



Challenges and Opportunities for ICT Applications in Rural Development

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by

Maohua Wang

Member of Chinese Academy of Engineering
Professor, China Agricultural University

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Forwards

Some facts of ICT revolution:

- ◆ Powered by the continuing advances in microelectronics and photonics, the capacity of expanding information infrastructure has risen exponentially, while simultaneously its cost has fallen, also exponentially;
- ◆ The global fixed telephone users has reached 1 billion through over one century, but since the emergence of new mobile phone to reach 1 billion users, there was only about 24 years;
- ◆ The recent IPv 4 Internet address resources will be fully occupied, the developed IPv6 Protocol will be capable to give each grain of sand on the earth surface with an independent address;
- ◆ The doubling time for bandwidth in fiber optic cables was 9 months rather than the 18 months for electronics, so a factor of ten billion increase in bandwidth will occur in just a bit over 20 years by estimation;



- ◆ RFID technology will cause a goods and materials dealer flow revolution. The biggest dealer – WALMART announced that from Jan.2005, all its first 100 large dealers shall use the RFID technology in all packing box; from Jan.2006 they will be extended to all selling goods.
- ◆ e-Commerce activity generated \$ 1.5 trillion (10¹²) in US, 2003. It was predicted that online sales in US will reach 3.2 trillion, and that global sales will reach \$ 6.8 trillion in 2004.

One cannot discuss the impact of ICT without a deep understanding of the incredible pace of change !



ICT should be an important technology to support APCEAM activities:

- ◆ technical transfer and knowledge dissemination;
- ◆ information exchange and regional cooperation;
- ◆ cooperative project research;
- ◆ remote learning, training; and
- ◆ mutual trades on agricultural equipment, etc.



Opportunities and Challenges

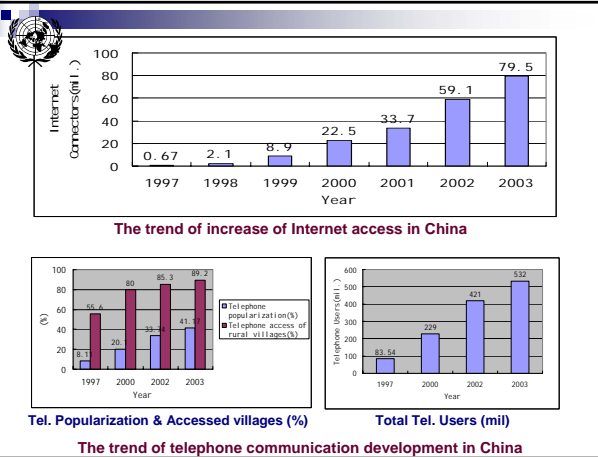
Advances in China

- ◆ A strategy to lead National Industrialization based on Informatization
- ◆ A National Informatization Quotient (NIQ) based on 20 items indexes is as another indicator to gauge the development of GDP



A favorable condition was created to foster ICT industry and national informatization:

- Rapid development of IT industries with 2-3 times over the GDP increase rate
- The annual increase of IT products manufacturing industry reached 33.2 %
- The annual increase of communication business in total reached 36.7 %
- There were rapid expanding the Internet access and telephone communication:



A considerable R & D projects on ICT for agriculture have been supported by the central and local governments in China

- ICT to support government macro management decision making and public services: infrastructure establishment; DB; DSS; e-Government system, Golden Agriculture Project, etc.
- ICT applications in R & D for agriculture. System modeling & simulation, Artificial Intelligent for agriculture: ES, KS, DSS for production, GPS, GIS, RS applied technologies, establishment IT Agriculture Demo Region, etc.

Results were less promoted into industry development.

- ICT investigation to serve farmers, producers and agro-industries is still in preliminary development: Network services; appropriate applied technologies development, sensing technologies and control technologies for farming use, practice of PA, etc.

Need to promote Agro-ICT products manufacturing and service industries development and create an end users driving mechanism.

A great concern with the Digital Divide in the information society

- The Global Summit on the Information Society in Geneva** on 10-12 Dec. 2003 showed a great concern to bridge the rural digital divide.
- FAO recognises** that knowledge and access to information are essential for combating hunger and poverty effectively.

FAO Representative said: "The information revolution has completely by passed nearly one billion people, who have not benefited from the transformation of global information systems, creating a digital divide that hinders development"; Bridging the rural digital divide has become a priority for FAO.

