



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Digital Insights on Agriculture in Bangladesh

FINDINGS FROM A SURVEY IN THE
FEED THE FUTURE FOCUS ZONES

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About this report

DAI Global LLC commissioned ResInt Bangladesh to conduct a study shedding light on the existing level of digital literacy, technology choices, usage habits, and digital lives of agricultural value chain actors in Bangladesh. This report includes interview findings, analysis, and actionable recommendations to inform DAI's design of targeted pilot activities on agricultural digital tools.



About the authors

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Disclaimer

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On the cover

One of ResInt Bangladesh's field researchers interviews a small shop owner serving farmers in Chattogram division. (Photo by ResInt Bangladesh with the permission of the subjects.)

Executive Summary

As the Feed the Future Bangladesh Digital Agriculture Activity prepares to pilot a range of digital interventions, DAI commissioned ResInt Bangladesh to document how farmers and other stakeholders playing an active role in Bangladesh's agricultural economy use their mobile phones in their personal, family, and professional lives. Specifically, the study aimed to shed light on the existing levels of digital literacy, technology choices, usage habits, and digital lives of four target populations: smallholder farmers, sellers of agricultural inputs, providers of services to farmers, and buyers of farm outputs.

ResInt Bangladesh conducted this study by interviewing 316 value chain actors encompassing crops, livestock, and aquaculture in November 2021 within the Feed the Future zones of Bangladesh in Dhaka, Khulna, Barishal and Chattogram divisions. Ownership of a mobile phone was a prerequisite for inclusion in the sample.

Among all mobile phone users of the target populations, three out of five (60%) own at least one smartphone, but more than half of smallholder farmers rely on basic phones every day. Those without smartphones point to a lack of need or lack of awareness instead of financial reasons for not owning one. The majority of study participants spend less than ₳300 (~\$3.48) per month on talk time and, for those with access, less than that same amount on data, however, more than two out of five still say they limit their talk time to save money.

The average person in the agriculture sector spends 39 minutes each day talking on their phone, primarily to friends and family but also substantially for business. Those with Internet access spent an average of 100 minutes each day connecting with family overseas and enjoying on-line entertainment. YouTube, Facebook, and imo dominate app usage. A small minority know of special apps for agriculture, but less than one in ten have ever used one. Interestingly, almost all use mobile money – including those with basic phones.

In almost every measure, input sellers and output buyers in agriculture value chains outpace their farmer counterparts in access to the digital world and engagement with it. That trend manifests itself in the real world as well. When tested on their ability to perform common functions using their mobile phones, smallholder farmers consistently lacked the digital literacy skills of their business counterparts.

Building on these findings, the Digital Agriculture Activity should recognize that phone users will always weigh cost against value. The best way to deliver information to agricultural actors will be through the same familiar platforms they already use for entertainment and news. Fortunately, respondents demonstrated high levels of competency with the digital tasks they are familiar with. This includes the use of mobile money which provides a promising entry point for the Digital Agriculture Activity.

Acronyms

DAE	Department of Agricultural Extension
FTF	Feed the Future
ICT	Information and Communications Technology
IVR	Interactive Voice Response
MFS	Mobile Financial Services
SDG	Sustainable Development Goal
SIM	Subscriber Identity Module
SMS	Short Message Service
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

Research Design

Agriculture contributes approximately 14% of Bangladesh's gross domestic product, yet jobs in the agriculture sector provide livelihoods for more than 40% of Bangladesh's workers according to Bangladesh's Ministry of Finance. Helping families achieve lasting food security requires addressing the root causes of poverty, hunger, and malnutrition. To advance the Sustainable Development Goals (SDGs), end extreme poverty in this generation, and promote Bangladesh's journey to self-reliance – in ways that economic growth alone cannot achieve – requires interventions designed around evidence.

DAI's Bangladesh Digital Agriculture Activity – part of USAID's Feed the Future (FTF) initiative – seeks to promote the efficient and effective use of digital tools and technologies to build the capacity of value chain actors under a market systems approach.

As the Digital Agriculture Activity prepares to pilot a range of digital interventions, DAI commissioned ResInt Bangladesh to elicit insights from farmers and other stakeholders playing an active role in Bangladesh's agricultural economy. Specifically, the study aimed to shed light on the existing levels of digital literacy, technology choices, usage habits, and digital lives of four target populations: smallholder farmers, sellers of agricultural inputs,

providers of services to farmers, and buyers of farm outputs.

In order to design interventions that are user driven and meet Bangladeshis where they are on their digital journeys, DAI seeks to gain this detailed information regarding usage, behaviors, and attitudes around digital tools and levels of digital literacy of target users.

This study focuses on understanding the current levels of digital literacy among these groups, as well as their usage of digital tools, and the various digital agricultural tools that the Digital Agriculture Activity has already identified in the market.

