



IPNI
INTERNATIONAL
PLANT NUTRITION
INSTITUTE



Strengthen Science and Technology Transfer to Improve Crop Production and Farmers' Income

Jiyun Jin

IPNI China Program

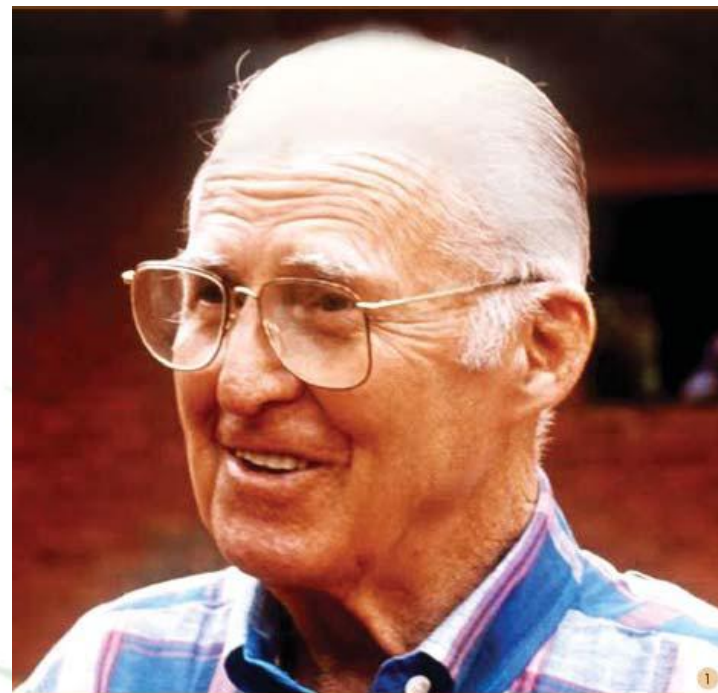
Chinese Academy of Agricultural Sciences

Presented at the 78th IFA Annual Conference,

June 1st, 2010, Paris

“The use of high yielding varieties, chemical fertilizers to restore soil fertility, have allowed world food production to increase more rapidly than global population over the past three decades.”

-Borlaug and Dowsnell, 1994



***Norman Borlaug*(1914-2009) :**
发展中国家小农户及资源匮乏农民的捍卫者
The Defender of small household farmers
in the developing world with limited resources



China is a developing country with: Limited land resource, large population and dominated with small size household farmers

**Arable land: Dropped to 122 million ha, 9% of world total,
Land/person is only 0.0926 ha, 42% of world average**

**Population: 1.306 billion (2005), 20.8% of world total,
Estimated to be 14.3 billion by 2020**

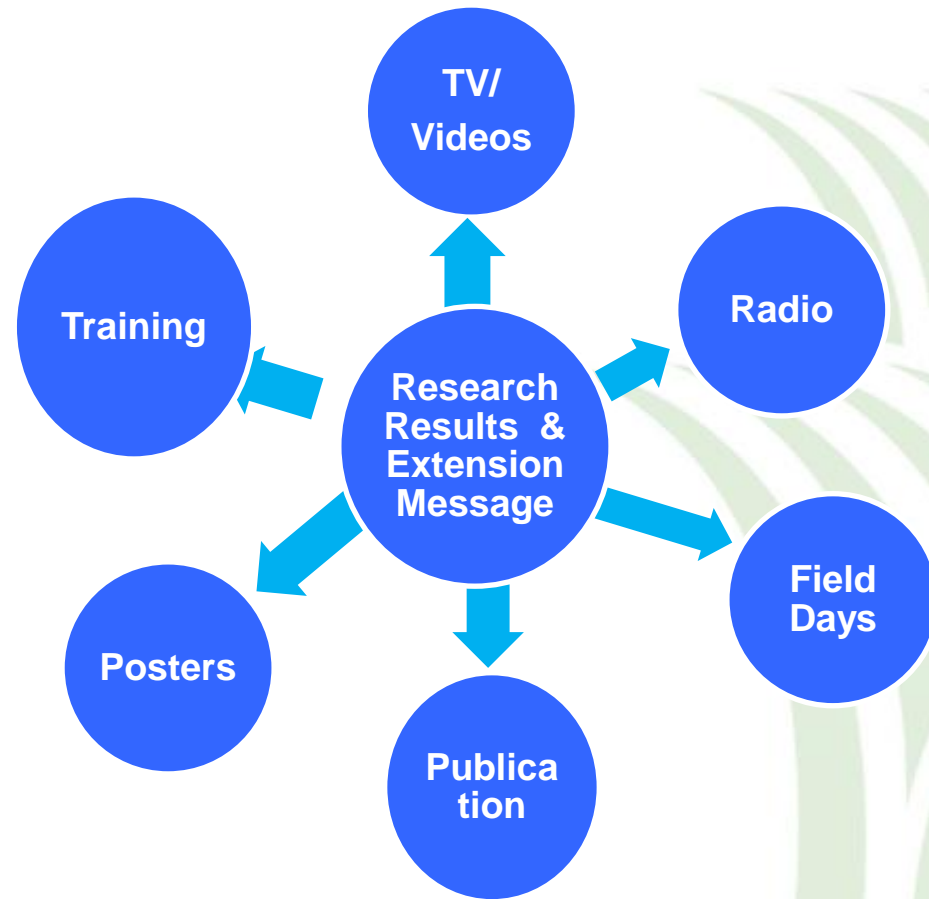
Population in rural area: 744.7 million, 57% of total (2005)

