NEW HORIZONS IN AGRICULTURAL INFORMATION MANAGEMENT

PROCEEDINGS OF AN INTERNATIONAL SYMPOSIUM

MARCH 13-16, 1991

BEIJING, CHINA
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New Horizons in Agricultural Information Management

Proceedings of an International Symposium,
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Gary K. McConce
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Some Ideas on the Tendencies of Information Services by the Regional Information Agencies of Agricultural Science and Technology

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Abstract
For most local and regional information agencies of agricultural science and technology, their activities ought to avoid only serving scientific research, and their emphasis ought to lean toward technological information services, so as to provide agrotechnical information services to rural areas, farmers, and personnel and agencies of agrotechnical instruction. Based on some actual situations in Sichuan Province, the most populous province of China, some strategies are pointed out in the field of technological information services.

1. The services of local and regional information agencies of agricultural science and technology in China

The focus of information service has been directed toward scientific research in agriculture for a long period of time. When investigating the present situation of most regional information authorities for agricultural science and technology, the following objective realities were easy to discover: no information authority in agricultural science and technology can escape its major role of serving scientific research, and most of them agree that information in agricultural science and technology is aimed at serving both scientific research and also the strategic decision-making of China's leaders. Although most of them recognize the important role of providing technological information services to promote agricultural production and the development of the rural economy, they appear weak and ineffective in providing these services due to the limitations of the fundamental premise that information authorities should serve scientific research, etc. Many facts such as those described below may be seen: many information users, especially rural users and farmers experience an information deficiency over a long period of time even though many references are collected by the information agencies year after year, and many highly skilled personnel work hard to collect, sort and report the references, however, the capabilities of the information services have not been fully realized, and its status and role has not been recognized and given attention by society. Most achievements in agricultural study cannot be utilized even if they were to emerge in an endless stream. All of these show, to a great degree, that the technological intelligence service is very weak and there is a great difference between the need for economic construction and the present key services of the information agencies. From this point of view, we may observe that this situation
is imperilling the existing value of local and regional intelligence agencies in agricultural science and technology.

In recent years, some information agencies of agricultural science and technology have explored the content and methods of information transmission and its utilization based on the needs of agricultural production and rural economic development in their own regions. Meanwhile, significant social and economic effects have been felt in services to support agricultural scientific research. We see that aspects of the gradually formed focal points of reference collection and provision, the structure of fundamental work and staffing, as well as the general features of information authorities, indicate that the function of information is mainly to serve scientific research.

Nowadays, almost all collected data in information agencies of agricultural science and technology are references in the field of agricultural science and technology, and the patents, samples and data of actual techniques are very deficient. Even the amount of agricultural science and technology periodicals, which are the most important transmission tools in China, is less than that of other countries. For example, the percentage of periodicals in science and technology as a whole is 19% in developed countries, 20% in India but only 11.6% in China.

For a rather long time, the guiding thought of the periodicals has been to include articles that reflect research. Most of the articles are reports of research and experiments and very few of them are articles on technical applications. This situation has been much improved in recent years. However, when compared with the same sort of periodicals in other countries, there is a considerable gap. The difference in utilization of the information in different regions is very obvious due to the influence of poor communications and postal conditions, as well as because most of the periodicals are bimonthly. From the point of view of serving scientific research there do exist problems of insufficient and excessive function, but from the point of view of services to share techniques, the problem of insufficient function is very serious. According to an investigation and analysis by the Sichuan Information Institute of Science and Technology on the distribution of foreign language journals in 21 reference collections in Sichuan province, foreign language periodicals are very costly and have a large volume, however the utilization ratio is rather low. Based on statistics for 2.5 years, almost nobody reads nearly 40% of the foreign journals in agriculture, this indicates the significant excessive function of the information. On the other hand, 45.53% of prized achievements can't be retrieved in foreign language journals and this reaches 58.4% for computer indexing. The same situation can be seen in foreign agricultural periodicals in the Sichuan Academy of Agricultural Science Library.

In the field of collected Chinese references in agricultural science and technology, the main role of the information is to address subjects and to serve as resources for scientific research. The applied technical references and data in this area are also very poor.

