Application Model of New Agricultural Hotline Sci-tech Information Service System in Beijing

CAO Cheng-zhong[1]*, ZHANG Jun-feng[1], WANG Zheng[2], LUO Chang-shou[1], GENG Dong-mei[3]

1. Institute of Agricultural Science and Technology Information，Beijing Academy of Agriculture and Forestry Sciences，Beijing 100097，China；
2. Rural Development Centre，Beijing Science and Technology Commission，Beijing 100097，China；3. Research Management Office，Beijing Academy of Agriculture and Forestry Sciences，Beijing 100097，China

Abstract   To further promote information construction in rural areas and popularize agricultural information service，we introduced the content of new agricultural hotline sci-tech information service system construction，summed up application effect of the system，analyzed advantages and existing problems in the system development，and put forward countermeasures for its further development.
Key words   Agriculture，Hotline service system，Information，Model

As a kind of rural information service system based on telephone communication network，the Voice Information Service System uses text-to-speech（TTS）technology to automatically convert text information into speech，then the user can hear the information. In 2001，Beijing Academy of Agriculture and Forestry Sciences built the Agricultural Technology Hotline 110 Information Service System. Nevertheless，due to its shortages such as bad simulation effect and operating mechanism，in 2008，China Ministry of Science and Technology asked，the whole country to upgrade the original 110 system and establish "12396 Spark Sci-tech Hotline". Taking this opportunity，Beijing built "12396 New Rural Sci-tech Service Hotline". On this basis，it set up new agricultural hotline sci-tech information service system that has advanced technology，perfect functions，flexible mechanism，and high-efficient service. To further promote information construction in rural areas and popularize agricultural information service，we analyzed application model of new agricultural hotline sci-tech information service system，in the hope of providing reference for perfecting working mechanism of rural sci-tech information service and improving the service effectiveness.

1   Content of new agricultural hotline sci-tech information service system construction

The new agricultural hotline sci-tech information service system is based on Agricultural Technology Hotline 110 Information Service System，and is the upgrade of Beijing 12396 new rural sci-tech service hotline system. On the basis of system construction，it specially built information resource for services，formed expert team，and actively made exploration in mechanism and system，to gradually perfect this information service system.

1.1   Establishing multi-channel convenient and swift sci-tech information service and agricultural technological popularization platform   Based on service-oriented architecture（SOA），the system rebuilt interactive voice response（IVR）management system to improve service ability. On the basis of this，it integrates automatic voice service，expert contact service，two-way video diagnostic system，mobile phone message inquiry，on-line inquiry services，and builds agricultural hotline centered sci-tech interactive service platform.

1.2   Setting up agricultural sci-tech information resource center suitable for farmers   In the construction of service information resource，it is mainly oriented towards development demand of Beijing suburban agriculture. It has set up backstage resource banks，such as voice data base，network information service data base，mobile phone customized information base and frequently asked question（FAQ）from agricultural sci-tech information，market information，policy and regulation information，and rural common sense of life，making sci-tech service satisfy multi-level and diversified demand of users.

1. 3   Forming readily available expert service team for farmers   In service expert team building，Beijing Academy of Agriculture and Forestry Sciences，through uniform organization and coordination，formed expert service team，including 20 resident experts and 68 mobile experts，ensuring 3 to 4 experts available daily. Experts were selected in consideration of both professional level and practical ability in guiding production.

1.4   Building service system to form unique channel for promoting conversion of agricultural sci-tech achievements   As to construction of service system，it has built new agricultural hotline sci-tech information service system that takes scientific research institutions as major subjects，is orien-

ted towards satisfying diversified demand of grass-roots farmers, effectively combines advantages of modern information technology and intellectual resource of experts, and joint participation of grass-roots production and operating organizations and public service organizations. Through active exploration and cooperation with grass-roots sci-tech service, the service system has been popularized in the existing information service stations of digital family, i-nong stations, and distance education accepting station, and has established over 110 standardized video service terminal stations in Beijing suburban districts (counties) with one set of computer, one piece of headset, one camera, one terminal system, and one full-time information assistant. The new system has converted over 40 new agricultural types and technological achievements, and propagated more than 100 kinds of practical technologies.

