AGRICULTURAL AND FARM INFORMATION NETWORK FOR KERALA

R RAMAN NAIR*

Surveys the agricultural research institutes in Kerala having library and information divisions. Emphasizes the need for establishing a computer communication network interlinking these institutions and providing access to databases world wide to enable effective utilization of up-to-date information by agricultural scientists, students and farmers of the State. Puts foreword a plan for setting up an Agricultural and Farm Information System (AGFIS) for the State under the leadership of Kerala Agricultural University.

0 INTRODUCTION

Agriculture remains the primary source of employment for the majority of world's population. About seventy per cent of India's population is directly or indirectly employed in agriculture and thirty five per cent of our gross domestic product is derived from land. Despite increased urbanization and growth of industrial and service sectors, more people are working in the agricultural sector and of course more people are dependent on agricultural products than in the earlier years. The growth in the productive capacity of the agricultural sector is crucial to the survival and development of a country like ours.

As in all other parts of the world in India also the quantity of land available to agriculture is fixed or declining. A surplus labour is often available; but an expanded labour force, given a fixed land supply, is unlikely to yield a substantial increase in product relative to its cost. Hence neither land nor labour increase is likely to boost agricultural production. So we have to turn to technological improvement as the most promising path to agricultural growth.

1 AGRICULTURAL INFORMATION

Technological transformation consists of changes in material inputs, complimentary farming techniques, storage technology, and research, supply, and marketing institutions. The effective integration

*University Librarian, Kerala Agricultural University, Thrissur-680 654.

of these factors is tied closely to adequate information flows. A continuous stream of new technical knowledge and a flow of industrial inputs in which the new knowledge is embodied represents a necessary condition for modern agricultural development. The stream of inputs must be complemented by investments in general education and in production education for farmers and by efforts to transform institutions to be consistent with the new growth potentials. The critical element in this process is an effective library and informatics system that provides linkage among farmers, public research institutions, private agricultural supply firms and the markets for products.

Hence, there is no doubt that library and information systems are crucial in agricultural growth. Information flow in agricultural sector can be divided into three broad categories. Information flow to the farmer which include education, extension, market information, and information that enables group organising. Then information flow to the agricultural technicians: pre and in-service training and supervision. The third is information flow from the field to the research and supply institutions which is the feed forward.

In recent years there has been tremendous explosion of data and information in the field of agricultural sciences and technology. An indexing journal which provided 10,000 citations in 1940's now covers to 2,00,000 citations. The total number of journals in agricultural sciences alone has exceeded 15,000. This poses several challenges to libraries and systems which enable the information flow. It will, no longer be possible to track and disseminate up-to-date information required for research and development in Agricultural Sciences by the traditional agricultural libraries or farm information bureau.

2 INFORMATICS

All live library and information systems are experiencing new challenges of adopting to new environment influenced by information technology. The methods, materials and tools of library and information work are undergoing dramatic transformation. The world of information is changing rapidly due to increasing possibilities and channels of 'interconnectivity'. This has given rise to thousands of specialized information systems. In the field of agricultural sciences also many information systems like ISNAR, AGRICOLA, AGRIS, BIOSIS, ENVIRONLINE, COFFEELINE, APINMAP, IFIS, WATERNET, *etc* at international level and BTIS, ARIS, AGRIUNIS, GISTNIC, *etc* at National level have come into

existence. So any agricultural library systems has to utilize these common pools of specialized information if it is to provide effective support to research and development. All modern library and information systems enable the scientists and scholars who use the library to communicate through E-mail with other scientists across the globe, access full text databases, navigate to on-line catalogues of universities and research institutes situated at different corners of the world, access national and international databases, download files, copy electronic journals or get informal advises on their research topic.

Under such technological onslaught it has become imperative for every agriculture research institute to modernize its library system by applying latest developments in Information Technology. An agricultural university or research institute should form part of an integrated information system or if it is in an apt position it should organise an Integrated Agricultural Information System.

This paper surveys the Agricultural Research Institutions in Kerala and proposes an Agricultural and Farm Information System that connects all these institutions.

