The FutureList

NjordFrey

Innovation Memo

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Innovation In Words

A note from the CEO & Co-Founder, Lars Hededam:

NjordFrey employs a range of technological innovations to enhance its aquaponic farming solutions, specifically designed to support smallholder farmers in increasing their income.

NjordFrey

Agtech

Aquaponics Tech Solutions

njordfrey.com

USD 605K

2018

Executive Summary

NjordFrey is an agritech company revolutionizing sustainable agriculture by developing innovative aquaponic systems that integrate fish farming and vegetable cultivation on small plots of land. Their user-friendly systems, designed for smallholder farmers, significantly increase fish and crop production while using 95% less water than traditional farming methods. NjordFrey's integrated digital monitoring service provides real-time data and remote support, ensuring optimal farm performance and scalability.

Since its inception, NjordFrey has built Rwanda's first commercial aquaponic farm, developed a mobile digital monitoring system with Innovate UK Agritech support, and conducted extensive market research to understand the needs of farmers and retailers.

Amidst that, NjordFrey faces challenges in securing sufficient investment, managing supply chain logistics, and overcoming technical hurdles. The reluctance of investors to fund asset heavy projects in agriculture and the high costs of importing components are significant obstacles. Despite these challenges, NjordFrey's commitment to innovation and sustainability positions them as a leader in the agritech industry.

With ambitious plans to integrate renewable energy, advance monitoring technologies, and expand their market reach, NjordFrey remains poised to drive efficiency, market access, and sustainable practices throughout the agricultural sector. Their innovative approach promises a transformative impact on smallholder farmers and the broader agricultural landscape.

Lars Hededam

CEO & Co-Founder

Lars brings a wealth of expertise in development and food technology with 15 years of experience spanning across working in large companies, restaurants, and startups. He has been operating in East Africa for 9 years. Lars holds a Master's degree in Global Studies from Roskilde University in Denmark.

Faisal Razzaq

Business Director & Co-Founder

Faisal is a Chartered engineer (IET) with 15+ years of delivery experience in large scale international energy and agriculture projects. Graduating from Strathclyde University, UK with a Masters in Electronic and Electrical Engineering.

Innovation Spotlight

Core Functionality/Features:

NjordFrey's primary innovation lies in its aquaponic systems, which integrate fish farming and vegetable cultivation on small plots of land. These systems consist of components such as fish tanks, grow beds, filters, and a sensor array to monitor water quality and other vital parameters. The system relies on a symbiotic relationship between fish and plants. Fish waste provides essential nutrients for plant growth, while the plants, in turn, help filter and clean the water for the fish.

Design and User Experience:

- NjordFrey have fully designed and built aquaponic farms to suit the terrain and user requirements. Their starter kit contains everything required. This includes civil works to accommodate rearing fish (aquaculture), establishing soil-less beds (horticulture), piping, establishing pumps and filtration for a complete system. All centered around significantly increasing fish and crop production while using 95% less water, compared to traditional farming.

- The systems are user-friendly, targeting smallholder farmers with limited formal education by leveraging their existing skills. Hands-on training is provided to ensure farmers can handle daily tasks and understand the theoretical underpinnings of system operations.

- NjordFrey's digital monitoring service, consist of an array of non-invasive sensors on site, and runs continually to allow them to monitor multiple farms remotely from NjordFrey HQ (using their purpose-built front-end dashboard) and provides simple and effective feedback to farmers to maximize farm production at all times. NjordFrey are also working with Intellecap (under their Innovate Africa Challenge programme) to integrate AI functionality into this monitoring system to further optimize as it scales. This remote capability allows them to scale/build more farms without having to hire more staff to manage them.

Performance Metrics:

Once the systems are built, NjordFrey provides access to their Digital Farm Monitoring System. This allows them to maintain full visibility, with real time data to guide farmers to maximize production at all times. The systems offer year-round production, unaffected by seasonal changes, and achieve an up to 30% faster crop growth rate with dense crop growth. Operational metrics include continuous monitoring of water quality parameters such as pH, temperature, oxygen levels, and nitrogen levels to ensure optimal conditions. Managing these optimal conditions also allows for a higher stocking density of fish, typically allowing for 3000% more fish compared to traditional aquaculture ponds.

Integration and Compatibility:

For digital aspects, NjordFrey employs a sensor monitoring system that integrates off-the-shelf sensors with advanced sensors developed in collaboration with universities. Data is sent via the internet for remote monitoring and analysis. The company plans to implement machine learning for predictive analysis, enabling early detection of issues like mildew presence.

