UK-China Sustainable Agriculture Innovation Network (SAIN)

Update

July - September 2013 (No 16)

Work in Progress

SAIN Policy Brief No 7 & 8 Released

SAIN Policy Brief No 7

How do farmers respond to climate change risk?

This brief outlines the findings and policy implications of research projects on the livelihood adaptation of farmers in China and Uganda to climate risk. Farmers perceived a change in their local climate. They had changed farming practices to cope with climate risk, partly with the support of Government agricultural extension services. A strong institutional environment to support adaptation with a focus on farmer-led participation over vertical multi-scales was important. Adaptation policy should be mainstreamed into other policy agendas and should incorporate farmers' livelihood priorities and their adaptive capacity to avoid mal-adaptation and to reduce risks from climate change

Click here to read full article

SAIN Policy Brief No 8

Economic Potential of Greenhouse Gas Mitigation Measures in Chinese Agriculture

Emissions mitigation in China faces a range of challenges in terms of understanding sources of greenhouse gases (GHG) and the technical potential for reductions in each sector of the economy. Agricultural and land use emissions accounting is particularly challenging due to the biophysical complexity and heterogeneity of farming systems. SAIN research has contributed to improving our understanding of the *technical potential* of mitigation measures in this sector (i.e. what works). But for policy purposes it is important to convert this into a feasible *economic potential*, which provides a perspective on whether agricultural emissions reduction (measures) are low cost relative to mitigation measures and overall potential offered in other sectors of the economy. This note outlines the estimated economic mitigation potential available in China's agricultural sector. We develop a marginal abatement cost curve (MACC) representing the cost of mitigation measures applied to baseline agricultural practices. The MACC demonstrates that while the sector offers a maximum technical potential of 412 $MtCO_2e$ in 2020, a reduction of 131 $MtCO_2e$ is potentially available at zero or negative cost (i.e. a cost saving); and 346 MtCO2e (approximately 29% of the total) can be abated at a threshold carbon price $\leqslant$ ¥ 370 (approximately £40) per tCO_2e. We outline the assumptions underlying MACC construction and indicate the barriers to realising the indicated level of mitigation.

Click here to read full article

SAIN research published at *Science*


Prof Tim Wheeler

Prof Tim Wheeler, member of SAIN Working Group 3 on Climate Change Mitigation and Adaptation, has recently published SAIN research findings at *Sciences* with the title of "Climate Change Impacts on Global Food Security":

> **Abstract** Climate change could potentially interrupt progress toward a world without hunger. A robust and coherent global pattern is discernible of the impacts of climate change on crop productivity that could have consequences for food availability. The stability of whole food systems may be at risk under climate change because of short-term variability in supply. However, the potential impact is less clear at regional scales, but it is likely that climate variability and change will exacerbate food insecurity in areas currently vulnerable to hunger and undernutrition. Likewise, it can be anticipated that food access and utilization will be affected indirectly via collateral effects on household and individual incomes, and food utilization could be impaired by loss of access to drinking water and damage to health. The evidence supports the need for considerable investment in adaptation and mitigation actions toward a "climate-smart food system" that is more resilient to climate change influences on food security.

Prof Tim Wheeler of Reading University is the Deputy Chief Scientific Advisor at UK Department for International Development (Dfid), he was lead of SAIN project "**Addressing vulnerabilities and building capacity for adaptation of agriculture to climate change in China**".

Click here to read the full paper

SAIN project legacy

The successful collaborative SAIN project: *A Review of Manure Use in China* brought together researchers from Rothamsted Research, CAU, NWAFU and Nanjing University to collate information about current management practices in China, and to assess the challenges of sustainable manure nutrient management as the demand for livestock products continues to increase (click to see Policy Brief No 6). Since the completion of the project, the collaborators have maintained an informal collaboration, even as one of the key research leaders moved institutions. However, Prof Dave Chadwick and Prof Chen Qing (CAU) have recently been successful in a proposal to the new joint Bangor University - China Scholarship Council Scheme for a PhD studentship. In early September, Ms. Yuhong Li arrived at the School of Environment, Natural Resources and Geography, Bangor University to study for a PhD on understanding how slurry and anaerobic digestate processing (separation, anaerobic digestion and composting) affects nutrient use efficiency and the fate of nutrients in the environment after land application. Her research will build upon the success of the SAIN project.


Ms. Yuhong Li

Other News

Food waste harms climate, water, land and biodiversity – new FAO report

11 September 2013, Rome - The waste of a staggering 1.3 billion tonnes of food per year is not only causing major economic losses but also wreaking significant harm on the natural resources that humanity relies upon to feed itself, says a new FAO report.

Food Wastage Footprint: Impacts on Natural Resources is the first study to analyze the impacts of global food wastage from an environmental perspective, looking specifically at its consequences for the climate, water and land use, and biodiversity.