Questionnaire Development

ResInt Bangladesh consulted with DAI's Digital Agriculture Activity teams in Dhaka and in Washington, D.C. working on the Digital Frontiers project to develop a questionnaire specific to this study. The questionnaire intended to capture both quantitative and qualitative insights to assess knowledge of existing digital tools, users' access and use of digital tools, perceptions of users around digital tools for agriculture, and users' level of digital literacy as well as barriers to digital literacy.

Questionnaires were pretested on October 16-18, 2021, in Jashore district for logical flow, responses, accurate translation, and ease of comprehension before data collection began.

Following revisions to the questionnaire based on the pre-testing, DAI approved the final questionnaire for use.

Data Collection

ResInt Bangladesh conducted this study within the Feed the Future zones of Bangladesh in Dhaka, Khulna, Barishal and Chattogram divisions. Following DAI's research design, ResInt Bangladesh's field interviewers conducted semi-structured interviews with smallholder farmers (with a mix between livestock, crops, and aquaculture), wholesalers and retailers of agricultural inputs (such as seeds and fertilizers), providers of services to farmers (such as those providing animal vaccinations, artificial insemination, and fish nurseries), and the buyers of farm outputs.

In consultation with DAI, ResInt Bangladesh selected 13 districts in the target area for field work. The sample distribution – by geographic location and by respondent category – were also finalized in consultation with DAI's Digital Agriculture Activity team in Dhaka.

The research teams collected data between November 2-13, 2021.

Researchers completed interviews with at least 75 people in each of the four divisions in the study. In total, teams of field interviewers experienced in qualitative data collection identified, recruited, and surveyed 316 respondents.



I use my mobile for listening to music, news, and watching films. I also watch videos for religious programs such as Waaj and Telawat. I also use it as a camera to capture good pictures of my families and friends.

MALE SMALLHOLDER FARMER IN BHOLA DISTRICT

To identify smallholder farmers in each location in the sample, we randomly selected two or three starting points from each selected village in the study. From the selected starting point, we randomly selected one of the first five households. From the selected starting point, ResInt's field interviewer visited every other household until completing the total number interviews matching the sampling plan.

For the other three categories of respondents in the value chain, we prepared a list of these categories available in the selected areas. We selected the number of the respondents required by the sampling plan randomly from the list. If there were very a smaller number of eligible respondents in a certain category, our field interviewers employed "snowball" sampling methods where respondents identify other potential respondents meeting set criteria.

With a view to protecting the rights and confidentiality of the research participants, oral or written consent was obtained from them before each interview. ResInt Bangladesh's field interviewers read out the purpose of the study, nature of information required, benefits of the study, confidentiality to be maintained, and freedoms to be exercised by the respondents during the study. The participants were told that the information they provide during the study will be kept strictly confidential and their names will not be disclosed anywhere, and the data will be used for research purposes only. Once they agreed, data was collected.

All the ethical standards were implemented at all the stages of the study, such as freedom of participation and withdrawal by the respondents at any point of time, ensuring non-discrimination in respondent selection, multi-cultural values, showing mutual dignity and respect people

without discrimination, irrespective of gender, color, and religion.

Consistent with “do no harm” principles, ResInt Bangladesh worked to minimize health safety risks to its staff, participants in the research, and third parties during this study. Precautions consistent with the rules issued by the Government of Bangladesh and the guidance of the World Health Organization were followed.

Research teams were equipped with masks, hand sanitizer, and anti-bacterial wipes for use during interviews. The team maintained social distance while interviewing the respondents.

A Field Operations Manager oversaw the operation of the interview teams during data collection, and the Project Director and ResInt Bangladesh’s data analysis experts provided inputs at various stages of data processing and analysis.

Field editing was done by teams in each division, office editing of all the completed schedules were carried out by trained office editors as per the data entry program, which includes coding of open-ended questions, identification details, and consistency checks, before starting the data entry process.

Data entry was carried out under the supervision of an Analysis Manager. A FoxPro package was used for entering the data obtained from the field survey and converted to an SPSS file for analysis. Computer-based checks were done and based on the errors generated,

inconsistencies were removed, and the base data were cleaned.

Demographics

The age range of the respondents was 18-45 years old. Among them, 28% were between 18 and 30 years old, 45% were between 31 and 40 years old, and 26% were over 40 years old. Of the respondents, 86% were married.

The educational profile is similar to the Bangladeshi average with 28% having only a primary school education, 29% having completed secondary school (up to grade 9), 29% holding higher secondary school certificates, and 15% having a bachelor’s degree or higher.

Only 12% of the respondents in this survey were women. Most of those were smallholder crop and livestock farmers. Women in aquaculture and those working as service providers to farms each constitute less than 1% of the total sample. No women were interviewed who work as input sellers or as output buyers. Although other studies have shown that women constitute almost half of the population involved in agriculture in Bangladesh, they primarily provide unpaid labor in a wide range of activities on family farms. They are underrepresented among owners and entrepreneurs.

The average annual income of the respondents was ₳355,098 (≈\$4,119). Buyers of agricultural outputs had the highest average annual income of ₳536,170 (≈\$6,220) and the smallholder farmers had the lowest of ₳254,383 (≈\$2,951) per year.

