

EATIP FORUM - “DIGITALISATION IN AQUACULTURE – FROM VISION TO ACTION”

On the 26th March 2021, nearly 200 participants attended the virtual [European Aquaculture Technology and Innovation Platform](#) (EATIP) Forum co-hosted by the EATIP Mirror Platform (MiP) Cluster ACUIPLUS.

The presentations can be viewed at the EATIP Forum web site [DIGITALISATION IN AQUACULTURE](#).

The Forum consisted of six presentations addressing the potential and status of the digital transformation in the aquaculture sector. Rapidly advancing technology and interpretation tools permit many sectors to utilise data in novel ways; aquaculture is no exception to this.

As a contribution to the breaking down of silos, the scene was set by presenting how big data and digital technologies are implemented within the terrestrial agri-food sector. **Doris Marquardt**, DG AGRI – Unit B2 – Research and Innovation, and **Marjan Van Meerloo**, DG RTD – Unit C3 – Climate and Planetary Boundaries opened the Forum by presenting [A comprehensive approach towards boosting digital and data technologies and sustainability in agriculture](#). They referred to digitalisation as tools to reach increased precision, efficiency, competitiveness, sustainability, and sector transparency, being applicable to all types of farming, be it organic or conventional, large or small scale. However, digital technologies depend on the availability of large data sets and on the creation of an enabling environment through e.g. broadband provision, training and skill development, advisory services, investment opportunities and data interoperability. Three key challenges that were highlighted are a lack of data on the actual uptake and use of digital technologies, a digital divide between regions and types of farms, and readying rural communities for potential changes in employment structures. Promoting digital technologies in farming was suggested to be achieved through increasing cost effectiveness of digital solutions, enhancing performance assessment opportunities and improving trust in data sharing. They referred to the [Code of Conduct on Agriculture Data Sharing](#) (2018), the [European Strategy for Data](#) (2020) and the [Common agricultural policy funds | European Commission \(europa.eu\)](#) (CAP 2020). “Agriculture of Data” is one of the candidates for [European Partnerships in food, bioeconomy, natural resources, agriculture and environment](#) planned for the Work Programme 2023/4.

The talk of **Per Ivar Lund**, Vice President Digital & Business Development in [ScaleAQ](#), addressed the overall topic of [Digitalisation in the aquaculture sector](#). Even though digitalisation has moved beyond the conceptual stage, questions remain on the exact vision, drivers and targets. Still many parameters of operational fish farming excellence are unknown and there is a lack of agreed best practice, in particular related to fish behaviour. Instead of a push for more data, there should be a focus on assessing the correct type of parameters to record and insert into models. Overcoming proprietary software, integrating land and sea-based systems, improving consumer-driven transparency and scaling up automated aquaculture farms were mentioned as key issues to address. Operating with simple standards, limiting costs when designing digital systems and building upon existing solutions are other important elements to take into account.

[The use of IoT and IA for Digitalized and Sustainable Aquaculture](#) was presented by **Marilou Suc**, Marketing Director at [BioOceanOr](#), a French start-up company and member of the EATIP MiP [AQUIMER](#). They develop hardware and sensors for real-time predictive water monitoring. Even though massive amounts of data are generated, providing graphs, alerts, time series, forecasts, videos, images, it was remarked that, on average, only 1.5% of the captured data is ever analysed. AI may provide a solution as it turns simple “data” into “intelligence” and thus adds value. This was illustrated by a real-time monitoring example, demonstrating the highs and lows within a 24-hour cycle of Dissolved Oxygen levels. When combined with predictive modelling, these data may be actively used in smart feeding to achieve precision farming. Sensors and probes combined with appropriate servicing and recalibrations lay at the basis of reliable data sets.