3 AGRICULTURAL RESEARCH INSTITUTIONS

The most important system in Kerala that deals with Agricultural education and research is Kerala Agricultural University (KAU). The University has a Main Campus at Vellanikkara, geographically a centralized position of Kerala. It has eight constituent colleges and 31 research stations scattered all over the State. The colleges are College of Agriculture and Home Science at Trivandrum; College of Fisheries at Cochin; Colleges of Horticulture and Forestry at Main Campus; Colleges of Veterinary and Animal Scences and Co-operation and Banking at Mannuthy in Trichur; College of Agriculture Engineering and Technology at Malappuram; College of Agriculture at Kasaragod and College of Dairy Science and Technology to be established shortly at Idukki.

Then there are institutes under ICAR; Central Tuber Crops Research Institute at Trivandrum, Central Plantation Crops Research Institute at Kasaragod and National Research Centre in Spices at Calicut.

There are also some institutions established by Central and State Governments which have their libraries. They are Kerala Forest Research Institute; Tropical Botanical Garden and Research Institute;

Rubber Research Institute; Centre for Water Resources Development and Management; Central Integrated Pest Management Centre; Central Marine Fisheries Research Institute *etc.* Oil farm India Ltd., Spices Board; Central Institute of Fisheries Technology; Coconut Development Board; Tea Board; Farm Information Bureau, Kerala Live Stock Development Board; Poultry Development Corporation; Fertilisers and Chemicals of Travancore, Indian Potash, Kerafed; Horticultural Development Corporation; Agromachinaries Corporation *etc.* also have their libraries.

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Till recently there was no attempt at state level to co-ordinate and integrate the libraries and information systems to develop a feasible Agricultural Information System. But recently under the able guidance of Dr A M Michael, Vice Chancellor of Kerala Agricultural University, an agricultural scientist of international repute University has started its work to establish a modern information system. In an interview to *Indian Express* he stated that university has considerably strengthened its research in the past three years and further development in research has been becoming increasingly difficult without the effective support of a modern information system which is to be the backbone of any institution engaged in research and teaching.

As the universities, colleges and research stations of KAU are widely scattered all over the State, the information system planned by the university has to extend its services throughout the State. So with the huge infrastructure it is having and the support from various external sources that it can avail; KAU is in an apt position to establish an Agricultural and Farm Information System (AGFIS) in Kerala.

Like this in others states also Agricultural Universities will be in the apt position to establish an AGFIS. The university, research institutes and Government Departments should avoid duplication of effort in this regard and pool and share their information resources under the leadership of the University. ICAR or other organizations should co-ordinate such systems at national level.

4 INFORMATION DIVISION

An Agricultural University should have an efficient and strong Division for lookingafter this Integrated Information System. Information Science is the key to success in research and development

in agriculture. In the field of agriculture and related areas also the process of research itself is becoming more and more complex and the function has come to be keenly dependent on efficient information services. The Division should also make available information on ongoing research on agricultural sciences all over the world. This has a scientific and technical focus on one had and an administrative focus on the other. The scientific aspect is that it serves to complement the published literature by bridging the prepublication information gap which exists between the time when a research project is initiated and the time its results become available in published form. The administrative aspect deals with relevant human, organisational and economic resources, including the patterned inter-relationships which exist among researchers, sources of funding, research institutions and funding levels. So an efficient information system is a powerful resource for policy makers, research managers and researchers. An efficient library and information system helps to avoid unwarranted duplication of research effort.

41 OFFICIAL NAME OF THE DIVISION

As a harbinger of modernization the official name of the University Library System may be changed to DIRECTORATE OF LIBRARY AND INFORMATICS (DLI). In Kerala; as the KAU Act specifies no name for this division of the university. It is not contrary to any provisions of the Act. As university Librarian is as per KAU Act, an Officer of University with equal status of Directors, Deans *etc.*, naming of this Office as DLI is essential. Other divisions are named as Directorate of Research, Directorate of Extension, Directorate of Physical Plant *etc.* Giving this official name to the library system will bring it outside the traditional concepts about a library system and will also give it, its due position among divisions of the University which play crucial role in education, research and development activities.

