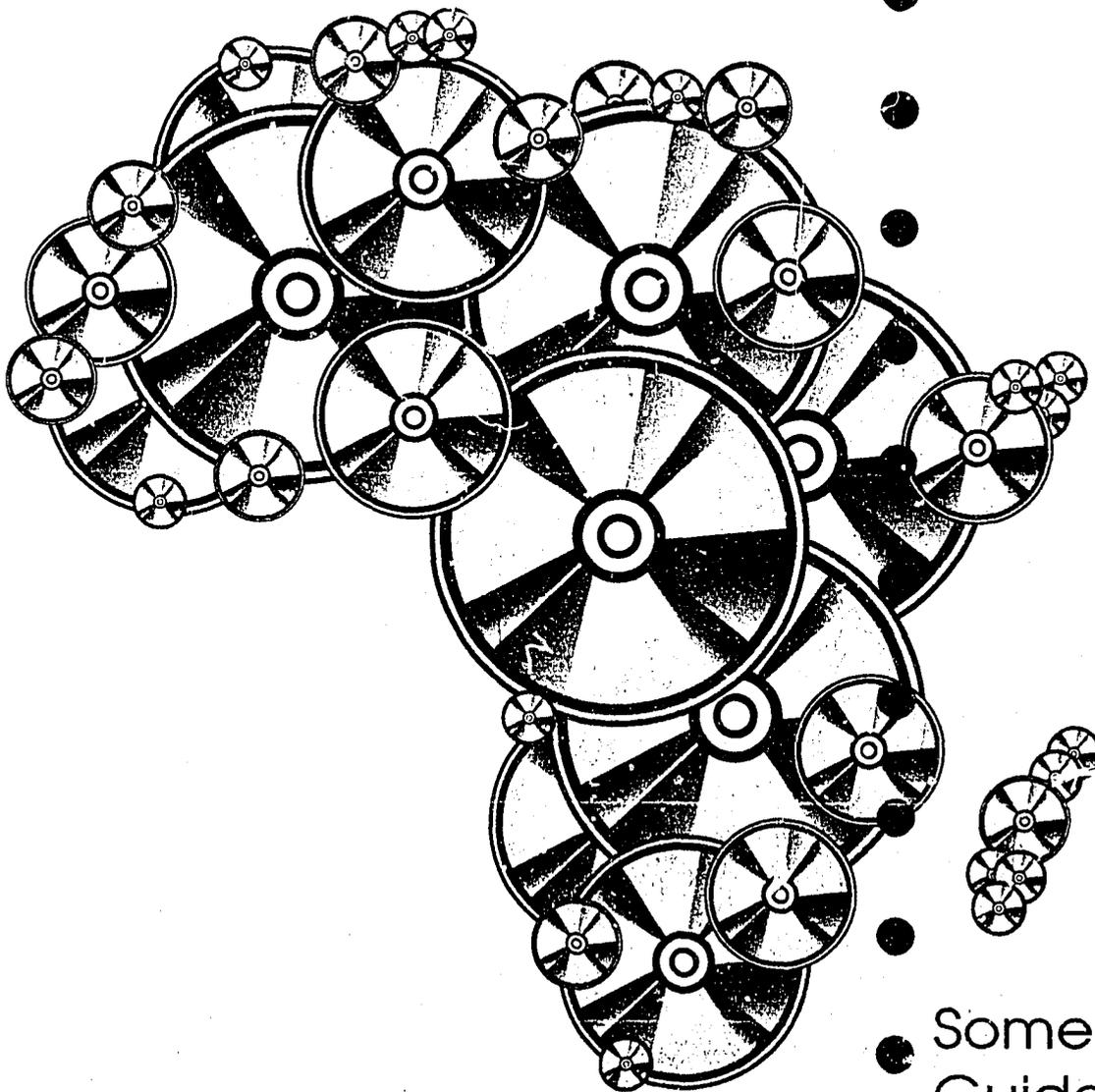


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# CD-ROM for African Research Needs



Some Basic  
Guidelines

CD-ROM  
for African Research Needs  
Some Basic  
Guidelines



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## Introduction

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That CD-ROM is an information technology with great potential for African scientists and scholars is not in question. The issue, however, is how to enhance the environment for CD-ROM usage on the continent, even though universities and research institutes are constricted by severe funding problems. Or put another way: how to sensitize African decisionmakers to the importance of CD-ROM as they grapple with conflicting demands for scarce financial resources.

Working with the Johns Hopkins University Center for Communication Programs and the Royal Tropical Institute of the Netherlands, AAAS developed the idea of organizing specialized CD-ROM seminars for decisionmakers.<sup>1</sup> The first was held in October 1992 in Harare during a three-day symposium organized by the Research Council of Zimbabwe (ZRC) for scientists from Southern Africa. The second seminar was arranged in conjunction with the Fifth General Conference of the Association of African Universities (AAU) in Accra in January 1993. The papers in this volume were presented at either or both of these seminars.

