OPPORTUNITY PROFILE FOR DIGITAL CLIMATE ADVISORY AND BUNDLED SERVICES (DCAS+)

- Ayeyarwady Delta, Myanmar

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Introduction

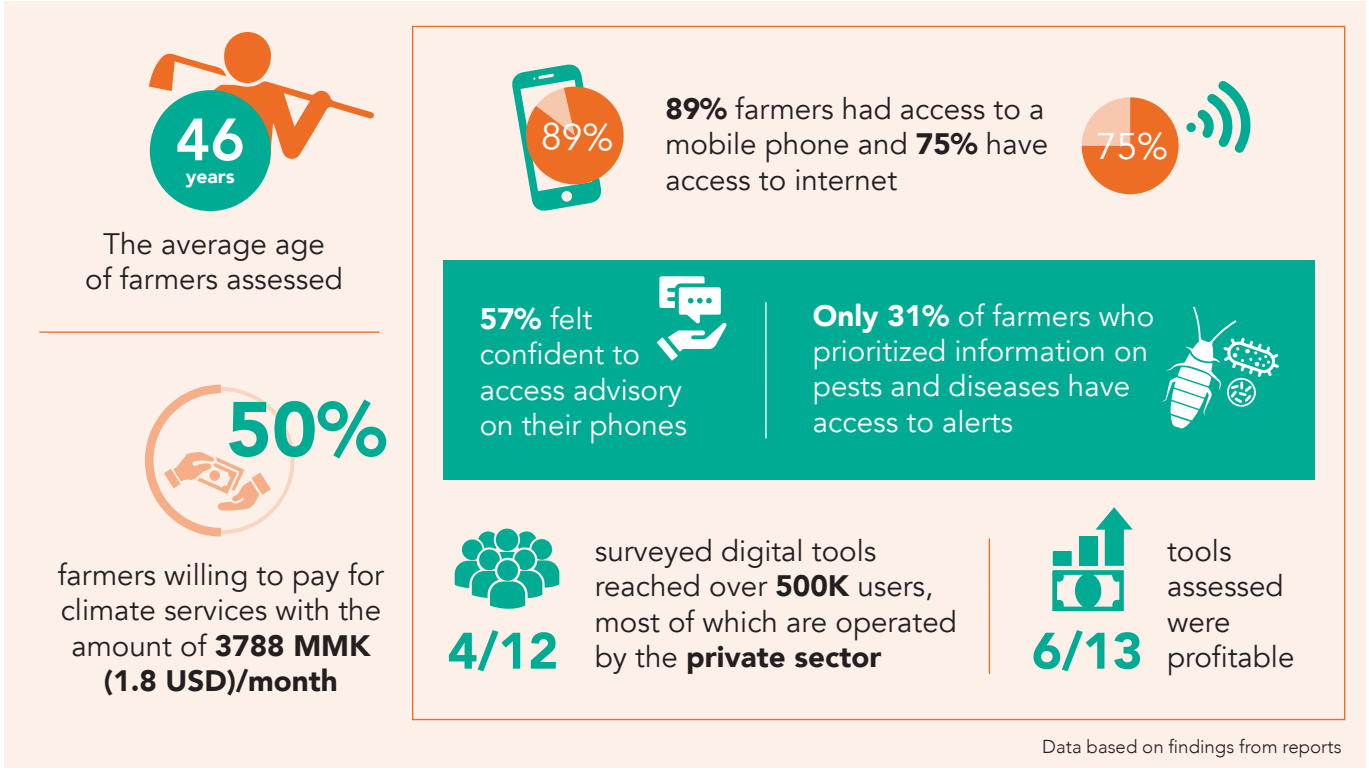
Digital Climate Advisory and Bundled Services (DCAS+) are vital innovations in the agriculture sector, particularly for Low and Middle-Income Countries (Phatty-Jobe, 2020). They provide farmers with timely information on weather conditions and management practices to enhance productivity and resilience against climate challenges (Kumar, 2021). Their importance is underscored by their ability to significantly reduce losses and increase yields and incomes, especially when combined with other services such as market linkages and financial products and services (Tsan et al., 2019; WBCSD, 2021). Yet, their adoption and long-term sustainability face challenges.