2 Application effect of new agricultural hotline sci-tech information service system in Beijing

2.1 Popularization and application of the service system

The agricultural hotline sci-tech information service system has been applied in 13 Beijing suburban districts (counties), popularized in over 200 digital families, 500 i-nong stations and 430 distance education accepting stations of the whole city. Besides, it has established more than 110 video service terminal stations in Beijing suburbs. In Daxing, Tongzhou, Miyun districts or counties, rural residents can skillfully use the 12396 hotline, to obtain required sci-tech information service. The system has not only covered users in all Beijing suburbs, but also radiated to 16 provinces (cities) and autonomous regions, including Hebei, Hunan, Guangxi, Jiangxi, Guizhou, and Fujian.

2.2 Service effect of the service system

Statistical results indicate that, since the system has been applied and popularized, it has always taken agricultural hotline service as major parts, provided over one million person-times of various agricultural information consultation, including over 60% about planting and cultivation technology and new varieties, 20% about agricultural policies and sci-tech information, and 20% about price of agricultural products. It served over 100 000 person-times through automatic voice information telephone; it directly answered more than 1 100 questions through artificial and expert telephone and on-site diagnosis; it provided network information service for one million person-times; it sent 50 000 pieces of mobile short messages; it solved 600 problems through expert two-way video consultation diagnosis; it directly organized experts to carry out technical training over 1 000 person-times in grass-roots, and the stations extended farmer training over 20 000 person-times; it promoted the agricultural transformation of new varieties and new sci-tech achievements more than 40, and propagated over 100 types of practical technologies; and it greatly pushed forward increase of Beijing suburban farmers and deepening of new socialist countryside construction.

3 Application model of new agricultural hotline sci-tech information service system in Beijing

The new agricultural hotline sci-tech information service system is based on 12396 agricultural hotline service, integrates Beijing i-nong stations, resource stations, and coordinator workstation, focuses on setting up urban-rural integral sci-tech service platform, builds rural public sci-tech service system, and establishes characteristic innovation service model, and promotes further play of hotline service functions.

3.1 Forming sci-tech resources with the aid of service port

The rural sci-tech service port is rural sci-tech service platform energetically built by Beijing to promote radiation of municipal level sci-tech resources to rural areas. At present, the whole city has formed municipal level service port and resource station, district level coordinator administrative station, township level sci-tech popularization station and coordinator workstation, and village level rural sci-tech coordinator station. With the aid of telephone, computer and video and other information-based services, 12396 hotline plays an active role in combining "service port, station and coordinator". Relying on 24 municipal level resource stations, 404 coordinator stations, and 10 000 rural sci-tech coordinators, through service port districts (ports), townships and village level workstations, it has set up all levels of terminal service platform of agricultural hotline, and becomes a main force of promoting sci-tech service in rural areas.

3.2 Building rural public sci-tech information service system with 12396 hotline platform as major part

Based on agricultural hotline service, this system integrates many types of resources, such as science and technology, information and experts, solves problems through voice, video diagnosis, mobile short message, and on-line question answering, and provides farmers with consultation service and expert video diagnosis service of new varieties, new technologies, agricultural production market information, agricultural production technology, agricultural policies and regulations, as well as rural common sense of life, all of which set up public sci-tech information service platform in rural areas. In addition, it constantly explores new development ideas and service space, integrates i-nong stations and coordinator workstation resource, to assist development of agriculture-related enterprises; it provides citizens with characteristic suburban agricultural products, handicrafts, characteristic tourism, and vacation information services. Through cooperation with i-nong card, it has set up production, inspection, tracing and delivery service system of green agricultural products from farmland to citizen families. In combination with agricultural material enterprises, it has built fine seed variety popularization and operating network in suburbs, established long-effective mechanism for updating agricultural varieties, and set up urban-rural integrated sci-tech service platform.

