

Timor-Leste Rapid Digital Agriculture Assessment



Phone charging at Timor-Leste Organic Fertilizer (TLOFE). Credit: Josh Woodard

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Background

This report is based on a rapid assessment conducted in Timor Leste from November 7-16, 2022. It included a three day visit to the municipalities of Ermera and Bobonaro to interview agriculture sector stakeholders and to assess the on-the-ground context of digital technology access and uptake, as well as meetings with key agriculture and technology sector stakeholders in Dili. Extensive interpretation and contextual detail were provided by USAID/Timor-Leste staff, Inacio Fernandes Quintao (Project Management Specialist) and Josefina Bakhita G. Soares (Program Assistant).

Limitations

This rapid assessment is based on an extremely limited sample size, so cannot claim to be representative of the populations that USAID will target through its agriculture programming. While we attempted to interview a diverse range of stakeholders, including factors such as gender, age, and farm size, interviews were ultimately guided based on who was available at the time we arrived in a particular community or market. All told, interviews were conducted with ten farming households, four traders, one shop owner, three people in the telecommunications space, two cooperatives, two government agencies, four development sector implementing partners, one donor, and two technology companies. See [Annex 1](#) for more details on interviews.

Therefore, the observations and potential opportunities presented in this report cannot purport to be reflective of the full depth of nuances related to how agriculture sector stakeholders in Timor-Leste are interfacing with digital technology. However, it can provide some insights into how a small subset of stakeholders are using digital technology and point to what opportunities may exist to leverage digital technology within USAID's agriculture programming. Before acting upon the findings outlined in this report, it will be important to further explore and verify them. This can be done by USAID's implementing partners who are working on agriculture programming or other development sector actors with an interest in this topic.

Brief Overview of Digital Sector

The digital sector in Timor-Leste has seen significant growth in the past twenty years since independence. In 2003, there were only 2 mobile cellular subscriptions per 100 people. By 2014, that figure exceeded 100 subscriptions per 100 people and has stayed above that level ever since.¹ In addition, close to a third of the population (29 percent) now use the internet, up from a mere one percent in 2006.²

Telecom sector liberalization a decade ago saw the introduction of two private sector competitors to Timor Telecom, which previously had a monopoly. Those include Telemor, which is owned by Viettel (a Vietnamese state-owned enterprise run by the Ministry of Defence), and Telkomsel, which is owned by Telkom Indonesia (a majority of which is owned by the Government of Indonesia). With no shared infrastructure agreements in place, all three mobile network operators have built out their own

¹ [International Telecommunication Union \(ITU\) World Telecommunication/ICT Indicators Database](#) Note: the reason there are more subscriptions than people is because some people own more than one SIM card. A person with two SIM cards would count as having two subscriptions.

² [International Telecommunication Union \(ITU\) World Telecommunication/ICT Indicators Database](#)

infrastructure. Estimates claim that more than 95 percent of the population lives in an area with 3G coverage and 20 percent in areas with 4G coverage.³

A high-level analysis of the pricing structure of all three mobile network operators (MNOs) revealed that the cost for 1 gigabyte of data ranges from USD \$2-3, although the price for a 24 hour unlimited data plan ranges from \$0.75 to \$1. While still relatively cheap compared to global averages, these costs are significantly higher than many other countries in Southeast Asia, such as Indonesia (average price of 1GB is \$0.46).⁴ Further, when considering the fact that the per capita GDP of Timor-Leste is less than \$1,500 per year, the cost of data is likely still somewhat prohibitive for many smallholder farmers to use without limits.⁵

While no data could be found related to digital literacy in Timor-Leste, UNESCO data from 2018 shows a traditional literacy gap between men (71.9%) and women (64.2%) aged 15 and older. While young women, aged 15-24, have a slight edge over young men in terms of literacy, 84.7% to 82.5%, there is a significant gap amongst those over 65, with only 9.5% of women literate compared to 21.4% of men over 65.⁶ These disparities are important to consider given that many of the current use cases for digital agriculture in Timor-Leste are text-based, although voice solutions, including even basic calling, do exist.

Key Observations

This section includes some of the key observations made related to access to and usage of digital technology during the three days spent in Ermera and Bobonaro municipalities.

