corps Guatemala/PROCOMIDA who are certified in such language. Translations were reviewed with the survey team and were standardized with the whole team. (See Annex 2)

Fieldwork Description

Mercy Corps hired the field survey team with the purpose of collecting the necessary information in the Priority Groups. Staff was trained on the fundamentals of the methodology of Barrier Analysis, highlighting the structure and use of questionnaires. Two work teams were formed with four surveyors and one supervisor for each team.

- **Training workshop for the recruited staff**

  Since the BA requires a specific methodology that includes qualitative elements, it was necessary to train the staff in interviewing techniques, since they had more experience with quantitative surveys. Training lasted five days, of which three were devoted to the conceptual and methodological aspects of the Barrier Analysis and the questionnaires. During the other two days, a field practice was performed so that interviewers could become familiar with the questionnaires, solve any doubts, and correct any errors.

  For the conceptual and methodological part, elements from the Practical Guide to Perform a Barrier Analysis, by Bonnie Kittle, were considered. Some work sheets and key definitions were extracted, for a better contextualized comprehension. Some elements were designed slightly differently from the manual, to answer some issues identified in a prior Barrier Analysis held by Mercy Corps Guatemala. . For example, the difference between "disadvantage" and "difficult" was emphasized, as well as the correct way for filling out the questionnaire, classifying people that will be interviewed and interpreting the responses received. Other elements were added in order to familiarize the staff with the qualitative investigation: Activities to understand the importance of the perspective of interviewed parties, different kinds of interviews, qualitative interview and the role of the interviewer.

  The field practice was held for two days, where two communities were visited near the training site. To find the people they were going to interview, they received support from community leaders, who accompanied the staff.

- **Field data collection**

  Fieldwork lasted 13 days, during which 27 communities were visited scattered throughout the selected municipalities.

Data Collection and Preliminary Analysis

Two persons carried out the counting and coding of the responses. Two behaviors were assigned to each person. The information was entered in the tables for data analysis downloaded from TOPS website. These are tables in which the information collected is entered, starting with the Behavior followed by the amount of doers and non-doers interviewed. Then, the number of responses obtained by each group (doers and not doers) for each determinant is entered. The table automatically performs calculations to establish which of the determinants are significant and which ones are not.

Information Analysis Workshop

The same multidisciplinary group that designed the behaviors gathered to analyze the significant determinants identified, in order to write the Bridges to Activities.

Workshop to Complete the Designing for Behavior Change Work Frames

A final workshop was facilitated with participation of governmental and non-governmental agencies from the area of Alta Verapaz involved in agriculture and health interventions. In this workshop, the Bridges to Activities were used to identify the recommended activities future projects should take into consideration to reduce mycotoxin levels.

Communication of Results

The results from this Barrier Analysis have been and will continue to be shared with representatives from the Agriculture and Food Security and Nutrition sectors in Guatemala and the United States, and globally through the Internet. Also the results will be presented to interested parties in a Knowledge Sharing Event organized by TOPS in Washington DC on April 9, 2015.

3. Results

3.1 Demographics

Geographic area

The chosen municipalities have a large Q'eqchi' population and they show similar geographic and climatic characteristics, therefore, harvesting and post harvesting practices are similar in both areas.

The geographic area included municipalities in two of the country's departments:

- Alta Verapaz: La Tinta, Panzós, Chahal, Chisec, Cobán, Fray Bartolomé de las Casas, and Raxruhá
- Izabal: El Estor

Sex of the people interviewed

More men than women were interviewed, since in three of the four behaviors the Priority Group was established as men; however, for such behaviors, some women were also interviewed. For the behavior related to nixtamalization, only women were interviewed. Total interviewed:

- 272 men
- 113 women
- 1 not registered

Language in which the interviews were performed

- 342 Q'eqchi'
- 38 Spanish
- 6 not registered

Age of the people interviewed

- Range: 17-80
- Average: 44 years old

The age range of the interviewed people is wide, since harvesting and consumption of maize are basic activities of the rural life in these communities, and therefore, they are widely practiced without regard to age.

Amount of valid interviews per behavior

Behavior	*Interviews total*	*Doers*	*Non-doers*
Bending cornstalks	96	45	51
Drying grains	96	46	50
Storage of dry grains	97	39	58
Nixtamalization	96	48	48

The behavior that proved most difficult to find doers was corn storage in silos. The first obstacle was to find families with a silo, followed by the actual use they give to it. Conversely, the behavior that proved most difficult to find non-doers was nixtamalization . In order to determine a non-doer, the proper amount of washings of cooked maize with clean water was key to determine whether the interviewed women were or not doers.

3.2 Analysis of Compiled Information

The most important determinants found for each behavior are detailed below with a brief description of the comparisons between the percentages that correspond to the number of answers obtained with each group of

individuals interviewed, doers and non-doers. The answers that resulted too disperse were omitted since they were not relevant for the analysis.

Behavior 1: Corn producers bend cornstalks within one to three weeks prior to harvest..

Six significant determinants were found for this behavior.

1. *Perceived Self-Efficacy*

This refers to the perception of the individual from the Priority Group regarding his/her own capacity to practice the behavior with his/her current knowledge, skills and resources. All of the doers thought that they are capable of performing the practice, in contrast to 60% of non-doers that have the same opinion.

There are elements that may facilitate or hinder the practice. During the interview, the producers were directly asked which elements facilitated and which elements hindered the promoted bending of cornstalks. With regard to facilitators, different elements were mentioned; none of them was significant due to the number of answers for each group. However, upon addressing the obstacles, the most significant answer was lack of knowledge.

A lot of people are not aware of the practice being promoted, because they perform it differently. While the knowledge does not guarantee the execution of a practice, it is the first step to adopt it. 33% of non-doers mentioned that the lack of knowledge is an obstacle to perform the bending of cornstalks one to three weeks prior to harvest. While only 14% of the doers stated the same; therefore, the difference between doers and non-doers is significant for this determinant.

The typical practice in the area is bending cornstalks at the moment of harvesting the maize, as a sign that the corn has been harvested. In general, producers believe that bending the cornstalks prior to that moment is against tradition and/or that the bending should only be performed with improved seeds or when the grain will be sold. This belief is the result of combining the existing beliefs of the Priority Group with the lack of knowledge regarding how the correct bending should be performed. This has a significant impact in adopting the practice or not to ensure a better drying of maize grains.

2. Perceived Positive Consequences

The Positive Consequences of the behavior refer to the good things that can happen from bending the cornstalk and these were acknowledged more by the doers than by the non-doers. However, the non-doers acknowledged the advantages in bending, although in a lower percentage than the doers. The advantages acknowledged by most of the interviewees and the percentages of their answers were:

- 32% of doers vs. 15% of non-doers answered that they produce better quality maize, which was described as white grain[4], with good size and not rotten at the center.
- 43% of doers, as opposed to 23% of non-doers said that the bent corn rotten less, which means that it lasts longer in storage, according to what some people stated in their answers. If maize lasts longer in storage without damage, this means that when consumed, people will get better nutrition and/or have less probability of getting gastrointestinal diseases.
- 52% of doers said that the birds do not eat the maize. This is because the when the cornstalk is bent downwards, the ears are no longer visible for them. However, only 27% the non-doers acknowledged this advantage.

