Insights from the field

Chasing the final percentages

At Lerøy Aurora's Klokkardalen site, strong production is built on skilled people, solid routines and the constant drive to capture the final percentages. With Bioscope 3.0 from OptoScale, the team now gets a clearer and more precise picture of the fish throughout the entire production cycle.

> **Bioscope 3.0 gives us a more precise picture of the fish's status and development – every single day.**

Stein Johansen
Site Manager, Klokkardalen

A site with high ambitions

Klokkardalen is a site with strong expertise, solid routines and high ambitions for production. Here, development is rarely about one major change, but about seeing more, understanding more and making more precise decisions.

For Klokkardalen, Bioscope 3.0 has become a practical support tool in this work. The technology provides the insight needed when the experience from the people on site remains the most important foundation for good decisions.

That is exactly where the value becomes clear, explains Hans-Ole Nordahl, Head of Coastal Farming Technology at Lerøy Aurora.

All-in-one and precise data

Bioscope 3.0 gives Klokkardalen continuous measurements across several important parts of production – including weight, lice, health, behaviour and feeding.

For Nordahl, the value lies in being able to see more of the full picture. When data from several areas is gathered in one solution, it becomes easier to follow development in the cages over time and understand how different parts of production are connected. This gives the site a broader picture of the fish – both in daily follow-up and in the longer-term assessments throughout production.

> **It's a real advantage to have an all-in-one solution that delivers the same precise figures as dedicated biological measuring instruments.**

Hans-Ole Nordahl,
Head of Coastal Farming Technology,
Lerøy Aurora

Modules with Bioscope 3.0

- Weight
- Lice
- Health
- Behaviour
- Feeding
- Planning

On the next pages, you can read more about:

Less manual work – more calm in production

Manual weighing and lice counting have long been a necessary part of everyday fish farming. At the same time, they require time, planning and handling of the fish.

With Bioscope 3.0, Klokkardalen gets more of this information continuously throughout the production cycle.

For the people on site, this creates a better flow in daily operations. For the fish, it means fewer situations where they need to be handled or disturbed unnecessarily.

Better flow in day-to-day operations

Stein Johansen, Site Manager at Klokkardalen, points out that this creates value throughout the entire production cycle – from weight and lice to feeding and daily follow-up.

"When more information is available continuously, it becomes easier to follow development closely without adding more manual work. It brings more calm to the site and provides a stronger basis for making good decisions along the way."

> **Camera technology reduces the amount of manual work throughout an entire production cycle.**

Stein Johansen
Site Manager, Klokkardalen

Value in practice

- Less manual work
- Less unnecessary handling

More functions. Fewer units.

When more of the daily follow-up is gathered in one unit, it makes a practical difference in the cage.

For Klokkardalen, this means less equipment in the water, fewer connections to manage and less to follow up throughout the production cycle. Functions that previously could require separate units – such as environmental sensors and dedicated feeding cameras – are now integrated into Bioscope 3.0. This gives the team a clearer, more streamlined everyday workflow and better conditions for stable operations.

Fish health

It is also about fish health. The less equipment there is in the cage, the fewer contact points there are for the fish. This helps reduce the risk of contact, minor injuries and wound development.

