

Toolkit for Digital Service Providers



Using Behavioral Science and Human-Centered Design to Drive Adoption Among Smallholder Farmers



ACKNOWLEDGMENTS



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Introduction and Objectives



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We developed this toolkit for digital service providers interested in conducting behavior change research.



This toolkit will help providers design and test solutions to increase the adoption of their digital services. Although our focus is on digital services for smallholder farmers in Sub-Saharan Africa and South Asia, these methods can be adapted for use in various sectors by digital service providers serving rural, low-income populations.

Our behavior change research is carried out in three phases, each requiring direct engagement with smallholder farmers, extension agents, or other target users of your digital services.

The three phases are:

- **IDENTIFY the Challenge:** This phase involves conducting surveys, interviews, or focus groups with your target

population to identify the barriers to digital service adoption and understand their decision-making processes.

- **CO-DESIGN Solutions to Overcome the Challenge:** This phase involves organizing co-design workshops, where you collaborate closely with your target population to brainstorm solutions for overcoming barriers to digital service adoption.
- **TEST if the Solutions Change Behavior:** This phase involves conducting small-scale testing to make sure the proposed solutions change the behavior of your target population and increase adoption before rolling them out at scale.

The toolkit draws on our experiences under the DIG-it-AL project. We partnered with five different digital service providers across Sub-Saharan Africa and South Asia to design and test solutions to increase the adoption of their offerings. These providers support farmers through services such as digital advisory, market connection platforms, and digital record-keeping tools for extension agents. You can find more information about our research projects at this [microsite](#).



Why behavior change research?



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Digital services are transforming agriculture for smallholder farmers, particularly in Sub-Saharan Africa and South Asia, by strengthening value chains and improving livelihoods.

For example, digital advisory services give farmers the information to adapt to shifting weather patterns and adopt more efficient practices, leading to higher yields and greater climate resilience. Similarly, digital market access platforms connect farmers with new opportunities to buy inputs and sell their produce at fair prices.

However, these benefits only materialize if farmers adopt and actively engage with the services.

Digital advisory tools, for instance, are only effective if farmers sign up, listen, and apply the guidance provided. Otherwise, they will see no improvement in yields or resilience from the service.

Under the DIG-it-AL project, we partnered with providers delivering top-quality digital services to farmers. Designed by experts, these services tackled key challenges faced by smallholder farmers and provided clear benefits. Many were also tailored to the local context, using SMS, IVR, and other accessible channels to reach farmers in rural, low-resource settings.

Still, adoption wasn't perfect, limiting the provider's ability to fully support smallholder farmers. Farmers engaged with digital advisory inconsistently and did not reach out to or follow the guidance of digitally-equipped extension agents. Similarly, extension agents did not always use digital tools correctly or to their full potential.

WHY BEHAVIOR CHANGE RESEARCH?



We leveraged methods and theories from behavioral science to identify the barriers preventing smallholder farmers and extension agents from adopting digital services. We chose to use a behavioral science approach because, at the end of the day, adopting any product or service is a behavior.

Nearly all behaviors are driven by a complex interplay of factors. Some factors are external and more structural in nature, such as the high cost of phones and data bundles, which can limit access to digital services. Others are internal to the farmer and are closely linked to their beliefs, preferences, and social interactions. For example, in the case of digital advisory, farmers may distrust this information, prefer advice from their peers, or feel hesitant because no one in their community uses these services. Our research examined both types of barriers.

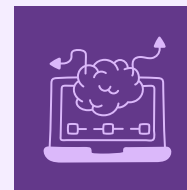


What is behavioral science?

Behavioral science is the study of how people make decisions and what influences their actions, including habits, emotions, social norms, and environment. It's based on methods and theories from several disciplines, including psychology and economics.

In this toolkit, we guide you through conducting research with farmers and extension agents to uncover the full range of barriers, offering a clear and comprehensive understanding of the decision-making processes behind adopting digital services.

Identifying the barriers to adoption is only half the battle. Once you know what's stopping farmers from using your service, you need to design a solution to fix it. At Busara, we believe the best way to do this is to bring smallholder farmers and extension agents into the design process, which we do using methods from human-centered design. This toolkit provides step-by-step instructions on the human-centered design process that we used for the DIG-it-AL project.



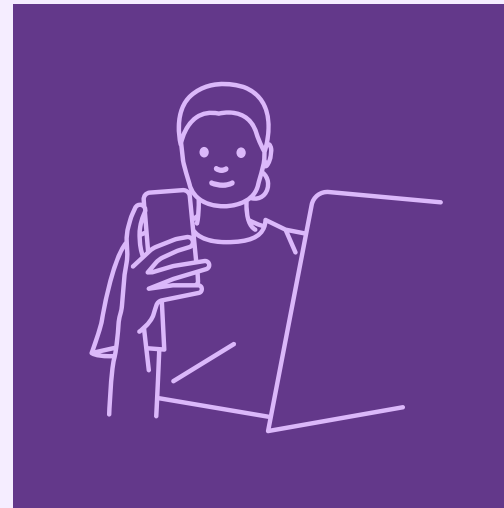
What is human-centered design?

Human-centered design is a problem-solving approach that focuses on understanding the needs, experiences, and challenges of the people who will use a product or service. It helps create solutions that are practical, effective, and user-friendly by involving real users in the design process and testing ideas based on their feedback.

WHY BEHAVIOR CHANGE RESEARCH?