This profile summarizes key findings from our research on DCAS+ in Myanmar's Ayeyarwady Delta region. The study, part of CGIAR's Asian Mega-Deltas Initiative on de-risking delta orientated value chains, employed a mixed-method approach including desk studies, key informant interviews, focus group discussions, household surveys, and online surveys. The full results are organised into the following reports:

1. **Value Chain Climate Risk and Vulnerability Assessments (VC-CRVA):** Analyzing key delta-oriented value chains (rice, pulses, rice-fish) to understand climate risks, vulnerabilities, and the demand for (digital) climate services. (Thant et al., 2023a,b,c)
2. **Digital Landscape Assessment (DLA):** National level mapping of digital tools, identifying data sources, and exploring advisory services dissemination channels, users, and business models. (Giles et al., 2023)
3. **User Needs Assessment (UNA):** Surveying farmer households (392 hh, 30% female sample) in three districts (Maubin, Kyonpyaw, Pyapon) covering priority production systems, to understand the farming system dynamics, climate information needs, digital tool access and use, and willingness to pay for DCAS+. (Thant et al., nd)

Additional references are used where relevant to support key findings.

This profile provides insights into the current situation and opportunities for DCAS+ in the Ayeyarwady Delta, Myanmar, with many of the identified opportunities being applicable at the national level. The document starts with an introduction to the study area and key delta-oriented production systems (rice, pulses, rice-fish), followed by the key research findings. It concludes with practical opportunities for enhancing the DCAS+ ecosystem, focusing on scaling and equitable access. Reviewed and refined by key stakeholders, this profile aligns with the field's real-world experiences and knowledge, ensuring its relevance and accuracy.



Agriculture and key production systems

Myanmar is extremely vulnerable to the impacts of natural hazards, which have been increasing in frequency and severity due to climate change. The major hazards facing the county include severe floods, storms, and droughts (MIMU, 2022). These hazards continue to erode the adaptive capacity of effected communities, further diminishing their capacity to cope with future events. It has been estimated that many of the communities in Myanmar take up to 20 years to return to their pre-disaster state (MIMU, 2022). Ecosystem degradation, underdevelopment, and conflict also contribute to rising levels of vulnerability in the country (MIMU, 2022). Natural disasters are costing Myanmar up to 3% of GDP annually, while killing thousands and displacing many more (United Nations Office for Disaster Risk Reduction, 2015)

The Ayeyarwady Delta region is identified as one of the most vulnerable in Myanmar, due to the spectrum of hazards faced. As a low-lying, sinking delta region, it is highly susceptible to sea-level rise, inundation from storm surges, increasing salinization of groundwater, and wind damage from cyclones (Besset et al., 2017; Seeger et al., 2023; Syvitski., 2009). The degradation of mangrove forests along the coastal belt is further exacerbating the impact of these hazards (MIMU, 2022). The delta districts are also some of the most prone to drought conditions, with severe impacts on crop production (FAOASIS, no date).

The impacts of climate hazards are felt acutely by smallholder farmers both in the Ayeyarwady Delta, and across the country. The delta is one of the most important rice growing areas in the country, making it critical for national food security (Schneider and Asch, 2020). Beyond rice it is also an important producer of pulses and has seen in recent years an expansion of farmers practicing rice-fish farming (Gonsalves et al., 2022). However, farmers across Myanmar are finding themselves struggling under the burden of climate shocks and an economic crisis that has gripped the country (Gonsalves et al., 2022).

Myanmar looks to support the agriculture sector through strategies that aim to enhance crop productivity, establish market connections, and implement climate change-related measures. These include cropping system adjustments, stress-tolerant plant varieties, and water use efficiency optimization. These commitments are evident in key policies such as the Myanmar Agriculture Development Strategy and Investment Plan, the National Export Strategy, the Myanmar Climate Change Strategy, and Myanmar's Climate Smart Agriculture Strategy (Gonsalves et al., 2022).

Key findings

Farmers and value chain actors across the Ayeyarwady Delta are highly susceptible to climate variability and are increasingly relying on a range of non-traditional climate services to meet their information needs.

- **The ongoing political situation in Myanmar has restricted farmers access to traditional in person extension support, creating opportunities for a growing number of digital advisory services.** The prevailing political turmoil in Myanmar restricts the mobility of extension agents in rural areas, diminishing farmers' access to vital climate information, crop advisories, and capacity development. These findings were supported by the results of the user needs assessment which found that farmers in Myanmar made most farming decisions themselves or in consultation with other family members, with very little input from other actors. Farmers are however, increasingly resorting to alternative providers for climate advisory services, fostering opportunities for non-governmental digital climate advisory service providers.

- **A discernible demand for climate advisory services exists throughout key commodity value chains in Myanmar.** This demand arises in response to the direct impact of climate variability, unpredictable rainfall and flooding, on agricultural activities and the consequential disruptions at various stages of the value chain.