Most staff members of the agricultural science and technology information agencies come from colleges and universities of foreign languages or agriculture. They lack
systematic theoretical learning in information science and lack actual experience in providing information services. They tend to show a preference for providing learned services for scientific research. Therefore, those members who are good at technical information services are insufficient. Thus a staff mind-set that coincides with serving scientific research has been created. In its organizational structure it also shows features of specializing in serving scientific research. The aim of many information authorities is to meet the need of scientific research. Relevant organizations have been set up to provide services in specialized subject areas and identifying foreign language references for scientific research. For a rather long time, however, almost no sectors have especially served the technical information developments in most intelligence agencies. Even in the most recent year’s plan and implementation of database construction, the tendency to mainly serve scientific research can also be seen, a fundamental approach that regards references as being superior to data is formed.

In addition, there exists a problem in that the establishment and distribution of local information agencies of agricultural science and technology are felt to be the same as administrative sections. If the overall functions of information agencies are subordinated to administrative sections and scientific authorities, naturally, they will pay a price for sacrificing the superior constitution of information circulation of agricultural science and technology. This violates a principle of net structure with more plots and fewer intermediate agencies in the utilization rule of information circulation, and it also runs counter to the special need for technical information at different ecological areas.

Some information agencies belong to administration, while some are administered by scientific sectors, thus each agency becomes a complete unit, and each does things in its own way. In this situation, it is very difficult to share information sources with each other, to exchange information with each other, and to cooperate in a broad way. Many agencies duplicate work of other agencies, and the whole information system is just like a "mixture of individual information units."

Why have the service focal points of information agencies of agricultural science and technology been inclined to scientific research for a long period? Generally speaking, there may be the following reasons:

First, China's agricultural science and technology information work develops from agricultural scientific research agencies and their management. Naturally, the information work is closely connected with scientific research either in the basic work, or in the constitution of staff members. Scientific research sectors are in an advantageous position in utilizing the advances of science and technology owing to their being the sectors that concentrate qualified persons and knowledge. They play a role in improving the formation of the approach to "face scientific research."

Second, due to the influence of the scientific and technological system of the Soviet Union introduced at the beginning of the 1950s, a serious disadvantage in China’s system is the idea of regarding scientific research as superior to the spread of research
results, and that scientific research and production have systems of their own. The problem that reflects on the service of information of science and technology is that it mainly serves the areas of the scientific research but weakens the transmission of technical information.

Third, people are biased against the role of scientific and technical information because of a wavering in the guiding thought of economic construction in China over a rather long term. Almost all the local information agencies lack either enough motive force to improve their technical service, or the power to serve the rural areas and farmers and spread technical information, due to the inhibition of some factors, such as information consciousness, information acceptability and the conditions of rural dwellers and farmers who are the main users of technical information. Therefore, these agencies have to provide information service for scientific research only.

2. Local and regional agricultural production and rural economic development should demand that the information sectors of agricultural science and technology focus their efforts on technical information services to the rural areas, farmers and the popularizing of agricultural techniques.

Worldwide, information services have come to a stage of development where they are being aimed at special problems. How to further increase agricultural production and labor productivity are the major problems facing China as a developing country. Therefore, providing the large amounts of timely technical information services that are needed for increased regional agricultural production and rural economic development are the key points for most local information services in agricultural science and technology. Especially in the case of the powerful voice of vigorously developing agriculture depending upon science and technology, the agricultural science and technology information service should fully play its functional role as an important foundation and as a "bridge" for spreading agricultural science and technology and popularizing knowledge of science and technology. Based on the needs of agricultural production and economic development, technical information in agricultural science and technology ought to play an important role in at least the following three aspects:

