

87011

Information
Sciences
Archival Copy

3-485-0233

NEW HORIZONS IN AGRICULTURAL INFORMATION MANAGEMENT

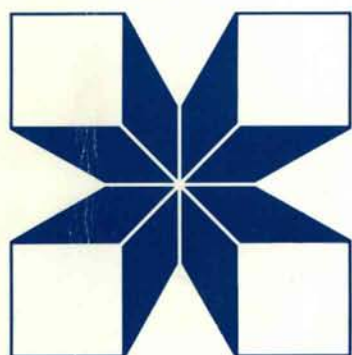
PROCEEDINGS

OF AN INTERNATIONAL SYMPOSIUM

MARCH 13-16, 1991

BEIJING, CHINA

IDRC
CRDI
CIID



C A N A D A

The International Development Research Centre is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of developing countries. The Centre's activity is concentrated in six sectors: agriculture, food and nutrition sciences; health sciences; information sciences; social sciences; earth and engineering sciences; and communications. IDRC is financed solely by the Parliament of Canada; its policies, however, are set by an international Board of Governors. The Centre's headquarters are in Ottawa, Canada. Regional offices are located in Africa, Asia, Latin America, and the Middle East.

Le Centre de recherches pour le développement international, société publique créée en 1970 par une loi du Parlement canadien, a pour mission d'appuyer des recherches visant à adapter la science et la technologie aux besoins des pays en développement; il concentre son activité dans six secteurs : agriculture, alimentation et nutrition; information; santé; sciences sociales; sciences de la terre et du génie et communications. Le CRDI est financé entièrement par le Parlement canadien, mais c'est un Conseil des gouverneurs international qui en détermine l'orientation et les politiques. Établi à Ottawa (Canada), il a des bureaux régionaux en Afrique, en Asie, en Amérique latine et au Moyen-Orient.

El Centro Internacional de Investigaciones para el Desarrollo es una corporación pública creada en 1970 por el Parlamento de Canadá con el objeto de apoyar la investigación destinada a adaptar la ciencia y la tecnología a las necesidades de los países en desarrollo. Su actividad se concentra en seis sectores: ciencias agrícolas, alimentos y nutrición; ciencias de la salud; ciencias de la información; ciencias sociales; ciencias de la tierra e ingeniería; y comunicaciones. El Centro es financiado exclusivamente por el Parlamento de Canadá; sin embargo, sus políticas son trazadas por un Consejo de Gobernadores de carácter internacional. La sede del Centro está en Ottawa, Canadá, y sus oficinas regionales en América Latina, África, Asia y el Medio Oriente.

This series includes meeting documents, internal reports, and preliminary technical documents that may later form the basis of a formal publication. A Manuscript Report is given a small distribution to a highly specialized audience.

La présente série est réservée aux documents issus de colloques, aux rapports internes et aux documents techniques susceptibles d'être publiés plus tard dans une série de publications plus soignées. D'un tirage restreint, le rapport manuscrit est destiné à un public très spécialisé.

Esta serie incluye ponencias de reuniones, informes internos y documentos técnicos que pueden posteriormente conformar la base de una publicación formal. El informe recibe distribución limitada entre una audiencia altamente especializada.

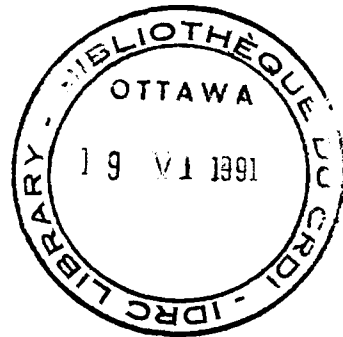
87011
PERIODICALS
PERIODIQUES

IDRC-MR293e
May 1991

New Horizons in Agricultural Information Management

Proceedings of an International Symposium,

March 13-16, 1991, Beijing, China



Compiled and Edited by

Gary K. McCone



ARCHIV
002:631(510)
N4
1991

Sponsored by

International Development Research Centre

Organized by

Sciencetech Documentation and Information Centre

Chinese Academy of Agricultural Sciences

Organizing Committee

Main Organizing Committee

Chairman	WANG Xianfu
Vice Chairman	JIAO Bin
	HE Chunpei
Secretary	MIAO Zhuoran
Members	HAN Ling
	JIA Shangang
	HUANG Xuegao
	GUO Dianrui
	ZHAO Huaying
	PAN Shuchun
	LI Kaiyang

