



THE NEW ADVANCES OF AGRICULTURAL MECHANIZATION AND EQUIPMENT INDUSTRY IN RECENT YEAR

[China Report]

**Presented at the 2rd Session of the TC
of APCAEM**

20-21 Nov. 2006, Suwon, ROK

WANG / Maohua

**Member of Chinese Academy of Engineering
Professor, China Agricultural University
Qinghua Donglu No.17, Beijing 100083, China
wangmh@cau.edu.cn**

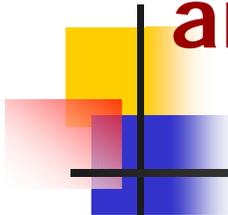
1. China Started to Implement the 11th Five-Year Development Plan (2006-2010)

The Critical Period of Building a Well-off Society in an All-Round Way

The Guiding Principles are:

- **Implement the Scientific Concept of Development on *keeping human as fundamentality and tracking comprehensive and coordinated sustainable development***
- **Maintain Stable and Fast Economic Development.**
- **Accelerate the Change of Economic Growth Mode.**
- **Improve National Independent Innovation Ability.**
- **Promote Coordinated Development between Urban and Rural Areas.**
- **Strengthen the Construction of Harmonious Society.**
- **Continuously Deepen Reform and Opening to Outside World.**

The Major Objectives of Economic and Social Development (2006-2010)



- Annual average growth of GDP will be **7.5%**
- Per capita GDP will **double** the figure of the year 2000.
- **45 million** rural labour forces will be transferred to urban
- Urban and rural regional development **tends to be coordinated**. The urbanization rate is increased to **47%**.
- The total national population is controlled at **1.36 billion**. Farmland retention is kept at **120 million** hectares
- Per capita annual income of urban & rural residents increase **5%** respectively

Construction of New Villages,

Development of Modern Agriculture

- Push Forward Strategic Adjustment of Agricultural Structure;
- Change the Agricultural Growth Mode;
- Increase Agricultural Comprehensive Production Capacity and Value Adding Ability;
- Increase Agricultural and Rural Investment & Accelerate the Establishment of Long-term Mechanism of Promoting Agriculture Development;
- Increase Peasants' Income, Improve the Policy of Income Increase and Burden Reduction.

Increase productivity, efficiency and farmers income ;

“Offering more, taking less and giving free hands for Farmers”

2. New Opportunity for Promotion of Agricultural Mechanization Development

State and local government have much enhanced financial subsidies for farmers to buy machinery:

★ Subsidies for buying farm machinery:

(Central Gov. / Local Gov. / farmers' input)

2004: 8.4 mil. / 49.4 mil. / 360 mil (1 : 5.9 : 43)

2005: 36 mil. / 96 mil. / 1.8 bil. (1 : 2.7 : 50)

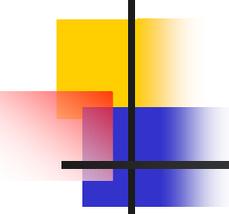
2006: 75 mil. / 126 mil. / 6.3 bil. (1 : 1.7 : 84)

★ Exemption of fee to passing through the public road for trans-regional harvesting and rice planting machinery services.

★ Some other subsidies policies to promote agricultural mechanization are preparing, such as:

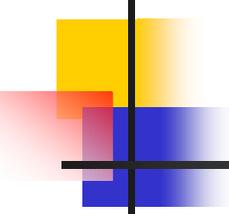
Farming used diesel oil; preferential tax for agricultural manufacturers;

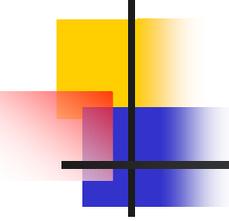
R & D on advanced farm machinery; financial & credit policy, etc

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- **Good economic benefit for farmers to adopt machinery in farming;**

Return of farmers' investment for AM: 2-3 years

- **More advanced appropriate agri. equipment is available and affordable for farmers adoption;**
 - ◆ *Rice harvesting & transplanting machinery on paddy fields are matured and fast extended, appropriate rice nursery technology has been improved*
 - ◆ *Fast extension of conservation tillage technology in arid farming and a series of machinery are available in use.*

