

# Denmark can triple its biomass production and improve the environment

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The industry is interested in establishing a biorefinery sector in Denmark that can replace oil-based products with biofriendly materials, chemicals, energy and fuel. But this requires a larger biomass production than we are currently achieving. Scientists from University of Copenhagen and Aarhus University have published an extensive report that shows how we can increase the production of biomass by more than 200% in an environmentally friendly way.

The report called "The ten-million-tonne plan" shows how we can increase the Danish production of biomass from agriculture and [forestry](#) by 10 million tonnes per year without affecting the current production of feed and food.

The plan also shows how we can substantially reduce the [environmental impact](#) compared with current levels.

"It sounds too good to be true, but it is quite realistic. By concentrating on a number of areas we can in practice double plant production and improve the utilisation of existing resources so there is enough both for food and feed production and for an additional 10 million tonnes of biomass in 2020," says Morten Gylling, senior advisor at the Faculty of Science, University of Copenhagen.

The report contains a number of specific subelements that combined provide a solution for how we can use sustainable biology and technology to get an additional 10 million tonnes of biomass a year by

2020 without incorporating more [agricultural land](#).

"One of the options is to double crop yield per hectare in selected areas. This can be done by converting to [cropping systems](#) with improved [perennial crops](#) and break crops to extend the growing season and thus more fully exploit the [solar radiation](#). This will be sufficient to meet the requirements for both feed and food production and for the biomass production for a number of biofriendly products," explains Uffe Jørgensen, senior scientist at Aarhus University.

The increased production of biomass means that it would be possible to establish a biorefinery sector in Denmark – a sector that is crucial for the establishment of a green growth economy in Denmark.

"A future Danish biorefinery sector would create around new 20,000 jobs in production and industry, primarily in the provinces," says professor Claus Felby from University of Copenhagen and continues:

"10 million tonnes of biomass actually corresponds to 20 percent of our current consumption of natural gas and to 30-50 percent of our consumption of petroleum and diesel. To this should be added a significantly higher feed production that to a large extent will be able to replace what we currently import from countries such as South America," says Claus Felby.

The results of the report also show that the aquatic environment will improve with a focus on biomass: The loss of nitrogen from farmland can be reduced by more than 20,000 tones:

"A focus on [biomass production](#) alone will help meet our obligations in the EU Water Framework Directive, which is one of the most important tasks of Natur og Landbrugskommissionen (Agriculture and Nature Council) at the moment. It is particularly a better utilisation of animal

manure that will help us to significantly reduce nitrate leaching," emphasizes Morten Gylling.

Biodiversity in Denmark will also be enhanced:

"We can increase biodiversity by harvesting the grass from approx. 70,000 ha of lowland meadows so they do not become smothered in nettles and willow as a result of nutrient overloads. Another option is to increase the area with natural woodland by 47,000 ha, and it is also possible to cut and remove the biomass and nutrients from approx. 7,000 ha of road verges to increase floral diversity," adds Uffe Jørgensen.

In order to realise the biomass potential, a massive investment in research and development will be needed in future years, particularly within agriculture and forestry, but also within the biological and [chemical](#) conversion of biomass.

The project is part of the collaboration between University of Copenhagen, Aarhus University and DONG set up in December 2011 to help launch special initiatives within research and education in green energy.

Provided by University of Copenhagen

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