Secretariat

Chairman	MIAO Zhuoran
Members	CHEN Junying
	HU Jia
	YU Fenghui
	TAI Weidong
	FANG Baoqin

Accommodation & Transport

Chairman	HUANG Xuegao
Members	ZHAO Huaying
	QIN Juanjuan

Conference Site

Chairman	HE Chunpei
Members	PAN Shuchun
	ZHANG Rongchang

Papers

Chairman	JIA Shangang
Members	LI Kaiyang
	LIANG Suzhen
	WANG Zhenjiang
	GUO Jian

Table of Contents

Foreword	viii
-----------------------	------

Keynote Address

Problems, Issues, and Challenges for Agricultural Information Systems and Services in the Developing World L. J. HARAVU	1
--	---

Session I: Management and Development of National Agro-Information Systems

Database Design at ICRISAT and the Experience of Using External Databases L. J. HARAVU	13
Implementation Results, Roles and Effects of the Chinese Agricultural Information Services Project WANG Xianfu	24
The AGRIS System and the Participation of China Helga SCHMID	32
Ten Years' Progress in China's Computerized Information Retrieval and Its Future (Abridged) ZENG Minzu	40
A Brief Introduction to the Computerized Agricultural Information Retrieval Systems in China Chunpei HE	47
Efficient Architecture and Development Strategy of Agricultural Information Systems in Developing Countries CHEN Qiben	54

Session II: Information Management and New Technology Application

The Infusion of Quality in Agricultural Information Services Syed Salim AGHA	58
Access Points to the Database of Bibliographies of Agricultural Documents in China and Their Retrieval Functions WU Zeyi	64
Management of the AGRIS and CARIS Regional Centers in Southeast Asia Josephine C. SISON	75
Preliminary Study on the Microcomputer-aided System for Compiling an Agricultural Thesaurus and the Establishment of a Descriptor Database Management System FANG Luming and WANG Caihua	85

Digitized Image Transmission Using High Speed Telecommunications Networks Gary K. MCCONE	92
The Integrated System of Database Creation and Computer-based Editing and Composition WANG Huaihui	98
Expert Systems for Agricultural Use: Recent Developments and Applications A. Mangstl and V. Troll	103
A Study of the Khonkaen University Research Information System Daruna SOMBOONKUN	114
Establishment of the Chinese Agriculture Abstracts Database GUO Jian	120
On the CAB Thesaurus HOU Hanqing and XU Jia	125
Realization and Application of Large Capacity Chinese Character Disk Operating System (LCCDOS) NIU Zhan Liang, BAI Juping and LIU Huifang	134
The Close Associations between Indexing and Microcomputer Software Maintenance BI Jinping	140
Program for Automatic Creation of Subject Indexes by Computer WANG Huaihui	145

Session III: Management and Development of Regional Agro-Information Systems

SEAWIC: Its Organization, Objectives and Activities Ruben C. UMALY and Soetitah SOEDOJO	152
Strengthening the Establishment of a Chinese Regional Monographic Agricultural Document Database YAN Ming-zhi, LU Ping and MA Tao	162
Indonesian Plan for an Integrated Management Information System for Agricultural Research and Development Prabowo TJITROPANOTO and Liannie K. DAYWIN	169
Creation of an Information Database and a Developmental line of Agro- Information Retrieval Techniques in Northeast China ZHENG Yegang and XIN Huajun	173
Cybernetic Analysis of Scientific Information Services for Agricultural Development in China CHENG Xiaolan and CAI Jianfeng	178
Functioning of the National Agricultural Information Network (AGRINET) D.Y. RATNAVIBHUSHENA	190
Agricultural Information Services of Hupei Province LI Zezhou	200