Among its key findings: Each year, food that is produced but not eaten guzzles up a volume of water equivalent to the annual flow of Russia's Volga River and is responsible for adding 3.3 billion tonnes of greenhouse gases to the planet's atmosphere.

And beyond its environmental impacts, the direct economic consequences to producers of food wastage (excluding fish and seafood) run to the tune of $750 billion annually, FAO's report estimates.

As a companion to its new study, FAO has also published a comprehensive "tool-kit" that contains recommendations on how food loss and waste can be reduced at every stage of the food chain.

The tool-kit profiles a number of projects around the world that show how national and local governments, farmers, businesses, and individual consumers can take steps to tackle the problem.

To tackle the problem, FAO's toolkit details three general levels where action is needed:

High priority should be given to **reducing food wastage in the first place.** Beyond improving losses of crops on farms due to poor practices, doing more to better balance production with demand would mean not using natural resources to produce unneeded food in the first place.

In the event of a food surplus, **re-use within the human food chain**-- finding secondary markets or donating extra food to feed vulnerable members of society-- represents the best option. If the food is not fit for human consumption, the next best option is to divert it for livestock feed, conserving resources that would otherwise be used to produce commercial feedstuff.

Where re-use is not possible, **recycling and recovery** should be pursued: by-product recycling, anaerobic digestion, compositing, and incineration with energy recovery allow energy and nutrients to be recovered from food waste, representing a significant advantage over dumping it in landfills. Uneaten food that ends up rotting in landfills is a large producer of methane, a particularly harmful GHG.

Click here to read the full report

How much land-based greenhouse gas mitigation can be achieved without compromising food security and environmental goals?

Pete Smith and a global team of co-authors published paper at *Global Change Biology* posed one of the most pressing questions: How much land-based greenhouse gas mitigation can be achieved without compromising food security and environmental goals? The following is the abstract of the paper:

Abstract Feeding 9–10 billion people by 2050 and preventing dangerous climate change are two of the greatest challenges facing humanity. Both challenges must be met while reducing the impact of land management on ecosystem services that deliver vital goods and services, and support human health and well-being. Few studies to date have considered the interactions

between these challenges. In this study we briefly outline the challenges, review the supply- and demand-side climate mitigation potential available in the Agriculture, Forestry and Other Land Use AFOLU sector and options for delivering food security. We briefly outline some of the synergies and trade-offs afforded by mitigation practices, before presenting an assessment of the mitigation potential possible in the AFOLU sector under possible future scenarios in which demand-side measures codeliver to aid food security. We conclude that while supply-side mitigation measures, such as changes in land management, might either enhance or negatively impact food security, demand-side mitigation measures, such as reduced waste or demand for livestock products, should benefit both food security and greenhouse gas (GHG) mitigation. Demand-side measures offer a greater potential (1.5–15.6 Gt CO_2-eq. yr^{-1}) in meeting both challenges than do supply-side measures (1.5–4.3 Gt CO_2-eq. yr^{-1} at carbon prices between 20 and 100 US$ tCO_2-eq. yr^{-1}), but given the enormity of challenges, all options need to be considered. Supply-side measures should be implemented immediately, focussing on those that allow the production of more agricultural product per unit of input. For demand-side measures, given the difficulties in their implementation and lag in their effectiveness, policy should be introduced quickly, and should aim to codeliver to other policy agenda, such as improving environmental quality or improving dietary health. These problems facing humanity in the 21st Century are extremely challenging, and policy that addresses multiple objectives is required now more than ever.

Click here to get the link to the full paper

Premier Li Keqiang meets with former UK Prime Minister Gordon Brown stressing to push forward China-UK relations on sound track

[Ministry of Foreign Affairs, China] In the evening of Sept. 11, 2013, Premier Li Keqiang met in Dalian with former UK Prime Minister Gordon Brown.

Li Keqiang extended welcome to Brown for coming to China for the "Summer Davos" and appreciated his contributions to the development of China-UK relations during the term as UK Prime Minister. Li Keqiang pointed out that China and UK are both Permanent Members of the UN Security Council as well as major countries of great influence. It is in the interest of the two countries to further deepen bilateral cooperation and to strengthen communication and coordination in international and regional affairs. Hope both sides will earnestly respect each other's core concerns and enhance mutual trust to push forward China-UK relations on a sound track. I expect Brown will continue to play a constructive role for this.

Brown thanked Li Keqiang for the meeting, spoke positively of the achievements of China's reform and development, and appreciated China's important contributions to the UN Millennium Development Goals. He expressed that China's reform benefits the global economic growth as well as financial stability and the international community should offer support. He will continue to make the efforts for enhancing the friendly exchanges between the two peoples.

Click here to read more

This issue of Update is compiled by SAIN Scretariat (UK). For more information about SAIN, please visit: http://www.sainonline.org/English.html. If you have any further enquiries, please contact Yuelai Lu at: y.lu@uea.ac.uk