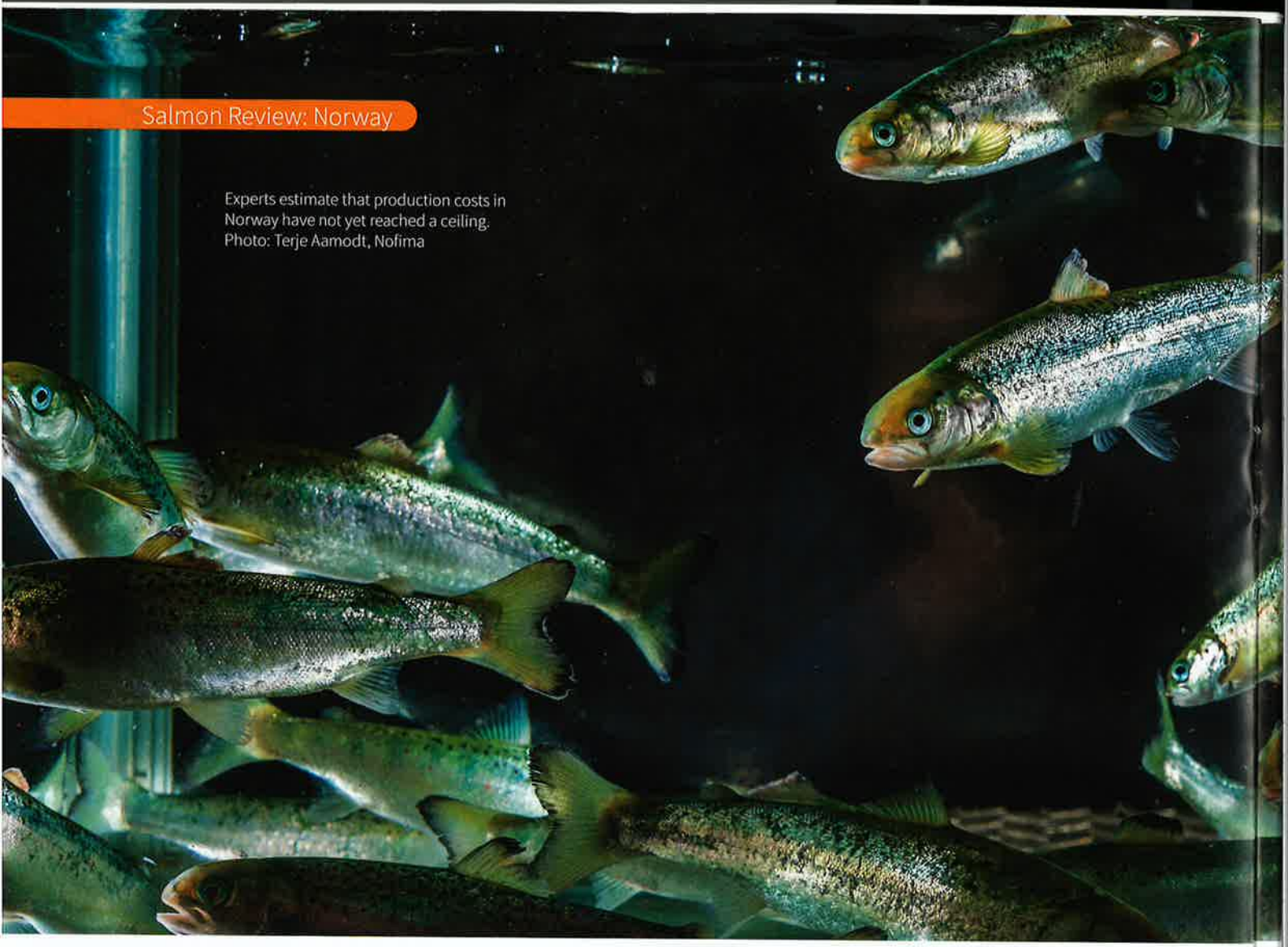

Experts estimate that production costs in Norway have not yet reached a ceiling. Photo: Terje Aamodt, Nofima

The cost peak was a false summit

Last year we asked if the industry might have reached 'peak cost' in 2016, so that the cost for the production of salmon would go down in 2017. Unfortunately, it didn't quite happen.

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Last year, things looked bright, with lower raw material costs for the feed, and lice costs that seemed to be on the way down. Bu the unit costs increased nonetheless from 36 to close to 37.50 NOK/kg (Finished slaughtered and packaged), or about 4%.

