SKOGSSTYRELSEN
SWEDISH FOREST AGENCY
Division of statistics and data collection

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Forest harvesting development in Sweden

Summary

The European Commission's Joint Research Centre (JRC) published an article in the scientific journal Nature last July claiming that harvesting in the EU had increased by 49% over the last few years and that Sweden and Finland are responsible for 50% of that increase. Because this statement is in direct contradiction with the official Swedish statistics on harvesting, the Swedish Forest Agency (SFA) has compiled statistics from various independent official sources that would have been affected if the JRC's conclusions were correct. Based on this compilation the SFA concludes that neither Swedish harvesting statistics, production statistics, trade statistics, energy statistics or employment statistics show any indications that could support an increase in harvesting to the extent posited by the JRC. The claim by the JRC on increased harvesting is faulty and misleading.

Introduction

On July 1st the journal Nature published an article by a number of scientists employed by the European Commission's Joint Research Centre (JRC[1]). The authors have used remote sensing methods to estimate the development of the harvested area and the harvested amount of biomass over time. They draw the conclusion that the annually harvested area has increased by 49% and that the annually harvested amount of biomass has increased by 69% in the EU between the periods 2011-2015 and 2016-2018. Furthermore, they state that over 50% of that increase has occurred in Finland and Sweden and that the driver behind this increase is a growing bioeconomy with an increased demand for forest biomass. Simultaneously Nature published an editorial in which it is argued that the EU needs to develop the way in which forest statistics are produced and that EU member states ought to include JRC's datasets in their official national statistics[2].

According to background information accompanying the article the annual harvested area in Sweden supposedly would have increased by 41% between the periods 2011-2015 and 2016-2018. It is unclear which harvesting is included in the article, probably final fellings are included but not all thinning. If only final fellings would be considered, it would mean – according to statistic from the Swedish University of Agricultural Sciences' (SLU) National Forest Inventory – that the area of final fellings would have increased from 200 000 hectares per year during 2011-2015 to 280 000

[1] Ceccherini, G., Duveiller, G., Grassi, G. et al. Abrupt increase in harvested forest area over Europe after 2015. Nature 583, 72–77 (2020). https://doi.org/10.1038/s41586-020-2438-y

[2] Editorial. How Europe can fix its forests data gap. Nature 583, 8 (2020). https://www.nature.com/articles/d41586-020-01848-x

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hectares per year during 2016-2018, i.e. an increase of 80 000 hectares. Converted to harvested volume this would correspond an increase of approximately 20 million m^3. These are tremendous increases and if the article's data – besides final fellings – even includes thinning the increases would be even larger.

Because the article's results contradict Swedish official statistics on harvesting and thereby risk misleading decision-makers as well as the public at large the SFA and SLU jointly issued a press release on the 3rd of July in which both government agencies questioned the article's conclusions[3]. Even Finnish authorities questioned the conclusions of the article[4].

In spite of this, the article has received both national and international attention. The SFA therefore sees a need to clarify that the development that supposedly occurred according to the JRC is not supported by other statistics sources either. Apart from the fact that such a large increase of harvesting in Sweden would have to be visible in the Swedish official harvesting statistics, it would also have shown up in a number of independent statistics sources. The supposed increase is so extensive that we then should be able to see it appear as well in Swedish production statistics, trade statistics, energy statistics and other harvesting-related statistics. These other sources are especially relevant because of the article's explanation that the increased harvesting is caused by a growing bioeconomy with an increased demand for forest biomass.