Some Ideas on the Tendencies of Information Services by the Regional Information Agencies of Agricultural Science and Technology PU Yunfeng and LI Pushen	205
Ideas on Effective Ways of Transforming Agro-Information into a Productive Force SUN Tianshi and XUE Yajie	213
Present Situation and Strategy of Development in Information for Agricultural Science and Technology in the East China Administrative Area CHEN Dingru	218
Coordination of Information Work on Agricultural Literature in Northwestern China MA Yingcai and ZHENG An	224
Discussion on Elementary Assignment on Information of Agricultural Sciences and Technology at the Provincial Level MA Yikang and ZHOU Guangheng	231
A New Domain of Agricultural Information Service at the Provincial Level -- The Combination of Information Analysis and Database Building YUAN Zhiqing	237

Session IV: Sciencetech Information and Productivity

The System of the PCARRD Applied Communication Division in Transferring Agricultural Technology to Farmers Teresa H. STUART	242
Discussion on Functions of Agricultural Scientific and Technical Information in the Development of a Rural Commodity Economy BAI Erdian, CHEN Enping and GAN Jintian	257
Information as an Economic Resource in Agricultural Development T. H. TAY	266
Scientific and Technological Information is a Potential Productive Force ZHU Binlong	274
Integrated Root Crop Program (Philippines): A Coordinated Approach in Research Development and Extension Perfecto U. BARTOLINI	279
Farm Management Data for Thai Farmers Mrs. Kanitha SOPANON	290
On Effective Ways for Information Research to Serve the Rural Economy CHEN Ming	292
Preliminary Study on Ways of Transforming Agricultural Science Information into Productive Forces CHEN Qi Rong	298
Studies on Agricultural Information Research for the Development of a Rural Commodity Economy LI Wenmao and NIE Shangqi	305

Joining the Main Front for Economic Construction to Open Up a New Aspect of Information Research SUN Xuequan and LIU Qingshui	314
Establishing a New System of Agricultural Information Technology, Production and Marketing, and Promoting the Agricultural Technological Development of China TONG Dijuan	319
On the Transformation of Agricultural Scientific and Technical Information -- Thoughts on Transforming Information into a Productive Force YUAN Weimin	325
An Effective Way for Transforming Scientific Information into Productive Forces LI Lunliang and YU Ying	331
Broadening the Media of Communication of Agricultural Information and Its Role in Agricultural Development LIU Shixing, LI Cuie and GONG Junjie	334

Session V: Development and Utilization of Agro-Information Resources

A New Approach to Information Systems Management at the International Potato Center (CIP): The Case of Information Services for National Potato and Sweet Potato Programs Carmen SIRI	340
Preparing English Abstracts of Chinese Documents -- an Important Step Toward International Sharing of Chinese Information Resources LI Kaiyang	351
Linking Information Resources Sharing Management and Library Training in the South Pacific Esther W. WILLIAMS	354
Resources of Chinese Agricultural Documents and Their International Exchange ZHAO Huaying	369
Developmental Status and Trends of the Retrieval Journal System for Agricultural Information in China JIA Shangang	377
Exploitation and Utilization of Sericultural Information Resources in China GAO Zhicheng and CHEN Xichao	385
The Agricultural Information Users in China and Changes in their Requirements PAN Shuchun	390
BIOSIS as an Agricultural Information Resource E. HODAS, M. O'HEARN and M. KELLY	398
On the Exploitation and Utilization of Agricultural Sciencetech Information DING Jincheng	406
Exploitation and Effective Use of Scientific and Technological Information on Agriculture LIU Yixian	410

