

# The FutureList

**DeepLeaf**

Innovation Memo

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# Innovation In Words




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A note from the Founder of DeepLeaf, El Mahdi Aboulmanadel;


DeepLeaf was founded to address the significant challenges of plant disease management and pesticide use in agriculture.

# DeepLeaf


## Executive Summary



Agriculture




Agriculture Technology



[deepleaf.io](https://deepleaf.io)



\$105,000



2023

DeepLeaf is revolutionizing the agritech sector with its advanced AI-driven solutions for crop management. The company's core offerings, the Morshida mobile app and the CropScan device, address critical challenges in plant disease and pest management. The Morshida app detects visible crop diseases and nutrient deficiencies, while the CropScan device identifies invisible issues using connections with smartphones and drones for real-time monitoring. DeepLeaf's technology aims to enhance crop health and sustainability by reducing chemical usage and optimizing harvest timing.

Operating in a competitive market with substantial growth potential, DeepLeaf has demonstrated early success and secured significant recognition for its innovative solutions. The technology has been validated through pilot programs in key agricultural players, showing strong real-world effectiveness. As DeepLeaf plans to expand its reach across Africa, the company seeks funding to scale operations, enhance technology, and forge strategic partnerships. This investment will support efforts to broaden its impact and drive improvements in agricultural productivity and sustainability.

DeepLeaf's innovative approach not only addresses critical challenges in crop management but also supports sustainable agricultural practices. By reducing dependency on chemical pesticides and improving resource efficiency, DeepLeaf is poised to make a meaningful contribution to the agricultural sector. The company's focus on user-friendly technology, scalable solutions, and strategic market expansion underscores its potential to become a leading force in advancing crop health and supporting farmers across diverse environments



**El Mahdi Aboulmanadel**  
Founder & CEO

El Mahdi Aboulmanadel leads DeepLeaf as CEO, focusing on advancing agriculture through AI-driven solutions. His background in AI, machine learning, and technology entrepreneurship drives the company's mission to enhance crop resilience, prevent disease outbreaks, and reduce pesticide use.



**Ait Houmaid Lahcen**  
CTO

Ait Houmaid Lahcen serves as the Chief Technology Officer at DeepLeaf, where he is responsible for driving the company's technological advancements and product development. Lahcen's expertise in technology and innovation is pivotal in shaping DeepLeaf's solutions to meet the evolving needs of the agricultural sector.



**Dr. Brahim Ezzahiri**  
CRO

Dr. Brahim Ezzahiri serves as the Chief Research Officer at DeepLeaf, bringing 30 years of experience in plant disease science and a prolific record of over 20 scientific research papers. He leads the phytopathology division, where he spearheads research on early detection and sustainable management of plant diseases.

## Innovation Spotlight

### Core Functionality/Features:

DeepLeaf is pioneering in the Agtech sector with its AI-driven solutions designed to enhance crop health and management. Key features include:

- **AI-Driven Disease Detection:** Utilizing advanced AI algorithms and 5M proprietary data, DeepLeaf provides early and accurate detection of plant diseases. The technology analyzes data from various sources, including images and sensor inputs, to offer precise predictions and early interventions, significantly reducing disease spread.
- **Field Monitoring Tools:** The company's product suite features the Morshida mobile app and the CropScan device. The Morshida app captures images of plants to detect visible diseases and nutrient deficiencies, offering treatment recommendations and optimal harvest timings. The CropScan device, on the other hand, detects invisible crop issues such as viruses and pests through its connectivity with smartphones and drones for real-time monitoring.

### Design and User Experience:

DeepLeaf emphasizes a user-centric approach in its product design:

- **Intuitive Interface:** Both the Morshida app and CropScan device are designed with user-friendly interfaces to ensure accessibility for farmers with varying tech literacy levels. The Morshida app features a straightforward design for easy image capture and analysis, while the CropScan device is equipped to function seamlessly with existing technologies like smartphones and drones.
- **Offline Functionality:** Addressing challenges in areas with limited internet connectivity, the Morshida app includes offline capabilities. This ensures that farmers can still access essential functionalities even in low-connectivity regions.

