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NEW HORIZONS IN AGRICULTURAL INFORMATION MANAGEMENT

PROCEEDINGS

OF AN INTERNATIONAL SYMPOSIUM

MARCH 13-16, 1991

BEIJING, CHINA

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Studies on Agricultural Information Research for the Development of a Rural Commodity Economy

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Abstract

After reforming the rural economic system in our country, the commodity economy has made great advances, and great changes have taken place in the structure, content and forms of information being used. Agricultural information research has shown the following tendencies: a) it turns in the direction of economic construction; b) it is developing in depth and width; c) it diversifies in content and form in many ways and d) it is developing in the direction of cooperation and modernization. In order to fit the new situation, new ideas such as improved information, combined cooperation, self-development, information commodities, and training qualified personnel are established in information research, the focal points of which are information and technology policy, level of production, dynamic prediction, comprehensive evaluation and so forth. In order to do our best to serve the rural commodity economy, scientists of information service have made advances by taking part in the exploitation of agricultural production, by spreading advanced scientific research achievements, by opening up agricultural products for export, by studying and exploring new products, by making propaganda of scientific information, and by imparting technical skills in the field of agricultural production. In addition, they have made recommendations such as how to strengthen the information system, how to train qualified personnel, how to serve the rural economy, how to treat information as a commodity and how to raise the quality of information research and the level of achievements and so on.

With the rise of a new technical revolution throughout the whole world, the implementation of the reform policy, opening up to foreign countries, stimulating the development of the national economy, regulating the rural industrial structure, vigorously developing science and technology and enterprises in villages and towns, great changes have taken place in agricultural production. The transformation of traditional agriculture to a modernized one, a natural economy to a commodity economy, decentralized and independent management to one of moderate-scale and a single type of cereal production to a comprehensive system of trade, industry and agriculture has enhanced the development of a rural commodity economy. This new situation has opened up a broad avenue, has created a higher demand for agricultural information and is faced with a new challenge.

I. The characteristics of changes in the requirements of agricultural information users and the tendency of the development of information research.

A. The characteristics of changes in the requirements for agricultural information

1. The structure of agricultural information users is developing in many ways and is serving people of all occupations and people living in cities, towns and villages. Based on service for the leaders and scientists in one's own institution, agricultural information service is being extended to agricultural administrative managers, to scientists who are extending new agricultural techniques, to people who are working in enterprises in villages and towns and to farmers who are demonstrating agricultural sciences and technology.

2. The requirement of the content of agricultural information is enlarged extensively. It has developed from the microscopic problems of agricultural sciences and technology to those of macroscopic sciences and technology, the economy, and social management such as the economy of agricultural techniques, the production of commodities, marketing, scientific management, technical policies, development strategies, crop production, animal husbandry, the processing of agricultural products and products of sideline production and a diversified economy, all of which merge technical development and market exploitation into an organic whole.

3. The forms of agricultural information requirements such as intermediary services, market prediction, feasibility argumentation, achievement certification, combined exploitation, consultation in kind, propaganda, training qualified personnel, organization of contracts and so forth are highly varied.

4. The quality requirement of agricultural information products is becoming higher. Higher value is put on its scientific basis, its comprehensiveness, its being systematic, its accuracy, feasibility, timeliness, and practicality and the economic benefit of information research products.

B. The tendency of the development of information research

1. Agricultural information research is developing in depth and width, and is closely associated with economic construction. The exploitation, processing and application of information resources have broken through the limitations of documentation, and have gone into society, the economy and agricultural production. The tendency to move from individual research to comprehensive, from practical research to predictive, from static research to dynamic and from closed research to open has occurred. Therefore, a lot of dynamic information, practical typical surveys, comprehensive investigations, scientific data which leaders at different levels use to make strategic decisions was developed. At the same time, it is also regulated in the field for aim, accuracy and implementation respectively.

