



Commercial Agriculture for Smallholders and Agribusiness

Driving Adoption beyond Access to information: Digital and data-driven agri- services in Ethiopia

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March 2026



**UK International
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DIGITALISATION AND DIGITAL AGRICULTURE IN ETHIOPIA

Ethiopia is undergoing a profound moment of digital transition. Guided first by the Digital Ethiopia 2025 Strategy¹ and now reinforced through the newer, though still unpublished, Digital Ethiopia 2030 framework, the country has placed digital transformation at the center of its economic modernisation agenda. This national shift is visible in the expansion of connectivity, the development of digital public infrastructure, and the emergence of an increasingly vibrant ecosystem of local technology innovators. Within this broader landscape, agriculture, still the backbone of rural livelihoods, has become a strategic priority for digitalisation. Policymakers see digital tools not only as a pathway for modernising food systems but also as a means of strengthening extension services, improving market efficiency, and enhancing climate resilience.

Digital and data-driven agricultural services in Ethiopia now span a wide spectrum: advisory algorithms and weather alerts; production monitoring tools; digital payments and mobile money; input-credit scoring; mechanisation booking platforms; supply-chain traceability systems; and contracting tools that link farmers to buyers. Yet the value of these tools lies not in the data alone, but in how effectively they reshape incentives, reduce risks, and enable coordinated participation in markets.

This direction is articulated clearly in the Digital Agriculture Roadmap (DAR) 2032² developed by the Ministry of Agriculture (MoA) and the Agricultural Transformation Institute (ATI). The roadmap provides a coordinated vision for how digitalisation can be woven into the fabric of Ethiopia's agricultural sector. It calls for more precise and responsive advisory systems, supported by AI and data analytics; a national farmer registry capable of underpinning targeted services and credit assessments; digital market ecosystems linking producers with buyers, input suppliers, and logistics providers; and a governance framework that enables secure, interoperable, and equitable data use. Moreover, the DAR emphasises the need for strong institutions and inclusive digitalisation efforts so that women, youth, and remote communities fully benefit from new technologies.

Despite these ambitious plans, the reality on the ground remains uneven. The number of digital agriculture solutions has grown from mobile-based advice and e-commerce platforms to digital financial tools and cloud-enabled analytics, but their uptake is far from uniform. Many smallholder farmers still lack access to smartphones or affordable mobile data. Digital literacy gaps persist, and gendered norms continue to limit women's participation in digital spaces, both as users and as decision-makers. At the same time, agricultural value chains remain fragmented and heavily intermediate, which limits the ability of digital platforms to reliably connect farmers with services or markets.

1. Digital Ethiopia Strategy 2025 <https://www.gdop.gov.et/pdf-resources/download/18/>

2. Digital Agriculture Roadmap 2032 moa.gov.et/wp-content/uploads/2025/04/Digital-Agriculture-Roadmap-Ethiopia.pdf

Ethiopia's digital transition therefore holds significant promise, but realising this potential requires more than simply increasing the availability of technology. It demands targeted efforts to close access gaps, address structural inequalities, and build the institutional and market capabilities necessary for sustained adoption. As global research and Ethiopia's own experience show, access to information alone rarely shifts farmer behaviour³. Farmers integrate digital tools into their practices when those tools reduce risk, raise incomes, create dependable market opportunities, and are reinforced through trusted intermediaries such as local agents, extension officers, cooperatives, and aggregators. Digital agriculture succeeds not because an app is available, but because the broader system of markets, incentives, norms, and governance structures aligns in ways that make the tool relevant and reliable.

The digital innovations emerging from CASA's partnerships with ChipChip, Lersha/GAS, and Bio-safe Bio Fertilizer Manufacturing Company illustrate how Ethiopia's digital agriculture sector is evolving. These cases show that digital transformation is not simply about putting information into farmers' hands. It is about building ecosystems that connect technology with trusted relationships, integrated service bundles, and predictable market structures. They offer a window into what it means to move digital agriculture beyond access to information and toward real behavioural and systems-level change.