3. Perceived Negative Consequences

The Negative Consequences of the behavior refer to the bad things that can happen when performing the bending. 48% of doers said that there are no disadvantages upon performing the bending, while only 19% of non-doers mentioned the same thing. Therefore, this determinant is significant.

[4] Guatemala grow white corn rather than yellow corn for most human consumption needs.

4. Perceived Social Norms

Interpersonal relationships are very important for human beings; therefore, the social approval or disapproval of certain practices directly influences the decision of adopting it or not.

The difference in the perception for approving the bending between doers and non-doers is significant, with a difference of 23% among both. Interviewed parties do not consider this a practice that is accepted by those who are considered wise or knowledgeable people in the community. Thus, this is an important issue that should be included when promoting the behavior.

To measure the acceptance or rejection of the promoted bending, we specifically asked who approved it and who disapproved it (would approve it or disapprove it, in the case of the non-doers). Three groups that approve the promoted bending of cornstalk were identified:

- The nuclear family. Understood as the first-degree relationship (father, mother, sons and daughters), as well as the people living in the household (including grandparents). Usually people approving the practices are those who help performing them: the immediate family.
- The extended family, or the blood relatives that do not live in the same household, as well as the in-laws. This holds the second place in importance for the approval of the promoted practice. While the number of answers is lower, it is still a significant group.
- People who are knowledgeable in the practice are also perceived to approve the promoted practice. This is due to the perception that whoever knows how to do the practice, knows the advantages of performing it and, if they do perform it, is because they agree with it.

People that disapprove bending of cornstalks are reduced to one group: community elders. In the communities, the elderly are depositaries and transmitters of traditions and cultural elements. Their opinion is fundamental for the community and their disapproval of any practice affect directly the probability of it being adopted. The elderly from these communities are a group which should be addressed in order to promote this behavior. The planned actions shall consider the strong link with the traditional way of making things and the potential resistance towards change.
In conclusion, it is critical to include extended family and community elders in the promotion efforts.

5. Perceived Action Efficiency

How efficient is bending the cornstalk within one and three weeks prior to the harvest in order to prevent the grain from growing mold? The Priority Group acknowledges that if the maize grain gets moldy due to a poor drying, this would be a serious problem; this is acknowledged by doers as well as by non-doers. However, only the doers consider that bending the cornstalk prevents the grain from becoming moldy (70% of doers vs. 21% of non-doers). Therefore, when promoting the behavior, we should emphasize the action's efficiency, as it is a significant determinant.

6. Perceived Divine Will

In rural communities in the country, religious beliefs represent a very important role, notwithstanding the religion they practice or the church they attend. Most people consider in their weekly activities a time on Sunday to attend church. Religious leaders have prestige and a strong influence in the decisions made by the families.

Perceived Divine Will is a relevant determinant among the people who consider that the opinion of their religious leader is important. 30% of doers and 46% of non-doers perceive, through comments and advice from their religious leaders, that God does <u>not</u> agree with the bending of cornstalks one to three weeks prior to harvest. Therefore, it is important to involve religious leaders of different denominations present in the area, as agents of change.

Behavior 2: Corn producers sun-dry their grain for at least three days.

Seven significant determinants for this behavior were identified:

1. ***Perceived Self-Efficacy***

   Almost 100% of doers affirm that they are capable of performing the drying of maize grains under the sun for at least three days. On the contrary, only 26% of non-doers consider this can be done.

   Regarding the facilitators, several elements were mentioned, of which, the following were significant: having the required materials (for example: a physical space, metal sheets, plastic, etc.) and having enough time for doing it. 67% of doers however perceive this practice requires too much time.

   Just as having the time to perform the practice was identified as a facilitator, 54% of non-doers said that lack of time is an obstacle. Another identified obstacle is bad weather (rain) with 28% of doers and 10% of non-doers mentioning it.

2. ***Perceived Positive Consequences***

   Positive Consequences of the behavior refer to the good things that can happen if the maize grain is sun-dried for at least three days. Half of the doers acknowledged that drying the maize grain preserves its aspect and remains white. A minority of doers (20%) also mentioned that the dried grain is of better quality. Both Positive Consequences were acknowledged by a small segment of non-doers (24 and 6% respectively). It is important to consider that the way in which the rural population measures the quality of the maize grain is by its appearance, specifically shape and color.

3. ***Perceived Negative Consequences***

   The Negative Consequences of the behavior refer to the bad things that can happen upon performing the promoted drying; these appear to be of strong concern for both the doers and non-doers. Even though a significant difference between the answers of both groups cannot be identified, the number of answers received was considered relevant. The loss of weight of the maize grain is a strong concern among producers, as shown by the high percentages of the answers regarding this issue (76% of doers and 78% of non-doers). The concern in this sense is oriented towards the loss of possible earnings at the time of selling the maize.

   Other concern expressed by producers is regarding the maize grain used as seed for the next harvest. 20% of doers and 12% of non-doers believe that if the promoted drying is performed, the maize grain cannot be used as seed because "drying under the sun takes the life from the grain". It will be critical to consider the concerns of the producers to disperse the erroneous beliefs and strengthen the knowledge regarding the normal changes maize grains suffer during the drying process.

4. ***Perceived Social Norms***

   The difference in the perception of the doers and the non-doers regarding the approval from other people about drying under the sun, results significant with a distance of a 25% between both. 61% of doers consider that the practice is approved by knowledgeable people, while 36% of non-doers gave the same answer. To measure the acceptance of the promoted drying, we asked the question about of who approved it and who disapproved it (would approve it or disapprove it, in the case of the non-doers).

   The nuclear family is the only group that, according to 87% of doers and 48% of non-doers, approves or would approve the desired behavior. However, 36% of non-doers think that their nuclear family would not agree with the promoted drying. This is an issue that should be considered when proposing the strategies to promote the behavior.

On the other hand, 33% of doers and 12% of non-doers specified distant neighbors as people that can disapprove the sun-drying practice. In community life, it is important what other people think. Due to the geographical distance, it is possible that producers do not have a clear idea of what the neighbors think and that is why the doers consider it possible for other members of the community or people that are not closed by, to disapprove the practice.

5. Access

In the case of drying the maize grains under the sun, the Priority Group perceives that, in order to perform this practice, they require a physical space, metal sheets and plastic. The help of other people was also identified as necessary.

There is a significant difference in the vision that doers and non-doers of the practice have regarding the easiness or difficulty on getting the required materials. For 33% of doers, it is difficult to get these materials, contrasted by 74% of non-doers indicating the same. 54% of doers and 22% of non-doers said that it is not difficult to get what is required.

