

The Global South Will Leapfrog Traditional Agriculture Just Like It Did with Phones & Banking

A compelling case for investment in CEA in 2025 and Beyond.

A Beyond Farming™ Special Report



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The Global South Will Leapfrog Traditional Agriculture Just Like It Did with Phones & Banks

Executive Summary

In regions across the Global South—Latin America, Sub-Saharan Africa, and MENA—a striking pattern of technological leapfrogging is repeating itself. Just as these regions bypassed landline infrastructure in favor of mobile phones and skipped traditional banks in favor of mobile money platforms, so too will they bypass water- and land-intensive traditional agriculture for **Controlled Environment Agriculture (CEA)**.

This paper provides empirical and geopolitical evidence to support that claim, explains why this transition is both necessary and inevitable, and positions [Beyond Farming \(CSE:BYFM\)](#) as a key enabler of this transition.

1. Leapfrogging Legacy Systems: A Global South Pattern



Across the Global South, leapfrogging outdated infrastructure has become a hallmark of innovation. When traditional systems—landlines, banks, and utilities—fail to reach rural or underserved populations, nations have often bypassed them entirely in favor of **modern, decentralized, tech-driven alternatives**. This same pattern is now

emerging in **agriculture**.

Africa: Mobile First, Then Mobile Everything

In 2000, only **1% of Africans owned a mobile phone**. By 2023, that number had soared to **89% in Sub-Saharan Africa** (GSMA, 2023). Countries like Kenya, Nigeria, and Rwanda skipped the cost and delay of copper line infrastructure and moved straight to mobile communication. This transformation enabled not just commerce and communication—but the birth of **mobile money ecosystems** like **M-Pesa**, which today handles over **50% of Kenya's GDP** via digital wallets. In much of the continent, traditional banking was never established. Instead, mobile-first financial services leapfrogged physical bank branches entirely, democratizing access to payments, savings, and credit.

In Africa, mobile phones didn't supplement landlines—they **replaced** them. Similarly, CEA won't supplement soil-based farming—it will **replace** it where conditions demand it.

Panama: From No Landlines to Mobile Finance

Panama's story follows a similar trajectory. In the early 2000s, most rural and indigenous regions lacked landline telephone access. Rather than expanding copper line networks, Panama leapfrogged straight to cellular networks, with **mobile penetration jumping from 15% in 2000 to over 140% by 2022** (ASEP, 2022).

That same mobile infrastructure enabled another leap: **digital banking and financial inclusion**. In 2019, over **40% of Panamanians were unbanked**. But when the COVID-19 pandemic struck, the government disbursed over **\$800 million in subsidies** via mobile wallets like **Yappy**, **Nequi**, and the **Panama Digital platform**, reaching citizens without ever requiring a bank branch. Today, **more than 70% of adults use mobile payments**—a leap that brought the unbanked into the formal economy (IDB, 2022).

Just as Panama leapfrogged landline networks and physical banks, it now has the opportunity to leap beyond traditional agriculture—toward sovereign, clean, tech-enabled food systems.

MENA: Smart Tech in Place of Legacy Systems

The Middle East and North Africa (MENA) region has also leapfrogged physical infrastructure in favor of scalable digital systems. In countries like Egypt, Jordan, and Morocco, **mobile phone adoption surpassed 100%** by the mid-2010s, despite limited landline expansion in rural areas (GSMA, 2021). In the Gulf, **UAE and Saudi Arabia boast over 150% mobile penetration**, driven by digital lifestyles and high smartphone use.

This leap set the stage for widespread **fintech adoption**. In **Egypt**, where two-thirds of adults lacked bank accounts in 2018, **Vodafone Cash and Meeza wallets** reached over **30 million users** by 2023. In **Saudi Arabia and the UAE**, fully digital banks like **STC Pay** and **Liv.** have made financial services mobile, instant, and branchless. These solutions deliver government stipends, wages, and utility payments with speed and reach unimaginable in legacy systems.

MENA's rapid shift to mobile infrastructure shows how **smart tech adoption accelerates when legacy systems are absent**—a blueprint now repeating itself in agriculture.