A CATALYST IN THE MIDDLE: HOW CASA SUPPORTED DIGITAL TRANSFORMATION

CASA's experience in Ethiopia illustrates this shift from information provision to behavioural change with striking clarity. Working within the momentum created by national digital strategies and the growing potential of data-enabled agricultural services, CASA partnered with [ChipChip](#), [Green Agro Solution/Lersha](#), and [Bio-safe Bio Fertilizer Manufacturing Company](#). Across these partnerships, a common pattern emerged: digital tools that began as simple information channels inevitably evolved into integrated, data-driven service ecosystems. They combined digital technologies with human support networks, climate-smart advisory services, financial inclusion mechanisms, structured contracting arrangements, and deliberately designed behavioural incentives that encouraged farmers to try and then adopt new practices.

Through this evolution, CASA observed that digital agriculture becomes meaningful only when it addresses the deep-rooted constraints that shape farmer decisions: risk exposure, market volatility, limited bargaining power, and the ongoing challenge of identifying trustworthy partners. In other words, successful digital adoption is not driven by technology alone but by the orchestration of systems that make technology relevant, reliable, and rewarding to use.

Across Ethiopia, many digital agriculture pilots begin with promise yet falter before they reach scale. Some operate within weak organisational systems; others lack sustainable revenue models or enter fragmented value chains where digital platforms cannot reliably connect farmers to markets. Recognising these structural barriers, CASA stepped in as a strategic catalyst, helping its partners bridge the gaps among technology, market incentives, and institutional capacity.

3. Valverde, Alvaro 2020 [Information and Communication Technologies for Improving Investment Readiness of Small and Medium Agribusinesses](#). CASA.

CASA's support extended far beyond technical fixes. It included strengthening internal governance systems; co-developing commercially-viable service bundles; conducting market and value chain diagnostics; designing gender-responsive strategies; building engagement models for farmers and agents; co-creating incentives that reduce adoption risks; and brokering relationships with cooperatives, offtakers, financial institutions, and regulatory bodies. These interventions helped each partner evolve from being primarily a technology or information provider into a trusted agricultural service actor capable of influencing real farmer behaviour.

This catalytic role laid the groundwork for the digital innovations that followed. By reinforcing organisational foundations, clarifying business models, and anchoring digital tools within coordinated market relationships, CASA enabled its partners to move beyond simply delivering information toward facilitating sustained, trust-based adoption. In each case, farmers began to use digital tools not because they were novel, but because they were valuable tools that reduced uncertainty, improved income prospects, expanded market access, and were reinforced through trusted intermediaries.

In effect, CASA's pilots functioned as learning models, generating practical evidence on how digital tools behave under real-world market conditions. They revealed the specific combinations of data, incentives, and human facilitation required to unlock behavioural change among farmers, intermediaries, and service providers alike. These insights now offer a foundation for designing and scaling digital agri-service models that genuinely support better decision-making, higher productivity, and stronger farmer-market engagement.

HOW CHIPCHIP AND CASA ARE TRANSFORMING DIGITAL MARKETPLACES IN ETHIOPIA

ChipChip entered Ethiopia's vegetable market with a bold ambition: to connect smallholder farmers directly to urban consumers through a digital platform designed to improve price transparency, reduce dependence on informal brokers, and raise farm-level incomes. The platform's early features – real-time prices, demand forecasts, logistics coordination, and digital communication – reflected the promise of data-driven agriculture. Yet adoption remained uneven. For many farmers, years of exposure to unpredictable markets and opportunistic intermediaries had fostered a culture of caution. Technology alone was appealing, but insufficient. What was missing was trust.

With CASA's support, ChipChip expanded its network of local agents who are community members already embedded in vegetable trading networks and respected for their knowledge of market dynamics. These agents

became the backbone of the model: using offline-compatible registration tools to onboard farmers, collecting benchmark prices, coordinating aggregation and transport, advising on quality standards, and explaining ChipChip's value proposition face-to-face. Early experience showed that digital interaction was necessary but not enough. Adoption only accelerated when advisory was reinforced by trust, embedded in local relationships, and tied directly to improved market access. This insight guided ChipChip's next evolution.

