

Science for Environment Policy

Halving EU meat and dairy consumption yields lower pollution and land use, and better health

Halving meat and dairy consumption in Europe could reduce agricultural greenhouse-gas emissions by up to 42% and nitrogen pollution by 40%, new research suggests. The amount of land needed to grow food for each EU citizen would fall from 0.23 to 0.17 hectares and the reduced intake of saturated fats and red meat could have substantial health benefits, the researchers conclude.

The [Roadmap to a Resource Efficient Europe](#) identified the food sector as particularly important to improving [sustainability](#). Reducing the amount of meat in the diet can reduce greenhouse-gas (GHG) emissions; however, other benefits such as reduced nitrogen pollution and improved [health](#) have been overlooked.

Here, the researchers investigated the effects of a 50% reduction in beef, dairy, pork, poultry and eggs in diets in the EU-27, to be replaced by cereals to make up daily calorie requirements. Where this resulted in a reduction of protein below the recommended level, the researchers added pulses to the scenario diet. However, this was only necessary in one country, Hungary. The researchers used data from the [Food and Agriculture Organization](#) to determine the current diets of the EU-27. They assumed that the dietary changes would result in a substantial drop in the number of livestock in Europe, with knock-on effects on the amount of feed needed and on [land use](#).

To calculate the impacts of these changes on [agricultural](#) GHG emissions and nitrogen pollution, the researchers used the [MITERRA-Europe](#) model. This is an environmental impact-assessment model partly based on the CAPRI (Common Agricultural Policy Regionalised Impact) and GAINS (GHG-Air pollution INteraction and Synergies) models.

The results show that the demand for animal feed would drop from around 520 million tonnes (calculated for the reference year of 2004) to 285 million tonnes. This implies that over 70 million tonnes of cereals would become available for human consumption, while imports of soy bean meal could be reduced by 75%. Moreover, 23.7 million hectares of land previously used as pasture and to grow fodder would become available for other uses.

The researchers investigated two hypothetical possibilities for illustration of what might occur under different land-use scenarios. They found that using the land to grow cereal resulted in a reduction of 19% of agricultural GHG emissions compared to 2004, and would enable the EU to become a net exporter of cereals.

Growing bioenergy crops (such as canary reed grass, switchgrass, miscanthus, poplar or willow) resulted in even greater agricultural GHG reductions; a 42% reduction, from 464 million tonnes in the reference year (2004) to 268 million tonnes.

The reduction in nitrogen pollution was substantial under both scenarios; on average nitrogen emissions to water and air were reduced by around 40% as a result of the modified diet. It should be noted that the researchers did not assess the effects of setting aside any land for conservation, although this would likely have significant environmental benefits.

The dietary changes would also have substantial benefits for human health. For instance, the amount of saturated fat in the diet fell by 40%, which is expected to lower cases of heart disease and stroke. Reduced intake of red meat has also been linked to lower risk of colorectal cancer.

The researchers note that they assumed that the meat and dairy would be replaced in terms of calories by cereals. They caution that if instead they were replaced with fruit and vegetables the health benefits would be higher, but the environmental benefits would likely be lower.



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