The Leap to CEA: A Logical Next Step

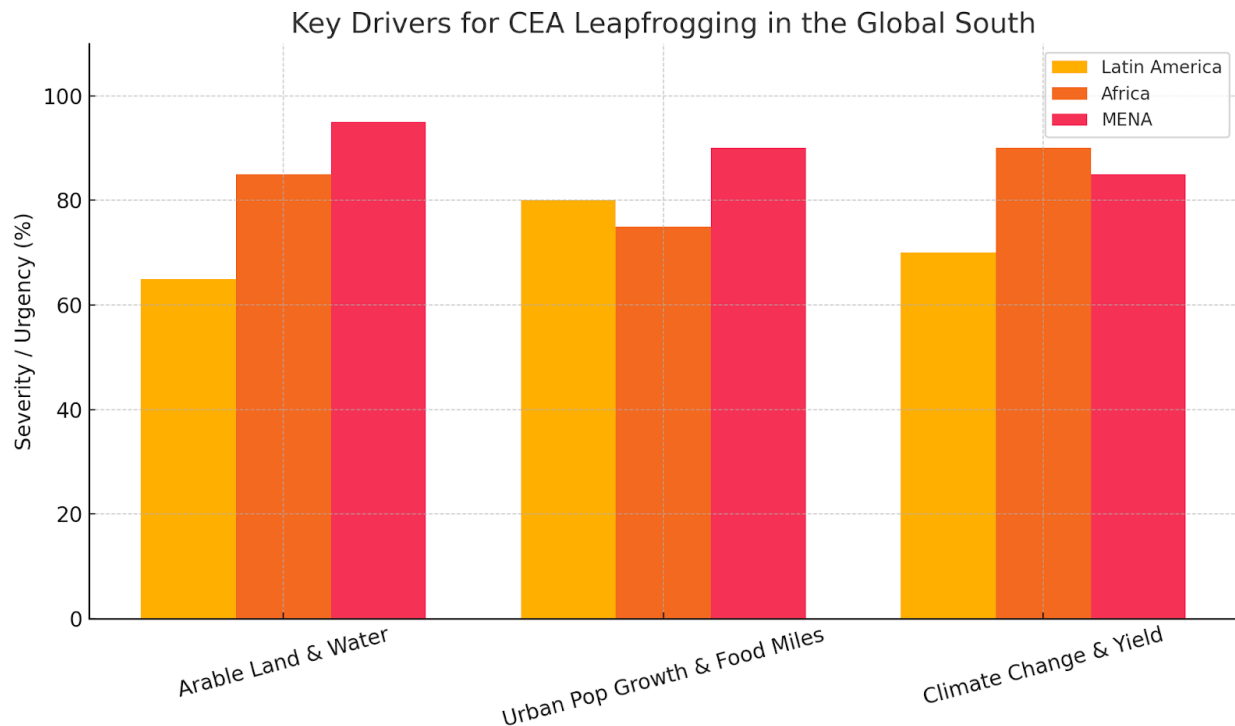
In all three regions—**Africa, Panama, and MENA**—when the **cost, complexity, or corruption** of legacy infrastructure created barriers, innovation thrived. Mobile phones, mobile money, and mobile governance are now woven into daily life. Today, these same regions face **critical barriers in food production**: drought, limited arable land, urban overcrowding, and climate volatility. These barriers mirror the same conditions that previously led to leapfrogging.

Just as these nations **leapt past copper wire and teller windows**, they now have the opportunity—and imperative—to **leap past soil, pesticides, and food miles**.

Controlled Environment Agriculture (CEA) is not a luxury in the Global South—it is **the next leap**.

Key Insight: When traditional infrastructure is weak or costly to build, leapfrogging becomes both logical and economically viable.

2. Why the Global South Will Leapfrog to CEA



a. Scarcity of Arable Land and Water

- **Africa** contains 60% of the world's uncultivated arable land (World Bank), yet rapid urbanization and soil degradation threaten future productivity.
- **MENA** is the most water-stressed region in the world. Traditional agriculture consumes over **80% of freshwater** in the region (World Bank, 2022).
- **Latin America**, while historically rich in agricultural exports, faces severe drought in the Southern Cone, soil exhaustion in the Amazon basin, and rapid urban encroachment on farmland.

CEA uses up to 90-98% less water and vertical farming 90% less land than traditional farming (Association for Vertical Farming, 2021).

b. Urban Population Growth and Food Miles

- By 2050, over **70% of the Global South's population** will live in cities (UN DESA, 2018).