This hybrid "digital + human" approach began to rebuild trust in the marketplace. As relationships deepened, adoption steadily increased. By mid-2025, more than 1,092 farmers were formally engaged with the platform, compared with fewer than 150 during its initial rollout. Crucially, this shift did not emerge from information access alone. Guided by CASA-supported analysis of

farmer incentives, ChipChip redesigned its model around risk-reducing, economically meaningful services. These included predictable pricing mechanisms, pre-selling arrangements that reduced exposure to price volatility, embedded advisory support through the ChipChip Social app, local weather alerts, and loyalty rewards that recognised consistent participation. The company also experimented with gamified learning approaches inspired by the GABISA sustainable farming game to increase engagement among youth and early adopters.

As ChipChip's service bundle matured, so did awareness of persistent structural gaps. Women who play central roles in vegetable production and post-harvest management remained underrepresented among registered suppliers. In response, ChipChip worked with CASA to introduce targeted inclusion measures: recruiting women agents, adapting outreach materials to communication channels commonly accessed by women, scheduling registration visits around domestic workloads, and testing solutions that reduce the need

for women to travel to aggregation centers. These efforts underscored a broader insight shared across CASA-supported digital initiatives: digital adoption is shaped as much by social norms and household dynamics as by technological design⁴. Digital advisory was necessary but insufficient; adoption accelerated only when advisory was paired with incentives, embedded in trust networks, and directly connected to improved market access.

Today, ChipChip's model reflects a more integrated and context-responsive digital agriculture approach built on data, trust, incentives, and human relationships. Through CASA's collaboration, the company has transitioned from a purely information-driven platform to a service ecosystem that actively reduces market uncertainty, strengthens farmer agency, and demonstrates what inclusive digital transformation can look like in Ethiopia's fresh-produce markets.

ChipChip Team



GREEN AGRO SOLUTION (LERSHA): STRUCTURING DIGITAL MARKET LINKAGES THROUGH INTEGRATED SERVICES

A similar but distinct transformation unfolded with Green Agro Solution (GAS) and its Lersha platform. Lersha initially gained traction in cereals and oilseeds through its innovative “one-stop” digital advisory service, which combined agent support, agronomic guidance, weather information, input ordering, and mechanisation access. The platform’s advisory tools were designed to help farmers make informed decisions on planting schedules, fertiliser use, and soil management supported by data from Lersha’s digital advisory services and its extensive field agent network.

However, when Lersha expanded into the vegetable sector, it encountered a new level of complexity. Vegetables require precise advisory support: timing is tight, quality parameters are strict, and production must respond to rapid shifts in demand. Yet the market is heavily shaped by informal brokers who influence prices and buyer access. In this environment, digital advisory alone offered limited value. Farmers needed not only information, but predictable buyers, timely inputs, and trusted facilitators who could translate digital guidance into actionable, market-aligned decisions.

Recognising this, and with CASA’s support, Lersha reimaged its role by expanding and diversifying its digital advisory services, but positioning it within a broader system of coordinated market relationships. CASA-supported value chain assessments in Jimma, Sidama, and Gurage revealed that advisory services were most impactful when bundled with structured contracting,

transparent aggregation, and guaranteed offtake. CASA also supported Lersha’s internal capacity and co-design impact on the full business model that enabled the company to embed advisory tools into a more resilient organisational model. As across CASA’s digital portfolio, digital advisory proved necessary but insufficient; adoption increased only when advisory was reinforced through incentives, trust networks, and credible market access.

The centerpiece of this evolution was a tripartite contract farming arrangement linking farmers, aggregators, and offtakers. Lersha’s digital advisory tools (e.g., weather alerts, crop calendars, production tracking, quality guidelines) and credit-scoring algorithms became operational pillars of the contracting system. Advisory content now guided farmers not only on how to produce, but what, when, and how much to produce in alignment with agreed buyer requirements. The shift demonstrated a critical lesson: digital advisory becomes practical and transformative when it is anchored to incentives, predictable markets, and shared commitments among value chain actors.