**Small farm: China has 200 million households, 350 million farm
labors, only 0.29 ha/labor**

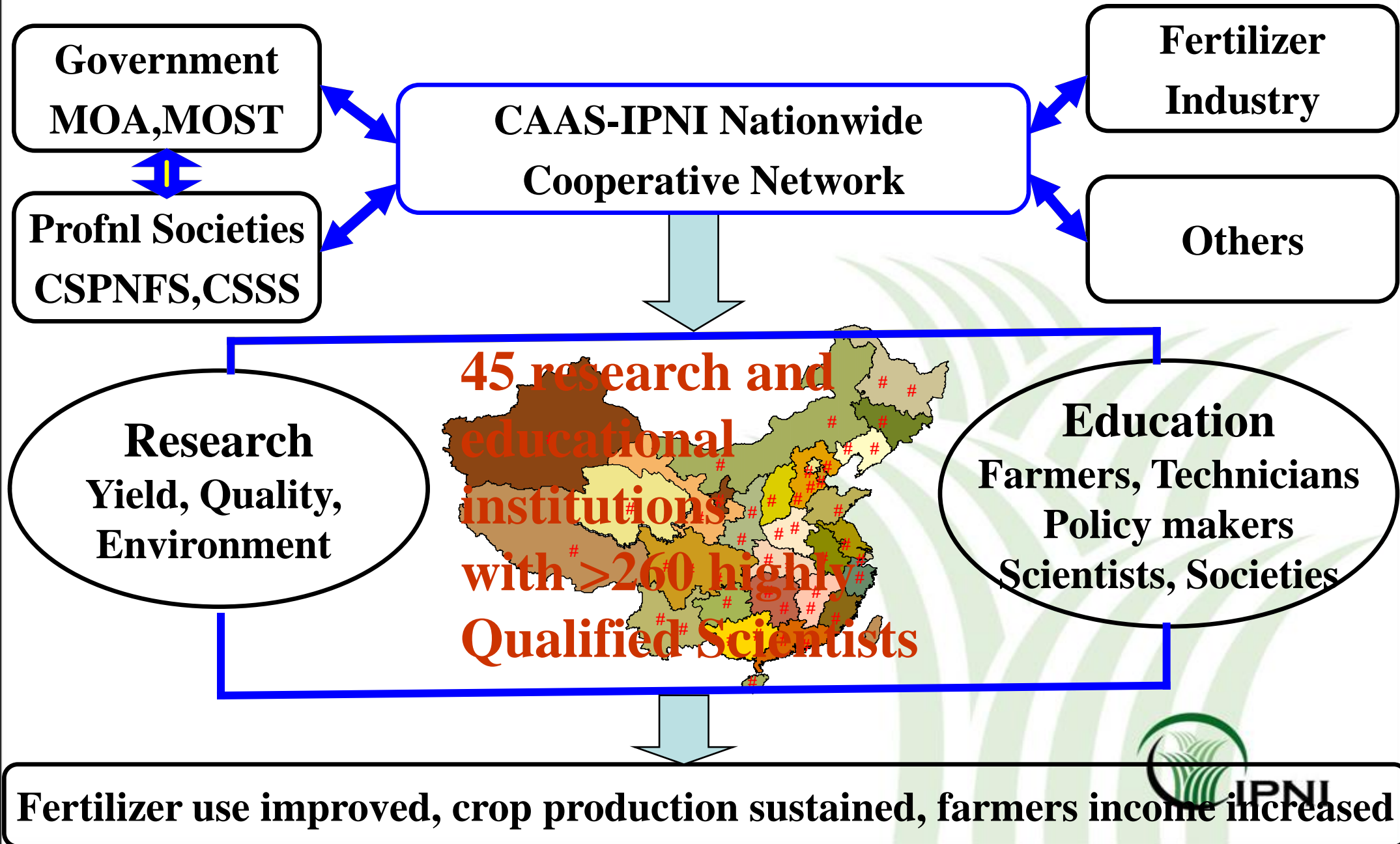


图 16-3 中国耕作制度区划图

It is important to have technology developed and transferred to small household farmers through various educational activities



Strategy of CAAS-IPNI Cooperative Program in China



Research focuses:

- Soil testing and fertilizer recommendation
- Nutrient management for high yield and high quality crop production
- Soil K status and rational K fertilization
- Improvement of fertilizer use efficiency
- Fertilization and environment quality
- Site specific nutrient management
- IT use in soil and fertilizer management

- **Over 4000 research trials, > 100 crops**
 - all major soil types
- **BF increased crop yields by 15%-rice, 25%-wheat, 26%-corn and 63%-banana**
- ***BF increase in average net income: 2000 yuan (250US\$)/ha***
 - ***grains: 800 -1,800 yuan (118-265US\$)/ha***
 - ***cash crops: 2,000 - 20,000 (295 – 2950US\$)/ha***

- **>5000 field demonstrations**
- **>95,000 soil samples analyzed**
- **>1200 field inspections for leaders**
- **>260 harvest field days**
- **> 360,000 people participated**
- **> 800 papers published (2005-2009)**
- **>50 scientific awards received**
- **>180 video developed & used by CCTV/local TV**