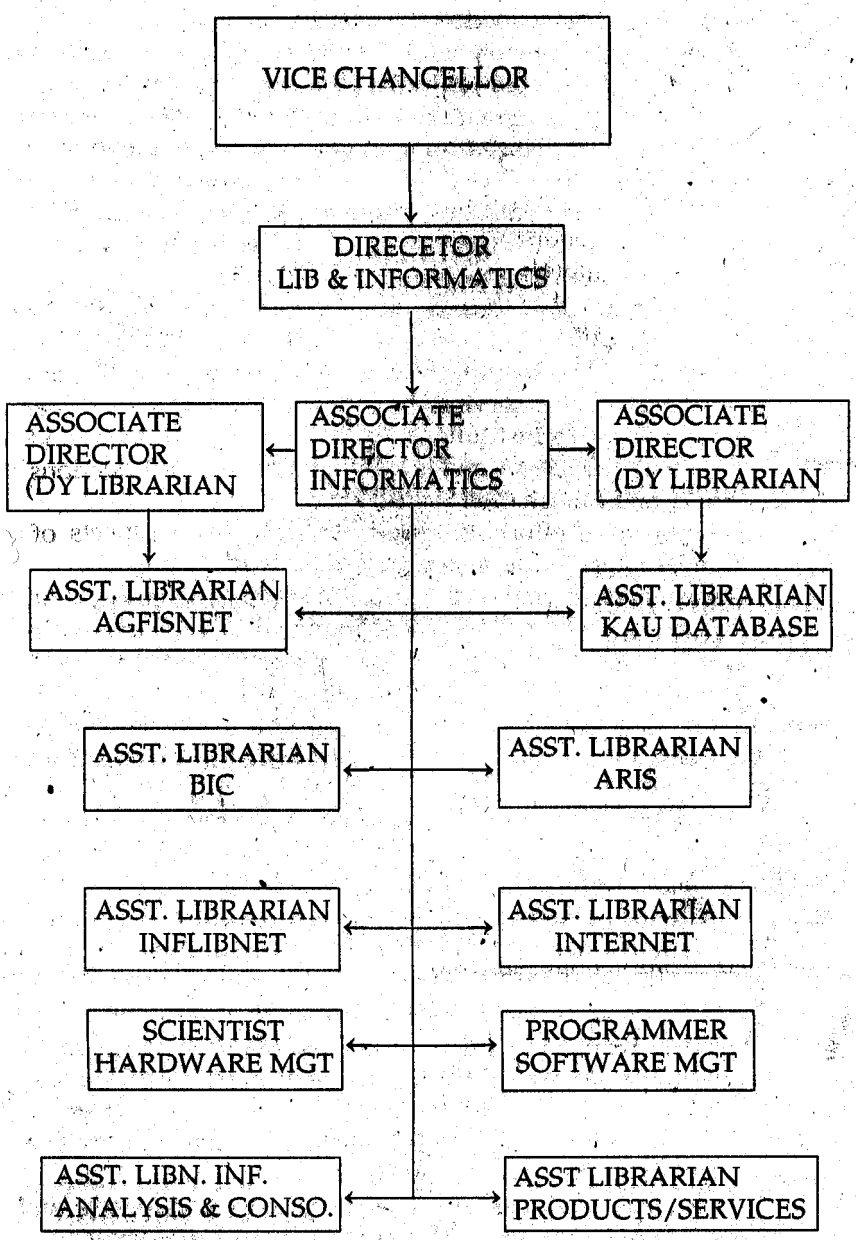
So the role of information is unique and it is essential to give to the division that handles information and equal position among other divisions or departments of the University. In Kerala Agricultural University; Library and Information Division has remained for decades without much attention. But now modernization programmes have already started.