Human-centered design ensures that the solutions you develop are truly effective. This approach requires setting aside your own personal biases and allowing farmers and extension agents to share their needs and preferences. By doing so, the solutions are more likely to be relevant, practical, and aligned with their lived realities. Ultimately, this leads to greater adoption and lasting impact.

We acknowledge that large-scale structural changes are needed before smallholder farmers in Sub-Saharan Africa and South Asia can widely adopt digital services: changes no single provider can make alone. However, by using the approaches laid out in this toolkit, providers can implement small, strategic adjustments to their offerings and operations. These tweaks are often cost-effective, relatively easy to implement, and can significantly boost adoption, helping providers to support farmers in accessing and benefiting from digital services without needing to overhaul the entire system.





Phase 1: IDENTIFY the Challenge



Image created using Midjourney

Step 1: Define the End Goal

Step 2: Specify the Relevant Behaviors

Step 3: Define the Steps to Executing the
Target Behavior

Step 4: Map Enablers and Barriers Along Each Step

Step 5: Prioritize Enablers and Barriers

Step 6: Identify Design Areas



In this phase, you will identify what behaviors farmers, extension agents, or other key groups need to complete to achieve your objectives.

You will then conduct surveys, interviews, or focus group discussions to understand why they are or are not following through on these behaviors.

STEP 1: DEFINE THE END GOAL

The first step in conducting behavioral science research is to think critically about what you want to change. For example, one digital service provider we worked with under the DIG-it-AL project wanted to digitize farmer data, allowing them to better understand farmers' needs and tailor their services to

offer more personalized support. The more specific, the better: having a narrow and detailed end goal will help ensure the findings you gather from the research are insightful, nuanced, and aligned with your objectives.

STEP 2: SPECIFY THE RELEVANT BEHAVIORS

Once you have a clear, specific end goal, identify the behaviors required to achieve it and who needs to carry them out. In the example above, the digital service provider offered subsidized smartphones to extension agents and asked them to share data on the farmers they interacted with through WhatsApp. As such, to achieve the provider's goal of digitizing farmer data, the extension agents had to use their smartphones for digital data collection. In summary:



Target Population: Extension agents

Target Behavior: Using smartphones for digital data collection



Other examples from the DIG-it-AL project include:

- Motivating farmers to follow advice from extension agents and lead farmers who use digital tools. Our research specifically focused on encouraging farmers to calculate the correct amount of fertilizer to use.
- Encouraging farmers to contact their extension agents when they had crops to sell. Extension agents provided market access, fair prices, and immediate payment, but farmers were not proactive in reaching out and often sold their crops elsewhere as a result.
- Increasing farmer registration through an app or USSD for a platform that provides market access and agricultural advice.

**STEP 3: DEFINE THE STEPS TO EXECUTING
THE TARGET BEHAVIOR**

Break the target behavior into the specific steps the target population must take to follow through on the behavior and achieve your end goal. These steps generally align with image 1: Awareness, Access, Use, and Continued Use.

Building on our example from above, to conduct digital data collection, extension agents must:

- Be **aware** that they expected to use their smartphone for digital data collection.
- Be able to **access** a smartphone, WhatsApp, and farmers in their communities.
- **Use** their smartphone and send data through WhatsApp.
- **Continue** to send data through WhatsApp regularly, rather than using their smartphone for one-off or ad-hoc collection.

These steps start to create a journey map, which visualizes the process the target population follows to adopt the desired behavior. It provides a clearer understanding of their experience—whether they are farmers, extension agents, or another group—while also helping you empathize with the challenges they face in the process.

Have a look at the journey map on the next page.



Image 1: Steps in Journey Map



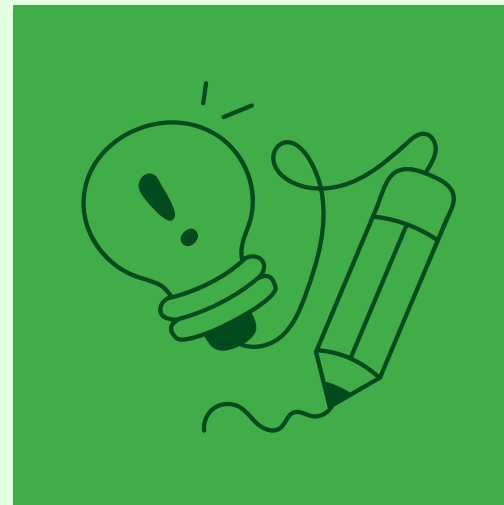
We recommend completing this exercise either individually or with your team. In the next step, you'll gather information from farmers, giving you the opportunity to validate, refine, or add steps to the journey map as needed.

extension agents, or other relevant individuals/groups to gather insights from their experiences. At Busara, we often use several approaches to do this, as shown on the following page.

STEP 4: MAP ENABLERS AND BARRIERS ALONG EACH STEP

This step will help you identify breakdowns and pain points that hinder the target population from completing the desired behavior. It will also reveal opportunities to encourage them to follow through.