Distribution of the Sample

District / Division	 All Farmers	 Livestock Farmers	 Crop Farmers	 Aquaculture Farmers	 Input Sellers	 Service Providers	 Output Buyers	 Total
Madaripur	10	-	10	-	10	6	5	31
Faridpur	20	10	5	5	10	7	7	44
Dhaka	30	10	15	5	20	13	12	75
Barishal	7	-	7	-	4	3	3	17
Barguna	5	-	-	5	4	5	4	18
Bhola	14	10	-	4	6	4	3	27
Patuakhali	8	-	5	3	4	2	4	18
Barishal	34	10	12	12	18	14	14	80
Banderban	6	2	4	-	3	2	2	13
Cox's Bazar	28	9	13	6	18	10	10	66
Chattogram	34	11	17	6	21	12	12	79
Khulna	9	-	4	5	5	4	5	23
Chuadanga	9	4	5	-	4	-	-	13
Jashore	13	7	1	5	5	4	4	26
Jhenaidah	5	-	5	-	3	-	-	8
Satkhira	7	-	-	7	3	2	-	12
Khulna	43	10	15	17	20	10	9	82
Total	141	42	59	40	79	49	47	316



Key Findings

This study seeks to shed light on the existing level of digital literacy, technology choices, usage habits, and digital lives of four target populations in the Feed the Future zones of Bangladesh: smallholder farmers, sellers of agricultural inputs, agricultural service providers, and buyers of farm outputs. We aim to review hidden barriers to digital literacy and usage, such as gender norms and family dynamics. This study also explores the interactions between the various value chain actors, especially through digital tools. By establishing a baseline understanding of users' digital literacy levels, this study can provide the Bangladesh Digital Agriculture Activity with a series of actionable insights that will inform the design of targeted pilot activities.

Mobile Device Ownership and Access

Generally speaking, mobile phones have become part of daily life for the Bangladeshi people. Due to the very wide variety of brands and prices for mobile phones available in the market, the Bangladeshi people, irrespective of their income level, can buy one according to their affordability. The outcome of the current study also reflects the same as regards to the sample respondent's ownership of mobile phones. However, the proportion of ownership of smartphones is lower with smallholder farmers relative to the other respondent categories.

Because ownership of a mobile phone was a prerequisite for inclusion in this survey,

naturally, all participants indicated they owned a device. Additionally, one out of three survey participants owned and used a second mobile phone. Almost all participants (97%) also live with another person in their household who also owns and uses a mobile phone.

Majorities in all categories of participants and all geographic locations report owning their first mobile phone more than nine years ago, except for women. The median length of mobile phone use by women in the survey is closer to five years.

Smartphones represent the most popular type with 60% of participants using one. However, they are significantly more prevalent among the input sellers and output buyers than among farmers. Almost eight out of ten (79%) input sellers, service providers, and wholesale buyers use smartphones compared to just less than half of the farmers (48%) in the survey.



I use my mobile phone for all the purposes, as needed. My children helped me learn how to use a touch phone. But I still don't know how to find out important topics, news, music, videos, and so on, but my daughter helps me. I can speak with my relatives and friends using imo and Messenger, watch videos, and many other purposes. I need to know more so I can use it on my own.

FEMALE LIVESTOCK & CROP FARMER IN BORGUNA DISTRICT

Smartphones are also noticeably more widely used in Chattogram divisions than elsewhere.

The other 40% of survey participants do not own any smartphone. Smallholder farmers are most likely to only own only a single basic mobile phone with some citing their preference to use a low-cost device during their busy business hours and thus minimize the loss that may be caused by losing their mobile phone in a rushed and crowded environment.

The absence of a recognizable need for smartphone features (39%) and lack of knowledge on how to navigate the interface (38%) were the top reasons why participants without smartphones say they haven't acquired one.

Among women without smartphones, unfamiliarity with how to use a smartphone (57%) presented a bigger barrier than perceived lack of need (24%) and the cost (24%) combined.

Only 14% of all participants without smartphones named the financial cost as a barrier. That figure is a little higher for farmers and a little lower for input sellers, service providers, and output buyers, but not by much.

Another 13% however professed that they do not have any problem having a smartphone; simply they have simply chosen not to buy one. Seven individuals without smartphones cited the harm a smartphone

might do to either a child's education or eyesight; and one man in Khulna is sure that his child would break an expensive smart phone.

Although respondents de-emphasized cost as a barrier to owning a smartphone in their verbal interviews, the average monthly self-reported income of smartphone owners in the survey (₹34,099 or ≈\$396) is more than 50% higher than the average monthly income of those who didn't own a smartphone (₹22,552 or ≈\$262). This substantial difference suggests that economic considerations may be more significant than respondents feel comfortable expressing openly.

Respondents more openly acknowledged cost factors in their mobile phone usage. Among the respondents, 42% limit use of their mobile phone in consideration of the costs of talk time and/or data. The rest of the respondents do not consider the costs that may be incurred for talk time and data by using their mobile phone.

