

***Interactive comment on “N<sub>2</sub>O release from agro-biofuel production negates global warming reduction by replacing fossil fuels” by P. J. Crutzen et al.***

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In this thought provoking paper Crutzen et al. have provided yet more reasons for concern over the drive to increase corn ethanol production in the US.

The US Senate last month passed a bill setting a target for a 7-fold rise in corn ethanol production by 2022, this would mean an annual production equivalent to 36 billion US gallons by 2022. Assuming an energy content ratio of about 1.4 gasoline:ethanol such an increase in production could in theory replace about 26 billion gallons (US) of gasoline.

With 2.4kg CO<sub>2</sub> per litre gasoline and 3.78 litres per US gallon, the baseline CO<sub>2</sub>

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emissions from burning this amount of gasoline would be about 236 million tonnes per year. Using the top and bottom of the range in the Crutzen et al. paper, for warming relative to fossil fuels, for maize-based ethanol (0.9-1.5), would equate to 212 million tonnes of CO<sub>2</sub> a year from using corn ethanol instead of gasoline for transport (best case) or 354 million tonnes (worst case). Under this latter scenario the new target for corn ethanol would result in an additional 118 million tonnes of CO<sub>2</sub> per year. This would represent a 6% increase in total CO<sub>2</sub> emissions from transport each year in the US, relative to emissions in 2005 - not, I think, what the Senate had in mind.

Obviously, there are many caveats here, not least the need for full life-cycle analyses and the trade-offs between the fossil fuel inputs associated with production and the co-production of useful products. Nonetheless, the work by Crutzen et al. presented here would seem to indicate that, as a policy aimed at reducing the climate impact of US transport, the wholesale expansion of corn ethanol production is on very shaky ground.

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