INFORMATION SERVICES IN RURAL CHINA

An updated case study

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Cover picture by: Matsee Chatkaweworawong, first prize winner of the high school level competition for the 2012 national World Food Day drawing contest, Bangkok, Thailand

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Foreword

With the rapid development of information and communication technology (ICT) and renewed focus on agriculture in the global economy, many governments now attach great importance to the dissemination of information and the application of communication technology in the field of agriculture.

In 2001 the Chinese Government, through the Ministry of Agriculture, launched several policies to strengthen the development of rural market information systems and information services. This included the Action Plan for Rural Market Information Services under the Tenth Five-Year Plan and other policies carried out in the provinces (municipalities and autonomous regions).

The Food and Agriculture Organization of the United Nations (FAO) established a study group through the Information Center of the Ministry of Agriculture in January 2003 to analyze how rural information services in the agriculture sector were being developed. The findings of the report were published in March 2004 through the FAO Regional Office for Asia and the Pacific titled *Information Services in Rural China: Field Surveys and Findings*. The study identified three successful information service models.

In 2009 the Ministry of Agriculture and FAO joined together again to build on the previous work, re-examine the three models, look for new models and identify existing challenges. The findings show that the previously existing models have grown over the intervening years, evolving with changes in agriculture and technology. A new model of information services was also identified, which arose from the need to meet a new form of information demand.

The information service models outlined in this publication highlight new and emerging techniques that could serve as prototypes of information service delivery in other parts of China to improve rural livelihoods. They serve as models for other developing countries too. Publication of the findings of the study also contribute to the broader goal, as a cornerstone of FAO's activities in Asia and the Pacific, of bridging the rural digital divide and advancing global knowledge on good practices in the use of information and communication technologies.

Hiroyuki Konuma
Assistant Director General and Regional Representative
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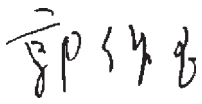
During the research and ensuing analysis, the research team received invaluable assistance from the agricultural information centers and relevant departments in the areas included in the study. The personnel involved in the research and field study were: Dong Yueyong and Wang Guohai of the Agricultural Bureau of Zhejiang Province; He Yande and Mei Jianping of the Agricultural Technology and 110 Information Service Center of Jinyun County, Zhejiang Province; Fang Shoudi of the Farmer's Home of Lanxi City, Zhejiang Province; Zhang Xiaojiang of the Agricultural Commission of Anhui Province; Qin Jianeng and He Daolai of the Agricultural Commission of Shucheng County, Anhui Province; Zhang Eryun and Zhang Jinhua of the Agricultural Commission of Wuhu County, Anhui Province, Wang Rengchun and Yao Yonghua of the Agricultural and Animal Husbandry Bureau of Ningxia Hui Autonomous Region; Zhou Xuewen and Wang Hui of the Agricultural Bureau of Litong District of Ningxia Hui; Guo Feng of the Agricultural Commission of Jilin Province; Yu Zhichen of Fuyu County Science and Technology Bureau of Jilin Province and Chen Jinghua of the Fuyu County Information Association; Yu Qian of the Fuyu County Information Center; Tu Yi, Zhang Sixue and Feng Zhijin of the Agricultural Bureau of Yunnan Province; Chen Xinglin of the Agricultural Bureau of Hongta District of Yuxi City, Yunnan Province; Wang Bo and Chen Yong of the Agricultural Bureau of Chongqing City; and Chen Wei and Jiang Peng of the Agricultural Bureau of Nanchuan District of Chongqing City.

This general report was drafted by Zhang Kuilin, Zhong Yongling, Han Fujun and Yan Donghao, with Guo Zuoyu as the editor in chief. Li Tingting drafted the report of Jinyun County, Jiangsu Province and Wuhu County, Anhui Province; Cong Lin drafted the report of Fuyu County, Jilin Province; Zhang Kuilin drafted the report of Litong District, Wu Zhong City, Ningxia Hui; Liu Han drafted the report of Lanxi City, Zhejiang Province; Yao Xiaoyan drafted the report of Hongta District, Yuxi City, Yunnan Province; Yang Shuo drafted the report of Nanchuan District, Chongqing City; and Yan Donghao drafted the report of Shucheng County, Anhui Province.

I extend my sincere thanks to those ladies and gentlemen for the concern and support they have shown to this research project.

The translation of this report was done by CICOS, Ministry of Agriculture, and I am very grateful to Qu Sixi, Director of CICOS, and Tong Yu'e, the Deputy Director, as well as the translators for their hard work.



Guo Zuoyu
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Executive summary

Rural information services make a vital contribution to China's rural economic and social development. There have been considerable improvements in the last decade in information service delivery. Although it is still evolving, the development and expansion of the various types of service delivery in China can be useful elsewhere in the developing world, especially where governments and other providers grapple with the challenges of reaching rural populations with timely information that can improve their livelihoods and their lives.

In 2003, the Food and Agriculture Organization of the United Nations, in collaboration with the Information Center of China's Ministry of Agriculture, took a close look at the way farmers accessed information and the way information connected with farmers. Narrowing the study to six counties in four provinces, the researchers identified three "service models", or channels, for information exchange: Service Stations, Farmers' Homes and specialized Associations.[1] Since then, the Government, which dedicates considerable attention to rural information services, has added new policies and measures to widen the reach and strengthen the services by involving many parties, including agricultural-related companies and telecommunication service companies, and multiple delivery modes, such as computers, mobile phones, television and an on-line agricultural information portal, that have proven effective. Additionally, cooperatives have joined with specialized associations in channelling critical information to their members. Consequently, FAO sought to update the previous case study and include the new structures and changes for use in conducting learning exchanges.

FAO and the Information Center of the Ministry of Agriculture initiated a new round of research in May 2009, adding two survey sites in addition to the previous six: i) Jinyun County and ii) Lanxi City, Zhejiang Province; iii) Shucheng County and iv) Wuhu County, Anhui Province; v) Litong District in Wuzhong City, Ningxia Hui Autonomous Region; vi) Fuyu County, Jilin Province; vii) Hongta District in Yuxi City, Yunnan Province; and viii) Nanchuan District in Chongqing City.

The case study analysis of those models led to the conclusion that over the six-year period since the previous study conducted in 2003, Chinese rural information services have matured and considerably improved: i) governments of various localities increased the emphasis given to the information service, including expanding the types of departments that are involved in providing and responding to the information needs of farmers; ii) the infrastructure to relay information improved, as did farmers' ability to access information; iii) the information network expanded and the coverage of the rural information service widened; iv) the channels and means of information service are now more diversified, shifting from a single source to multiple sources; v) greater use of mobiles and the Internet developed; vi) the types of information disseminated broadened, adding value and critical technical information that farmers have used to improve their techniques, skills and their incomes.

In re-examining the previous three models and looking at the new localities, the researchers identified a fourth model, the Government + Company model, which is a collaboration between a local government and a company or enterprise that is based on a market-oriented approach. The local government provides the policy and sometimes financial support, such as start-up funding and a reduction or exemption from taxes as well as access to experts at a subsidized rate, while the company or enterprise provides the services (devices, networks and customized information) for a fee. This new model services large-scale commercial crop and animal farming and agriculture-related enterprises, groups and farm households with valuable information.

[1] These models are explained in detail in section 3.

Thus this report highlights four information service models:

(i) the Service Station,

(ii) the Farmers' Home,

(iii) the Association-Cooperative and

(iv) the Government + Company.

Although there are some similarities among the four models of information delivery, there are also differences in terms of: i) operations, ii) targeted users, iii) service scope, iv) source of financing, v) type of service, vi) convenience, vii) the link between the service entity and targeted users, viii) available resources (non-financial) and ix) operational costs.

The case study looks at how various levels of government are taking the lead to expand and improve service delivery, how social forces are involved and how agricultural-related companies and telecommunication service companies have contributed to building rural information systems and services. The research found that the four models have had considerable impact in: i) helping farmers adopt new technology and new varieties of crops and increasing their income; ii) improving the local agricultural structure readjustment, raising agricultural productivity and promoting agricultural production; iii) pushing forward local economic development; iv) improving the transparency of village affairs and enhancing the involvement of farmers in both social and civic activities; and v) raising awareness among farmers of the importance of information to make prudent decisions.

Despite the progress, there are still some constraints that need to be further addressed, such as the inadequate development of information resources, little awareness of the need for an information service and insufficient development or adoption of communication channels (such as SMS messaging or even use of the Internet) and structural mechanisms (unified government department planning).

The crucial role that agriculture and agricultural information services have in ensuring food security for more than 1.3 billion people in China cannot be overstressed. If the objectives of further developing agriculture and the rural economy are going to be achieved, rural information services need to operate optimally. Thus, the case study analysis concludes that the much-improved rural information service still needs to resolve several issues: i) the government's role for leading, guiding and supporting the growth of information services; ii) what contribution non-governmental organizations can make; iii) how the relevant enterprises can more effectively satisfy the demand for information; iv) how farmers can promote the information services; v) how to further develop non-profit, semi-non-profit and commercial streams of information services; vi) improving the skills of service provider staff; vii) safeguarding service resources (the information, the Internet and skilled personnel); and viii) the improvement and use of more channels (television, radio, newspapers, bulletins, public bulletin boards, videos and multimedia messaging).

1. Introduction

1.1 Background

In 2003, the Food and Agriculture Organization of the United Nations (FAO) and the Information Center of China's Ministry of Agriculture initiated a study on information service delivery to rural areas in China. Six study locations were selected: Jinyun County and Lanxi City in Zhejiang Province, Shucheng County and Wuhu County in Anhui Province, Litong District of Wuzhong City in Ningxia Hui Autonomous Region and Fuyu County in Jilin Province. The researchers identified three models of information service delivery: the Service Station, the Farmers' Home and the Association. The report of the study was published in March 2004 through the FAO Regional Office for Asia and the Pacific.[2]

Since the time of that study, the Chinese government, which recognizes the critical importance of information delivery to rural areas, has introduced several policies conducive to programmes working on information services targeting agriculture and rural development. Substantial investment has been committed to agricultural e-governance projects aimed at delivering non-profit information services. This has opened the way for non-government institutions, such as telecom companies, research institutions and associations, to engage in delivering information that targets rural households. Positive progress has been made since the new policies were first launched in 2004.

The Government's master plan on economic reform and development for agriculture and rural development in China offers guidance, objectives and policy measures for the rural information drive. Under the e-governance campaign of the Ministry of Agriculture, a Golden Agriculture Programme was initiated to create a three-pillar system for strengthening the agricultural sector, with several primary components: i) agricultural surveillance and early warning system, ii) a regulatory information system for the marketing of farm produce and iii) a rural market and technical information service system. The Golden Agriculture Programme seeks to consolidate domestic and international agricultural information resources and forge a nationwide agricultural information service network that covers counties and townships. A "3-in-1" pilot was designed in which a wealth of audio, video and textual information was woven together to deliver high-quality information services through multiple delivery modes, including computers, mobile phones, television and an on-line agricultural information portal.

Similar nationwide information dissemination services have been piloted and are being expanded by the Ministries of Education, Culture, Commerce and Science and Technology as well as the China Meteorological Administration. The investment in rural communication infrastructure by leading telecom operators has greatly aided the cause of delivering information services to rural households. Local agricultural authorities work closely with the telecom service providers to deliver information through a variety of channels, although mainly through short messaging service (SMS) and voice technology. The infrastructure environment for delivering services to rural households has greatly improved over the past few years, thereby providing a plethora of opportunities to facilitate information exchange with rural communities.

The Information Center continues to monitor information services in rural China; in early 2006 staff specialists began documenting the improvements and changes in the dissemination and collection of various types of information. The Information Center then organized a workshop of service providers in Guangzhou City in March 2008 to exchange experiences in delivering information to rural areas. In January 2009, the Information Center sent delegates to attend an FAO workshop on knowledge-sharing

[2] **Yongling, Z.** 2004. *Information services in rural China: Field surveys and findings.* FAO Regional Office for Asia and the Pacific, Bangkok, Thailand, RAP publication 2004/03 (available at www.fao.org/docrep/007/ad504e/ad504e00.htm)

techniques.[3] After listening to the updates on China's information service, FAO suggested that a joint study be conducted as a follow-up to the one in 2003[4] to generate more current documentation on what is working in terms of reaching farmers and other relevant parties with useful information, the improvements in service delivery and where difficulties remain.

A research team was established to re-examine the six sampled counties and cities from the 2003 case study and to incorporate more recent studies (mostly from 2008) that also included two additional districts – Hongta, of Yuxi City in Yunnan Province and Nanchuan, of Chongqing City (municipality).

1.2 Follow-up study objectives

The primary point of the follow-up study was to document the growth of information services in rural China since the previous study in 2003-2004. It also highlighted new and emerging techniques and models that could serve as prototypes for information service delivery to rural communities in other parts of the world.

