



## Nanjing Meeting Summary

Nanjing Forum: November 21<sup>st</sup> – 23<sup>rd</sup>, 2019

This paper presents a summary of the MIDST-CZO team attendance at the Jiangsu Academy of Agricultural Sciences (JAAS), Department of Agriculture and Rural Affairs of Jiangsu Province, Soil society of Jiangsu Province jointly organised 'Symposium on the efficient use of soil, fertiliser and water resources in the Yangtze River Economic Belt' and 'The 5<sup>th</sup> Jiangsu Academic Forum on Excellent Young Scientists in Soil and Agriculture' on 21<sup>st</sup> – 23<sup>rd</sup> November 2019.

### MIDST team in attendance:

University of Glasgow: Ying Zheng

University of Aberdeen: Paul Hallett, Joseph Oyesiku Blakemore, Xiangrui Xu

Peking University/University of Exeter: Boyi Liang

Institute of Soil Science, Chinese Academy of Sciences: Shunhua Yang

Nanjing University: Hongyan Guo

Shanxi Normal University: Shuai Li

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The Meeting was Supported by:

JAAS

Department of Agriculture and Rural Affairs of Jiangsu Province

Nanjing Xinhuitong Biotechnology Ltd

NERC/NSFC MIDST Maximising Impact by Decision Support Tools for sustainable soil and water through UK-China Critical Zone science

# 1. Overall summary

The meeting was attended by 300+ people comprising mainly applied agricultural scientists, with representation from government ministries ( $\approx 5$  people) and industry ( $\approx 10$  people). The aim of the meeting was to bring together experts in agricultural and environmental science in China for discussions on the prevention and control of agricultural non-point source pollution, farmland nutrient management, soil health, and biodiversity conservation. Notable guests included Academicians Prof. Fusuo Zhang, Prof. Zhaoliang Zhu and Prof. Yongguan Zhu. News reports from the meeting included: <http://newzhs.jaas.ac.cn/show-1068-589-1.html> (News report from JAAS) and [http://jsnews.jschina.com.cn/shms/201911/t20191125\\_2430202.html](http://jsnews.jschina.com.cn/shms/201911/t20191125_2430202.html) (News report from Jiangsu net).

MIDST Co-hosted the "Symposium on the experience and problems of the efficient use of soil, fertiliser and water in the Yangtze River Economic Belt" along with the Station of Farmland Quality and Agricultural Environment Protection of Jiangsu Province (See appendix for agenda). Our interest in this meeting was to network with applied agricultural scientists in China who work more closely at the interface between science and farming than the Chinese collaborators on MIDST. JAAS are directly involved in the Peri-Urban CZO, hosting field trials on the outskirts of Nanjing and providing expertise on agronomic performance of fertilisers derived from waste. We sought input from scientists and agricultural specialists on practical needs from Decision Support Tools (DSTs) targeted at improved agricultural and environmental performance. This was achieved through the hosting of this symposium and an exhibitor stand.

Our symposium had a number of very relevant talks for DST developments. There were 10 talks that covered new fertilisers, machinery, environmental concerns and farmer engagement. Dr Ying Zheng finished the talks in the session by providing an overview of the MIDST project, summarising the work of the UK-China CZO programme. The practical challenges and policy relevance of our research was emphasised by our invited speaker, Director Du Sen of the Ministry of Agriculture. All talks were in Mandarin to ensure full engagement of the Chinese audience. We followed the talks with an open panel session discussion which provided the floor with the opportunity to ask all speakers questions. This included a targeted discussion on research needs for DST development in China.

On Day 2 of the meeting, MIDST collaborator Prof Yongguan Zhu provided a talk that celebrated his very recent award as a CAS Academician. This was followed by another discussion forum on challenges facing agriculture and soils in China. Both Paul Hallett and Ying Zheng participated on stage to provide their insight and to guide questions towards DST development.

MIDST had an Exhibition Stand throughout the entirety of the event. This had an animation of one of our functional DSTs, computers running other DSTs that we have tested for application in China, and pamphlets in both English and Mandarin summarising the project and aimed at either users or researchers. There was considerable 1:1 discussion, reaching over 100 people. To enable guided discussion, questionnaires were given to participants to ask about their

knowledge, experience, perceptions and needs for DSTs. The MIDST post docs and 2 PhD students managed to get conference participants to complete 65 individual questionnaires.