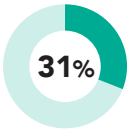
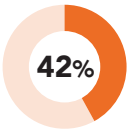
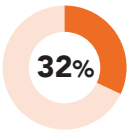
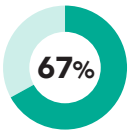
  - **Short-term forecasts -** are required by stakeholders across the value chain to facilitate their operations. Forecasts and early warnings for high temperatures, rainfall, and flooding are useful for seed producers and farmers to maintain better seed quality and yield, as well as to prevent fish and crop losses. Linked advisories support farmers to respond by implementing effective management practices (e.g., adjusting time of sowing and harvesting of crops, and repairing and raising pond embankments to protect fish stocked in rice-fields). Short term forecasts also support downstream actors to adjust their activities (e.g. transportation, processing, and storage) in response to adverse weather conditions.
  - **Longer-term seasonal forecasts -** are crucial for input providers to gauge customer demand, allowing them to stock resources appropriately (e.g., temperature-tolerant fish and crop varieties). Traders, collectors, processors, and machinery providers also seek long-term forecasts to anticipate product quantity and quality, enabling strategic planning for transport, storage, and processing in alignment with prevailing conditions (e.g., transport volume, cold storage, drying, packaging). Furthermore, long term forecasts are utilised by weather index-based insurers and microfinance institutions to assess their risk exposure and calibrate their lending models.

Most of the existing services in Myanmar are focused on production, overlooking the needs of other value chain actors. This oversight has resulted in high levels of post-harvest losses and spoilage.

Icons indicate which of the key source documents the findings have been taken from:

Value Chain Climate Risk and Vulnerability Assessments (VC-CRVA) | Digital Landscape Assessment (DLA) | User Needs Assessment (UNA)

Table 1: Results on priority agro-climatic services, current levels of access, and key information. Priority refers to the % who rated the service as one of the top 3 agro-climatic services they need. Access is the % of those who prioritized the service that currently have access.

Agro-climatic services	Priority	Access	Key information
Pest and disease alerts			• When and how to spray pesticides • Type of pesticides • Risk of pest and disease outbreak
Weather forecast			• Rain • Temperature • Wind
Market information			• Current prices (products) • Market access • Input prices
Technical agricultural advisory during season			• Advice on sowing/planting date • Fertilizer application • Harvesting
Seasonal forecast and advisory			• Weather for whole season • Potential climate hazards
Early warning of extreme weather events			• Heavy rain • Storm • Flood

A significant gap exists between the services that Myanmar's farmers and agricultural practitioners need and what is currently available.

- **Myanmar's farmers find government-provided forecasts and advice poorly aligned with their needs, despite these being a primary sources of climate advisory.** Farmers mainly access climate information through the Department of Meteorology and Hydrology (DMH) via TV, radio, and Facebook. Farmers report that DMH forecasts are not localized, difficult to understand, and do not include relevant agricultural guidance. While some technical advice is available on government websites, it is often inaccessible and not tailored to farmers' specific needs.

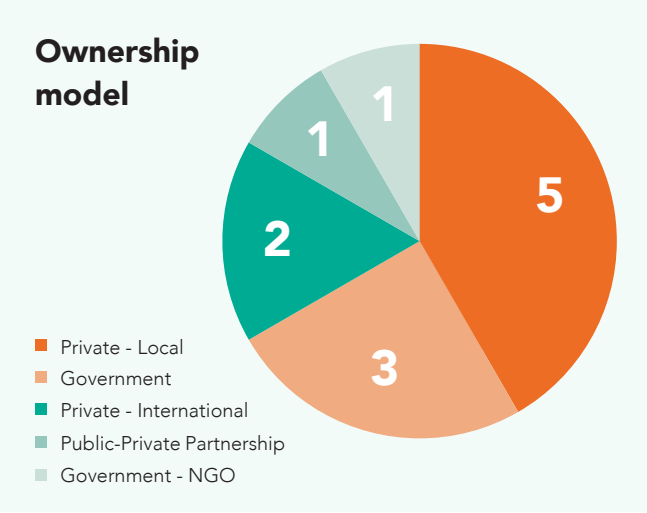
- **A survey of farmers in Myanmar revealed that pest and disease alerts, weather forecasts, and market information are the most important services to support their activities (Table 1).** However, their access to these services remains limited. Of those who identified pest and disease alerts as important, fewer than 40% of rice and pulses farmers, and less than 20% of rice-fish farmers currently have access.