On Information Obstruction	
YOU Xiu-Ling	415
Prospects for the Chinese Agro-library and Information Education	
XUE Zihua	423
A Database of Bamboo Abstracts	
ZHU S. L. and ZHANG X. P.	429
Multi Level Services for User Needs in Agriculture	
XING Zhiyi	435
Results and Benefits from an IDRC-supported Project: Tea Information Services (China)	
CHEN Zongmao, WANG Zipei and LU Zhenhui	440
Practice and Enlightenment in Collection Development	
CHEN Aifen	446

Appendix 1: Supporting Papers

Opening Address	
WANG Xianfu	451
Welcoming Address	
LIANG Keyong	452
Welcoming Address	
Clive David WING	454
Welcoming Address	
WANG Tingjiong	455
Discussion	457
Summary Report of the International Symposium on New Horizons in Agricultural Information Management	459

Appendix 2: Symposium Participants

List of Symposium Participants	466
--------------------------------------	-----

Appendix 3: Author Index

Author Index	472
--------------------	-----

Strengthening the Establishment of a Chinese Regional Monographic Agricultural Document Database

YAN Ming-zhi LU Ping MA Tao

*Institute of Sciencetech Information
Shaanxi Academy of Agricultural Sciences
Wugong, China*

Abstract

First, this paper discusses the local superiority of Chinese agricultural reference documents, cites some local agricultural publications and briefly analyzes the utilization of agricultural documentation resources and the existing situation of China's information science and technology. The authors hold that the establishment of a monographic agricultural document database not only meets the needs of our era but is also an effective strategy to exploit the local advantages of China's agricultural document resources as well. The paper puts more emphasis on a significant discussion of existing conditions, technical approaches, and developing a strategy for establishing a regional monographic database in China.

Nowadays, agriculture based on natural resources and traditional experience in China is changing into one with scientific knowledge and modern techniques as the base. The effects of science and technology in modern agricultural production is becoming more and more important. The 60-80% increase in agricultural production in the developed countries depends on the progress of technology. As the medium and carrier, the documents of agricultural science and technology are one of our special agricultural information resources. The exploitation and utilization of which have an important role to play in the course of modern agriculture. How to increase the exploitation and transmission of agricultural documents in science and technology is always a major task in the sectors of agricultural science and information technology.

1. The regional characteristics of China's agricultural documentary resources

As a special kind of agricultural resource, agricultural documents have a close relationship with agricultural production and scientific research, and in return, agro-production and agro-scientific research activities are the resources of agricultural documents and information. At the same time, agricultural documentation information reacts to agricultural production and agro-scientific research, guides it, and pushes it forward.

China is a large country with different natural conditions (including climate, topography, soils, organisms, etc.), different areas, and different economic environments. These differences result in the fact that agricultural production and agro-scientific

research have strong regional superiority, and also causes agro-science and technology documents to have a large regional distribution, thus forming different superior special documents resources in different regions.

Let's begin to examine the journals published in four main regions in China: the southern part of China is the region for tropical crop production. The journals *Research on Crops*, *Research of Tropical Crops*, *Reference Materials of Tropical Crops*, *Science and Technology of Tropical Crops*, *Transactions of Tropical Crops*, and *Sugarcane and Sugar*, etc., are published in this region. The eastern part of China is a major region of silkworm and tea production. The journals *Science of Silkworm*, *Abstracts of Silkworm*, *Foreign Agriculture--Silkworm*, *Tea of China* and *Abstracts of Tea*, etc., are published in this area. The northeastern part of China is a major region of soybean production where the journals *Science of Soybean*, *Foreign Agriculture--Soybean* and *Abstracts of Soybean*, etc., are published. Moreover, in the journals of general agriculture, the number of papers on soybean are obviously more prevalent than those on other subjects. The Northwestern part of China is the region of animal husbandry production. Among the 52 journals on animal husbandry and veterinary medicine published in China, eighteen are published in the northwestern region. Major arid agriculture production is also in the northwestern part of China. The journals *Research on Agriculture in Arid Regions*, *Abstracts of Agriculture in Arid Regions*, *Journal of Geography in Arid Regions* and *Research of Arid Regions* are published in this region. The regional distribution characteristics of the above agricultural documents are shown not only in the professional journals but also in the comprehensive agricultural publications, the proceedings of research papers and notes of seminars and even in agricultural books. For instance, the *Shaanxi Journal of Agricultural Sciences* has a special column for rainfed agricultural research. The comprehensive agricultural journals published in Yunnan and Guizhou provinces have a large number of papers on tobacco science and technology. The Rainfed Agricultural Research Laboratory of Shaanxi Province has contributed "The Selection of Rainfed Agricultural Information in Arid and Semiarid Areas in China," etc. This characteristic in China's agricultural science and technology information work can not be neglected.