6. ***Reminders***

Recalling the adequate moment for performing the practice may be essential for its adoption. In the case of drying maize grains under the sun, it resulted a significant determinant, with 35% of doers and 52% of non-doers indicating that it is (or would be) very difficult to recall when and how to do it. This may be because it is a new practice and very different from the traditional one, which is hanging the corn ears tied from the husks.

7. Perceived Divine Will

Perceived Divine Will is a relevant determinant among the people who considers that the opinion of their religious leader is important. 39% of doers and 74% of non-doers perceive, through comments and advice from their religious leaders, that God does not agree with drying the maize grains under the sun at least three days before storage. They consider that the maize suffers when sun-dried and that God does not want that.

It is important to note that one-third of doers, in spite of considering that God does not agree with sun-drying maize, still sun-dry their maize. We can assume then, that the practice is performed with a feeling of guilt or, at least, certain fear of doing something incorrect.

Behavior 3: Corn producers store their maize in silos before consuming it.

It was difficult to find doers for this behavior, because most people in the area of the survey do not have silos, and those who do have them, generally use them for something else. Three significant determinants were identified:

1. Perceived Self-Efficacy

100% of doers answered that it is possible to carry on with the behavior, while 62% of non-doers indicates that they could perform it. In spite of the observed difference, the producers perceive that this is a behavior that is possible to implement.

There are elements that may facilitate or hinder the practice. During the interview, producers were asked directly about the facilitators and the difficulties of storing the maize grains in silos before consumption.

23% of doers and 9% of non-doers mentioned as a significant facilitator, having the support of the family through different parts of the process, while 3% of doers and 34% of non-doers expressed that they don't know elements that would facilitate the practice.

Two barriers resulted significant upon analyzing the responses from non-doers: the lack of knowledge and having small amounts of maize grains. During the research, it was identified that producers have the idea that the silo needs to be filled up all the way, therefore they would need to have big quantities of grains.

2. Policies

Policies are the norms, laws and/or procedures that may favor or hinder a practice. In a Barrier Analysis, the Priority Group is asked about their knowledge regarding whether there are polices or not in their area. However, it was an unexpected finding what the people in the Priority Group understands as policies, because for them these are the procedures for a specific practice that some entity external to the community tells them to do, or provides the training for.

In the case of storing maize in silos, the population from the research area refers as policies to what the technical personnel from organizations visiting them and/or the Ministry of Agriculture, tells them they should do about this practice. This description of what the Priority Group understands by the term "policies" was obtained when adding the question *which?*, in case the interviewee answered *"yes"* to the question about knowledge of any law or norm in favor or against the behavior.

82% of doers and 97% of non-doers are unaware of policies in favor or against storing maize grains in silos.

Behavior 4: Women in corn producing families nixtamalize their corn by boiling it in water and lime and washing it at least three times with clean water.

Two significant determinants for this behavior were identified.

1. Perceived Negative Consequences

The Negative Consequences of the behavior refer to the bad things that can happen by nixtamalizing maize grains inappropriately. These appear as a source of concern for non-doers; however, we should clarify that they see Negative Consequences when the behavior is done incorrectly, specifically the times they wash maize grains after boiling them with lime.

4% doers vs. 25% of non-doers indicate that the most significant negative consequence due to improper execution of the nixtamalization is that the family could get sick due to any lime residue in the boiled maize grains.

2. Access

The Priority Group indicates that for the proper nixtamalization some materials are required, including wood, water and lime; some of which may be difficult to get.

There is a significant difference in the vision doers and non-doers have about the proper nixtamalization regarding the easiness or difficulty for obtaining the required materials, because 50% of doers said it is "not difficult" to obtain them, while 31% of non-doers reported the same. The key resource and the most difficult to obtain in many cases, is clean water.

4. General Considerations For A Behavior Change Strategy

By considering the analyzed information, the investigative team prepared the Framework for Behavior Change Design, which suggests Activities that could be included upon designing nutrition, health, and economic development programs. It is worth mentioning that the implementation of activities to improve corn harvest and post-harvest practices should be addressed to achieve a significant decrease the risk of mycotoxin contamination, with the purpose of obtaining healthy maize and contributing to the decrease in chronic malnutrition rates.

When implementing a Behavior Change strategy that includes promotion of improved maize harvest and post-harvest practices, the significant determinants should be considered, in order to address the perceptions of the Priority Group and Influence Groups. The purpose is to reduce beliefs and customs that prevent the adoption of good practices; as well as to identify beliefs and customs that enable their adoption, and reinforce them.

Annex 1 you can find the charts with the four frameworks for Behavior Change Design. Such frame works detail the determinants, the Bridges to Activities, and the Activities of each behavior. Also, the last column refers to the Bridges to Activities that are addressed through suggested activities. For example: When implementing demonstrative parcels, several Bridges to Activities should be addressed:

- Increase the perception that producers may perform cornstalk bending with their current resources and skills.
- Reinforce the perception that better quality maize is obtained by bending the cornstalks.
- Increase the families' acceptance of the bending cornstalks practice.
- Reinforce the perception that the grain will rot less as a result of bending cornstalks.
- Reinforce the perception that the grains will be protected from birds by bending the cornstalks.

It is recommended for the implementing organization to consider designing their strategy by integrating all four behaviors, in order to increase the likelihood of obtaining the desired results. Also, implementers shall take into consideration their own objectives and resources in order to be able to design a feasible, efficient, and sustainable strategy.

5. Recommendations

In general terms, the Barrier Analysis tends to focus only on the determinants that show a significant difference between doers and non-doers. However, it is always important to consider findings that both groups identify as important, even when there is no significant difference. Also, it is important to consider factors that both groups do not consider important, in order not to plan large or expensive interventions around them. Just as with every research, it is important to complete quantitative results with qualitative inquiries and the Barrier Analysis is a methodology that allows combining these two scopes comprehensively.

To address the significant determinants of each behavior, we recommend considering the following Bridges to Activities:

Behavior 1: Corn producers bend cornstalks within one to three weeks prior to harvest.

Strengthen the perception that the producers can bend the cornstalks with their current knowledge, resources and skills. Perform activities that strengthen the knowledge to perform the behavior in an ideal way.

- Reinforce the perception that better quality corn is obtaining by bending the cornstalks.
- Reinforce the perception that the grain will rot less as a result of bending cornstalks.
- Reinforce the perception that the grains will be protected from birds by bending the cornstalks.
- Strengthen the perception that bending cornstalks does not entail any Negative Consequences.
- Decrease the perception that the corn shrinks up or is at risk of being eaten by animals.
- Increase the families' acceptance of the practice of bending cornstalks.
- Strengthen the perception that most people approve of bending cornstalks.
- With the doers, reinforce the perception that bending cornstalks will ensure the start of good drying.
- With the non-doers, strengthen the perception that bending cornstalks will ensure the start of good drying.
- Decrease the perception that God disapproves this practice.