2. Strategic information research is developing in depth and width, and tactical information research is deepening in its content. At the time of investigation, traditional summaries and reviews of information are replaced by comprehensive, predictive and planning information research of strategic decisions in order to provide a scientific and even basis for the decisions of leaders. At the same time, technical, economic and marketing tactical information research has been deeply developed.

3. Broadening the channels of information services and raising the effectiveness of social services.

Information is necessary to have distinctive resources, commodities, circulation and advanced characteristics, because agricultural scientific and technological information is a potential product and would become real productivity through conditions of transformation. For this reason, information research on industrial exploitation, market trade, economic techniques, economic management and international cooperation has been vigorously developed for agricultural extension services, high-yield plans, spark plans, enterprises in villages and towns, helping poor farmers to become rich, and acting as bridges for units of scientific research, production and economy. They are also developed for the exploitation, intermediary transfer and comprehensive units of information production.

4. Information research is developing in the field of cooperative transformation, modernization of investigative measures and information products as commodities. It is necessary to cooperate and combine with many scientific research branches and units, because information research should be extensive and comprehensive. Mathematical models, the theory of systematic engineering, computers and resource analytical tools are used as major measures of information research. In order to raise the effect of information service and strengthen self-vitality, information research is developed for paid and lower-paid services.

II. Strategic changes of information research have taken place in order to fit the development of new situations.

A. Setting up a new idea

In order to satisfy the demand for reform of the rural economic system, and the scientific and technological system, the old model and mechanism of agricultural information must be reformed. It is important to renew the ideological idea of information research. First of all, it is necessary to set up the concept of great information, and to use great science and technology for great agriculture. It is developing and penetrating to the field of economy, production and society. For example, we carried out information research on the studies of markets and technical cooperation of agricultural products in the Soviet Union and countries in Eastern Europe, the countermeasure of developing research joining rural specialties and comprehensive units of science, technology and production. Second, it is necessary to foster the idea of comprehensive cooperation. In order to get more achievements, to obtain achievements quickly and improve their quality, we advocate the combination of multiple specialties and scientific branches,

inside and outside, in a matrix to join superior, qualified scientists and technicians. For instance, the State Scientific and Technological Commission has assigned a key project on the reform of scientific and technological systems in Heilongjiang Province, and then the Provincial Scientific and Technological Commission has divided it into thirteen subprojects and has organized more than fifty scientists who came from more than twenty units of natural sciences, social sciences and agricultural management to finish them in one and a half years. Third, it is necessary to establish an idea of self-development. We have gotten programs and funds from the Provincial Agricultural Bureau, the Provincial Scientific and Technological Commission, and the Chinese Academy of Agricultural Sciences, Ministry of Agriculture, we have made recommendations and consultations to provincial governors and leaders on our own initiative in order to enlarge our tremendous influence on agricultural production. Fourth, it is necessary to foster the idea of an information commodity. We have opened an offset printing factory and a duplicating room, conducted translation and training, and investigated the effect of plant growth regulators in order to get more income and raise the capacity of self-development. Fifth, it is necessary to foster the idea of qualified scientists and technicians. Man is a carrier of knowledge. The quality of qualified personnel determines the level of achievements. We have sent middle rank scientists to TV universities, and sparetime universities. Last year we sent two scientists to the Soviet Union on a study tour and cooperative investigation.

B. New content of information research

1. Conducting the investigation of agricultural scientific and technological policy.

According to the demands of agricultural technical policy worked out by the provincial government, an agricultural technical policy and the policy of soybean exportation were investigated by us and the Office of Science and Technology of the Provincial Agricultural Bureau. These recommendations in policies provide a basis for working out agricultural plans and their accomplishment. In addition, they play the role of a staff officer for leaders to resolve the problems of soybean exportation.

2. Conducting the investigation of dynamics and levels of agricultural production, the tendency of its development and countermeasures.