Field on-site technology transfer activities





Field on-site technology transfer





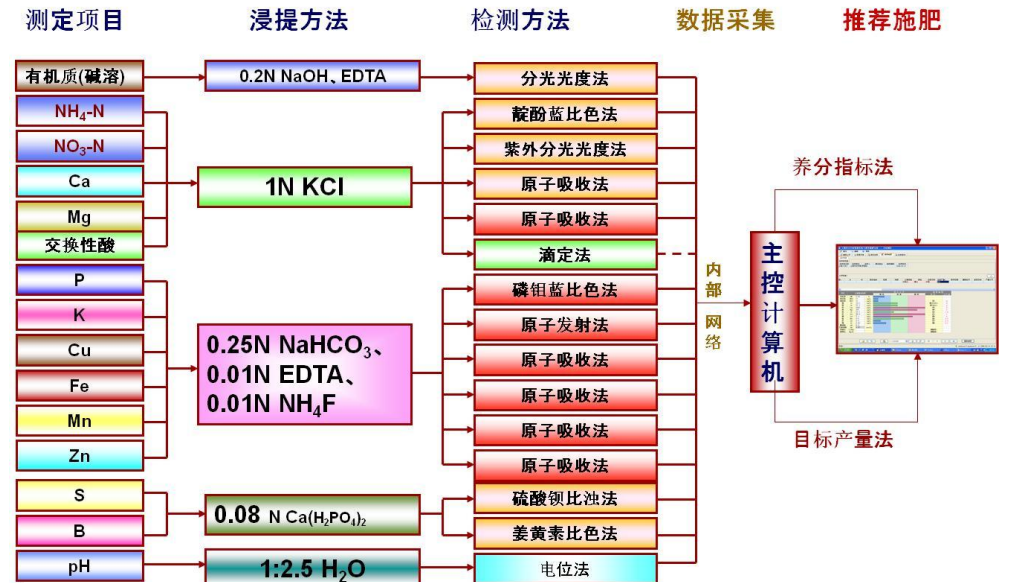


*Getting the message out:
TV, Video and Radio Programs*



Soil testing and fertilizer recommendation:

- ✓ Computerized and web-based soil testing and fertilizer recommendation program developed
- ✓ Multi-nutrients extraction
- ✓ Batch sample handling
- ✓ Automatic data collecting
- ✓ Programmed fertilizer recommendation





The CAAS-IPNI Soil and Plant Analysis Lab was named as National Lab for Soil Testing and Fertilizer Recommendation



中一加合作
土壤植物测试实验室
CAAS—IPNI COOPERATIVE SOIL
AND PLANT ANALYSIS LABORATORY

中国农业科学院
国家测土施肥中心实验室
National Laboratory of Soil Testing and Fertilizer Recommendation
Chinese Academy of Agricultural Sciences

- Workshops, training courses organized
- Over 260 papers, 6 books published
- TV/videos developed
- Posters/brochure used
- Awarded by Ministry of Agriculture and the Central government of China in 1998-1999
- Widely used in China to improve fertilizer use efficiency



Site specific nutrient management (SSNM)

- ✓ GIS, GPS technology used
- ✓ Soil nutrient map and fertilization map developed
- ✓ Used to guide balanced use of fertilizers in field, village, county and regional levels
- ✓ TV/Video developed
- ✓ Training courses/workshops
- ✓ Publications, posters, etc.
- ✓ SSNM on-line program developed

SSNM on-line System:
作物精准施肥远程服务系统

星期一

首页 土壤养分 作物营养 肥料使用 养分平衡 精准施肥 远程诊断

MEMBER LOGIN 会员登录

用户名:
(USERNAME)

密码:
(PASSWORD)

忘记密码

登录 注册

作物精准施肥远程服务系统

土壤养分远程采集

中国农业科学院土壤肥料研究所
在国际合作、国家攻关、国家863等项目的支持下，研制了土壤样品快速系列化分析设备和土壤养分综合系统评价方法，研究形成了实验数据采集与分析系统，实现了通过互联网收集送样单和土壤样品信息、实验数据

