

DEVELOPMENT AND POLICY PROPOSALS OF RURAL INFORMATIZATION IN CHINA

Yanjun Zhang¹, Liwei Zhang¹, Liying Xu¹, Daoliang Li^{1,*}, Jing Du^{1,2}

¹ College of Information and Electrical Engineering, China Agricultural University, Beijing, P. R. China, 100083

² China Agricultural University Library, Beijing, P. R. China, 100083

* Corresponding author, Address: P. O. Box 121, College of Information and Electrical Engineering, China Agricultural University, 17 Tsinghua East Road, Beijing, 100083, P. R. China, Tel:+86-10-72737741, Fax:+86-10-62737679, Email: li_daoliang@yahoo.com

Abstract: Based on the full analysis of the current development situation of rural informatization in China, combined with the development practices and trends in recent years, this paper presents some policies proposals for promoting the development of rural informatization mainly from five aspects, including infrastructure construction, integration of the resources, system of information service, application of information technology and policy environment.

Keywords: Policy Proposals, Rural Development, Rural Informatization

1. INTRODUCTION

The People's Republic of China is the fourth largest country in terms of area and the largest in terms of population. It has a population of 1320 million, with rural population of 730 million, accounting for 55.1% of its total population ([National Statistic Bureau, Feb., 2008](#)). 30 years' reform and opening up has brought about tremendous changes to China's economic and social conditions. The Gross Domestic Product (GDP) of 2007 reached 24,661.9 billion yuan, which is at the fourth place all over the world; meanwhile, the income of the farmers keeps rising. However, there are still a number of problems and difficulties to encounter in rural development.

Economic development is regionally uneven, resulting in considerable differences among areas. The gap of economic development between western parts and eastern coastal areas is significant. Inhabited by 40% of the national population, the coastal areas nevertheless took up 60% of GDP, with per-capita GDP 1.5 times higher than the national average level. In rural areas, the situation is even graver. The income gap between urban and rural areas is getting wider and wider, on account of dual structure in urban and rural economy. In 2007, the per-capita net income of farmers was 4,140 yuan, which was 3.33 times lower than that of urban residents, that is, the absolute gap reached 9646 yuan ([The State Council. Aug., 2008](#)). There really has a long distance to go in raising farmers' income. With the improvement of agricultural productivity, a great many surplus labor force has emerged in rural areas. The labor force primarily transferred to urban areas and relatively developed areas, forming a new social class with 200 million migrant workers from rural areas, resulting in a series of new social problems ([Research Office of the State Council. Apr., 2006](#)).

All in all, China has higher density of population when compared with geographic areas, and its average natural resources are rather low. Regardless of the fact that social services, like education, health care, culture, have made some progress in rural areas, there remain a number of problems and difficulties in rural development. Uneven economic and social development continues to exist between regions, and between urban and rural areas. Moreover, problems about how to deal with the shrinking of arable land, how to increase farmers' income, how to transfer labor force, are crying out for solutions.

Rural informatization is a situation and process to fully develop and employ the information resources and establish an information service system through the infrastructure construction of rural broadcasting and TV network, telecom network, computer network, etc, with a purpose of promoting information exchange and sharing of knowledge so as to realize the application and popularity of modern information technologies in the fields of rural production and operations, public service, administrations and life consumptions, etc. Rural informatization is a necessity of speeding up the rural modernization at the information era when the rural economy, farmers' income and cultural qualities have reached a certain level and the corresponding informatization environment including systems and standards have been gradually established ([Daoliang Li, Oct., 2008](#)). The development of rural informatization will contribute to solve a range of problems and encounter difficulties.