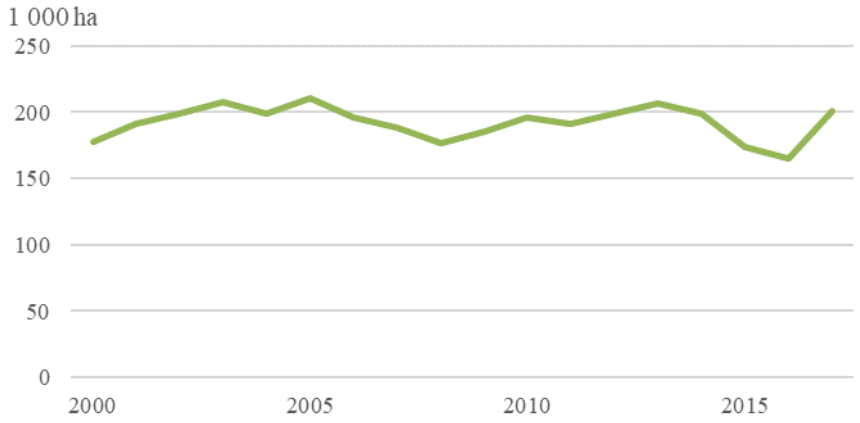
The SFA has therefore compiled statistics from different sources for the respective periods that would have been affected by the supposed increase in harvesting. The sources are various independent statistics producers and independent inquiries: the Swedish Forest Agency[5], the Swedish University of Agricultural Sciences' National Forest Inventory[6], Statistics Sweden (SCB)[7], the Swedish Energy Agency[8] and Biometria[9].

Statistics on harvested area

The area of final fellings per year has decreased by 8% between the periods 2011-2015 and 2016-2018 according the National Forest Inventory's (NFI) random plot sample inventory, which amounts to a decrease of over 16 000 hectares (Fig. 1).

[3] https://www.skogsstyrelsen.se/nyhetslista/felaktig-statistik-om-avverkning-i-tidskriften-nature/, https://www.slu.se/ew-nyheter/2020/7/felaktig-statistik-om-avverkning-i-tidskriften-nature/
[4] https://www.luke.fi/en/blog/a-new-article-in-the-journal-nature-overestimates-the-increase-of-forest-harvesting-in-europe/
[5] Skogsstyrelsen. https://www.skogsstyrelsen.se/statistik/
[6] SLU Riksskogstaxeringen. https://www.slu.se/miljoanalys/statistik-och-miljodata/statistik/
[7] Statistiska centralbyrån. https://www.scb.se/
[8] Energimyndigheten. https://www.energimyndigheten.se/statistik/den-officiella-statistiken/
[9] Biometria. https://www.biometria.se/rapporter-och-statistik/

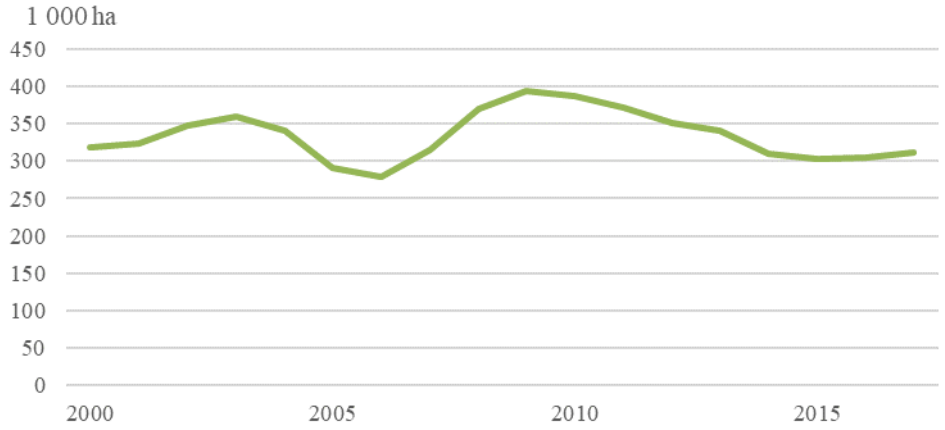
Figure 1. Annual area of final fellings 2000–2017. Whole country. Moving 3-year average. 1000 hectares



Source: SLU National Forest Inventory

Even the average annual area of thinnings has decreased under this period with approximately 20 000 hectares, which corresponds to a decrease of 8% (Fig. 2).

