COMPLETED PROJECT CASE STUDY

CONNECTED SEAFARM: UNLOCKING THE VALUE OF DATA IN AQUACULTURE

PARTNERS

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The 'Connected Seafarm' project aimed to transform aquaculture by leveraging digital and Internet of Things (IoT) technologies. The primary objective of the Connected Seafarm platform is to bridge the gap between accurate and timely data collection and actionable insights for the aquaculture sector.

BACKGROUND

The aquaculture sector continually strives to advance sustainability, growth, and cost-efficiency. Regulatory, consumer and environmental considerations encourage the industry toward ever more sustainable and evidence-based practices. However, fish farms are often located in remote and harsh operating areas, making it challenging to digitise operations and fully harness the potential of data-driven decision-making. To address these challenges, Krucial introduced the 'Connected Seafarm' project in 2020, with the aim of transforming aquaculture by leveraging digital and Internet of Things (IoT) technologies.

AIMS

The primary aim of the Connected Seafarm platform is to bridge the gap between accurate and timely data collection and actionable insights for the aquaculture sector. The project sought to:

Enable high-quality data collection and standardisation to support evidence-based decision-making;

Integrate multiple external data parameters via sensors, for enhanced insights;

Facilitate remote control of farm systems based on near real-time data;

Deliver tailored user interfaces for different stakeholders within the industry;

Centralise data to eliminate silos and improve accessibility;

Quantify and deliver long-term benefits to stakeholders, including improved fish welfare and cost savings.

CONNECTING FARMS GLOBALLY WITH MEANINGFUL INSIGHT

Krucial's Connected Seafarm platform is a comprehensive digital solution designed to connect fish farm operations worldwide via satellite-enabled technology. The platform offers a full end-to-end sensor and hybrid satellite and cellular enabled communication service that supports continuous data collection from multiple devices across different farm locations. The project in 2020 focused on producers in Scotland, with wider plans for international expansion.

The platform aims to provide value by transforming raw data into meaningful insights. This transformation is achieved through the platform's ability to securely store, process, interpret, and present data using web-based dashboards and user interfaces tailored for various stakeholders, such as farm managers and operations managers. By combining data across multiple parameters with external sources like satellite imagery, the platform provides insights across whole farm operations to help improve stock survival rates, fish welfare, and operational efficiency.

The Connected Seafarm platform was designed to address key challenges in the aquaculture industry through the project objectives:

1. HIGH-QUALITY DATA COLLECTION AND STANDARDISATION

The project partners worked with the University of Stirling's Institute of Aquaculture to improve data quality by standardising data collection. Metadata, such as sensor type, location, and maintenance history, will be appended to data sources, allowing users to trust the data's accuracy.

The platform has been developed to help farmers identify causative factors and implement preventative measures by linking data to critical events, which is crucial for meeting increasingly strict industry certification standards.

2. INTEGRATION OF EXTERNAL DATASETS

The platform combines site sensor data with external sources, such as satellite or drone imagery, to create more accurate predictive models. For example, integrating satellite data with local sensor information can improve the prediction of harmful algal blooms (HABs), allowing farmers to take timely preventative action. Rather than relying on satellite imagery alone, the Connected Seafarm platform can extend the warning period for HABs using ground-truth data from on-site sensors.

3. REMOTE CONTROL OF FARM SYSTEMS

The platform's two-way communication capabilities enables remote control of farm systems. For instance, farmers will be able to remotely activate or deactivate aeration and oxygenation systems based on near real-time data, reducing labour costs and improving system efficiency.

4. USER-CENTRIC INTERFACE DESIGN

The platform will offer user experiences for various stakeholders, from region-wide data views for operations managers to more specific data for farm managers. This design approach prevents data overload by displaying only relevant information for each user type.

The platform will also support advanced analytics through machine learning algorithms, allowing the integration of big data to improve operational insights continuously.

5. CENTRALISED DATA MANAGEMENT

The platform aims to centralise collected data, making it accessible to authorised users anytime, anywhere. By eliminating data silos, the platform helps ensure that critical information is available to decision-makers when needed.

During the feasibility study, stakeholders frequently highlighted data integration as a significant challenge. The centralised architecture of the Connected Seafarm platform directly addresses this issue, enabling seamless data access across departments.

6. QUANTIFIED LONG-TERM BENEFITS

The feasibility study indicated significant anticipated benefits for stakeholders. For example, 60% of all stakeholders and 100% of farmers believed the platform would improve fish welfare in the long term. Additionally, 36% of stakeholders and 67% of farmers anticipate cost savings.

Two areas where the platform can deliver measurable benefits are feed efficiency and mortality reduction. Feed accounts for a large proportion of production costs in salmon farming. The platform's insights could improve the feed conversion ratio (FCR) by 1%, resulting in substantial savings across Scotland's 160+ marine sites. Using sensor insights to address issues like low oxygen levels or equipment failures, reducing mortality by 10% could result in significant cost savings across the industry.

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IMPACT

The impact of Krucial's Connected Seafarm platform extends beyond individual farm operations to the entire aquaculture sector. By digitising the fish farming process, the platform supports the industry's sustainability goals and helps meet exacting regulatory requirements. Its data-driven approach aims to enable more precise and timely interventions, ensuring to fish stocks with a high level of health and welfare, reduced environmental impact, and increased productivity.

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The Connected Seafarm platform represents a significant opportunity in advancing aquaculture technology with space-enabled technologies. With its potential for driving more informed business decisions that can lead to cost savings, improved welfare, and helping meet any compliance measures, the platform is poised to drive the digitisation of the global aquaculture industry and unlock new levels of efficiency and sustainability.