2. DEVELOPMENT OF RURAL INFORMATIZATION

2.1 Infrastructure Construction

2.1.1 Radio and television networks in rural areas

There are 378 million families in China, while 240 million families are scattered in rural areas; and nonetheless only 5490 rural families have access to cable television networks, compared to 140 million in the whole country. More than 70% of rural people mainly receive radio and television programs through wireless way. The Ministry of Finance gave full support to wireless networks, with total investment of 3,000 million yuan (500 million yuan in 2006 and 2,500 million yuan in 2007). After joint efforts, radio and television programs could be brought to 95.04% and 96.23% of the population at the end of 2006. Currently, there are 66,000 wireless television transmitting and relay stations throughout the country. The large-scale and potent radio and television networks have been built up, covering both rural and urban areas in the country. People can listen to or watch programs more easily and clearly in those areas.

2.1.2 Popularity of fixed and mobile phone

Although China Telecom ranks first in the world in terms of scale and the number of users, troubles just came out in the extension of communications in rural areas, especially in those old, small, remote, mountainous and impoverished areas. The Ministry of Industry and Information Technology has initiated the Village Coverage Project to popularize rural communications since 2004. By the end of 2007, China Telecom and other 5 operators have invested more than 30 billion yuan. As a result, 99.5% of administrative villages in the country have got the access to telephone networks, and telephone calls can be made in all the administrative villages of 29 provinces ([The Ministry of Industry and Information Technology, Jan., 2008](#)). On the other hand, China maintains a good momentum in the popularity of mobile phone. Mobile phone subscribers have increased to 5,230 million by the end of September of 2007. Nearly half of the new subscribers are from rural market ([The Ministry of Industry and Information Technology, Nov., 2007](#)). With the popularity of fixed and mobile phone, communications in rural areas have been greatly improved.

2.1.3 Access to internet in rural areas

China's net-surfers have amounted to 253 million by the end of June in 2008, ranking first in the world (CNNIC, Jul., 2008). However, the gap of internet development between urban and rural areas stays wide. In June of 2007, rural net-surfers were 37.41 million, accounting for 5.1% of rural population. While the number of rural net-surfers was only 29.9% of that of urban ones, with rural internet popularity rate less than one fourth of the urban. The infrastructure of internet is weak. In 2006, the computers owned by rural families were 2.7 every hundred households, well below urban areas with 47.2 computers every hundred households. Among rural net-surfers, males were comparably more than females, with a proportion of 61.7%; youngsters were the largest part, net-surfers under the age of 25 accounting for 69.1%. There are two reasons for why farmers seldom use internet: incapability of using it and lack of computers, separately resulting in 28.3% and 39.5% of non-net-surfers. Accordingly, they become the biggest obstacles in the expansion of net-surfers (CNNIC, Aug., 2007).

2.2 Information services system

2.2.1 Establishment of information service stations

Based on the information technology like computers, internet, intranet, telephones, rural information service stations, which are led by the government, supported by network operators and partly run by social organizations, adopt a approach of paid operation and free services. They can provide various information services to farmers, such as searching, skimming, collecting and releasing information, communicating with others and entertaining themselves. At the beginning of 2006, 97% of cities and 80% of agricultural sectors at the county level have launched information management and service organizations, and simultaneously 41% of information service stations in villages and townships possesses computers and are able to surf on the internet (Yu Fang. 2006).

2.2.2 Foundation and development of farmers' organizations

It is considered as an important part of modern agriculture and new village construction to develop and improve farmers' organizations. Economic cooperation organizations are the most universal type that mainly refers to organizations such as special cooperative society, community cooperative society, special society or specialized technical associations, various united economic entities and associations established by co-operatives. Currently,

there were more than 1,400 thousand special economic cooperation organizations, of which 150,000 run in a standardized manner, with 23,630,000 members, accounting for 9.8% of famers in the whole country. This kind of organization concerns all sorts of industries, ranging from fruit and vegetable industry, animal husbandry, aquaculture, forestry, to agricultural machinery services, transportation, water conservancy construction, resource development, production of handicrafts and so on.

2.2.3 Information tellers in rural areas

With the continuous development of market economy in rural areas, farmers yearn for more specialized and updated information about the market and agricultural technology. Information tellers could transmit all sorts of agriculture-related information to farmers in different forms, making great contribution to the development of rural economy. At present, an agricultural information service system has been set up from the central to local governments; more than 200 thousand information tellers around the country are playing their roles in information transmission through varied channel, such as computers, telephones, television.