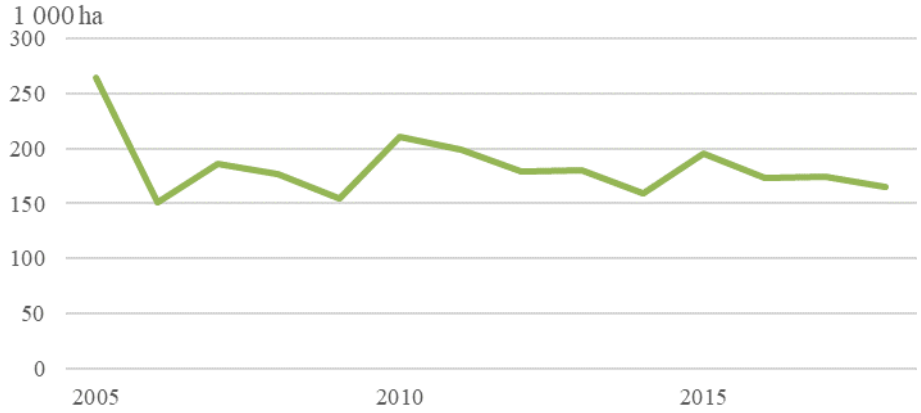
Figure 2. Annual area of thinnings 2000–2017. Whole country. Moving 3-year average. 1000 hectares



Source: SLU National Forest Inventory

Apart from statistics by from the National Forest Inventory, the SFA – within the frame of its supervision and extension assignment – conducts continuous surveys and monitoring by means of remote sensing of the areas that have been harvested. Data on harvesting acquired through change analysis of satellite imagery are subsequently audited by the SFA. A compilation of the results of this work shows that the annual area of final fellings decreased by approximately 7% between the periods 2011-2015 and 2016-2018 (Fig 3).

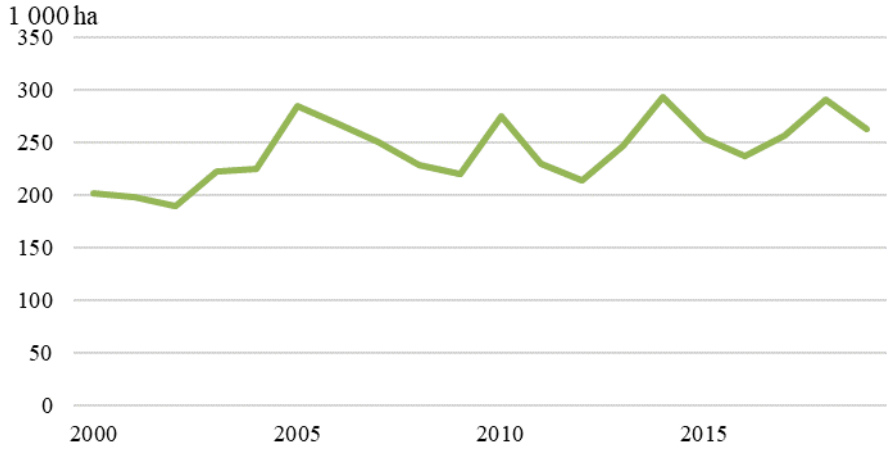
Figure 3. Harvested area according to the SFA's surveys of actual harvests 2005—2018. Whole country. 1000 hectares.



Source: Swedish Forest Agency

Final felling is a measure that requires an obligatory notification to the SFA according the Swedish Forest Act. A notification is valid for five years, which means that the year of actual harvest does not always coincide with the year in which the notification was sent. The average annual area of harvesting notifications increased by 5% between the periods 2011-2015 and 2016-2018 (Fig. 4).

Figure 4. Notified area for final felling 2000–2019. Whole country. 1000 hectares



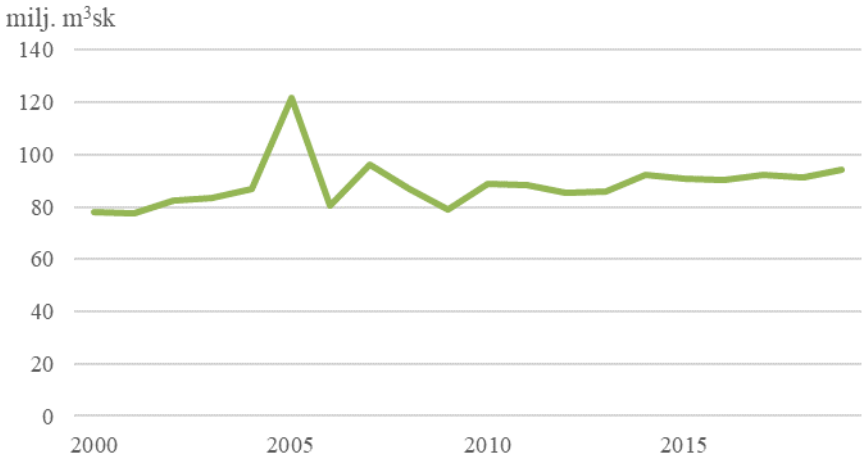
Source: Swedish Forest Agency

Statistics on harvested volume

The annual Swedish gross harvest has increased by just over 3% between the periods 2011-2015 and 2016-2018 according to official statistics, which amounts to an increase of just under 3 million m^3 (Fig. 5). The SFA produces the official statistics on harvested volume independently from other statistics producers based on model calculations. This model calculation is mainly based on data on the forest industry's consumption of roundwood,