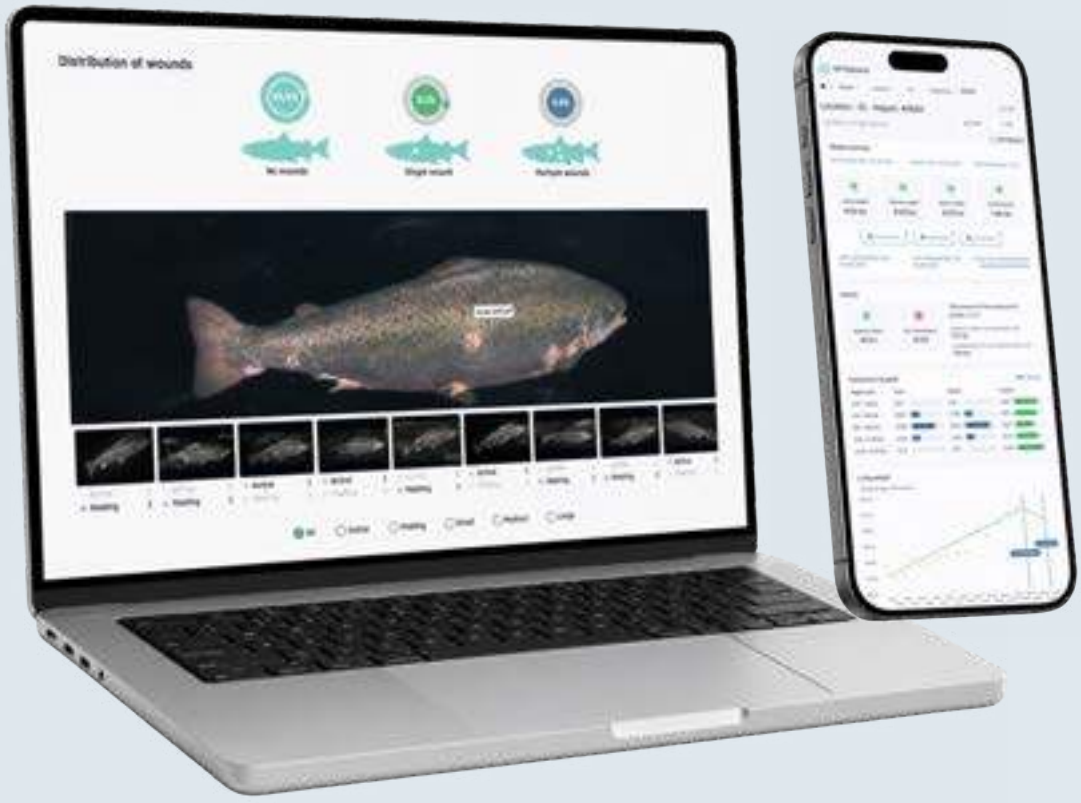
During colder periods in Northern Norway, this becomes especially important. When sea temperatures are low, wounds can take longer to heal – making it even more valuable to remove unnecessary strain wherever possible.

> **We now have fewer units in the cage, and we believe that can have positive effects for the fish.**

Stein Johansen
Site Manager, Klokkardalen

Value in practice

- Less equipment in the cage
- Fewer contact points for the fish



In the web portal, the team can follow wound development and quality distribution over time – two of several features included with Bioscope 3.0.

Example from the health module

> **Precision in the data is extremely important to us.**

Simon Eliseussen
Technician, Klokkardalen

Data you can trust

At Klokkardalen, the team follows production closely from start to finish. They know the fish, follow development in the cages and work systematically to understand what is happening beneath the surface. That places high demands on the data.

When weight, lice, behaviour, health and feeding are part of the daily follow-up, frequent measurements are not enough on their own. The data also has to be precise enough to reflect the reality in the cage. Small deviations can affect how growth, biomass and production decisions are assessed.

Thousands of measurements every day give the team a continuous picture of development in the cage.

Precision means everything

For Klokkardalen, precision is one of the most important values delivered by Bioscope 3.0. The measurements remain accurate over time, and weight precision in particular is highlighted as important. This gives the team a clearer picture of how the fish are developing – making it easier to follow growth, biomass and production over time.

Value in practice

- Precise measurements
- More reliable assessments

During feeding, the image has to deliver

For Iben Hoel Jensen, Feeding Operator at Klokkardalen, good feeding is about reading the fish's behaviour as accurately as possible. The image has to be clear enough to see the response from the very first second, follow the feed and make the right adjustments along the way.

Good image quality

With Bioscope 3.0, feeding operators get stronger support in the actual feeding moment. Good image quality makes it easier to see how the fish are responding, while automatic pellet detection provides extra support in following how the feed moves through the cage.

The feeding camera can be panned and tilted, giving the team a wider view of what is happening around the bioscope during feeding.

