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# Analysis on New Paradigms of Informatization in the Countryside

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**Abstract** Through the analyses of several typical paradigms of informatization in the countryside, the status of informatization in the countryside and some unresolved issues were studied. A new way was proposed to develop rural information with embedded mobile phone terminal, and to explore an inexpensive and efficient information services paradigm for the future development in the countryside.

**Key words** Informatization in the countryside, New paradigm, Inexpensive and efficient, Diversified, Embedded mobile phone

The building of new construction puts emphasis on the informatization in the countryside, which is conducive to narrow the digital gap between countryside and city in the hope of stabilizing countryside, energizing countryside and benefiting countryside. With the help from Chinese government, rural informatization is in full swing, and outstanding achievement has been made. The infrastructure of informatization is being launched to make it true that people in the countryside can surf on the internet, can call each other through telephone and can watch TV or listen to the radio. Remarkable achievements have been made in the construction of information resources. Agricultural departments at all provincial levels are making progress in the information collection, construction of agricultural website and agricultural database. The information service system keeps improving, and innovation has been made in each field to explore the distinctive agricultural information service mode. Application of technologies such as cloud calculation, internet of things, and 3G, and promotion of precise agricultural further motivate the development of informatization in the countryside. However, there are still many problems in the current rural informatization. Therefore, based on the principle of "government leading, market operating, resources integrating, and information sharing", and by focusing on internet extension, resource development, information service, multiple effects of agricultural informatization and modernization were given to construct a cheap, efficient and flexible comprehensive rural information service system<sup>[1]</sup>.

## 1 Study on the current paradigm of informatization in the countryside in China

The key and difficulty in developing informatization in the countryside is to realize the popularization and convenience of information service. The paradigm of rural information service directly relates

to the effects of information service, which is essential advancement of rural informatization. Government's attention on farmers, agriculture, and countryside is the trend to make agriculture accustomed to informatization, to meet the demand of social informatization. Considering local situations, a series of new modes to adapt to agricultural development were explored.

**1.1 Pingliang pattern**<sup>[2]</sup> Under the leadership of professional cooperative organizations and governments in Pingliang of Gansu, a platform of "information about agriculture in Pingliang" is constructed so as to provide more useful information to local farmers. The website for farmers would publish information about produces timely to the public and reply customers' request. This kind of website would be the window for local farmers to learn something about what is happening around the world, and make contribution to the rural information.

**1.2 Ningxia pattern**<sup>[3]</sup> According to the regional development in Ningxia, the Ningxia Hui Autonomous Region in China tries to work out a way to benefit agriculture and promote industrial development. Under the leadership of local government, scientists are on the mission to construct a low – budget pattern to spread information about produce. In this pattern, a platform will be constructed, so is a information highway, an agricultural database, and an information service station. The difficulty of Ningxia pattern lies in integration and fusion. The achievement made through this pattern is historical and far – reaching to local farmers.

**1.3 Hangzhou pattern**<sup>[4]</sup> To make agricultural industry prosperous is based on cable digital television. The integrated digital television technology suitable to the popularization of information is developed to combine digital television, broadband network, information platform and basic work platform together. This technology is of low budget, full coverage and functional. It breaks through traditional mode and promotes the further development of agricultural information. Based on the development experiences in these regions, achievements have been made on the construction of agricultural information in the aspects of information service, organizational management and technological application so as to realize the optimal configuration and to broaden information exchange.

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## 2 Study on the status quo of agricultural information and existing problems

In recent years, the rural informatization in China has been developing vigorously, which promotes to the rural economic and social development to certain degree. However, there are lots of contradictions between large investment and low output, high technology and low quality, high mobile usage and farmers income. This intensifies the imbalance of social and economic development. In retrospect of the history of rural informatization, several key issues still exist.

### 2.1 High cost of information service

**2.1.1** High cost of infrastructure construction. The main body of current agricultural infrastructure is based on the end of computer, and the cost on the purchase of computer and broadband in the countryside is high.

**2.1.2** High cost on the operation of information service. At present, the countryside mainly use optical fiber and the cost for construction is high. Zhang Xinjian, party leader of Zhejiang Telecom of China Telecom, pointed out that the cost of providing the same kind of WIFI to each rural family is higher than that of urban family. The connection of rural broadband and operation fee is higher than that in urban city, and the percentage of website use is larger than farmers' income.

**2.1.3** High training cost. Compared to electronics, computer is more complicated and the training is immature. Therefore, few farmers would use computer.

### 2.2 Insufficient information service

**2.2.1** Insufficient studies on the users' requirement. Generally speaking, rural users are different from urban users in the ability to receive information, and to endure the cost. Farmers' demand of information would vary from the need of grassroots technicians, professional cooperation organizations and information service companies. The current studies on rural information service are insufficient. Not enough attention has been paid on differentiation services.

**2.2.2** Low insufficient use of information. Computers, as the end of internet information process model, does not match the objective condition in the countryside, which makes it inconvenient for farmers to get information.

**2.2.3** Poor ability to synthesize information. One characteristic of agricultural production is restricted by regional factors. At present, the construction of rural information does not show any regional differences. Meanwhile, there is no general planning about the development of agricultural information, such as repeated construction, information sharing, technological support and mechanical construction.

**2.2.4** Poor integration of information service. Traditional forms of rural information service are cheap and their functions are monotonous, such as television, radio and telephone, etc. These kinds of ways can pass information to farmers, but can not get any responses from farmers, and it is difficult to determine whether the information is true and useful.