42. OBJECTIVES OF DIRECTORATE OF LIBRARY AN INFORMATICS (DLI)

It is essential to define the objectives of the Division in Statues or other Documents of the University in the context of AGFIS. The

objectives of DLI can be defined as follows:

* To provide a Library and Information Service Network consisting of the libraries in the University campus, colleges, research stations, agricultural research institutes in the State and also the specialized information Systems available to the University.
* To build up information resources, prepare computerised databases on agricultural Sciences and to develop relevant information handling tools and techniques.
* To continuously asses the agricultural information requirements of the University and the State and to create necessary infrastructure and to provide information and computer support services to colleges and research stations and participating institutions.
* To evolve standards and guidelines for various aspects of Library and Information Systems and Networks.
* To co-ordinate efforts to access information on Agricultural Sciences world wide including establishing of linkages with national and international Agricultural Information Systems.
* To provide an active network mode in which agricultural scientists, students and decision makers get access to the community of agricultural scientists, answer requests for information in an interpretive and discussive mode and actively initiate dialogue on the fields of research and extension.
* To provide information retrieval services either on-line or off-line in all areas of Agricultural Sciences and to give overall information support in all field of knowledge.
* To conduct training courses in the specialized areas of information handling in agricultural sciences to meet manpower requirements for handling various subsystems of AGFIS and also divisions of information systems in which AGFIS participate like ARIS, BTIS, INFLIBNET *etc.* and their application to educational research and development programmes in the State.
* To perform research into advanced methods of computer based information processing and retrieval.
* To develop software package specific to user needs and conduct studies on utilization of indigenous hardware *etc.*
* To implement User Education Programmes for scientists and students on subjects like Information sources, literature search, indexing and abstracting procedures, Computerised



Systems approach of Informatics Division, Directorate of Library and Information, KAU

Information retrieval, *etc.*

* To provide inservice training for library and information professionals.
* To provide consultancy services for Libraries and Information Centres in the State.

43 INFORMATION STORAGE MEDIA

Due to information explosion and onslaught of new information storage media, only 20 to 30 per cent of up-to-date information reach us through print. The other seventy per cent come to us through specialized information systems established elsewhere like BITS, ARIS, GISTNIC, INFLIBNET, *etc.*, or in machine readable media, So DLI has to harness current information technologies consisting of computer, communication and networking technology to improve its resources and provide timely and effective services.

Many reference books, specialized collections, full set of back volumes of important journals in agricultural sciences and many other large textual databases are now available in CD-ROMs. Many such databases are available integrated with text, graphic, sound, video animation, *etc.*, as interactive systems. They are also cost effective than print media. DLI should install a CD network to share the information that it acquires in CD-ROMs *etc.* with Colleges, Research Stations and also with other institutions that participate in AGFIS.

Using the available micro earth stations and computer peripherals, DLI should make available to library users information from millions of bibliographic and full text records kept in thousands of libraries and information systems of the world and also the electronic journals on highly specialized areas which bypass print technology accessible to us through various networks.

5 INTEGRATED INFORMATION SYSTEM (AGFIS)

Traditional library systems and printed materials cannot meet the present day information requirements of agricultural education and research. Even independent automated systems cannot track required information on all fields of agricultural sciences. Hence, the present trend as seen in modernized library systems is towards improving access to networked information as compared to the traditional commitment to developing self sufficient collections. All information systems in which university participates like BTIS, ARIS, INFLIBNET *etc.* should form part of Library and Information Systems under DLI.

If all information systems available to the university work together, co-ordinated by DLI access and utilization of maximum information at minimum cost will become possible. At present information systems and equipments available to the universities under various schemes like BTIS, ARIS, INFLBNET *etc.* are kept at various departments in many universities including KAU. If information systems in the university work in isolation as at present, systems like AGFIS will not be possible and services will also be restricted to one or two specific subject fields and access will be restricted within some groups of scientists. Also professionals trained in information technology available to libraries will not be available to these isolated Information Systems to make them achieve their goal. Maximum utility of individual systems can not be extracted and services can not be extended to all the colleges, research institutes and Government departments. But an integrated information system can reach all, including the farmers at their village if it is well planned.