- According to FAO experts, the digital divide excludes countries and specific populations, above all rural people, from vital knowledge and information on agriculture, forestry, fisheries, nutrition and other aspects of rural development. **Such exclusion is a major constraint to the achievement of the goal of halving the number of the undernourished in the world by the year 2015.**

Digital Divide between Developed & less developed Countries:

Numbers of farmers with PC and Internet connection in developed countries:

| | Number of farmers with PC | % of farms internet connection |
|---------------|---------------------------|--------------------------------|
| USA(2001) | 55% | 52% |
| UK(2001) | 60% | 26% |
| Canada(2001) | 39.4% | 27.8% |
| Germany(2003) | 55% | 45% |
| France(2003) | 50% | 22% |
| Finland(2003) | 76% | 62% |
| Sweden(2003) | 74% | 80% |
| Neway(2003) | 75% | 62% |

Total own PC (2002): USA – 500 units / thousand population
China – 8.8 units/ thousand population

About 16 % population in rich countries owns 70 % Internet users; but 40 % population in the poorest countries owns only about 5 Internet users

Regional Digital divide in China:

China (2003) : Total Internet users = 79.5 mil.
Per capital connection: 6.2% (The world average is 10.7 %). Among them, only 0.76 % farmers have internet access

NIQ: Beijing, Shanghai: > 70
South-west China: < 19

Number of Web stations:
Beijing, Shanghai, Guangdong : > 50%
10 western provinces: > 7%

Looking for the future development

Understanding the connotation of ICT

- ICT is studing on science and technology for information acquisition, measurement, transfer, transformation, processing, recognition and applications.
- Data → Information → knowledge → wisdom
- Microelectronics & photonics — Computers — network & Communication — System Integration for applications
- Manufacturing industry – Infrastructure – service industry - applications for end users

Rural Informatization - a component of national economy & social Informatization

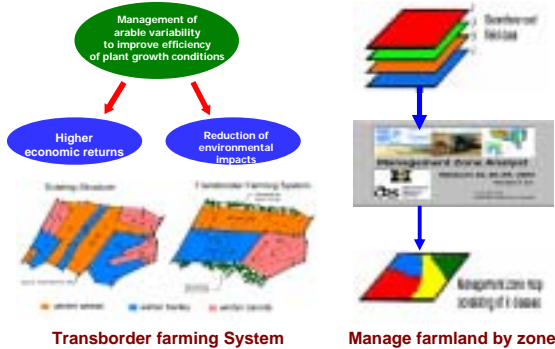
6 Key factors for informatization:

- ◆ Information resources development
- ◆ Information infrastructure construction
- ◆ IT applications promotion
- ◆ Information equipment manufacturing ;
- ◆ Information training for end users;
- ◆ Policy, regulation and information standardization etc.

ICT for Farming - Precision Agriculture

- A Practice of Modern Precision Management for Agricultural Production System based on Information
- A transformation of conventional, qualitative agricultural management into modern precision quantitative management based on knowledge
- Modern technologies for intensive and meticulous farming based on information & knowledge

PA is a management strategy. It can be practiced based on various real condition



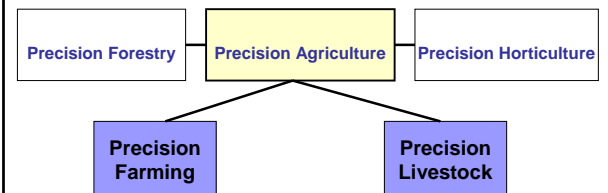
PA practice will promote farm electronic & IT equipment R & D, new IT manufacturing industry development



The practice of PA in less-developed countries



Expanding Information Technology in Land Use





Some Prior Subjects for further R & D

- 1). **Strategic problems to bridging digital divide in rural and agricultural field**
 - Adoption for ICT by farmers and rural industries, countermeasures for the promotion;
 - Development of appropriate and affordable IT technology for local information servers and farmers
 - Development of information advisory service industries for local managers and farmers
 - Provide training for local end users
- 2). **Extension of ICT technology for rural areas**
 - Broadband
 - Mobil systems
 - Location based services
 - Open source technology
 - Web technology



3). IACS, traceability, precision farming

- Control systems in Agriculture
- ICT to support food safety and product traceability
- Precision farming

4). E-rural

- E-work and e-business in rural regions
- New tools in rural development
- ICT application in tourism development in rural areas
- Distance learning and its roll in rural development

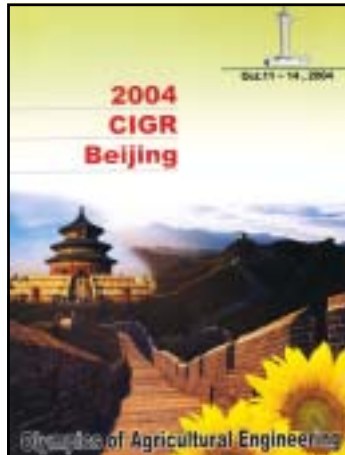
5). Application ICT for agriculture

- Spatial Information Technology (GPS, GIS, RS) for rural resources and environment management and farming
- Information systems for management
- Web technologies for business
- Open source solution for farmers



Conclusion Remarks

ICT as one of the fast changing advanced technologies has brought world-wide impacts and emerged as a force modern agriculture and food production over the past two decades. It owes its success to the developments in microelectronics and software systems through personal computers, linked to Internet; mobile telephones and global positioning and geographic information system popularization. It is already become common items in agricultural sectors in some parts of the world. More intelligent machines and processes are becoming reachable based on analysis of human behaviour. Multiple services were performed to identify reason why ICT is not adapted as much as predicted in many countries and rural areas. Reducing the digital divide in developing countries and various rural regions is a crucial challenge. It should be worthy concern by the APCEAM in further activities to promote the regional agricultural engineering and mechanization technology cooperation, and agro-industry development as well.



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Thank you!