Jørn Torsvik, General manager at [AquaCloud AS](#), which was initiated by the EATIP MiP [NCE Seafood Innovation](#) shared a number of lessons learnt in [Managing muliti-stakeholder digitalisation and big data project - bottlenecks and possibilities](#). As a not for profit company founded by fish farmers, AquaCloud addresses three main areas: sensor data, environmental best practice for capturing data, and fish health. The system covers 130,000 data points and a total input from some 4000 cages. With reference to the UN Global Compact initiative “[Accelerating Sustainable Seafood](#)” it was stated that access to high quality standardised non-financial data remains a critical bottleneck. Data quality, data standardisation and data sharing beyond farm level are all issues to be addressed if to contribute to the creation of a sustainable aquaculture growth. It is critical that cooperation and confidentiality agreements are signed off – noting that, for example, data could influence market first sale prices. The project takes a systems approach, engaging data users, companies, providers and researchers. It acts as a data integrator rather than a data provider.

Another example of public-private partnership in aquaculture is the [PPP Seafood – a system by and for the industry to collaborate on the use of data](#). **Henrik Stenwig**, Director of Environment and Veterinary Affairs at the [Norwegian Seafood Federation](#), explained how this newly established system uses digital tools and sharing of data to ensure sustainable growth and profitability. Three key outputs are envisaged, i.e. legal, scientific and technical interoperability. The legal aspects are linked to the EU Code of Conduct on Agricultural Data as referenced above. The next steps to be taken are contractual agreements between partners, particularly with regard to ownership of data.

The final presentation was given by Hendrik Monsees, a scientist at Leibnitz Institute of [IGB Berlin](#), on the [Use of innovative virtual reality methods in practical aquaculture training](#). Through funding by the Federal Ministry of Education and Research in Germany, a tool has been developed for virtual reality (VR) training in RAS aquaculture. One of its main strengths are the “total immersion” experience, its independence of location, the possibility to use off-line, no need for maintenance or use of living organisms, and the fact that complex scenarios and a wide range of problems may be presented that would not be possible in actual operational sites. This solution may thus provide a good opportunity to train staff at low costs.

An on-line poll was run among the attendants in two separate sessions, followed by an open discussion. There was a nearly equal split when asking at what rate aquaculture is experiencing the digital transformation compared to other sectors, with 42 % feeling progress was much or slightly lower vs 39% much or slightly higher. Further discussions revealed that these differences may be linked to the type of respondents (industry vs. academia), their size (SMEs vs. large companies), and type of production (finfish vs. shellfish and algae). The application of data and digital technologies across sectors and species clearly requires further consideration, specifically with regard to the implementation in small-scale production sites, which often lack the resources to invest in expensive and complex solutions. Exchange of experiences from the agriculture to the aquaculture sector on how to address these bottlenecks was recommended.

Automation and remote control seemed to be the areas where most participants recorded some use experience, although the response rate was relatively low. Cost and skills remained a perceived barrier to uptake of new digital tools whilst not all metrics were considered to be sufficiently addressed – fish welfare being the most significant of these. The role of digital technologies, VR and AR for training purposes was clearly recognised.

As a conclusion, the key themes to have emerged from the forum include data as an enabling tool for improved observation, implementation and prediction. Considerations that need to be taken into account in the digital transformation of the aquaculture sector are:

- **Costs and financial implications** – not only in terms of hardware / software to facilitate greater digitalisation within companies, but also including the free provision of shared data resources and the value of individual data.

- **Trust** – relating to issues of confidentiality along with codes of conduct and best practice in data use. Consistency, reliability and standards within data use must also be addressed.
- **Users** – with particular regard to those unable to exploit and optimise data. This is linked to wider issues including digitalisation and data use education, skill development and training.

Recommendations for further work in this field include:

- Developing a data vision for aquaculture (addressing sector transparency, food safety, traceability as selling points towards reaching the European targets).
- Consideration of application of digital technologies across micro / SME businesses, including the shellfish and algae sectors.
- Continuing sharing best practice & lessons learned between the agriculture / aquaculture experiences.
- Consideration of supporting provision of aquaculture data and monitoring through tailored services (e.g. through data provided by Copernicus / EMODnet)
- Focus on smart data use and application supporting precision farming centred on optimal fish health & welfare.

For further information on this webinar, as well as any other queries, please contact EATiP at secretariat@eatip.eu.