At this stage, you will need to involve the target population to understand their perspectives, selecting a sample of farmers,





	Surveys	Focus Groups	Interviews
Sample Size	Relatively large, >30 surveys.	Relatively small, <12 focus groups with 6 to 12 participants each.	Relatively small, between 12 and 30 interviews.
Best Practices	Ask close-ended questions, like multiple choice, yes/no, or select-all-that-apply.	Ask open-ended questions (i.e., don't give participants any pre-populated responses). Ask probing/follow up questions to gather in-depth information.	Ask open-ended questions (i.e., don't give participants any pre-populated responses). Ask probing/follow up questions to gather in-depth information.
Data Collection Process	Surveys can be administered in-person, over the phone, or online.	Focus groups are typically best in-person, although, in some instances, they can be done online.	Interviews are typically best in person, but they can also be done over the phone or online.
Analysis Process	Calculate the frequency and/or average for responses to each question.	Take notes and/or transcribe the discussion, then review the transcripts to identify relevant themes.	Take notes and/or transcribe the interviews, then review the transcripts to identify relevant themes.
When to Use	When you want to gather data from a large sample of the target population and analyze trends.	When you want to understand “why” or “how” and encourage conversation and debate around a certain topic.	When you want to understand “why” or “how” and ask specific, probing questions.



For the DIG-it-AL project, we interviewed approximately 30 farmers and extension agents per digital service provider. We created a rough interview guide that gave us a structure while allowing flexibility to explore topics farmers cared about.

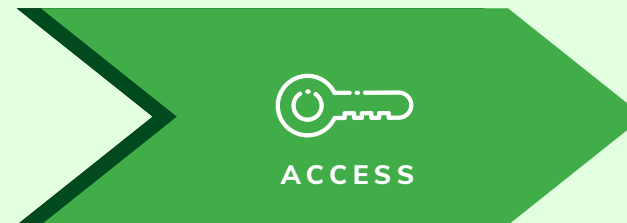
Below is a high-level overview of our approach, outlining the information we gathered along each step in the journey map:



Is the target population aware of the digital service they are meant to be adopting?

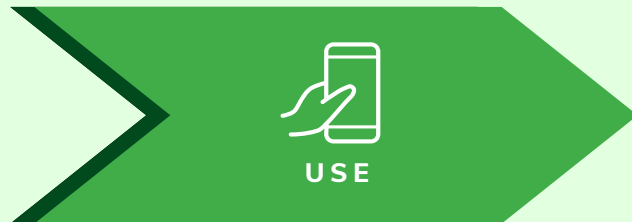
1. Does the target population have the means to be aware of the digital service they are meant to be adopting? (e.g., phone ownership, credit for phone bundles, attendance at training meetings with extension agents, etc.)

2. How is the target population learning about the digital service?
3. Who do they typically get information from, and why?
4. Does awareness vary across the target population? (e.g., gender)



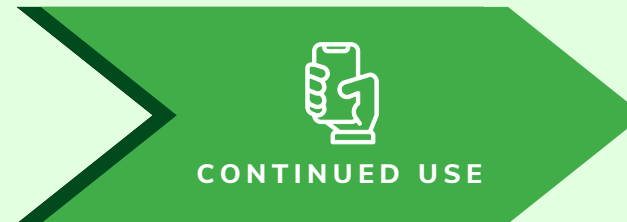
Does the target population have access to the digital service?

1. Is access to the digital service hampered by a lack of skills? (e.g., ability to use a phone app, ability to read and type, etc.)
2. Is access limited because of the financial constraints of the target population?



Is the target population using the digital service?

1. Does the target population have the capacity to use the digital service as intended? (e.g., digital literacy)
2. For digital advisory, is the target population using the advice they are given? Why or why not?
3. Does the target population trust the digital service? Why or why not?
4. Does using the digital service require help from an extension agent?
5. Does the target population understand the value of the digital service? Why or why not?



Is the target population using the digital service repeatedly?

1. Has the targeted population realized meaningful gains because of the digital service? Why or why not?
2. Is the delivery of the digital service reliable and consistent? Why or why not?

We conducted the interviews in the native languages of the target population so they were more open and comfortable. We then translated and transcribed each interview and read them afterward to identify enablers and barriers at each step along the journey map.



For the DIG-it-AL project, we looked at two overarching categories of enablers and barriers.

First, we analyzed “structural” enablers and barriers, which are systemic, institutional, and infrastructural factors. Examples of barriers include poor internet connection and high costs of internet services, while an enabler is the availability of efficient and effective extension services.

Second, we identified “behavioral” enablers and barriers to give us a holistic picture of the factors driving adoption. These are more internal to the target population and related to their preferences, beliefs, and characteristics. A wide range of behavioral factors could influence the target population’s willingness and ability to execute the target behavior.¹ Next is a list of behavioral enablers and barriers that came up repeatedly in our research with the five providers under the DIG-it-AL project:

- **Risk Aversion:** Adopting a new technology can be risky, and farmers and extension agents may avoid adoption in an effort to avoid risks.
- **Ambiguity Aversion:** Farmers and extension agents may not know the risks involved in adopting a new technology, and these unknowns make them uncomfortable.
- **Cultural and Traditional Practices:** Many prefer familiar farming methods that have been passed down through generations, even when new approaches offer clear advantages.
- **Negative Perceptions:** Concerns about data privacy or distrust of digital service providers can discourage adoption.
- **Complexity:** Technical or overly detailed advisory information can confuse and overwhelm farmers and extension agents, making it difficult to act on.
- **Perceived Benefits:** A lack of clear, tangible benefits can make digital services seem unappealing.
- **Trust:** Farmers and extension agents often rely on information from familiar, trusted sources over digital advisory.
- **Skills and Capacity:** Limited digital literacy can prevent effective engagement with digital services.