consumption of roundwood for energy purposes (fuelwood), import/export statistics on roundwood and statistics on roundwood stocks.

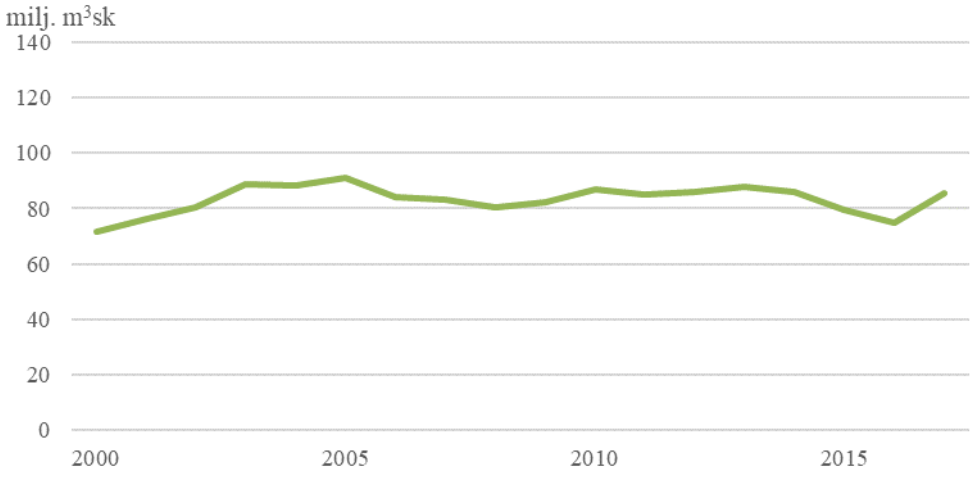
Figure 5. Annual gross harvest according to the SFA 2000–2019. Whole country. Million m³



Source: Swedish Forest Agency

The official gross harvesting statistics are produced by the SFA, but harvesting statistics are also produced by the SLU National Forest Inventory based on a random sampling of the country's forests. SLU's statistics are therefore based on different data sources than those used by the SFA in its production of the official statistics. Estimates by the SLU National Forest Inventory indicate that the average annual harvested volume remained unchanged (<1%) between the periods 2011-2015 and 2016-2018 (Fig. 6).

Figure 6. Annual gross harvest according to SLU National Forest Inventory 2000–2017. Whole country. Moving 3-year average. Million m³

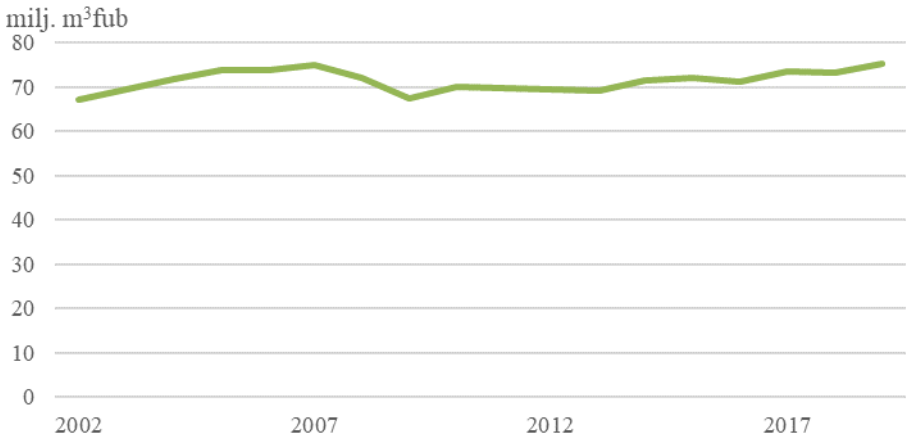


Source: SLU National Forest Inventory

Production statistics

Statistics on the forest industry's production (output) and intermediate consumption of raw materials is produced by Biometria. Data collection is from sawmills, panel industry, post- and match industry and paper and pulp industry. Statistics for the Swedish forest industry's raw material consumption indicates that the annual consumption of roundwood has increased by just over 3% during the periods 2011-2015 and 2016-2018 (Fig. 7). This corresponds to an increase of roughly 2 million m^3.