2.3 Application of information technology

With a late start, the application of information technology to agriculture however enjoys rapid development. Assorted agriculture-related networks, databases and application systems have been widely employed. Meanwhile, the research and extension of information technology has yielded fruit.

Agricultural information network platform has taken initial shape. Centering on Agriculture Information Network of China, assembling over 20 professional networks into a whole, a national gateway is now basically in place. The gateway has been linked with over 3000 websites, with daily page view of 2400 thousand. The system for information broadcast on the national agricultural network has launched a relatively perfect indicator system for information collection. With unified data standard and communal module, information can be issued through a website but shared in the whole system, which has promoted the development and sharing of information resources in an all-round way (Yu Fang, 2004).

In coastal areas and eastern developed areas, a large quality of information technology has been widely applied, such as information technology in agricultural production and management (like agricultural expert systems, control technology in agricultural facilities, agricultural remote-diagnosis technology), technology in acquiring and processing agricultural information (like “3S”, namely, GIS, GPS, RS), technology in rural information terminals (like call centers, set-top boxes, SMS platforms, hotlines),

information technology in management of rural communities (like the integrity office for government affairs of villages and townships, digital libraries, systems of serious epidemic and disaster forecasting and alarm, systems about population, social security and medical care).

3. POLICIES FOR THE DEVELOPMENT OF RURAL INFORMATIZATION

3.1 Strengthening Infrastructure Construction and Accelerating the Route to Success by the Magnitude Project

The construction of agricultural and rural informatization is progressing smoothly under the guidance of macro policies. The State Council Information Office started informatization experiments in counties; based on the project of “gold farmers”, the Ministry of Agriculture advanced the construction of the system for agricultural informatization and agricultural information network platform, together with project of “nine major activities”; the Ministry of Industry and Information Technology initiated a range of projects, like five projects for agriculture, rural areas and farmers, projects of “village to village” and post chain distribution networks; the Commerce Department launched projects for “building new rural commercial information system” and “new rural business network”; the Ministry of Science and Technology started activities to make science and technology enter villages; the Publicity Department, the Spiritual Civilization Office of CPC and the State Administration of Radio, Film and Television launched the project of “television in thousands of families”; the Central Committee of CPC, the Education Department and the Ministry of Culture separately set up long-distance education for rural Party members and cadres, long-distance education in primary and middle schools, project of sharing cultural resources around the country.

According to preliminary estimation, more than 30 ministries and commissions have made policies about rural informatization, involving 40-odd projects, which key projects powerfully promoted infrastructure construction and the popularity and application of informatization. These important projects provide the greatest stimulus to the development of rural informatization in the longer term. It should be the current focus to implement these major projects in depth, consolidate the existing results, shorten the distance between farmers and informatization, improve economic and social development in rural areas and consequently increase farmers' income.

3.2 Strengthening the integration of all information resources to “The first mile”

The ultimate goal of integrating rural information resources is to enhance the comprehensive effectiveness of rural informatization and service quality, which can be achieved by reallocating the relevant resources to focus the intensity of resource allocation and to find the best match between demands and resource utilization.

3.2.1 To strengthen the integration of information resources and information platforms

Currently, it is very important to strengthen the integration of information resources and platforms in rural informatization. Firstly, in view of database construction, we should develop the data exchange interface, establish the resource directory system, create data format technical standards for information exchange, set up data sharing platform to provide environment and technology for information resources congregating, exchanging and sharing. Secondly, the information platform shall be an integration of multi technical and working methods by connecting all kinds of agricultural service process, hardware, application software and standards, enabling the integrating of the inner business and providing service to the outside. Thirdly, the construction of system should depend on the improvement of the communication and coordination of all agricultural-related sectors and branches. The improved information exchange system should avoid repeating collection of information, the divided possession of information, the monopoly use of information and low effectiveness of information system, developing, but accelerate the open and share of information among agricultural sectors and branches in all levels, agricultural enterprises and scientific research institutions instead.