### Performance Metrics:

The effectiveness and impact of DeepLeaf's technology are demonstrated through several metrics:

- **Revenue and Adoption:** The Morshida app has generated \$35,000 in revenue within its first six months, indicating strong market acceptance and user engagement.
- **Pilot Program Results:** DeepLeaf conducts pilot programs to test and validate its technology, with positive outcomes reflecting the tools' efficacy in real-world conditions.
- **Recognition and Awards:** The company has secured \$105,000 in awards, showcasing external validation of its technology and its alignment with industry standards.

### Integration and Compatibility:

DeepLeaf's solutions are designed for seamless integration into agricultural workflows:

- **Scalability and Adaptation:** DeepLeaf's technology is built to be adaptable across different crops and environments. The AI models are continuously updated based on real-world feedback, ensuring their effectiveness remains high as conditions and challenges evolve.

- **Cross-Platform Functionality:** The CropScan device's ability to connect with smartphones and drones facilitates real-time data collection and analysis, enhancing its adaptability to various operational contexts.

### Innovation in Business Model:

DeepLeaf's business model represents a significant innovation in the Agtech industry:

- **Subscription and Sales Models:** The company employs a dual approach with its Morshida app available on a subscription basis and the CropScan device offered for purchase with an optional monthly subscription for ongoing service. This model ensures a steady revenue stream while providing farmers with flexible access to technology.
- **Market Penetration and Expansion:** DeepLeaf focuses on addressing large-scale markets with significant potential, such as the tomato and cocoa sectors in Morocco and Ghana. The company's approach to scaling involves strategic partnerships and market expansion efforts.
- **Cost and Accessibility:** By calculating the carbon capture achieved by using the technology in collaboration with Carbon developers, DeepLeaf ensures its technology remains affordable and accessible to small-scale farmers, enhancing its market reach and impact.

### Safety, Compliance, and Sustainability

#### Safety:

- **Proactive Disease Management:** DeepLeaf's AI-driven technology helps in early detection of plant diseases, which contributes to reducing the need for excessive pesticide use. By identifying issues at an early stage, the technology minimizes the risk of disease outbreaks and ensures safer agricultural practices.

#### Compliance:

- **Reduced Chemical Usage:** The Morshida app helps farmers reduce chemical use by at least 8%, supporting compliance with regulations that limit pesticide application. This aligns with global trends towards minimizing chemical residues and adhering to safety standards in agriculture.

#### Sustainability:

- **Enhanced Crop Resilience:** DeepLeaf's solutions focus on improving crop health and resilience, which contributes to sustainable agricultural practices. By enabling early disease detection and reducing reliance on chemicals, the technology supports more sustainable crop management.
- **Resource Efficiency:** The use of AI for precision agriculture helps optimize resource use, including water and fertilizers, further promoting sustainability. The ability to make informed decisions based on real-time data leads to more efficient farming practices.
- **Environmental Impact:** By decreasing the need for chemical treatments and focusing on early disease management, DeepLeaf's technology helps in reducing the environmental footprint of agriculture. This aligns with broader sustainability goals and promotes eco-friendly practices.

## Market Impact & Future Outlook

DeepLeaf's technology has demonstrated initial market success, generating \$35,000 in revenue from the Morshida app within its first six months. This early revenue indicates a positive reception and engagement with the company's solutions.

The company has conducted pilot programs with three partners, which have validated the effectiveness of its technology in real-world settings.

These pilots confirm that DeepLeaf's tools effectively address crop health issues and support its approach.

DeepLeaf has also received \$105,000 in awards, providing external validation of its technology and alignment with industry standards. This recognition enhances the company's credibility and market presence.

DeepLeaf operates within a substantial market, with a total addressable market (TAM) for tomatoes in Morocco valued at \$27.50 billion and a serviceable available market (SAM) of \$5.76 billion. For cocoa in Ghana, the serviceable obtainable market (SOM) is \$450 million.