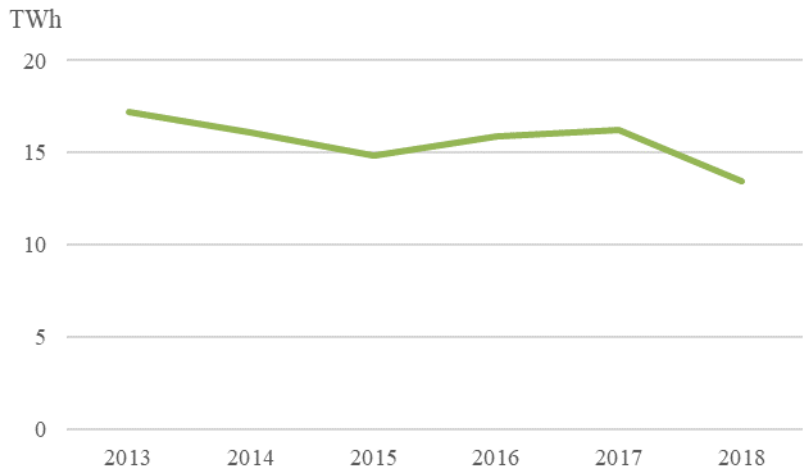
Figure 7. Consumption of roundwood in sawmills, panel industry and paper- and pulp industry 2002–2019. Million m^3



Source: Biometria

Besides the forest industry's (sawmills, panel industry and paper- and pulp industry) consumption, roundwood is also used for energy purposes. The Swedish Energy Agency is responsible for official energy statistics. Since 2013 they survey Swedish producers of unprocessed woodfuels (chips, bark, shavings and fuelwood). These statistics show the consumption of roundwood for commercial and non-commercial woodfuel production in Sweden. The annual consumption of domestic roundwood has decreased by 5% between the periods 2013-2015 and 2016-2018, which corresponds to approximately 0.4 million m^3 (Fig. 8).

Figure 8. Annual production of unprocessed woodfuels of domestic roundwood 2013–2018. TWh

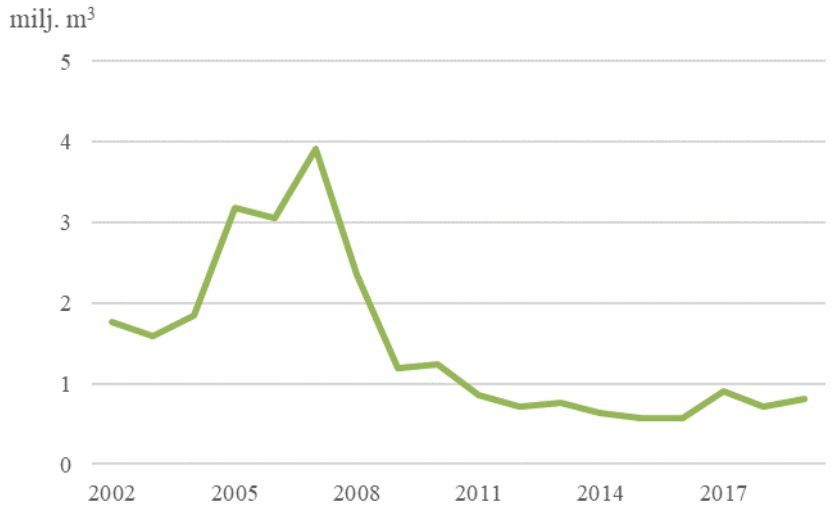


Source: Swedish Energy Agency

Trade statistics

Swedish foreign trade statistics are produced by Statistics Sweden (SCB). The annual export of roundwood under the period 2016-2018 totaled approximately 0.7 million m^3 which is an increase of 4% compared to the annual export in the period 2011-2015 (Fig. 9). Net imports (imports minus exports) of roundwood increased by approximately 5% during the same period.