Mobile phone access

Of those farmers interviewed, every one of them had at least one phone in the household, ranging from basic/feature phones to smartphones. One NGO interviewed shared that from their experience it is generally the case that every household will have at least one phone. Conversations with one mobile phone vendor at the Railaco market revealed that the most popular phone he sells is a \$13 feature phone (which tends to be preferred by older customers) and that his most popular smartphone models start at around \$30 (which tends to be preferred by younger customers).



Phones on display at Railaco market

³ [USAID mAccess Diagnostic Tool](#)

⁴ [Worldwide mobile data pricing 2022](#)

⁵ [World Bank data](#)

⁶ [UNESCO Institute for Statistics](#)

Conversations with farmers interviewed during this assessment revealed prices for secondhand smartphones ranging from \$30 to \$110, so there may also be access to market factors at play that strongly influence prices for new and secondhand phones.



Mobile tower in Malilait village (Bobonaro)

Mobile broadband access

For the most part, all of the areas we visited during the assessment trip had access to 4G connectivity, although actual speeds varied greatly. The worst connectivity we found was in Leohito, which had only sporadic 3G connectivity. Telemor appeared to have the greatest 4G penetration in the areas we visited. Since they use cables affixed to electricity poles to connect their mobile towers to the internet, as opposed to radio wave transmission, their network is more susceptible to outages, particularly during the rainy season when high winds or fallen trees can knock down utility poles and/or sever wires. The Telemor branch manager in Ermera recognized this issue, but shared that their

maintenance teams were fairly quick to fix damaged lines. One interviewee in Dili also noted that they have observed mobile network operators periodically shutting down mobile towers in sparsely populated and low use areas to save on the costs of operating towers. While this practice does not appear to be officially acknowledged, it is something that may warrant further exploration when working in such areas.

Electricity access

Perhaps due to the fact that we were sticking mostly to established roads, every community we visited was connected to the electrical grid with the exception of one, Cruz village in Bobonaro. This is not surprising given the fact that World Bank data claims that more than 96 percent of the population has access to electricity.⁷ We met two households in Cruz village, both of which had solar panels. One household installed solar panels about five years ago, while the other only recently installed them in the past few months. The latter household shared that it is enough to power lighting and charge their phones, although since they do not have battery backup, they are often left without electricity on cloudy days.



Recently installed solar panels in Cruz village, Bobonaro

⁷ [World Bank data](#)

Mobile phone usage

Given the relatively small sample size, it is impossible to draw broad conclusions about how agriculture sector stakeholders, including farmers, traders, and agribusinesses, are using mobile phones and other forms of digital technology. Having said that, here are some of the use cases that were observed:

- Several farmers and traders made use of their phone to call buyers/sellers to coordinate with them
- A couple of farmers posted on Facebook to advertise produce they had for sale
- A couple of farmers watched videos on YouTube to learn new practices related to farming
- One female farmer was a member of a local Facebook group for farmers

Startup ecosystem and tech capacity

Three of the interviewees noted significant limitations to the startup ecosystem in Timor-Leste, particularly in relation to digital technology. They could only name a couple of local software development companies both of which primarily develop products on a contract basis, as opposed to developing, deploying, and owning products themselves. Access to technical and business know-how, as well as to financing, was seen by one interviewee to be primary constraints inhibiting the startup ecosystem.

While there are IT-related academic programs at some of the local universities, according to one interviewee, most of the top talent go to work at one of the mobile network operators, development organizations, or the government. Both of the technology companies interviewed noted having to provide significant in-house training to their local software and hardware engineers.

Potential Opportunities

Based on the key observations of this rapid assessment, there are a number of opportunities where digital technologies may potentially have value add in USAID's agriculture programming. It is important to note that the opportunities below require further market research and exploration before being implemented. It is particularly critical to understand how agriculture stakeholders are interfacing with digital technologies in the precise areas where USAID's agriculture programming will be implemented. It is also important to recognize that stakeholders' access to and usage of digital technologies will run a spectrum that will include people without access to a phone at all up to those comfortably using smartphones and able to afford unlimited data packages. Therefore, it is unlikely that a single opportunity will be broadly applicable. Efforts should therefore be taken to ensure that some stakeholders are not excluded due to differences in their digital access or ability.

