

Recent Events on UK China Cooperation in Agriculture

- ❖ **8 July**, organised by the British Embassy and China International Technology Transfer Centre, the UK China Agri-Tech Workshop on Precision Agriculture and Soil Management was held in Beijing. Over 130 academic, government and industrial representatives (about 100 Chinese and 30 UK including 3 from North Ireland) attended the event.

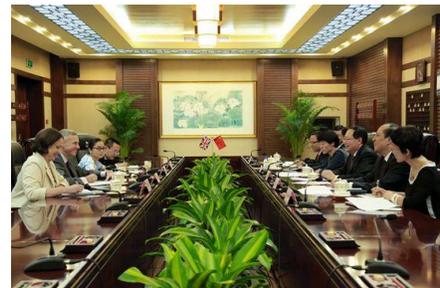


- ❖ **9 July**, UK-China Workshop on Funding System and Policy in Agri-Tech was convened in Beijing, organized by Institute of Policy Management of Chinese Academy of Sciences (CAS). The workshop was part of a research project on comparative studies of agri-tech funding systems between China and UK, funded by FCO of UK government.



- ❖ **8-9 September**, 10th UK-China Workshop on Space Science and Technology was held in Newbury, UK. In the session of Agri-Tech at the workshop, speakers presented the primary findings of scoping studies funded through Newton Fund Agri-Tech programme which is a £24 million programme jointly funded by UK and China for 5 years (2014-2019), focuses on the application of remote sensing technologies to China's agriculture.

- ❖ **9 September**, the Chinese State Chief Veterinary Officer (CVO) Zhang Zhongqiu met with Nigel Gibbens, the visiting CVO of DEFRA of the UK. It was proposed to set up a subcommittee or working group on animal health under the China-UK Joint Committee on Agricultural Cooperation, as a regular mechanism for animal health exchanges and cooperation.



- ❖ **21 September**, the Chancellor George Osborne and Chinese Vice Premier Ma Kai concluded the seventh UK-China Economic and Financial Dialogue. The Chancellor and Vice-Premier Ma Kai agreed a number of outcomes, include: a £24m programme on remote sensing for agritech and a programme using space technologies for unmanned agricultural vehicles.

UK-China Sustainable Agriculture Innovation Network (SAIN)

SAIN Work in Progress

In the period of July to September 2015, SAIN project team produced one journal paper (accepted), and two SAIN Policy Briefs.

Journal paper

LU Yong-Li, KANG Ting-Ting, ZHANG Xiao-Jia et al. (2015). Evaluation of current fertilization status in kiwifruit orchards on the northern slope of Qinling Mountains: A case study of Yujiahe catchment, in Zhouzhi County. *Journal of Plant Nutrition and Fertilizer*. (Forthcoming)

Abstract

[Objectives] The northern slope region of the Qinling Mountains is suitable for kiwifruit (*Actinidia deliciosa*) cultivation, and now has developed large area of Kiwi orchards in Shaanxi Province. Therefore, investigating the current nutrient inputs and the problems in kiwifruit orchards is of great significance for increasing fruit quality, generating farmers' income and promoting industrial development in this region.

[Methods] The Yujiahe catchment is a typical and relatively isolated catchments on the northern slope of the Qinling Mountains. More than 240 kiwifruit orchards were surveyed face-to-face, combined with questionnaire records in two consecutive years (2012 and 2013). The investigated items included orchard basic situations, planting area, fruit varieties, tree ages, densities, fertilizer rates, fertilizer varieties, fertilizer nutrient content, fertilization methods, fruit yield and irrigation. The nutrients input from chemical fertilizers in kiwifruit orchards were calculated according to the actually surveyed chemical fertilizer application rates and the nutrient content labeled on these fertilizers. The nutrients input from organic fertilizer were calculated based on the standards provided by the Chinese Organic Fertilizer Nutrients Record. The reasonable fertilizer rates in kiwifruit orchards were determined on the basis of our study in combination with the regional literatures, and further the nutrients input status were evaluated.

[Results] The investigation results and literature summary suggested the recommended fertilizer rates were N 375~500 kg/hm², P₂O₅ 186~186 kg/hm², K₂O 286~350 kg/hm² and organic fertilizers 30000~65000 kg/hm², respectively, the N: P₂O₅: K₂O ratio was about 1:0.5:0.73 when the yields of kiwifruits are within 24~42 t/hm². The actual nutrients input surveys showed: organic fertilizer are rarely applied, approximately 36.4% of orchards never have any manure input; In the kiwifruit orchards using organic fertilizer, the applied amount were seriously insufficiently in about 94.3% of the orchards, the nutrient provided by manures was less than 30% of the total nutrient inputs. Excessive application of N fertilizer is very common with an average input of N 891 kg/hm². Only 5.0% of the investigated orchards apply reasonable amount (N 375~500 kg/hm²), 22.7% apply N of 500~750 kg/hm², and 59.1% more than 750 kg/hm². The ratio of orchards with a reasonable phosphate fertilizer input (P₂O₅ 186~266 kg/hm²) was 19.4%, low input (P₂O₅ 266 kg/hm²) were 28.9% and 51.7%, respectively. The orchards with reasonable potassium application rate (K₂O 286~350 kg/hm²) was only 10.7%, with low input (K₂O 350 kg/hm²) were up to 30.6% and 58.7%, respectively.