In 1986 the Institute of Information of the Chinese Academy of Agricultural Sciences, organized scientific research institutes and teaching departments to conduct a program called "Experience of cultural practices of soybean production in foreign countries and recommendations about how to develop soybean production in our country," which played a significant role in working out a plan for soybean production in the whole country and in guiding soybean production. The project has won a third class prize given by the Ministry of Agriculture. In the light of the practice of soybean production in our province, several papers such as "Recommendations for developing soybean production and its prospects" and "The comprehensive exploitation, processing and utilization of soybean" were written and played a role in working out the plan of agricultural production, and in providing a basis for offering a program of soybean processing. They

were selected as textbooks for training courses by the General Agricultural Extension Service of the Ministry of Agriculture.

3. Conducting an investigation of the prediction of scientific and technological development.

In order to satisfy the demand of the Eighth Five Year Plan, a program called "The development and the assumption of agricultural science and technology in Heilongjiang Province" has been carried out by us and the Northeast Agricultural College. This program played an important role in studying and working out a plan for the development of agricultural sciences and technology, outlining developing agriculture by means of science and technology, and helping the provincial government to make strategic decisions. This achievement was reported to the Provincial Scientific and Technological Commission.

4. Conducting an investigation of a comprehensive evaluation of technical economics.

In view of the important technical economic problems in agricultural production in our province, a series of problems such as "The quality of agricultural products," "The purchase price of soybean products for exportation," "The reduction of soil fertility in agricultural production," "Pollution of agricultural products by chemical fertilizers and pesticides" have been investigated through the cooperation of us and the departments concerned, and we have written several reports such as "Raising the quality of agricultural products and stimulating the development of commodity production," "The current situation of the quality of rice and the criteria of good quality of rice," "The competitive situation of the international soybean market and the countermeasure of soybean exportation in Heilongjiang Province," "The reduction of soil organic matter is a potential threat of the regression of soil fertility" and "The pollution of pesticides and chemical fertilizers and the countermeasures for their control." Some of them have been given to the provincial government, Standards Bureau to serve as a basis in working out plans and policies, some of them have been used in agricultural production, foreign trade and exploitation. For example, some recommendations such as the establishment of the Soybean Scientific and Technological Exchange Center, the Food and Oil Trade Center, and the Productive Bases of Special Purpose Commodities for Exportation, and the exploitation of different kinds of agricultural products, strengthening the purchasing of agricultural products, export inspection, storage systems and so forth have been carried out. According to one estimate, an increase of between one and two million dollars of economic income in soybean exportation every year and the loss of soybean will be decreased by 15,000 kg.

5. Conducting an investigation of agricultural scientific and technological management.

According to the demands of the reform of science and technology in the whole country, the program called "The study on scientific and technological reform in rural areas" has been assigned to us through the Provincial Scientific and Technological Commission, the subprogram of which called "The study on the reform of scientific research in rural

areas" has been carried out by us for two years. This "632 comprehensive scientific and technological system in rural areas" has served as a model for scientific and technological systems in rural areas of North China, after an appraisal made by the State Scientific and Technological Commission, and has won a prize for consultative achievement given by the Provincial Department of Agriculture and Industry of the Chinese Communist Party and a third class prize given by the provincial government.

In addition, a paper called "The mechanism and effect of scientific and technological achievements at the time of their extension and application" has won a prize from the Provincial Scientific and Technological Commission, and has been read in the National Symposium of Scientific and Technological Exchange.

C. Opening up new scientific information fields

1. Taking an active part in the projects of agricultural scientific and technological exploitation in the whole province.