To bring this model to life, CASA supported the training of 163 Lersha agents in digital service delivery, climate-smart advisory, crop monitoring, and farmer engagement. They acted as trusted intermediaries, translating digital messages into practical field-level decisions, collecting geo-tagged production data, and ensuring farmers understood how advisory recommendations linked to grading standards, delivery schedules, and market expectations. Awareness campaigns promoted not just digital tools, but the behaviours and relationships needed to make advisory services meaningful.

Partnerships facilitated by CASA amplified the impact of advisory. Collaboration with Awash Bank enabled the use of advisory and production data to build a smallholder credit-scoring model, linking recommended practices to financial eligibility. Offtaking agreements with actors such as the Dona Cooperative Union gave advisory commercial weight, allowing farmers to plan production and apply guidance with far greater confidence.

The results have been significant. Over 7,900 farmers registered for services; more than 3,000 were credit-assessed; and 400+ initiated input loan documentation. Farmers previously hesitant to adopt advisory recommendations fearful of unpredictable markets began reporting higher confidence in production planning and marketing. As with ChipChip, trust grew because advisory was no longer abstract: it was part of a coordinated system that reduced risk and linked information directly to opportunity.

Through its collaboration with CASA, Lersha has demonstrated that digital advisory services become most effective not when they stand alone, but when embedded within structured, incentive-driven market systems. The platform has evolved from an advisory tool into a market integrator showing that meaningful digital adoption emerges when information, trust, and aligned incentives move together.

Mr Abrhame Endrias, Lersha CEO



BIO-SAFE BIO FERTILIZER MANUFACTURING COMPANY: DIGITALISING THE FOUNDATIONS OF INPUT ADOPTION

Across Ethiopia, legume crops such as chickpea, lentil, faba bean and soybean play a vital role in rural livelihoods and soil fertility. Yet the biological input that enhances their performance, the rhizobium inoculant, remained a practical stranger to most smallholders. The science behind inoculation was proven. The product was readily available, but knowledge alone did not translate into action.

Some kinds of innovation reshape markets. Others reshape the land itself.

Bio-safe Bio Fertilizer Manufacturing (BBM), established in Addis Ababa in 2018, recognised both the opportunity and the barrier. As one of only two inoculant producers in Ethiopia, it had the capacity to supply enough product to treat more than 25,000 hectares annually. Its goal was ambitious: to make soil-restoring inputs a routine part of legume production and reduce farmers' dependency on costly fertilisers. But adoption lagged, not because farmers rejected innovation, but because the entire system around this innovation had yet to earn their trust. Farmers were unsure how to use inoculants. Agro-dealers rarely stocked them. Seed providers did not bundle them with improved varieties, and when an input appears inconsistently, belief in its value remains just as irregular.

This is the point where BBM's story intersects with CASA, where together they began rethinking adoption not as a matter of transferring information, but of reshaping behaviour through support systems that reduce risk. Starting in the soybean-growing zones of Jimma and Buno Bedelle, they shifted from scattered outreach to a digitally-enabled model that improves visibility and coordination along the supply chain. Farmers were

digitally registered, allowing Bio-safe to understand exactly where interest existed and where future demand might grow. Agro-dealers received clear signals on when and how much to stock. Product movement, once difficult to track, became visible through simple digital records.

Most importantly, the digital system did not replace people; it empowered them. Young agents from the same communities stood beside farmers during their first attempts at inoculation, demonstrating correct use and offering reassurance. Extension workers reinforced the same messages, ensuring that guidance and access arrived together. For many farmers, this was the first time that advice about productivity-enhancing inputs came with real, practical support to try them safely.

As demonstrations expanded and digital communication reinforced results, farmers noticed changes in their own fields: better germination, stronger plant stands, clearer signs of crop stand after effective nitrogen fixation. With reliable access now in place, agro-dealers no longer hesitated to stock inoculants, and farmers no longer feared that one successful trial would lead nowhere next season. The supply chain, once fragmented, settled into a rhythm that farmers could trust.

Within a short period, more than 2,500 farmers in 126 kebeles across 15 woredas gained dependable access to inoculants, supported by ten agro-dealers and ten youth agents. What started as a challenge of information became a shift in behaviour, from uncertainty and skepticism toward growing interest and confidence.

