AGRICULTURAL INFORMATION AND PUBLICATION SYSTEMS AND SERVICES

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ABSTRACT

An overview is given of the role and value of agricultural information to policy makers, researchers, scientists and extension workers. The need for ready access to agricultural research information and repackaging of such information for other users such as extension workers is stressed. Ways of obtaining such information are highlighted with emphasis given to recent developments in information technology, particularly the use of electronic databases and CD-ROM technology. CABI's role as information provider and publisher with a special focus on the needs of developing countries is discussed briefly. The importance of training and familiarisation with developments in information technology is also emphasised. Some new information products based on CD-ROM technology (such as the Crop Protection Compendium and the proposed Forestry Compendium) add on encouraging prospects for information support of user needs in the region. These and similar developments together with the existing range of printed and electronic products have equipped the Organisation with the tools to play a dynamic role in bridging the information gap between developed and the developing countries. Some proposals to address this imbalance for Papua New Guinea are tabled for discussion.

***Key words**: Agriculture, information, publications, research, extension, database technology.*

INTRODUCTION

It is an acknowledged fact that agricultural scientists and farmers in the developed world can have immediate access scientific and technical information that is unavailable to many developing countries. There are varied reasons for this continuing scenario but one of the most important one is the lack of foreign exchange to allow the purchase of publications that are so vital to the scientific community to enable them to play their roles effectively. Other reasons could be the lack of recognition of the importance of information by policy makers or the lack of a proper infrastructure to cater for the different functions of an organisation. Policy makers at times find it difficult to understand the fuss that is being made on information needs, citing other more important priorities like feeding the poor and blinded to the fact that satisfying the information needs of scientists and farmers has the potentials to boost productivity and hence to reduce poverty. Fortunately, in economic development planning, policy makers are beginning to stress the role of information (Hammond 1990) especially in the areas of science and technology. Similarly, donor agencies are beginning to accept information provision as an important component in the rehabilitation of National Agricultural Research Systems (NARS).

NARS in developing countries can operate effectively if they have adequate resources and facilities to allow scientists to carry out research. The results of research would subsequently be fed to the end-users (the farmers, in this case) in a form suitable to the needs of the farmer. In the absence of information, time and funds are wasted through duplication of research which a developing country can ill afford.

Information is a vital component of NARS. Its value lies in the fact that knowledge can be used either to guide decision making or to encourage the introduction of more productive agricultural systems or technologies that will enable adoption of such systems.

INFORMATION SOURCES

Depending on the nature or type required, information may be sourced through books, journals or electronic databases. These are obtainable from

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libraries or institutions (either research or industry, including advisory groups) providing such services. Communications between scientists (peer groups) in the research community remain an important basis for exchange of information. Conference proceedings (subject-specific or crop-specific) are important sources of information and abstracts may be found in the more reliable databases.

One of the most important developments in the past 5 years has been CD-ROM technology and the use of CD-ROMs as a medium of information storage. It is already fast gaining popularity and will no doubt be widely used or promoted as the medium for information transfer by the information providers catering to agriculture worldwide. Among the notable organisations that are great proponents of this technology are CABI (for CAB ABSTRACTS), IFIS (for Food Science and Technology Abstracts), CARIS (Current Agricultural Research and Information Systems), AGRIS (the FAO Abstracts database) and AGRICOLA (database of the National Agricultural Library (NAL) of the United States Department of Agriculture).

I would like at this point to talk at some length of CAB International and how I perceive its resources and services can assist Papua New Guinea in the areas of information transfer and training.

ROLE OF CABI AS AN INFORMATION PROVIDER

CAB International (or CABI) is an intergovernmental not-for-profit organisation with its Headquarters based at Wallingford in the United Kingdom. The Organisation, established in 1928, currently has 36 member countries which enjoy certain privileges in terms of availability of resources and member country rates for its wide range of information products.

The Scientific Services provided by CABI's four scientific institutes focus on identification services for insects, fungi and other microorganisms as well as research and consultancy services in biological control and integrated pest management. All the four institutes also offer training courses in their specializations.