Farmers and women were more likely to limit their usage for cost considerations. Geographically, this was more common in Dhaka and Khulna divisions than in Chattogram and Barishal divisions.

There exist several sources where the respondents buy talk time and data. Local shops were nearly universally visited by respondents to purchase additional talk time and data.

A full 99% of survey participants responded that they used them. The next most frequently mentioned vendor, mobile financial service providers, was only as third as popular.

Farmers and respondents in Barishal division were more likely than others to buy talk time at their upazila market. Only 3% bought time directly from their mobile phone service.



I don't use a touch phone, rather I use a button phone. Touch phones are not good for your eyes. They have a negative impact on your eyesight. It also damages the kids. They don't study, become absorbed in it always. I just avoid touch phones.

MALE SMALLHOLDER CROP FARMER IN SATKHIRA DISTRICT

Overall, only a quarter of the survey participants have access to a computer, and the rest do not. While 34% of the output buyers have access to computer, only 17% of smallholder farmers have the same.

Likewise, responses on whether someone else in the household has access to a computer corresponds very closely across most categories to whether the respondent has access to one. However, only 8% of women in the study have access to a computer themselves, but 29% live in a household where another member does.

Connectivity

Grameenphone is the most popular mobile phone network with 68% of respondents using their SIM cards. This is almost equal to the combined number of subscribers using Grameenphone's two next closest competitors: Banglalink (35%) and Robi (34%).

A majority of respondents (60%) use multiple SIM cards. The average number of SIM card per respondent is 1.5. This is equivalent to every other person having two phone numbers. (The average number of SIM cards per respondent is slightly higher than the number of mobile devices per respondent (1.3), possibly because of the use of dual SIM phones.) Output buyers used the highest number of SIMs (1.8); a smallholder farmer uses 1.4 SIM cards on average.

Most respondents (61%) have access to the Internet via their electronic devices (i.e., mobile phone, tablet, or computer). The availability of Internet access is the lowest with smallholder farmers (47.5%) relative to the other three categories. It is highest with input sellers (78.5%).

Only one in five respondents have any connectivity through wi-fi. That figure is lowest in Barishal division (6%) and highest in Dhaka division (36%).

Around 55% of respondents spent less than ₳300 (~\$3.48) per month on talk time. Another 22% spend between ₳301 and ₳500 (~\$3.49-\$5.80) per month. The remaining 23% spend over ₳500 (~\$5.81) per month on mobile airtime. Output buyers spent the highest amount per month (₳542 or ~\$6.29). Smallholder farmers spend the least per month (₳336 or ~\$3.90).

A similar pattern of spending for buying mobile data was observed among the respondents. About 55% spend less than ₳300 per month. Another 34% spent between ₳300 and ₳500 per month. The last 11% spent more than ₳500 per month on data. The predominance of smallholder farmers is also evident in the lower segment of this spending.

The power supply situation has been improved significantly during the past decade. Still, 55% of the respondents experience up to two hours loadshedding and 39% experienced 2-6 hours loadshedding on average daily basis at their homes.

Device Usage Habits

Among survey participants, 56% use talk time up to 30 minutes per day, another third use between 31 minutes and 60 minutes each day, and the remaining 11% use more than an hour daily. On average, each



My mobile phone is extremely essential to me. I speak with my friends and family members, and communicate through Facebook, imo, WhatsApp, and Messenger. I watch news and documentary videos on animal husbandry and treatment through YouTube. I get a lot of important information on my phone.

MALE PESTICIDE SELLER IN FARIDPUR DISTRICT

respondent believes they spent 39 minutes each day talking on their mobile phones. The average daily usage of talk time by a smallholder farmer was around 32 minutes; the average output buyer used 47 minutes per day. In Chattogram division, the average talk time exceeded an hour of each day.

Respondents with a data connection for their devices use the Internet for 100 minutes on an average day. That length is similar across the four categories of respondents. Around 55% of them used the Internet up to one hour, around 19% for 1-2 hours, 12% for 2-3 hours and the rest of them for over 3 hours.

Unsurprisingly, almost every respondent (98%) reports using their mobile phone for calls with friends and family, and 82% used it for business purposes.

Surprisingly, the third most popular use of mobile phones by survey participants is for illumination as a flashlight (62%). For 53% of respondents, their mobile phone is a watch and alarm clock.

Social media comes in fifth place (48%) just a fraction ahead of taking photographs (48%) and “gathering information on agriculture or business” (48%).

Exchanging text messages with friends and family (32%) and overseas calls with friends and family (24%) were also popular.

Importantly, 23% report using their mobile devices for banking transactions. Respondents from Khulna (49%) and farmers in aquaculture (30%) appear ahead of their peers in this regard. Those in Dhaka

(1%), livestock farmers (7%) and women (8%) trail farthest behind in on-line banking.