Objective 1: Examine the sustainability of existing service models

Since 2004, information services in rural China have seen tremendous improvement, fostered by an enabling environment created by government guidance, development in infrastructure and market inputs. This has encouraged experiments with diverse models of service delivery and a variety of delivery mediums. The researchers concentrated on three models of information delivery that were examined in the previous study.

Objective 2: Documenting the advances in existing service models

In looking at the three models previously studied, the researchers focused on the fast-changing information delivery paradigm and an enabling environment facilitated by favourable policies as well as investment in rural communications infrastructure.

Objective 3: Learn about the latest development of information services in rural China

The studies conducted in the eight sites looked to identify change in farmers' information needs and the information value chain, primarily to size up the role of organizations that facilitate the rural information service, funding sources, expenditures to deliver information services, the development of content, advancements in the types of service delivery and the perception of users on the value of the information service.

1.3 Methodology

The updated case study research entailed a field survey, interviews with a range of service providers and users and other data collection (such as demographics, household ownership of information appliances and agricultural production) in the eight study sites. Survey findings and other research that the Information Center specialists collected since 2006 were incorporated into the analysis for both the individual study site reports and for this comprehensive case study report.

Given the diversity of the study sample in terms of infrastructure, information needs and access to technology, an empirical study methodology with integrated approaches was used. The research team comprised government officials, information service workers, professionals from the agribusiness sector and farmers to ensure that the views of all parties involved in the information value chain were reflected in the study.

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[3] The Share Fair, Rome, Italy, 20-22 January 2009. See http://www.sharefair.net/share-fair-09/about-the-fair/en/

[4] The findings of which appeared in the 2004 *Information services in rural China: Field survey and findings.*

Figure 1: The research team interviewing farmers in Dongfang town of Jinyun County in Zhejiang Province

Figure 2: The research team interviewing officials of the Agricultural and Livestock Bureau in Wuzhong City in Ningxia Hui Autonomous Region

Figure 3: Farmers filling out questionnaires in Wanzhi town of Wuhu County in Anhui Province

Figure 4: Farmers filling out questionnaires in Xingfu village in Wuhu County in Anhui Province

Once assembled, the research team designed a questionnaire to assess current access to and demand for information services by farmers; the questionnaire was distributed to a cross-section of individuals in the sample sites before the field visits. The researchers then conducted the field investigation to further assess the need for information and how users demand and receive information; this involved interviewing provincial and township government authorities, village committee members, farmers, enterprise owners or managers, officers with specialized farmers' associations or collectives, information service operators and other users and non-users of the information services. The researchers then conducted a quantitative analysis of the information collected in the field investigation.

Each case study (per study site) entailed research on the information value chain and the information needs assessment. A few other studies documenting the reach of information services since 2006 were conducted in parallel and the findings highlighted in the report, *The selected cases on information services in rural China* (published in August 2009) and made available to agricultural information centers, relevant institutions and experts across the country to solicit comments. This report draws on that work.

The collected data were aggregated and contrasted with the developments in each county or city. This brought out the salient factors contributing to the success of information service centers in each location. It also generated valuble insight into the design of future information centers. The salient points of the site-specific reports were then consolidated into this comprehensive case study report.

2. Profile of study sites

As noted, along with the six sampled counties (in Zhejiang, Anhui, Jilin and Ningxia Hui provinces/ autonomous region) studied in 2003, the 2009 field investigation added two districts – one in Yunnan Province and one in Chongqing City (sites labelled in black in Figure 5). In those sites, the researchers looked at six dimensions of the sampled counties and farm households: economic development, population, education, household availability of information appliance, farmers' frequency in accessing information channels and progress in establishing farmers' associations. This section highlights those findings.

Figure 5: Map of the eight study sites

2.1 Geographical location and economic development

Although central China and Jilin Province in the northeast are moderately developed, Yunnan Province and Chongqing City in the southwest and Ningxia Hui Autonomous Region in the northwest are less developed. Zhejiang Province has a great advantage in terms of its geographical location on the east coast and has achieved impressive economic development (in 2009, its gross domestic product ranked fourth in the country[5]). However, among the surveyed counties, Lanxi and Jinyun are less developed in Zhejiang Province, with a per capita net income of farmers in 2008 at 6 277 yuan and 5 228 yuan, respectively (despite a growth margin of more than 65 percent and the provincial average at 9 258 yuan). Wuhu County (Anhui Province) is more advanced, ranking among the province's top-ten counties for "comprehensive economic strength" for seven consecutive years since 2002; the per capita net income of farmers in Wuhu in 2008 was 6 452 yuan (2 250 yuan higher than the provincial average of 4 202 yuan). Also in 2008, Wuhu was awarded Excellent County in Science-Based Development and Excellent County in the Digital Anhui Campaign.[6]

In contrast, the per capita net income of farmers in Shucheng County (Anhui Province) was 463 yuan lower than the provincial average in 2008; and at 4 098 yuan, the per capita net income among farmers in Fuyu County (Jilin Province) was 835 yuan lower than the provincial average (Table 2). At 4 176 yuan, farmers' per capita net income in Nanchuan District was only 50 yuan higher than the provincial average.

With its favourable irrigation conditions, Litong District (in the central plains of Ningxia Hui Autonomous Region) has a long history of high-yield and good-quality agriculture. It is also a major economic zone within the province. Farmers here earned 5 613 yuan per capita net income in 2008, which was 1 932 yuan higher than the provincial average (Table 2).

[5] 2010 China Statistical Yearbook, published in 2010 and the data in it was collected in 2009.

[6] Wuhu Agricultural Commission of Anhui Province.

Table 1: Per capita net income of farmers in the sample provinces (autonomous region, municipality), 2002 and 2008

Unit: yuan

Province (region, municipality)	2002	2008	% growth
National average	2 476	4 761	92.3
Zhejiang	4 940	9 258	87.4
Jilin	2 301	4 933	114.4
Anhui	2 118	4 202	98.5
Chongqing City	2 098	4 126	96.7
Ningxia Hui	1 917	3 681	92.0
Yunnan	1 609	3 103	92.9

Table 2: Per capita net income of farmers in the sample counties (cities, districts), 2002 and 2008

Unit: yuan

Sites (counties, city, districts)	2002	2008	Growth rate (2002–2008) (percent)	Difference with provincial or city average (2008)
National	2 476	4 761	92.3	n.a.
Wuhu County	2 790	6 452	131.4	2 250
Lanxi City	3 800	6 277	65.2	-2 981
Hongta District	3 566	6 006	68.4	2 903
Litong District	3 124	5 613	79.7	1 932
Jinyun County	2 939	5 228	77.9	-4 030
Nanchuan District	2 243	4 176	86.2	50
Fuyu County	2 600	4 098	57.6	-835
Shucheng County	1 780	3 739	110.1	-463

Although Yunnan is a province with a large population of minorities, Hongta District is mainly a Han community and is the political, economic and cultural center of Yuxi City. The district was included in the study because of its unique model of disseminating agricultural information: in the cooperative facilities where farmers buy their farming supplies and equipment, agricultural extension workers dispense market and technology information and answer farmers' questions on new techniques. A fast-developing municipality, Chongqing City is directly under central government oversight. It was included in the study because of the use of mobile phone networks there to deliver SMS-based agricultural information.

2.2 Demographics and agricultural production

Overall, the proportion of people involved in agriculture was relatively high in the study sites (Table 3), ranging from the smallest in Litong District, at 53 percent, to 90 percent in Jinyun County. Although agriculture is the main occupation of people in the study sites, the proportion of the population engaged in the sector has been decreasing since 2002.

Table 3: Proportion of agricultural population to total population in the surveyed sites, 2002 and 2008

Sites	2002		2008	
	Agricultural population (millions)	Proportion of agricultural population to total (percent)	Agricultural Population (millions)	Proportion of agricultural population to total (percent)
Jinyun County	39.7	92	40.3	90
Lanxi City	56.0	85	56.0	85
Wuhu County	47.6	88	34.1	89
Shucheng County	86.0	88	83.0	84
Fuyu County	68.0	91	68.0	91
Litong District	20.0	66	20.0	53
Hongta District	26.0	67	32.9	80
Nanchuan District	44.0	83	58.0	89

Despite the varied terrain across some of the surveyed sites, the primary agricultural production in each area is generally similar (Table 4).

Table 4: Primary agricultural products in surveyed sites, 2008

Sites	Agricultural production
Jinyun County	One of the leading agricultural industries, with products from upland vegetables (water bamboo and day lily mainly), edible fungi, fruits, tea, sericulture and herbs used for traditional Chinese medicine
Lanxi City	Cash crop production, including vegetables, fruits, tea and sericulture and aquaculture
Wuhu County	Grains, edible-oil crops, livestock, poultry, aquaculture, fruits, vegetables and nursery stock
Shucheng County	Grain, cotton and grapes
Fuyu County	One of the country's commercial grain bases, with corn, soybean, rice, peanut, minor cereals, peas and beans
Litong District	Quality grain, dairy cow, Tan sheep, melon and fruit, with advanced protected agriculture
Hongta District	Rice, flue-cured tobacco and oil-bearing crops
Nanchuan District	Tea, vegetables, bamboo, herbs and livestock (Nanchuan is located in southern Chongqing and the transitional belt between Sichuan Basin and Yunnan-Guizhou Plateau, with middle and lower mountains)

2.3 Education level of farmers

An average of 31 percent of the surveyed farmers in the study sites had attended school up to senior middle level, while nearly 14 percent had attended technical school or higher (Figure 6). Lanxi City and Wuhu County had the largest proportion of the population who had attended technical school or higher, while 60 percent of the population of Jinyun County had only a junior middle school education or lower. The differences in education achievement has made designing information services a challenge.

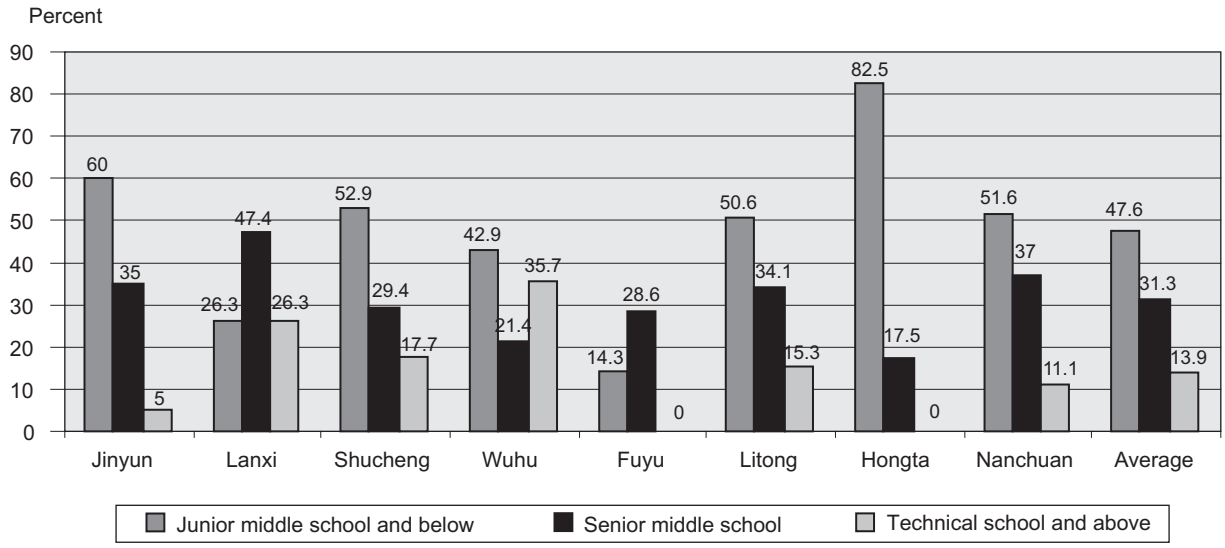

Figure 6: Education level of farmers surveyed, 2009

2.4 Household ownership of information appliances

The ownership rates for televisions and telephones have increased since the 2003 study; some areas have experienced geometric growth in the ownership of mobile phones and computers. Statistics provided by the local agricultural departments indicate that televisions remain the most owned information appliance (Figure 7), with nearly all areas reflecting an ownership rate higher than 95 percent (the exceptions are Nanchuan District at 80 percent and Fuyu County at 85 percent). In most areas, more than 60 percent of households had a telephone as of 2008 (Figure 8), with Jinyun and Wuhu counties having the sharpest rise – to 71.4 percent and 99.2 percent, respectively, which is an increase of 31.4 and 48.2 percentage points, respectively, when compared with 2002 data (although the study was conducted in 2003, other research was incorporated into the analysis). The ownership rate of mobile phones between the two data sets jumped from 30 percent to 90 percent in Shucheng County, up by 60 percentage points, and from 3 percent to 58 percent in Jinyun, up by 55 percentage points (Figure 9).