2. Establishment of a regional monographic database of agricultural documents

With the development of the world database industry, the Chinese scientific and technological information cause is now in a period of transition from a traditional mode to a modern mode of database development. Construction of a database on agricultural documents is in its beginning stage. There are seven special databases being constructed, and another four databases are planned to be set up on a small scale, dispersed, and in a specific subject specialty with obvious regional characteristics. The Database of Sesame Documents set up in the Academy of Agricultural Sciences of Hebei Province, the Database of Scientific and Technological Documents on Tropical or Sub-tropical Fruits set up in Guangxi Agricultural college, etc., are examples in this field. The establishment of a database of agricultural documents not only meets the needs of our times, fits the developmental trend of scientific and technological infor-

mation, but is also an effective strategy for agro-document resource exploitation and utilization.

The regional features in agricultural production determine the forms of agricultural documents. In return, the demand for agricultural documents by agricultural production and scientific research also have regional features. Statistics on the utilization of publications in our library shows that the number of consultations of the *Shaanxi Journal of Agricultural Science* by scientific research personnel and the utilization ratio are significantly higher than the numbers for journals in other regions. This shows that regional publications have a high value of utilization with strong local characteristics. Based on the dispersed characteristics of agricultural document resources and taking advantage of different professional document resources and different demands for different professional documents in different regions, we can establish a monographic database for agricultural documents and information in dispersed distribution arrangements. It will not only reflect the level and development of agro-science research of the region, adapt to the needs of document information for different special research, but also can develop the regional document resources, and provide an effective agricultural information service for the region.

2.1. At present, some basic conditions for the regional agricultural document database establishment have changed greatly with the start of the monographic database establishment.

2.1.1. China's agricultural information system has been formed after ten years' efforts. It consists of the national center, the seven regional subcentres, thirty agricultural institutes distributed in more than thirty provinces, municipalities, autonomous regions, seventy agricultural colleges and universities and more than forty national professional research organizations, libraries and information sectors. Agro-science information units in different districts have cooperative organizations with different forms, doing an effective job in coordinating the distribution of documents to achieve the sharing of resources, developing information research, exchanging experiences, etc., thus laying an organizational basis for the establishment of the regional monographic database.

2.1.2. There are a large number of comprehensive, special publications and retrieval journals which report agricultural information both at home and abroad.

2.1.3. Some units affiliated with the central agricultural libraries and information centres, agricultural colleges and universities have been equipped with microcomputers or minicomputers. The seven regional subcentres have also been equipped with IBM PS/2-50 microcomputers.

The basic hardware conditions are ready for the establishment of regional monographic databases.

2.1.4. The Chinese character processing techniques are being perfected. A lot of national standards on information processing and document publishing, such as the

Format for Documentation Bibliographic Information Interchange on Magnetic Tape (GB2901-82), Document Subject Title Rules (GB3860-83), and Retrieval Journal Catalogue Rules (GB3973-83) have been published, thus laying a solid foundation for the standardization of computer processing of agricultural documentation and information.