Behavior 2: Corn producers sun-dry their grain for at least three days.

- Strengthen the perception that with their current resources and skills the producers are able to perform this behavior.
- Reinforce the perception that this practice is worth the time-investment in order to obtain the desired results.
- Strengthen the perception that the materials needed to sun-dry corn can be obtained.
- Strengthen the perception that the grain dries faster and more evenly and is of a better quality when sun-dried.
- Strengthen the perception that the grain does not molder when sun-dried.
- Improve knowledge on how corn changes during the drying process.
- Strengthen the perception that dried grain can be used for seed.
- Strengthen the families' acceptance of sun-drying.
- Strengthen the perception that the necessary materials can be procured.
- Improve knowledge on the corn sun-drying process.
- Build the capacities of the producers to remember important moments in the corn sun-drying process.
- Decrease the perception that God disapproves of the process of sun-drying corn.

Behavior 3: Corn producers store their maize in silos before consuming it.

- Strengthen the perception that the producers can store their corn in silos with their current resources and skills.
- Strengthen the perception that the families can support the process of storing corn in silos.
- Increase knowledge on the process of storing corn in silos (what is entailed, steps, what is to expect).
- Strengthen the perception that there are no Negative Consequences of storing corn in silos.
- Increase the knowledge that the silo does not have to be completely full.

Behavior 4: Women in corn producing families nixtamalize their corn by boiling it in water and lime and washing it at least three times with clean water.

- Improve knowledge on the proper way to nixtamalize.
- Strengthen the perception that when the practice is properly performed it does not make the family sick (proper nixtamalization does not adversely affect the family's health).
- Decrease the perception that it is very difficult to obtain what is needed for nixtamalization.

6. Annexes

6.1 Annex 1 – Designing for Behavioral Change Work Frames

Table 1 - Behavior 1: Bend Cornstalks

Corn producers bend cornstalks within one to three weeks prior to harvest.

No.	*Determinant*	*No.*	*Bridge*	*No.*	*Activity*	*Other bridges covered by the activity*
1	Perceived self-efficacy	A	Strengthen the perception that the producers can bend the cornstalks with their current resources and skills.	1	Implement demonstration plots showing how to bend cornstalks.	2A, 2B, 2C, 4A
				2	Use existing structures and/or methodologies to exchange experiences between doers and non-doers. Consider an exchange between different communities or municipalities.	2A, 2B, 2C, 3A, 3B y 3 C, 5A, 5B
				3	Use local media to disseminate key messages.	2A, 2B, 2C, 4A
		B	Increase the producers' knowledge regarding bending cornstalks.	4	Prepare a "corn wheel" poster illustrating the process from planting up through consumption (include 3 behaviors and agricultural calendar).	
				5	Train producers to bend cornstalks using existing structures and/or methodologies.	4A
				6	Provide periodical technical assistance to producers.	4A
2	Perceived positive consequences	A	Reinforce the perception that better quality corn is obtained by bending the cornstalks.	7	Reserve a space during the technical assistance for the producers to share their experiences from that month or the previous period (this space is for the producers to advise each other and reinforce their practices under the accompaniment of the promoter).	3A , 5A, 5B
		B	Reinforce the perception that the grain will rot less as a result of bending cornstalks.			
		C	Reinforce the perception that the ears will be protected from birds by bending the cornstalks.			
3	Perceived negative consequences	A	Strengthen the perception that bending cornstalks does not entail any negative consequences.	8	Promote messages that reinforce the idea that properly performing this practice will not adversely affect the quality of the corn.	
		B	Decrease the perception that the corn shrinks up or is at risk of being eaten by animals.			

Table 1 - Behavior 1: Bend Cornstalks

4	Perceived social norms	A	Increase the families' acceptance of the practice of bending cornstalks.	9	Engage wives, children, and other family members in training sessions and in the practice of bending cornstalks.	
		B	Strengthen the perception that most people approve of bending cornstalks.	10	Implement or extend collective planting and harvesting practices to include the process of bending the cornstalks.	
5	Perceived efficacy of the action	A	With the doers, reinforce the perception that bending cornstalks will ensure the start of good drying.	11	Implement satisfaction assessment focus groups with doers and non-doers in the same community.	
		B	With non-doers, strengthen the perception that bending cornstalks will ensure the start of good drying.			
6	Perceived divine will	A	Decrease the perception that God disapproves of bending cornstalks between one and three week before harvest.	12	Train religious leaders on the process and benefits of bending cornstalks.	
				13	Engage religious leaders in promoting messages in favor of bending cornstalks.	

Table 2 - Behavior 2: Sun-dry corn

Corn producers sun-dry their grain for at least three days.

No.	*Determinant*	*No.*	*Bridge*	*No.*	*Activity*	*Other bridges covered by the activity*
1	Perceived self-efficacy	A	Strengthen the perception that with their current resources and skills the producers are able to do the practice.	1	Use existing structures and/or methodologies to exchange experiences between doers and non-doers. Consider an exchange between different communities or municipalities.	1B, 1C, 2A, 2B
		B	Reinforce the perception that this practice is worth the time-investment in order to obtain the desired results.	2	Hold demonstrations and pilot tests to compare different shelling technologies.	1A, 1C, 3A, 4A
		C	Strengthen the perception that the materials needed to sun-dry corn can be obtained.	3	Demonstrate proper practice with necessary and procurable materials (show different material options).	1A, 1B, 5A,
2	Perceived positive consequences	A	Strengthen the perception that the grain dries faster and more evenly and is of a better quality when sun-dried.	4	Reserve a space during the technical assistance for the producers to share their experiences from that month or the previous period (this space is for the producers to advise each other and reinforce their practices under the accompaniment of the promoter).	
		B	Strengthen the perception that the grain does not molder when sun-dried.			
3	Perceived negative consequences	A	Improve knowledge on how corn changes during the drying process.	5	Prepare illustrated materials on how corn changes.	
				6	Train on using the "corn wheel" poster and illustrated materials on how corn changes during the drying process and how this does not mean that it is harmed.	
		B	Strengthen the perception that dried grain can be used for seed.	7	During the training process, include the message that sun-dried corn can be used as seed.	
4	Perceived social norms	A	Strengthen the families' acceptance of sun-drying.	8	Engage wives, children, and other family members in training processes and the practice of sun-drying corn.	
				9	Engage wives, children, and other family members in shucking corn for subsequent drying.	1C
5	Access	A	Strengthen the perception that the necessary materials can be procured.	10	Demonstrate proper practice with necessary and procurable materials (show different material options).	
6	Reminders	A	Improve knowledge on the corn sun-drying process.	11	Give the "corn wheel" poster to families in the priority group.	
		B	Build the capacities of the producers to remember important moments in the corn sun-drying process.	12	Train on how to use the "corn wheel" poster in order to define when the practice should be performed.	
7	Perceived divine will	A	Decrease the perception that God disapproves of the process of sun-drying corn.	14	Train religious leaders on the process and benefits of the practice.	
				15	Engage religious leaders in promoting messages in favor of sun-drying corn.	