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- ◆ *Corn harvester development has got a good progress*
 - ◆ *Rapeseed, potato, peanut, sugarcane, forage harvesting and horticultural machinery have extended use in practice.*
 - ◆ *Machinery for straw incorporation into soil, treatment, collection, packing are popular in use, etc.*
 - ◆ *Take more attention to value-added pre- & post harvest treatment & processing mechanization*

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- **Set up a Series of Regulations to Improve Agri. Mechanization Management & Implementation of the State Law for AM Promotion;**
 - **The Contract Systems for Mechanization Services are fast Developed and Improved.**

33 million specialized households of Agricultural machinery, more than 40 million people engaged in contract system service with annual income of about 30 bil. US\$

A New Scenery of Agricultural Mechanization Promotion

Farmers needing machines;

- ◆ *AM products having to be introduced;*
- ◆ *New technology requesting investigations;*
- ◆ *Experiences should be communicated;*
- ◆ *Nationality enterprises desiring to go abroad;*
- ◆ *Foreign ones yearning for coming to china*

The Cause of China Agricultural Machinery is Eager for a "Big Opera" to Satisfy Those Aspiration above !

Some Indicators on the Agricultural Mechanization development

The data by the end of 2005:

- ◆ Total farm power: 680 mil. kW ↑ 31% than 2000
- ◆ Possession of big-mid size tractors: 1.4 mil. sets
- ◆ Possession of small-sized tractors: 15.4 mil. sets
- ◆ Possession of Combine harvesters: 0.48 mil. sets
- ◆ Comprehensive mechanization level: 36 % ↑ 3.6%
- ◆ Wheat harvesting mechanization: 76%
- ◆ Rice harvesting mechanization: 34% ↑ 18%

The Development Target by 2010

- ◆ AM enters into **mid-stage development level** around the country. Some developed areas enter to **high-stage development level**;
- ◆ The agricultural productivity will reach **double than 2000**;
- ◆ Total farm power: **800 mil. kW**
- ◆ Comprehensive mechanization level: **45 %**

The criteria for evaluation of AM development level

Indices	Preliminary level	Mid-term level	High
level			
Comprehensive	< 40 %	40-70 %	
>70%			
mechanization level			

3. The Recent Advances of Agricultural Machinery Industry

- The annual growth rate of total output value & sale income have exceeded **over 20 %** since 2002 .
- The total sale income in 2005: **13.61 Billion US \$**
- The predicted annual product output in 2006 :
 - ◆ The total output value & income: **Over 16.5 bil US \$;**
 - ◆ Output of large-mid size tractors: **200 thousands sets**
 - ◆ Output of self-propelled combines: **Over 80 thousands sets**
- The AM industry includes about **8000** manufactures & among them **1578** scale enterprises.
- Statistics of products in 2005:
 - Large-Mid Size Tractors: **162 thousands sets;**
 - Small Size tractors: **2.01 mil sets;** Combine harvester: **80,000 sets**

The Agricultural Machinery Output between Jan. — June 2006

(In Comparison with the Same Period of 2005)

Large & middle scale Tractors:

113 thousands Units

↑ **54.05 %**

Harvesting machinery:

206 thousands Units

↑ **88.72 %**

Rice Transplanter:

30 thousands Units

↑ **over one time**

Small Tractors: 1.011 mil. Units

↑ **2.53 %**

Rural vehicle: **952.1** thousands Units

↑ **14.16 %**

The Status of Scale Agricultural Machinery Manufacturers by the end of 2005

Indicators	State-owned or State-owned Holding Enterprises	Private Enterprises	Three Kind of Foreign Invested Enterprises
Quantity of Enterprises	252	1178	148
Structure of Ownership	16.65 %	74.14 %	9.3 %
Percentage of Sale Income	20.4 %	64.78 %	9.18 %
Percentage of Fixed Assets	38.37 %	52 %	9.63 %

Products of The first Tractor Company in China (Luo Yang)