Cost developments from 2003 to 2017 are shown in **Figure 1**. Since their lowest level in 2005, unit costs have risen by circa 70% in actual prices (and circa 110% in nominal prices).

Lower prices for feed ingredients contributed to a reduction of 5% in the largest cost item, feed, from 16.36 to 15.6 NOK/kg. Lower economic feed factor due to biological and technical improvements also contributed positively. At the same time other cost items continued to increase.

Smolt costs increased by 40 cents/kg (12.5 %), the labour costs by 20 cents/kg, and the depreciation by 55 cents/kg. Other operating expenses, which in recent years have increased greatly due to the lice plagues, increased by approximately 70 cents/kg. The remaining costs are relatively stable.

What are the driving forces?

Nofima and Kontali Analysis have, in a project for FHF, looked more closely at the driving forces behind the cost development in aquaculture. Last year we had special focus on lice and feed costs 1). In this year's report we look more closely at developments in smolt costs and the increased cost accrual resulting from increased investment levels in the industry. In this article, we will describe the development both in these and the other key cost components.

Smolt costs

Smolt costs have more than doubled from 2006 to 2017, from 1.55 kr/kg to 3.60. Since 2012 the increase has been 76%, from 2.05 to 3.60. This is due to several factors. Firstly, unit cost per smolt put to sea has increased. Farmers have chosen to put out ever larger smolt to reduce the time in the sea. This can both reduce the risk of harm by lice and provide better MTB utilisation.

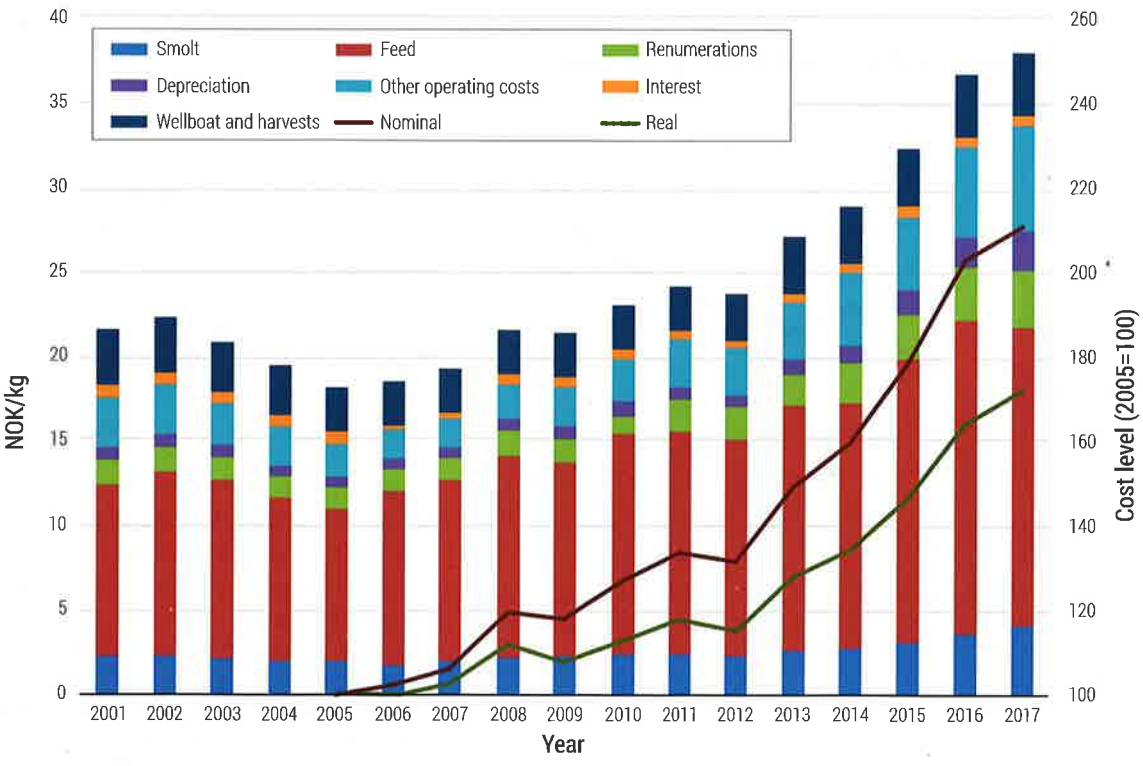

Figure 1. Cost development since 2005. Source: Kontali Analysis

In 2010 the average stocking weight was 80 grams, now it's at around 135 grams (**Figure 2**). Behind this lies considerable investment in facilities, while the vast majority of variable costs, such as travel, wages etc., increase significantly per smolt with such a weight gain. A number of breeders are trying out massive-smolt strategies with smolt of close to 1 kilo. This can result in production time in the sea reduced down towards 10 months, thus giving less exposure to lice, and in addition a completely different utilization of sites, equipment and, not least, MTB. At the same time, much has happened over the last 5-7 years on both the egg side and with vaccination regimes. These are also changes that have contributed to higher unit costs.