- Current supply chains mean food travels **1,500–2,500 km** to urban centers, increasing spoilage, emissions, and cost.
- CEA allows hyperlocal food production—inside or adjacent to cities—eliminating dependence on long-haul refrigerated supply chains.

c. Climate Change and Yield Instability

- Traditional farms in the Global South suffer disproportionately from **climate volatility**—droughts, floods, and shifting seasons.
 - CEA eliminates weather risk entirely, ensuring **consistent, year-round production**.
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3. Food Security = National Security

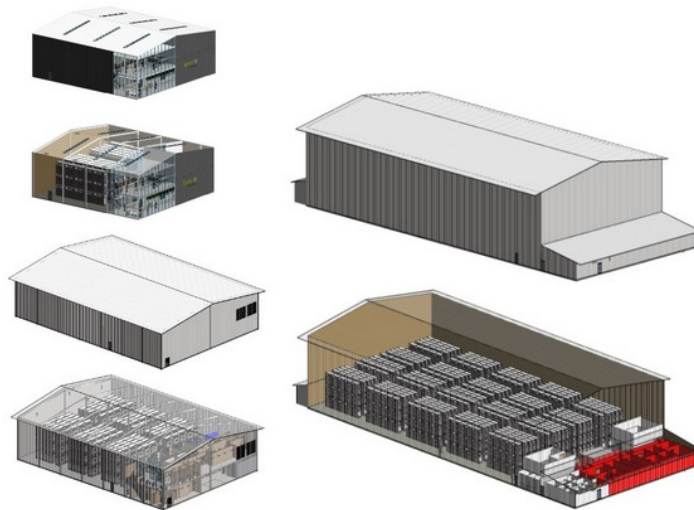


a. Geopolitical Tensions and Supply Shocks

- COVID-19 and the Ukraine war demonstrated that **food imports are a national security risk**. Over 80 countries imposed export bans during the pandemic (IFPRI, 2020).
- MENA nations, especially Gulf countries like the UAE and Saudi Arabia, import over 85% of their food (FAO, 2023). This exposes them to **external market volatility**.

b. Urban Riots, Migration, and Regime Instability

- **2011 Arab Spring** was sparked in part by food price spikes.
 - **2022 protests in Sri Lanka, Sudan, and Peru** were linked to food and fuel inflation.
 - **Controlled, sovereign food systems** are not just about cost—they are about stability, peace, and political continuity.
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Beyond Farming provides 3 sizes of turn-key pre-fabricated **Farm as a Solution (FaaS) Facilities** under either a “**We Own**” or a “**You Own**” model to produce fruit, vegetables and mushroom within the same facility using its fully integrated hardware, software and fertigation systems.

4. Why This Time Is Different: Enabling Technologies

CEA is viable now due to convergence in:

- **AI + IoT:** Real-time data optimization for lighting, nutrients, and climate control.
- **Modular Manufacturing:** Mass production of plug-and-play farms reduces cost and deployment time.
- **Renewable Energy Integration:** In solar-rich nations, CEA can be **energy self-sufficient**.

- **Private Financing Models:** Leasing, franchise, and FaaS (Farm-as-a-Service) models lower upfront costs.
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5. The Role of Beyond Farming: Enabler of Food Sovereign Smart Nations



In May 2023, Beyond Farming presented its first locally grown potato seed using both its aeroponic and fogponic technologies to [Panama's Ministry of Agriculture, IDIAP](#), and farmer representatives during a nationally televised event. The ceremony marked [the launch of a Federal Food Security Initiative](#) to replace imported potato seed with sovereign, high-quality local urban indoor production using Beyond Farming's integrated systems.

a. Technology Provenance + Local Deployment

Beyond Farming's AI-controlled fogponic habitats:

- Use **up to 98% less water**, and **produce their own water for cultivation**
- Offer **250% more plant density**
- Produce **contaminant-free crops**, making them ideal for local distribution and pharma-grade use
- Are modular and scalable, allowing rapid deployment in both urban and rural areas

b. Public-Private Partnerships (PPP)

BYFM partners with:

- National ministries to co-deploy Farm as a Solution (FaaS) Facilities
- Universities for training and local workforce integration
- Sovereign funds for long-term food and tech security

Case Study: Panama

Beyond Farming has signed [a multi-year collaboration agreement with the Panama Institute for Agricultural Innovation \(IDIAP\)](#) to jointly research secure crop development using urban indoor vertical farming technologies, including aeroponics and fogponics. In parallel, Beyond Farming has partnered with the Specialized University of the Americas (**UDELAS**) to provide on-site training, practicum programs, and open access to its controlled environment systems—enabling students to complete thesis work in biochemistry, food science, and related fields. Together, these initiatives position Panama as a regional hub for clean food production and agri-export.