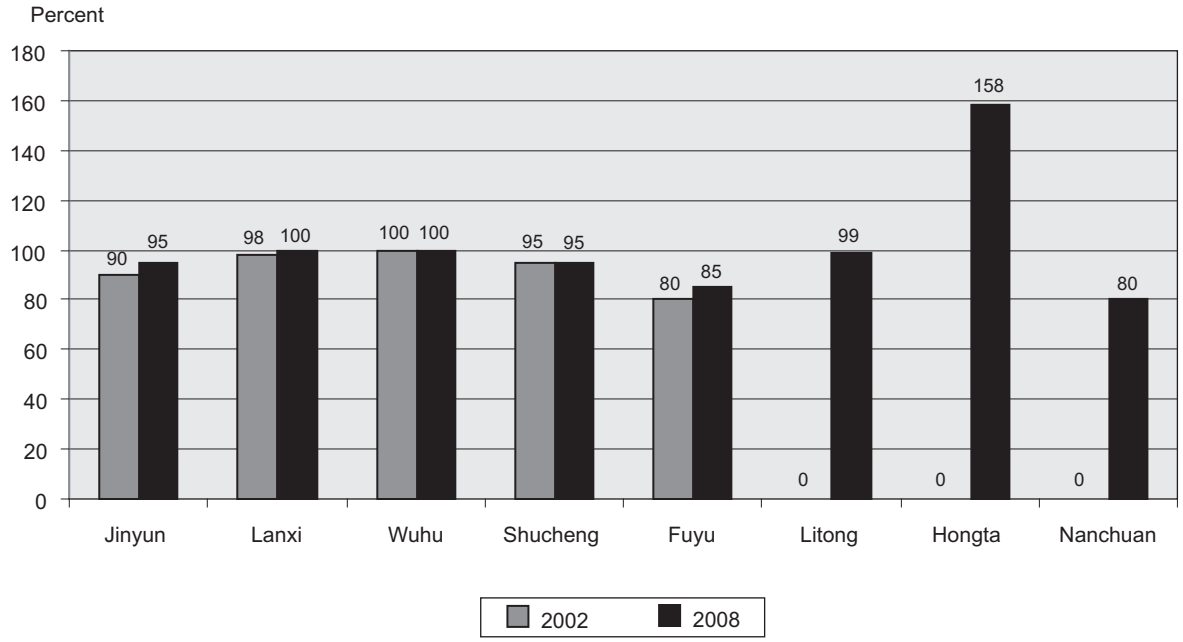

Figure 7: Farmer household ownership of televisions in the study sites, 2002 and 2008

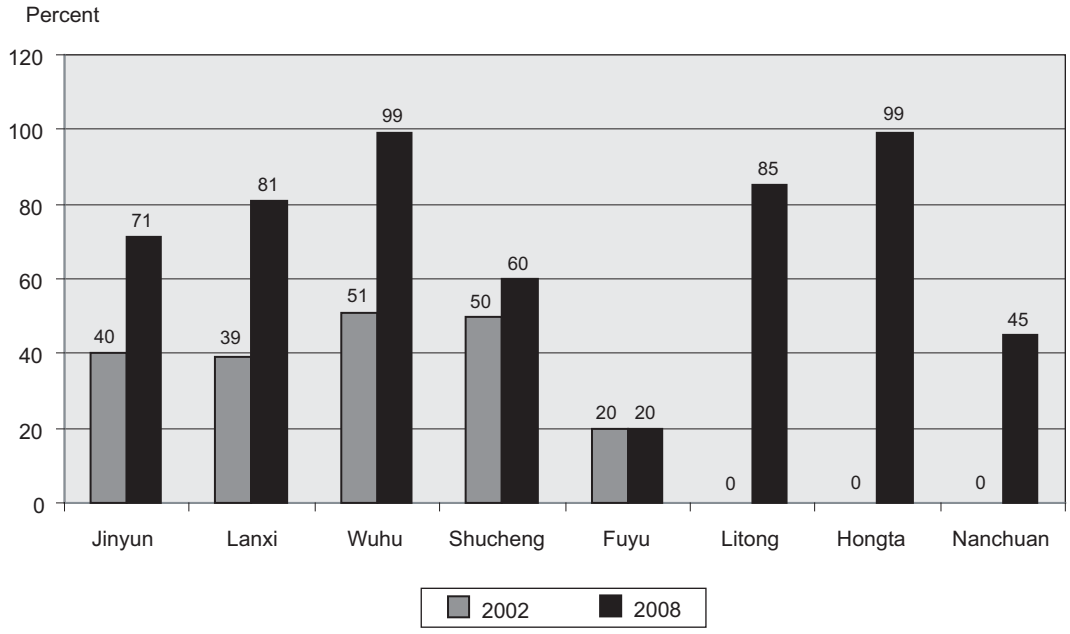

Figure 8: Comparison of farmer household telephone ownership rates in the study sites, 2002 and 2008

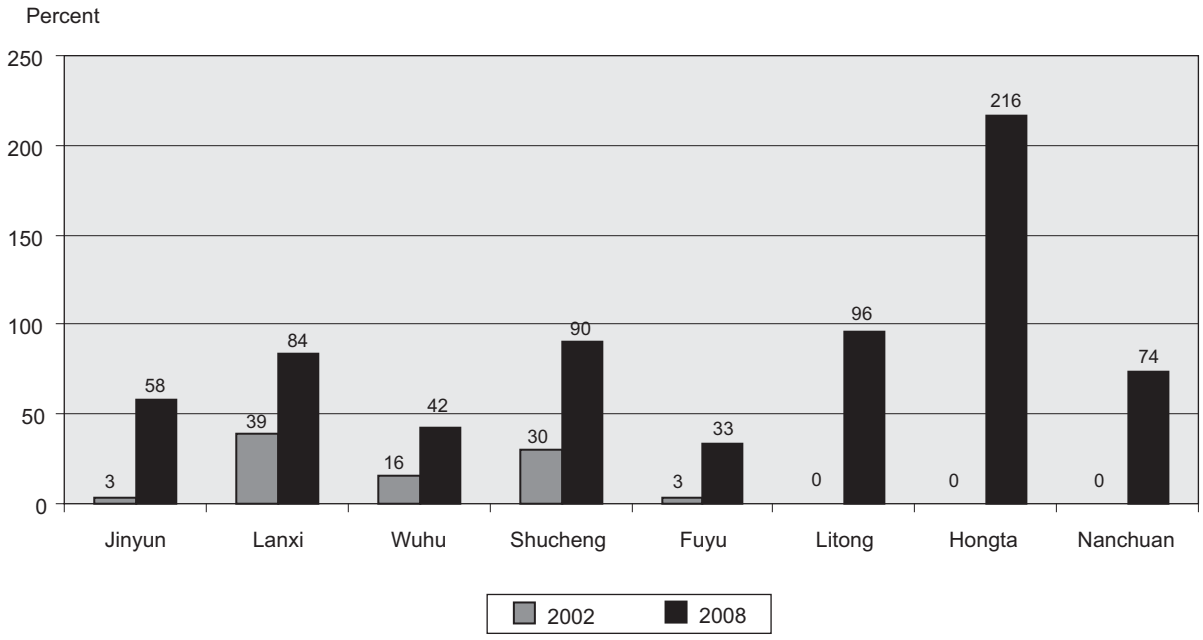

Figure 9: Farmer household ownership of a mobile phone in the study sites, 2002 and 2008

The ownership rates of computers were very low as of 2002, with the highest rate in Lanxi City, at a mere 0.5 percent. Six years later, it was 6 percent in Jinyun County and 8 percent in Wuhu County. According to what farmers reported in a 2008 survey, the rate of computer ownership was 92.9 percent in Wuhu County, 68.4 percent in Lanxi, 60 percent in Jinyun, 29.4 percent in Shucheng, 25.6 percent in Litong, 43 percent in Fuyu and 17.5 percent in Hongta (Figure 10). Improved information infrastructure and greater information equipment use in rural areas is critical for enabling better information provision.

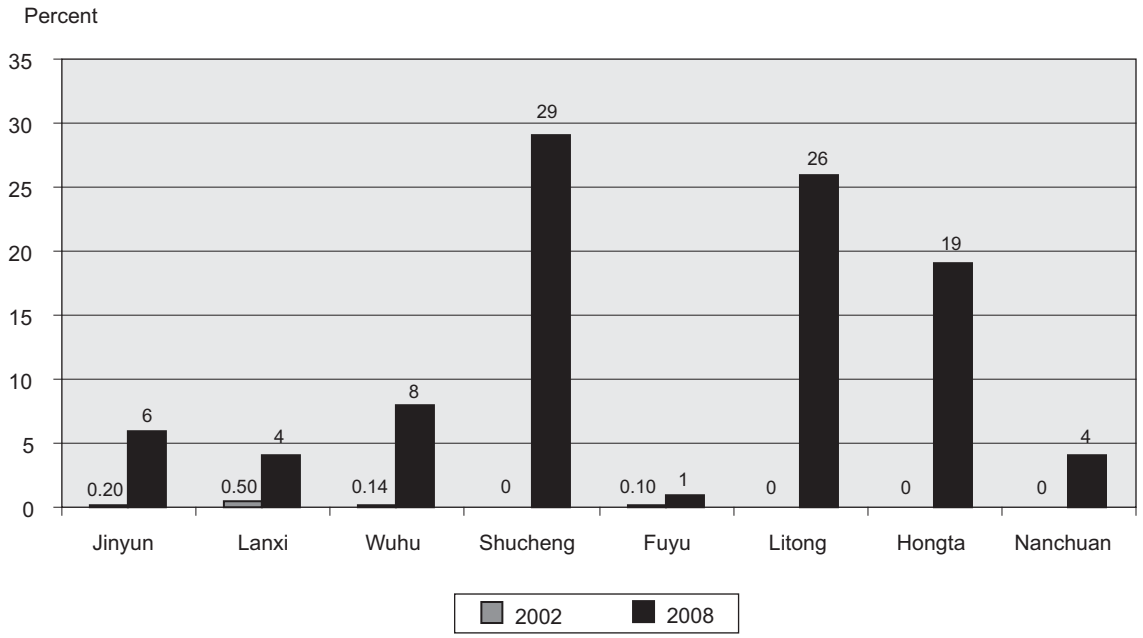

Figure 10: Farmer household ownership of a computer in the study sites, 2002 and 2008

2.5 Information channels used by farmers

In recent years, local departments of information service have integrated traditional and modern channels to provide a rich and varied service that facilitates farmers' access to information through SMS, television programmes, fixed-line telephones and the Internet. In particular, SMS has been growing rapidly, while the coverage rate of the Internet has also been improving.

SMS messaging by mobile phone is considered more convenient than using a fixed-line telephone (with voice communication), which is restricted by time and location. According to the survey findings, SMS ranks behind television and newspapers as a major channel for farmers to acquire information, but ranking higher than fixed-line telephone and the Internet. Around 50 percent of farmers in Fuyu County and 41 percent in Shucheng County reported using SMS, while in the other six survey sites it was more than 60 percent (for example, 92.5 percent in Jinyun (same as for television), 84.2 percent in Lanxi and 78.6 percent in Wuhu). Compared with the 2003 data, the SMS use rate grew in Litong, Jinyun and Wuhu, by 61.4, 53.6 and 40 percentage points, respectively.

The number of Internet users in rural areas is also increasing. Among the rural households interviewed in Wuhu, Jinyun and Lanxi, 85.7 percent, 60 percent and 57.9 percent of farmers, respectively, reported using the Internet frequently. The proportions, however, may not be an accurate representation, considering the local agricultural departments selected interviewees (and thus those more known to them due to increased familiarity with the information service). For example, the interviewees in Wuhu County were mostly people in charge of the local cooperatives or major agricultural enterprises. In Jinyun and Lanxi, the interviewees were information service workers (who are also farmers) appointed by county officials, with an education level higher than the average. Among the interviewees in Shucheng County, 35.3 percent reported using the Internet for information searching and dissemination.

Households without computers reported using a computer in the village or the county Service Station for Internet access. The utilization rate of the Internet was higher than the 29.4 percent for telephone use and 23.5 percent for hotline use. In Fuyu and Nanchuan, where the Internet infrastructure is not well established, the use of telephones was higher than that of the Internet.

Table 5: Channels farmers use to access information in the study sites, 2009 interviews

Unit: percent

Surveyed sites	SMS	Television	Newspapers and magazines	Telephone	Internet
Jinyun County	92.50	92.50	87.50	–	60.00
Lanxi City	84.21	78.95	84.21	10.53	57.89
Shucheng County	41.18	82.35	88.24	23.53	35.29
Wuhu County	78.57	71.43	78.57	14.29	85.71
Fuyu County	50.00	100.00	100.00	42.86	16.00
Litong District	68.97	89.66	100.00	27.59	26.44
Hongta District	67.50	95.00	70.00	5.00	7.50
Nanchuan District	74.19	96.77	83.87	22.58	16.13

Additionally, 60 percent of the interviewed households said they "trust" the information on the Internet.