¹ If you're interested in learning more about cognitive biases and behavioral enablers and barriers, the Decision Lab has a thorough list of cognitive biases [here](#).



- **Peer Influence and Social Proof:** Adoption increases when farmers see peers using a service and benefiting from it.

When analyzing enablers and barriers, consider gender and other demographic differences. For example, access to and use of digital services may vary between men and women due to factors like household responsibilities and gender norms. Keeping these distinctions in mind will help you design and test inclusive solutions that drive adoption in later phases of the research.

STEP 5: PRIORITIZE ENABLERS AND BARRIERS



After gathering data from the target population, you will likely identify many enablers and barriers. In the next phase of this toolkit (below), you will design solutions that leverage enablers and overcome barriers to encourage the target behavior. However, no single solution can solve every issue, and some challenges require broader system-level or policy changes. Therefore, you must prioritize which barriers to tackle.

We recommend prioritizing several behavioral enablers and barriers to take into the next phase of research, such as trust, risk aversion, or peer influence. Many of these factors are amenable to “nudges,” which are small, relatively inexpensive changes to the digital service that can have disproportionately large impacts on the behavior of the target population.

Many structural barriers are too large for one single provider to address alone. Most providers cannot bring down the cost of internet bundles, give all farmers a smartphone, or fix the infrastructure in the countries where they operate. Structural factors should not be ignored, though. While it is unlikely they will be the focus of the co-design workshops in the next phase of research, you should consider them when designing your solutions. For example, WhatsApp reminders to use information from advisory would not be practical if farmers do not have smartphone phones, and thus, SMS or IVR would be more suitable.



STEP 6: IDENTIFY DESIGN AREAS

For each prioritized enabler or barrier, try to dig deep to uncover the underlying drivers. This process will likely involve making connections between some of the findings from the surveys, interviews, or focus group discussions. The objective with this exercise is to try to paint a complete picture of what's going on.

Building on the example above, we found that extension agents rarely used their smartphones at all, let alone for digital data collection. When we looked deeper, we discovered that many lacked digital literacy skills and felt unsure about using their smartphones. Additionally, because their families helped purchase the phones, they shared them with family members. As a result, their work as extension agents often took a backseat to their families' other needs for the smartphone.



By making these connections, specific, nuanced design areas will start to clearly emerge. We recommend making these connections on your own or with your team and validating them in the workshops in the next phase of research.

More examples from the DIG-it-AL project include:

- Extension agents did not want to send data through WhatsApp because they did not trust that their data was saved on the smartphone or that the provider was receiving the data. Whenever they send data on WhatsApp, they often do not receive a response from the provider to let them know their data was saved and received.
- Farmers hesitated to engage with the provider's services, believing promises weren't being fulfilled. For example, farmers were upset that they weren't receiving loans from the partner, but our partner doesn't offer loans. In reality, the high number of digital service providers in the area made it difficult for them to distinguish our partner from others.
- Farmers lacked trust in lead farmers, who provided agricultural advice using digital tools on behalf of our partner. When communities elected the lead farmer, they viewed them as a peer. However, when our partner appointed the lead farmer, farmers suspected they received special privileges and were less likely to trust them.



Phase 2: CO-DESIGN

Solutions to Overcome the Challenge

Step 1: Identify Participants

Step 2: Determine Number of Workshops

Step 3: Develop Agenda

Step 4: Organize Logistics and Run the Workshop

Step 5: Refine and Prioritize Ideas

Image created using Midjourney





In this phase, you will organize co-design workshops to bring the target population together and brainstorm ideas for solutions to overcome the barriers (or leverage the enablers) identified in Phase 1.

STEP 1: IDENTIFY PARTICIPANTS

Consider who you want to attend the workshop, keeping your barriers and design areas in mind. At a minimum, include members of the target population. However, it may also be valuable to involve others who use the digital solution or are directly affected by the barrier. For example, if a solution targets smallholder farmers and extension agents, including

both groups in the workshop can help develop solutions that benefit everyone involved. Additionally, if you aim to address multiple barriers, each with a different target population, be sure to account for that in your planning.

You will also want to carefully consider how the participants will interact with each other. Since co-design workshops rely on active participation, everyone should feel comfortable sharing their opinions. In many farming communities, explicit or unspoken power structures can discourage certain individuals from speaking up. For example, a newly married young woman may hesitate to voice concerns in front of older farmers. Social status, financial standing, and land ownership can also create imbalances. To foster open discussion, select participants in a way that minimizes power dynamics that could inhibit engagement.

STEP 2: DETERMINE NUMBER OF WORKSHOPS

After finalizing the participant list, determine how many workshops to hold. Co-design workshops require significant



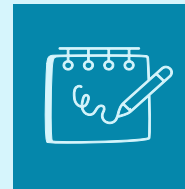
time and effort, but, luckily, you don't need many to gather meaningful insights. We recommend organizing one to three workshops.

The number of workshops will depend on how you structure attendance. You might hold separate sessions for men and women or older and younger farmers. Hosting workshops in multiple locations can also reduce travel burdens for participants while helping capture regional differences, since solutions that work in one area may not be effective in another.

STEP 3: DEVELOP AGENDA

Co-design workshops center around brainstorming. Participants should feel comfortable sharing their ideas, engaging in discussions, and challenging one another respectfully. They also need a clear understanding of the context, including why they have been brought to the table and the enablers and barriers they are addressing. This clarity ensures that the brainstorming stays focused on the main issues.