The Information Services of CABI are largely responsible for collating and disseminating scientific and technical information in support of agriculture, forestry, veterinary science, human nutrition and health, the environment, rural development and related subjects world-wide (Ogbourne 1993). This it does through its bibliographic database (the CAB ABSTRACTS database) from which a number of information products are produced. These are abstract journals (46 titles), primary journals (4 titles) and electronic products such as CABCD and the more specialised CD-ROMs, the CAB SPECTRUM series (12 titles).

CABI has expertise in the use of information technology for the development of new electronic products and publication systems to expedite the transfer or dissemination of agricultural information and online access to the agricultural database (Gilmore 1993).

CABI also has an expanding book publishing programme covering a similar range of topics with some 50 new titles targeted yearly.

A Marketing Department handles all aspects of marketing and sales of printed and electronic products, while project management is handled by Developing Services.

Since this Meeting is centred on agricultural information and publication systems we have to address two issues that would be pertinent if "effective delivery of agricultural services to the farmers" is to be achieved. These issues are:

1. Access to scientific information
2. Repackaging and delivery of scientific information

ACCESS TO SCIENTIFIC INFORMATION

Prior to the development of electronic databases, it has been the practice to scan through volumes of hard prints either through author search or subject search to access the relevant literature on the topic of interest to the researcher. Where computerisation has taken its hold, this practice has given way to the use of electronic databases from which access to the required information is through the use of a user-friendly search software. Several electronic databases are currently available on agriculture (including livestock), forestry and related sciences. Among the most renowned of these is the CAB ABSTRACTS database "in terms of coverage and quality of abstracts" (quoting the words of Librarians of some of the biggest agricultural libraries in Southeast Asia). Perhaps some understanding of how this database has

been developed is necessary, as some or all these steps may be necessary should PNG decide at a later date to develop its own electronic database from national literature available.

The CAB ABSTRACTS Database

Over 100 scientists and linguists in five subject-specialized Divisions scan, abstract and index primary literature published world-wide on agriculture, forestry, human health, the environment, and related sciences. More than 150,000 new records (> 95% with abstracts) are added to the database each year. These records are also published in a series of abstract journals currently nearly 50 in number. The whole database dates back to 1973 and contains over 3.0 million records.

ACQUISITION OF LITERATURE

An Accessions Unit acquires all the relevant scientific and technical literature for the editorial staff preparing input to CAB ABSTRACTS. Every year over 14000 serials(more than 50,000 issues per year, published in some 60 languages), books, conference reports as well as more than 4000 monographs are handled by this Unit. To obtain all these titles, the Unit liaises with several thousand publishers, cooperating libraries and other sources of literature worldwide.

SUBJECT COVERAGE

Subjects covered include : animal and crop husbandry, animal and plant breeding, plant protection, plant and animal genetics, land management, soils, the environment in relation to land use, forestry, agricultural engineering, agricultural economics, veterinary medicine, human nutrition, human health including community medicine and communicable diseases, rural development, agricultural leisure, recreation and tourism.

QUALITY STANDARDS

Items selected for abstracting are mainly those which report original research or contain new interpretations or applications of scientific knowledge. New records must be as up-to-date as possible, high in information content and well indexed. Citations of journal titles need to conform to international guidelines, subject indexing needs to be consistent, precise and comprehensive (Wightman 1991).

Access to CAB ABSTRACTS

CAB ABSTRACTS is available through printed journals, online, on magnetic tapes and diskettes as well as on CD-ROM.

Online: The database is accessible through a number of online hosts namely, DIALOG Information Services, Inc (USA), ESA-IRS (Italy), DIMDI (Germany), DATA-STAR (UK), STN International/ JICST (Japan) and CAN/OLE (Canada).

Magnetic Tapes: These are available on lease to organisations who prefer to use their own computer systems to provide information services to their management and professional staff. Updates are on monthly basis.

CD-ROM: Abstracts prepared since 1984 may also be accessed via CABCD on 4 compact discs covering 1984-86 (Vol.1), 1987-89 (Vol.2) and 1990-92 (Vol.3). The first issue covering 1993 for the period 1993-96 (Vol.4) is to be released soon. CD-ROM a storage medium is by far the most popular and fast gaining popularity as computers and CD-ROM drives become more easily available and pricing of such hardware becomes more competitive. Updates which used to be annually are now on quarterly basis.