2.6 Participation in farmers' associations

In recent years, local governments have invested in developing rural communities and improving farmers' access to markets, which has included establishing specialized associations and cooperatives. As a result, there has been dramatic improvement in people's farming capabilities and their access to markets. The survey findings demonstrate that the proportion of rural households affiliated with a cooperative increased markedly from the situation six years previously, at 100 percent in Wuhu County, 68.42 percent in Lanxi City, 67.5 percent in Hongta District, 53.85 percent in Jinyun County, 53.57 percent in Nanchuan District and 41.18 percent in Shucheng County.

3. Rural information service models

Researchers for the 2003 study distinguished three models of rural information service in China: the Service Station, the Farmers' Home and the Association-Cooperative. For the 2009 case study, the researchers added a fourth version that was found to be rather common – the Government + Company. This section elaborates on all four models.

3.1 Service Station

The Service Station refers to an information service center operating in townships and villages where there is strong demand for information and that relies on the support of county agricultural agencies. Such centers are referred to as "township information service stations" or "grassroots information service spots"; they are widely located in rural areas where they are easily accessible to farmers and respond to a variety of information needs. The Service Station links government offices at the county, township and village levels and moves information both to and from farmers. The county agricultural agencies provide both information and funding support to the Service Station. The model has proven important for farmers to access agricultural information that is useful for improving their livelihoods. The Service Station is predominant in the three counties of Jinyun, Shucheng and Wuhu.

Figure 13 illustrates the information flow of the Service Station model. The two-way arrow ◄——► represents two-way information exchange.

Figure 11: Xinjian agricultural information Service Station in Jinyun County, Zhejiang Province

Figure 12: Information service spot in Dajun village of Xinjian township (Jinyun County in Zhejiang Province)

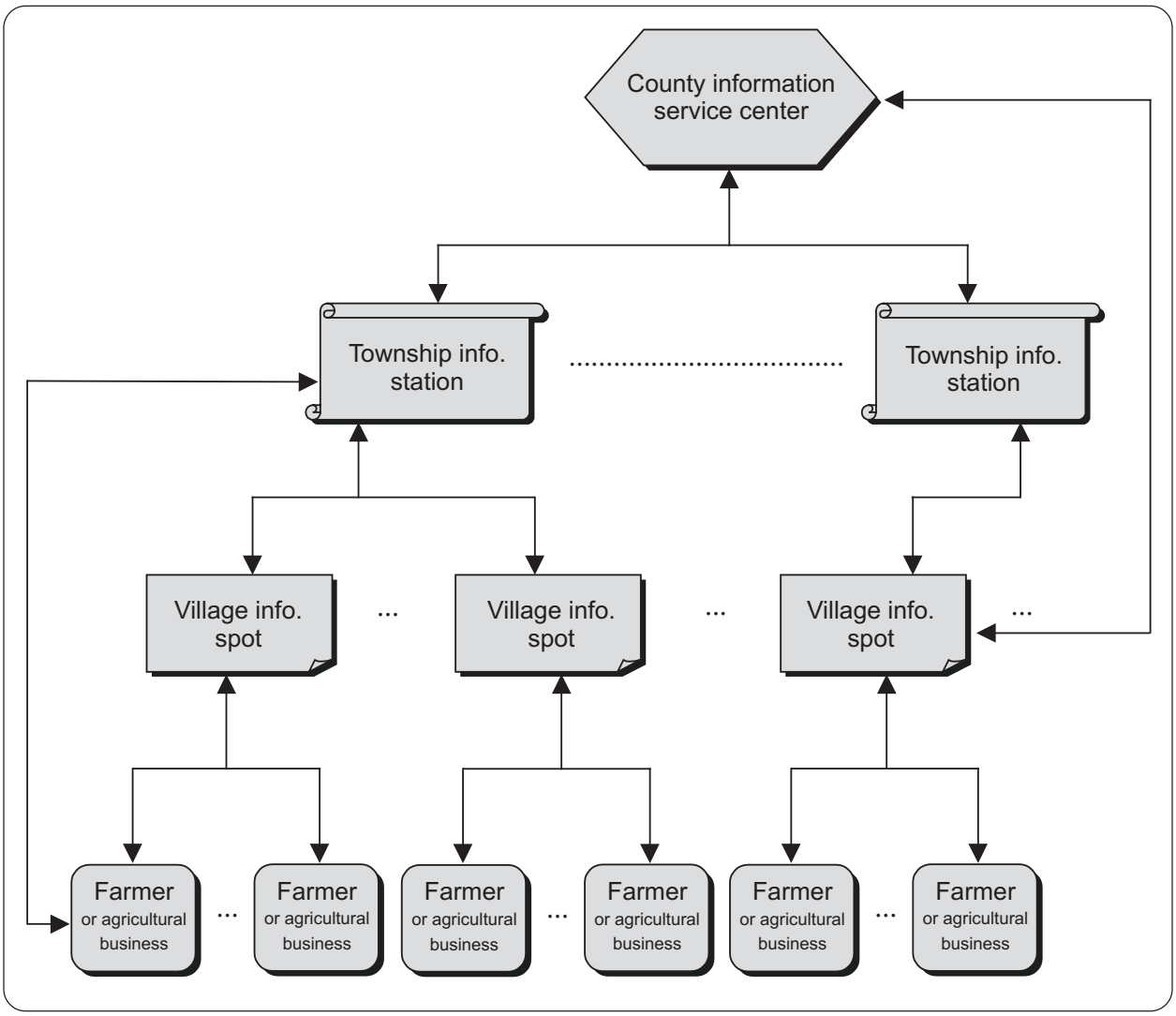

Figure 13: Information flow within the Service Station model

Key points for implementing the Service Station model

Preconditions: The information centers in general and the Service Stations in particular rely on the agricultural expertise from the administrative departments of all levels of government to provide rural information services. Local governments must be willing to provide policy support, office accommodation and funding for such services (although local governments have long prioritized agricultural information service, such service may require an increase in support or preferential treatment). A strong demand for information (market information, environmental conditions, new techniques, etc.), resulting from the presence of a critical mass of agricultural producers and products, is equally important.

Operational mechanism: The local government is responsible for the infrastructure of the Service Station, providing computers, printers and telephones free of charge; government finance bureaus or agencies cover the daily operating expenses of the county and township Service Stations. Such operating expenses with the village Service Stations are managed by a village committee, some households (prominent in cropping, animal raising, processing and/or marketing), an agricultural enterprise or an agricultural organization. Whichever entity manages it, the village center typically charges an Internet or communications fee. The county and village governments take responsibility for overseeing the staff professionals and technical personnel (from the agricultural departments), formulating rules and regulations and clarifying the functions of the Service Stations at the various levels to ensure optimum services.

Information flow: The Service Station provides advisory services to farmers or agricultural enterprises, such as market updates and trends, useful insights on production technologies and agricultural products, details on the latest supply and demand of products as well as government policies. The Service Station also announces technical training opportunities through government agencies that are available to farmers or agricultural enterprises. Farmers can use the Service Station to enquire on line for specific information, with assistance from staff on where to direct their request. The nature of the information flow within the Service Station has not changed since the 2003 study.

3.2 Farmers' Home

Organized by agricultural departments together with the departments of forestry, water conservancy, science and technology and education, the Farmers' Home is both a venue and a platform to serve farmers. It is a kind of one-stop shop in a central location for farmers to buy agricultural products, seek out technical information and consult with experts (or a hotline service) on agricultural problems. They can also avail of technical training. The concept is oriented around the goal of providing access to goods and services that would traditionally be unavailable to or difficult for rural farmers to obtain. The Lanxi Farmers' Home in Zhejiang Province (photos below) is a typical example: In addition to the information available within the facility, the Farmers' Home deploys an "information service vehicle" that is equipped with computers and Internet access and information pamphlets to provide mobile service to farmers unable to make it to town; the mobile service includes computer and other technical training.

Figure 14: Local newspaper's top story cites the Farmers' Home in Lanxi City, Zhejiang Province, as a good example of agricultural extension

Figure 15: The Lanxi City Farmers' Home information service vehicle

Figure 16 illustrates the information flow within the Farmers' Home, with ◄——► representing two-way communication.

Key points for implementing the Farmers' Home model

Preconditions: The Farmers' Home model requires a venue with a concentrated sales volume of agricultural products (which can be located in a city, township or even a village). It should be a venue to which farmers go to purchase all their agricultural needs. Local governments must be willing to provide policy support and funding for such services as agro-technical expert consultations, promotion materials and the necessary infrastructure equipment.

Operational mechanism: Local government is responsible for providing the Farmers' Home with expert consulting, promotion materials, free computers, touch panels, remote diagnostic systems, telephone and other information service equipment. In areas with better economic conditions, the Farmers' Home should be responsible for the daily operating costs of the information service, with the county and

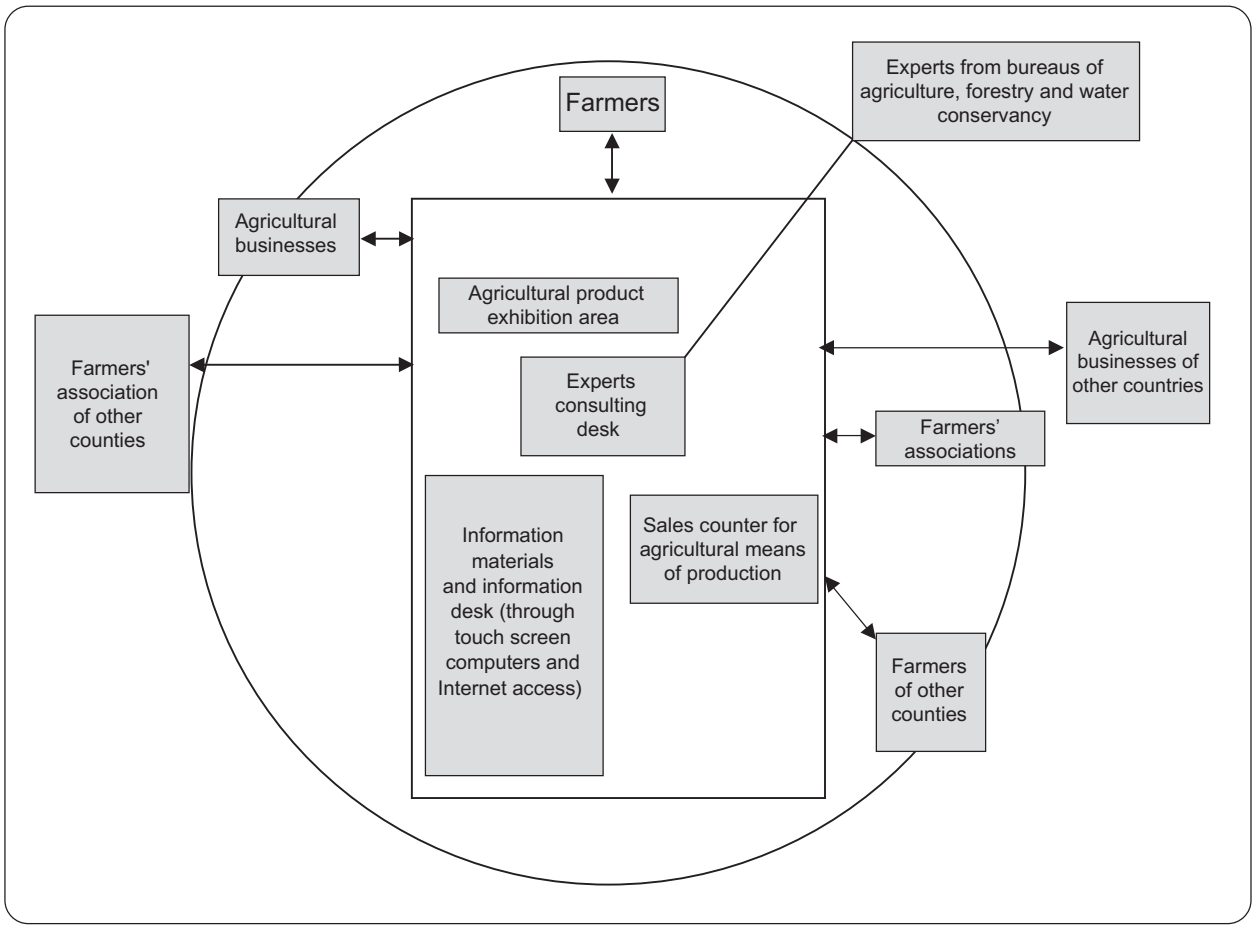

Figure 16: Information flow of the Farmers' Home model

village governments contributing if need be for the rent of the venue space. The local provincial government is responsible for hiring appropriate staff within the agricultural departments, formulating rules and regulations and clarifying the responsibilities of the Service Stations at the various levels to provide optimum services.

Information flow: The Farmers' Home not only provides consulting services to farmers through agricultural experts and salespersons or in the form of promotional materials, Internet inquiries and brochures, it also offers technical training on agricultural technologies. As well, farmers can provide useful feedback on products or techniques, which can be reported to the relevant government departments. The information flow pattern of the Farmers' Home model has not changed since the 2003 study.