We recommend developing an agenda that fosters a comfortable environment, clearly outlines both the target behaviors and the barriers to achieving them, and allows participants to brainstorm freely while staying focused on the key challenges. Therefore, when developing your agenda, we recommend having three sessions, which are listed below. Be sure to also include some breaks in your agenda so participants don't run out of energy.



SESSION 1: Introduction and Icebreaker

Start the workshop by introducing yourself, outlining the objectives, and reviewing the agenda. Then, invite participants to introduce themselves and take part in a short icebreaker. This could be Two Truths and a Lie, a quick drawing exercise where participants illustrate and explain their role (e.g., as a farmer), or have each person share one word describing how they feel about attending the workshop.



SESSION 2: Presenting Barriers and Empathizing With the Target Population

Present the barriers and design areas to participants to help them focus on the key challenges they need to address. You can validate the findings from your research in Phase 1 to ensure it reflects the reality of the target population. Encourage discussion by asking questions such as: Do you face similar barriers? How do these challenges show up in your daily life or work? This dialogue helps confirm the relevance of the findings and provides deeper insight into how these barriers impact participants.

At this stage, it's important to help participants empathize with the target population. In many co-design workshops under the DIG-it-AL project, we used an empathy mapping exercise to encourage participants to see the challenges from the target population's perspective. This was particularly valuable when the workshop included a mix of stakeholders, but even when only the target population was present, the exercise allowed participants to reflect on their experiences

and keep them at the forefront of the discussion. The insights from this exercise also helped us refine our brainstorming prompts and activities for the next session.

Empathy mapping uses the following steps:

- 1. Describe the Target Population:** Develop personas representing individuals in the target population. If your target population is smallholder farmers, describe their daily lives, living conditions, and challenges, and even give them a name. The goal is to humanize the population and create a vivid and relatable picture of who they are.
- 2. Describe the Barrier or Design Area:** Present the barrier or design area to participants, relating it back to the persona. For example, describe how your persona struggles to use digital data collection tools because they have to share their smartphones with their families. The goal is to illustrate how they encounter and experience the barriers you uncovered.



3. Map the Target Population's Feelings and Actions:

Create a template to display for participants that poses a series of questions around how the persona feels and reacts in these situations. The template can include:

- **Think:** What is the persona thinking? What occupies their mind?
 - **Feel:** What emotions are they experiencing? What matters to them?
 - **See:** What do they see in their environment? What influences them visually?
 - **Hear:** What are they hearing from others or the environment?
 - **Say and Do:** What are they saying out loud? What actions are they taking?
 - **Pain Points:** What challenges or frustrations do they face?
 - **Gains/Needs:** What are their goals, or what benefits are they seeking?
- 4. Synthesize, Reflect, and Discuss:** Takes notes in the template while participants are responding to the questions. Then, review and discuss the findings, highlighting patterns and interesting insights that emerge.



SESSION 3: Brainstorming Activities

Brainstorming activities make up the bulk of the co-design workshop agenda. There are many different brainstorming activities you could use. Below, we list the ones we used under the DIG-it-AL project. In each workshop, we typically conducted at least two different activities to give participants multiple ways to explore ideas.

The brainstorming activities you choose should suit your participants. Typically, co-design workshops use *how might we* questions (described below), which aim to encourage abstract, open-ended brainstorming. This approach pushes participants to develop creative, unconventional solutions and discuss them openly. While effective in many contexts, consider whether the farmers and extension agents you work with would feel comfortable thinking abstractly and sharing unconventional ideas in front of their peers that may go against what everyone else is thinking. If this could be a



challenge, consider an alternative brainstorming exercise, such as story completion.

Brainstorming Option #1: “How Might We....”

These activities translate problems into questions that participants can then answer. They leave space for ideas to be innovative but give enough focus so everyone is solving the problem at hand.

To develop *how might we* questions, take the barriers and design areas from the previous phase and turn them into questions using the following formula as a rough framework:

How might we + intended action + for + target population + so that + target behavior.

Building on our example above, extension agents were unable to access their smartphones because they lacked

digital literacy and had to share their smartphones with their families. Several *how might we* questions for this design area would be:

- *How might we improve digital skills among extension agents so that they use their smartphones for digital data collection?*
- *How might we improve confidence among extension agents with using WhatsApp and digital technology so that they use their smartphones for digital data collection?*
- *How might we encourage families to share the smartphone with extension agents so that they use the smartphones for digital data collection?*

To give another example from the DIG-it-AL project, we found that farmers were not following the advice given by lead farmers in their communities, who were equipped with various digital tools. In some cases, the farmers didn’t respect them. In others, the farmers didn’t trust them. Several *how might we* questions for this problem would be:

- *How might we select or appoint lead farmers so that the farmers in their communities follow their advice?*



- *How might we build trust in lead farmers so that the farmers in their communities follow their advice?*
- *How might we build respect for lead farmers so that farmers in their communities follow their advice?*

Phrasing these questions slightly differently may also help spur creativity and critical problem solving. Variations to *how might we* questions include:

- “In what ways might we....?” (allowing for multiple solutions)
- “What’s stopping us from...?”
- “What would happen if...?”

You can also include a series of follow-up questions to each *how might we* question to spark new ideas or understand the proposed solutions more deeply, such as:

- “Why would we...?”
- “What has changed to enable us to....?”
- “Who would need to...?”
- “Where should we...?”