东方红-1604



东方红-1002/1202履带拖拉机



东方红-1004/1204



东方红-X700/X800



东方红-350



东方红-200



东方红4LZ-200全喂入
水稻联合收割机



东方红4LZ525EX全喂入
水稻联合收割机



东方红4LZ225全喂入小麦
水稻联合收割机



功效非凡

福田雷沃 欧豹 350A



系列拖拉机
农田作业新选择

福田雷沃 欧豹 524



功效非凡

福田雷沃 欧豹 550



功效非凡

福田雷沃 欧豹 800B



欧洲技术 功效非凡

福田雷沃 欧豹 824



荣获福田雷沃 欧豹
“中国名牌”称号
并荣获中国拖拉机市场
“国家地区”

功效非凡

福田雷沃 欧豹 860



功效非凡

福田雷沃 欧豹 904



功效非凡

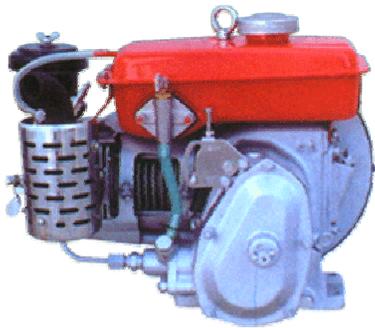
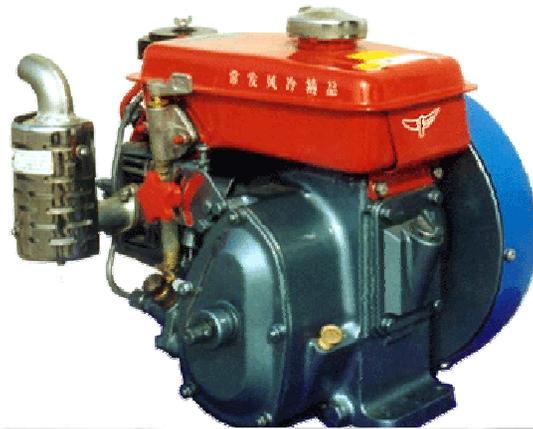
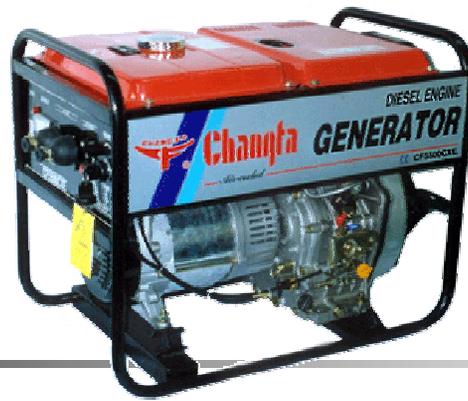
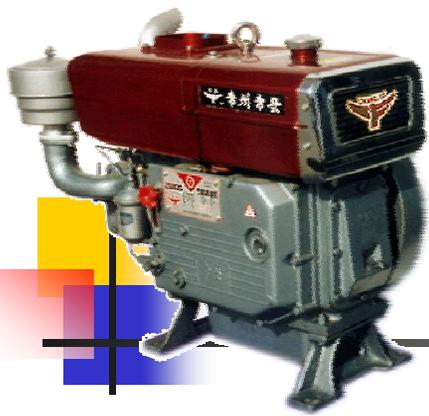
福田雷沃 欧豹 254A



欧洲技术 功效非凡

荣获福田雷沃 欧豹
“中国名牌”称号
并荣获中国拖拉机市场
“国家地区”











福田谷神B1500



行业的骄傲 更高的效率
农民们的自豪 更低的油耗

半喂入联合收割机 4LBZ-180

- 主要技术参数
- 收割效率: 80
 - 额定功率 / 额定功率 (kW) / (HP) / (CV)
 - 额定速度 / 额定速度 (km/h) / (MPH) / (MPH)
 - 额定牵引力 (kN) / (kgf)
 - 额定重量 (kg)
 - 收割行程: 5
 - 额定最高车速 (km/h) / (MPH)
 - 额定作业长度 (km) / (MPH)
 - 额定作业效率 (kg/h) / (kg/h)
 - 额定生产率 (kg/h) / (kg/h)
 - 额定燃油消耗率 (kg/h) / (kg/h)
 - 额定油耗 (kg/h) / (kg/h)
 - 额定燃油消耗率 (kg/h) / (kg/h)
 - 额定燃油消耗率 (kg/h) / (kg/h)