In addition, a series of 10 CD-ROM titles in the CAB SPECTRUM series each cover at least 20 years of literature, from 1973 to the present, on a particular discipline. They are BEASTCD (animal production and breeding), VETCD (veterinary medicine), TREECD (forestry), CABPESTCD (crop protection), HORTCD (horticulture and plantation crops), SOILCD (land management, soils and water), PLANTGENECD (plant genetics and biotechnology), CROPCD (field crops and grasslands), AGECONCD (agricultural economics and rural development), and E-CD (environmental quality and degradation).

CD-ROM TECHNOLOGY

Compact Disc Read Only Memory (CD-ROM) is a new technology for the retrieval of large amounts of information from an optical disc. Physically the CD-ROM device has a laser disc drive (or "player") which is about the same size as a normal 5 1/4" drive. The removable disc is 4 3/4" in diameter and has a capacity of 550-650Mb, equivalent to more

than 1500 360K floppy disks. Information stored in a CD-ROM can be loaded into memory (RAM), displayed and printed, as with other media but is different only in that the data in RAM cannot be altered so that the original copy is always intact. The CD-ROM is a major advance in the provision of machine-readable bibliographic databases for regions where telecommunications are unreliable and the cost of online searching makes the use of online databases difficult or impossible. Fast, flexible, user-friendly access to large volumes of information is possible for a modest capital outlay and low running costs. Capital expenditure is limited to a compatible personal computer (PC), disc player/drive, printer and the CD-ROMs themselves. With a little training, the only costs after that would be staff time spent on the searches.

For those with little or no knowledge of computers, special training courses are available or could be arranged and CD-ROM training manuals can be made available to augment training needs.

ADVANTAGES OF CD-ROM

Durable medium
Powerful retrieval
Vast storage capacity
Simple technology
No telecommunications network necessary
Rapid access
Use with any desktop microcomputer
Easy to use

HOW CD-ROMS ARE USED

Single workstations	-	one CD, one computer
Daisy chaining	-	linking 2 or more CD-ROMs, up to 7 can be linked.
Networking	-	multiuser access to a CD-ROM station through a local area network (LAN).
Site licensing	-	multiple workstations using multiple CD-ROM players.
Modem access	-	dial-up access to a CD-ROM workstation through a modem and a telephone line.

REQUIREMENTS FOR USING A CD-ROM

- A computer (IBM XT,AT,PS/2 or 100% Compatibles)
- DOS version 3.1 or higher
- 640K RAM
- CD-ROM Extensions
- Controller Card
- CD-ROM Drive

[For Macintosh, System version 6.02 or higher; 2 MB memory, a hard disk of minimum 20Mb; a Macintosh-compatible SCSI CD-ROM drive]

DOCUMENT DELIVERY

CAB International also provides a document delivery service for the full text of papers referred to in the CAB ABSTRACTS database. This service is coordinated from the CABI Library Services Centre at Silwood Park, United Kingdom. The Centre is in a position to provide copies of most articles cited in the CAB ABSTRACTS journals and database.

PUBLICATION SYSTEMS

CAB International has a well established book and primary journal publishing arm and is responsible for the publication and timely distribution of books and journals worldwide. The organisation has now 12 primary journal titles with some 50 new book titles published each year while several new journal titles have been added in the past 3 years. Publications of the Bureau of Hygiene and Tropical Diseases (BHTD) have recently been added to the list. These high quality publications are of enormous importance to both developed and developing countries. The latter can often obtain them through funding agencies under projects which allow an information component to be factored in.

CAB International has a strong commitment to getting information products to users in the developing world (1993,Twelfth Review Conference) and has embarked on a number of new sponsorship programmes which effectively place journals and CD-ROM products in many developing countries. Such programmes are however on a short term basis and longer-term solutions are being sought through policies that allow self-sustaining programmes to be developed.

The introduction of desktop publishing softwares (e.g.Pagemaker, Ventura) and even the further development of existing word processors (Word 5.5 or Word for Windows, Ami-Pro, Wordstar, WordPerfect) allow modest publications to be undertaken by information/extension workers or the publishing unit within the country at minimal costs. This would be particularly useful for publications aimed for dissemination by extension workers to the farm level. Training in the use of such software would not be a problem.