Formalizing agriculture information and advisory services

All the farmers we met with during the rapid assessment had a mobile phone, which included basic phones without internet capabilities, feature phones that allow for limited internet capabilities, and smartphones ranging from low quality Chinese brands to higher quality brands, such as Samsung. Most of them were already using their phones in some capacity to access information and/or advisory services, although this was almost entirely informal and oftentimes ad hoc. It ranged from placing a phone call to a government agriculture officer to ask questions to searching for videos on YouTube or in groups on Facebook. Interestingly, radio was not mentioned as a source of information. Whether that is because no such agricultural radio programming exists, or because farmers did not find it useful cannot

be said from this rapid assessment, although it likely warrants further exploration. However, one Dili-based interviewee shared that they were not aware of any agriculture radio programming in the country. A couple of development sector stakeholders also mentioned awareness of other informally organized online information and advisory groups, such as a veterinarian who provides support to farmers via WhatsApp and Facebook groups for livestock farmers.

The fact that some farmers are already using their phones to seek out information is a positive step, although given the ad hoc and informal nature that was observed, the lack of formalization can result in farmers receiving—and potentially applying—information that is not optimized or appropriate for their circumstances. There may, therefore, be an opportunity for USAID’s agriculture activities to help to formalize this nascent space in order to increase the likelihood that farmers will receive standardized and appropriate agricultural information. The delivery of more targeted advisory services through digital means may also be possible, although doing so would require a greater investment and capable local partners to execute sustainably.

Some ideas that USAID, through its agriculture programming, may wish to pursue include:

Video production on good agriculture and nutrition practices in local languages that can be uploaded to a single YouTube channel, broadcast on television, and/or disseminated locally in communities. Videos can be produced in communities using low-cost methods, created using animation (e.g. [SAWBO](#)), or developed with high production quality (e.g. [Shamba Shape Up](#)). While video can be a helpful learning medium for anyone, it can be particularly helpful for low literate and illiterate individuals who may be more challenged to engage with written content.

A more detailed analysis of the cost-benefit of each model in the context of Timor-Leste would need to be conducted before the production and dissemination modalities are decided upon. Regardless of the modalities selected, given the growing mobile data penetration, it will make sense to have any videos developed stored on a single YouTube channel, even if that is not the primary mode of dissemination. While it may be expeditious for that channel to be run by the USAID activity directly, a better approach would be to identify a relevant in-country partner who can be supported to produce and manage such videos.

It is important to recognize that streaming videos can consume large amounts of data, and may be expensive to access for individuals who are paying by the gigabyte without unlimited data plans. It is possible to share videos from phone to phone for free via Bluetooth, where accessible, although this requires the sender and receiver to be in close proximity to each other. It may also be possible to negotiate deals with one or more MNO to host the videos on their servers and provide their subscribers with free access to them, although that would require further exploration. These options are obviously only accessible to individuals who have access to a smartphone, tablet, or computer.

Videos can also be shown locally within communities using projectors or on a tablet, which is a model that USAID has employed through its partners, such as [Digital Green](#) and others, in several countries. However, such an approach requires significant logistical planning and human resources to effectively execute. It tends to be better suited to environments where there is already on-the-ground presence in these communities that can be leveraged to help disseminate videos. While such a model could work in Timor-Leste, further analysis would be required to determine its feasibility in the local context.

Dissemination of agriculture information, such as generalized production and post-harvest tips, **via mobile messaging**. The fastest way to do this would be to simply pay one or more of Timor-Leste's three mobile network operators to push messages to farmers' phones, such as what was previously done with COVID-19 messaging. However, such an approach would be completely dependent on donor funding. There may be instances where this will be necessary in the short-term to share critical information with farmers, but it should not be considered as a long-term option. One NGO interviewed did report being able to negotiate deals with Timor Telecom and Telemor for free SMS and data (for specific websites), respectively. This approach could potentially be replicated, although there are likely limits to how many such arrangements MNOs would have.

Alternatively, USAID and its implementing partners could explore the development of [agriculture value added services \(VAS\)](#) by one or more MNOs. The VAS model is one that is already used by MNOs in Timor-Leste, whereby customers can subscribe to a service (such as daily horoscopes, TV streaming, and daily religious messages), which is often delivered by SMS (text message) or voice service. MNOs in a number of countries have also included agriculture information services as one such VAS, and the opportunity could exist to do the same in Timor-Leste. For example, Telkomsel in Indonesia (which shares the same majority owner at Telkomcel) and Mytel in Myanmar (which is also partly owned by Viettel like Telemor) both offer agriculture-related services to customers.