## 2. Summary of what was learnt in the session discussion

Prof Fusuo Zhang (China Agriculture University) summarised the focus and outcome of the conference elegantly with this visionary statement (translated): "*To enter the new era of green development, multi-sectoral integration and multi-disciplinary cross-innovation are required to fully upgrade the entire industrial chain in order to form a complete solution.*" The conference recognised the need to build from fundamental research, as conducted in the first China-UK CZO projects, to provide applied solutions to improve agricultural productivity and environmental protection at the same time. Based on guidance from our initial Stakeholder visit in March 2019, we targeted Jiangsu as it is one of the most agriculturally rich and productive regions of China, so a likely early-adopter of CZO-based DSTs. New agricultural technologies are being deployed in Jiangsu at a more rapid rate than many regions of the world. We focus on one of these in MIDST; fertilisers extracted from industrial waste streams that present concerns about antimicrobial resistance genes and pathogens entering the environment.

From discussions, DSTs were not in common use in China, but were viewed to be an effective way to bring together multidisciplinary, complex information, into tools that are feasible to implement and interpret. The science focus of this meeting biased understanding towards regional-based DSTs that can be implemented by experts. More applied researchers from provincial agricultural institutes identified a demand from farmers and field agronomists for simple farm-scale DSTs that could guide fertiliser, irrigation and crop selection. This supported our findings from the initial Stakeholder visit in March 2019 where we directed discussions to farmers, industry and government ministries.

There were a number of questions that were asked of the panel by participants that were relevant to the MIDST project:

1. How will DSTs help improve farming activities, in terms of fertilisation, tillage and crop selection?
2. How will DSTs guide the strategies of fertiliser companies in selling fertilisers?
3. How often will the DSTs be updated? Will they really be helpful in providing guidance to farmers in land management and the use of fertilisers and chemicals?
4. Who are the main users of the DSTs, e.g. what government office? Where are the data coming from?
5. DSTs can provide rather accurate support for decision making over small areas such as farms. How will it be possible to ensure they work at larger scale for regional assessments, given the complexity of farming and the environment?

We identified similar questions when conducting our initial review of DSTs for use in China. Some of the questions reflect our adoption of the term DST for any decision model, whether it be at farm or regional scale.

Our exhibition stand demonstrated some simpler DSTs (e.g. CoolFarm) alongside a more complex regional DST developed as part of this project (CZIMLP). From this Stakeholder event, we have begun to identify commercial conferences in China to attend during 2020 to reach applied users.

A number of actions have been guided from the knowledge exchange gained from the Nanjing forum:

1. Greater inclusion of applied agricultural scientists in DST development and deployment.
2. Reinforcement of our desire to integrate environmental and economic analysis into agriculturally focussed DSTs.
3. Re-evaluation of project activities to ensure that unique CZO understanding (e.g. deep nutrient leaching and water pollution) is integrated in our DST development.
4. Targeting of applied users in future Stakeholder events, which can draw on large commercial agricultural conferences taking place in China in 2020.

### 3. Exhibition stand

The exhibition stand allowed for 1:1 discussion on DST development to help guide and disseminate the research being conducted on MIDST. This was facilitated by a questionnaire that is provided as an Appendix. A total of 65 questionnaires were returned. It asked respondents about their background, knowledge of DSTs, and their perceptions on what is needed in future DST development. Before completing this questionnaire, they had the opportunity to visualise a regional scale DST (CZIMLP) developed as part of MIDST and to use smaller-scale DSTs on computers at the stand. The stand was tended by 3 postdoctoral scientists from the MIDST project, a collaborator from China who works for an IT spin-out of Shanxi Normal University developing agricultural science software, and 2 PhD student volunteers who are China Scholarship recipients spending one year at the University of Aberdeen in the Environmental Modelling team.

The questionnaires built on the Knowledge Exchange surveys previously completed during the initial China-UK CZO projects (2016-2019) in the Karst and Red Soil regions, and during MIDST in the Loess Plateau. The respondents were generally scientist giving a contrasting view on DSTs to the farmers and government staff previously questioned.



## 4. Appendix

### 4.1 Agenda

\*\*next to a speakers names highlight those who had significant interaction with MIDST team members and can be contacted for follow up in 2020.