3.3 Association-Cooperative

The Association-Cooperative consists of farmers in an area who are in need or interested in the same types of information. Because of their similar interests, they form either a specialized association or a specialized economic cooperative on a voluntarily basis that they then manage. This type of group centers around one crop or animal or some other commodity in common. The association or cooperative provides members with information services

Figure 17: Tieqiao specialized cooperative on farm machinery in Nanchuan district of Chongqing municipality

before, during and after the production of a certain type of agricultural product with the intent of improving their production and increasing their income. Unlike the previous two models, the association or cooperative narrows its service to provide information to its members that is relevant to their common ground. Although narrow in focus, the service covers a range of technical, market and policy issues. Some associations and cooperatives also purchase production materials for members and offer marketing services for farm products. This model is mainly found in Fuyu Country of Jilin Province and Wuhu County of Anhui Province (see the Annex for more details).

Figure 19 illustrates the information flow of the Association-Cooperative, with the two-way arrow ◄——► representing two-way communication.

Figure 18: Reading room of the Tieqiao specialized cooperative on farm machinery in Nanchuan district of Chongqing municipality

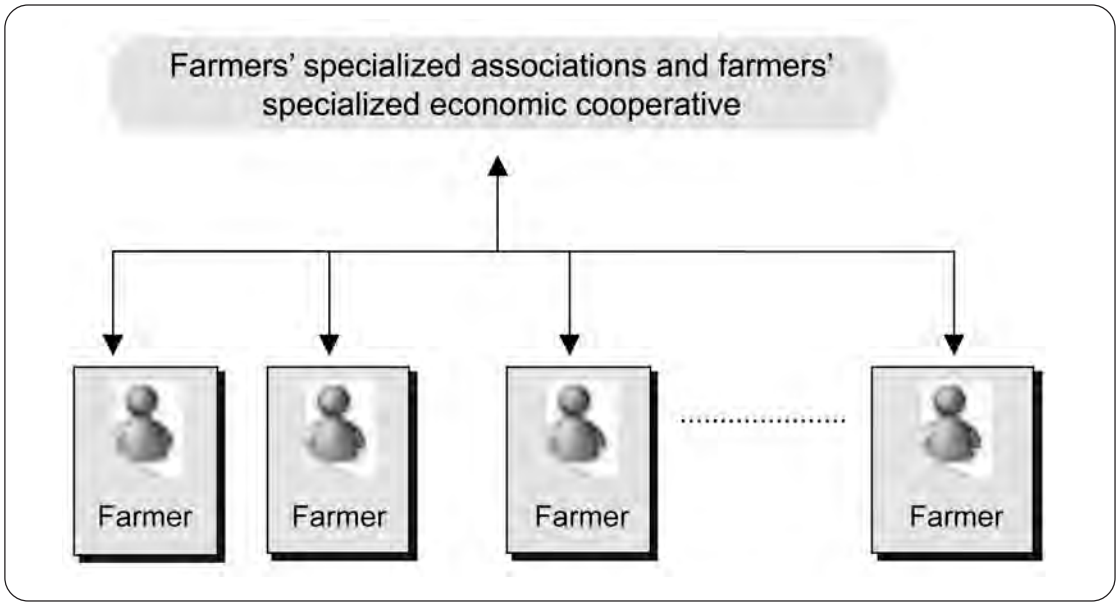

Figure 19: Information flow of the Association-Cooperative model

Key points for implementing the Association-Cooperative model

Preconditions: The agricultural production of members of an association or economic cooperative should be at a set minimum level; the affiliated service should provide members with sufficient critical information on production and technological capabilities and market trends before, amid and after agricultural production that helps them to achieve a certain degree of economic benefit. The local government must be willing to provide support in terms of facilities, information resources and a favourable policy environment, such as financial support and/or a reduction or exemption of certain taxes.

Operational mechanism: In areas with relatively better economic conditions, the local government can offer service facilities, including computers and telephones, for free to associations and economic cooperatives. The organizations should establish dedicated divisions or designate specialized personnel to engage in information services. The daily operating costs of running the information service should be borne by the association or economic cooperative.

Information flow: The associations and economic cooperatives determine the information needed, process it and then deliver it to their members. The information from the local government departments relate to policy, technology and market trends, although the associations and cooperatives also rely on the Internet for similar information. They invite agricultural experts to conduct technical training for members, often in response to members' requests for specific information. The information flow pattern is the same as in the 2003 study.

3.4 Government + Company

The Government + Company model is a business relationship designed to provide information directly to a large client base that includes farmers and other people involved in planting, breeding, processing or sales of agricultural products, agribusinesses and related organizations. It is essentially highly targeted professional information, with "public" information provided for free and customized information delivered for a fee.

The model emerged with the advancement of China's agricultural development and the increase in farmers' demand for highly technical information. It is a useful supplement to the government-led information service. Through this model, the agricultural departments in Ningxia Hui, Chongqing and Jilin have created a platform jointly with the telecommunications sector to provide information services; the departments supply the information and the telecommunications companies provide the infrastructure and customized information while the users pay for their specific information demands.

Figure 20 illustrates the information flow of the Government + Company model, with the two-way arrows ◄——► representing two-way communication.

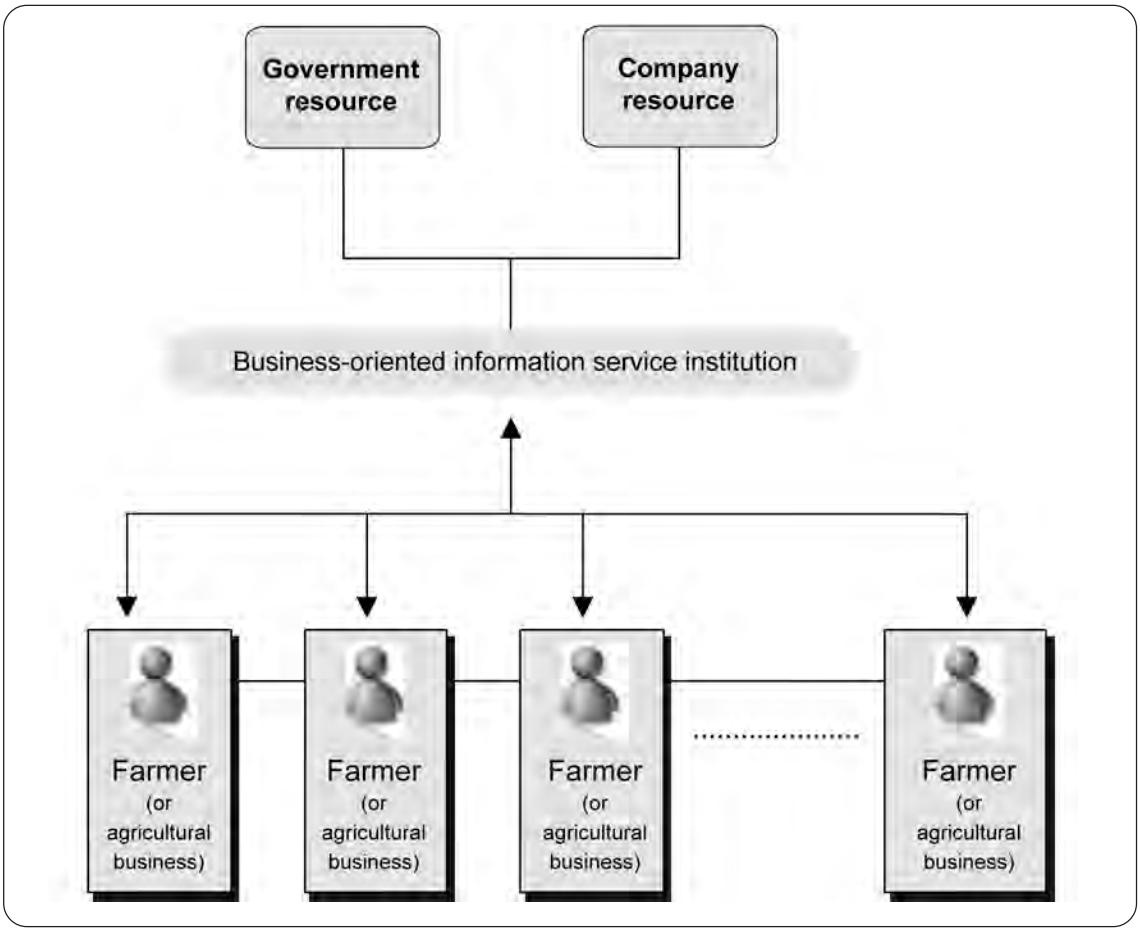

Figure 20: Information flow of the Government + Company model

Key points for implementing the Government + Company model

Preconditions: This model requires well-developed specialized agricultural operations, farmers in need of professional information (on planting, breeding, markets, etc.) with access to a telephone and basic telecommunications infrastructure. The local (country and village) government must be willing to offer certain preferential policies for the commercialization of information service delivery. The model works where both the local government and companies are not able to carry out professional market information service delivery on their own.

Operational mechanism: This model represents a synergy of strengths: The local governments have the expertise, administrative resources etc. related to agricultural extension and the private sector has the advantage of infrastructure, technical personnel and networking facilities – the "last mile connectivity" resources. The companies provide users with a professional information service – responding in a customized way to individual request for specific information or assistance with a particular issue – that the users pay for; part of the fee charged covers the operating and maintenance costs.

Information flow: The government provides for free general information, distributed through the company's infrastructure. Famers, organizations and other agencies can request from the company (or from the government through the company) specific information; government experts may respond at a subsidized rate to the company that in turn passes onto the user at still a nominal fee. Farmers and other users are also encouraged to report problems, complaints and other feedback regarding agriculture-related products and services. In combining their separate strengths, the government and companies provide useful policy, technological and market information that serves the public interest and demand; farmers, on the other hand, provide feedback and valuable insight in terms of their information needs.

4. From 2003 to 2009: Evident progress

The Government has long highly valued the importance of agriculture, rural development and farmers livelihoods. With increasing inputs, rural information service has experienced a rapid expansion. Over the past decade, the Ministry of Agriculture initiated such accommodating programmes as the Golden Agriculture Programme, the Integrated Information Service Programme via telephone, television and computer, and the National Rural Information Technology Demonstration Programme. In addition, other ministries and commissions launched pro-farm information service schemes, including the Ministry of Industry and Information Technology with its telephone service access to Every Village Programme, the State Administration of Radio, Film and Television with its Extending Radio and TV Coverage to Every Village Programme, the Ministry of Science and Technology with its National Rural Science and Technology Information Programme and the Ministry of Commerce with its Rural Business Information Service Programme.

In comparing the information service situation between the two studies (2003 and 2009) in the eight sample sites (in the six provinces, municipality or autonomous region), several changes are apparent:

- Networks have extended both vertically and horizontally to the rural community, and the coverage of information services has expanded.
- Better rural information infrastructure has greatly improved farmers' access to information. The telecommunications and Internet facilities in rural areas have substantially increased. Some of the village Service Stations have shifted their method of Internet access from dial-up to fibre optic cable. Almost all villages receive the China central television station programmes on channel 7.
- Information services have diversified, with rapid growth in SMS and Internet coverage. Information service providers have integrated use of both traditional and modern channels, including flyers, on-site guidance, TV programmes, fixed-line telephones, SMS and the Internet. There were several service delivery innovations operating in 2009, such as the Nostalgia Network telephone voice-message service and a mobile network classroom called the Information Caravan. A more prominent trend has been the rapid growth of SMS service as well as a much wider use of the Internet. There is an evident comfort level among rural folks in using modern communication devices for ordinary purposes, such as the agricultural technicians who send SMS New Year photos of their projects. The agricultural technicians are comfortable with modern communication channels, such as the Internet and mobile technology. The content of information services has been enriched, which has improved the quality of farm production and farmers' skills. Additionally, the services are not confined to agricultural production information; rather, they now concentrate more on improving farmers' production and life skills, raising farmers' social status and promoting a harmonized rural atmosphere.
- The service delivery model has shifted from a single type to an integration of multiple models. Thus, each model complements the others and more varied resources are tapped, resulting in the provision of better service.

It is clear that over the years the government principle of "government-driven, market participation and farmers benefit" has been instrumental in guiding and maximizing the role of the market while pushing forward rural information services. The diversification of service actors and modes of delivery have strengthened the sustainability of rural information services.

The service delivery of the three models operating in 2003 (the Service Station, the Farmers' Home and the Association) has clearly evolved and grown, as shown in the following highlights:

4.1 Service Station

Geographic distribution: The Service Stations are situated in the rural areas, in close proximity to farmers, which was the same finding in 2003. However, they have increased remarkably in number. Shucheng County added 142 village-level or other grassroots information service spots, bringing its 2008 total to 290; Jinyun County added 54 village-level information service spots to a 2008 total of 152; Litong District grew from 7 village-level information stations to 97; and Fuyu County grew from 72 village-level information spots to 160.