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Secondly, the yield per smolt has not increased as one would expect. Smolt yield has been clearly reduced for the last 3-4 generations that have been harvested (**Figure 3**). This is primarily as result of reduced harvest weight and increased wastage, albeit with a small improvement from the 2015-to 2016-generations.

Labour costs

Labour costs continue to increase. The increase was 7% from 2016 to 2017, in itself not dramatic, but also this year greater than wage increases, which indicates that the workload is increasing. Labour costs have about doubled from 2012 to 2017. This relates, inter alia, to lice problems, how much labour is used for monitoring (such as lice counting), prevention and treatment of lice. With the extensive and increasing outsourcing of labour-intensive operations, the real increase in labour costs is even greater,

Other operating costs

Other operating costs continue to increase, up 15% from 2016 to 2017. Here we have also seen (more than) a doubling since 2012. Lice problems remain the underlying driver for this development. At the same time, they increase the hiring of services to this item. Disease also contributes to poor biology.

Depreciation and capital tied up

Depreciation increased by 35% from 2016 to 2017, after an increase of 24% a year earlier. The depreciation was at 2.10 kr/kg in 2017, which is more than four times the level it was in 2006. Depreciation has thus gone from making up 2.7% of the costs in 2006 to 5.6% in 2017. When depreciation increases so much, it is of course related to increased investments in the industry. Investments are due to both technology development and automation, but also have the context of investments in equipment to prevent and treat lice. Capital cost also increased considerably from 2006 to 2017, although the interest rates are lower. This also has some relationship with increased investments.

In the report we discuss the reasons behind the increased capital tied up in the industry. It has invested a lot in new, larger and more modern equipment. Feed barges are larger, workboats are both larger and more numerous, rings, nets and mooring equipment become more complicated and more solid, and the fish are being monitored ever better. Overall,

Evolution in the set-out weight 2005-2018E, smolts put to sea in Norway

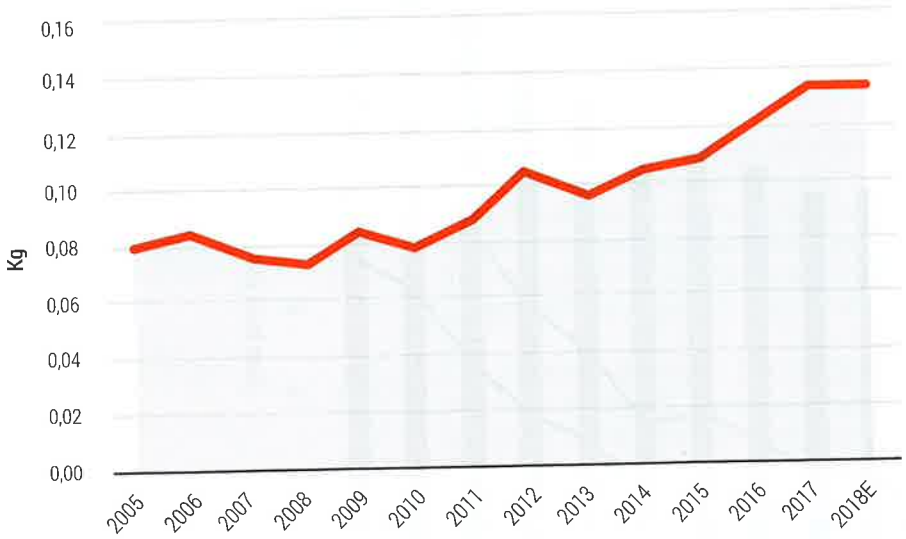

Figure 2 Development of smolt yield 2005-2018, smolts set out in Norway.

this represents significant investments in production equipment.

In addition to investing a lot in food fish production, we find large investments with different suppliers, which also affect the industry's costs. Large investments in smolt plants affect the smolt cost. When service providers invest heavily in delousing equipment, such as delousing barges, this cost is passed on to the farmers through the purchase of services and shows under "Other operating expenses". The same happens when investing heavily in wellboats and service boats. These are investments that the farmer is less likely to take on, but which they pay for through the prices of the services.