6. Policy Recommendations for Development Institutions

For UNFAO, IFAD, and World Bank:

- Support CEA infrastructure as **public infrastructure**, akin to roads or energy grids
- Fund **PPP pilots** for urban food hubs
- Integrate CEA in **climate resilience programs**

For Sovereign Wealth Funds & Ministries of Agriculture:

- Diversify agri-capex into **resilient, urban-based models**
- Link national food security strategies to **domestic production tech**
- Adopt “**Food Sovereignty Tech Zones**” where tech transfer, training, and production are colocated

7. Conclusion

The Global South has shown it will leap over legacy systems when those systems are failing or absent. CEA, enabled by modern tech, is **not a luxury—it's a necessity**. It's also an opportunity: to own the future of agriculture, to export clean produce, and to stabilize economies from the soil up.

Beyond Farming stands at the helm of this transformation.

*"The Global South has already shown the world that necessity accelerates progress. Just as it leapfrogged into the mobile age—bypassing wires, landlines, and outdated banks—it now stands ready to leap again. We've had the age of aviation. The age of space. The age of software. Today, we're entering the age of food as infrastructure. **Controlled Environment Agriculture (CEA) isn't niche—it's the next trillion-dollar infrastructure class.** It's how the Global South will feed its people, protect its economy, and dominate the next frontier of domestic food security. Those who recognize the pattern early will shape the future."* Chris Bolton, Chairman & CEO Beyond Farming

 **Interested in participating early?**

 **Contact for Investment**

For access to investment opportunities:

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 <https://beyondfarming.com/investors>

 **Stay Connected**

For updates, investment opportunities, and information on Pure Produce partnerships:

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 **Facebook:** [facebook.com/beyondfarmingbyfm](https://www.facebook.com/beyondfarmingbyfm)
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For access to verified data, or Pure Produce licensing and CPC deployment:

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Verification Note

All claims made in this report regarding Beyond Farming (BYFM) operations, technology, and purity standards are based on internal logs, controlled environment certifications, QA records, and peer-reviewed assessments conducted between 2022–2025.

Full audit trails and environmental sensor logs are available upon request for regulatory or institutional due diligence.

Forward-Looking Statements Disclaimer

This report contains certain forward-looking statements within the meaning of applicable Canadian securities laws. These statements reflect the current expectations and projections of Beyond Farming (BYFM) regarding future growth, deployment targets, financial results, and market adoption. These statements are not guarantees of future performance and involve known and unknown risks, uncertainties, and other factors that may cause actual results, performance, or achievements to differ materially from those expressed or implied by such statements. Readers are cautioned not to place undue reliance on forward-looking statements. Beyond Farming undertakes no obligation to update or revise any forward-looking statements except as required by law.

#BeyondFarming #ControlledEnvironmentAgriculture #FoodSovereignty #UrbanFarming
#Leapfrogging #SmartNations #IndoorFarming #VerticalFarming #GlobalSouth #AgriTech
#ClimateResilience #FoodSecurity #ImpactInvesting #SustainableFarming #FutureOfFood
#SmartCities #FoodTech #AfricaFarming #MENAAgTech #LatinAmericaInnovation
#AgriculturalRevolution #Fogponics #CEA #Ag4SDGs #BYFM #PublicPrivatePartnerships
#GreenEconomy

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 <https://www.gsma.com/mobileeconomy/sub-saharan-africa/>

Direct PDF (2023 Report):



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2. Statista (2023)

Title: *Number of mobile money accounts in Africa (2023)*

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 <https://www.statista.com/statistics/1269586/number-of-mobile-money-accounts-in-africa/>

(Note: You will need a Statista Pro account to access full datasets.)

3. World Bank (2022)

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 <https://www.worldbank.org/en/topic/water-in-agriculture>

4. UN DESA (2018)

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Main Page:

 <https://population.un.org/wup/>

Direct Report PDF (Highlights):

 <https://population.un.org/wup/Publications/Files/WUP2018-Highlights.pdf>

5. Association for Vertical Farming (2021)

Title: *The State of Indoor Farming Report*

 *Note: The AVF does not publicly release full reports online without membership or partnership. However, the following summary and related materials are available:*

AVF Homepage:

 <https://www.vertical-farming.net/>

Alternative (Freely Accessible Industry Report from 2021):

Bowery Farming & Agritecture (2021):

 <https://agritecture.com/blog/2021/12/16/state-of-indoor-farming-2021>

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Main Page:

 <https://www.fao.org/publications/card/en/c/CC4424EN/>

Direct PDF:

 <https://www.fao.org/3/cc4424en/cc4424en.pdf>