Behind each farmer's decision sits a private calculation: What if it doesn't work? Who will help me if it fails? Will this option be available again when I need it? Digital tools alone cannot answer these questions. Trust can. Coordination can. Experience can. By bringing those elements together, CASA and BBM helped move inoculants from an unfamiliar product into an emerging norm for legume cultivation.

BBM's digital transformation is still in motion, but its lesson is already clear. Digital and data-driven services make an impact when they give farmers more than information, make new practices feel safe to try, are reinforced by trusted people, and when they are embedded in systems that respond predictably to

farmers' choices. In this case, digital tools improved not just market access, but the very foundation of production. This journey illustrates that digital transformation does not always begin with selling better crops. Sometimes, it begins with healthier soil. Sometimes, adoption grows from the ground up.

Mr Tamirat Cherinet, BBM CEO



WHAT THESE EXPERIENCES REVEAL ABOUT “DIGITAL ADOPTION”

CASA’s pilots show that digital adoption in agriculture is not a function of technology availability, but rather of trust, incentives, and coordination. In each case, adoption grew only when digital innovations reduced the everyday uncertainties farmers face and offered credible solutions to real market and production risks. Farmers adopted digital tools not because they were new, but because they were useful when a human they trusted stood behind them, the market honored their efforts, and the system around them responded predictably when they engaged.

This is the central insight shared across ChipChip, Lersha, and Bio-safe: digital agriculture succeeds when it reshapes the conditions under which farmers make decisions. Digital information travelled further and landed deeper when it was attached to a set of assurances: that prices would hold, buyers would come, inputs would be available again next season, and that someone experienced would help if things went wrong. Digital tools accelerated learning but behaviour changed only when farmers felt confident enough to act on that learning.

The logic of adoption was consistent across all three cases:

- ChipChip’s vegetable suppliers began using mobile services when digital price transparency was backed by negotiators they already knew and when guaranteed pricing reduced exposure to volatile markets.
- Lersha’s vegetable farmers followed digital advisory when it was tied to contract farming arrangements that secured buyers and enabled access to credit.
- BBM’s inoculant users tried a new input only when the product was available locally and supported by trusted youth agents who could vouch for its results.

Agents, coordinators, youth leaders, and extension staff all played the role of translators, interpreters, and bridge-builders. They enabled farmers to test platforms with confidence. In this sense, trusted intermediaries are not a delivery channel; they are the digital infrastructure that adoption rests on.

In every example, digital tools worked because human relationships worked.

CASA’s experience also highlights that digital inclusion cannot be assumed. Women, who are deeply involved in production and marketing, remained less likely to be registered, digitally equipped, or positioned to benefit. Adoption increased when solutions were intentionally designed for women: when messaging used channels women trust, agent networks included women, and when participation was aligned with women’s time and mobility constraints. Without this, digitalisation risks reinforcing existing inequalities rather than overcoming them.

Underneath every digital service lies another critical resource: data. Reliable farmer, production, and transaction data enabled credit scoring, improved advisory recommendations, reduced wastage, and supported traceability and contracting. Where data were incomplete or inaccurate, digital services could not fully perform their intended role. Where data were strong, value for farmers and for companies multiplied.

CASA’s pilots show that digital and analogue systems are complements, not substitutes. Demonstration plots, community meetings, extension visits, cooperative relationships, and peer learning continually amplified the reach and credibility of digital messaging. Farmers do not make decisions in isolation; social proof matters. Seeing a neighbour succeed with a new tool made digital adoption feel less like gambling and more like a smart step forward. Together, these experiences demonstrate that digital adoption is a systems outcome. It emerges when technology is embedded in the incentives, norms, and partnerships that underpin real agricultural markets. Farmers do not adopt apps; they adopt solutions that make their lives easier, risks lower, and futures more secure.

Finally, these experiences highlight the importance of market system facilitation. CASA’s role was not only to support product design, but to reshape the conditions in which products could succeed, brokering partnerships with banks, cooperatives, processors, and public actors who provided the finance, governance, and market coordination necessary for scale.