Table 3 - Behavior 3: Storing Corn

Corn producers store their maize in silos before consuming it.

No.	*Determinant*	*No.*	*Bridge*	*No.*	*Activity*	*Other bridges covered by this activity*
1	Perceived self-efficacy	A	Strengthen the perception that the producers can store their corn in silos with their current resources and skills.	1	Provide training on what silos are, the different types available, and options to obtain one.	N/A
				2	Encourage producers to make arrangements to obtain different alternatives for silos (barrels, standard silos, etc).	N/A
		B	Strengthen the perception that the families can support the process of storing corn in silos.	3	Engage wives, children, and other family members in training sessions and the practice of storing corn in silos.	N/A
		C	Increase knowledge on the process of storing corn in silos (what is entailed, steps, what is to be expected).	4	Provide technical training on the silo storage process.	N/A
				5	Provide technical assistance to producers to ensure and maintain silo use.	N/A
				6	Use existing structures and/or methodologies to exchange experiences between doers and non-doers. Consider an exchange between different communities or municipalities.	N/A
2	Perceived negative consequences	A	Strengthen the perception that there are no negative consequences of storing corn in silos.	7	Disseminate key messages via radio campaigns, illustrated materials, and educational processes.	N/A

Table 4 - Behavior 4: Nixtamalization

Behavior: Women in corn producing families nixtamalize their corn by boiling it in water and lime and washing it at least three times with clean water.

No.	*Determinant*	*No.*	*Bridge*	*No.*	*Activity*	*Other bridges covered by this activity*
1	Perceived negative consequences	A	Improve knowledge on the proper way to nixtamalize.	1	Train and demonstrate the proper way to nixtamalize corn.	N/A
				2	Prepare illustrated materials to promote proper nixtamalization.	N/A
		B	Strengthen the perception that when the practice is properly performed it does not make the family sick (proper nixtamalization does not adversely affect the family's health).	3	Disseminate key messages via radio campaigns, illustrated materials, and educational processes.	N/A
2	Access	A	Decrease the perception that it is very difficult to obtain what is needed for nixtamalization.	4	Encourage the families to make arrangements to obtain water storage containers or other means of ensuring water supply.	N/A
				5	Demonstrate proper practice with necessary and procurable materials (show the option of the nixtamalization pot).	N/A
				6	Make arrangements to obtain nixtamalization pots and promote their use.	N/A

6. 2 Annex 2 – Questionnaires

Questionnaire 1 - Behavior 1: Bending Cornstalks

☐Doer ☐Non-doer

Barrier Analysis Questionnaire on bending cornstalks prior to harvest
To be used with Corn producers

Definition of behavior
Corn producers in the research area bend cornstalks within one to three weeks prior to gathering the ears.

Demographic information

Interviewer's name: _____ Questionnaire No.: _____

Date: _____ Community: _____

Municipality: _____ Department: _____

Sex of respondent: ☐ M ☐F Age of respondent: _____

Interview language: _____

Introduction
Hi, my name is_____; and I am part of a study team looking into harvest and post-harvest practices for corn crops. The study includes a discussion of this issue and will take about 45 minutes. I would like to hear your views on this topic. You are not obliged to participate in the study and no services will be withheld if you decide not to. Likewise, if you chose to be interviewed you will not receive any benefits or services. Everything we discuss will be held in strict confidence, so neither your name and nor any of your family members' names will be recorded. If they do not wish to participate, thank them for their time.

Section A: screening questions

1. Do you bend the cornstalks?
   - ☐ a. Yes
   - ☐ b. No *(Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

2. When do you bend the cornstalks??
   - ☐ a. Before harvest
   - ☐ b. After or during harvest (*Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

3. How long before the harvest do you bend the cornstalks?

☐ a. Between one and three weeks (7 to 21 days) before harvest
☐ b. Less than one week *(Classify as non-doer and move on to section B)*
☐ c. Does not know or no response *(End interview and find another respondent)*

Doer or Non-doer classification table

	Doer (all of the following)	Non-doer (some of the following)	Do not interview (some of the following)
Question 1	a	b	c
Question 2	a	b	c
Question 3	a	b	c

Classification ☐ Doer ☐ Non-doer

Behavior explanation

In the following questions we are going to be talking about bending cornstalks prior to harvest. This means bending the stalk between one and three weeks prior to harvest.

Section B: research questions

(Perceived self-efficacy or skills)

1. **Doers and non-doers:** With your current knowledge, resources, and skills, do you think you could bend the cornstalks between one and three weeks prior to harvest?
   ☐ a. Yes
   ☐ b. Possibly
   ☐ c. No
   ☐ d. Does not know

(Perceived positive consequences)

2a. Doers: What are the advantages of bending the cornstalks between one and three weeks prior to harvest?

2b. Non-doers: What would be the advantages of bending the cornstalks between one and three weeks prior to harvest?

(Write all responses below. Probe with "What else?")

(Perceived negative consequences)

3a. Doers: What are the disadvantages of bending the cornstalks between one and three weeks prior to harvest?

3b. Non-doers: What would be the disadvantages of bending the cornstalks between one and three weeks prior to harvest?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: facilitators)

4a. Doers: What makes it easier for you to bend the cornstalks between one and three weeks prior to harvest?

4b. Non-doers: What would make it easier for you to bend the cornstalks between one and three weeks prior to harvest?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: barriers)

5a. Doers: What is difficult about bending the cornstalks between one and three weeks prior to harvest?

5b. Non-doers: What would be difficult about bending the cornstalks between one and three weeks prior to harvest?

(Write all responses below. Probe with "What else?")

(Perceived social norms)

6a. Doers: Do most of the people that you know approve of bending the cornstalks between one and three weeks prior to harvest?

6b. Non-doers: Would most of the people you know approve of bending the cornstalks between one and three weeks prior to harvest?

- ☐ a. Yes
- ☐ b. Possibly
- ☐ c. No
- ☐ d. Does not know or does not answer

(Perceived social norms)

7a. Doers: Who are the people that approve of you bending the cornstalks between one and three weeks prior to harvest?

7b. Non-doers: Who are the people that would approve of you bending the cornstalks between one and three weeks prior to harvest?

(Write all answers below, probe with "Who else? Anyone in particular?)

(Perceived social norms)

8a. Doers: Who are the people that do not approve of you bending the cornstalks between one and three weeks prior to harvest?

8b. Non-doers: Who are the people that would not approve of you bending the cornstalks between one and three weeks prior to harvest?

(Write all answers below, probe with "Who else? Anyone in particular?)

(Perceived access)

9a. Doers: How difficult is it to get what is needed to bend the cornstalks between one and three weeks prior to harvest?

9b. Non-doers: How difficult would it be to get what is needed to bend the cornstalks between one and three weeks prior to harvest?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer 50400022

(Perceived cues for action/reminder)

10a. Doers: How difficult is it to remember to bend the cornstalks between one and three weeks prior to harvest?