So the university should interconnect as AGFIS under DLI, all information systems available to it from various project like BTIS, ARIS, INFLIBNET, *etc.*, as suggested in Diagram II to be able to retrieve and correlate maximum information on agricultural sciences.

In such an integrated system, AGFIS can achieve the following benefits:

(*a*) Professionals trained in library and information technology will be sufficiently available to all information systems.

(*b*) Computer scientist recruited with support from various schemes can be pooled together and used in the integrated library and information system of the University.

(*c*) Computer and communication equipments received by the university under various schemes can be installed at different regions of the state on a set plan to form the WAN and make AGFIS a reality.

(*d*) This can enable scientists and research scholars of all colleges and stations of the university and participating institutions to use resources and services of the world through AGFIS.

(*e*) This will give the university's information system high reliability at less cost and manpower.

So bringing all information systems of the university and their computer and communication equipments under DLI as subsystems of AGFIS and extending their use through university's own network

is an inevitable necessity to enable all agricultural scientists and research students of the state to have all information generated by agricultural research institutes all over the world.

51 AGFISNET

Agfisnet at KAU will consist of Information Systems specializing in various subject fields available to the University, six Local Area Networks organised by Central Library and College Libraries, 31 Research Stations, participating institutions and an apex AGFISNET centre at the DLI to co-ordinate the activities of this Library and Information Service Network.