- **The assessed climate service tools often offer advisory services that are generic, outdated, and lack specificity.** They typically cover generalized best practices in areas like crop management, growth monitoring, and pest and disease control, yet many farmers report limited access to these services. Advice on market linkages – encompassing transportation, market actor connections, and processing and storage – is scarce. Aquaculture advice, particularly on stocking density and feeding management, is also notably insufficient.

The growing ecosystem of digital tools offers a broad array of services through multiple channels, supported by a variety of business models.

- **In Myanmar, the landscape of Digital Climate Advisory and Bundled Services (DCAS+) consists of a mix of tools developed by both private companies and government agencies (Chart 1).** It is noteworthy that among the four tools that have reached over 500,000 users, three are run by private companies. These tools mainly provide information on climate, weather, and agricultural practices, with only a few offering market data. Specifically, five tools – the Htwet Toe app, Armo Agri app, SEAD app, Su Su San Facebook page, and the Wisara Facebook page – offer a comprehensive range of information, including climate, weather, and market data. The weather forecasts provided by most tools are sourced from global, open-access providers like Weather Impact and AccuWeather. Market information, which includes data on input and commodity selling prices, is typically collected by the Agriculture and Market Information Agency (AMIA) or the Department of Planning.
- **Dissemination methods for tools varied with service types and target users.** Climate and weather tools often used mass media - TV, radio, websites, and Facebook - for broad outreach. For example, Su Su San, a popular Facebook page with 1.2 million followers, provides downscaled forecasts to followers. Tools offering personalized services opted for app-based communication. Despite a clear preference among farmers for in-person interactions, current political conditions limit such activities, leading to increased reliance on call centres and message boards for remote but personal engagement.
- **Private sector tool providers in Myanmar are exploring bundled services to boost user engagement and create revenue streams.** Common bundles include market access, price information, input services, mobile banking, and microfinance. Improving credit access through microfinance partnerships could address investment shortfalls in the value chain. User attraction is bolstered by integrating comprehensive value chain information, including input origins and logistics with cold storage solutions. While the most successful models generate revenue through market connectivity, others rely on user data sales and advertising. However, the dependency on project funding for many tools jeopardizes their long-term viability and discourages significant investment, with providers struggling to secure the necessary funds for service maintenance and expansion.

Chart 1: Breakdown of tools by ownership model.



Case study 1: Access to finance challenges

In Myanmar, smallholder farming households are increasingly hesitant to seek loans from Microfinance Institutions (MFIs) and banks, limiting their ability to invest in advanced inputs and technologies. While some larger farmers attempt to secure financing through MFIs and banks, they often encounter obstacles. This issue is particularly acute for fish-farmers, who face significant difficulties in obtaining loans due to the scarcity of lenders willing to finance fish farming. A major barrier is the lack of proper permits (Form 30) required for converting arable land into fish farms, leading MFIs and banks to deny loans without the necessary documentation. Furthermore, there is a risk of land confiscation by the government if unauthorized conversions are discovered. Consequently, farmers are increasingly turning to community-based financing models, such as revolving funds or in-kind credit from input suppliers, as more viable alternatives for funding. Cooperatives are also helping to bridge the credit gap, offering their members loans on the condition that they deposit 10% of the loan amount upfront as compulsory savings at the time of disbursement. However, they often lack the funds to meet their members borrowing needs (Karim, 2020).

Case study 2: Faltering connectivity

Myanmar presents an unusual scenario where internet penetration has declined recently, attributed to significant increases in mobile data costs and localized internet shutdowns. Additionally, the prevalence of low-quality Chinese smartphones poses compatibility issues, often lacking GPS functionality and restricting the range of downloadable apps. To mitigate these challenges, DCAS+ providers are exploring enhanced SMS and voice based solutions to expand their outreach effectively.

Persistent obstacles like digital literacy, gender constraints, and economic limitations, hinder farmers' use of DCAS+ tools.

- **Digital applications show immense potential, with 89% of surveyed farmers having mobile phone access and 75% internet access.** However, many farmers still face challenges including digital literacy gaps, poor rural internet connectivity, and rising data costs. Surveys indicate pulse and rice-fish farmers hold more positive views of digital tools than rice farmers, likely due to higher education and income levels.
- **Gender was found to influence the access to and use of climate advisory services, which should be considered for future service development.** A higher proportion of male respondents were found to make decisions independently when compared to female respondents, who tended to jointly make decisions with other household members. The results did however show that women were heavily involved in the decision-making process for a range of agricultural activities. There were similar levels of mobile phone use by men and women, but men were more likely to use it for accessing the internet (social media and apps). This could be explained by the results of a WorldFish survey which found higher levels of illiteracy amongst female farmers limiting their ability to engage with applications, and a general reluctance of women to share details online under the current political situation. Furthermore, hikes in mobile data prices have driven many families to only pay for a single mobile data package, often on the man's phone.
- **Farmers were mixed in their willingness to pay for climate services. Half of farmers were not willing to pay for the service, believing it should be provided for free.** Other challenges cited include not having digital devices (not supported by data on smartphone ownership), preferring to use existing free sources, and challenges in understanding the information. Of the 50% of farmers who were willing to pay for the service, they indicated they would be willing to pay 3788 MMK (1.8 USD)/month, with rice farmers having a lower willingness to pay.