[Conclusions] The organic fertilizer inputs in the kiwifruit orchards in the Yujiahe catchments was extremely inadequate, N fertilizers were generally excessively, and excessive and deficient application of phosphate and potassium fertilizers existed simultaneously. Therefore, it was strongly suggested to increase organic fertilizer inputs, reduce nitrogen fertilizer, strengthen the reasonable application of phosphate and potassium in kiwifruit production in future. The widely distribution of sloped cultivated lands in this region require optimizing nutrient management and controlling nutrient losses in the future research.

UK-China Sustainable Agriculture Innovation Network (SAIN)

SAIN Policy Brief No 12

Inefficiency and Environmental Risks associated with Nutrient Use in Agriculture within China and the UK

Jessica Bellarby, Ben Surridge, Philip M. Haygarth, Xin Lai, Guilong Zhang, Xiaolong Song, Jianbin Zhou, Fanqiao Meng, Jianbo Shen, Clive Rahn, Sean Burke, Laurence Smith, Giuseppina Siciliano

Key Messages

- The stocks and flows of nitrogen (N) and phosphorus (P) were quantified for five case studies, representing contrasting agricultural systems in China and the UK.
- The input of nutrients exceeded the output of nutrients in agricultural products for all five systems, although to varying degrees between individual case studies.
- Excessive input of nutrients for each system increases the risk of negative environmental impacts on soil, air and water quality.
- Soils accumulate nutrient stocks due to excessive nutrient inputs, representing an underexploited nutrient reserve that could contribute to future agriculture production.
- Livestock and crop production are increasingly disconnected in China. Manure application was limited to high-value fruit and vegetable crops in the systems analysed, but often without adequate accounting for the nutrient content of the applied manure.
- Pathways to improve the efficiency of nutrient use include:
 - **Curtailling persistent over-fertilisation**, especially for high value crops within China.
 - **Fully accounting for nutrient sources beyond synthetic fertiliser**, including manure, crop residue, atmospheric deposition, biological N fixation and soil nutrient content.
 - **Improving nutrient management practices**, including the rate, timing and technology for nutrient application to land, but also how nutrients are redistributed within a given area when recycling material such as livestock excreta to land.
 - **Re-integrating livestock and crop production systems**, closing nutrient loops at local scales through application of manure/slurry to arable, fruit and vegetable systems.
 - **Optimising irrigation practices**, in order to minimise nutrient losses through leaching, protect groundwater resources and optimise water use efficiency.

SAIN Policy Brief No 13

Delivering improved nutrient stewardship in China: the knowledge, attitudes and practices of farmers and advisers

Laurence Smith, Giuseppina Siciliano, Alex Inman, Clive Rahn, Jessica Bellarby, Ben Surridge, Philip Haygarth, Xin Lai, Guilong Zhang, Ji Li, Jianbin Zhou, Fanqiao Meng, Sean Burke

Key Messages

- There is a need to assess and re-orient agricultural knowledge and innovation systems (AKIS) in China, aiming to rebalance the importance of productivity alongside the stewardship of farm inputs, natural resources and broader protection of the environment; a new ethos is needed.
- Farm advice should emphasize resource use efficiency, profit maximisation and environmental protection, rather than simply yield maximisation. It should address farms as businesses, looking beyond yields to the objectives of the farming family and management of costs, labour use, crop residues and animal wastes, marketing and supply chains and environmental impacts.

UK-China Sustainable Agriculture Innovation Network (SAIN)

- Advice and training modes should become more differentiated by farm size, management type and cropping system, given the increasing diversity of farm scales, types and needs.
- Similarly, a greater diversity of communication and education methods should be employed, matched to the needs and access of different farmer types, and also targeting wider public awareness of environmental quality and food safety.
- The public agricultural extension system is a key resource for delivery of such messages, training and wider education, but also for coordination and quality control with other AKIS actors.
 - Provision of agricultural advice needs to be coordinated and consistent with an agreed nutrient management strategy for a defined farm type, cropping system and area; even if that advice is delivered via multiple public and private sector pathways.
 - Closer inter-agency working, with improved communication and data sharing at all levels, are required to develop the new ethos and overcome barriers to coordination created by functional divisions and specialisations.
 - Farmer participation and feedback should increasingly inform research and extension agendas through a 2-way dialogue and process of information exchange.
 - Planning and regulation is needed for confined animal feed operations (CAFOs) to achieve integrated livestock and crop production systems, on farms or within localities, at a catchment or sub-catchment scale.
 - Support should be given to emerging farmer associations and cooperatives, whilst leading agro-enterprises should be assisted and utilised as demonstrations of best practice for sustainable production systems.
 - Soil testing should become more accessible to farmers, with improved frequency and spatial resolution, and results better used in informing nutrient management planning and advice.
- Success in all these activities should increase farmers' trust and respect for public extension as a leading and reliable source of agricultural and environmental management advice.

Conference Presentations

Tong Yanan: "Possibility Analysis for Fertilizer "0" Increasing in China -A Case Study in Shaanxi Province", UK China Agri-Tech Workshop on Precision Agriculture and Soil Management, 8 July, Beijing

Yuelai Lu: "UK-China Cooperation in Sustainable Agriculture", at the UK China Agri-Tech Workshop on Precision Agriculture and Soil Management, 8 July, Beijing

Yuelai Lu, David Norse: "Agriculture, innovation and sustainability: insights from China", Westminster Food & Nutrition Forum - Meeting the Challenges of Food Security: Innovation, Sustainability and International Collaboration, 14th July, London

Yuelai Lu, "China's Agricultural Modernization - Policies, Challenges & Implications", 10th UK-China Workshop on Space Science and Technology, 8-9 September 2015, Newbury, 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