Service targets: The targeted users remained the same in 2009 as in 2003 – farmers, specialized associations and agricultural enterprises.

Service content: Previously, the services focused on providing information on production technology, market trends, the supply and demand of agricultural products and related policies and regulations. By 2009, as noted, the content had grown beyond agricultural production information and included a focus on improving farmers' production and life skills, farmers' social status and the rural social environment. For instance, townships in Shucheng County relied on the information spots to release information regarding village affairs, including monthly and quarterly fiscal revenue and expenditure reports, and villages used the information bulletin boards to update the community on village business as a way to encourage public monitoring. That evolution had encouraged greater farmer involvement in village affairs and political administration, which had increased their social status and expanded the nature of community discussions.

Service manner and means: By 2009, the means of information delivery had become more modernized, with much greater use of the Internet and SMS-based communication.

Major players: Previously, the major players were village committee members, specialized farmers, officers of agricultural enterprises, members of cooperative organizations and staff with the government agricultural departments. By 2008, there was greater diversification at the government level, with the departments of telecommunication, culture and science and technology working with the agricultural departments.

Funding sources: In 2003 the operating funds derived mainly from the government budget. By 2009, although only in certain areas, there was experimentation with the village committees, agricultural enterprises and cooperative organizations raising their own operating funds to cover all expenses other than the physical facility, which the local government continued to subsidize.

4.2 Farmers' Home

Geographic distribution: In 2003, the Farmers' Home operated at the city and county levels. By 2009, it had extended to the town and township levels, with some Farmers' Homes having set up in villages. There was and remains only one Farmers' Home at the city level, but it now needs to relocate largely because of its limited space and plans to greatly expand the services offered (the current site is a leased 450 m^2 location). The new location is near the railway, thus providing convenient access to the city's passenger train terminal, making it easier for farmers to visit. The new location covers an area of 6 mu (0.4 hectare), with a floor area of 11 162 m^2 – financed with an estimated investment of 17.68 million yuan. When completed, the service building will become a farmers' training base, with two halls (the agricultural service hall and the special agricultural products exhibition hall), three stations (for plant protection, soil and fertilizers and seed management) and four centers (for animal disease control, quality testing of agricultural products, marketing management of agricultural products and extension assistance on new varieties and techniques). It will have 15 counters providing books, videos, experts for farmers to consult on crop and husbandry-related problems and hotlines offering assistance on general agricultural

information and agricultural technologies related to premium crop varieties, grains and oil-bearing crops, cash crops, animal husbandry and so on.

Service targets: Targeted users remained the same in 2009 as in 2003 – farmers, specialized associations and agribusinesses within the district.

Service content: Content in 2009 was similar to 2003, with information and advice as well as products to buy.

Service manner and means: In 2003, the service was primarily expert consultation – technical experts were available for dispensing advice in a space within an accessible or busy shopping area. By 2009, there were more options, including information access via materials, touch-screen resources, the Internet and "long-distance diagnosing" by telephone (hotlines) in addition to the original concept of salespeople or experts available in an accessible area for on-the-spot information exchange.

Major players: In addition to the agricultural, forestry and water conservancy departments that managed service delivery in 2003, traders of agricultural products were engaged in providing service in some towns/townships in 2009.

Funding sources: In 2003, the local government was the primary subsidizer of the service, with some contribution from the sales of agricultural products. By 2009, the operating costs were solely funded by the sale of agricultural products.

4.3 Association-Cooperative

Geographic distribution: As in 2003, the locations by 2009 were concentrated in rural areas, close to farmers. However, the number of associations or cooperative organizations had increased substantially by 2009, with a broader coverage of information service. For example, the information association of Fuyu County had added ten specialized associations/cooperatives (dedicated to the farming or husbandry of Silihong peanut, cereals and beans, edible fungi, fruits and vegetables, green rice, special birds, Chinese brown frog and practical agricultural techniques), bringing the total to 18 associations/cooperatives, with membership increasing from around 1 300 households to more than 3 000.

Service targets: In addition to their own members, more and more associations by 2009 were providing useful information service to non-member farmers.

Service content: In addition to the advisory service regarding production technology and market trends for agricultural products and the buying and selling of such products, some associations and cooperatives by 2009 had introduced financial services, such as assistance with obtaining loans.

Service manner and means: By 2009 there was much greater use of the Internet and mobile phone technology in the delivery of farm-related information.

Major players: Management remained essentially the same in 2009 as in 2003 (management by farmers' specialized associations or cooperatives).

Funding sources: The funding source remained the same in both time periods – membership fees and profit from the sale of seeds, fertilizers, pesticides, etc. (which associations/cooperatives buy in bulk and sell at a subsidized price to members).

5. Similarities and differences among the four models

The differences among the four models are analyzed from the following nine aspects, with the similarities highlighted at the end of the section:

5.1 Major players

Service Station: It is managed either by a local government or an agricultural administrative department.

Farmers' Home: It is basically managed by a local government or an agricultural administrative department.

Association-Cooperative: It is mostly developed and managed by farmers.

Government + Company: It is co-sponsored by a local government and a company in partnership, with the local government providing some start-up capital and organizing service teams to provide information and the company responsible for the operations and delivering to users.

5.2 Service targets

Service Station: It receives financial support from a local government, and generally, its users only cover the farmers or companies engaged in rural production within its administrative area.

Farmers' Home: It has a broad range of service users, which includes not only farmers, brokers, intermediaries, cooperatives, specialized farmer associations and companies within its administrative area but also the vast agribusiness operators outside the area. There are no administrative geographical restrictions for rural service users.

Association-Cooperative: The users are far less diversified (more specialized). An association or collective targets a very specific group (members) in agriculture who produce similar products.

Government + Company: The users are highly varied, typically farmers, business operators, brokers' associations and cooperative organizations as well as leading intermediaries – the agencies or organizations that provide technical, market and policy-related information to other users.

5.3 Service content

Service Station: In general, it only provides advisory services. Some Service Stations use their own technological advantage or office space to sell seeds, pesticides, fertilizers and other agricultural products. The scope of services has gradually expanded, and many of the services involve farmers who also act as information intermediaries to provide other famers with advice.

Farmers' Home: It mainly offers advisory services as well as the sale of seeds, pesticides, fertilizers, etc.

Association-Cooperative: It usually provides farmers with information and technical advisory services on plant protection, disease prevention, harvesting and agricultural inputs as well the sale of farm production products, loans and other services. The service content aims at the professional but specialized scope of rural members, such as peanut associations, dairy cooperatives and farm machinery cooperatives.

Government + Company: Its main service is interactive advice, but it also offers a mobile phone SMS information service and a channel for receiving complaints about misleading or bogus products, such as counterfeit seeds or dangerous pesticides. The model provides the widest range of information service, covering all agriculture-related fields.

5.4 Funding sources

Service Station and Farmers' Home: Both rely largely on financial support from a local government.

Association-Cooperative: It largely makes use of the profits from membership fees and the sale of products to members to cover operating expenses.

Government + Company: A local government subsidizes the information it provides (to the company) while the company charges for the information and service, which is typically specialized information or responses to an individual request.

5.5 Type of service offered

Service Station: In general, it provides advice, answers technical questions and informs farmers of relevant public notices and some sell agricultural products. The information is provided through the technical experts, published "briefings" or brochures, cable casting (the broadcasting of a programme over a cable network), mobile phone SMS, bulletin boards and so on.

Farmers' Home: It mainly offers expert consultations; technical experts can be consulted in the store or when purchasing seeds, fertilizers and other production products.

Association-Cooperative: It carries out production and operating activities (hands-on farming assistance or advice), training, financial business and other similar services as well as the sale of reduced-price agricultural products.

Government + Company: It provides modernized communication networks, video equipment, telephone hotlines, mobile phone SMS, video programmes and printed information materials.

5.6 Accessibility to users

Service Station and Association-Cooperative: They are basically located in vast rural areas but close to farmers to heighten their easy accessibility.

Farmers' Home: It is located in downtown areas, at a somewhat long distance from farmers. If there are problems encountered in production and operations, it is not very convenient for farmers to seek out.

Government + Company: It is a long-distance service, delivered primarily through communications networks; it is comparatively accessible to those who have better communication and Internet conditions.

5.7 Relevance between major players and service targets

Service Station: It is a government-led public interest service, and the government is fulfilling its function, responsibilities and obligations of public service to taxpayers. Government financial support is crucial for the day-to-day operation.

Farmers' Home: It is a government-led public interest service for farmers and contains traces of a buyer-seller relationship in its commercial activities. The operations partly rely on government investment and partly on commercial activities.

Association-Cooperative: It is an interaction of self-service, cooperation, mutual assistance and self-discipline among members within the organization (according to rights and obligations of membership). It provides more direct, faster and targeted services for its farmer members; its interest in market efficiency, social benefits and self-development mirror its members' interests.

Government + Company: General public information is supplied free of charge, but users can request specific information or advice (from an expert, specialist in the public or private sector or government authority), for which they need to pay. The government's role is to lead, guide and launch the service with information input when needed and some subsidy; the companies construct, operate and maintain the favourable network communications services and manage the individual information requests that they charge for. The operating and maintenance services as well as purchasing power of users for assistance from the communications network are key factors.

5.8 Available resources

Service Station: The local government provides the agricultural experts, information, equipment and facilities as well as the entire operating and maintenance funds.

Farmers' Home: The local government provides the agricultural experts, information, equipment and facilities as well as part of the operating and maintenance funds; the Farmers' Home supplies the products that are sold, a portion of the proceeds cover expenses.

Association-Cooperative: The resources include its own organizational strength (industrial facilities and equipment, products, equity funds) and members' knowledge, skills and market and social relations; supporting government policies are also integral to its functioning.

Government + Company: The local government provides the agricultural experts and information as well as some subsidy to the companies. The companies provide the construction, operation and maintenance funds, network communications equipment, infrastructure conditions and reduced fees for accessing the communications networks (using whichever medium for specific requests).

5.9 Establishing and operating costs

Service Station: The local government provides a suitable venue, basic equipment and covers the salaries of staff, the subsidies for experts and information services and the maintenance expenses. The construction costs are not high for a single site or at the initial stage. However, due to the large number of Service Stations now set up, the total operating costs and funding is by no means a small amount.

Farmers' Home: There are very few venues, which actually require little overhead expense to construct. The overall operating expense is not high, with only experts' subsidies and venue costs to cover. If the model is replicated extensively at the township and village levels, the total expenses could be huge even though the individual unit operating costs are not.

Association-Cooperative: Because associations and cooperatives are voluntarily established by farmers, there are basically no cost requirements for staff salary and offices; establishing and operating costs are relatively low.

Government + Company: Given the expense of the team of experts, resource building, communications infrastructure, service equipment, offices and staff salaries, the total cost to establish and

operate this model is quite high, more than any of the other three models; typically, more than 1 million yuan is required for the initial capital, while the cost for individual use (special requests) is also very high.

5.10 Similarities

The four models overlap somewhat in the following five aspects:

1. They all require rich, reliable, timely, accurate, effective and well-targeted information resources as well as expert support.
2. They all need a certain degree of backup from the local governments, including policy support, financial subsidies and other accommodating measures.
3. They all incur operating expenses to varying degrees, and thus require commitment from some regular source to cover the costs.
4. They all need competent and dedicated (skilled in information technology and agriculture extension) full-time or part-time service staff.
5. They all cannot thrive without a modern communications network.

6. Development and expansion of the four models

6.1 Service Station

Development of the model

The main service provider has expanded from the agricultural department to include those responsible for forestry, agricultural machinery, animal husbandry, aquaculture, meteorology, electronic communication, civil affairs and legislation. As well, the content has extended from agricultural technology and market information services to policy, other technological areas, meteorology, rural society and culture as well as information concerning agricultural subsidies, civil affairs, family planning and civil dispute settlement. The devices used have become more advanced, with greater reliance on the Internet and SMS and greater use of mobile units to reach farmers more easily.

Expansion of the model

The Service Station was launched by the Ministry of Agriculture in 2001 with a plan to extend the concept nationwide,[7] which local governments have instituted. The facilities and quality of service delivery has continuously improved, with new technology and with the help of various government programmes (cited previously). By the end of 2009, every provincial agricultural department included a special agency engaged in information work, while 97 percent of the country's prefectural/municipal and more than 80 percent of the county agricultural departments had a special unit for information service management. In addition, 70 percent of all towns/townships across the country had a Service Station, with more than one million rural information service agencies of various forms at the village level.[8]

The government at all levels is the driving force for the continuing development of the Service Station model.

6.2 Farmers' Home

Development of the model

Locations have expanded from county seats to townships, where they are closer to farmers and thus reach more end users. The service provider has expanded from one dominated by the agricultural department to a more diversified grouping of agriculture-related government sections and distributors of agriculture-related inputs; the service itself also has grown more diversified, beyond simple agricultural consulting and sales service for agricultural products. For instance, some township Farmers' Homes provide the information and technology service needed before production, during production and after harvest. In some places, such as Biandangou town in Ningxia Hui Autonomous Region, service centers have been set up, each with a variety of specialists addressing such issues as land resources, agricultural machinery, agricultural technology, agricultural economy, civil affairs, forestry, water affairs, family planning and legal advice and/or assistance. The operating costs are no longer borne by the local government solely but distributors of agriculture-related inputs now contribute.