Opportunities

1. **Sustain and enhance support for existing services.** The situation for smallholder farmers in Myanmar continues to be extremely precarious, with households facing unprecedented challenges linked to the faltering economy, a reduction in support services, and continued climate vulnerability. The current DCAS+ in Myanmar have proven themselves to be a critical lifeline for farming households but have increasingly been struggling to generate sufficient funds to maintain their services due to large reductions in grant funding. This presents a vital opportunity to bolster and improve DCAS+ through increased grant support. While developing a sustainable business model is crucial for the long-term viability of DCAS+, the challenges faced by Myanmar's farming community necessitate a short-term strategy to address their immediate needs.

2. **Opportunity for broad-based awareness campaigns to increase DCAS+ uptake.** Initiating wide-reaching awareness campaigns presents an opportunity to significantly increase the uptake of DCAS+. By utilizing a multi-channel approach—including social media platforms like Facebook, Viber, and Telegram, along with state and regional TV and radio broadcasts, farmers' journals, community notice boards, and NGO networks—there is potential to reach farming households unaware of available climate information and advisory services, thereby enhancing their resilience and productivity.

3. **Development of bespoke forecasting products to support pest and disease forecasting and flood early warning systems.** Two key areas where practitioners and farmers identified a need for additional information is on pest and disease forecasting and flash flood early warning. This presents an opportunity for development partners to provide technical assistance to private providers and national institutions in conducting secondary analysis on short- and medium-term forecasts to generate early warning mechanisms for pests, diseases, and flooding.

4. **Broaden the scope of DCAS+ to support farming households in managing market shocks and food shortages.** The political climate in Myanmar is significantly affecting the economy, leading to substantial volatility in the prices of agricultural inputs and outputs. This situation presents an opportunity for DCAS+ providers to extend their advisory services beyond climate change responses and include guidance on navigating market price fluctuations. Additionally, with the cost of a healthy diet soaring by 80% in the last 18 months, leaving 25 million unable to afford proper nutrition, there is a critical need to offer advisories on nutrition conscious farming practices and consumption recommendations to help households manage their food security and dietary health. This should be achieved by exploring promising partnerships to expand the scope of the advisory offered.

5. **Develop a centralized database for technical advisory.** The creation of a centralized, open-access repository for technical advisory documents offers a significant opportunity to enhance the quality and efficiency of advisory services provided to farmers. By reducing duplication of effort among DCAS+ actors and lowering costs, this initiative could streamline the dissemination of critical advisory information, tailored to specific times in the crop cycle and particular conditions, thereby improving decision-making amongst farmers.

6. **Enhance DCAS+ tools with market and credit access.** There is considerable scope to develop DCAS+ tools that not only offer climate and agricultural advisories but also facilitate access to connected markets and

credit facilities. Given the challenges faced by farmers in accessing and affording high-value inputs and adopting stress-tolerant crop and fish varieties, these enhanced tools could play a crucial role in ensuring that advisories are actionable, supporting the transition to improved production methods and contributing to the overall resilience and sustainability of the agricultural sector. Such tools would need to be conscious of the numerous constraints faced by farmers and the reasons for their reluctance to engage in formal lending markets. An example of such a model is pre-credit scoring of fish farmers by DCAS+ provider Village Link, for referral and further assessment by MFIs as part of a joint collaboration.

Conclusion

In conclusion, the challenging conditions faced by Myanmar's smallholder farmers demand a comprehensive strategy to bolster agricultural support services. Strengthening DCAS+ through financial and technical support is imperative to meet the urgent needs of these farmers and build their long-term resilience. A strategic blend of awareness campaigns, advanced forecasting, and expanded advisory scope will improve the uptake and sustained use of DCAS+, while integrating market and credit access is essential to foster productive agricultural value chains. Collectively, these efforts will advance sustainable agricultural practices, enhance food security, and boost smallholder incomes.

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