



IEAGHG Information Paper: 2016-IP14; Climate Targets for Agriculture in a post COP21 World

A recent study has been published by the International Institute for Applied Systems Analysis (IIASA) which suggests that reducing emissions in the energy and transport sectors will not be enough to meet the new below 2°C target set after COP21. They stress that agriculture must also play a strong role in reducing its emissions before 2030.

According to the study, 119 nations included mitigation in agriculture in their Intended Nationally Determined Contributions submitted to the UNFCCC. They caution, however, no work has been carried out to determine how these pledges will be accomplished.

Agriculture (not including land use change) contributes an average of 35% of emissions in developing countries and 12% in developed countries today. As ever, there is a balance to be struck as countries need to produce enough food, particularly poorer nations, to feed growing populations.

In the study published in the journal *Climate Change Biology*¹, they estimate that the agricultural sector must reduce non-CO₂ emissions by 1 billion metric tons per year by 2030. Such a target is a 17% reduction compared to their reference level projections of about 5.8 GtCO₂eq. They also raise the concern that currently known practises would only deliver between 21-40% of mitigation required.

These known practises include:

- Sustainable intensification of cattle,
- Efficient use of water through alternate wetting and drying in irrigated rice,
- Nutrient management for annual crops, including efficient use of nitrogen and manure,
- Relocating production to increase input efficiency.

However, the authors attest that implementation would require massive investment, information sharing and technical support to enable a global-scale transition.

The authors argue that much higher impact technologies and policies will be needed. Promising technical innovations on the horizon include;

- Recently developed methane inhibitors that reduce dairy cow emissions by 30% without affecting milk yields,
- Breeds of cattle that produce lower methane,
- and varieties of cereal crops that release less nitrous oxide.

Policies they suggest that support more ambitious mitigation are needed, examples identified include:

- Introducing more rigorous carbon pricing, taxes and subsidies,
- Governments and the private sector adopting sustainability standards that include reduced emissions in agriculture;
- and improving the reach of technical assistance for farmers on locally relevant mitigation options, for example through cell-phone and web-based information portals.

Other options they suggest include:

- Focusing more attention on sequestering soil carbon, increasing agroforestry,
- Decreasing food loss and waste
- and shifting dietary patterns

¹ Wollenberg E et al (2016). Reducing emissions from agriculture to meet the 2°C target. *Global Change Biology* <http://dx.doi.org/10.1111/gcb.13340>



However they note that these latter options could all contribute significantly to reducing emissions from agriculture. However, much less work has been done on mitigation of emissions from these sources, so action is needed now to identify options and their impacts.

Comments

This is an interesting piece of new work and one would concur with the authors that to meet the below 2°C goal then the agricultural sector will need to play its part along with the energy, building and transport sectors. However we should raise the point against the recent analyses that Non-CO₂ GHG emissions in the agricultural sector have been rising steadily in recent years and are on a strong upward growth-path due to increased food production in developing countries². So, whilst we have seen energy sector emissions decreasing in many economies and CO₂ emissions growth now decoupling from economic growth, the situation for the Non-CO₂ GHG emissions in the agriculture sector is on a different pathway making mitigation all the more challenging.

It is also true that the early mitigation measures are generally well known³, but despite having “been around” for years implementation seems to have been slower than its potential if methane emission increases from rice farming in SE Asia have grown as suggested by recent studies. The measure of relocating production to increase input efficiency, however, is a newer concept to me. The principle here is that *there are major differences in the efficiency of agricultural production with respect to non-CO₂ emissions in different regions of the world. That means that international trade can bring a big potential for mitigation, by helping to encourage more production in the most efficient regions.*

This goes back to the principle of globalisation is a better solution for the climate and counter to the idea that food production/consumption should be more regional and seasonal. Personally, I side with the latter rather than the former which in principle to me seems better for the environment. The authors do side with the more global view, but do acknowledge the problem associated with this approach is the need to agree and apportion global targets for emissions reductions. I was surprised by the fact that the authors point to the EU and USA as less efficient farming systems; this is counter intuitive to me I had assumed these were more efficient than those in Africa for example.

The other measures quoted such as new varieties of grain and new breeds of cattle suggest a form of genetic engineering, and genetic engineering itself is a very contentious issue in many regions of the world.

Of the newer topics:

- On Soil carbon sequestration and agroforestry, the authors suggest that soil carbon is highly variable and involves many assumptions related to organic matter inputs, carbon-nitrogen ratios, depth and bulk density, and timing of saturation. In addition, global data on carbon in biomass, such as agroforestry, is comparatively weak. It would therefore seem these options require a lot more research before we can confirm their mitigation potential.
- Decreasing food waste is an issue that has come to the fore in the press and in the public’s eye of late with emissions of greenhouse gas from food waste projected to be the third highest emitter after USA and China⁴. Since then we have seen the launch of initiatives like the Think.Eat.Save campaign which, is a partnership between UNEP, FAO and Messe Düsseldorf, and in support of the UN Secretary-General’s Zero Hunger Challenge, which seeks to add its authority and voice to these efforts in order to galvanize widespread global, regional and national actions, to minimise food waste. There is considerable public interest in this area

² http://www.ieaghg.org/docs/General_Docs/Publications/Information_Papers/2016-IP10.pdf

³ http://www.ieaghg.org/docs/General_Docs/Reports/2013-TR4.pdf,

⁴ <http://climatenewsnetwork.net/food-waste-worsens-ghg-emissions-fao/>



which you can follow on social media at #foodloss and #foodwaste. There is now a Food Loss & Waste Protocol (FLW Protocol) which is a multi-stakeholder effort to develop a global standard and guidance for measuring food loss and waste⁵. The vision of the FLW Protocol is that wide use of the measurement standards will empower the world to minimize food loss and waste, thereby enhancing food security, economic growth, and environmental health. This therefore seems to be an area where there is a growing global effort amongst many stakeholders that could help mitigate the global GHG emissions from food waste.

- On the changing dietary patterns, I was surprised to look back and see that Dr Pachari's (then IPCC head) call for people to eat less meat as a way of tackling climate change was way back in 2008. Getting people to change their lifestyles in such a way may be a bridge too far for many.

Summary

This new report by IIASA raises many issues and concerns regarding the ability of the agriculture sector to be able to mitigate greenhouse gas emissions whilst meeting the food production needs of growing regional populations. It is true that the agricultural sector will have to pitch in if the world is going to achieve the below 2°C target. In the near term initiatives to reduce food waste and the greenhouse gas emissions thus generated is the best near term mitigation option for this sector.

John Gale
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