22G-6型水稻高速插秧机



桂林之星
桂林山水甲天下 桂联机器富万家



4LL-1.8型全喂入联合收割机深泥脚地区作业



2BMD-12型小麦对行免耕播种机



2BMFS-6/12型带状粉碎浅旋免耕播种机



1S-3型深松机



1S-1型深松机



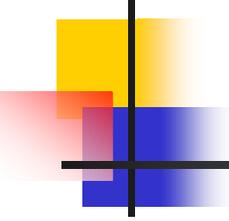
1S-2型深松机



1S-5型深松机

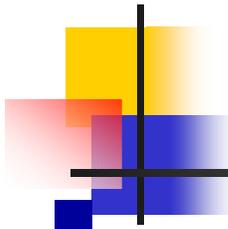
1S-7型深松机

The Prediction of Agricultural Industry Production for 2010



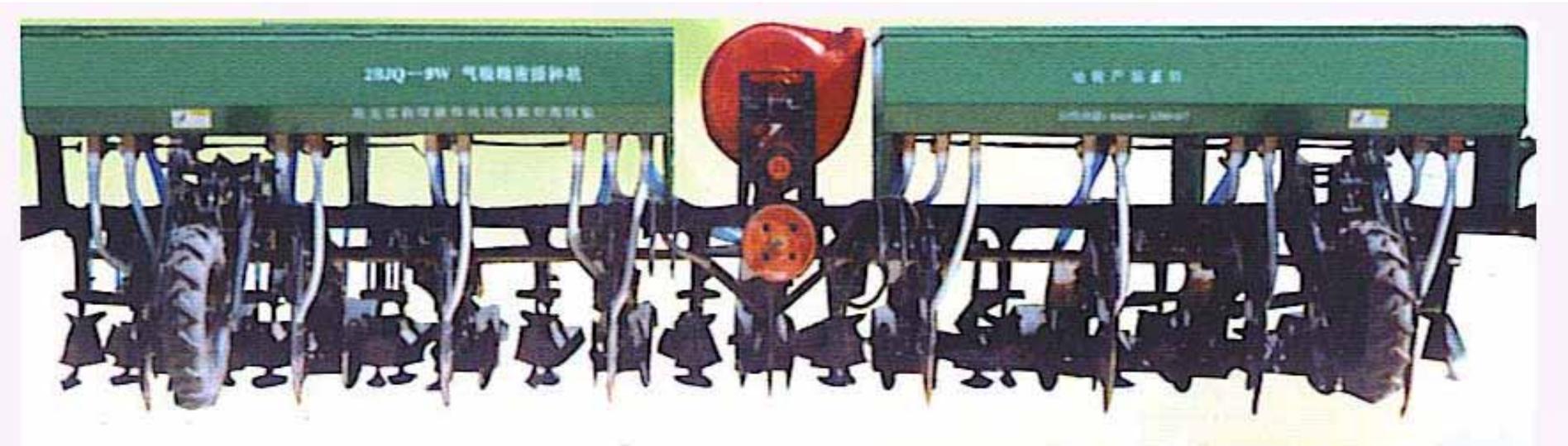
Total Output value:	25 billion US \$
Annual Output of Large-Mid Size tractors:	> 0.2 mil. Sets
Annual Output of Small size tractors:	1.6 ~ 1.7 mil. Sets
Annual Output of Combine harvester:	60~80 thousands.
Annual Output of Farm Vehicles:	2.2 ~ 2.5 mil. sets
Export value of agricultural machinery:	6.0 billion US \$

Crucial Challenges for the Industry



- Main products are small-size with lower-grade technology. Many large-size machine systems have to be imported from abroad.
- Product structure could not be able to meet the requirement of agricultural development
- Manufacturing industry structure isn't rational and the most enterprises are small scale with low technological level.
- Large enterprises are not strong enough while the small enterprises are not professional.