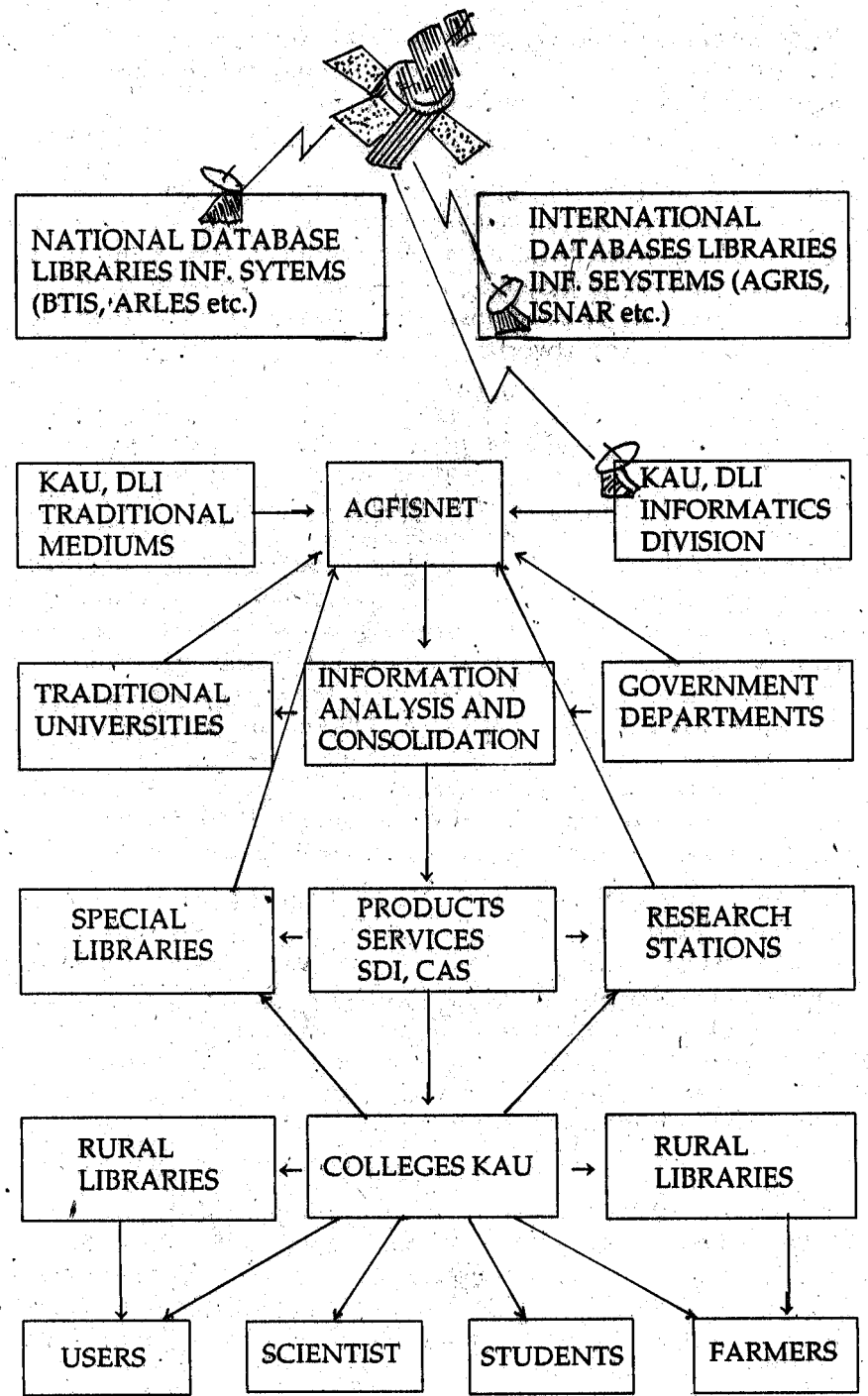
52 AGFIS CENTRE

Apex centre or AGFIS will function at DLI in main campus for co-ordinating, organising and providing information services covering a wide range of subjects of Agricultural Sciences to Colleges and Research Institutions. It will co-ordinate the activities of six Campus Networks and will provide communication network between various Campus Networks and Research Institutes. It will also co-ordinate the linkages and co-operate with external sources of information like IARI where all journals in agricultural sciences will be subscribed and their use will be shared with agricultural universities of the country and also BTIS, ARIS, INFLIBNET, etc. AGFIS will also provide linkages with libraries and documentation and information centres abroad which maintain computerised databases. This centre will have the responsibility to exchange on-line information to College Campus Networks and Research Institutes to meet their specific requirements.

This centre will have all the facilities to discharge the above functions. Micro Earth Stations received by the university under various schemes will be pooled together and shared by different colleges to enable sharing of information resources. Computerised database of all the documents available in University Central Library, college libraries and research institutes in the state will be maintained at the centre. A CD-ROM Network with 64 CD Drives will be established here and connected to AGFIS.

53 INFORMATION SYSTEMS

Various Information Systems and network participations allowed to the University like ARIS, BTIS, INFLIBNET etc. will function at AGFISNET centre. Access to them will be possible to all colleges and research institutes through AGFISNET. The databases in CD-ROM Network will always be ready for on-line search arising from any


NATIONAL DATABASE LIBRARIES INF. SYTEMS (BTIS, ARLES etc.)
INTERNATIONAL DATABASES LIBRARIES INF. SEYSTEMS (AGRIS, ISNAR etc.)
KAU, DLI TRADITIONAL MEDIUMS
AGFISNET
KAU, DLI INFORMATICS DIVISION
TRADITIONAL UNIVERSITIES
INFORMATION ANALYSIS AND CONSOLIDATION
GOVERNMENT DEPARTMENTS
SPECIAL LIBRARIES
PRODUCTS SERVICES SDI, CAS
RESEARCH STATIONS
RURAL LIBRARIES
COLLEGES KAU
RURAL LIBRARIES
USERS
SCIENTIST
STUDENTS
FARMERS

node in the six Campus Networks or Research Stations or outside institutions with which KAU have resource sharing programmes.

BTIS, ARIS, DAI, INFLIBNET, GISTNIC, NISSAT, ENVIS, AGRIUNIS, are a few of the national information systems and resource sharing programmes in which the university is participating or from where information can be accessed and disseminated by it through AGFIS. At international level the University participates in ISNAR, COGENT, AGRIBUSINES USA, AGRICOLA, AGRIS INTERNATIONAL, CAB ABSTRACTS ON-LINE *etc.*

These databases are a few from the hundreds of data bases existing in agricultural sciences and related areas. AGFIS can provide priced and non-priced on-line information retrieval services which will enables AGFIS users to access information; bibliographic or full text from millions of documents existing in hundreds of data bases all over the world which covers scientific and technical literature from full text journals, news papers and other sources.