精准施肥

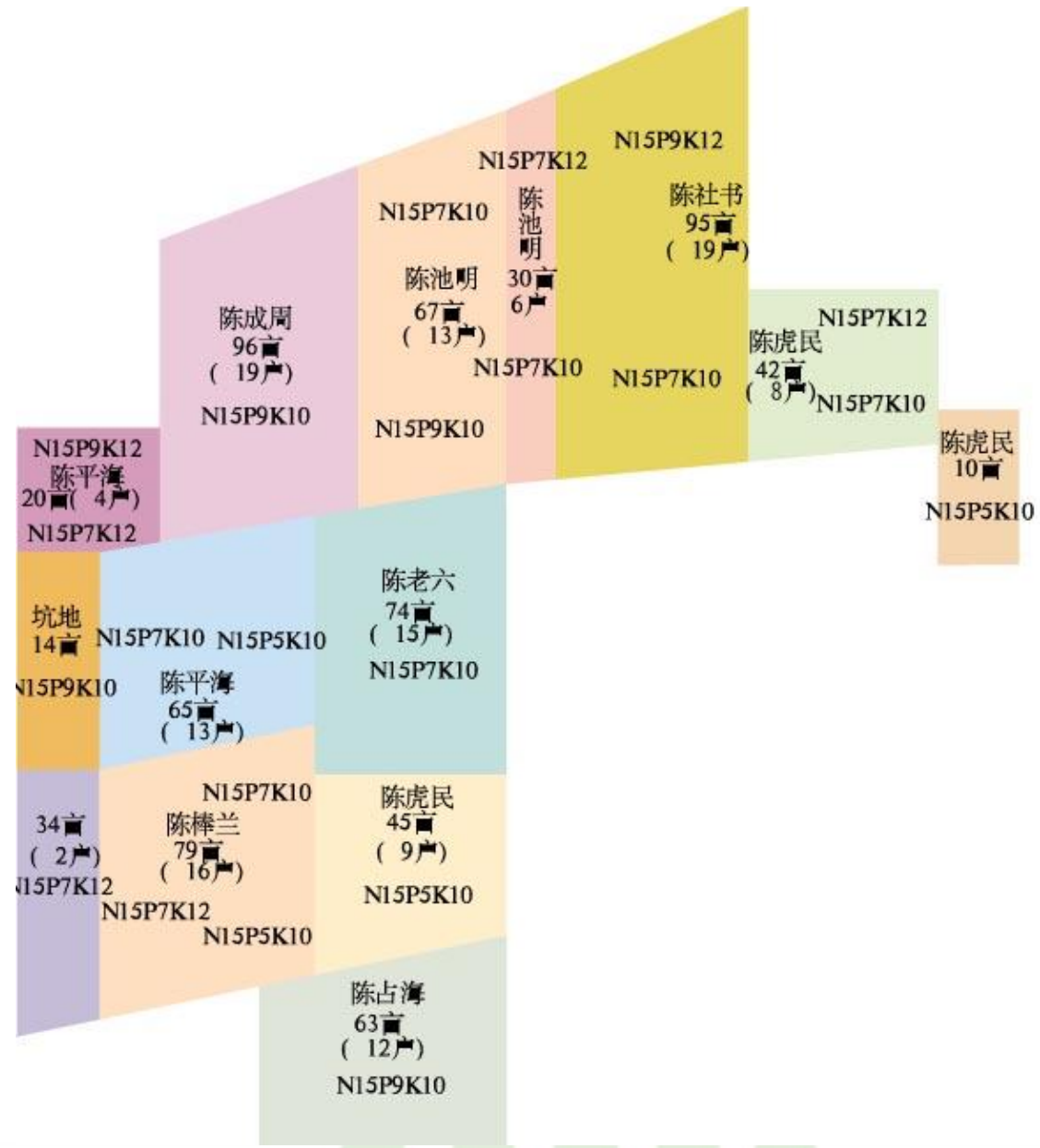
中国农业科学院土壤肥料研究所
在国家攻关、973、863、国家基金等项目的支持下，应用GPS、GIS等有关信息技术开展了大量的有关土壤养分精准管理及变量（分区）平衡施肥技术方面的基础性研究和应用工作，建成了村级、乡（镇）