2.1.5. The establishment of the National AGRIS Centre and seven regional AGRIS subcentres laid the foundation for the regional monographic database establishment, and provided database creation experience. The authors are members of the northwestern AGRIS subcentre and took part in the construction of the Comprehensive Database of Chinese Agricultural Documentation Bibliographies, and were involved in the work of collecting, analyzing and processing documents. We find, among fifty different journals in agriculture, sixteen are journals on animal husbandry and veterinary medicine. Among the 1,000 records inputted in the database in the first half of 1989, 540 were on animal husbandry and veterinary medicine. According to the Compilation of Names of Scientific Research Institutes and Institutes of Developing Techniques in China, there are 129 institutes of research on animal husbandry and veterinary medicine in China, and 28 of them are in northwestern China. The number of institutes in northwest China is eleven more than the average number for the other six regions.

This figure shows that the large number of documents on animal husbandry and veterinary medicine is a majority of the agricultural documents in northwest China. These kinds of documents are the local areas of necessity for documents and of information services in northwest China. In fact, there is a local characteristic to documents input in the other subcenters, such as aquatic product documents in central China; documents on wheat, barley, triticale, etc., in north China; basic subject research documents in east China, etc. We feel that when the AGRIS centre and subcentres in China established the national comprehensive database of documents, they laid the foundation for constructing regional databases of documents.

2.2. On developing a strategy for a regional monographic document database.

2.2.1. To strengthen integrated programs, make sure to coordinate their development. For problems existing during the early development of the monographic database, it is necessary to bring the superiority of macroscopic control at the national level into full play with the further development of the monographic database, with overall planning for the structure of the system, its distribution, the range of subjects, and to ensure a rational design, concentrated aim, and better applicability.

The electronic computer retrieval system should be expandable to become an agricultural information system for the whole country, including farming, animal husbandry and fisheries. Coordination with retrieval publications systems, agricultural science organizations, and agricultural colleges and universities, should be ensured.

2.2.2. A proper dispersed treatment and cooperative establishment of the database must be practiced. The collection of documents is an important step in setting up the database, and it is a major source for data to input. So the scope of collecting documents should be extensive and cover all subjects. As prices of journals and books rise in China, the quantities of documents acquired becomes smaller and smaller. But the advantage of socialism makes strengthening of cooperation easier, so that we can establish the monographic database mainly by using documents in our own collections, we can also consider the method of shared collection development in accordance with provinces' strengths and specialties. First, every academy, college (or university), and professional institute throughout China should take up the collecting, and pre-processing of data for different professional documents. And then, each of the seven AGRIS subcentres should serve as an authorized regional centre of professional document retrieval, and undertake the establishment of the monographic database, including inputting data and document retrieval. Finally, this system of document collection and processing of professional agricultural data should conform to that in the seven AGRIS subcentres. If the system combines with the national comprehensive database and becomes a subsystem of the national database, this will increase the speed of establishing the database, enlarge the amount of data, improve the applicability, and will also give full rein to the superiority of each locality, and reduce investment costs.

2.3. Technical tactics on the establishment of the regional monographic document database.

2.3.1. On the computer system. There is no doubt that establishing databases using microcomputers is a suitable technical approach in China and other developing countries, because of its small investment and low environmental requirements. Thus, as far as the establishment of a regional monographic document database is concerned, microcomputers are very suitable for small-sized databases and dispersed data processing. At present, there is a kind of super microcomputer with 620Mb hard disk and 4Mb RAM, whose price is only 1/5 to 1/3 that of a minicomputer. Furthermore, a microcomputer has the advantages of ample software, a short period for software development, and being easy to operate, etc. Thus, no priority is given to the selection of a minicomputer during the establishment of the regional monographic database, but attention must be paid to enhanced functions, and consideration should also be given to the performance of a main computer which can be used as a file server.

For computer storage systems, the capacity of a floppy disk is obviously too small, but its utilization for data collection and interchange is effective at present. A harddisk is too expensive and is not easily transportable. CD-ROMs are mainly used for foreign database retrieval at this early time. The magneto-optic (MO) disk is the ideal selection for information retrieval, but, it will take a period of time before it is used widely in China. There is also a kind of "removeable harddisk," which can be used like a floppy disk, whose capacity is 20Mb, and with a search speed approaching that of a harddisk. This "removeable harddisk" is very suitable for the establishment of regional databases. It may be considered for use in database storage and retrieval, and in the national database storage and annual data exchange. But close attention should be paid to MO disks; once the conditions are ripe, the MO disk must be used as early as possible.