Large-Scale Advanced Agricultural Equipments have to be Imported







Import & Export of Agricultural Machinery between 2001-2005

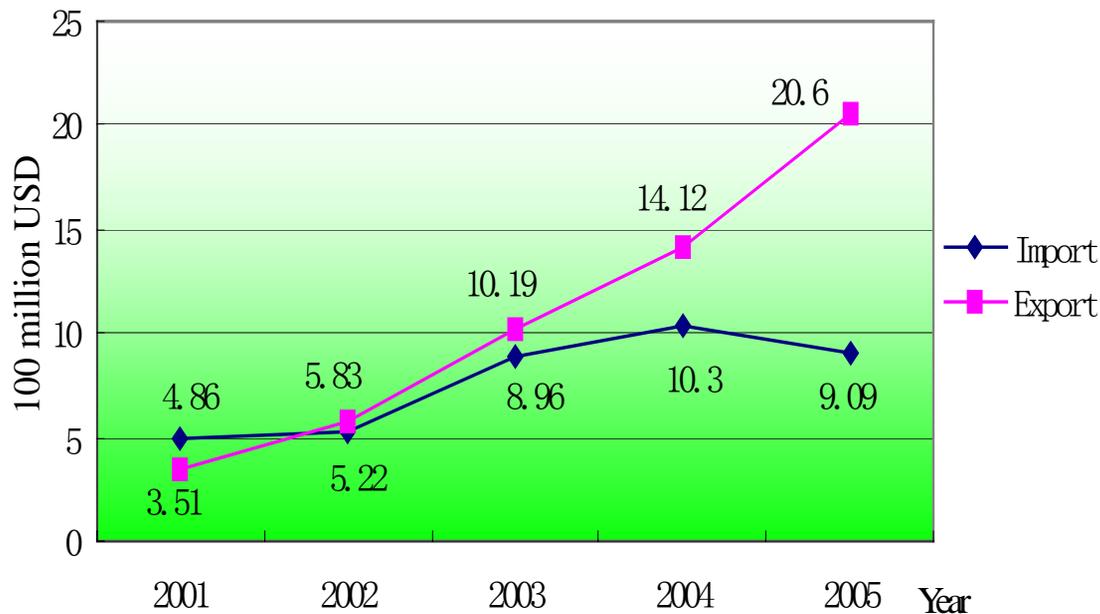


Fig 1—5 Import & export of agricultural equipment (exclude diesel engines and water pumps)

In 2005 China imported AM from 62 countries:

Japan - 1.498 bil. \$
 Germany - 10:45 bil. \$
 USA - 0.81 bil. \$
 ROK - 0.534 bil. \$

In 2005 China exported AM to 179 countries and regions:

Asia: 2.218 bil.
 North America: 1.104 bil. \$
 EU: 0.884 bil. \$
 Africa:

Enhanced International Joint Venture and Cooperation

More than 70 AM sub-companies or joint-venture enterprises were established in China:

John-Deere,

New Holland,

Yanmar,

Kubota,

Tong Yang,

Jinzi,

Valtra,

Claas, etc

.....

Products from these Famous manufacturer started to be accepted by Chinese customers

News of sell income of some overseas and joint venture AM manufacturers in the first half year of 2006:

Kybota-Suzhou:	92 million \$	↑	120.53 %
Deere-Tianjin Tractor:	71 million \$	↑	51.72 %
New Holland Shanghai:	46 million \$	↑	24.16 %
Yangma-Wuxi:	43 million \$	↑	141.95 %
Dongyan-Jiangsu:	18 million \$	↑	91.37 %

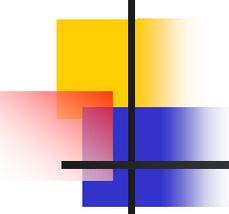
A very attractive and high potential opportunity for both domestic & worldwide manufacturers

Some Important Issues to Improve the Independent Innovation Capability



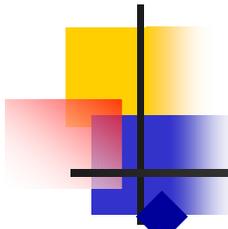
- 1、 Combination of agricultural equipment innovation with close cooperation of agronomic scientists**
- 2、 Sustainable development of contract system of agricultural mechanization to better serve farmers**
- 3、 Industry re-structuring in agricultural machinery manufacturers**
- 4、 Energy-saving agricultural equipment development**
- 6、 Development of advanced & appropriate agricultural equipment with lower cost and higher technology**
- 7、 Improvement the ensuring and management systems and provide preferential policy to support farmers to adopt mechanization.**