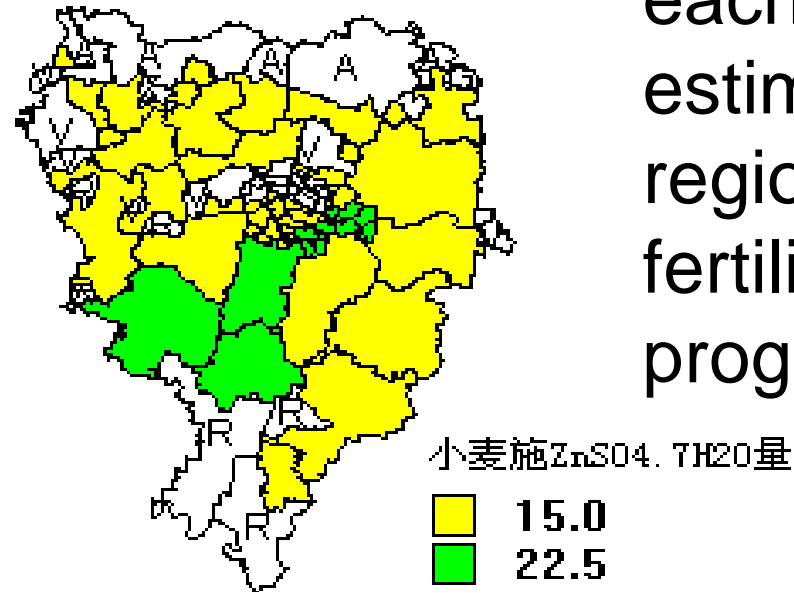
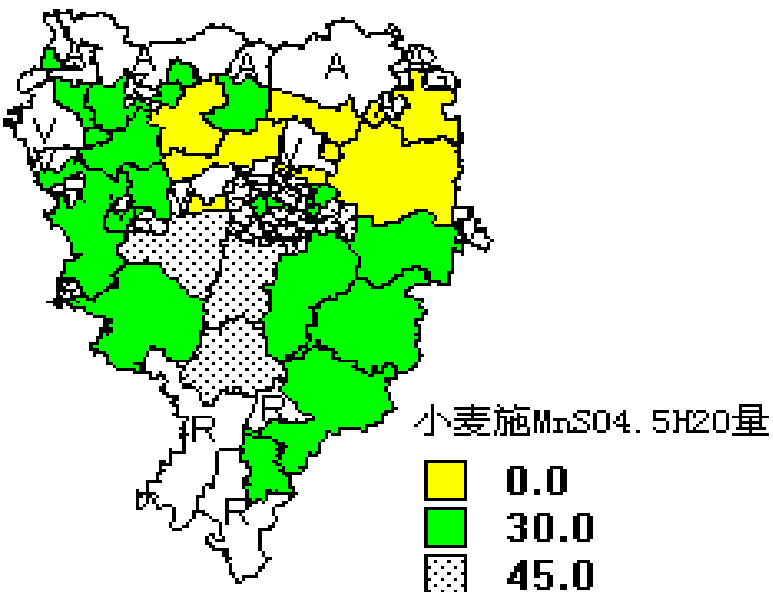
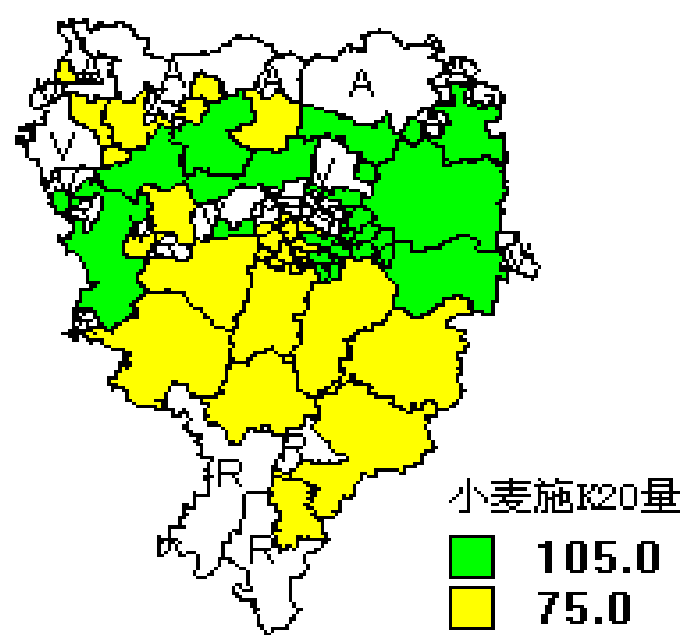
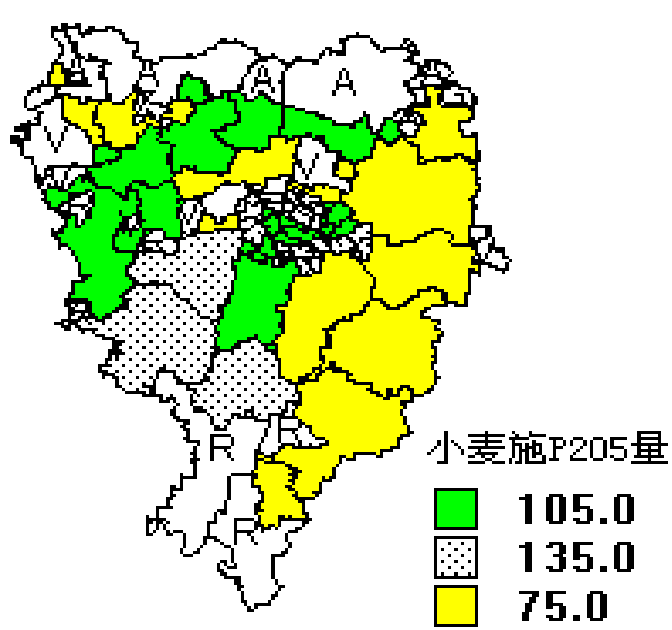
远程诊断

中国农业科学院土壤肥料研究所
在国际合作、国家攻关等项目的支持下，研制形成了居国内外先进水平能快速准确测定和全面评价土壤中、大、中和微量营养元素的一整套适合我国土壤条件和种植制度的土壤养分综合系统评价法与作物

SSNM in 53 ha cotton field in Yongnian county of Hebei

- Using soil testing, GIS, GPS technology, field N, P, K maps and fertilization map developed
- N, P and K rates was recommended for each farmer's plot
- Cotton yield increased by 20% and farmers profit by 5315 Yuan RMB/ha (643 US\$/ha)





By overlay the township map on top of nutrient map, nutrient status of each township was estimated and regionalized fertilization program developed

Regionalized fertilization in Yutian county of Hebei (kg/ha)