1<sup>st</sup> Day (21<sup>st</sup> Nov. Thursday): Registration

Time	Content	Place
14:00-22:00	Registration	Nanjing Shuixiuyuan Hotel, No.11 Jiahu West Rd, Baijiahu, Jiangning Kaifa District

2<sup>nd</sup> Day (22<sup>nd</sup> Nov. Friday): Opening, General talks, Thematic talks

Opening Host: Linzhang Yang Professor		
Time	Content	
08:30-09:00	Chairman of Soil Science Society of Jiangsu Province JAAS Department of Agriculture and Rural Affairs of Jiangsu Province Academician Science and Technology Association of Jiangsu Province	
General talks Host: Professor Jizhao Fang and Professor Linzhang Yang		
Time	Content	Speaker
09:00-09:30	The challenges and ways of agricultural green development	Academician Fusuo Zhang (China Agricultural University)
09:30-10:00	Nitrogen removal mechanism of high nitrogen input in farmland in the Yangtze River Delta	Academician Zhaoliang Zhu & Professor Xiaoyuan Yan (Institute of Soil Science, CAS)

10:00-10:30	Mechanism of Trichoderma and Development of Trichoderma Bio-organic Fertiliser	Professor Qirong Shen (Nanjing Agricultural University)
10:30-10:45	Group picture, tea break, exhibition, posters	
Host: Professor Jianwen Zou, Professor Xionghui Ji		
11:50-11:20	Microbial fertiliser and agricultural green development	Director, Professor Jun Li (Microbial fertiliser Quality Inspection Center, MOA)
11:20-11:50	Nutrient input and soil microorganisms for phosphorus cycle	Professor Jianming Xue (College of Environmental & Resource Sciences of Zhejiang University)
11:50-12:20	Soil interface process and agricultural green development	Professor Wenfeng Tan (College of Resources & Environment of Huazhong Agricultural University)
Lunch 12:20-13:30		
<p>General talks &amp; thematic talks</p> <p>Forum of practical experience in the efficient use of soil, fertiliser and water resources in the Yangtze River Economic Belt</p> <p>AND</p> <p>Forum of decision support systems development for agriculture and environment.</p> <p>Host: Professor Yonghong Liang etc.</p>		
13:55-14:20	Based on the Yangtze River Delta, serving the whole catchment, and innovating a new era of agricultural resources and environment research	Professor Linzhang Yang** (Institute of Agricultural Resources and Environment, JAAS)
14:20-14:45	Opportunities and challenges in optimising water and fertiliser management for food production and the environment	Director, Professor, Sen Du** (Water-saving Agriculture Division, National Agro-technical Extension and Service Center, MOA)
14:45-15:05	Earthworms and modern soil ecosystems	Head, Professor, Weiguang Lv (Institute of Ecological Environmental Protection, Shanghai Academy of Agricultural Sciences)
15:05-15:25	Discussion on the utilisation of farming bio-slurry resources and the related issues	Head, Professor, Alin Shen (Institute of Environment, Resource, Soil and Fertiliser, Zhejiang Academy of Agricultural Sciences)
15:25-15:45	Discussion on soil quality and green improvement technology of greenhouse vegetables	Head, Professor, Yan Ma** (Institute of Agricultural Resources and Environment, Jiangsu Academy of Agricultural Sciences)
15:45-16:05	Tea break, exhibition, posters	
16:05-16:25	Farmer engagement during crop nutrient management	Chief expert, Professor, Guangde Yin** (Jiangsu Province Cultivated Land Quality and

		Agricultural Environmental Protection Station)
16:25-16:40	New fertilisers help agricultural green development	Director, Renshan Ge (Plant Nutrition Research Center, Jiangsu Huachang Chemical Co., LTD)
16:40-16:55	Practice and exploration of social service for agricultural machinery integration in local agriculture	Chairman, Jinwei Liu (Zhuanghe Agricultural Machinery Cooperative of Yizheng City)
16:55-17:15	MIDST overview – using CZO science and DSTs to help with environmental issues	Professor Paul Hallett & Dr. Ying Zheng (University of Aberdeen, UK & University of Glasgow, UK)
17:15-17:40	Open discussion	
Dinner 18:00-20:00		

3<sup>rd</sup> Day (23<sup>rd</sup> Nov. Saturday) Talks, Research discussion, Closing