a. Promoting the spread and utilization of research achievements in agricultural science. According to statistics by sectors concerned, about 7,000 research results per year may be achieved by Chinese scientific and technological workers. In recent years about 30-40% of them, however, may not have been utilized, parts of the achievements have been spread but have achieved little. For example, the production of hybrid rice which was initiated in China is 750kg/ha higher than conventional varieties, however, of 32 million ha of rice fields, the planted area of hybrid rice is only 42%. The plastic membrane technique, which is praised as a "white revolution," may increase the crop's output 30-50%, even above 100% if it is used in the crops' cultivation. But the it is widely used in over several million hectares in the whole country. For a lot of scientific research achievements, not only the farmers, but also the information specialists do not know enough, so how can they claim to provide an effective transmission service?!
b. Providing technological services for rural areas, farmers and non-agricultural industries. After ten years’ reformation and opening policy in China, a single industrial structure of rural life which lasted many centuries has been broken, a new style industrial structure composed of three parts, i.e., plantation industries, agriculture including forestry, animal husbandry and fishery, and non-agricultural industries including village and urban enterprises, commerce, architectural industry and service industry has been formed. Among them, the development of village and urban enterprises which are the main components of non-agricultural industries is rather rapid. Up to 1988, the total output value of village and urban enterprises in the whole country was 449.6 billion yuan over that of agriculture. This variation of industrial structure provides a great possibility for fully and reasonably utilizing resources to create a rural economy with high efficiency and a fine ecological circle, for changing the situation of 800 million farmers who work for a living, for carrying forward the advantages of Chinese traditional agricultural, for using modern science and technology and for combining both concentrated styles of labor and technology. Similarly, this variation is also a vast opportunity for enlarging the service domain, extending the service content, and enhancing the information function of information agencies of agricultural science and technology, it also provides an opportunity for transferring the focal points of services. At the moment, the local information agencies of agricultural science and technology still look rather weak in providing technological information services to the main agricultural, village and urban enterprises.

c. Popularizing scientific and technological knowledge to raise the farmers’ cultural level. Eight hundred million farmers live in rural areas among 1.1 billion Chinese people. This basic condition in China demands that all the agricultural sectors including the sectors of management, scientific research popularization and information services must change their fundamental foothold and key points to rural areas. On the other hand, the fact that in the Chinese countryside the small-scale peasant economy is the major part of the agricultural economy, that the farmer’s educational level is very low, and that their productivity is particularly low, must be fully taken into consideration. All these indicate that not only is it a complex social problem to let millions and millions of farmers take a socialist road with China's own features and to reach the aim of common wealth, but also these increase a lot of difficulties for the popularization and application of science and technology, and for information transmission services. Especially in the rural areas liberated early, minor nationalities areas, border and poverty areas where it is inconvenient to travel, poor in economy and backward in culture, it is rather difficult to achieve a great improvement in accepting and utilizing advanced science, technology and information in the short term. These increase the degree of difficulty for information services. The information agencies of agriculture are responsible for improving the transformation of the above unfavorable factors, as well as for making a contribution to improve the information service conditions and to accelerate the development of the economy, by combining with educational services, etc.
3. Conclusion and countermeasures

Based on the above analysis, the authors consider that, for most local and regional information agencies of agricultural science and technology, it is necessary to pay great attention to providing technological information services and popularized units of agricultural technology for the rural areas and farmers so that they define their own true value rather than try to scale the heights of technological services.

According to the actual situation in Sichuan province which has the most population in China, the following are the authors’ opinions concerning some problems of information services for the local information units of agricultural science and technology.

a. Enhancing the coordination and management of scientific and technological information work.

Taking into consideration that, at present, both the information services of science and technology and the general information situation are very weak. The information products of China have not been controlled by the market. And for a long time, the weak administrative control of the government over information work has not been useful for the construction of information channels and their rapid development. Therefore, it is necessary to develop a powerful instructive administrative management scheme science and technology information over a rather long period. Thus, our suggestions: i. Changing the present state of "two units one leading group," i.e., both the bureaux of scientific and technological information and their corresponding synthetic information institutes of science and technology are led by the same leading group respectively, and setting up the bureaux of information directly led by different levels of the government or establishing special supervisory agencies of scientific and technological information directly led by different level committees of science and technology. ii. Formulating legal, economic and other relevant laws and regulations through the state legislative body and the government to ensure that information services can be provided smoothly. iii. To meet the needs of the development of the economy and information channel on its own, it is necessary to work out feasible and administratively binding programmes in some important areas, such as setting up the information agencies, establishing goals, constructing databases, and the collating and collecting the references.

b. Reasonably distributing the local information agencies of agricultural science and technology.

At the provincial level academies of agricultural sciences, the present information research agencies should be maintained, their main task may be as follows: providing academic information for agricultural scientific research, providing information services for the leader's policy-making, collecting and transmitting important technological information from in-country and abroad which is concerned with the agriculture of its own province. Setting up an agrotechnical information service agency which is attached to the provincial department of agriculture and animal husbandry, its main
task should be, according to different areas and ecological conditions, to collect and disseminate information concerning technical agricultural achievements and new technology to the basic level information units and to collect and provide information concerning processing techniques of agricultural products, the manufacturing techniques of new products and the market economy.