Leaders in our academy have organized scientists and technicians to join the projects of agricultural exploitation in large areas. Scientists engaging in information research have supplied a series of scientific and technological information at home and abroad, have propagated and summarized achievements of investigations, and have spread advanced experience for three years. This group exploitation is an effective form of close combination of information, technique and production and plays the role of a bridge in transferring scientific technology to agricultural production. This cultural practice has been extended over 300,000 hectares in four years, has increased the yield of rice by 550 million kg, which equals 250 million Yuan. Therefore, farmers have increased their income by 180 million Yuan. This project has won a second class prize for scientific and technological improvement given by the Ministry of Agriculture. A booklet called *The cultural practices of high yielding rice* and more than ten articles have been written through the cooperation of us and other scientists. In addition, we have sent an expert engaged in the culture of edible fungi to join the Chinese Exploitative Group of Edible Fungi working on exploitation of edible fungi.

2. Actively extending new agricultural techniques and new achievements.

In order to extend new cultivars of corn, scientists in our institute went to rural areas to compose a combined unit of information and production, to provide services in the whole growing season and to produce 30,000 kg of the new hybrid seeds, Longdan 7, the acreage of which covers 700 hectares in the second and third accumulated temperature zones of our province. The corn yield has increased by 750 kg per hectare compared with local varieties. The total output of corn increased by 0.5 million kg. Farmers have gained 300 thousand Yuan of income. Besides, cultural practices of rice by means of throwing rice seedlings has been extended in our province. After its investigation, we wrote an article called "The current situation and development of cultural practices of rice by means of throwing rice seedlings," in which we propagated and reported this technique, and assisted farmers in buying agricultural materials such as plastic pans for growing rice seedlings, seedbed herbicides and seedbed acid regulators. By the end of

1988 the acreage of this new technique covered 3,300 and more hectares in the whole province. Rice yield had increased by 1,500-2,250 kg per hectare, the net income was 598.5 Yuan per hectare. The economic effect in the whole province reached over 2 million Yuan.

3. Taking part in the development of agriculture for exportation.

Since the strategic policy called "Ally our province with provinces in the South and open up to the foreign country in the North" was put into practice in our province, Chinese-Russian boundary trade and technical cooperation have been developed rapidly, the amount of exportation of agricultural, subsidiary and processing products is about half of the total amount of exportation of commodities. For this reason, we have conducted a program called "Studies on marketing of agricultural and subsidiary products and technical cooperation," and we have collected a lot of data for leaders and personnel going abroad. We have been in touch with many foreign trade companies, boundary trading ports, universities and colleges, scientific research institutes in the field of information and have collected a series of technical criteria on potato, soybean, corn and so forth for export, and submitted these materials to the departments which have sources of these kinds of goods. We sent two persons to the Soviet Union to make an investigation and look for works in translation. We have conducted training courses in the Russian language for training translators who shall be sent to the Soviet Union to work.

4. Manufacturing and developing new products.

In order to fit the demand of information propaganda, our institute established an electronic printing system to publish all journals, reports and papers of our academy and obtained a better effect last year. Our institute has undertaken a program called "Studies on the reasons for the decrease in soybean production in a continuous cropping system and countermeasures for its control." A preparation called yield-increasing agent for soybean continuous cropping has been manufactured on the basis of extensive investigation and consultation of a great deal of references at home and abroad. The results of experiments at more than twenty locations has shown that soybean yield when applying yield-increasing agent has increased by 9-16% or 165-300 kg per hectare compared to the control. The cost of this agent per hectare is thirty Yuan which is equivalent to the purchase price of 22.5 kg of soybean. It is convenient, safe and reliable in application. Now the Agricultural Bureau of Yilan County has asked to transfer this technique and to produce it jointly with others. In addition, "YemianBao," a plant growth regulator, made by Guangxi Chemical Engineering Institute was examined by our institute in the past two years. The effect of the increase of yield reaches 7-13%, which is not inferior to analogous products such as "Yield-increasing fungi," "Fengchan-su" and so forth. Its cost per hectare is only a few Yuan. It will be further tested and manufactured jointly.