When asked about who are the people they communicate with via mobile phone, the majority of respondents said that they communicate with family members (99%), friends (74%), and business colleagues (70%) with their mobile phone.

As a mode of communication, all respondents use voice calls to communicate with others via mobile phone.

Other modes of communication include audio calls (51%) and video calls (50%) through apps like WhatsApp, imo, and Messenger and text messaging (26.6%) through both their service provider and apps. Respondents told interviewers this is mainly how they stay in touch with family members living abroad.

Less than half of the survey participants (46%) recognized email as a type of electronic communication. Only a third of those familiar with email have their own email address.

Use of hotline and interactive voice response (IVR) lines is not common among the survey’s target population. Only about 14% of the respondents said that they dial hotlines for their business purposes and 10% of them used IVR services. Among the small number of respondents using these, a variety of mobile phone subscriber services were most frequently cited. However, 18% of those using hotline or IVR services used them to get information related to agriculture. Of note, 9% used them for COVID-related services or information and 7% for bKash services.

Facebook (88%) is the most familiar app that respondents could name, followed by YouTube (85%), imo (76%), Messenger (65%) and WhatsApp (42%). These closely correspond to the apps respondents say they actually use: YouTube (58%), Facebook



I transfer money to my children using bKash. They study in Dhaka. I also receive money as a stipend for my son from the government through my mobile.

MALE SMALLHOLDER FARMER IN BARISHAL DISTRICT

(54%), imo (52%), Messenger (38%), and WhatsApp (20%).

Agricultural apps were named by 15% of the total respondents. Service providers (22%) and input sellers (22%) were more aware of agriculture apps than smallholder farmers (10%) and output buyers (9%). However, only half (7%) of those who voluntarily named an agriculture related app actually use it.

Interestingly, a buyer of farm outputs in Khulna division was the only person in the study to name Twitter – but he doesn't use it.

Only 6% of participants in this study could not name any app for any purpose. However, 39% of respondents (primarily basic phone users) do not use any apps.

Respondents use apps to talk (73%), make video calls (63%), and exchange information (60%). Entertainment was a popular function of apps with watching movies and dramas (60%), listening to music (40%), watching news (34%), and watching sports (7%) rating highly.

Among app users, 43% named “knowing agricultural information” as something they use an app for.

Sending messages (42%) and sending photos (20%) were also major uses of apps among survey participants. And 24% listen to religious content on their mobile devices.

Money transactions by using mobile apps like bKash, Nagad, and Upay are gaining popularity among the Bangladeshi mobile users. Among the respondents of the current study, 48% use mobile apps for money transactions. This is possible even with basic phones. Among the respondents who use mobile apps for money transactions, the major purposes were business (74%), buying talk time or data (70%), and supporting friends and families (66%). Mobile money transactions for business purposes is more common with input sellers (89%), output

buyers (86%), and service providers (84%) than with farmers (55%).

Half of the respondents do receive information on agriculture and business via mobile phone that helps their businesses, and the other half do not. To three out of four respondents, the principal point of communication for getting information needed for business are business colleagues. Neighboring farmers (64%), friends and family (38%), and government officials (30%) are sources of information. For this purpose, 82% of smallholder farmers rely on neighboring farmers, while business colleagues are commonly used by output buyers (96%), input sellers (94%), and service providers (88%).

Overall, just less than half of the respondents use their phones to browse the Internet. For smallholder farmers, the proportion is below average (37%). The leading purposes respondents use the Internet for are entertainment (81%), sports (59%), and news (56%) websites.

More than half of those respondents who access the Internet with their phones (51%) look for agriculture information. Smallholder livestock farmers (60%) and service providers (57%) are most likely to do so and aquaculturalists are least likely (39%).

To communicate with other businesses, 95% use voice calls, 20% use text SMS, and



If there is digitalization in agriculture, definitely, it will be good for us. We will know the exact price of the commodities, produce, and inputs. We will know from the real sources. We will not be cheated by the middlemen, the agents (many of them are frauds). We will get a good price. We will be able to sell directly.

MALE SMALLHOLDER FARMER IN FARIDPUR DISTRICT

9% use messaging with mobile apps. A small segment (3%) also use email for business communication while a final 4% report that they do not communicate for business at all with their mobile phones.

Willingness to Pay for Services

Almost 37% of respondents currently pay for information and/or services that help grow their business through their mobile phone. In Chattogram division, that number shoots up to 85%.

Great potential remains untapped. Among the respondents, 75% say they are ready to pay for services that might help grow their business. As for the remaining 25% who are not ready to pay for hypothetical services to grow their incomes, most (50%) offered that they would be interested if the service were provided for free or cited they “don't need the service” (38%).

Digital Literacy

ResInt Bangladesh's field interviewers assessed the digital literacy of the respondents by observing their basic technical and operational skill in using their mobile phones.

For this study, digital literacy indicators include the respondent's ability to dial a call, to send or receive an SMS, to make an audio or video call using an app, to watch a video on YouTube, to make a digital money transaction, to use the mobile device's built-in camera, and to operate the calculator.