54 CAMPUS NETWORKS

Local Area Networks will be set up in each of the campuses of the University, the main campus in Vellanikkara and College Campuses at districts of Kasaragod, Malappuram, Trichur, Eranakulam and Trivandrum. One micro earth station will be installed in each of the campuses according to their availability to the university from various schemes and information systems. This will give to these campus networks strong communication capabilities to access information from AGFISNET and also external data bases.

55 RESEARCH STATION NODES

Each Research Station will be given a pentium which can be connected to the Public Switched Telephone Network (PSTL) through dial-up modems to the college campus networks and through them to the Central Node. Any outside institution participating in the programme can also access AGFIS in the same way. If a Village Library can afford a PC and a telephone with support from Agriculture Department; farmers can have direct access to AGFIS from their village.

56 KAU DATABASES

The Kerala Agricultural University will prepare at DLI bibliographical and full text databases on location specific and regional agro-climatic based Agricultural and related Technologies on which KAU only can specialize. KAU can share these databases with other institutions so that the University will have a position of repute

among all resource sharing information systems.

6 HUMANWARE FOR AGFIS

Human beings are the most important components of an information system. The first and most important requirements for the effective functioning of any information system is the availability of qualified and experienced staff. University should reorganize its library system in a way in which sufficient qualified library and information science professionals become available to the University's Informatics Division. The organization of the Informatics Division of the University should be done as suggested (Diagram 1) under an Associate Director with required qualification and experience in automated information systems. Each section of the informatics division should be manned by an Assistant Librarian. The staff of the Informatics Division of DLI should have the following qualifications and experience in accordance with recommendation of UGC.

61 ASSOCIATE DIRECTOR

Associate Director of Library and Informatics will be in Deputy Librarian's Grade suggested by the UGC and will have the pay scale of Rs 3700-125-4900-150-5700.

Qualifications (Essential)

1 Master's Degree in Library and Information Science with specialization in Computer Application to Library and Information Services or Information handling in Science and Technology and atleast 55 per cent marks or its equalent grade.
2 Eight years experience in automated information systems.
3 Continuous research activity and innovation in library and information services evidenced by published work.

Qualifications (Desirable)

1 Doctoral Degree or equivalent published work in the field of Computer Application/Information Technology/Library Network.
2 Experience and proven ability in conducting courses on Information Technology and the use of various communication medias in teaching.

62 ASSISTANT LIBRARIAN

Assistant librarian should be in the UGC scale of pay of Rs 2200-75-2800-100-4000.

Qualifications (Essential)

1 Master's Degree in Library and Information Science with 55 per cent marks and National Eligibility Test of UGC.

2 Certificate/Diploma in Computer Application/Information Handling in Agricultural Sciences or related areas.

Desirable

Experience in automated Library or Information Systems.

6.3 INSERVICE TRAINING

For the success of AGFIS it would be essential to give priority to education and training of manpower. It is the man at the job who matters. If we recruit specialized staff and give excellent education and training to already available library and information professionals AGFIS will function efficiently. DLI should conduct necessary training programmes in information technology.

7 CONCLUSION

Now there is lack of co-ordination among the various research institution specialising in agricultural sciences and related areas in the State. Government's agricultural information services also operate independently. Considering the importance of information in agricultural research and development, the present information explosion and the wastage of resources due to duplication of effort in research and information systems, it has become urgent to have a conserted effort in the information sector to pool and share the information resources at State level. Kerala Agricultural University (KAU) considering its available facilities for collection organisation and dissemination of information, is no doubt the most suitable institution in Kerala to locate the State level information centre (AGFIS) as central facility. AGFIS can help the State's agricultural and farm information steering to achieve maximum productivity and avoid unnecessary duplication of resources and finance in agriculture research and developments.

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