In order to make the case to Timor-Leste MNOs, it may be necessary for USAID, through its activities, to conduct a market opportunity analysis and/or to buy down some of the initial cost of deploying such a service, such as by developing content. While it may be expeditious for USAID's activities to subsidize the cost to deliver these services to farmers by paying the fee that the MNO would ordinarily charge its customers for using a VAS, doing so will likely have a distortionary effect and is not advisable.

Another option could be to identify organizations or businesses that already have a wide network of farmers to help them to formalize their direct-to-farmer agriculture information services. At least one cooperative already uses a cascade method of information dissemination, with a WhatsApp group that they use to disseminate information to district-level staff. In turn, many of those district-level staff have WhatsApp groups with sub-district staff in their district that they use to share information and communicate. There may be opportunities to work with organizations and cooperatives in Timor-Leste to create and promote one or more topical Facebook groups that farmers can join to learn about good practices and exchange on a peer-to-peer basis.

There may also be opportunities to formalize peer-to-peer learning and access to advisory services through WhatsApp or Facebook groups. One female farmer interviewed noted that she is already a member of a Facebook group for farmers in Timor-Leste. Although she did not recall the group's name, there may be opportunities to further build upon existing groups such as that one or to work with local partners to create more structured groups. One limitation of using WhatsApp for such exchanges is the fact that the current limit to users per group is 512—although they are [beta testing a 1,024 user limit](#)—which makes such an approach unwieldy at scale. Facebook may be more promising for larger user groups, although it tends to be more data heavy than WhatsApp, which could have cost implications for users. It is also critical for development practitioners to weigh the risks of some of the [privacy concerns](#) related to Facebook and its parent Meta, which also owns WhatsApp, with the benefits of engaging farmers using those platforms. Even if the benefits are worthwhile, it is important to make sure that

individuals understand how third-party services may use their data and to take steps to mitigate potential risk to those individuals, where feasible.

Supporting the use of digital tools to strengthen market access

Based on the limited observations and interviews conducted as part of this assessment, there appear to be a number of inefficiencies related to market access for smallholder farmers and traders, with many of the farmers and traders interviewed taking a fairly opportunistic approach to buying and selling, often based on proximity. There are several potential opportunities for digital technology to support with market strengthening activities, including:

Capacity strengthening for online marketing. A couple of the farmers interviewed had already begun advertising their produce on their personal Facebook pages. In one instance, a fish farmer reported that most of his sales came from people who found him on Facebook, whereas in the other, it was a last resort channel for a farmer when he had excess produce. There could be opportunities to work with farmers to strengthen their capacity to use social media and other online channels to help market—and potentially aggregate the sales of—their produce. Such an approach would likely not be relevant to all farmers that USAID’s activities work with, although it could be valuable to those who have produce to sell, an ability to transport it to buyers and/or having a farm that is conveniently located to potential buyers, have access to a smartphone or internet capable feature phone, and can afford sufficient mobile data to be able to check and respond to messages in a timely fashion.

Linkages to buyers. Several of the farmers interviewed noted that they sold to whoever showed up at their farm gate. This was confirmed by several traders who either bought from farmers at the farm gate or directly from farmers at the market. The unstructured nature of many of the transactions may not be optimized for either the buyer or the seller. Digital technology can potentially be used to bring more structure and efficiency to these market linkages. At a very basic level, USAID through its programs, can develop telephone directories of buyers and sellers with basic information such as location, crops grown/sought, and phone numbers. However, while such directories are fairly easy to create, keeping them up-to-date is often a more difficult task and could end up being more trouble than it is worth. A cost-benefit analysis of such an approach would need to be conducted prior to undertaking this idea.

Alternatively, there may also be opportunities to use Facebook or WhatsApp groups to link buyers to sellers. One individual interviewed noted that they are aware of a supermarket in Dili that keeps a WhatsApp group with farmers that they use to post requests for produce and coordinate sales. It could be possible to facilitate the creation of similar groups that include smaller scale buyers and traders. As trust is a big factor with any online sales, moderating such groups may be necessary at first to ensure that only vetted individuals are allowed to join.

At some point there may also be opportunities to use web- or app-based tools to facilitate market linkages, such as exist in other countries, although no current examples were identified in Timor-Leste as part of this assessment. It is also not advisable for USAID or other donor funded activities to fund the development of such solutions, as doing so would likely not be sustainable.