3.3 Perfecting rural sci-tech training service system relying on spark training network

Actively relying on training network, such as spark training base, i-nong station, distance

education station, and coordinator workstation, it integrates urban-rural sci-tech resources, and establishes a team of rural sci-tech training teachers with sci-tech popularization experts, local experts and sci-tech coordinators. It perfects the spark sci-tech training system, and makes training plan on the principle of "township layout, distribution according to need, and receiving training by classification". It is aimed to improve farmers' ability of exploiting market, and oriented towards training information assistants, agricultural product brokers. It carried out rural sci-tech "setter" training, to constantly improve quality of rural sci-tech service personnel, and build a high quality rural sci-tech service personnel team.

3.4　Promoting combination of scientific research institutions and government work in cooperation with innovative township construction　For construction and application of new agricultural hotline sci-tech service system, scientific research institutions should closely cooperate with government, and sci-tech service combines fully with grass-roots work, especially the combination with construction of innovative townships, to promote application and popularization of local science and technology, and give impetus to economic development. Through training and drive activities of hotline, it organized those farmers who have operating mind and technical foundation to start undertaking of science and technology, so as to promote flow of production and operating factors, such as science and technology, personnel, information and management, to rural areas. Gradually, it explores the agricultural popularization professor system in innovative townships, attracts scientific research institutions and scientific and technological personnel at colleges and universities to participate in joint construction of agricultural technological popularization center.

3.5　Exploring service model of legal person as special commissioner in science and technology based on construction of agricultural sci-tech city　Focusing on construction of agricultural sci-tech city, it pushed forward leading agricultural enterprises centered legal person as special commissioner service system. Besides, relying on existing service promotion foundation of Beijing suburban legal person as special commissioner, it lifted its role in high end agricultural product research and development, industrial chain promotion, and construction of service system. It won priority in projects of tackling key scientific and technical problems, conversion of scientific and technological achievements, and spark demonstration, etc. It encouraged legal person as special commissioner to carry out technological innovation, promote conversion of achievements of scientific research institutions, and improve high-end research and development level of legal person as special commissioner. Through strengthening propagation and introduction of scientific and technological achievements, a lot of practical technologies were popularized, a batch of characteristic industry was expanded, which promotes development of agricultural industrial chain. Through setting up model of legal person as special commissioner, it improved technical radiation driven capability, and built the agricultural industrial service system that has achievement, chain and team.

4　Strength and weakness of Beijing new agricultural hotline sci-tech information service system and development suggestions

Based on combination of scientific and technological service of sci-tech research institutions with government work, this new agricultural hotline sci-tech information service system initiated new approaches and methods, and can be regarded as new measure for promoting sci-tech service in rural areas. However, there are also limiting factors in the course of its development.

4.1　Strength in development　The strength in development is mainly shown in following aspects.

（ⅰ）Integration of sci-tech achievements. Since the hotline gathers experts, resources and achievements of every discipline of Beijing Academy of Agriculture and Forestry Sciences, and it grasps the latest sci-tech achievements, it is able to realize integrated popularization of agricultural sci-tech achievements, and promote conversion of sci-tech achievements.

（ⅱ）Aggregation of resources. Under guidance of government sectors, participation of scientific research institutions, the aggregation of resources of municipal level, district and county level and grass-roots sci-tech service departments realizes the effect of "1 + 1 > 2", saving construction cost and operating expenditure for rural information service system.

（ⅲ）Group promotion. The hotline service promotes base construction. It focuses on service oriented towards vegetables and fruits. Through group promotion, after a type of technology is used by one household or several households, other production households will imitate, and then this technology will be rapidly spread to all production households in the entire base.