Figure 9. Annual Swedish export of roundwood 2002–2019. Million m^3



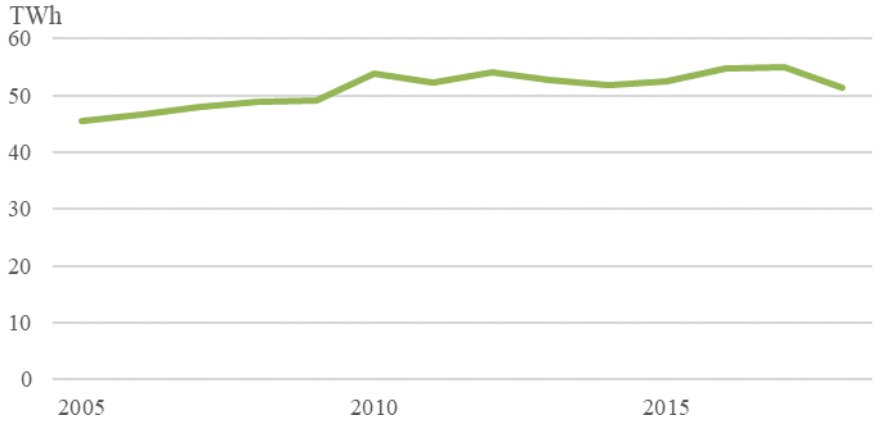
Source: Statistics Sweden

Other statistics

In addition to harvesting statistics, production statistics and trade statistics there are other statistics sources where an increased harvest would become visible. Such sources include various energy statistics from the Swedish Energy Agency as well as employment statistics by the SFA.

The Swedish Energy Agency publishes official statistics in the form of annual energy balances where the use of unprocessed woodfuels can be gathered Unprocessed woodfuels comprise chips, bark, shaving and fuelwood. This includes primary fuels (harvesting residues), by-products from the forest industry and post-consumer recovered woodfuel. The annual consumption of unprocessed woodfuel in the Swedish energy system increased by approximately 2% during the period 2011-2015 and 2016-2018 (Fig. 10).

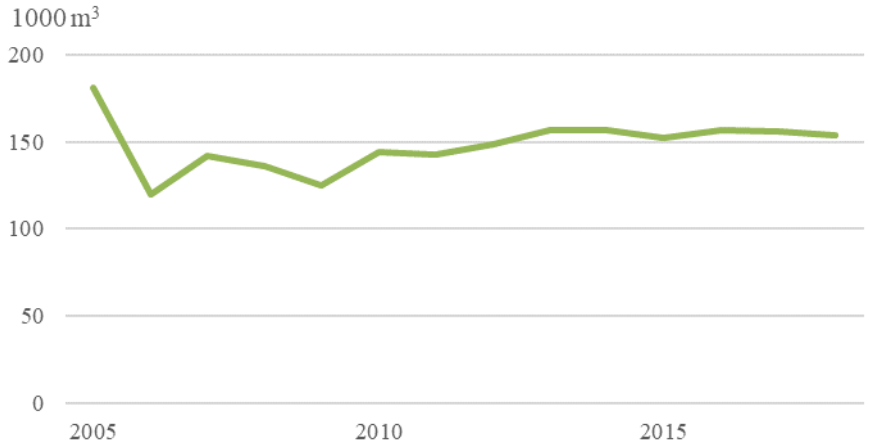
Figure 10. Consumption of unprocessed woodfuels 2005–2018. TWh



Source: Swedish Energy Agency

The Swedish Energy Agency's official energy balances also show the consumption of diesel in forestry operations. The annual consumption of diesel increased by almost 3% between 2011-2015 and 2016-2018 (Fig. 11).