County level regionalized SSNM program in Xinjiang

欢迎

新疆县级土壤养分管理及推荐施肥信息系统

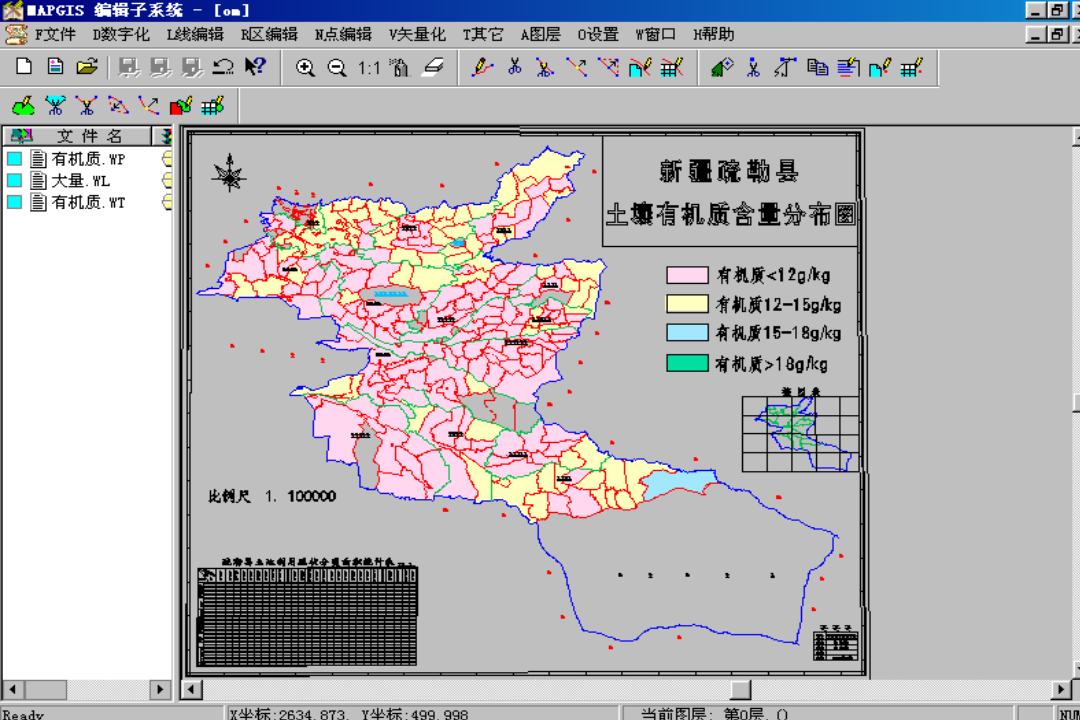
WELCOME



用户

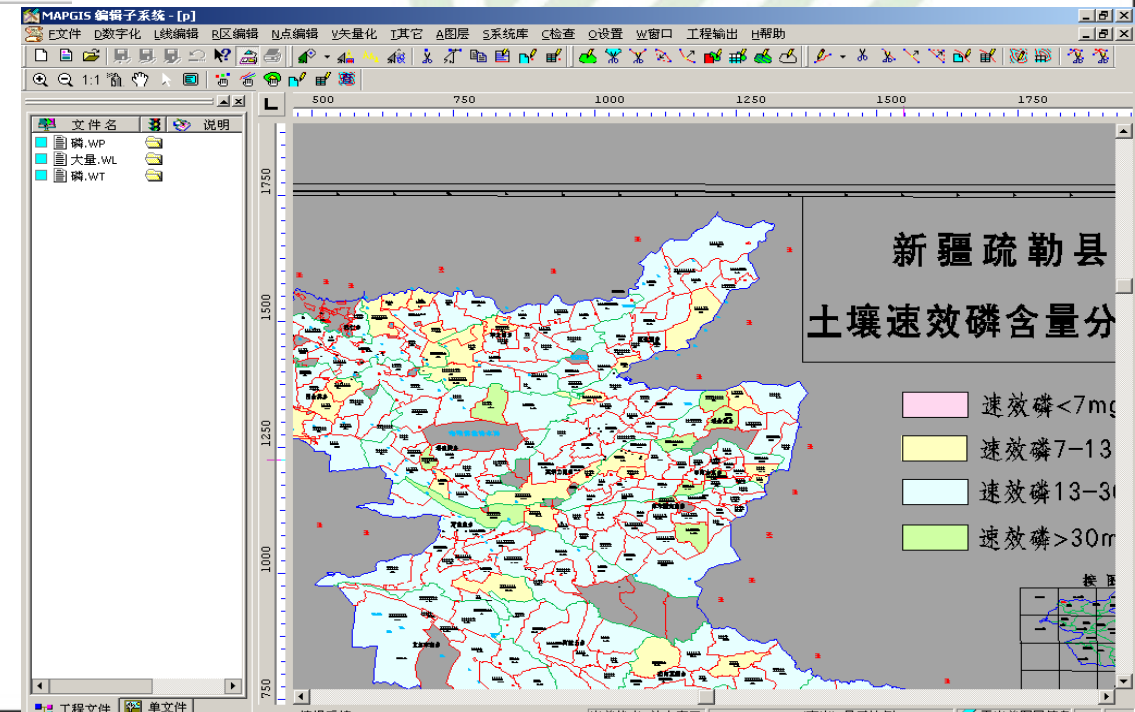
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确定 取消 高级

