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Organic farmers can gain from Green House Gas trade

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Farmers may earn money from participating in the ongoing greenhouse gas (GHG) trade system under the Kyoto agreement.

Farmers do not trade greenhouse gases (GHG) under the Kyoto agreement. This is a puzzle as agricultural land use contributes to 12% of global GHG emissions. In Denmark, the GHG contribution is even higher, namely 18%. Thus, while the debate on GHG has mainly focused on the energy, industrial and transportation sectors and household behaviour, there has been limited attention paid to the significant potential to limit GHG emmissions in the agricultural sector. The farming sector mainly emits methane and nitrous oxide besides carbon dioxide.

Buyer and seller can earn money from GHG trade

A main flexible mechanism in the Kyoto Protocol is emissions trading. It means that trade of GHG credits can take place between firms in different countries. The ownership of one credit gives the right to emit 1 ton of CO_2 equivalents per year. Once the permit has been used to show compliance in a given year, it will be withdrawn from the market. Every new year means that the permits will be reissued.

The duration of the compliance period has so far been limited to one year in the market to ensure liquidity in the market. The longer the compliance period, the less liquidity can be expected in the marketplace, which could create uncertainty and higher transaction costs concerning the GHG market price. As long as the credits have not been used to show compliance, they stay in circulation, and all permits are identical no matter what year they have been issued.

A potential for cheap GHG reductions

A German power plant, for example, may buy GHG credits from a Danish farmer if it is cheaper for the latter to reduce GHG than it is for the German firm. Firms will then respond to this price and will reduce or increase their individual GHG emissions until all their individual marginal reduction costs are equal to the GHG price.

This system means that both buyer and seller can earn money from GHG trade. It has been calculated, that total gains from free GHG trade among countries may reduce the reduction costs by around 40 per cent compared to the situation without trade, because GHG reduction now can take place in the cheapest firm where the 'low-hanging fruits' are.

Maybe a higher potential for organic farmers

There seems to be a huge potential for relatively cheap GHG reductions in agricultural ecosystems. For

The Kyoto agreement
The Kyoto agreement was signed in Japan 1997 and sets an emission ceiling for a group of six greenhouse gases (GHG), namely: carbon dioxide (CO_2); methane (CH_4) and nitrous oxide (N_2O). Also included are three types of chlorofluorocarbons (CFCs), namely: hydrofluorocarbons (HFCs); perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

example, the Intergovernmental Panel on Climate Change (IPCC) and others have suggested a range of measures such as improved cropland management (including nutrient management, tillage/residue management and water management), improved grazing land management (e.g. grazing intensity, nutrient management) and the restoration of degraded soils. Also sink enhancement (carbon sequestration), low energy production facilities, biofuels (also for own use) and the minimization of transportation distance are important options.

Research conducted over the last decade also indicates that organic farming production methods may have an even higher potential to reduce GHG emissions than conventional farming.

This difference in emmissions is to a large extent caused by the non-use of chemical fertilizers. When emmission reduction is measured per hectare, the reduction potential seems very impressing (Fliessbach 2007) estimates that GHG emmissions from organic farming systems are 35-37% less per hectare compared to organic farming, but when emmission reduction is measured on the basis of production output, emmissions reductions are significantly lower as a result of lower yields in organic farming.

Nevertheless organic farming still has signifant potential for GHG emmissions in the arable sector, while the potentional is more modest in the livestock sector and negative for vegetables (Halberg 2008).

Furthermore, based upon Danish data Dalgaard et al. (2002 & 2003) find that the extent to which emissions decrease depends on the way in which livestock production is adjusted to lower crop yields.

If livestock production is upheld at pre-conversion level and fodder is imported to compensate for lower crops yields, the decrease in GHG emmissions are significantly lower compared with a situation in which livestock production is adjusted to lower crop yield.

In summary, farmers as a group may gain significant benefits from GHG trade. Politically, the participation of farmers could be one extra important tool for the European Union. As it is, the EU is facing a big challenge under the Kyoto Protocol in its ambitious efforts to achieve 8% GHG reduction from 1990-2012 and 20% from 1990-2012.

Future challenges

The crucial next step, however, is to further develop and establish adequate monitoring techniques for documenting GHG reductions from farmers. If this challenge can be addressed adequately, the future role of farmers in climate policy may become a hot issue during the next climate meeting in Copenhagen, Denmark 2009 (COP-15). If so, farmers could then earn money from joining the ongoing GHG trading system. Furthermore, the US would be more likely to rejoin the Kyoto agreement. The US has up till now strongly advocated land-use practices as the missing link in climate negotiations.

Further reading:

Dalgaard T, Halberg N and Fenger J (2002) Can organic farming help to reduce national energy consumption and emissions of greenhouse gasses in Denmark? In: EC van Lerland and AO Lansink (eds.) Economics of sustainable energy in agriculture. Economy and Environment vol. 24. p. 191-204. Kluwer Academic Publishers, Dordrecht.

Dalgaard T, Kelm M, Wachendorf M, Taube F, and Dalgaard R. (2003) Energy balance comparison of organic and conventional farming. In: Organic Agriculture: Sustainability, Markets and Policies. pp. 127-138. Organisation for Economic Co-operation and Development (OECD) and CABI publishing, Wallingford.

Fliessbach (2007) Organic Farming and Climate Change, working paper, Climate Change and Organic workshop at BioFach 2007.

Halberg, Niels (2008) 'Energiforbrug og drivhusgasudledning i økologisk jordbrug' in H.F Alrøe and N. Halberg (eds), Udvikling, vækst og integritet i den danske økologisektor, Foulum: ICROFS, pp. 463-74.

Svendsen, G.T. (2009) 'Why should farmers participate in the EU ETS?' Working paper.