Excellent Young Soil Scientist Special Forum Host: Professor Rong Li, Associate Professor Jiangang Li ect.		
Time	Contents	Speaker
8:30-8:50	Molecular mechanism of adsorption and immobilization of Cd on manganese oxide surface	Yujun Wang Dr./Professor (Institute of Soil Science, CAS)
8:50-9:10	The genetic basis of plant molybdenum nutrition	Xinyuan Huang Dr./Professor (Nanjing Agricultural University)
9:10-9:30	Does Human Activity Influence the Soil Antibiotic Resistome?	Fang Wang Dr./Professor (Institute of Soil Science, CAS)
9:30-9:50	In-situ online monitoring of heavy metal pollution using electrical signals by soil electricity-generating bacterial	Huan Deng Dr./Associate Professor (Nanjing Normal University)
9:50-10:10	Effects of herbicides on rhizosphere nitrogen-fixing microorganisms and screening of symbiotic bacteria	Yan Gao Dr./Professor** (Institute of Agricultural Resources and Environment, Jiangsu Academy of Agricultural Sciences)
10:10-10:20	Tea break, exhibition, posters	
10:20-10:40	Ecological mechanism of obstacle removal for soil continuous cropping in greenhouse cultivation using reactive oxygen species	Hongsheng Wu Dr./Professor (Nanjing University of Information Science & Technology)
10:40-11:00	Key microorganisms in soil affect crop rhizosphere community and functional characteristics	Weibing Xun Dr./Associate Professor (Nanjing Agricultural University)

11:00-11:20	Mechanism of effects of long-term fertilisation on soil N <sub>2</sub> O emissions	Yi Cheng Dr./Associate Professor (Nanjing Normal University)
11:20-11:40	Microbial degradation mechanism of abandoned keratin from slaughtering and processing and its product effects	Lin Wang Dr./Associate Professor (Nanjing Institute of Agricultural Sciences)
11:40-12:00	Effect of ultra-high temperature pretreatment on carbon and nitrogen conversion of livestock manure compost	Yun Cao Dr./Associate Professor (Circular Agriculture Research Center, Jiangsu Academy of Agricultural Sciences)
Lunch 12:00-13:30		
Research talks and discussion Host: Professor Linzhang Yang ect.		
13:30 – 14:00	Source and spread of antibiotic resistance genes in soil.	Academician Yongguan Zhu (Institute of Urban Environment, CAS)
14:00 – 14:30	Promote planting, breeding and circular agriculture schemes to accelerate the development of clean agricultural catchment.	Professor Changxiong Zhu (CAAS)
14:00-15:30	Thematic discussion forum: agricultural environmental protection and beautiful village development	
15:30-15:50	Closing	
15:50-17:00	Tour in JAAS	
Dinner 18:00-20:00		



## 4.2 Photos



## 4.3 Questionnaire

Thank you very much for having accepted to participate in this survey. We are researchers from different universities in the UK, working as part of a joint UK-China programme, and we are interested in understanding the experience and perception of Chinese researchers and people from agricultural industries in using agricultural decision support tools [1]. This is a continuation of three surveys which were conducted to farmers and village to city level policy makers from Loess Plateau, karst and red soil landscapes in China during 2016 – 2019, to explore their experience and preference in learning different agricultural practices, and their knowledge of the environment and how their activities/land management practices influence environmental quality. Together with your answer, this can help us inform a better farm management strategies and farming practice more effectively. We will use the data collected here to inform the development of a DST we are making to support Chinese agricultural policy and practice, and we will also publish these data academically. All answers will be treated anonymously.

This survey will take about 5 minutes, and thank you in advance for your participation. We would also like to encourage you to answer 1-2 questions as an open-ended interview. Please let us know if you would like to do this when you return this form to us, and we can find a time to do this.