（ⅳ）Innovation application. The innovation of service system is based on technical support of modern information network. With the aid of the innovation, users can obtain swift, cheap and high quality service. Besides, users not only can obtain technical services that have rich content and broad coverage, but also can obtain information of trade, industrial and agricultural chain, as well as can expand industrial development space.

（ⅴ）Work complementation. The hotline service system can bring into full play resource, personnel and technology advantages of government and scientific research institutions, so it expands service functions and improves service effect.

4.2　Limiting factors　The construction and application of Beijing new agricultural hotline sci-tech information service system are based on work innovation of government work. Although it has produced positive effect in the process of practice, there are still many potential problems that could not be neglected. Problems are mainly as follows:

（ⅰ）Long-effective mechanism of operation and maintenance of the system management. The new agricultural hotline sci-tech information service system is an innovative system

generated in the course of application of rural information technology. In the early days of China's foundation, its funds were mainly supported by government project. It completed platform construction, expert team and resource construction. Nevertheless, as public service, the hotline service could not make profit, so the long-effective mechanism becomes limiting bottleneck of system development.

（ii）Construction of expert team. Expert resource is an important part of this service system, therefore keeping constant supplement and growth of expert team is an important factor for constant development and improvement of this service system. It is required to keep continuity and stability of expert team construction, but not influence normal promotion of expert sci-tech personnel. In addition, funds for their consultation service should be guaranteed.

（iii）Development of service system network. Another important limiting factor of service system construction is the system network. This system is formed through linkage of works, in grass-roots areas, especially townships and villages, it mainly depends on service stations of construction organizations and related personnel engaged in agricultural sci-tech service in government sectors, therefore, the connection is relatively loose, it lacks systematic guarantee, and works are often passive.

4. 3　Development suggestions　The government should provide certain policy, fund and work support from long term objective of improving rural sci-tech supply and demand situations, to promote this system to make greater contributions to rural socio-economic development.

（i）It is proposed to incorporate this system into municipal level financial budget to provide special support. The construction of rural sci-tech information service system is a systematic work. It can not be build overnight. The new agricultural hotline sci-tech information service belongs to quasi-public service, so its funds should be assumed by the public finance. Otherwise, it is difficult to survival. In this situation, it should be incorporated into municipal level financial budget, to have a long term operation and provide longer and more benefits for farmers.

（ii）It is recommended to establish expert selection mechanism. The existing system is based on experts from professional research institutions of Beijing Academy of Agriculture and Forestry Sciences. From the point of long term development, it is required to expand technical background and source of experts, particularly those first-line experts who have rich practical experience. On the basis of cooperative works, it is proposed to get in touch with technical experts of relevant agricultural and forestry departments, colleges and universities and scientific research institutions at municipal level, and encourage them to participate in construction of the system.

（iii）It is suggested to encourage various circles of society to actively participate in construction of the system, and innovate upon service network. The construction and innovation of rural new sci-tech information service system are connection of information-based development of agriculture and current urban and rural integrated development of local economy. To make

the system development construction in a healthy way, the service of system construction is the key point. Currently, it is required to encourage various circles of society to actively participate in construction and service of rural sci-tech information service system.

（iv）It is proposed to improve application feedback mechanism to improve service quality. Satisfying demand, perfecting feedback, constantly improving service and promoting sustainable development are basic requirements for keeping vitality of new rural sci-tech information service system. In this situation, the stress of new rural sci-tech information service system construction should be placed on construction of application effect feedback mechanism. In particular, it should focus on how to carry out service according to demands, solve urgent problems of farmers.

5　Conclusions

The rural information construction is a long-term public service. It not only requires support of advanced information technology, but also requires in-depth exploration of the state in basic trend of socio-economic development, operating model and mechanism. This is of great significance to implementing rural sci-tech information service and providing agriculture, countryside and farmers with real benefits. The construction and application of Beijing new agricultural hotline sci-tech information service system provide new idea and exploration for combination of information-based construction in rural areas and rural sci-tech information service.

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