2.3.2. Data collection and interchange. The establishment of a computer network should not be considered at least for 3-5 years, because of restrictive conditions and low utilization. The data collection and data exchange activities may also use floppy disks.

2.3.3. The regional databases must be standardized in three aspects; that is to standardize the database structure, the data interchange tapes, and the language of retrieval, because of considerations for convenient cooperation, compatibility, transformation between systems, maintaining unanimity, improvement of the quality of the database and the effect of service. First, CDS/ISIS (the version which can process Chinese characters) should be considered. This is good microcomputer-based information retrieval software. The data interchange standard is ISO 2709 which allows exchange of data between small and large computers. As for the language of retrieval, the Agricultural Descriptor Language edited by the Chinese Academy of Agricultural Sciences should be considered. The National AGRIS Centre and the seven subcentres have done a good job in starting the establishment of the Comprehensive Database of Chinese Agricultural Documents, and their experience can be used for reference.

2.3.4. To augment the equipment in the regional AGRIS subcentres with computers for data input and facsimile capabilities added, will make the regional AGRIS subcentres become the core of the regional monographic database establishment.

The storage capacity of the PS/2-50 microcomputer provided for every regional AGRIS subcentre is too small (the harddisk is only 20Mb). The early edition of the CCS Chinese Character Processing System for the PS/2 is not fit to do the large quantities of tapes of Chinese characters. It is suggested that the harddisk and control card be changed to raise the capacity to 60Mb, with an external 5.25 inch floppydisk drive for easy data exchange with XT, ATs or the same model in order to fit the necessary and gradual increase in data input.

3. The tentative plan and preparation for the establishment of the animal husbandry and veterinary scientific document database.

As we described before, northwest China is the main area for animal husbandry, and the information services emphasize the literature of animal husbandry and veterinary science, and have an obvious superiority in animal husbandry and veterinary science document resources. Because of these characteristics, we are prepared to establish the Animal Husbandry and Veterinary Science Document Database with the characteristics of northwest China, simultaneously with the establishment of the national comprehensive agricultural document database. At present, we have done some preparatory work. First, we have investigated the resources of animal husbandry and veterinary science in our country, we have strengthened the collection of related documents, and paid attention to the quality of the information indices. Then we separated the sub-database of animal husbandry and veterinary science from the comprehensive database. So far we have accumulated about 4,000 records. We plan to go further and get funding for the establishment of the database from various sources.

We wish to get help from the national centre, as well as assistance from related sectors. Although we are facing lots of difficulties, our aims will finally be attained when we establish the agricultural database, in order to exploit local agricultural document resources, raise the utilization efficiency of documentation, develop agricultural production, and promote agricultural scientific research.

As far as the Chinese agricultural information sectors at present are concerned, the establishment of the Chinese Agricultural Documentation Comprehensive Database is the main task of China's agricultural retrieval system, but the development of a distributed, small-size, standardized monographic database with regional features according to the regional characteristics of China's agricultural scientific research, production, and document distribution can form a "distributed database" by using the superior computer retrieval capability of the seven subcentres. If suitable exchange methods are adopted, the whole system will have a lot of the merits of a distributed database. It can be expected that with a high utilization ratio, better economic and social benefits will be obtained. If the monographic database establishes synchronized intersects with new information techniques including video-audio information, micrographics, facsimile, computer typesetting, laser printing, etc., the level of new information techniques can be improved quickly. Just as we have found that after computer typesetting and laser printing systems have been installed, the speed of agricultural document typesetting and printing has been greatly accelerated, also better economic returns and social benefits have been obtained, thus creating better conditions for the publishing of retrieval publications and starting a new field of research on the establishment of new integrated information techniques.