The significant annual spending by farmers on tomato health monitoring (\$1,700) highlights the potential impact and demand for DeepLeaf's solutions. DeepLeaf plans to expand its market presence across Africa and target large agribusinesses. The company intends to scale operations and enhance its technology to address the growing demands of the agricultural sector.

Growth priorities include increasing user adoption, improving technology capabilities, and securing additional funding. The company is focused on scaling its technology and operations to support expansion efforts.

The \$1.6 million in funding sought will be used to reach 100,000 hectares, expand the team, and support market expansion and sales initiatives. This investment aims to achieve milestones related to user adoption, technology enhancements, and market entry.

DeepLeaf aims to become a leading provider of AI-driven plant disease management solutions. The company envisions making a significant impact in the Agtech industry by improving crop health, reducing pesticide use, and enhancing farm productivity. Its long-term vision includes advancing sustainable agriculture practices.

## Societal Impact

DeepLeaf's technology helps farmers by providing tools for early disease detection and management. The Morshida app and CropScan device enhance crop health and productivity, potentially increasing yields and farmer income. These tools assist farmers in making informed decisions, reducing losses due to diseases, and improving farm efficiency.

The technology is designed to be user-friendly and accessible to farmers with various levels of technical expertise. DeepLeaf provides trial periods and comprehensive training to encourage adoption among small-scale farmers, aiming to make advanced agricultural tools available to a broader audience.

The company also supports farmers through educational initiatives, such as workshops and hands-on training, which help in the adoption of the technology and empower farmers with knowledge about disease management and crop health.

DeepLeaf's technology aims to reduce the use of chemical pesticides by offering early and accurate disease detection. This leads to a decrease in unnecessary pesticide applications and chemical residues in the environment. The Morshida app, for example, helps cut down pesticide use by approximately 8% through targeted treatment recommendations.

The company's solutions promote sustainable agricultural practices by encouraging proactive disease management and improving resource efficiency. This supports healthier crops and aligns with goals of environmental sustainability.

DeepLeaf's focus on enhancing crop resilience and optimizing management practices contributes to sustainable agriculture initiatives. The technology helps reduce chemical dependency and supports long-term environmental sustainability in agriculture.

DeepLeaf's technology can lead to economic growth in farming communities by improving productivity and profitability. This has broader implications for local economies and can stimulate development in rural areas. The reduction in pesticide use and improved management practices contribute to the conservation of natural resources. These benefits align with efforts to reduce the ecological footprint of agriculture.

## Potential Roadblocks & Risks

**Technology Adaptation:** Ensuring that DeepLeaf's AI-driven tools work effectively across diverse agricultural environments and crop types can be challenging. Variations in plant diseases and environmental conditions may affect the performance of AI models. DeepLeaf is addressing this by developing robust machine learning models trained on extensive datasets that cover a range of conditions. Continuous feedback and real-world testing are used to refine the technology and adapt it to new challenges.

**Farmer Adoption:** Adoption of new technology by farmers can be slow due to varying levels of tech literacy, skepticism, and resistance to change. To encourage adoption, DeepLeaf focuses on user-friendly interfaces and provides comprehensive training and support. The company uses pilot programs, workshops, and trial periods to demonstrate the technology's value and ease of use.

**Infrastructure Limitations:** Deploying DeepLeaf's solutions in regions with limited internet connectivity or technological infrastructure can be challenging. This may impact the functionality of mobile apps and real-time monitoring. To mitigate this, DeepLeaf has developed offline functionalities for its apps and optimized its devices to function efficiently under low connectivity conditions.

**Cost and Accessibility:** Making DeepLeaf's technology affordable and accessible to small-scale farmers is a significant challenge. High costs could limit adoption among smaller operations. DeepLeaf addresses this by offering flexible pricing models and collaborating with agricultural cooperatives and government bodies to subsidize costs, aiming to increase accessibility.