非常感谢您接受此次问卷调查。我们是来自英国不同高校的研究人员，参与中英地球关键带国际合作项目。我们希望通过调研了解中国研究人员和来自农业生产领域的人们在使用农业决策支持工具方面的经验和看法[1]。在 2016-2019 年我们已在中国黄土高原、喀斯特和红壤丘陵区域对当地农民和村、镇、县各级政府人员进行过类似的社会调查，以探讨他们在学习不同农业实践方面的经验和偏好，他们的知识环境，及其活动/土地管理实践如何影响当地环境质量。结合您的答案，这些数据可以帮助我们制定更好的农场管理策略和耕种方法。我们将使用此次收集的数据来指导我们项目中决策支持工具的研发，以对中国农业政策制定和实践操作提供支持，并用于学术上发表。所有答案将被匿名处理。

这项调查大约需要5分钟的时间，在此先感谢您的参与。我们也鼓励您通过开放式访谈回答1-2个问题。当您将此表格退回给我们时，请告知我们是否愿意进行访谈，我们将另行安排时间。

**1. I give permission for my answers to inform the design of the DST and to be used anonymously as part of academic papers.**

我同意将我的答案用于决策支持工具（DST）的设计，并可匿名用于学术论文中。

- a. Yes 同意                      b. No 不同意

**2. What is your gender? 您的性别:**

- a. Female 女性                      b. Male 男性

**3. What is your age? 您的年龄:**

- a. 18-25      b. 26-40      c. 41-60      d. >61

**4. What is the highest degree or level of school you have completed/received?**

您的教育水平:

- a. No schooling 未曾接受过教育  
b. Primary school, not completed 小学，但未完成  
c. Primary school 小学

- d. Middle school, not completed 初中，但未完成
- e. Middle school 初中
- f. Some high school, no diploma 高中，但未完成
- g. High school graduate 高中
- h. Technical/vocational training 职业技校
- i. Bachelor's degree 本科
- j. Master's degree 硕士
- k. Doctorate degree 博士

5. **What is your job? 您的工作是什么?**

6. **Do you know what an agricultural decision support tool (DST) is?**  
您知道什么是农业决策支持工具 (DST) 吗?

- a. Yes 知道
- b. Not sure what it is. 不确定
- c. No 不知道

7. **Read the definition of a DST at the end of this document. Please chose which uses of such a tool would be in China. (tick or circle all that apply)**

阅读问卷最后一页的 DST 定义。请选择哪种工具可在中国使用 (可多选)

- a. To inform farming policy? (specify at which scales, national, provincial, city)  
用于支持农业政策制定? (并指明哪个级别的政策制定: 国家, 省, 市)
- b. To change how farms and farming as managed at the farm scale?  
用于改变农田和农田管理方式?
- c. To change the type of advice that is given to town and village leaders?  
用于更改向乡镇领导提供的建议类型?
- d. To change the advice/training that is given to farmers?  
用于改变对农民提供的建议/培训?
- e. Other (please specify)  
其他 (请说明)

**Questions 8-15 relate to a specific tool you are aware of (the tool you are most familiar with). Answer questions 8-15 ONLY if you answer yes (circled A) to Q6, and respond only in relation to the DST/tool you are most familiar with. If you answered B or C in Q6, please skip to question 16 to complete the rest of the survey.**

如果第 6 题答案为 a, 请继续作答第 8-15 题, 且仅针对您最熟悉的决策支持工具/系统作出回答。如果第 6 题回答了 b 或 c, 请跳至问题 16 继续作答。

8. **If you chose 'a' as your answer to question 6, what tools have you used? Please list ALL relevant tools here and note which you are most familiar with.**

如果第 6 题答案为 a, 请列出您所用过的所有农业决策工具, 并注明您最熟悉的一种。

9. **If answered a to question Q6, please describe the level of experience in using agricultural DSTs? 如果第 6 题答案为 a, 请说明您使用农业决策支持工具的经验水平?**

- a. Never used, only know what they are 从未用过, 只知道是什么

- b. Used infrequently (< once per year) 不太常用 (几年用一次)
- c. Used a little (between 2-5 times per year) 偶尔使用 (每年 2-5 次)
- d. Used regularly (used at least 6 times per year) 较常使用 (每年至少 6 次)
- e. Frequent user (used > once per month) 经常使用 (每个月至少一次)

**10. If yes to Q6 (choice A), where did you learn about DSTs?**

如果第 6 题答案为 a, 您是从哪里了解决策支持工具?

- a. Introduced by my family 家人介绍
- b. Introduced by my friends 朋友介绍
- c. Introduced by farmers 农民介绍
- d. Promoted by government 市/县/镇/村政府部门推广
- e. Developed and promoted by researchers/experts 相关学者/专家研发推荐
- f. Promoted by farming/fertiliser companies 农业/化肥公司推广
- g. Promoted by farm cooperative 农村合作社
- h. Other (please specify) 其他 (请说明)

**11. Do you think the DST you used was helpful in improving farming practice and/or farming policies?**

您认为您使用的决策支持工具是否有助于改善农耕方法和/或农业政策制定?