3.2.2 To improve the integration of information service and information dissemination channels

The integration of information service places must be based on the principle of sharing, under which, the extended information service stations and resources from different agricultural sectors and branches shall be integrated, while information blockage and monopoly shall be abandoned. Information service stations, shall play multi-role(business, society service and information etc.), provide reliable information and service, , what's more, run at lowest cost. The integration of information dissemination channels is mainly encouraged agricultural enterprises, organizations and institutions to build information dissemination channels in the areas where

rural informatization infrastructure is incomplete. Based on the principle of “Acts as circumstances permit, to adapt measures according to time”, the strategy to develop dissemination channels should stick to multi channels presence with the Internet as the main channel. In which case, it means that modern means and traditional medias including Internet, fixed communication, mobile communications, radio and televisions, newspapers, books, blackboards etc., are all carriers of information promoting information services and applications available to every village and rural householder.

3.2.3 To strengthen the integration of information services and information service personnel

The mechanism to integrate of information service should be guided by the government with cooperation of all agencies under the principal of “combination of public welfare bodies and non-public welfare bodies”. Government plays important roles in integrating information service provision and promoting the development of information services. Through government purchasing service or contracting with the service providers, service providers, communication operators, IT enterprises and other relevant business enterprises are eager to participate in the activities of rural informatization adoption.

3.3 To strengthen both the construction of rural informatization service systems and innovation in organizing and delivering information services in rural areas

3.3.1 Make the best use of the joint forces involved in rural informatization, underlining the leading role of government, demonstrating local strengths especially the functions of associations

People involved are the most important force in rural informatization, which tells us that agricultural informatization should start at the grass roots. First of all, it is government who will guide the whole process of informatization. At the same time, it is equally important to bring the local forces into active playing, including the dragon enterprises, wholesale markets, intermediary organizations, farmers’ brokers, large scale farmers and breeders. The special position, knowledge and demand of agriculture information make the above mentioned folk forces outstanding in informatization provision and adoption. As to the farmers, it is very

important to help farmers realize the benefits of agriculture informatization and to help them initiate their demand for agriculture informatization by training, demonstration and experience of the intermediaries who have already adopted the informatization.

3.3.2 The most practical information service mechanism is to provide farmers with free information services and charge for the application of the technology carriers and logistics

Under the free information service principle, use the profit from the technology carriers and logistics to compensate the shortage of funds, so leads the dissemination of countryside science and technology information to march into the benign development track and make the information flow and logistics supplement each other during the process.

3.4 To strengthen the application of information technology in agriculture and achieve the informatization in rural affairs management

The integration of information technology and traditional agriculture is increasing. And information technology has penetrated widely into all fields of agricultural production and management, which becomes an important feature of modern agriculture. Therefore, we should focus on the following aspects of the application.

- i. To strengthen the availability and transparency of information about agricultural products and inputs including seeds, plants, pesticides, fertilizers etc., and to improve information availability about the release of agricultural products and market information, to make it the convenient for farmers to purchase production materials, verify the product information and complain when needed.
- ii. To strengthen the building of Monitoring, Forecasting, and Early Warning Systems for national staple agricultural products market and to provide accurate production-oriented information.
- iii. To speed up the utilization of information technology for better controlling and cost-efficiency of agricultural production.
- iv. To increase information technology support capability of resisting heavy natural disasters and animal and plant epidemic situation and to enhance the capacity of agricultural production system to cope with disaster prevention, disaster relief and disaster reduction.
- v. Actively support informatization provision and adoption in the agricultural products processing, preserving and packaging sectors.
- vi. To enhance the match between of agricultural products supply and demand information. To promote the construction of e-business and

brand-based web sites and marketing for specific agricultural products.

- vii. Focus on the transformation of information technology in distribution channels, to the develop e-commerce, to support the development of ordering agriculture in rural areas, chain operating, logistics and distribution, and to promote the integration of modern agricultural logistics flow and information flow.
- viii. To implement the whole china tracing management from agricultural products from the supply of raw materials, processing, packaging, marketing with support of information technology.
- ix. To improve the reclamation agriculture system's functions such as environment protection, tourism and leisure, cultural heritage via information technology. To exploit the specific agricultural resources, the leisure and tourist information service network should be developed and completed.