As a best practice, phrase these questions to avoid guiding participants toward a specific solution. Ensure they are open-ended so they generate ideas independently, without being influenced by your biases or preconceptions. Try to also use positive language whenever possible, as people tend to respond more openly and honestly to positivity. For example, instead of saying, “...to prevent farmers from dropping off a service,” say, “...to retain farmers for a longer period.”

Brainstorming Option #2: Story Completion

This brainstorming activity leverages storytelling as a natural way to express thoughts, feelings, and ideas. In the DIG-it-AL project, we used this method often because we found that the farmers and extension agents we worked with felt more comfortable sharing creative ideas through storytelling compared to *how might we* questions.



Story completion uses the following steps:

- 1. Develop a “Story Starter”:** Take the barriers and design areas from Phase 1 and develop a story around them. Create a character from the target population who has to follow through on the target behavior but encounters the barriers (or enablers) you uncovered. In our example of extension agents sharing phones with their families, we told the story of an agent trying to send data to our partner while juggling competing demands—her child wanted to play games, and her husband needed to make a call. Stop the story after describing the enabler or barrier, keeping the ending open for participants to finish.
- 2. Distribute the Story Starter:** Read the beginning of the story or print the story starter and give it to participants. Then, give them a few minutes to reflect.
- 3. Story Completion:** Participants complete the story either individually or in small groups, imagining what happens next, how characters feel, and what solutions might emerge. The facilitator should prompt participants to draw on their own feelings and experiences.

- 4. Share and Discuss:** Have participants share their stories with the group. Discuss recurring themes, surprising insights, or potential solutions from the stories.
- 5. Synthesize Insights:** Discuss the different stories with participants to identify patterns, unmet needs, or innovative ideas. Record the ideas and insights on a board for everyone to see.

Brainstorming Option #3: 1-2-4-All

1-2-4-All is a structured brainstorming activity that helps groups generate and refine ideas collaboratively. The 1-2-4-All process prevents groupthink and gives quieter participants a voice.

Start by presenting participants with a barrier or design area from Phase 1. Then, follow these steps:



- 1. Individual Reflection (1):** Each participant reflects silently and writes down their ideas or responses to the design area or barrier described by the facilitator. This encourages individual thinking and ensures everyone has time to form their thoughts before group discussion.
- 2. Sharing With a Partner (2):** Participants pair up and share their ideas with a partner. They discuss and refine their thoughts, identifying common themes or new insights. This promotes dialogue and helps participants build on each other's ideas.
- 3. Sharing With a Small Group (4):** Pairs join another pair to form groups of four. These groups share their ideas from the pair discussions, build on them, and explore different perspectives. This step helps refine ideas and move toward common themes or solutions.
- 4. Sharing With the Entire Group (All):** Everyone comes together to share their top ideas with the larger group. The workshop facilitator records the ideas on a board for everyone to see, synthesizing the discussion and highlighting key insights.

STEP 4: ORGANIZE LOGISTICS AND RUN THE WORKSHOP

As you develop the logistics for the workshop, keep the following in mind:

- **Location:** To encourage attendance, hold the workshop as close to participants as possible. A community space in a village where participants gather regularly could be a good place to conduct a workshop.
- **Facilitators:** The facilitator should be someone familiar with both the digital service provider and the participants, ensuring a comfortable and open environment for discussion. To better support participants, consider having multiple facilitators. This approach helps ensure that everyone feels at ease and allows for more hands-on guidance during brainstorming activities.
- **Setting Up the Venue:** Co-design workshops often require stationary, such as pen and paper for participants and a whiteboard or flipchart for facilitators. Additionally, arrange tables and chairs in a way that fosters collaboration, such as setting them in a circle to encourage open discussion and brainstorming.



- **Refreshments:** Co-design workshops are usually full-day events. Make sure you give participants refreshments. Their minds will start to wander if they get hungry.

STEP 5: REFINE AND PRIORITIZE IDEAS

You will likely conclude your co-design workshop(s) with a long list of ideas for solutions. Usually, the quality of these ideas will vary significantly. Take time to refine these ideas and combine them when necessary, ensuring they align with your objectives.

Next, prioritize a select few ideas, as testing and implementing all of them may not be realistic. At Busara, in close collaboration with our partners, we typically rank the ideas based on feasibility and potential impact, which refers to the solution's potential effectiveness in driving the target behavior. This process can be done individually or collaboratively. We suggest organizing a meeting with your team and other partners to review the ideas from the workshop(s) and rank the ones with the most potential.





Phase 3: TEST if the Solutions Change Behavior



Image credit: Envato Elements

Step 1: Determine What You Want to Measure

Step 2: Determine How to Collect Data

Step 3: Randomly Assign a Sample of the Target Population to Groups

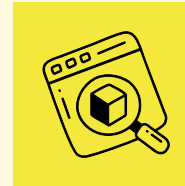
Step 4: Implement the Solution with the Right Group

Step 5: Collect Data and Compare

Step 6: Iterate

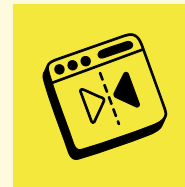


In this phase, you will test whether your prototypes are effectively changing the behavior of the target population. While there are many ways to conduct testing, we will walk through the approaches we used for the DIG-it-AL project: mini-randomized controlled trials (RCT) and A/B tests.