Access to market price information. Most of the farmers interviewed did not seem to have a clear sense of market prices and generally sold through whatever channels were most convenient. While it is impossible to say how representative this is of farmers across Timor-Leste, it is possible that having

better access to market prices could help farmers determine where to sell their produce. That is, of course, assuming that they have the ability to transport their produce and that the cost of doing so is worth it. It is important to note that whether access to market price information is actually beneficial to smallholder farmers has long been debated (see [this counterpoint](#)). It would, therefore, be important to further examine whether greater market price transparency in Timor-Leste would actually alleviate existing barriers or if it would be irrelevant.

The accuracy and robustness of existing market price information would also need further exploration. One of the interviewees mentioned that the World Food Programme supports the Ministry of Agriculture and Fisheries (MAF) to collect market price information. That information is then disseminated to organizations in Dili by hardcopy. If that data is accurate, frequent, and geographically diverse enough to be of value to farmers, USAID's activities or other development organizations could support MAF to disseminate this information more broadly through SMS, social media, or messaging services (like WhatsApp). If MAF lacks the interest and resources to do so, dissemination could be led by a third-party, although data sharing arrangements with MAF would need to be agreed upon and there would need to be a long-term plan in place to ensure sustainability of the third-party model.

Building out the use case for digital financial services

Digital financial services are still fairly new in Timor-Leste, with Telemor and Telkomcel only releasing mobile money products in the past couple of years, Mosan and T-Pay, respectively. Uptake of these services appears to be fairly limited at the moment, and use cases are limited to person-to-person transfers, electricity payments, mobile top up, and very limited merchant payment options.

Yet despite still being new and underdeveloped, there is already some initial uptake in the development sector. FAO is reportedly using T-Pay to pay the salaries of interns at the Timor Leste Organic Fertilizer (TILOFE) cooperative, with one intern reporting that they liked receiving their money that way since it was much less bureaucratic (presumably compared to dealing with a bank). One NGO also has plans to test cash transfers using T-Pay in early 2023, and one cooperative has expressed interest in paying their farmers using mobile money.

Consistent with [USAID Procurement Executive's Bulletin No. 2014-06 on Guidance for Electronic Payments under USAID awards](#), **there is an opportunity for USAID's activities to also begin testing out the use of mobile payments in lieu of cash for field-based payments** across its portfolio, not just within its agriculture programming. This is a model that has been tried by several other USAID Missions, including in Bangladesh, which encouraged its activities to digitize all field payments for things like training expenses.⁸ By being one of the early adopters of mobile payments, USAID's activities can indirectly help build out the infrastructure and use cases for such services, which may then directly benefit farmers and other agriculture sector actors down the road.

In addition, the DFAT-funded Paseria Ba Prosperidade Inkluzivu/Partnership for Inclusive Prosperity (PROSIVU) activity has been supporting the Government of Timor-Leste with the implementation of the [Unique ID project](#), which will allow for the creation of digital identification with biometric data points. As

⁸ A wealth of information from the experience with digitizing payments in USAID's activities in Bangladesh can be found here: <https://www.marketlinks.org/resources/mstar-mobile-solutions-technical-assistance-and-research-activity-profile-bangladesh>

having an approved form of identity is a precursor to opening a mobile wallet, it is possible that Unique ID will make it easier for citizens to open accounts once it is fully implemented, not to mention providing access to any number of other services that require identity verification. While not something that is likely to be immediately actionable, the development of Unique ID and its use cases are worth tracking.

Supporting the use of digital technology for improved business processes

Based on the limited interactions in this assessment, it would appear that a significant amount of business processes and recordkeeping is still being done on paper. While paper has its benefits, digital technologies tend to offer more efficiency in terms of both storage and analysis. Helping agribusinesses to digitize their business processes will likely yield tangible economic benefits, if done properly. Two immediate opportunities in this space include:

Introduction of digital traceability solutions. Conversations with one cooperative revealed that their fair trade and organic certification processes are done entirely on paper. Keeping track of all of these paper-based forms and receipts can require a fair amount of resources, can be slower to verify, and at risk of damage or manipulation. There could be opportunities for USAID to provide technical support and capacity strengthening to relevant agribusinesses and cooperatives on the introduction of digital traceability solutions to manage certifications. There are already a number of off-the-shelf solutions that exist, some of which, like [Fairfood](#), pay farmers a data premium for sharing information digitally. USAID, through its implementing partners, could help cooperatives and other export-oriented agribusinesses to identify and test the most appropriate traceability solution for their needs.