CONCLUSION: BEYOND INFORMATION TOWARD SYSTEMIC, DATA-DRIVEN TRANSFORMATION

Digital agriculture in Ethiopia is entering a decisive phase. The shift that is visible in the experiences of ChipChip, Lersha, and BBM shows that digital tools alone do not change farming practices or market participation. Behaviour changes when uncertainty shrinks, when participation becomes less risky, and when farmers are supported by people and institutions they trust. It is in this intersection of technology, incentives, and human relationships where true transformation begins.

Each CASA pilot demonstrated that adoption accelerates only when digital services are embedded in systems that farmers can rely on. For ChipChip, trust in market relationships unlocked the willingness to adopt new tools. For Lersha, advisory drove change only when tied to predictable markets and shared responsibilities across the value chain. For BBM, data and demonstrations helped normalise soil-enhancing inputs that were once unfamiliar. Across all cases, digitalisation became powerful when it reorganised how farmers decide, interact, and prosper.

These insights closely align with the ambitions of Ethiopia's Digital Agriculture Roadmap, which calls for the integration of farmer registries, digital payments, interoperable data systems, and market-linking platforms. CASA's work demonstrates what these priorities look like in action: not abstract policy ideas, but practical models that reveal how digital services can be designed to fit the realities of rural production and commerce.

The conditions for successful digital adoption are now clearer. Farmers adopt when technology is anchored in trusted human networks; incentives are visible, immediate, and meaningful; advisory is connected to markets, not theory; and data reduce risks instead of shifting it.

When these elements are missing, digital tools remain unused. When they come together, they deliver higher productivity, stronger bargaining power, and more reliable income pathways.

As Ethiopia deepens its digital transformation, the next frontier is not simply expanding the reach of digital services but strengthening the systems that make those services matter. CASA's pilots show that digital innovation flourishes in organised market systems that reward farmers for participating and ensure that the costs of trying something new do not fall solely on their shoulders.

The future of digital agriculture lies beyond information. It lies in the creation of inclusive, data-enabled ecosystems that enable farmers to grow confidently, engage fairly, and prosper consistently. When digital tools are layered with trusted relationships, financial access, market stability, and supportive norms, they become catalysts of a food system that is not only more efficient but more equitable and resilient. That is the path ahead, and it is already taking root.

RECOMMENDATIONS

For government:

- **Institutionalise data systems that enable value:** Strengthen farmer registries, production tracking, and interoperable data governance to support credit scoring, traceability, advisory targeting and market coordination. Where data were strong, value multiplied across the chain.
- **Align digital pilots with value chain governance:** Enable structured cooperation among banks, processors, cooperatives, and policymakers to ensure digital tools operate within organised market relationships. Digital pilots fail when entering fragmented value chains.
- **Design for women's inclusion from the start:** Adopt gender-responsive engagement models including women agents, accessible registration channels and reduced mobility burdens. Without deliberate measures, women are systematically excluded from digital benefits.

For the private sector:

- **Support scalable business models for sustainability:** Invest in business model strengthening, revenue strategies, and commercial partnerships to avoid pilot dependency on external subsidies. CASA's support has transformed tech projects into investable agricultural service companies.

- **Anchor digital advisory to predictable market opportunities:** Scale models that link advisory and production planning to guarantee buyers, known prices, grading standards, and logistics commitments. Adoption is accelerated only when digital guidance is aligned with buyer requirements.
- **Reduce farmer risk through bundled incentives:** Expand pre-selling, contract farming, input financing, and loyalty mechanisms that make first-time adoption safe and rewarding. Farmers change behaviour when uncertainty decreases, and incentives are visible.
- **Scale youth-led digital service enterprises:** Equip young intermediaries with tools, technical capacity, and commercial incentives to serve as long-term last-mile service providers. Youth agents directly drove adoption in all pilots.

For non-governmental organisations:

- **Invest in trust-based last-mile delivery systems:** Strengthen networks of local agents, cooperatives, and extension workers who serve as trusted digital enablers and advisory translators. Human networks are the digital infrastructure for adoption.
- **Expand demonstration and social proof mechanisms:** Pair digital messaging with field demonstrations, peer learning, and cooperative-led trials to build confidence in new practices. Farmers adopt faster when seeing neighbours succeed.



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