- a. Yes (please specify why)有帮助 (请说明为什么)

- b. No (please specify why)没有帮助 (请说明为什么)

**12. Do you know of any tools with similar functions (that may not be called DSTs)?**

您是否知道具有相似功能的其他工具 (可能不称为决策支持工具)?

- a. Yes 知道  
(Please list 请列出\_\_\_\_\_)

- b. No 不知道

**13. Are there factors you would suggest the tools should consider but don't currently include?**是否有任何因素您觉得您使用的决策支持工具应该考虑但未包括的?

- a. Yes 是  
(Please list 请列出\_\_\_\_\_)

- b. No 否

**14. Do you think this tool says something useful about farms for the following groups (please tick or circle all that are useful).**

您是否认为该工具对以下人群提出了有帮助的农业建议 (可多选)。

- a. Farmers 农民
- b. Farm advisors/technician 农业顾问/农技人员
- c. Fertiliser manufacturers and/or sellers 化肥生产商和/或化肥销售商
- d. Village and/or Town and/or County government 村、镇、县政府
- e. City and/or Provincial government 市、省政府

f. National Policymakers 国家决策制定者

15. **What factors do you LIKE about this tool? (Please circle or tick multiple where appropriate) 您喜欢这个工具的哪些因素/设计? (可多选)**
- a. User interface 使用界面
  - b. Mode of operation (e.g. web based or excel spreadsheet) 操作模式 (如在网页上或表格文件中)
  - c. Subject area 决策主题
  - d. Spatial scale of tool (e.g. farm or regional scale) 工具覆盖的空间范围 (如农田规模或区域规模)
  - e. Temporal scale of tool output (seasonal/ annual output) 工具输出结果的时间性 (如每季或每年的结果)
  - f. Data requirements 数据要求
  - g. Input/ design including options for features (of the environmental/ agricultural system) you consider important 输入/设计, 包括功能选项 (例如环境因素或农业因素的考虑)
  - h. Ease to run 易于操作
  - i. How useful the outputs are 输出结果有帮助
  - j. The way outputs are presented 输出结果的显示方式
  - k. Other (please specify)其他 (请说明)

**All survey respondents please complete questions in this section.**  
请所有受访者回答以下问题。

16. **Does your job role require you to have knowledge of secondary data sources (e.g. Data collected by others such as data on yield?)**  
您在工作中是否要求您了解收集间接数据展开工作 (例如其他人收集的数据, 包括作物产量数据?)
- a) Yes 是
  - b) No 否

17. **If you answered yes to Q16, then please complete this question.** Which of the following input data are likely to be freely available for tool users at different scales? (please tick)

如果第 16 题的回答为“是”, 请作答此题。

以下哪些输入数据可能免费提供给各个不同决策工具使用群体? (请打勾)

Field scale 较大土地面积	1km grids 1km 网格范围	
<input type="checkbox"/>	<input type="checkbox"/>	Yield 作物产量
<input type="checkbox"/>	<input type="checkbox"/>	Energy used 能源使用
<input type="checkbox"/>	<input type="checkbox"/>	Cost of farm inputs (e.g fertilizer) 农业成本 (如化肥)
<input type="checkbox"/>	<input type="checkbox"/>	Soil texture 土壤质地
<input type="checkbox"/>	<input type="checkbox"/>	pH pH 值