Increased capital tied up in the industry

We have data from Fisheries Directorate's profitability studies until 2016, and Kontali's own data sets which also include 2017. These are not altogether congruent, but we combine these to indicate an increase in the balance sheet for hatchery production from about 7.5 to 14.5 billion NOK from 2009 to 2017. The changes are distributed fairly evenly across the various categories of assets – buildings and equipment doubles, while goods, receivables, intangible assets and cash / bank increases by 30-50%.

For food fish farming, the absolute changes in the balance are greater. Here the assets increase from roughly 38 to 78 billion NOK. Here too, the distribution of various assets is fairly steady. Non-financial fixed assets more than double, while items, receivables, and financial fixed assets are doubled. Intangible fixed assets increase by 50% and cash/bank by three times.

During the period, production has increased considerably, so that the capital tied up per produced unit has not increased correspondingly, but it is still a sharp increase.

The wellboat industry is growing rapidly: from 2012 to 2017 the turnover has been roughly doubled. And between 2015 and 2017 the book values of the wellboat companies grew nearly 40%, from approximately 6 billion to about 8.5 billion NOK. The growth in capital tied up is due to large investments in new builds. The amount of fish transported has been relatively stable since 2012, ensuring that the turnover increase is mainly due to increased prices and increased use of wellboats for delousing and fresh water treatment against AGD.

Non-drug delousing methods have increased in revenues from 90 million in 2011 to 400 million in 2016. Some of these companies are investing in large capital ties in the form of, for example, delousing vessels. The capital invested has increased from 148 million in 2016 to over 284 million in 2016, and even more so in the 2017.

The service companies have also had a tremendous growth driven, among other things, by the need to deal with lice issues. There are now about 40 companies in this category, and they have tripled turnover from 2011 to 2016. In the course of this, there has also been a large capital build-up, where the balance values increased from 1.8 to 2.1 billion from 2015 to 2016.

Summary

There are still developments in feed prices and consumption, as well as the lice and disease situations that have the most impact on cost developments. But we have also seen that other expenses evolve, and in this year's report have moved into smolt costs and the costs associated with investments in plant and equipment. Changes in these costs reflect changes in the challenges the industry has and changes to the operating strategies to meet the challenges.

When this was written, the industry was in the midst of the most demanding period of lice handling. Wise of the damage we may not imply that the cost peak has been reached...

Reference

Audun and Øystein Hermanen (Nofima), Ragnar Nystøyl and Eirik junge Hess (Kontali analyse) (2017): Cost development in salmon farming. With a focus on feed and gate costs. Nofima, Report 24/2017.

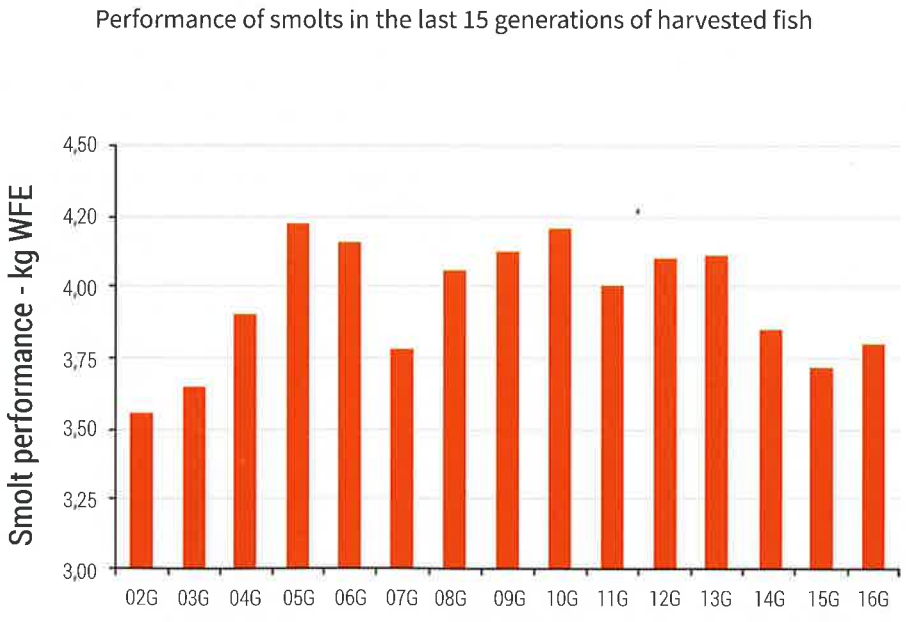

Figure 3 Development in smolt yield per generation (02G - 16G), smolt set out in Norway.
Source: Kontali Analysis