Across all practical exercises, the skill level of smallholder farmers trailed behind the digital literacy of the other three categories of respondents in this study.

All input sellers, service providers, and output buyers were very good at dialing to make calls. Smallholder farmers were slightly less adept at this and brought the overall percentage deemed “very good” down to 98%.

In sending and receiving SMS messages, 62% of the respondents were found very good and another 7% “good.” Again, farmers trailed buyers, sellers, and service providers with only half skilled at sending texts.

Only 51% of respondents were very good in making audio or video calls using an app. Among farmers, only 43% were considered “very good” or “good,” and 55% simply could not perform the function at all. Farmers were also below average in using YouTube (42% compared to 55%), using a camera (48% compared to 57%), using a calculator (70% compared to 79%), and dialing a hotline (59% compared to 66%).

Only 26% of smallholder farmers were considered “very good” at using mobile money. This was behind the familiarity of input sellers (46%) and output buyers (36%) but not far behind service providers (29%).

There was only one respondent who was not able to perform any of the activities demonstrating digital literacy. She mentioned that she takes help from her children when she needs to do anything with her mobile phone.



Recommendations

Through the Bangladesh Digital Agriculture Activity, USAID aims to find new ways to accelerate the scalability of its investments in Feed the Future activities and enhance the demonstrated sustainability of its efforts.

DAI's Feed the Future Bangladesh Digital Agriculture Activity seeks to promote the efficient and effective use of agricultural and others digital tools and technologies to build the capacity of value chain actors under a market systems approach. These value chain actors should then be able to use these tools to sustainably and effectively build the capacity of their clients and customers during and beyond the period of activity implementation. Specifically, DAI's first two defined tasks of increasing the availability of appropriate and gender sensitive digital agricultural tools and enhancing digital literacy and the capacity of value chain actors to understand and utilize digital agricultural tools should flow into the third task of improving utilization of digital agriculture tools by value chain actors for capacity building of their clients and customers.

The project-specific objective of enabling targeted Feed the Future stakeholders to leverage technology for greater sustainability and impact can contribute to secondary goals of increasing agricultural production, raising nutrition levels in vulnerable communities, boosting household incomes of smallholder farmers, and promoting better environmental practices.

To further the project's goal of helping farmers and their suppliers, service providers, and buyers improve the functioning of agricultural markets through the adoption of digital tools – which in turn generates economic value through greater efficiencies – ResInt Bangladesh makes the following recommendations based on this survey.

RECOMMENDATIONS FOR TASK 1

Increase the availability of appropriate and gender sensitive digital agricultural tools

In the first year, DAI intends to identify and shortlist appropriate and gender sensitive digital agricultural tools within Bangladesh that are deemed effective and market fit for farmers and others value chain actors in crops, livestock, and aquaculture. As such, DAI will be working closely with Feed the Future partners, sub-awardees, and other stakeholders to conduct user testing among target users to understand usability, areas for tool improvement, the value perception of what the tool offers, the ability to absorb and utilize the information offered by the tool, and willingness to use the tool in practice.

Develop “values based” messaging

The Digital Agriculture Activity should complement its highly technical approach with human-centered design techniques to incentivize behavior change. An implicit assumption built into the program description is that value chain actors,

especially smallholder farmers, share a common interest in improving their value chain.

In reality, individuals value different things. For example, a farmer may value increased leisure time over a higher income. More efficient production might be valued because it allows children to attend school instead of working at harvest.

The Digital Agriculture Activity should invest in research to understand how the individuals that make up the value chain prioritize the potential benefits to them. DAI should broaden the current focus on the nexus of agriculture, economics, and technology to incorporate psychosocial perspectives.

Focus group discussions with stakeholders can better identify these factors. Importantly, the factors which provide strong motivations may differ between different socio-economic groups and by gender.

Subsequently, the Digital Agriculture Activity should develop and test messaging around the non-technical benefits of adopting digital tools in parallel to their selection and piloting of the actual tools.

This study provides some clues as to what agriculture value chain actors do value based on what they currently use their mobile devices for. Admittedly, it may be foolhardy to try to convince a farmer that an agriculture app can be as entertaining as YouTube, but it could be messaged that farmers who use a certain tool to increase their productivity end up with more free time to watch videos on YouTube. Helping smallholder farmers envision how the use of digital tools can improve not only their livelihoods and not just their digital lives but really change other aspects of their lives for the better is key to accelerating adoption and making it sustainable.

Avoid Specialized Apps

The Digital Agriculture Activity should focus on reaching farmers and other agricultural value chain actors through the familiar avenues they already utilize for entertainment, news, and sports and to communicate with friends and family.

Facebook and YouTube are by far the most popular on-line platforms (available through apps as well as websites) in this survey. The three next most frequently cited – imo, Messenger, and WhatsApp – are all messaging apps with text, audio, and video capabilities.