Expansion of the model

The building of an open and integrated agro-technological service center in which consultation and extension, information service and the sale of products are combined has been widely extended across the provinces of Zhejiang, Anhui, Henan, Yunnan, Jiangxi and Shaanxi and in Chongqing municipality. In

[7] The Action Plan for Rural Market Information Service during the Tenth Five-Year Plan Period, drawn up by the Ministry of Agriculture in 2001, stated "the establishment of information platforms at province, city and county levels and information Service Stations in township levels should be actively promoted".

[8] MOA. 2010. *2009 report on agricultural and rural information service development.* Beijing. Ministry of Agriculture.

the process, the model has been further refined. The Farmers' Home at the town/township level in Hongta Prefecture of Yunnan Province, for example, offers agricultural information, expert advisory service and a "supermarket" of agricultural products. The Farmers' Homes at the village level in Ruichang City of Jiangxi Province were established with the help of village committees, which provided the land, facility and equipment. In Luoyang City of Henan Province, the Farmers' Homes have made the best use of chain stores of agricultural enterprises, providing on-line service, on-line expert advisory service, on-the-spot technical guidance and information bulletins.

Because the Farmers' Home model combines an information service with the sale of agricultural products, it is conducive for both government and enterprise contribution, which in turn boosts the growth of agribusinesses. In some areas, agriculture-related manufacturers provide touch screens in their distribution shops to guide farmers on how to use their products and answer related questions that help farmers resolve problems or other issues.

6.3 Association-Cooperative

Development of the model

The service provider expanded from primarily farmers' specialized associations to involve economic cooperatives. An economic cooperative is a legal entity operating for profit; the funding of the information service depends on the profit of the organization. The service content focuses more on improving the production and technological capacity of the members and helping them to increase their income; the service covers all three stages of production activity (before, during and after harvest).

Expansion of the model

Associations and cooperatives are responsible for improving their members' production technology and increasing their income, which is a strong incentive to provide useful information and technical training.

The Law of the People's Republic of China on Farmers' Specialized Cooperatives (that took effect on 1 July 2007) provides the legal support and huge impetus for extending this service model. By the end of 2009, around 246 400 farmers' specialized cooperatives were registered with the industrial and commerce administrative authorities across the country, representing more than 21 million farmers. Farmers' cooperatives have become a major information service provider, partly because of their strong link with and awareness of the demand. The model has continued to grow in its delivery and innovation; in Dongying City of Shandong Province, for example, the information association has deployed technical extension agents to work directly with farmers. The approach has been used successfully in more than 20 counties in the province, with a membership of more than 50 000 farm households. The Xinghua Agricultural Information Service Cooperative of Henan Province instigated a "four in one" approach to better serve farmers by informing them of innovations in commodity distribution and technology. In this approach, the "four" refers to farmers, village stores, manufacturers and cooperatives. By the end of 2009, the cooperative had established agencies in 1 387 towns/townships of 110 counties/districts and 18 cities. It also had set up Service Stations in more than 40 000 villages and attracted around 25 000 stores that sell agricultural products (with 200 000 employees) as members.[9]

6.4 Government + Company

Development of the model

This model is relatively new, and instigated by the private sector and the government is responsible for providing support. With the further development of the economy and the advancement of modern

[9] ibid., MOA.

agriculture, farmers' information demands will certainly increase. Thus the information service needed will be more specialized, more targeted and in a much wider range. According to the survey findings for this case study research, farmers likely will be willing to pay a fee for the information they need. All of this points to a great business opportunity in rural information service. Various enterprises already have discovered this opportunity and are seeking access to the market and experimenting with more effective service models.

Expansion of the model

Considering the sheer number of farmers as well as the diversity and complexity of the information they need now and will need as technology advances, the government at all levels cannot manage the huge demand on its own. Enterprises have advantages in network equipment, information channels, information resources and technical talents but lack the strength in mass organization and agricultural technology expertise. By working together, the government and enterprises can optimize their own advantages to ensure service quality, at a profit and contribute towards sustainable development.

In fact, telecommunication operators, such as China Mobile, China Unicom and China Telecom, have successfully forged rural information service platforms of their own. China Mobile extended its SMS-based Mobile Agricultural Information Services (MAIS) platform for distributing advisories and other messages to users in 27 provinces across the country. China Unicom offers air time on both television channels and in mobile phone service in 26 provinces and a hotline "12316" in several provinces and municipalities for dispensing agricultural news. China Telecom promoted an integrated information service platform, called "information countryside", which combines various information sources of government authorities, agribusinesses and specialized agricultural cooperatives using all forms of telecommunications (telephone, SMS, the Internet and the IPTV system for delivering television programme via a broadband connection); the content covers agricultural policies, technology, market trends, industry guidance, employment opportunities (job listings), health care and education. By September 2008, China Telecom had set up more than 1 400 information service demonstration units at the town/township level nationwide; broadband Internet access is now available in 93 percent of towns/townships and 52 percent villages.[10]

Several other IT and information service enterprises also are working in partnership with the government at all levels. Microsoft, Intel and Beijing Smart Dot Company, for example, signed an agreement with the local government of Wuyishan City in Fujian Province on jointly establishing a "digital Wuyi" and providing rural information service. Mobile phone-based rural information services were introduced to Inner Mongolia by Haixin Company, the Inner Mongolia Branch of China Mobile and the Department of Agriculture and Animal Production of Inner Mongolia.

[10] ibid., MOA.

7. Impacts of rural information services

The development of the rural information service system has made tremendous progress under government guidance, with the participation of various social sectors and with inputs from agribusinesses and telecommunication companies – all of which has led to equally tremendous impact on rural lives, as the following section highlights.

7.1 Increased farmers' income

Promoted agricultural products and increased farmers' income

Information service agencies have made great use of the Internet to collect information on policies, science, technology and markets to then turn around and provide farmers with vital information on farming practices and marketing, including assistance in the supply and demand for agricultural products in response to farmers' difficulties in marketing. Service stations on-line sales and guidance to farmers on modern marketing have helped them attain better prices and greater distribution of their produce. For example, sales information on white mushrooms and stone tomatoes from Yanhe township, on strawberries from Liqi townships and autumn/winter turnips produced in mountain areas in Yunnan helped buyers in and outside the province to learn about the supply of these products. Interested buyers negotiated with local suppliers via telephone or postal letters. According to farmers' survey responses, both marketing channels and farmers' income increased thanks to the increased orders.

In addition, information service providers also sought other ways to promote sales and increase farmers' income. For example, the Lanxi Agriculture Department in Zhejiang Province offered guidance to farmers in Xiajiangwu village of Podu township on regulations for the safe production and packing of strawberries and on how to register a brand name. As a result, they netted a price for their strawberries that was more than two times higher than what other farmers were paid; their annual income from strawberry sales increased by more than 800 000 yuan.

Helped farmers make use of new techniques and varieties

Information service providers helped farmers make use of new techniques and crop varieties to improve the quality of their produce and increase their income. For example, in Lanxi City (Zhejiang Province), under the guidance of the Bureau of Agriculture and its experts, farmers adopted a new packing method to bag their loquats. Thanks to the improved quality, they were paid 2 yuan for each loquat fruit – up from 0.35 yuan; their annual per capita income from loquat sales reached 12 000 yuan – up from only 3 000 yuan.

7.2 Expanded local agricultural production

Promoted restructuring of local agriculture

Taking into consideration local farming conditions, the information service providers guided farmers on restructuring their "business" by providing them with suitable new varieties and techniques as well as information on new agricultural supplies. For example, in the past few years, various information service providers in Lanxi City (Zhejiang Province) introduced more than 170 new crop varieties along with various new farming techniques and supplied more than 200 000 kilogram of quality seeds, some 500 tons of pesticides and chemical fertilizers and 370 tons of feed for animal farming and aquaculture. All of which impacted positively on the restructuring of the local agriculture. In Lanxi City, for example, the cash crop production expanded considerably due to the introduction of new varieties and techniques. In 2009, the sown areas of cash crops accounted for 50 percent of farmland production – up from 44 percent in 2007.

In addition, the agencies helped farmers obtain market information on the price fluctuations of agricultural products so they could rethink their crop farming, animal production and aquaculture choices for higher efficiency. For example, the information service providers in Wufu County (Anhui Province) helped farmers shift from growing paddy rice to cash crops and animal farming. As well, the providers guided the agricultural industrialization to move from domestic market-oriented development to one that is export-oriented and based on rational and highly efficient evidence.

Promoted increased agricultural production

The information service providers distributed production information and made field visits to introduce scientific and technical knowledge to farmers, give on-the-spot advice and technical training to popularize farming techniques and introduce new techniques to raise local production levels. For example, a dairy cooperative in Huangshawo village of Biandangou township introduced mobile "milking cars" to collect the supply from 269 dairy farmers having difficulty transporting their milk, which was affecting the quality. The collection support improved the quality of milk collected.

7.3 Increased the growth of local economies

The information service providers developed on-line transactions, increased marketing channels and improved the economic efficiency of enterprises by guiding small and medium-sized businesses, large crop and animal farming households as well as extension agents on how to navigate the supply and demand of information on the Internet. All this contributed to greater efficiency in crop farming and the processing of agricultural products and thus promoted increased development of the local economy. At the same time, the providers publicized through Internet channels information on local agricultural production and attracted foreign investment into local crop and animal farming as well as processing. For example, Wufu Shuangfeng Grains and Oil Corporation established a long-term stable supply relationship with Liyang Xinliang Grains and Oil Corporation of Jiangsu Province after publishing information on the Internet. In the past three years, the two corporations together exported 5 000 tons of processed products to Australia, Japan and the Republic of Korea among others, recording sales of 12 million yuan and giving impetus to the development of relevant industries.

7.4 Increased transparency of village affairs and improved participation of farmers in the community affairs

The information service providers made use of their information platforms to release monthly or quarterly updates on village affairs, including financial income and expenditure statements. Village service points issued public notices on the bulletin boards to arrange villager meetings. In addition, the service points also provided villagers with timely information by means of a telephone hotline and loudspeakers. All this helped villagers learn about the latest development of village affairs, which in turn encouraged greater openness and villagers' participation in community activities.

7.5 Instilled greater information awareness among farmers and expanded the further extension of farming techniques

Thanks to the rural information service over the past few years, farmers have learned more about the importance of information and cared more about acquiring scientific, technical and market information in farming production and operations. There has been tremendous increase in farmers seeking out the Service Stations for information on new crop varieties and techniques. Both farmers and processing enterprises have made considerable use of the Farmer Mailbox[11] to advertise either their supply of

[11] The Department of Agriculture's farmer's mailbox (www.zjnm.cn) runs an integrated advisory service and the Ministry of Agriculture is working with Chinese telecommunication providers to complete a comprehensive information service programme.

a product or their demand for it. According to the survey responses for this case study update, when confronted with difficulties in production or problems concerned with technology, farmers first turn to information service providers because they trust them for the better service and the technical information offered. After experiencing the convenient service, many have evolved from simply receiving information to asking for specific information. For example, the Farmers' Home in Zhejiang Province offers a dozen training courses to farmers every year. Each course attracts hundreds of farmers, who although typically quiet during the course (which lasts for hours), reportedly discuss the content extensively afterwards.

8. Constraints

Despite the considerable expansion of the rural information service, there remain several constraints. This section looks at those issues in terms of information demand, the supply of information, information channels and systems and mechanisms.

8.1 Information demand

Poor ability to use information

Currently, many people engaged in agricultural production in rural areas are mainly the elderly and women, who are less educated and/or outdated in their knowledge level and generally content with a small income. In the areas surveyed for this case study update, only Lanxi City had a large proportion of farmers with a senior high school education in 2008. In the other counties and districts, around 60 percent of farmers only had a junior high school education or lower. Focusing on farming per se, many farmers don't quite understand the role of information in the new era or they have no way of using such information, and their ability and awareness to acquire and exchange information is rather weak. In addition, adhering to the traditional way of thinking and farming, based on personal experiences, farmers feel like an "IT misfit" in the rapidly emerging new farming technologies and have a poor ability to acquire and screen information.

Small-scale farming and lower demand for information

The scale of production and operation of most farmers is relatively small. For an individual farmer, information only makes a trivial contribution to the farming returns; in comparison, new technology and market uncertainty bring more risks. Farmers with a low income and weak capacity to fend off risks tend to prefer stability over change. This constitutes the most important hallmark of farmers' demand for information and inhibits the urgency of their demand as farmers with a low income and reduced capacity to fend off risks tend to prefer stability over change.