OTHER SERVICES

In addition to the identification services offered by CABI's Scientific Services and the database, journals and other products from the Information Services, CABI can also provide expertise in information technology, including the production of CD-ROMs and advice on database development.

CABI can also offer training for information staff in abstracting, indexing and other aspects of information science either at CABI, Wallingford, UK or at the client's own location.

REPACKAGING AND DELIVERY OF SCIENTIFIC INFORMATION

While scientific information may be accessed in the ways described above, the information may need to be collated, re-worded or simplified in a language that is easily understood by extension workers or at the farmers level. This could be the English language itself or in the local language. The final version would be in the form of extension leaflets, brochures, manuals or booklets confined to a topic or problem or on a crop/commodity which are disseminated through an extension system. Desktop publishing of the kind described above could be provided and used to achieve this goal.

What is to be published, the depth of the subject, how the information is to be presented, and the level of technical terminology to be used would depend on various factors such as the target users, their needs and their level of literacy. Crucial to this process is for the scientists or researchers (considered the first level in the transfer of information technology) to be able to access reliable scientific information which already exists and needs only to be tapped by the various methods indicated earlier. Scientific papers are typically written by scientists for the consumption of other scientists and therefore there is need to repackage or modify the information in order to make it easily understood by other users, for example policy makers or extension officers.

THE GREY LITERATURE

In the past few years there has been a clamour for access to information that has not been formally published in either journals or books and which collectively has been designated "grey literature". Such literature may be difficult to find in conventional libraries and bibliographies. Examples are research reports circulated within an organisation and prepared for internal seminars. Product leaflets, extension materials, and market data also fall within this category. There may be of value in including selected literature of this type in regional or local information compilations, as for example in the IPM Bibliographic Database for SE Asia being compiled by CABI.

SOME NEW TRENDS

Several exciting developments in specialised or scientific software have emerged in recent years, such as electronic taxonomic keys for the identification of insects, weeds, etc with accompanying illustrations (e.g.CABIKEY) and textual data sheets providing standardised information on the species. CABI's Electronic Compendium for Crop Protection (Scott 1994), whose development has been supported by ACIAR, provides information on pests and diseases, including text, illustrations, distribution maps, bibliographic records, taxonomic keys, etc. in a user-friendly package on a PC. The Compendium can be linked with other information systems e.g.CABPESTCD, and the CLIMEX, a system for predicting climatic range of pests. A similar product, the Forestry Compendium will be developed in 1994. Geographical Information Systems (GIS) which have wider applications in the development of distribution maps of pests and diseases and crop production/agronomic information relating to districts, climate, soil types and crop yields provide another example.

Current interest in developing a Crop Protection Compendium for the Southeast Asia Region has stimulated a proposal to develop a bibliographic database for integrated pest management (IPM) which would be retrievable within the Compendium. The compilation and collation of this important database would place pest control in an envi-

ronmentally appropriate perspective: biological control would be featured as an important component of IPM where such information exists.

BIOSYSTEMATIC NETWORKING AND INFORMATION SHARING (BIONET INTERNATIONAL)

Sharing of taxonomic information (and expertise) on invertebrates and microorganisms is proposed in CABI's concept of BioNET International. Training programmes envisaged under this programme will benefit developing countries as apart from information sharing and human resource development there are also possibilities for institutional development.

PROPOSALS FOR PAPUA NEW GUINEA

With the objective of making global scientific information available to researchers which are relevant to Papua New Guinea and the need for repackaging such information to cater for extension/farmer levels, five proposals are tabled for your discussion. These are:

1. Training in CD-ROM use for researchers, as distinct from training for agricultural librarians which has a much wider scope and which could be provided and continued by CABI in the UK.

2. Training in desktop publishing for extension/ information units. This will involve use of desktop publishing software.

3. Local database development for efficient information management (e.g.using CDS/ISIS or dBASE 4 software).

4. Acquisition of CD-ROMs, scientific books and journals that have relevance to the needs of the scientific community.

5. Local participation in development of the Crop Protection Compendium for SE Asia.

These proposals could be incorporated into a single project for submission to donor funding or be the information component of a larger project that would stand a better chance of donor funding. CABI has had considerable experience in formulating such proposals and would be in a position to offer assistance.

The Asia Regional Office, backed by the full resources of CABI, would be able to support the formulation and implementation of such projects.

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