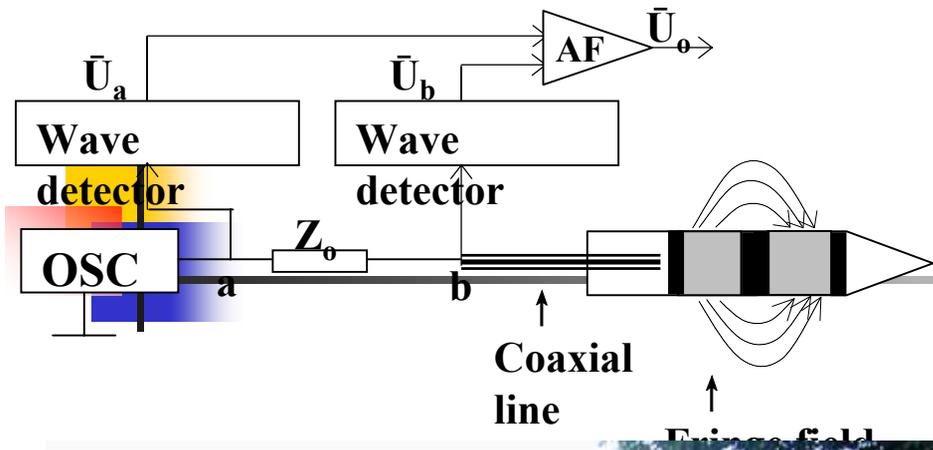
4、 Extending AE Services for Modern Agriculture



- **ICT for Agriculture and Rural Development**
- **Product Quality Detection, Grading and Traceability**
- **Bio-energy & Bio-based Products Development**
- **Soil & Water Engineering and Management**
- **Township Enterprises Management & Development**

■ **ICT for agriculture and rural development**

- 
- ◆ **113 mil. Internet users in China by the end of June;**
 - ◆ **More 200 bil. mobile messages communication were used by now in this year.**
 - ◆ **The Electronic and Information industry are planning to provide mobile with price USD 30 for farmers and the monthly payment for sending short message would be only 1 USD /month.**
 - ◆ **“Digital agriculture has become to leading the technological innovation on Agricultural & Engineering technology for farming and rural development**



The Prototype Vertical Soil Dielectric Sensors has Conducted Field Testing both in German and China since 2004

Tractor-driven Horizontal Prototype Dual Sensors started field application





The handheld dual sensors have tested in different soil conditions and can be used simultaneously measure Soil moisture content, Cone index, penetration depth and position parameter with auto-data storage

Low Cost Land Leveling Laser-controlled System Development



Electrochemical Detection

Two-Electrode System:

Working Electrode (WE):