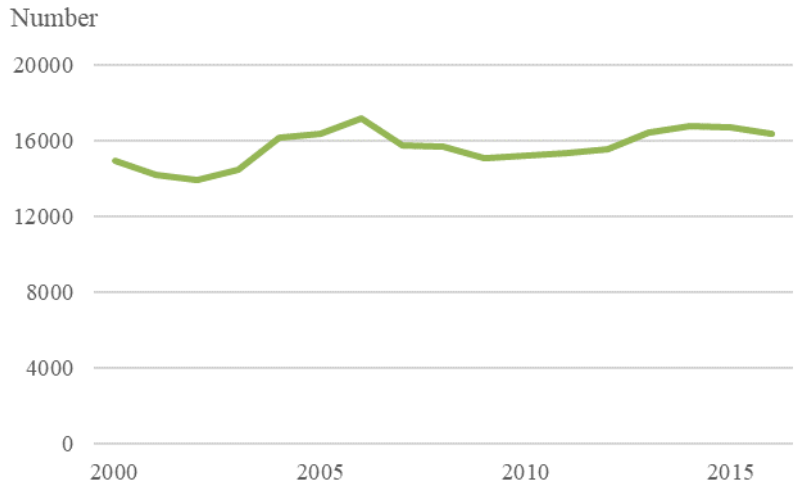
Figure 11. Consumption of diesel in forestry operations 2005–2018. 1000 m³



Source: Swedish Energy Agency

The SFA publishes official employment statistics for the forestry sector. No aggregated employment statistics in forestry were produced for the year 2018 which inhibits the comparison of the periods 2011-2015 and 2016-2018 (Fig. 12). However, statistics up till and including the year 2017 indicate a rather unchanged employment in forestry.

Figure 12. Number of annual working units in forestry 2000–2016. 3-year average. Number of annual working units



Source: Swedish Forest Agency

Conclusions

The JRC claims that the annually harvested area in Sweden increased by 41% between the periods 2011-2015 and 2016-2018 which would mean that the area of final fellings would have increased by 80 000 hectares. This is not in line with estimates by the SLU National Forest Inventory. Estimates by the SLU National Forest Inventory rather show a decrease of 8%. This decrease is also supported by the Swedish Forest Agency's own remote sensing analyses that indicate a decrease of approximately 7%. The area notified for final felling increased by 5% during the period but it has to be noted that a harvesting notification is valid for 5 years and it is also not the case that the area will actually be harvested. Even though the area of notified final fellings increased somewhat, it is far from the 41% that the JRC claims.

A 41% increase of final fellings means that the annual gross harvest volume in Sweden on average would have had to have increased with 20 million m^3. According to the official harvesting statistics by the Swedish Forest Agency, the gross harvesting volume has increased somewhat during the period, but only by 3% or 3 million m^3. The SLU National Forest Inventory which produces an independent estimate of Swedish harvests based on other data sources shows instead an unchanged harvesting level during the period.

The large increase in harvesting that the JRC claims can also not be found in the Swedish production statistics, trade statistics or energy statistics. The consumption of roundwood in the Swedish forest industry (sawmills, panel

industry and paper- and pulp industry) increased by 3% during the period according to statistics from Biometria while simultaneously the consumption of roundwood for energy purposes decreased by 5% according to statistics from the Swedish Energy Agency. The changes that occurred in the domestic consumption of roundwood correspond with the official harvesting statistics. Moreover, there is also no indication in the foreign trade statistics from Statistics Sweden that the export of roundwood would have increased by any appreciable extent. Neither the domestic consumption of roundwood or Swedish export of roundwood have changed to such extent as would have had to have been the case if the JRC's claims would have been accurate.

The explanation the JRC presents, namely that the large increase in harvesting is a consequence of a growing bioeconomy does not only lack support in the Swedish production- and trade statistics but also the energy- and employment statistics give no such indication. The official energy statistics do not indicate that the use of unprocessed wood fuels has increased by any significant amount during the period or that the consumption of diesel in forestry operations has significantly increased. Apart from the fact that an increase in harvesting would have caused an increase in fuel consumption it would have also required an increased workforce to carry out said harvesting. However, also employment in forestry has not increased according to official employment statistics.

Finally, it has to be noted that statistics are always connected to uncertainties which means that data from different statistics sources can lead to different assessments and conclusions, especially when dealing with lesser changes over time. In this case however we are dealing with extremely large changes that the JRC claims have occurred and such changes should have affected a multitude of independent statistics sources. This has not been the case. The reason for the increase in harvesting as claimed by the JRC is therefore to be found in their own flawed method and calculations rather than the Swedish forest or a growing bioeconomy. What we are dealing with here is a faulty and misleading estimate of Swedish harvest by the JRC.