Innovation in Business Model:

Group Financing and Land Allocation: NjordFrey's business model is distinguished by its approach to group financing and land allocation. The company organizes groups of at least 40 farmers and assists them in securing financing through partnerships with farming cooperatives and development banks. These development banks have mandates to support smallholder farmers, facilitating the acquisition of starter kits and inputs necessary to build and operate the aquaponic farms. The revenue generated from the sale of fish and vegetables covers operational costs and allows farmers to repay the capital cost within 2-4 years. Post repayment, farmers continue to enjoy high profits and can reinvest in additional NjordFrey products.

Co-Ownership Model: The co-ownership model ensures that farmers have majority ownership of the system, sharing profits with NjordFrey after loan repayment. NjordFrey also provides extensive ecosystem support, including inputs like fish feed, supplements, and seeds, and market access. This support includes vertical and horizontal scaling options to maximize productivity and profitability.

Ecosystem Support: For NjordFrey, revenue is generated through a markup on the starter kits and inputs sold to the farmers. Additionally, the company establishes service contracts with each farm, providing monitoring systems to ensure maximum production and assisting farmers in securing the best market prices for their produce. This comprehensive support model not only enhances the operational efficiency of the farms but also ensures sustained profitability and growth for both the farmers and NjordFrey.

Safety and Sustainability:

NjordFrey prioritizes safety with continuous monitoring and alert systems that allow for timely interventions. The systems comply with local and international agricultural standards and promote sustainability through integrated farming methods, reducing dependency on external inputs and enhancing local food security.

Market Impact & Future Outlook

NjordFrey's mission is to provide high-yield aquaponic farming solutions to smallholder farmers to significantly increase income while being sustainable. Over the past five years, NjordFrey has developed a comprehensive model for sustainable aquaponic farming from its base in Rwanda. To describe their market impact, some noteworthy milestones include:

First Commercial Aquaponic Farm in Rwanda: In May 2022, NjordFrey built and operated Rwanda's first commercial aquaponic farm. During the initial trials, the farm delivered 1.5 tonnes of lettuce and 375 kg of tilapia, demonstrating a remarkable 1800% increase in fish production and a 500% increase in crop production compared to basic alternatives. With performance upgrades and the commencement of new batch trials in 2024, NjordFrey is confident in achieving its ambitious targets of a 3000% increase in fish production and a 700% increase in crop yields.

Extensive Market Research: NjordFrey conducted surveys with 342 farmers and retailers, along with a larger survey of 46 users within the country. These surveys provided a clear understanding of the needs and preferences of their customers and users, informing the development and refinement of their products and services.

NjordFrey is exploring several advancements that have the potential to significantly shape the future of the aquaponic farming industry. NjordFrey in April 2024 secured an Innovate UK Energy Catalyst Project to introduce renewable energy (such as solar power) and cold storage into their aquaponic solutions. This project aims to further enhance the sustainability and efficiency of their farming systems.

Through collaboration with technology partner Smart Villages, the company aims to reduce the energy footprint of its farms, making them even more environmentally friendly and cost-effective. This advancement could set new standards for energy-efficient aquaponic systems, further promoting sustainable agriculture.

Another future plan for NjordFrey is implementation of advanced sensor technologies and machine learning algorithms. By developing predictive analytics capabilities, the company can provide farmers with real-time insights and early warnings about potential issues like water quality imbalances or disease outbreaks. This proactive approach to farm management will enhance productivity, reduce losses, and improve overall system resilience.

Societal and Environmental Impact

Societal Health and Well-Being: NjordFrey's innovations in aquaponic farming have significant implications for societal health and well-being. By increasing the production of fresh, locally grown fish and vegetables, NjordFrey enhances food security and provides communities with access to nutritious food. This can lead to improved dietary health and reduced reliance on imported, less fresh produce. The company's focus on supporting smallholder farmers also contributes to economic stability and empowerment, providing a reliable income source and promoting local economic development.

Empowering Communities: NjordFrey's model of organizing farmer groups and facilitating access to financing and resources empowers rural communities. Also, in Rwanda, +70% of farmers are female and a core user of this solution, increasing opportunities for gender inclusion. This co-ownership model not only ensures farmers have a stake in the success of the farming systems but also fosters ownership and responsibility. The ecosystem support provided by NjordFrey, including market access and ongoing technical assistance, helps farmers maximize productivity and profitability, leading to long-term economic sustainability.