The informatization in rural affairs management is still in its infancy, especially in the less developed western regions. Therefore, we should give priority to develop the following aspects of application.

- i. To speed up the construction and integration of Rural Government Affairs Management System to assist the decision-making of the rural grass-root units.
- ii. To set up the Digital community Management System to promote the process of digital countryside construction.
- iii. To stress the construction of rural areas culture informatization to promote the process of rural informatization.
- iv. To stress the construction of rural areas' security system to ensure the security of rural areas.
- v. To build and complete the labor security and society help information system to increase government management and service ability.
- vi. To build a rural distance-learning education platform and to make use of the platform to promote the sharing of excellent education resources, consequently the education quality in rural areas could be increased.
- vii. To speed up the construction of new rural cooperatives medical service information system to increase the public welfare medical information service.

3.5 To create a favorable environment for the development of rural informatization provision, and promote all-round development of rural informatization adoption

The success of rural informatization can not be achieved without regulations and laws. So it is important to make and perfect supportive policies, to issue relevant laws and regulations, to establish and improve the management system along all the agricultural products supply chain, and to promote the healthy development of an agricultural information service system. On the other hand, it is not enough to just depend on government; all forces should participate actively by offering funds with the demand of market. By funding input with all kinds of society forces, a diversified rural informatization investment pattern is achieved, which is guided by government and invested mainly by society.

The capacity of rural informatization staff that provides information services should be enhanced by regular training and inspection. The training activities shall help update information teller's notion, improve their computer and internet application skills, enhance computer and network applications, strengthen their accepting and analyzing ability of knowledge and information. At the same time, rural informatization is nothing if farmers have no intention to accept or adopt it. The understanding of information and information services is a new concept to farmers. Therefore, it is critical to increase farmers' awareness and acceptance of informatization by all kinds of means like training and guiding.

4. CONCLUSIONS

With the rapid development in rural areas, it remains lots of problems and difficulties to encounter. One of the effective ways to solve rural problems is to promote informatization and to enhance the popularity of information technology in rural areas. This paper has given the status and policies for promoting the development of rural informatization from five aspects like below: construction of infrastructural facilities, integration of information resources and system of information service, application of information technology and environmental of policy. It will help staff in agriculture and rural to grasp the realities of rural informatization and to promote the development of rural informatization better.

ACKNOWLEDGEMENTS

This work is subsidized by the EU-China Information Society Project (ASIE/2004/003-265), and it is part of the work of the Project: Study on ICT for Rural Development in China and EU. Our special thanks should also go to Mr. Fang Yu at Advisory Committee for State Informatization (China) for his support and guidance.

REFERENCES

- CNNIC (China Internet Network Information Center). Aug., 2007. *China Internet Survey Report in Rural Areas*.
- CNNIC (China Internet Network Information Center). Jul., 2008. *Article 22 of the China Internet Development Report*.
- Daoliang Li. Oct., 2008. *Annual Report on ICT for China Rural Development 2008*: 19~20
- National Statistic Bureau. Feb., 2008. *Statistics Bulletin of National Economy and Social Development in 2007*
- Research Office of the State Council. Apr., 2006. *An Investigation Report on Rural Migrant Workers of China*.
- The Ministry of Industry and Information Technology, Jan., 2008. *A Suggestion on Promoting Village Coverage Project and Developing Rural Information Service in 2008*.
- The Ministry of Industry and Information Technology, Nov., 2007. China Telecom ranks first in the world in terms of scale, *Industry Information*, 338: 14~15
- The State Council. Aug., 2008. *A report on Promoting Higher Income for Rural Workers*.
- Yu Fang. 2004. Let Information Services more Substantial. *Chinese Computer Users*, 21: 40
- Yu Fang. 2006. Reality and Prospects: Informatization under the "three rural" issue. *China Information Times*, 24: 16~18