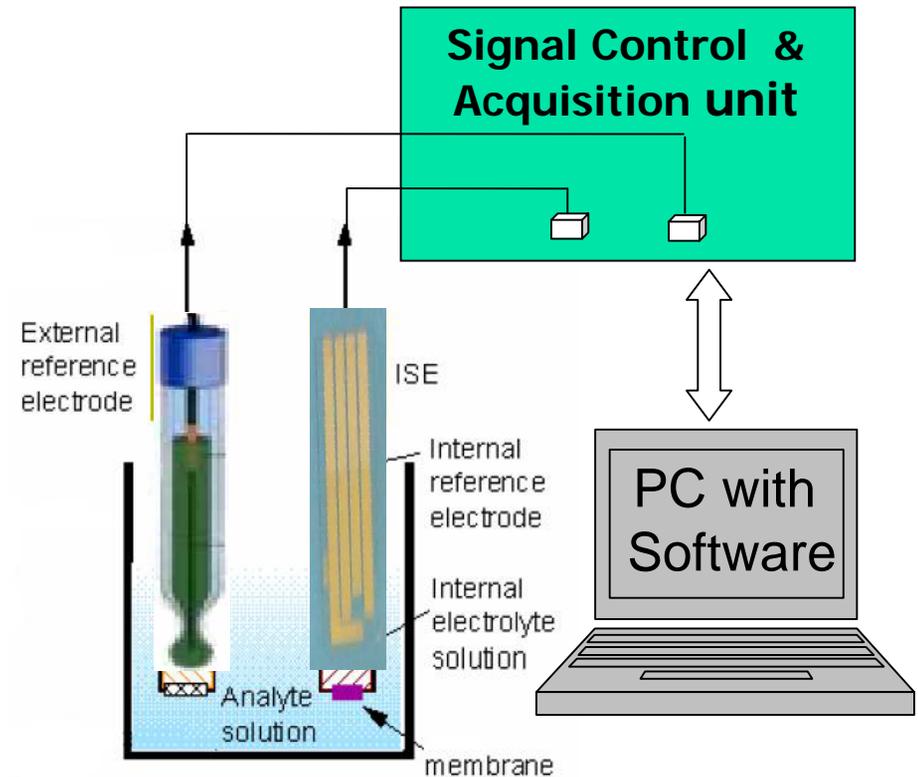
Ion-selective Electrode

Reference Electrode (RE):

Ag/AgCl Electrode or Calomel Electrode

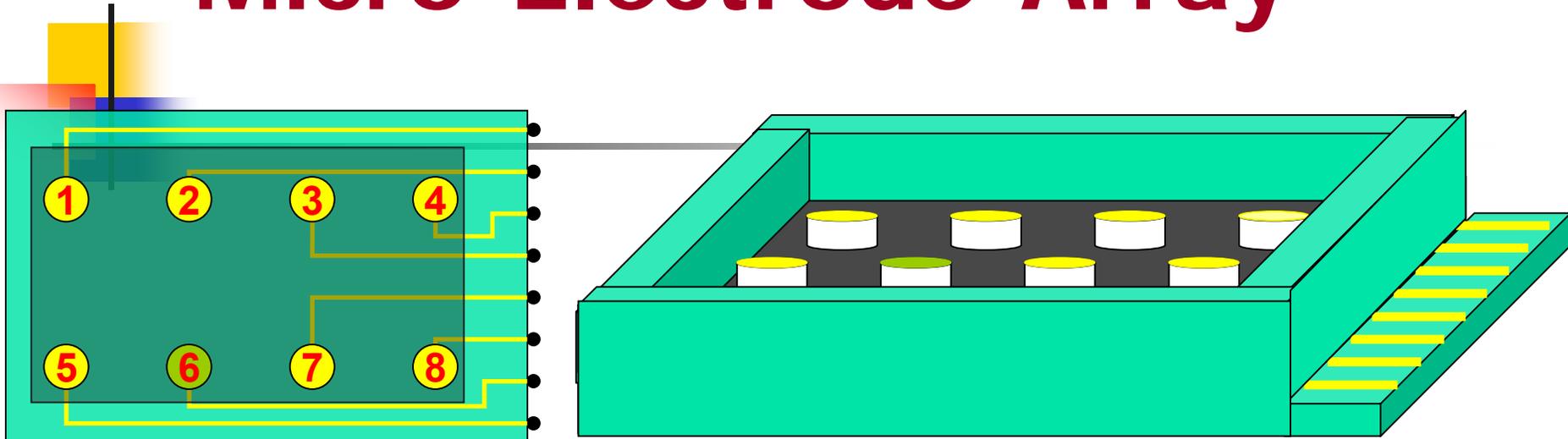
Electroanalytical Measurement:

Potentiometry



Electrochemical Cell

Micro-Electrode-Array



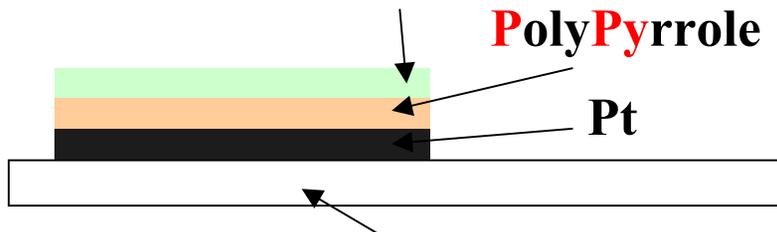
1. NO_3^- ; 2. K^+ ; 3. H_2PO_4^- ; 4. HPO_4^{2-} ; 5. PO_4^{3-} ; 6. Ag/AgCl; 7. NH_3 ; 8. pH