What is a mini-RCT?

A mini-RCT is a small-scale experiment that helps test whether the solution is making an impact. You randomly divide a sample of the target population into two groups and give one group the solution. Then, you compare the two groups to determine if the group that received the solution changed in the way you thought. You could also divide the sample into more than two groups, testing different solutions and comparing them to each other.



What is an A/B test?

An A/B test is an experiment that compares two versions of something to see which one works better. It's similar to a mini-RCT in that you randomly divide a sample of the target population into two groups. However, instead of giving one group the solution and the other nothing, you give each group a different version of the same solution, allowing you to test which version is most effective.



Mini-RCTs are ideal for testing entirely new solutions to determine if they work. Once you have an effective solution, use A/B tests to refine its design.

STEP 1: DETERMINE WHAT YOU WANT TO MEASURE

The first step is to turn your target behavior from Phase 1 into a quantifiable metric that can be tracked and measured (i.e., your “outcome measure”). To do this, consider what you ultimately want to increase or decrease. For example, our partner who was trying to digitize farmer data wanted extension agents to share farmer data through WhatsApp. Therefore, the metric we were interested in was the number of extension agents sending data through WhatsApp.

Other examples from the DIG-it-AL project include the number of extension agents attending Google Meet meetings, the number of farmers registering for a partner’s services, and the number of farmers calling an extension agent after receiving a pre-recorded IVR message.

STEP 2: DETERMINE HOW TO COLLECT DATA

After defining your primary outcome measure, you will need to determine how you will collect data on this metric. Critically, you need to be able to tie the metric to individuals in the target population. For example, you’ll need to know that Farmer A and Farmer B called their extension agent after receiving an IVR message, while Farmer C did not.

Some metrics will be relatively easy to track, as most organizations already monitor registration and adoption to some extent. Others may require reorganizing your system to link metrics to specific individuals or better record their actions. In some cases, you may need to collect additional data, such as through surveys, if the metrics are not readily available in your backend system.



If you need to collect more data, think of how you can do this cost-effectively and sustainably so you can collect enough data to adequately measure your outcome. Examples include SMS, IVR, or WhatsApp surveys.



STEP 3: RANDOMLY ASSIGN A SAMPLE OF THE TARGET POPULATION TO GROUPS

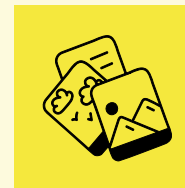
Select a sample from your target population and randomly assign individuals to two groups. For a mini-RCT, assign one group to receive the solution and the other (the “control”) to receive nothing. For an A/B test, assign each group a different version of the solution.

Aim for a relatively large sample. If dividing the sample into two groups, we recommend at least 60 to 100 individuals total: 30 to 50 per group.² If testing more solutions or versions, increase the sample size accordingly.



Why have a control group?

A control group allows us to see what would have happened without the solution. By comparing the group that receives the solution to a control group, we can better understand whether any changes are due to the solution itself or other factors, like time, outside influences, or natural improvements. In other words, having a control group allows



us to say with certainty that improvements/impacts were from the solution, not other outside factors.

Why randomize?

Randomly assigning individuals to groups ensures they are comparable. This way, any differences in outcomes can be confidently linked to the solution rather than external factors. At Busara, we randomly assign individuals to groups and then check for balance in characteristics such as gender, age, and income, which could influence the results.

For example, if we are testing the impact of digital advisory on adopting new farming practices, the two groups should have similar levels of formal education. Otherwise, if the group receiving the advisory is more educated and shows higher adoption rates, we would not know whether the advisory or education level drove the difference.

² This number is a simple rule of thumb. If you're interested in making the assessment more academically rigorous, we recommend consulting *Running Randomized Evaluations: A Practical Guide* by Rachel Glennerster and Kudzai Takavarasha. There are also many online resources available on RCTs. We recommend using the guides from J-PAL and/or World Bank.

PHASE 3: TEST IF THE SOLUTIONS CHANGE BEHAVIOR



In some cases, you may want to select villages or other geographic areas instead of individuals. The idea with a mini-RCT is that you compare a group that received your solution to a group that did not.

However, sometimes it's impossible to restrict who gets the solution. To use an example from the DIG-it-AL project, we co-designed posters for extension agents to take home after training. These posters provided clear, step-by-step instructions on using smartphones for digital data collection, helping to overcome barriers caused by limited digital literacy. If we selected our sample from only one village, and there were posters hanging everywhere, our control group would likely see the poster. As a result, there would be no difference between the group that got the poster and the group that did not. Therefore, we selected several villages in our sample instead of individual extension agents. We collected data on the agents in each village and compared the agents in Village A to the agents in Village B.

STEP 4: IMPLEMENT THE SOLUTION WITH THE RIGHT GROUP

Once you've randomly allocated your sample to different groups, you now need to implement the solution(s). This may involve distributing posters, updating the platform, sending messages, and more. Keep the following in mind as you're developing your implementation plan:

- If conducting a mini-RCT, make sure the control group does not have access to the solution.
- If conducting an A/B test, make sure each group receives the correct version.
- Make sure you're able to track who is in which group; you need to know Farmer A received the solution but Farmer B did not.

STEP 5: COLLECT DATA AND COMPARE

Now that you've implemented the solution, you wait for it to work before you collect data on your outcome measure. The amount of time you need to wait requires you to think critically about your solution and your target behavior.