**Market Competition:** The Agtech sector is competitive, with many players offering similar solutions. To stand out, DeepLeaf relies on its advanced AI algorithms, comprehensive monitoring tools, and focus on innovation. Strategic partnerships and ongoing technology enhancements help maintain its competitive edge.

**Regulatory Compliance:** Navigating regulatory requirements related to agricultural technology and data privacy can be complex. DeepLeaf monitors regulatory developments and ensures compliance with local and international regulations. The company works with legal experts to manage compliance effectively.

**Funding and Financial Stability:** Securing sufficient funding and maintaining financial stability are crucial for scaling operations. Financial uncertainties or delays could affect expansion plans. DeepLeaf has a clear funding strategy, has secured initial funding, and continues to seek additional investment opportunities while maintaining a financial plan to support growth.

**Technology Integration:** Integrating DeepLeaf's technology with existing agricultural practices and systems may present challenges. The company designs its technology to be adaptable and works to ensure compatibility with existing systems. Support for smooth integration and collaboration with partners help address these challenges.

## Conclusion

DeepLeaf is advancing the integration of AI technology with agriculture, targeting key challenges in crop management. The company's solutions include AI-driven disease detection and field monitoring tools, designed to improve crop resilience, sustainability, and productivity.

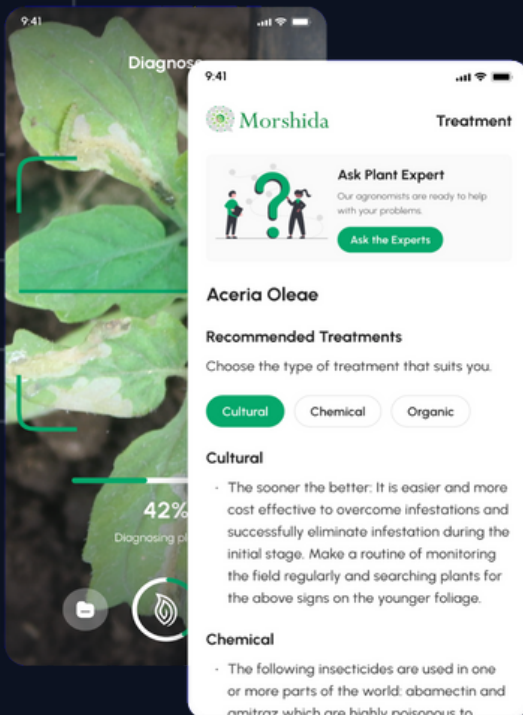
DeepLeaf addresses significant challenges such as technology adaptation, farmer adoption, and infrastructure limitations through various strategies. These include developing robust machine learning models, offering comprehensive training and support, and creating technology that functions under diverse conditions. The company also focuses on flexible pricing and partnerships with agricultural cooperatives and government bodies to enhance accessibility.

As DeepLeaf moves forward in a competitive market and navigates regulatory requirements, its approach to integrating with existing agricultural practices and managing financial stability will be essential. The company's strategy and efforts will influence its ability to meet its goals and contribute to advancements in sustainable agriculture.



# Innovation In View

## How DeepLeaf brings innovation to life



DeepLeaf brings innovation to life by leveraging its advanced AI algorithms and deep learning to detect plant diseases early and accurately.

Their solutions include the Morshida mobile app, which offers disease detection and treatment recommendations, and the CropScan device, which provides real-time monitoring of invisible crop issues.

These tools are designed with user-friendly interfaces and offline capabilities to ensure accessibility. Continuous improvement of AI models and strategic partnerships further drive the company's impact, supporting sustainable agricultural practices by reducing pesticide use and optimizing crop management.

DeepLeaf's latest AI models supports 30 crops, detecting 690 anomalies—including diseases, pests, and nutrient deficiencies—with 96% accuracy, revolutionizing precision agriculture and enhancing crop health management.