Fewer than one in ten respondents actually claim to have used any agriculture-specific app. IVR systems and hotlines were similarly unpopular. Despite the Bangladesh Department of Agricultural Extension (DAE) launching phone services for agriculture information, for detecting crop diseases, and for selecting the appropriate pesticides, the adoption of agriculture-specific services requires further convincing.

Factor User Costs into Interventions

Respondents were very mindful of the amounts they paid monthly for airtime and data. Although the costs of purchasing a smartphone were less frequently named as the barrier to owning one than expected, a considerable income gap divides smartphone users from non-owners.



I listen to music and use bKash for money transactions. I speak with my friends and families. I frequently discuss about business matters with fisheries people, veterinarians, suppliers, and also agriculture officers.

MALE FISHERIES OWNER IN BARISHAL DISTRICT

The Digital Agriculture Activity should help agricultural value chain actors make informed value decisions on whether to purchase their first mobile phone or upgrade to a smartphone.

The Digital Agriculture Activity should also recognize that the cost considerations of women and their access to resources is significantly different than men's. Gender-smart planning is required for inclusivity.

Plan for a Segmented Market

Two out of five (40%) survey respondents do not own a smartphone. That figure does not account for Bangladeshi agricultural value chain actors who were not selected for interviews because they owned no mobile phone.

Although the adoption of smartphones will increase as lower cost models spread in the market, incomes rise, and existing basic phone users find themselves needing to replace their older phones (or obtain a second phone for themselves or a family member, as the survey showed was common), millions of Bangladeshi farmers will be using basic phones for years to come.

The Digital Agriculture Activity should separately structure interventions for smartphone and basic phone users. It is unreasonable to focus exclusively on lower end digital tools for basic phones which would be "reverse compatible" with smartphones because it denies the benefits



If the company pays, I will use the Internet. Now it is not needed. Now I receive all the information from the company representatives. They provide all information related to crop farming and the marketing of crops.

MALE LIVESTOCK FARMER IN JASHORE DISTRICT

of smartphones' processing power and access to the Internet.

Moreover, the majority of survey respondents are currently using smartphones, and we expect that proportion to grow. However, the project's aims cannot be achieved by ignoring such a large pool of beneficiaries.

RECOMMENDATIONS FOR TASK 2

Enhance digital literacy and capacity of value chain actors to understand and utilize digital agricultural tools

The Digital Agriculture Activity will help value chain actors increase their digital literacy and awareness of tools. In the second year, the Digital Agriculture Activity will conduct trainings to build the capacity of value chain actors to train customers and clients on improving their agricultural productivity, resilience, and household nutrition in a sustainable manner.

Recognize Intuitive Learning Abilities

As noted above, this survey's observational tests on digital literacy showed a "digital divide" between more skilled input sellers, service providers, and output buyers and less digitally literate smallholder farmers.

A second look reveals that overall and within each category of respondents, the observed abilities are largely dichotomous. Respondents largely "scored" at opposite ends of the spectrum: either "very good" at the task or "cannot use at all."

Relatively few landed in the middle classifications of "good" or "fair" or "poor."

This suggests that all agriculture value chain actors have a high capacity for learning how to operate smartphones and for mastering the fundamentals of digital literacy once they have reason to practice them. If so, the Digital Agriculture Activity can assume value chain actors will have a

uniformly high level of skill for any digital task they regularly perform.

Although literacy and numeracy levels are lower in rural Bangladesh, this survey indicates that access to technology and connectivity may be a bigger barrier to digital literacy than educational levels. Customizing approaches for teaching “hard” digital skills to different income levels, genders, and educational levels does not appear necessary.

Greet those crossing a “digital divide”

When engaging input sellers, service providers, and output buyers, the Digital Agriculture Activity should clearly explain the “digital divide” between them and smallholder farmers generally. If the project lets commercial actors assume that their customers/suppliers share the same level of technology and the same digital skills as themselves, it will exclude many potential beneficiaries and perpetuate inefficiencies.

The Digital Agriculture Activity can develop interventions to help agricultural value chain actors with their transition from basic phones to their first smartphones. New smartphone users will be naturally keen to elevate their own digital literacy. DAI can help establish location-based or profession-based introductory programs where new or potential future smartphone owners can get “hands on” trainings and customized demonstrations with their devices. These programs can initiate users to specific uses or specific apps early in their digital journey.

Equate financial literacy with digital literacy

Respondents showed a great willingness to pay for services that improve their businesses.

Practically, it will be more difficult to convince value chain actors to make upfront

investments in technology or services without a guarantee of return.

The Digital Agriculture Activity can increase understanding of business economics – casting fee-based services as an “investment” – and help smallholder farmers see their “personal” device as also a business tool.

The Digital Agriculture Activity can help users understand the differences between “free” sites which are sponsored by ads or collect and sell user data and others with monetary costs, such as in-app purchases or subscription services.

Program activities should educate new basic phone and new smartphone owners how to calculate the costs of airtime and data and how to mindfully manage their data usage habits. Financial responsibility should be equated to an aspect of digital literacy. This will also improve sustainability.