8.2 Information supply

Information resources insufficient to meet farmers' needs

The insufficiency of information resources is mainly manifested by the inadequacy of market-related information. Currently, the information service providers at all levels have experience and talent in educating the public on agricultural technologies but lack access to market information; the capacity to collect and develop such information prevents them from amassing comprehensive, accurate and timely outputs. Market information is mainly gathered on line, and there is no way to verify the authenticity and effectiveness of it because the information service providers cannot send personnel for field investigations due to budget constraints. Additionally, the reliability of the information on trend forecasts is not fully convincing to farmers and has had a limited role in guiding their decision-making.

Lack of competent specialists

Information service providers at all levels are in most cases affiliated to agencies and most of their clerks work part time, with very few information specialists. From the perspective of knowledge updating, with the diversification of crop varieties and animal breeds as well as the rapidly changing supply-demand situation, the most up-to-date farming technologies and market information should be provided to farmers in a timely manner. However, the available technical staff has outdated knowledge and their individual capabilities can hardly meet the market demand thus far. The agricultural information service not only requires familiarity with the agricultural market economy and specialized agricultural knowledge but also mastery of information collection, processing, dissemination and other skills. Finding staff with such multidisciplinary talents, especially in the towns and villages, has proven difficult. Although young people

are familiar with computer operation, they lack agriculture-related knowledge; while people who are middle-aged are more experienced with agricultural production and have a good understanding of marketing and agricultural products, they are unable to operate a computer or use the new technologies.

8.3 Information channels

Limited computer users

With their economic conditions generally improved since 2003, more farmers can afford mobile phones, telephones, televisions and computers. However, the computer ownership of farmers remains low, and farmers still have difficulty in paying the Internet fees; so their access to on-line information remains limited. In addition, more and more information service providers use the Internet as their main tool for information dissemination. But there are limited regions offering SMS, and farmers in most regions still rely on television programme, radio, bulletin boards and other traditional channels for information. In general, farmers are still passively receiving information instead of proactively acquiring it.

Weak information transmission affects the timeliness

With the rapid development of information technology, the old equipment is just that – old and not in good condition and thus cannot meet the present demand. The channels and approach for information service need to be further improved. The Service Stations mainly rely on financial input from the government at various levels. However, due to funding shortages, some stations at the township and village levels cannot afford to collect and distribute information via the Internet or even to collect information through meetings and oral communication along the management line and release the details through traditional ways, such as radio and information bulletins. Due to the underdeveloped transmission channels, it is difficult for farmers to obtain timely information.

8.4 Systems and mechanisms

Unsound management system lacks planning and coordination

The distribution of information technology access (management of services) is not systematic but essentially ad hoc – there is a lack of macro planning and coordination. Too often people don't know whose order to follow (among, for example, the Ministry of Agriculture, Ministry of Industry and Information Technology and Ministry of Science and Technology), which has become a major constraint to the greater development of the rural information service. Additionally, the division of responsibilities is not clear and many government departments duplicate data or collect the same data, thus wasting time and resources. In this circumstance, if the central Government earmarks funds for IT application, different agencies will compete for the funding, which will lead to more duplication. Although IT-related resources – such as databases, software and computers – are maintained well, they lack domain expertise in agriculture. The lack of digital content in agriculture makes the entire system less valuable – despite Internet connectivity; for instance, in some areas there is no correct or validated information to disseminate.

Inadequate fiscal input

The inadequate input of fiscal resources is a major constraint to the further development of the information service. The case study primarily finds that government is largely responsible for expanding the expansion of the rural information service, largely through supporting budgets at various levels. To provide the information service, local governments generally take advantage of the central Government's rural IT projects. Because the IT application projects typically receive lump sum investment in hardware and related facilities from certain agencies with no follow-up input or maintenance investment, the facilities in some stations are aged and cannot function properly for lack of updating and systematic care. Although some village-level information service centers have computers and printers, they still cannot provide effective service because they cannot afford the Internet tariff. Overall, it is very difficult to ensure the regular functioning of information service providers at all levels.

9. Key issues and conclusions

Based on the findings from this updated case study, the following eight issues should be carefully studied and resolved in order to provide good rural information service.

9.1 The role of government

Agriculture maintains a special importance in China, considering the impact that the food security of 1.3 billion people has on the country's socio-economic stability. Information service is a crucial mechanism for the further development of agriculture and the rural economy. The case study researchers found that the understanding, attention and support from the government at all levels and its leading and guiding roles have formed the foundation for the success of the rural information service. Going forward, the analysts involved with the study recommend:

- Continue the good job of top-level design and environment development, including focusing on theory and strategy analysis, enacting relevant laws and regulations and formulating new policies. This includes further strengthening the relevant functional departments, improving the working conditions and tools and introducing performance evaluation indicators.
- Increase financial inputs to strengthen infrastructure construction and then extend the information highway.
- Improve public service, improve the quality of government web sites, open government affairs to the public, conduct on-line administration and on-line interactive service, build more public databases and improve the sharing of information and knowledge.
- Reduce the government's direct involvement in service programmes and shift that responsibility more to the business sector and market intermediaries or outsource them through bidding.
- Support the market-based service activities that are in need of making a profit, even meagre profits, by providing tax rebates or reducing loan interest rates.
- Encourage a platform for enterprises to increase their participation. In addition to increasing fiscal support, the government should promulgate relevant policies and reduce or exempt network channel expenses and the communication and Internet tariffs for rural information service organizations and farmers. Additionally, provide free or favourable media support for the distribution of agricultural information, and provide subsidies or favourable tax treatments in line with World Trade Organization policies for agricultural information service entities.
- Support rural specialized associations and specialized farmers' cooperatives.

9.2 NGO participation

Non-government organizations mainly refer to those groups that function in between government and private enterprises. NGOs are unofficial, non-profit, autonomous and voluntary organizations, which have a constructive role in the world, especially in industrialized countries. After China's reform and opening up, there are more and more agricultural NGOs, such as societies, research institutes, foundations, federations, industry associations, technical associations and economic cooperatives. They are making a positive contribution in applying information technology and promoting the rural information service. There is room and need for greater NGO contributions to the growth of the rural information service; for example, they can be incorporated into the development programme and provide policy and financial support.

9.3 Greater enterprise participation to meet market demand

There is vast market potential for the rural information service. Many enterprises engaged in the distribution of information have mature technologies and products as well as solid financial strength, but there is a need to expand the number of users of their services. Currently, there is great potential for rural information services – both general and customized, and many enterprises are looking to expand their coverage. The key is to make an effective link between supply and demand. There is need for in-depth analysis of users' demands to find useful information for them. Then meticulous preparations should be made to provide customized services at a profit.

9.4 Farmers' contribution to information service development

Although farmers are the targeted beneficiaries of the rural information service, they also can propel its further development. To exploit their contribution, there is a need to expand publicity activities and trainings to improve farmers' awareness of and capacity for using the information service. Gathering feedback and suggestions from farmer users should be heavily stepped up. There is also need to improve farmers' purchasing power so they can afford the Internet fees and other services; the government could encourage farmers to use information technology or information technology products by offering a preferential Internet access fee and/or a subsidy for purchasing a computer. The increased development of the rural information service likely will contribute to a rise in productivity, income and purchasing power, which will in turn help strengthen the expansion and evolution of the information service.

9.5 Strengthening delivery

Generally speaking, there are three categories of information service in rural China. The first is the public interest type in which the service is supported by government funding, such as what the Service Station and the Farmers' Home rely upon. As the economy keeps growing, the Government should consistently increase its investment in this type of service to ensure farmers' access to basic information, such as macro policies, market analysis and forecasts, farming knowledge and know-how. The second type is the public-private partnership in which the government and enterprises utilize government subsidies and fee charges that are lower than the market price, which enables farmers to enjoy professional information service at a nominal price. It has a relatively flexible and adaptable operating mechanism because it taps the complementary advantages of both parties. The third type is the commercial venture in which the dominating investors are enterprises that cover all the costs, such as those related to information sourcing and service delivery. Its service is targeted, professional, technically demanding and directly linked to business returns. Although somewhat successful, this type of service is still limited in number and experiencing many difficulties, mainly because the market for information service in rural China is still at an initial and immature stage. In the longer term, it will likely thrive because it has a strong driving force behind it.

In general, the three models complement one another; all of them have important roles and thus deserve continued government support.

9.6 Strengthening service delivery teams

The service delivery teams include staff employed in the information service centers. The staff number should be increased, and trainings are needed to improve their capacity and skills to deliver good service, which includes building their capacity to collect targeted information, for processing and analysis, for mastering knowledge and application skills and in how to assist farmers to obtain authentic, reliable and useful information. Public outreach to farmers and trainings for them should be stepped up to improve their technical capacity, their awareness of IT applications and their ability to use the information service.

9.7 Increasing information service sources

This case study found that information sources are not fully tapped. Useful information is insufficient. Some information is not well targeted and some of it lags in timeliness. More effort is needed to address these shortcomings. First, there is a need to develop local information sources. More attention should be given to this issue in the future, such as source information related to local leading farm products, specialty products and competitive products, tour activities and village history and culture as well as the economic and social development of a specific area. Such a “walking encyclopaedia” will facilitate publicity, attract investment and promote collaborations. Second, there is a need to integrate Internet resources, information resources and human resources from different sectors to form a synergized force to work for the rural information service. Third, there is a need to make the information more targeted and effective by improving the agricultural market analysis and forecasts and building up information sources related to science, technology, policy and meteorology.

9.8 Improving information service tools

Due to the infrastructure differences between urban and rural areas and between the eastern, middle and western regions of the country, the central Government investment should favour rural areas and particularly those in the middle and western regions to improve the cyber infrastructure. Regarding the information service for farmers, the case study analysis concludes that it is better to make full use of the present conditions and continue to use such traditional information dissemination as television, radio, newspapers, periodicals, briefing notes, CD-ROMs, blackboards, bulletin boards, etc., to broaden the coverage and guarantee a prompt and effective information delivery. In addition, currently and in the future, special attention should be paid to mobile phone messaging (including multimedia and voice messages) as a tool of service delivery. Mobile phones are widely used in rural areas throughout the country, and the message charge is rather low. Compared with other media, mobile phone service has many advantages, such as real time, cluster oriented and low cost, which accommodates rural use requirements for a service that is prompt, targeted and locally specific. It is the most effective terminal instrument that may solve the problem of “the last mile of connectivity” of information. As well, Internet-based information delivery should also be emphasized.

Annex 1: Schedule of the field survey

Date	Surveyed sites	Researchers
18-19 September 2009	Hongta District, Yunnan Province	Han Fujun Rao Xiaoyan
19-22 October 2009	Nanchuan District, Chongqing Municipality	Zhang Kuilin Yang Shuo
21-22 October 2009	Lanxi City, Zhejiang Province	Zhong Yongling Liu Han Li Tingting
23-24 October 2009	Jinyun County, Zhejiang Province	
27-30 October 2009	Litong District, Wuzhong City, Ningxia Hui Autonomous Region	Zhang Kuilin Cong Lin
3-6 November 2009	Fuyu County, Jilin Province	Zhang Kuilin Cong Lin
9-10 November 2009	Shucheng County, Anhui Province	Zhong Yongling Yan Donghao Li Tingting
10-11 November 2009	Wuhu County, Anhui Province	

Annex 2: Researchers and organizers

Contributors to this case study report

Group	Name	Employer	Position	Job description
Members of the research team	Michael Riggs	FAO	Knowledge and Information Management Officer	Guidance and review of the final report
	Gerard Sylvester	FAO, Regional Office for Asia and the Pacific	Knowledge and Information Management Officer	Review and editing of the final report
	Guo Zuoyu	Information Center, MOA	Director General	Head of research team, chief executive of the survey and chief editor of report
	Zhang Kuilin	Division of Network Operation, Information Center, MOA	Director	Vice head for organization of the survey and writing of general report and subreport
	Zhong Yongling	Division of Information Analysis, Information Center, MOA	Director	Vice head for organization of the survey and writing of general report
	Han Fujun	Division of Application and Extension, Information Center, MOA	Director	Vice head for organization of the survey and writing of general report
	Rao Xiaoyan	Division of Software Development, Information Center, MOA	Engineer	Secretary for assisting the survey and writing of the subreport
	Yang Shuo	Division of Application and Extension, Information Center, MOA	Engineer	Assisting the survey and writing of the subreport
	Xu Jianan	Division of Application and Extension, Information Center, MOA	Engineer	Assisting the survey
	Liu Han	Division of Information Analysis, Information Center, MOA	Cadre	Assisting the survey and writing of the subreport
	Li Tingting	Division of Application and Extension, Information Center, MOA	Cadre	Translator for liaison of China and the overseas, assisting the survey and writing of subreports
	Yan Donghao	Division of Network Operation, Information Center, MOA	Cadre	Assisting the survey and writing of general report and subreport
	Cong Lin	Division of Network Operation, Information Center, MOA	Cadre	Assisting the survey and writing of subreport

Annex 2: *(continued)*

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Annex 2: *(continued)*

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Annex 2: *(continued)*

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