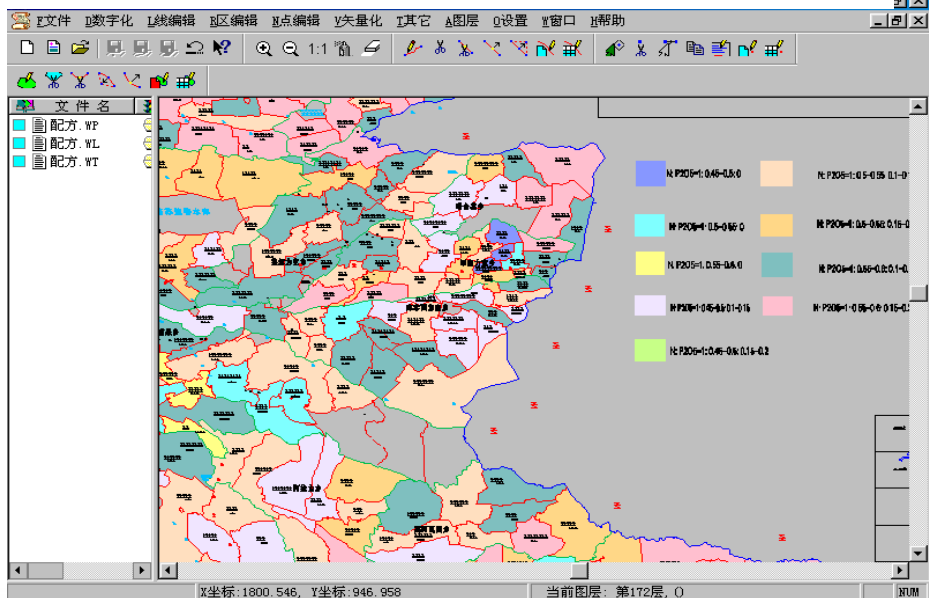
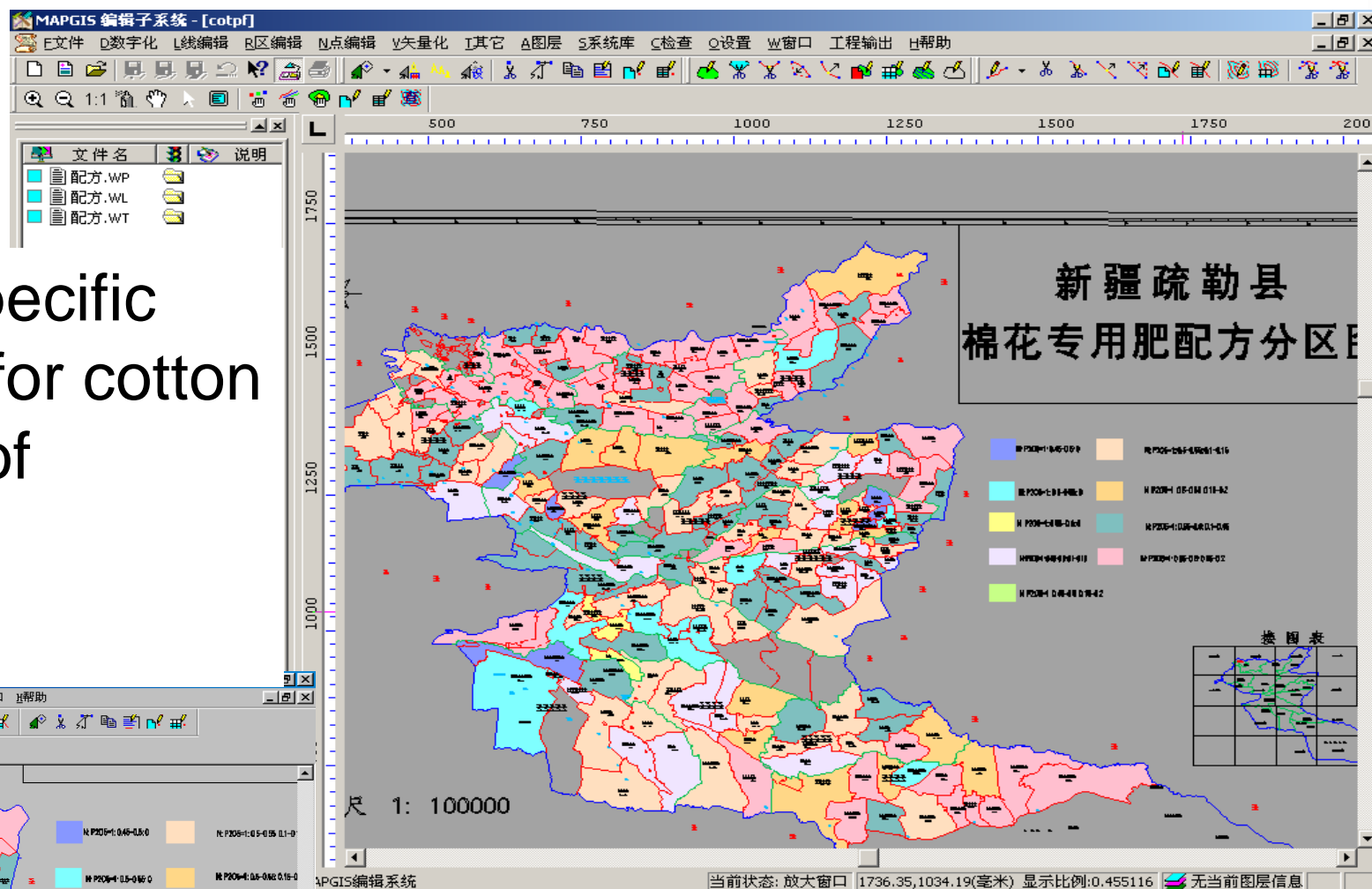


Soil organic map of Shule county of Xinjiang

Soil available P map of Shule county of Xinjiang



Site (regional) specific fertilization map for cotton in Shule county of Xinjiang



Over 180 TV/video developed and used by CCTV/provincial TV.

A 135 minute video series of Soil Fertility Management Video Program (9 chapters each 15 minutes). The videos were provided to China Central Agricultural Broadcasting School (CCABS) as the educational materials to be used through the CCABS's national educational network and the CCTV agricultural channel.



- Posters for 24 crops developed
- Information includes: nutrient requirement, deficiency, fertilization rate, N, P, K ratios
- >20,000 copies were printed and distributed nation wide



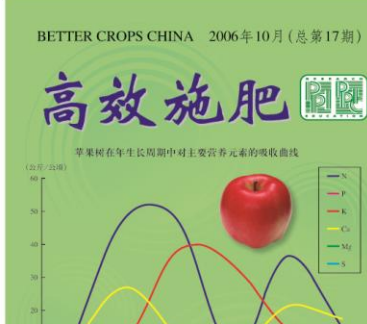
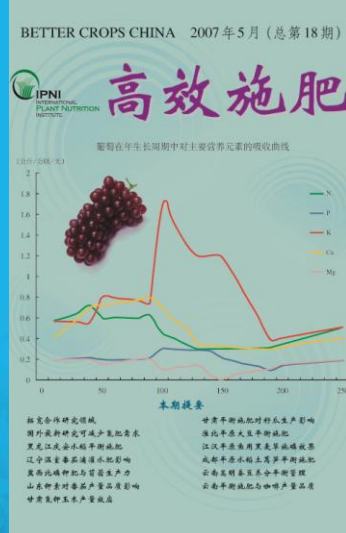
Better Crops China (BCC):