Nitrate Selective Solvent

Polymeric Membrane

PolyPyrrrole

Pt



Glass substrate

No.1 Nitrate Ion Selective Electrode

AgCl

Porous Sintered Glass

Ag

Saturated KCl Solution



Glass substrate

No. 6 Ag/AgCl Reference Electrode

Soil Testing Procedures



1. Sampling



Crush, Sieving

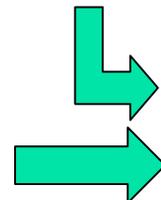


Moisture Determination

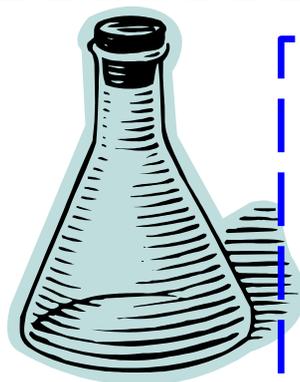


3. Weight / Volumetry

Extractant

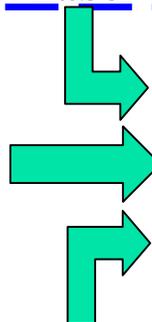


Heating, Stirring
4. Extracting



5. Target Solution

Label



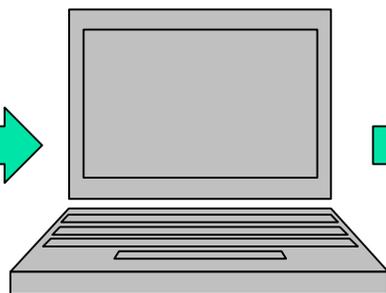
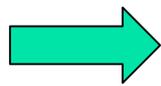
Buffer



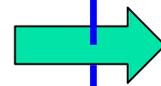
6. Fluidic Control



7. Electrochemical Detection
by Microelectrode Array



8. Signal Processing



9. Washing



Next Sample
Detection

■ Renewable Energy & Biomass Engineering

A "State Renewable Energy Law" was effective from 1st January, 2006

Prospective Opportunities:

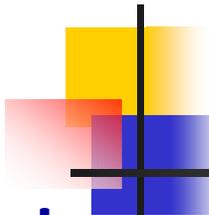
- ◆ 200 mil. tons out of 700 mil. of crop stalk burnt out immediately after harvested in field;
- ◆ 200 mil. tons of forest castoffs are not used yet;
- ◆ More than 2.5 bil. tons of animal dung & huge amount of organic residuals are left as polluting source;
- ◆ More 100 mil. ha bad farmland can be used to grow energy crops;
- ◆ Others are biogas, wind power, solar energy, bio-ethanol and bio diesel technology investigation.

It is planed that the non-food bio-liquid fuel production capability should be 1.2 mil. tons per year by 2010.

■ The AE-related Institutions in China

- ◆ Chinese Society of Agricultural Engineering (CSAE)
- ◆ Chinese Society for Agricultural Machinery (CSAM)
- ◆ Chinese Association of Agricultural Machinery Manufacturers (CAAMM)
- ◆ China Agricultural Machinery Circulation Association (CAMCA)
- ◆ Chinese Academy of Agricultural Mechanization Sciences (CAAMS)
- ◆ Chinese Academy of Agricultural Engineering (CSAE)
- ◆ China Agricultural University (CAU)

Summary



The first two decades of this century are of great importance in China's development, and the period from 2006 to 2010 is especially crucial. Promotion of Agricultural mechanization will be much faster than before in realizing its new development strategy. Balancing domestic development and opening wider to the outside world is of an important policy. To promotion of mutually beneficial cooperation among the APCAEM membership countries as a strategic partnership in agricultural Engineering & machinery manufacturers will be full of vigour in the future!

Thank you!