**2.2.5** Poor timely service. One advantage of modern information service is timely, but the rural information service in China now fails to prove this point. The timely service needs perfect technological supporting system, and synthesis mechanism.

**2.3 Shortage of long-term operation mechanism** It is imperative for the government to invest more during its operation process, which would also make it hard for local government alone to subsidize the project. Besides, to simply consider rural information service with social welfare is bad for the improvement and perfection of services in depth. The following are some existing problems.

**2.3.1** Insufficient cooperation mechanism. The diverse bodies to provide information include government, communications operators, rural cooperative organizations, and agricultural companies. The information service does not construct efficient operation mechanism and cooperation services in the aspects of technology, organization and promotion, which leads to information lag.

**2.3.2** Problems in renewing information service. Farmers are the main bodies of rural information, instead of the ones to pay the bills of information service. Rural information service would result in various benefits in each link concerning the production and retailing of produce, transportation and logistics of produce. Therefore, the flexible distribution of information service will form long-term effective operation mechanism.

**2.3.3** Obstruction in information supply chain. The information service in the countryside faces various problems, obscure responsibility, weak profession, and insufficient services. Moreover, the rural information service is narrow and its channel is monotonous, which all add troubles to the collection, processing and supply of information.

## 3 New ideas on the development of rural information in future

The annual income per capita in the countryside of China is low, so there are few equipments for surfing on the internet in the countryside. Along with the increasingly use of mobile phone, farmers favor the mobile phone of low price. According to the statistics report of internet development in China, the percentage of population gaining information through mobile phone reached 74.5% in 2012, while the percentage of farmers gaining information through mobile phone was only 27.6% at the end of 2012. Relatively speaking, there are more farmers using mobile phone to search information than using computers. With the widely application of 3G technology, using mobile phone to surf on the internet will be the mainstream in future.

**3.1 Maximize the inheritance and transformation of early stage of informatization in the countryside** The early stage of preparation laid firm foundation to construct the new pattern of information service based on mobile phones. Based on cloud calculation technology and related institutions, the current information resources have been optimized and synthesized to construct a transitional, expansive and low budget information service source.

### 3.2 The construction of industrial database center with the advantageous industry as the core

It is suggested to construct an information resource and service team covering production, processing, preservation and logistics. For example, four major industries such as freshwater cultivation, rape, rice and edible fungi gradually form a synthesized information sharing system of full industrial type and chain through interregional database center and service center.

### 3.3 Reforming millions of low-end mobile phone and exploring new pattern of rural information service

"The last one kilometer" is one of the key problems bothering rural informatization in the countryside, for it is difficult to pass loads of information to farmers, and to pass scientific and technological information to farmers in the field<sup>[5]</sup>. The current information processing technology through mobile phone is close to the early stage of computer, as it can send and receive digital data. Besides of Speech data, mobile phone can also receive and send words, pictures, videos, and other types of data. So far, there are almost 300 million mobile phones for receiving phone calls and texts. Therefore, the technology to reform the low-end mobile phone is studied to win the largest amount of villagers. Apps for agricultural cultivation have been implanted into millions of cheap mobile phones which can connect into the internet. This kind of new information service pattern would send information about agriculture information to farmers' mobile phones. Meanwhile, the new mobile phone technological model can meet the diverse demands of rural information service and can be fit to the characteristics of agricultural production in China, regardless of regions, industries, and final products.

### 3.4 Developing a cheap but efficient new technology model with compatibility and expansibility

The new mobile technology model is characterized as cheap but efficient. The entire technology supporting system is cheap and functional during the construction and operation process. New technologies such as computers, internet and communication fields have been widely applied, together with technologies such as the cloud calculation, and internet of things. Starting from the invention of cheap mobile information terminal, the main supporting environment, rural information resource and application cloud are invented and built.

### 3.5 Facing diverse users, organizing diverse service bodies and constructing benefits mechanism

The diverse information service system in the countryside focus on various aspects such as service main body, besides of attentions on technology invention, users' demand and channels to spread information. The new rural information service platform based on embedded technologies and mobile computer technology costs only one tenth of the "computer + broadband + internet". Such rural service model based on

mobile calculation uses the voice, text, GPRS, even other 3G and 4G services. The benefits obtained through those businesses will form a long – acting operation mechanism for new rural information service.

## 4 The new form of rural informatization with embedded mobiles as terminals

In recent years, problems about agriculture, farmer, and countryside have been considered as the most crucial ones. Influenced by popularization of computers and other factors, what farmers need is to pass information to them incessantly and timely. Mobile phones are used to receive telephone and to send texts by farmers, and its ability to process information fails to display. The cheap but functional embedded mobile phones become the necessity for regular farmers to reduce service cost and to pass information and service to grassroots. The technology to synthesize information based on embedded mobile phone contribute to the reconstruction of current information. Therefore, the embedded mobile phone will be the new form of rural informatization and will meet the necessity of sustainable development of rural information service.

## 5 Conclusions

The key of rural informatization is to provide effective information service for agriculture and industries involving agriculture, to keep the healthy development of agricultural industry, and to make countryside and farmers earn more. The main body of rural informatization is based on the terminal of computer, but the popularization of computers in the countryside is low. How to use an information terminal is especially important. The embedded technology promoted the rural computation capacities. The widely-used low-end mobile phone can be extended as the mobile terminal of rural information distribution project. Besides, it can produce good social and economic benefits.

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