Continued support for training on digital productivity tools. Through the Farmer-to-Farmer program, USAID has provided hands-on training to several small agribusinesses on the use of Quickbooks for accounting. As more small agribusinesses in Timor-Leste gain access to digital devices, there will likely be additional opportunities to strengthen their capacity on how to use productivity tools, like Quickbooks, Excel, and others, in ways that help them to better manage their businesses. Depending on the level of demand, this type of support can continue to be done on a one-on-one basis or could potentially be expanded into more structured trainings and technical support for a larger number of individuals and businesses.

Supporting Timor-Leste on development of digital agriculture strategic action plan

The PROSIVU activity has been supporting TIC Timor, the government's Information and Communication Technology Agency under the Prime Minister's office, to develop a National Strategic Plan for Digital and ICT Development through 2032. While this plan has not yet been approved by the government, one of its proposed strategic pillars is agriculture. Assuming the plan is approved, there could be opportunities for USAID and its agriculture programming to contribute to the development of the digital agriculture strategic action plan that would be a follow on to the approved national strategic plan.

Things to Consider Moving Forward

Timor-Leste's digital landscape appears poised to make significant gains over the next few years, likely bolstered by anticipated legislative reforms—some of which were supported by USAID's Accelerating Timor-Leste's Autonomous Telecommunications Landscape (ATL ATL) activity—and the landing of a new submarine cable from Australia, which is expected to go live in 2024. In addition, any progress around

shared infrastructure, including operationalizing existing dark fiber capacity⁹, could potentially help expand access to mobile internet while also reducing prices. While it is unclear what, if any, progress will be made on this front, it is an area worth tracking.

Yet even with these advancements, there will likely be a lag in terms of access, affordability, and digital literacy. Unlimited access to the internet on a high quality mobile device still remains out of reach for most smallholder farmers in Timor-Leste due to current costs. Lower-end, yet more affordable smartphones, many of which are produced in China, often offer limited functionality due to their scaled down nature and use of older Android operating systems. Furthermore, the current cost of mobile data can limit the extent to which individuals can afford to use online services, particularly bandwidth heavy ones such as YouTube. Digital literacy skills, which are often self-learned through user experience, can also be inhibited by limited access and use cases. Furthermore, building a large and technically competent cadre of software engineers and IT specialists within the country will take time, meaning that a robust startup ecosystem will not be built overnight.

While USAID has provided ecosystem level support through its ATLATL and Powering ICT activities, directly targeting these broader barriers would likely be outside of the scope of USAID's agriculture programming. That said, there are some steps that USAID's agriculture activities can take to effectively and responsibly leverage digital technology in ways that are contextually appropriate.

Focus on inclusion. Within the limited scope of this assessment, there did appear to be some differences in terms of mobile access by age (e.g. younger people were more likely to have smartphones, whereas those over 50 were more likely to have basic or feature phones). On the other hand, there were no clear differences in terms of gender. In one household, the wife owned a smartphone, while the husband had only a feature phone. Such a small sample size, however, should not form the basis of decision making. Prior to making any decisions about how to use digital technology in agriculture programming, it will be important for the implementing partner to assess the state of access, affordability, digital literacy skills, and usage across a broad spectrum of project participants. This should include focus on potential differences related to age, gender, ability status, education level, ethnic groups and language in order to parse out what groups may be more or less likely to fully use digital technologies. Understanding the general usage patterns and any variance will help the activity align any digitally-enabled interventions to where users are, as well as to develop any differentiated approaches to reduce the likelihood of excluding those with lower levels of access.

Strongly consider privacy and security. Many of the individuals that USAID's agriculture programming works with are likely to have only recently started using digital devices and online services. As such, they may not have a rich understanding of the privacy and security risks that may exist from, for example, posting their phone number and address on a public Facebook group or opening a file shared with them in WhatsApp. In addition, they may have limited knowledge about what types of data online service providers collect about them and how it is used. Making sure that any individuals that USAID engages with have a full understanding of the risks and privacy considerations associated with their using any digital tool is of utmost importance.

⁹ Timor-Leste: Powering Information Communication Technology Political Economy Assessment (May 2022)

Follow the [Principles for Digital Development](#). These nine principles, which USAID helped establish, have been endorsed by more than 300 organizations globally and offer tested guidance for effectively and responsibly using digital technology in the context of development. While each principle is important, those focused on designing with the user, building for sustainability, addressing privacy and security, and being collaborative are particularly relevant in the context of Timor-Leste.