10b. Non-doers: How difficult would it be to remember to bend the cornstalks between one and three weeks prior to harvest?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived susceptibility or risk)

11. Doers and non-doers: How likely is it that the corn from your next harvest would not dry well and stay damp?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perceived severity)

12. Doers and non-doers: How serious would it be if the corn from your next harvest did not dry well and stayed damp?

- ☐ a. Very serious
- ☐ b. Somewhat serious
- ☐ c. Not serious at all
- ☐ d. Does not know or does not answer

(Perceived action efficacy)

13. Doers and non-doers: How likely is it that the corn from your next harvest will not dry and stay damp if you do not bend the cornstalks between one and three weeks prior to harvest

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perception of Divine Will)

14a. Doers: Do you think God approves of your bending the cornstalks one to three weeks prior to harvest?

14b. Non-doers: Do you think God would approve of your bending the cornstalks one to three weeks prior to harvest?

- ☐ a. Yes
- ☐ b. No/No
- ☐ c. Does not know or does not answer

(Policy)

15a. Doers: Do you know of any community rules or norms that favor your bending the cornstalks between one and three weeks prior to harvest?

15b. Non-doers: Do you know of any community rules or norms that would favor your bending the cornstalks between one and three weeks prior to harvest?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer
(If Yes, ask "Which ones" and write down answers)

(Culture)

16. Doers and non-doers: Are there any customs, traditions, or cultural norms either in favor or against your bending the cornstalks between one and three weeks prior to harvest?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer
(If Yes, ask "Which ones" and write down answers)

(Universal motivators)

17. Doers and non-doers: What is the one thing you most desire in life?

Thank the respondent for his or her time!

Questionnaire 2 - Behavior 2: Sun-drying maize

☐Doer ☐Non-doer

Barrier analysis questionnaire on sun-drying corn
To be used with corn producers

Behavior statement
Corn producers in the research area sun-dry their corn harvest for at least three days prior to storing it.

Demographic information

Interviewer's name: _____ Questionnaire No.: _____

Date: _____ Community: _____

Municipality: _____ Department: _____

Sex of respondent: ☐ M ☐F Age of respondent: _____

Interview language: _____

Introduction
Hi, my name is_____; and I am part of a study team looking into harvest and post-harvest practices for corn crops. The study includes a discussion of this issue and will take about 45 minutes. I would like to hear your views on this topic. You are not obliged to participate in the study and no services will be withheld if you decide not to. Likewise, if you chose to be interviewed you will not receive any benefits or services. Everything we discuss will be held in strict confidence, so neither your name and nor any of your family members' names will be recorded. If they do not wish to participate, thank them for their time.

Section A: Screening questions

4. Do you dry the corn you harvest?
   - ☐ a. Yes
   - ☐ b. No *(Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

5. How do you dry your harvest?
   - ☐ a. Under the sun
   - ☐ b. By hanging it in a small attic *(Classify as non-doer and move on to section B)*
   - ☐ c. By hanging it in the kitchen (smoking) *(Classify as non-doer and move on to section B)*
   - ☐ d. Does not know or no response *(End interview and find another respondent)*

6. How long do you leave the grain in the sun?
   - ☐ a. Three days or more before storing it
   - ☐ b. Less than three days *(Classify as non-doer and move on to section B)*
   - ☐ c. No Does not know or no response *(End interview and find another respondent)*

Doer or Non-doer classification table

	Doer (all of the following)	Non-doer (some of the following)	Do not interview (some of the following)
Question 1	a	b	c
Question 2	a	b/c	c
Question 3	a	b	c

Classification: ☐ Doer ☐ Non-doer

Behavior explanation

In the following questions we are going to be talking about sun-drying corn before storing it. This means putting it out under the sun for three days or more.

Section B: Research questions

(Perceived self-efficacy or skills)

1. **Doers and non-doers:** With your current knowledge, resources, and skills do you think you can sun-dry your corn for at least three days before storing it?
   - ☐ a. Yes
   - ☐ b. Possibly
   - ☐ c. No
   - ☐ d. Does not know

(Perceived positive consequences)

2a. Doers: What are the advantages of sun-drying your corn for at least 3 days before storing it?

2b. Doers: What would be the advantages of sun-drying your corn for at least 3 days before storing it?

(Write all responses below. Probe with "What else?")

(Perceived negative consequences)

3a. Doers: What are the disadvantages of sun-drying your corn for at least three days before storing it?

3b. Non-doers: What would be the disadvantages of sun-drying your corn for at least three days before storing it?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: facilitators)

4a. Doers: What makes it easier to sun-dry your corn for at least three days before storing it?

4b. Non-doers: What would make it easier to sun-dry your corn for at least three days before storing it?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: barriers)

5a. Doers: What is difficult about sun-drying your corn for at least three days before storing it?

5b. Non-doers: What would be difficult about sun-drying your corn at least three days before storing it?

(Write all responses below. Probe with "What else?")

(Perceived social norms)

6a. Doers: Do most of the people you know approve of sun-drying corn at least three days before storing it?

6b. Doers: Would most of the people you know approve of sun-drying corn at least three days before storing it?

- ☐ a. Yes
- ☐ b. Possibly
- ☐ c. No
- ☐ d. Does not know or does not answer

(Perceived social norms)

7a. Doers: Who do you think are the people that approve of you sun-drying your corn at least three days before storing it?

7b. Doers: Who do you think are the people that would approve of you sun-drying your corn at least three days before storing it?

(Write all answers below, probe with "Who else? Anyone in particular)

(Perceived social norms)

8a. Doers: Who do you think are the people that do not approve of you sun-drying your corn at least three days before storing it?

8b. Doers: Who do you think are the people that would not approve of you sun-drying your corn at least three days before storing it?

(Write all answers below, probe with "Who else? Anyone in particular?")

(Perceived access)

9a. Doers: How difficult is it to get what is needed to sun-dry your corn for at least three days before storing it?

9b. Non-doers: How difficult would it be to get what is needed to sun-dry your corn for at least three days before storing it?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived cues for action/reminders)

10a. Doers: How difficult is it to remember when and how to sun-dry your corn for at least three days before storing it?

10b. Non-doers: How difficult would it be to remember when and how to sun-dry your corn for at least three days before storing it?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived susceptibility or risk))

11. Doers and non-doers: How likely is it that the corn from your next harvest will not dry well and stay damp?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perceived severity)

12. Doers and non-doers: How serious would it be if the corn from your next harvest did not dry well and stayed damp?

- ☐ a. Very serious
- ☐ b. Somewhat serious
- ☐ c. Not serious at all
- ☐ d. Does not know or does not answer

(Perceived action efficacy)

13. Doers and non-doers: How likely is it that the corn from your next harvest will not dry and stay damp if you do not sun-dry your corn for at least three days before storing it?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perception of Divine Will)

14a. Doers: Do you think God approves of you sun-drying your corn for at least 3 days before storing it?