# Contributors

## **The FutureList**

Daniel Boateng  
**Program Specialist**

## **DeepLeaf**

El Mahdi Aboulmanadel  
**Founder & CEO**



# The FutureList

# Notes on our methodology

## About The FutureList

The FutureList is dedicated to identifying and linking innovative technology companies with the investors, talent and strategic growth partners they need to rapidly scale their innovation. The FutureList leverages its network of local Innovation Scouts, a comprehensive online platform, and curated events to rapidly spot and match opportunities. The FutureList network has already profiled over 6,000 innovative companies, investors and partners globally.

We scout across a broad range of sectors in tech, aiming to identify the most innovative startups globally. This includes everything from AI to biotech, renewable energy, and more. The 10 categories we currently focus on are: Agriculture (farming, food, beverages, crops, forestry, aquaculture, livestock, irrigation, veterinary, etc.), Climate (electricity, energy, environment, renewables, recycling, circular economy, carbon credits, cleantech, etc.), Education (e-learning, school management, assessments, upskilling, tutors, languages, etc.), Enterprise (legal services, AI, cyber security, market research, recruitment, HR, customer success, consulting, SaaS tools, business analytics, etc.), Finance (banking, capital, trading, lending, personal finance, insurance, crypto, real estate, etc.), Health (medicine, biotech, medical equipment, pharmaceuticals, public health, digital health, hospitals, health records, wellness, fitness, beauty, etc.), Infrastructure (architecture, materials, computer networks, safety, law enforcement, construction, data centers, machinery, telecom, wireless internet, manufacturing, etc.), Media (marketing, influencers, animation, arts, gaming, fashion, content, platforms, music, publishing, translation, editing, etc.), Mobility (delivery, transportation, etc.), and Supply Chain (e-commerce, warehousing, logistics, retail, etc.)

## About Our Innovation Scouts

Our Innovation Scouts are experienced professionals from diverse sectors with a keen eye for groundbreaking technologies and business models. They undergo rigorous training to ensure they provide maximum value to the startups they work with. They conduct their research on a volunteer basis. We have strict ethical guidelines in place. Any Scout with a potential conflict of interest is recused from the process to ensure fairness and objectivity.

## About Our Innovation Memos

Innovation Memos provide a comprehensive profile of an innovator, whether its a startup, hub, investor or more established corporate, highlighting technological and business model innovations. The Memo is written in direct consultation with a verified representative from that entity, and also outlines suggestions around how to rapidly scale their innovation further through use of The FutureList's network. Once published, the Memo accessible to our network of investors, partners, and the general public for free on our platform. The Memo process is completely free for the companies featured as well. The entire process, from initial contact to publishing the Innovation Memo, typically takes about 4-6 weeks, but this can vary based on the startup's availability and responsiveness. Our goal is to promote and scale innovation globally. The FutureList platform and events are sponsored by partners.

# Scaling Innovation

How **The FutureList** identifies and scales innovation globally



## **Ecosystem and sector mapping**

Our Innovation Scouts identify the most innovative early-stage and growth-stage tech companies across key sectors in tech hubs around the globe.



## **Innovation memos and platform profiles**

Our Innovation Scouts interview founders and tech executives to publish innovation memos and create a comprehensive company profile on our public online platform.



## **Introductions to strategic opportunities**

Our Innovation Scouts share company profiles with relevant investors and strategic growth partners across our global ecosystem, and facilitate warm introductions where requested.



## **Private dinners and fireside chats**

Our exclusive evening events bring together founders, tech executives and other special guests for networking and interactive discussions around technology and innovation.



## **Global summits & learning trips**

Featured companies will be invited to larger annual events held at the regional and global stage that connect the most innovative companies with opportunities for further visibility.

# Sponsor

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**Sand Technologies**, a global technology services company with presence across Silicon Valley, France, the UK, Romania, and several emerging markets, is at the forefront of supporting scale-ups worldwide in overcoming the challenges of rapid growth. We're currently aiding businesses in the United States, New Zealand, Denmark, the Netherlands, the UK, the UAE, South Africa, Kenya, and numerous other locations in developing scalable technology products, constructing world-class tech teams, enhancing revenue generation, and elevating customer satisfaction.

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