Find a market fit. In countries with underdeveloped digital ecosystems, it can be tempting for donor-funded projects to choose the most expeditious path, which is to develop and deploy digital solutions themselves. While there is no doubt that this can often be the fastest and easiest (in the short-term) way to bring a product to market, experience shows that this is very rarely a recipe for long-term success. Handing off a donor-funded digital solution to a local entity, such as a government agency, is rarely straightforward or easy. While there may be instances where donor funding is necessary to subsidize the development or deployment of a digital solution, it should be done in a way that is aligned with market forces. Ongoing donor subsidization is generally not a viable pathway, so finding the right business model is critical to increasing the likelihood of long-term success. Such pathways can include for-profit, non-profit, or government-led models. The key factor is that there is a locally-based owner of the digital solution with a business model that can exist independent of ongoing donor support.

Learn from elsewhere, but apply contextually. As there are not yet many examples of digital agriculture solutions in Timor-Leste, a lot can be learned about what has worked (and not worked) elsewhere. USAID has compiled a number of resources related to [digital agriculture](#) that may be of use, along with others such as the [FAO's e-agriculture site](#), the [World Bank's Digital Agriculture Learning Series](#), and others. These can serve as inspiration, although generally there are no cut-and-paste solutions so it is still critical to find a contextually appropriate fit for Timor-Leste.

Consider including digital literacy skills strengthening along with other types of capacity strengthening. As Timor-Leste's digital economy grows, the individuals that USAID's agriculture activities work with will likely find themselves interfacing with digital technology more and more. Therefore, it may be beneficial for activities to include a focus on strengthening digital literacy skills as part of their broader capacity strengthening focus. This should be the case even if the activity is not explicitly using digital technology directly with project participants. [USAID's Digital Literacy Primer](#) is a great place to start to learn more about how to do this.

Annex 1: List of Interviews

Organizations/Companies

Organization name	Type	Website
TOMAK (To'os ba Moris Di'ak, or Farming for Prosperity)	Development project	https://tomak.org/
Australia Department of Foreign Affairs and Trade (DFAT)	Donor	https://www.dfat.gov.au/
TIC Timor	Government agency	https://www.tic.gov.tl/en
Minister of Tourism, Commerce and Industry	Government agency	Ministério do Turismo, Comércio e Indústria – Ministério do Turismo, Comércio e Indústria (mtci.gov.tl)
Paseria Ba Prosperidade Inkluzivu/Partnership for Inclusive Prosperity (PROSIVU)	Development project	
CRS	Development partner	https://www.crs.org/our-work-overseas/where-we-work/timor-leste-east-timor
Mercy Corps	Development partner	https://www.mercycorps.org/where-we-work/timor-leste
Similie	Technology company	https://similie.org/
Catalpa	Technology non-profit	https://catalpa.io/
Telemor, Gleno Branch office	Mobile network operator	
Telkomsel, Gleno Branch office	Mobile network operator	
Cooperativa Café Timor (CCT)	Cooperative	https://hamutuk.tl/en/profiles/organisation/CCT/
Timor Leste Organic Fertilizer (TILOFE)	Cooperative	<ol style="list-style-type: none"> Facebook Page Facebook Group

Individuals

Type of Respondent	Age	Gender	Location
Phone vendor	20s	Male	Railaco market, Ermera
Trader (vegetables)	55+	Male	Railaco market, Ermera
Trader (vegetables)	35-40	Female	Railaco market, Ermera
Trader (vegetables)	60+	Female	Railaco market, Ermera
Farmer (vegetables)	40	Male	Estado village, Ermera
Farmer (coffee)	15	Male	Estado village, Ermera
Farmer (fish)	20s	Male	Estado village, Ermera
Trader	50-60	Female	Letefoho market, Ermera
Small shop owner	30	Female	Malilait village, Bobonaro
Farmer (vegetables)	61	Male	Maliana, Bobonaro
Farmer (vegetables)	50+	Male	Maliana, Bobonaro
Farmer (vegetables)	23	Male	Maliana, Bobonaro
Farmer(vegetables/live stock)	60+	Female	Maliana, Bobonaro
Farmer	38	Male	Cruz village, Bobonaro
Farmer (same household as above)	30s	Female	Cruz village, Bobonaro
Farmer	30s	Female	Cruz village, Bobonaro
Farmer (fish)	39	Male	Leohito village, Bobonaro