14b. Non-doers: Do you think God would approve of you sun-drying your corn for at least three days before storing it?

- ☐ a. Yes
- ☐ b. No
- ☐ c. Does not know or does not answer

(Policy)

15a. Doers: Do you know of any community rules or norms that favor your sun-drying your corn for at least three days before storing it?

15b. Non-doers: Do you know of any community rules or norms that would favor your sun-drying your corn for at least three days before storing it?/

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answers)

(Culture)

16. Doers and non-doers: Are there any customs, traditions, or cultural norms either in favor or against your sun-drying your corn for at least three days before storing it?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answers)

(Universal motivators)

17. Doers and non-doers: What is the one thing you most desire in life?

Thank the respondent for his or her time!

Questionnaire 3 - Behavior 3: Storing corn

☐Doer ☐Non-doer

Barrier Analysis Questionnaire on Storing Corn in Silos
To be used with corn producers

Behavior statement Corn producers in the research area store their corn harvest in silos for at least two months before consuming it

Demographic information

Interviewer's name: _____ Questionnaire No.: _____

Date: _____ Community: _____

Municipality: _____ Department: _____

Sex of respondent: ☐ M ☐F Age of respondent: _____

Interview language: _____

Introduction

Hi, my name is_____; and I am part of a study team looking into harvest and post-harvest practices for corn crops. The study includes a discussion of this issue and will take about 45 minutes. I would like to hear your views on this topic. You are not obliged to participate in the study and no services will be withheld if you decide not to. Likewise, if you chose to be interviewed you will not receive any benefits or services. Everything we discuss will be held in strict confidence, so neither your name and nor any of your family members' names will be recorded. If they do not wish to participate, thank them for their time.

Section A: Screening questions

7. Do you have a silo?
   - ☐ a. Yes
   - ☐ b. No *(Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

8. What do you use your silo for?
   - ☐ a. Storing harvested corn
   - ☐ b. Other *(Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

9. How long do you store your corn in the silo?
   - ☐ a. At least two months
   - ☐ b. Less than two months *(Classify as non-doer and move on to section B)*
   - ☐ c. Does not know or no response *(End interview and find another respondent)*

Doer or Non-doer classification table

	Doer (all of the following)	Non-doer (some of the following)	Do not interview (some of the following)
Question 1	a	b	c
Question 2	a	b	c
Question 3	a	b	c

Classification: ☐ Doer ☐ Non-doer

Behavior explanation

In the following questions we are going to be talking about storing corn in silos for at least two months before consuming it.

Section B: research questions

(Perceived self-efficacy or skills)

1. **Doers and non-doers:** With your current knowledge, resources, and skills do you think you are able to store your corn in a silo for at least two months before consuming it?
   - ☐ a. Yes
   - ☐ b. Possibly
   - ☐ c. No
   - ☐ d. Does not know

(Perceived positive consequences)

2a. Doers: What are the advantages of storing your corn in a silo for at least two months before consuming it?

2b. Non-doers: What would be the advantages of storing your corn in a silo for at least two months before consuming it?

(Write all responses below. Probe with "What else?")

(Perceived negative consequences)

3a. Doers: What are the disadvantages of storing your corn in a silo for at least two months before consuming it?

3b. Non-doers: What would be the disadvantages of storing your corn in a silo for at least two months before consuming it?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: facilitators)

4a. Doers: What makes it easier to store your corn in a silo for at least two months before consuming it?

4b. Non-doers: What would make it easier to store your corn in a silo for at least two months before consuming it?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: barriers)

5a. Doers: What is difficult about storing your corn in a silo for at least two months before consuming it?

5b. Non-doers: What would be difficult about storing your corn in a silo for at least two months before consuming it?

(Write all responses below. Probe with "What else?")

(Perceived social norms)

6a. Doers: Do most of the people you know approve of storing corn in silos for at least two months before consuming it?

6b. Non-doers: Would most of the people you know approve of storing corn in silos for at least two months before consuming it?

- ☐ a. Yes
- ☐ b. Possibly
- ☐ c. No
- ☐ d. Does not know or does not answer

(Perceived social norms)

7a. Doers: Who do you think are the people that approve of you storing your corn in a silo for at least two months before consuming it?

7b. Non-doers: Who do you think are the people that would approve of you storing your corn in a silo for at least two months before consuming it?

(Write all answers below, probe with "Who else? Anyone in particular?")

(Perceived social norms)

8a. Doers: Who do you think are the people that do not approve of you storing your corn in a silo for at least two months before consuming it?

8b. No-doers: Who do you think are the people that would not approve of you storing your corn in a silo for at least two months before consuming it?

(Write all answers below, probe with "Who else? Anyone in particular?")

(Perceived access)

9a. Doers: How difficult is it to get what is needed to store your corn in a silo for at least two months before consuming it?

9b. Non-doers: How difficult would it be to get what is needed to store your corn in a silo for at least two months before consuming it?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived cues for action/reminders)

10a. Doers: How difficult is it to remember how and when to store your corn in a silo for at least two months before consuming it?

10b. Non-doers: How difficult would it be to remember how and when to store your corn in a silo for at least two months before consuming it?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived susceptibility or risk)

11. Doers and non-doers: How likely is it that the corn from your next harvest would be affected if not stored properly?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perceived severity)

12. Doers and non-doers: How serious would it be if the corn from your next harvest was affected because of not storing it properly?

- ☐ a. Very serious
- ☐ b. Somewhat serious
- ☐ c. Not serious at all
- ☐ d. Does not know or does not answer

(Perceived action efficacy)

13. Doers and non-doers: How likely is it that the corn from your next harvest would be affected if you did not store it in a silo for at least two months before consuming it?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perception of Divine Will)

14a. Doers: Do you think God approves of you storing your corn in a silo for at least two months before consuming it?

14b. Non-doers: Do you think God would approve of you storing your corn in a silo for at least two months before consuming it?

- ☐ a. Yes
- ☐ b. No
- ☐ c. Does not know or does not answer

(Policy)

15a. Doers: Do you know of any community rules or norms that favor storing your corn in a silo for at least two months before consuming it?

15b. Non-doers: Do you know of any community rules or norms that would favor storing your corn in a silo for at least two months before consuming it?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answers)

(Culture)

16. Doers and non-doers: Are there any customs, traditions, or cultural norms either in favor or against storing your corn in a silo for at least two months before consuming it?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answers)

(Universal motivators)

17. Doers and non-doers: What is the one thing you most desire in life?

Thank the respondent for his or her time!

Questionnaire 4 - Behavior 4: Nixtamalization

☐Doer ☐Non-doer

Barrier Analysis Questionnaire on nixtamalizing corn
To be used with women in corn producing families

Behavior statement

Women in corn producing families in the research area boil corn with lime and then rinse it at least three times with clean water.