Contributions to Sustainable Agriculture: The company's efforts in developing and promoting aquaponic systems support the broader goals of sustainable agriculture. By offering a scalable and efficient farming solution, NjordFrey provides a viable alternative to conventional farming methods that are often resource-intensive and environmentally damaging. This approach aligns with global sustainability targets and contributes to the resilience of food systems in the face of climate change and other challenges.

Educational and Knowledge Sharing: Through its operations and partnerships, NjordFrey also plays a crucial role in educating and training farmers and local communities. This knowledge transfer is essential for building local capacities and promoting the adoption of innovative agricultural practices. The company's market research and user surveys further contribute to a deeper understanding of local needs and conditions, ensuring that solutions are tailored and effective.

Potential Funding & Partnership Opportunities

NjordFrey's innovative aquaponic systems and sustainable agricultural practices present a compelling funding opportunity for entities such as Impact investors, Venture capitals, Government grants and subsidies, focused on advancing agritech, enhancing farmer productivity, and promoting environmental sustainability, in addition to securing a financial return.

Potential Roadblocks & Risks

Investment and Funding: There is a general reluctance from investors to fund asset heavy projects, especially in agriculture, as opposed to more attractive sectors like tech apps or real estate. This reluctance is compounded by unrealistic and condescending expectations from some investors, leading to offers that significantly undervalued the company. Securing sufficient and timely investment remains a continuous struggle, limiting NjordFrey's ability to scale quickly.

Supply Chain Issues: The local production of necessary components and expertise for NjordFrey's aquaponics systems in Rwanda is insufficient, forcing the company to import most of their supplies. This process is both costly and logistically challenging. Additionally, finding reliable suppliers and technicians continues to be a difficult task, further complicating the supply chain.

Operational and Technical Hurdles: Supply chain issues at critical times, such as equipment failures due to limited availability of parts, are a recurring challenge for NjordFrey. Though the company is constantly engaged in continuous learning and adaptation to new challenges, which is a major part of their ongoing journey.

Conclusion

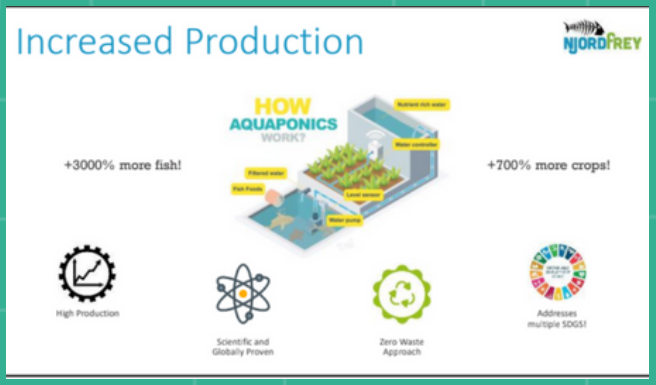
NjordFrey’s innovative aquaponic systems represent a significant advancement in sustainable agriculture, offering a scalable, efficient, and environmentally friendly alternative to traditional farming methods. Their comprehensive support model, combined with a focus on empowering smallholder farmers, ensures long-term profitability and growth for both farmers and the company. Despite existing challenges in investment, supply chain logistics, and technical operations, NjordFrey's commitment to innovation and sustainability positions them as a leader in the agritech industry. With continued advancements and strategic funding opportunities, NjordFrey has the potential to revolutionize the future of farming, contributing to global food security and environmental sustainability.

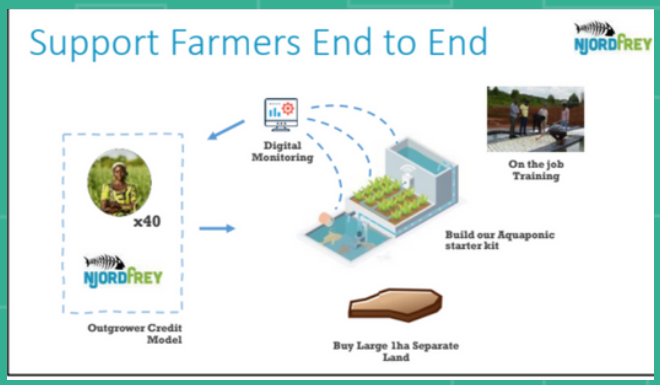
Innovation In View

How **NjordFrey** brings innovation to life

How it works:

Overall, NjordFrey's innovation leverages aquaponics to create a highly efficient, sustainable farming system that significantly increases productivity while providing comprehensive support to farmers, from financing to training and monitoring.





Contributors

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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

The FutureList platform and events are sponsored by partners.

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.

Learn more at www.sandtech.com

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