Estimates of future agricultural greenhouse gas emissions and mitigation in China

sa in

UK-China
Sustainable Agriculture
Innovation Network

The problem we are trying to address

- Reducing agricultural GHG emissions and increasing soil carbon sinks in China, whilst maintaining food security for its very large population
- Providing the evidence base, the policy advice and the decision support tools to allow policy implementation and knowledge exchange between scientists, policy makers and farmers.

Purpose and objectives of the project

- Provide the evidence base, policy advice and decision support tools to reduce agricultural GHG emissions and increase soil carbon sinks in China, whilst maintaining food security
- Develop a national and regional picture of economic abatement potential from Chinese agriculture. To explore any behavioural/ incentive barriers associated with any obvious high abatement potential (and low cost) measure that is obviously not being adopted
- Assess applicability of mitigation strategies to decrease livestock and manure emissions at different farm topologies. Create whole China model of mitigation potential for livestock and manure emissions, also considering pollution swapping
- Provide policy advice of cost effective mitigation options for soil C sequestration, and for reducing GHG emissions from croplands (dry and paddy), grasslands and livestock
- Provide database, journal publications, decision support tools and policy briefings on GHG emissions and GHG mitigation options in China's agriculture.

Contribution to SAIN's strategic objectives

- Contribution to global climate change mitigation

- Innovation in the area of policy approaches, by expanding the evidence base and capacity for better policy making, interdisciplinary research, communication and application of appropriate technologies, and provision of policy advice through provision of decision support tools
- Joint research and the exchange of policy expertise and research findings between leading UK and Chinese individuals and institutions active in the field of GHG mitigation in agriculture and increase S&T research in support of new areas of policy formulation
- Translating policy and science into practice on the ground through policy briefings and decision support tool, and supporting farmers, farmers associations and agro-industrial enterprises in the adoption of sound agricultural practices.

Activities

- Collation of database on soil carbon change and GHG emissions from experiments conducted / published in China in the last 30 years
- Meta-analysis examining how GHG emissions vary with different cropping / livestock systems in different regions
- Meta-analysis on how climate mitigation potential varies between practices and regions
- Economic assessment of the marginal abatement cost of agricultural GHG mitigation in China and barriers to implementation
- Modelling of the total emission reduction potential of Chinese agriculture under different scenarios of implementation including uncertainty
- Creation of list of appropriate, economically-costed agricultural climate mitigation strategies for each region / cropping system in China – construct decision support tools

Expected outputs

- Database (with experiment meta-data) on soil carbon change and GHG emissions
- Scientific paper / policy briefing examining how GHG emissions vary with different cropping systems in different regions
- Scientific paper / policy briefing on how climate mitigation potential varies between practices and regions including gap analysis and priorities for future research
- Scientific paper / policy briefing on the economic assessment of the marginal abatement cost of agricultural GHG mitigation in China
- Scientific paper / policy briefing on the identification of the barriers to implementation, through social science survey (regional differences)
- Scientific paper / policy briefing on the estimates (using modelling) of the total emission reduction potential of Chinese agriculture under different scenarios of implementation
- Decision support tools to provide Chinese policy makers with the scientific information necessary for devising evidence-based policy on climate mitigation in agriculture, tailored to the circumstances of each region and cropping system.

Benefits

- Improved evidence base of soil carbon sinks and agricultural GHG emissions to aid policy decisions
- Decision support tool to help policy makers and farmers explore GHG mitigation options and identify the most efficient and cost effective practices in each region
- Collated database of results and economic assessments for use by other researchers and policy makers.

Partners

- University of Aberdeen: Pete Smith (UK Co-Leader), Dali Rani Nayak
- Nanjing Agricultural University: Genxing Pan (潘根兴 - China Co-Leader), Weiyun Zhu (朱伟云), Feng Shuyi (冯淑仪)
- University of Aberystwyth: Jamie Newbold
- Lanzhou University: Ruijun Long (龙瑞军), Fujiang Hou (侯扶江), Zhibiao Nan (南志标)
- Rothamsted Research – North Wyke: Laura Cardenas
- Zhejiang University: Jianxin Liu (刘建新)
- Scottish Agricultural College: Dominic Moran
- Peking University: Jintao Xu (徐晋涛)
- ISSAS, CAS: Xiaoyuan Yan (严晓元)
- Shenyang Agricultural University: Liyong Xie(谢立勇)
- Fudan University: Changming Fang (方长明).

For more information please visit:
http://www.sainonline.org

or contact

In the UK :

Prof Pete Smith
University of Aberdeen

Tel: +44(0) 1224 272702
Fax: +44(0) 1224 272703
Email: pete.smith@abdn.ac.uk

In China:

Prof Genxing Pan
Nanjing Agricultural University

Tel +86(0) 25 439 6027
Fax: +86(0) 25 439 6027
Email: pangenxing@yahoo.com.cn