- Chinese language technology transfer serial publication promoting high efficiency fertilization
- Transfers information on best nutrient management and rational fertilization practices to farmers, local leaders, technicians and farmers
- 23 issues have been published and distributed to over 8000 addresses nation-wide

BETTER CROPS CHINA

XII (12) 2009, No 2. (23)

加拿大钾肥公司在中国的平衡施肥示范项目报告 (23)	1
金继运	
长期施钾和秸秆还田对青海春小麦产量和土壤钾素的影响	2
张亚丽, 陈占全, 李月梅	
氮肥不同基追比和氮肥种类对夏玉米产量和氮肥利用率的影响	7
李丙奇, 孙克刚, 和爱玲	
河南玉米主产区生产现状及农田土壤养分状况分析	11
孙克刚	
内蒙古河套灌区油菜养分吸收、积累和分配规律研究	16
段玉, 妥德宝, 赵沛义, 李焕春, 张君, 安昊	
平衡施肥对白菜产量和品质的影响	24
赵欢, 张国平, 孙倩倩, 王小晶, 吕慧峰, 王正银, 向华辉, 周长洪	
平衡施肥对穿心莲生长和药效成份的影响	31
李录久, 高本军, 刘学敏, 郭配盛, 丁楠, 孙义祥	

Web-based technology transfer

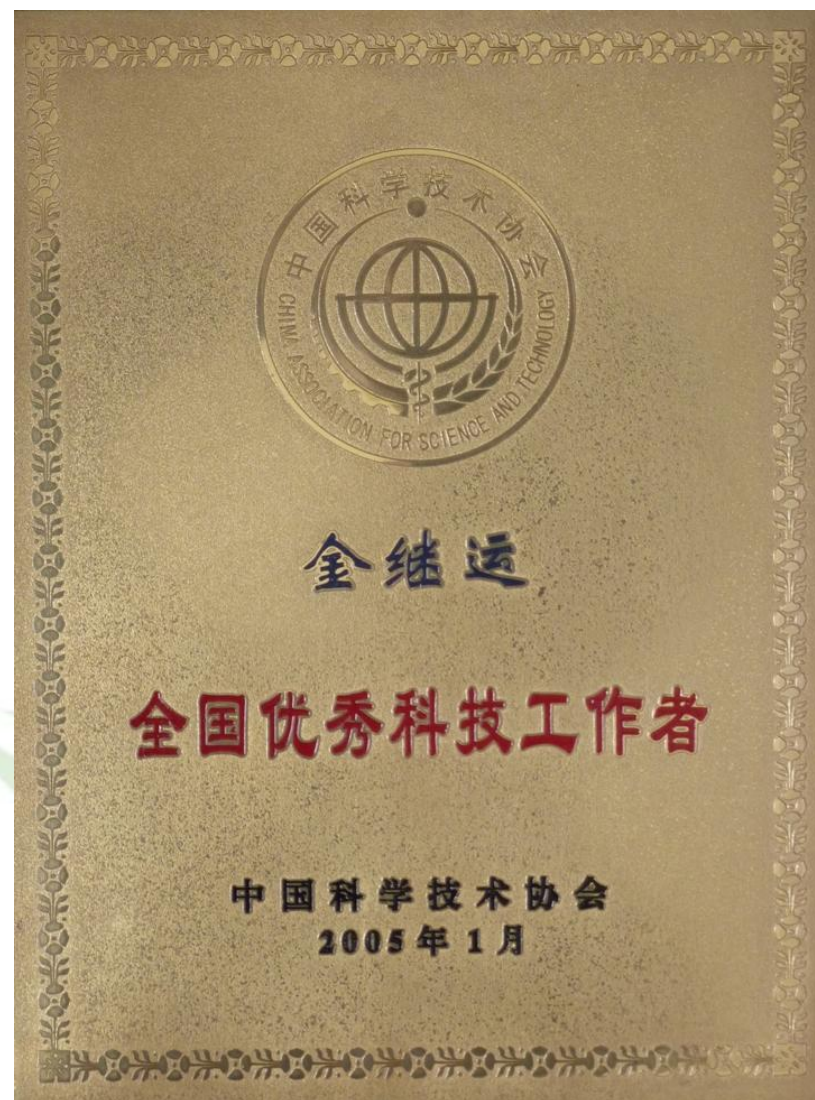
- National and Provincial web pages for technology transfer developed
- General knowledge in soil, crop and fertilizers available
- All publications available
- Nutrient requirement for major crops
- Fertilization technics
- Soil testing and fertilizer recommendations



<http://cclab.caas.ac.cn>



- It was estimated that over 400 million people are being influenced and 50 million households are benefiting
- Received National Outstanding Scientist Award from Chinese Science and Technology Association in 2005
- Awarded by the Central Government of China in 2007 as one of the National Model Scientists for Agricultural Science and Technology Transfer



Acknowledgment:

To IFA for this honorable recognition and to Sinochem for the nomination

To MOA, MOC, CAAS of China, CIDA, Canpotex, and MCs of IPNI for the long term support to the program

To all cooperative institutions in China for many year spirit cooperation and friendship



Thank you!