5. Conducting propaganda of information and impartation of technical skill.

The achievements of research, new techniques and exploitative activities of our academy are always widely propagated by means of newspapers, radio, journals and so forth. In order to enhance our role in serving the rural commodity economy, we organized an information network of all businesses in villages and towns in our province, in which nearly a hundred units and persons joined these activities. All kinds of useful techniques, dynamics of marketing and information on how to get rich are introduced in the journal called *Information on all kinds of techniques to get rich for villages and towns*. Good varieties of field crops and vegetable crops, seedlings of fruit crops, chemical fertilizers, and pesticides are also introduced in it as a consultative service for the purpose of providing a proper choice for farmers. We have edited a corpus of articles about scientific nd technological achievements for all specialized societies and institutions and helped them to compile practical technical materials such as booklets called *The cultivation of muskmelon* and *The cultivation of edible fungi* for developing the rural commodity economy.

III. Recommendations for developing information research

1. Strengthening the construction of agricultural information systems.

At present information research attaches itself to the administrative service department, resulting in its becoming a working model in which it is led by the leaders of several institutions, and is separated into pieces, divorced from agricultural production and it is decentralized, small and complete, and consequently it is not beneficial to strengthen leadership and unified management. It is necessary to set up a modern agricultural information system which is suitable to the development of a rural commodity economy, harmoniously developing with scientific and technological economy and society, rationally distributed and completely functional.

It is also necessary to establish a Bureau of Agricultural Information in the Ministry of Agriculture, which would provide dual leadership in administration and business and to form a network system to play the function of management, organization and coordination, to work out and accomplish the general plan of scientific and technological information, to reform the operating mechanism of information institutions and to stimulate their activities, to formulate a law of agricultural information and a policy of information research to improve all systems, to standardize the management of the achievements of information research, to raise the social status of information research and to pay more attention to determine programs, budgets and evaluation of achievements.

2. Agricultural information must actively throw itself into the main battlefield for the development of the rural commodity economy.

The aim of the reform of the Chinese scientific and technological system is to develop productivity, and to closely combine science and technology with the economy. Therefore, reform of the information system must proceed from national conditions, to set up an operating mechanism combining information with the economy and to transfer

the main battlefield to the service of economic construction. Information investigation is an important component of agricultural information business in China. It is necessary to play up the superiority of information research so as to give service to the working out of policies, the strategies and long-term plans of development, the development of agriculture with scientech, the extension of agricultural techniques, the improvement of productive conditions, the development of agriculture for exportation and the development of township enterprises. At the present time, it is necessary to study problems such as the reform of the agricultural economic system, the regulation of industrial construction, large-scale management, group contracts, combined units, the increase of the potential of agricultural production and the processing of agricultural products in order to provide a scientific basis for making decisions for leading organizations and institutions at all levels.

3. Strengthening the construction of battalions of agricultural information research.

Premier Li Peng pointed out that the extension of science and technology can not be developed without education and qualified personnel. For this reason, it is necessary to set up an on-the-job training center to build up a large number of newly qualified personnel who are well-developed in an all-round way, to arrange rational knowledge construction, to resolve the problem of knowledge renewal in order to raise the quality of scientists and the level of achievements.

4. Making information products into commodities.

According to the law of value of commodity production, it is necessary to put into practice the paid transfer of information products which serve as knowledge commodities, and their exchanges at equal value. It is also necessary to develop paid services in all directions through a series of channels and forms. The National Bureau of Information must work out an open policy to encourage the transfer of information products.

5. Raising the level of modernization of the information research environment.

It is necessary to strengthen the construction of data pools for information research, economic comparison of scientific and technological production and different specialties, and the construction of files for managing business, to provide computers, microfilm and office automation systems and to absorb advanced theory and methods of information research at home and abroad in order to combine published data with the investigations in situ, to combine the knowledge of experts with the experiences of the masses, and to combine qualitative research with quantitative. It is also necessary to organize the cooperation of many branches of learning and various departments in order to enable information achievements to have advanced and applicable character, and consequently to initiate new circumstances and reach a new level for information research development.