Demographic information

Interviewer's name: _____ Questionnaire No.: _____

Date: _____ Community: _____

Municipality: _____ Department: _____

Sex of respondent: ☐ M ☐F Age of respondent: _____

Interview language: _____

Introduction

Hi, my name is_____; and I am part of a study team looking into harvest and post-harvest practices for corn crops. The study includes a discussion of this issue and will take about 45 minutes. I would like to hear your views on this topic. You are not obliged to participate in the study and no services will be withheld if you decide not to. Likewise, if you chose to be interviewed you will not receive any benefits or services. Everything we discuss will be held in strict confidence, so neither your name and nor any of your family members' names will be recorded. If they do not wish to participate, thank them for their time.

Section A: Screening questions

10. Do you nixtamilize your corn?
    - ☐ a. Yes
    - ☐ b. No *(Classify as non-doer and move on to section B)*
    - ☐ c. Does not know or no response *(End interview and find another respondent)*

11. What do you add to the corn when you boil it?
    - ☐ a. Lime
    - ☐ b. Ashes *(Classify as non-doer and move on to section B)*
    - ☐ c. Does not know or no response *(End interview and find another respondent)*

12. What do you do after boiling the corn?
    - ☐ a. Rinse it
    - ☐ b. Let it cool and rinse it
    - ☐ c. Let it cool *(Classify as non-doer and move on to section B)*
    - ☐ d. Does not know or no response *(End interview and find another respondent)*

13. How many times do you rinse the boiled corn?
    - ☐ a. Three times
    - ☐ b. More than three times
    - ☐ c. Twice *(Classify as non-doer and move on to section B)*
    - ☐ d. Once *(Classify as non-doer and move on to section B)*
    - ☐ e. Does not know or no response *(End interview and find another respondent)*

Doer or Non-doer classification table

	Doer (all of the following)	Non-doer (some of the following)	Do not interview (some of the following)
Question 1	a	B	C
Question 2	a	B	C
Question 3	a / b	C	D
Question 4	a/ b	c / d	E

Classification: ☐ Doer ☐ Non-doer

Behavior explanation

In the following questions we are going to be talking about proper nixtamalization. This means boiling the corn in water and lime, letting it cool, and then rinsing it at least three times with clean water before taking it to the mill.

Section B: research questions

(Perceived self-efficacy or skills)

1. **Doers and non-doers:** With your current knowledge, resources, and skills do you think you are able to nixtamilize your corn by boiling it with lime and then rinsing it at least three times with clean water before grinding it?
    - ☐ a. Yes
    - ☐ b. Possibly
    - ☐ c. No
    - ☐ d. Does not know

(Perceived positive consequences)

2a. Doers: What are the advantages of boiling your corn with lime and then rinsing it at least three times with clean water?

2b. Non-doers: What would be the advantages of boiling your corn with lime and then rinsing it at least three times with clean water?

(Write all responses below. Probe with "What else?")

(Perceived negative consequences)

3a. Doers: What are the disadvantages of boiling your corn with lime and then rinsing it at least three times with clean water?

3b. Non-doers: What would be the disadvantages of boiling your corn with lime and then rinsing it at least three times with clean water? *(Write all responses below. Probe with "What else?")*

(Perceived self-efficacy: facilitators)

4a. Doers: What makes it easier to boil your corn with lime and then rinse it at least three times with clean water?

4b. Non-doers: What would make it easier to boil your corn with lime and then rinse it at least three times with clean water?

(Write all responses below. Probe with "What else?")

(Perceived self-efficacy: barriers)

5a. Doers: What is difficult about boiling your corn with lime and then rinsing it at least three times with clean water?

5b. Non-doers: What would be difficult about boiling your corn with lime and then rinsing it at least three times with clean water?

(Write all responses below. Probe with "What else?")

(Perceived social norms)

6a. Doers: Do most of the people you know approve of boiling corn with lime and then rinsing it at least three times with clean water?

6b. Non-doers: Would most of the people you know approve of boiling corn with lime and then rinsing it at least three times with clean water?

- ☐ a. Yes
- ☐ b. Possibly
- ☐ c. No
- ☐ d. Does not know or does not answer

(Perceived social norms)

7a. Doers: Who do you think are the people that approve of you boiling corn with lime and then rinsing it at least three times with clean water?

7b. Non-doers: Who do you think are the people that would approve of you boiling corn with lime and then rinsing it at least three times with clean water?

(Write all answers below, probe with "Who else? Anyone in particular?")

(Perceived social norms)

8a. Doers: Who are the people that you think do not approve of you boiling your corn with lime and then rinsing it at least three times with clean water?

8b. Non-doers: Who are the people that you think would not approve of you boiling your corn with lime and then rinsing it at least three times with clean water?

(Write all answers below, probe with "Who else? Anyone in particular?")

(Perceived access)

9a. Doers: How difficult is it to get what is needed to boil your corn with lime and then rinse it at least three times with clean water?

9b. Non-doers: How difficult would it be to get what is needed to boil your corn with lime and then rinse it at least three times with clean water?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived cues for action/reminders)

10a. Doers: How difficult is it to remember how to boil your corn with lime and then rinse it at least three times with clean water?

10b. Non-doers: How difficult would it be to remember how to boil your corn with lime and then rinse it at least three times with clean water?

- ☐ a. Very difficult
- ☐ b. Somewhat difficult
- ☐ c. Not difficult at all
- ☐ d. Does not know or does not answer

(Perceived susceptibility or risk)

11. Doers and non-doers: How likely is it that your children will not grow during this coming year?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perceived severity)

12. Doers and non-doers: How serious would it be if your children did not grow well?

- ☐ a. Very serious
- ☐ b. Somewhat serious
- ☐ c. Not serious at all
- ☐ d. Does not know or does not answer

(Perceived action efficacy)

13. Doers and non-doers: How likely is it that your children would not grow well if you did not boil your corn with lime and/or rinse it at least three times with clean water?

- ☐ a. Very likely
- ☐ b. Somewhat likely
- ☐ c. Not likely at all
- ☐ d. Does not know or does not answer

(Perception of Divine Will)

14a. Doers: Do you think God approves of you boiling your corn with lime and then rinsing it at least three times with clean water?

14b. Non-doers: Do you think God would approve of you boiling your corn with lime and then rinsing it at least three times with clean water?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(Policy)

15a. Doers: Do you know of any community rules or norms that favor boiling your corn with lime and then rinsing it at least three times with clean water?

15b. Non-doers: Do you know of any community rules or norms that would favor boiling your corn with lime and then rinsing it at least three times with clean water?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answers)

(Culture)

16. Doers and non-doers: Are there any customs, traditions, or cultural norms either in favor or against boiling your corn with lime and then rinsing it at least three times with clean water?

☐ a. Yes
☐ b. No
☐ c. Does not know or does not answer

(If Yes, ask "Which ones" and write down answer)

(Universal motivators)

17. Doers and non-doers: What is the one thing you most desire in life?

Thank the respondent for his or her time!