Counter disinformation with digital literacy

Misinformation and intentional disinformation undermine all development efforts. Agriculture and markets are as susceptible to intentional and unintentional disruption by rumors, confused facts, bad actors, a lack of transparency, and foreign malign influence as political systems and the public health has been shown to be.



You need to train the small farmers. Most of them are unaware about this technology and have to depend on their children or neighbors or even the sellers or agents. If they know how to operate a mobile phone properly and are collecting the right information, it will be beneficial for them and for the overall agriculture market.

MALE OUTPUT BUYER IN JASHORE DISTRICT

At any stage of production, erroneous information found on the Internet or spreading virally through social media can result in farmers damaging or losing their outputs. Similarly, poor information and rumors can prevent markets from setting prices and conditions fair to all.

The Digital Agriculture Activity should equip its beneficiaries to be wise consumers of information as an integral part of its digital literacy efforts. Training components on how to identify misinformation and disinformation, how to conduct basic fact checking, the dangers of sharing such unsubstantiated information, and how to counter misinformation should be integrated throughout digital literacy promotion efforts. Equipping program participants to counter the spread of misinformation extends the benefits of the program to a greater number of value chain actors.

Do not overlook core features of devices

Almost all respondents indicated that they use their mobile devices as a telephone. But the number of Bangladeshis surveyed using it as a flashlight, a clock, and a camera exceeds those who say they use it for social media.

The Digital Agriculture Activity can “piggyback” digital literacy lessons and

introductions to new tools on these familiar features. For example, having farmers send photos to their produce to a “digital county fair” with prizes is one step removed from using a camera to submit photos of diseased plants for diagnosis and recommendations. The ubiquity of built-in calculator apps gives greater confidence in totaling prices.

Importantly, basic phones and feature phones frequently also have calculators, flashlights, clocks, and cameras. The Digital Agriculture Activity can reach the widest number of users with activities targeting these built-in tools.

RECOMMENDATIONS FOR TASK 3

Improve utilization of digital agriculture tools by value chain actors for capacity building of their clients and customers

The Digital Agriculture Activity will produce a set of capacity-building resources to build the capacity of value chain actors so that they can effectively use piloted digital agriculture tools and train their clients and customers. Then it will increase the number of clients and customers reached by those value chain actors.

Expand Mobile Money Usage

Bangladeshi agricultural value chain actors seem poised to enjoy the convenience of mobile money transactions. Almost half of the survey respondents already use mobile phones for exchanging money. One in four report using on-line banking services. The survey did not distinguish between cash transfers between family members and commercial transactions, but respondents exhibited a comfort level with mobile money.

The observational digital literacy tests largely confirmed the viability of mobile money, although as with all digital skill levels, smallholder farmers trailed the other categories of agricultural value chain actors.



Women will be more benefited from digitalization. We won't face hassle from the men. They will not create problems. Moreover, if our husbands sell our product, they don't give us the exact amount and keep some taka with them. But we need to know more about the process: how to collect information, from where, and also how to receive information on the mobile phone.

FEMALE CROP & LIVESTOCK FARMER IN KHULNA DISTRICT

The Digital Agriculture Activity can naturally leverage expanding familiarity with the means of mobile money services as an entry point for larger discussions of pricing and markets.

Importantly, mobile money services work with both basic phones and smartphones. This interoperability makes it key for connecting actors throughout the agricultural value chains.

The use of mobile money can also give women greater control of their financial resources, as some respondents volunteered in interviews.

Other programs in Bangladesh have successfully organized peer groups of women to boost their confidence in signing up for mobile accounts and setting savings targets.

Coordinate with government & civil society

The project's emphasis on working with developers of tools and providers of digital services in the private sector – especially the focus on providing feedback directly from the intended end users – is important but should not be done in isolation.

The Digital Agriculture Activity should map out synergies with government and civil society organizations which are working in this space or adjacent to it. Findings should be shared with government and civil society and updated periodically. Obviously, duplication of effort should be minimized and synergies found. However, the Digital Agriculture Activity should recognize other actors may not have the same end goal of achieving sustainability of efforts and avoid having good intentions undermine this.



Data Tables

The data tables presenting the quantitative findings from the survey are available in a spreadsheet as a separate annex.

Each entry presents one question from the interview in the order in which they were asked. Percentages are given for the responses overall and within each key category of respondent. A total of 316 individuals completed interviews.

This is not a scientific survey. It is not intended to be wholly representative of the population surveyed. The number of interviews conducted within each category was determined to provide diversity and does not correspond to their proportions

within the agricultural sector. For example, smallholder farmers and women are grossly underrepresented.

Similarly, an equal number of interviews were conducted in each of four divisions per DAI's specifications although they have different populations.

All figures in this report have been rounded to the nearest whole percentage for ease of comprehension and to avoid projecting a misleading degree of precision. Exact figures are retained in the data spreadsheet. Because of rounding (and where multiple responses were allowed), not all totals add up to 100%.





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