Iben points out that image quality makes it easier to assess appetite, activity and signs of change. Especially in periods with poor visibility, reliable technology becomes even more important.

> **"Good image quality makes feeding more reliable. Especially when visibility is poor."**
>
> Iben Hoel Jensen
> Feeding Operator, Klokkardalen

Feeding response in context

For Iben and the feeding team, good feeding is about more than seeing that the fish are taking feed. They also need to understand why the response changes.

When activity, behaviour, oxygen levels or temperature affect the fish, it provides important context in the feeding moment. This makes it easier to interpret the response in the cage and adjust with greater confidence.

Value in practice

- Easier to read feeding response
- Better support during feeding

AI-generated illustration created to visualise a feeding moment.

Smart winch gives more control

At Klokkardalen, the Bioscope does not stay in one fixed position. It needs to move with the conditions in the cage – whether the fish are standing deeper, the feeding picture changes, or the unit needs to be lifted for cleaning and service.

For technician Simon Eliseussen and the team, the smart winch is therefore a practical part of daily operations. It makes it easier to adjust the camera's position in the cage and retrieve it when needed.

Simon points out that it is often the small, practical features that make the biggest difference in everyday work. Being able to lift the Bioscope easily for cleaning or service makes the system easier to follow up and keep in operation.

> **It is the small things that make everyday operations easier.**

Simon Eliseussen
Technician Klokkardalen

Value in practice

- Easier camera handling
- Clearer images

Self-cleaning lenses provide better conditions for clear images – also over time in demanding sea conditions.

Clean lenses over time

Self-cleaning lenses reduce the need for manual cleaning, while helping the camera deliver clear images over time.

For Klokkardalen, this is a practical feature in everyday operations. Even in demanding sea conditions, the team sees that the glass stays clean – also when algae are present.

High uptime gives better continuity

A camera only creates value when it is in the cage and delivering.

For Klokkardalen, stable operations are therefore about more than technology. It is about having eyes on the fish during feeding, when measurements are collected, and when the team needs to follow development in the cage over time.

For the team, Bioscope 3.0 has delivered stable results, with high uptime highlighted as an important part of the value.

> **A camera in the cage is our daily eyes on the fish.**

Stein Johansen
Site Manager, Klokkardalen

High demands on robustness and support

In Northern Norway, conditions can be demanding. Weather, wind, low temperatures and variable visibility all place high demands on equipment operating at sea – especially during winter.

Site Manager Stein Johansen highlights support and easy access to spare parts as important reasons why the system works well in daily operations. When something needs follow-up, help is close at hand. This makes it easier to solve small issues before they grow – and helps keep the cameras running throughout production.

Continuity in daily follow-up

For the team, this means better continuity in how the fish are followed over time. The cameras should not only deliver good images and measurements when conditions are ideal – they also need to perform reliably through everyday production, with everything that comes with operating at sea.

Value in practice

- Eyes on the fish around the clock
- More continuity in operations

The final percentages

Klokkardalen has delivered strong results over time. That does not come from technology alone, but from the people who know the fish, the routines that shape everyday operations, and the decisions made throughout the production cycle.

That is exactly where Bioscope 3.0 creates value: as a support tool that gives the team an even stronger foundation for good decisions.

More measurements. Clearer images. Less manual work. And a better overview of how the fish are developing in the cage.

The interaction between people and technology

For Klokkardalen, this is not about starting from scratch. It is about giving an already strong production environment even better conditions for making the right choices.

Bioscope 3.0 fits in as a support tool for the expertise already present at the site. With more measurements, clearer images and better continuity in daily follow-up, the team gets a more complete picture of the fish throughout production.

The value rarely comes from one major change alone. It comes from the interaction between people, routines, experience – and technology that makes it easier to see a little more, a little earlier.

And that is where the final percentages are captured.

> **Strong results come first and foremost from the people, routines and expertise in production. Bioscope 3.0 helps us capture the final percentages.**

Hans-Ole Nordahl
Head of Coastal Farming Technology,
Lerøy Aurora