<input type="checkbox"/>	<input type="checkbox"/>	SOM 土壤有机物质
<input type="checkbox"/>	<input type="checkbox"/>	Soil Moisture 土壤湿度
<input type="checkbox"/>	<input type="checkbox"/>	SOC 土壤有机碳
<input type="checkbox"/>	<input type="checkbox"/>	Soil N 土壤氮素
<input type="checkbox"/>	<input type="checkbox"/>	Bulk density 土壤密度
<input type="checkbox"/>	<input type="checkbox"/>	Phosphorus 磷
<input type="checkbox"/>	<input type="checkbox"/>	Electronic conductivity 电导
<input type="checkbox"/>	<input type="checkbox"/>	Chloride 氯化物
<input type="checkbox"/>	<input type="checkbox"/>	Soil type 土壤类型
<input type="checkbox"/>	<input type="checkbox"/>	Slope (angle/ length) 坡度 (角度/长度)
<input type="checkbox"/>	<input type="checkbox"/>	Erosion measurements 土壤 侵蚀测量
<input type="checkbox"/>	<input type="checkbox"/>	Fertilizer application rate 施 肥量
<input type="checkbox"/>	<input type="checkbox"/>	Residue management and amount 残留物管理和数量
<input type="checkbox"/>	<input type="checkbox"/>	Crop protection application 作物保护
<input type="checkbox"/>	<input type="checkbox"/>	Irrigation schedule, method, water source 灌溉时间、方法、水源
<input type="checkbox"/>	<input type="checkbox"/>	Change in management 管理 的变化
<input type="checkbox"/>	<input type="checkbox"/>	Planting density 耕种密度
<input type="checkbox"/>	<input type="checkbox"/>	Fertilizer application schedule 化肥施用时间
<input type="checkbox"/>	<input type="checkbox"/>	Land use 土地利用
<input type="checkbox"/>	<input type="checkbox"/>	Planting schedule 耕种时间 安排
<input type="checkbox"/>	<input type="checkbox"/>	Liming Material/ application rate 涂料及用量
<input type="checkbox"/>	<input type="checkbox"/>	Evapotranspiration 蒸散
<input type="checkbox"/>	<input type="checkbox"/>	Rainfall 降雨
<input type="checkbox"/>	<input type="checkbox"/>	Temperature 温度
<input type="checkbox"/>	<input type="checkbox"/>	Radiation 辐射
<input type="checkbox"/>	<input type="checkbox"/>	Wind speed 风速
<input type="checkbox"/>	<input type="checkbox"/>	Soil water retention curve 土 壤保水曲线
<input type="checkbox"/>	<input type="checkbox"/>	Fertiliser type+ source 化肥 类型及来源

Open-ended questions 开放式问答

**1. What functions would your ideal DST tool include?**

您理想的决策支持工具应包括哪些功能？

2. **Who would use it and what would the results be used for** – [Note to the survey team: the list here is a prompt for the semi-structured interviews, to elaborate on the question above]

工具的使用人群及用途 – [给调查组的说明：这里的列表提示半结构化访谈，以详细说明上述问题]

- a. To inform farming policy? (specify at which scales, national, provincial, city)  
用于支持农业政策制定？（并指明哪个级别的政策制定：国家，省，市）
- b. To change how farms and farming as managed at the farm scale?  
用于改变农田和农田管理方式？
- c. To change the type of advice that is given to town and village leaders?  
用于更改向乡镇领导提供的建议类型？
- d. To change the advice/training that is given to farmers?  
用于改变对农民提供的建议/培训？
- e. Other (please specify)  
其他（请说明）

3. **What data would you need to run it? (please list the top 5 data types you would need, see Q16 for ideas)**

需要什么数据来运行它？（请列出最需要的5种数据，可参阅问题16选项）

[1] What is an agricultural decision support tool?

Agricultural decision support tools are devices which decision makers in agriculture use to inform policy, land management or farm-scale decisions they are making. These can take multiple forms including software, paper or physical equipment. Users typically choose options within the tools and provide the tools with information on the scenario in question. For example, a tool can be used to input crop type, fertiliser use and environmental conditions to predict crop yield under different fertiliser uses, and the likely environmental impacts of the fertiliser use. The tools typically use this input to provide the user with information on the likely outcomes of different options. This may be by recommending specific practices or setting out a series of outcomes that are likely to happen if a particular farm management approach is taken.

[1]什么是农业决策支持工具？

农业决策支持工具是农业决策者用来帮助制定农业政策、土地管理或农田范围决策的工具。这些工具可以采取多种形式，包括软件、纸质材料或物理设备。用户通常会在工具中选择选项，并提供有关所讨论场景的信息。例如，在工具中输入作物类型、化肥使用和环境条件，以预测不同化肥使用情况下的作物产量以及化肥使用可能对环境造成的影响。工具通常使用输入的数据为用户提供不同选项可能产生的结果，最后推荐特定的实践操作或列出了不同农田管理方法可能产生的一系列结果。

## 5.4 Conference committees

Hosted by:

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