Setting up the regional information agencies of agricultural technology with regional characteristics in some typical and representative ecological areas. These may be established at the same site as agricultural scientific research organizations depending on the distribution of these organizations.

Setting up and enhancing county level information development and advisory service units of agricultural technology. The following two methods may be considered. One is to set up a common agency including the information unit and the agrotechnical advisory service centre to provide common services. Another is to combine the information unit with the county level committee on science and technology, the association of science and technology, broadcast station or library, founding a county level synthetic information service centre of agricultural science and technology. Its task is, according to the characteristics of its own county and the need for economic development, to directly provide the concerned technological and economic information to the basal level service stations of agricultural technology, scientific popularization stations and farmers, to train the technicians at basal level, and to develop advisory services.

c. Selecting suitable technical measures in line with local conditions.

Based on the situation in Sichuan province, which is a large inland province located on the upper reaches of the Yangtze River. Sichuan is a big granary in the western part of China due to its superior natural conditions and bumper resources. It is also one of China's four forest zones, one of its four medicinal materials zones, and simultaneously, one of the five pastoral zones. The total output of many products of farming and side-line production are at the first rank of whole country. Exploiting Sichuan province will play an active role in promoting China to participate with international economic competitiveness. This gives a very arduous task to the Sichuan provincial information agencies of agricultural science and technology in strengthening the transmission service of technological information. However, the following facts must be seen: the population in Sichuan province is nearly 110 million, among this the rural population is about 90 million, and the proportion of illiteracy and semi-illiteracy is considerably high. About 70% of the farmers in Sichuan do not know new techniques. The average number of scientific workers per ten thousand agricultural population is only 0.34, and 2.59 technological extension personnel. In this case, the local information agencies of agricultural science and technology have the problem of how to select a suitable method of transmitting the technological information. According to our investigation and practice in recent years, at present, the regional information agencies ought to select those technological transmission measures that are rapid, audio-visual, imaginative, correct, lively, easy to be learned and that cover a large area. The broadcast stations, wired broadcast stations and TV stations have been built up in most places, and they
have developed very fast in Sichuan province. Excepting the provincial TV station, sixteen relay stations with a launching power above 1 Kw, and more than 1,000 stations below 1 Kw have been installed in different regions, cities and autonomous prefectures. The area of TV broadcast coverage is over 80% of the standard population in the whole Sichuan province. Most TV stations at the level of regions, cities and autonomous prefectures have their own TV programmes. At district, county and town levels, video projection plots have been set up. Up to 1987, the Sichuan Academy of Agricultural Sciences had accumulated 426 scientific research achievements. If the regional information agencies of agricultural science and technology make them into video tapes and imaginatively show them to the farmers, the deficiency of low educational level for most farmers and the farmers’ reluctance to accept the agricultural technological information transmitted by the journals may be overcome, enabling the agricultural technological information to be spread to the farmers rapidly and effectively. In Sichuan province, there are 75 county level advisory centres of agricultural technology and more than 4,000 primary agrotechnical schools established by counties. If the different level information institutes of agricultural science and technology cooperate with them closely, and form a network, then we may combine the "soft" with "hard" sciences and provide a common service. It would play an active role in the development of Sichuan provincial agriculture. In 1988, the Information Institute of Agricultural Science and Technology, Sichuan Academy of Agricultural Sciences cooperating with the Sichuan Broadcast Station held a training class on strawberry cultivation. According to the original plan, the training was to recruit 200 students only, in fact, 1,988 students were accepted. Thirty percent of the students came and attended the lectures in person. Very high efficiency was achieved. This indicates that it is easy to reach the farmers by using modern methods, such as video and broadcast to spread agrotechnical information, and it is an effective approach for information service. Therefore, the authors of this paper suggest that the capable agricultural information agencies continually and in a planned way make a series of video and recorded products which are suitable for the local needs of agricultural technology, whether or not the Committee of Science and Technology stipulates that all the achievements of agricultural research which are fit for the local population and application ought to be produced on video tape by the research units. After those achievements are identified, they should be handed over to the information agencies to dub, then be sent to the basal level agrotechnical advisory stations and information units for dissemination.

d. Establishing and perfecting an information service system which will meet the needs of technological information services, such as document collecting and information providing and a relevant constitution of information personnel.

e. The government ought to allocate basal funds to agrotechnical information services personnel and build the necessary essential installations, so that they will gradually move towards industrialization.