PHASE 3: TEST IF THE SOLUTIONS CHANGE BEHAVIOR



Is the behavior you're trying to encourage a relatively easy one to adopt? Or, are you asking farmers to change long-standing traditions? Is the solution a subtle change to your platform? Or, are you implementing something entirely new and transformative?

Take our poster example above. After distributing the posters, we measured whether these posters encouraged extension agents to send farmer data to our partner using WhatsApp. We had to consider how long it would take for the posters to influence smartphone usage. We didn't expect extension agents to take home the poster and immediately start using WhatsApp for data collection. We waited three months from when we gave them the posters to when we measured our outcome.

After allowing enough time for the solution to take effect, collect data on your outcome measure using the method chosen in Step 1. This could involve retrieving administrative records, extracting data from backend systems, or conducting surveys.

Next, calculate the outcome measure for each group. For example, in our earlier case, we determined the average number of extension agents sending data through WhatsApp in villages that received the poster and compared it to the average in villages that did not.

Finally, compare the results across groups to assess whether the solution effectively changed behavior.³

STEP 6: ITERATE

At this point, you will know whether your solution encouraged the target population to execute the target behavior. Even if you followed every step in this toolkit, there is still a chance the solution had no effect. Behaviors can be really sticky and hard to change. If that happens, we typically investigate further to understand what went wrong. Even if there was a positive change, we will still dig deeper to identify ways the solution can be further improved.

³ For more information on how to make this comparison more academically rigorous, we recommend consulting *Running Randomized Evaluations: A Practical Guide* by Rachel Glennerster and Kudzai Takavarasha.

PHASE 3: TEST IF THE SOLUTIONS CHANGE BEHAVIOR



There are two overarching areas you should investigate. The first is the design of the solution. It's possible that it didn't adequately address the barrier it was meant to overcome, or it could have introduced a new barrier you hadn't anticipated.

At Busara, we return to the target population for feedback using the methods outlined in Phase 1, Step 4. You can organize focus groups or interviews to present the solution and explore ways to improve it. Alternatively, you can conduct a survey to gather feedback on specific aspects of the solution. Use these insights to refine and develop a new iteration that better meets the needs of the target population.

The second is implementation. Implementing any new solution can be tricky, and we often see well-designed solutions fall short because of implementation challenges. For example, our training posters may not have reached extension agents due to printer issues, difficulties contacting extension agents, or the partner forgetting to distribute them.

To identify problems and improve the implementation process, talk to those involved. This could be as simple as meeting with your team or conducting interviews with key stakeholders. If your digital service relies on extension agents to reach farmers, speaking with them can help uncover and address implementation gaps.

Other Testing Approaches

Sometimes, mini-RCTs and A/B tests aren't practical. You may not be able to randomly give the solution to different groups, the sample size might be too small to yield meaningful results, or collecting data on the outcome measure could require major system changes. However, testing a solution before scaling is essential to ensure it works before committing significant time and resources to large-scale implementation. The table on the next page provides several other approaches that you could use to test your solution.



	Interviews or Focus Groups	Difference-in-Differences	Behavioral Lab Studies ⁴
Description	Interviews and focus groups test solutions in an open-ended way. Instead of measuring the impact of the solution on an outcome measure, they gather feedback on what may or may not work from the target population’s perspective. These discussions can also shed light on how people believe the solution might influence their behavior beyond the target behavior, offering a more complete view of its overall impact.	Difference-in-differences is used to measure the impact of a solution by comparing changes over time between a group that received the solution and a group that did not. Instead of just looking at before-and-after results for one group, it looks at how both groups change and then compares the difference between them. This helps separate the true impact of the solution from other factors that might have influenced the outcome.	Behavioral lab studies test how people make decisions in a controlled setting, like a research lab or online experiment. Participants are given tasks or scenarios that mimic real-life situations, allowing researchers to observe their choices without outside distractions. This helps identify patterns in behavior and test how different solutions might work before applying them in the real world.
When to Use	When you cannot draw a relatively large sample and can only conduct testing with ~30 people, or when you want a more holistic understanding of how your solution may impact your target population.	When you’re unable to randomly assign a sample of the target population to different groups or unable to randomly give the solution to some groups but not others.	When implementing the solution and measuring its impact in the real world is impractical—either due to high costs at a small scale, long timelines for results, or budget constraints that limit testing multiple solutions.

⁴ If you’re interested in conducting behavioral lab studies, we recommend bringing in an expert. Designing them in a way that produces relevant insights requires in-depth knowledge of lab games and certain outcome measures. Busara’s contact information is listed at the end of the toolkit if you want more information.



By applying the research methods and design approaches in this toolkit, digital service providers can take meaningful steps to increase adoption among smallholder farmers.

While large-scale structural changes are important for long-term transformation, small but strategic refinements to offerings and operations can make digital services more accessible, relevant, and impactful.

When designing these refinements, farmers and extension agents should be at the center of the design process. Actively involving them in research and co-design ensures that changes to the digital service reflect their realities, address key challenges, and meet their needs.

Our goal in developing this toolkit is to ensure that adopting and using digital services feels intuitive and seamless for smallholder farmers. As a result, farmers will be more likely to use them consistently, leading to lasting improvements in their livelihoods and resilience.



For more information on this project and Busara's work in leveraging behavioral science to increase the uptake of digital agricultural services, contact **Morgan Kabeer** at morgan.kabeer@busara.global