In addition to formal presentations, ample time was built into both programs for CD-ROM database demonstrations, which proved to be key to the success of the seminars. Seminar participants, many for the first time, had an opportunity to conduct their own literature searches. With more than 50 bibliographic and full-text databases to choose from, there was something of relevance to everyone. A list of these databases, categorized by disciplinary area, will be found in Appendix Two.

Ancillary activities were arranged as well. In Harare the University of Zimbabwe hosted a CD-ROM open house. The "expo" was advertised widely through posters and newspaper ads, with the result that the CD-ROM room was crowded with visitors throughout the day. Not only university students and lecturers came, but also secondary school students and members of the general public. In Accra a somewhat smaller CD-ROM demonstration was organized at the University of Ghana.

A third CD-ROM activity is worth mentioning here, as well. Together with the seminar in Accra, a two-day workshop for African research librarians was organized on how to market CD-ROM services. Intended for information professionals who already have CD-ROM capability in their own institutions, the workshop covered marketing principles and methods, evaluation techniques, and document delivery issues. Twenty librarians from seven countries participated in the workshop. AAAS will publish a CD-ROM marketing manual in 1993, which will be

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<sup>1</sup>See Appendix One for a description of the three collaborating organizations.

available free of charge.

Funding to support the AAAS Project for African Research Libraries, including the CD-ROM initiatives described above, is provided by the Carnegie Corporation of New York, the Ford Foundation, and the Agency for International Development. Additional grants to AAAS from UNESCO, the International Development Research Centre (IDRC), and the Technical Centre for Agricultural and Rural Cooperation (CTA) made possible the CD-ROM marketing workshop.

Recognizing the importance of these CD-ROM activities, SilverPlatter, EBSCO Electronic Information Services, University Microfilms, Inc., and Compact Cambridge provided supplemental financial and material support in Harare and Accra. Their contributions were complemented by database donations from CMC ReSearch, Dialog Information Services, Inc., the Johns Hopkins University Center for Communication Programs, and Macmillan New Media.

Finally, our thanks go to the University of Zimbabwe, the Research Council of Zimbabwe, the University of Ghana, and the Association of African Universities. Planning activities that require computers and other technical arrangements is easier to contemplate in the abstract than in reality. Despite a multitude of problems, our hosts in Harare and Accra were always able to cope and find appropriate solutions. We acknowledge their assistance with gratitude and admiration.

## CD-ROM Technology: Hardware and Software

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*Anne Compton<sup>2</sup>*

What is CD-ROM? CD-ROM is an acronym for the phrase Compact Disc-Read Only Memory. Compact indeed; actually smaller than a floppy disk. In just a few minutes I will explain the huge amount of information that this little disc can hold.

But what about this funny way of spelling disk? With a C instead of a K? The C is to distinguish this technology from standard computer technology. Floppy disks--spelled with a K--are written on and read with magnetic media. That is why floppy disks are so sensitive to environmental conditions. The information on compact discs, however, is stored and read with laser media. Disc with a C refers to high-capacity laser media.

So now we know about the C and D in CD-ROM. What about read only memory? If you have used a computer before, you know that you can create a file, perhaps a letter to someone. Then you can make changes to that letter--either then or later. You can recall--read--the letter and you can make changes to--write--the letter. With CD-ROM you can only read the information on the disc. You cannot write--change any of the information on the disc; it is not possible, even by accident. This is read only memory.

Now we know what CD-ROM stands for. Let's move onto why this particular technology is so important. Both for users of the information--all of you--and also for information providers.

There are six reasons why CD-ROM technology is important to all of us. The first is storage capacity. A CD-ROM disc can store up to 660 megabytes of data. If you do not like to think in terms of megabytes, consider hard drives. Most PCs have at least a 40 megabyte hard drive. These 660 megabytes would fill up almost 15 40 megabyte hard drives. Other comparisons can be made with floppy disks and paper. Those 660 megabytes would fill up over 1,800 floppy disks or store the amount of text that fills 330,000 pages of paper.

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<sup>2</sup>Anne Compton is Associate Director of the Population Information Program at the Johns Hopkins University Center for Communication Programs. Further information on the Center for Communication Programs will be found in Appendix One.

The second reason CD-ROM is important is durability. Only severe damage can make a disc unreadable. You do not have to worry about environmental problems--moisture/humidity, heat, power outages or fluctuations, or even spilling your coffee on it. The plastic used to manufacture a disc is the same polycarbonate material used to make bullet-proof glass. And remember that ROM means read only memory. The data on a disc cannot be tampered with, changed, overwritten, or erased. That means that CD-ROM discs are not susceptible to computer viruses.

The third reason CD-ROM technology is important is low mailing costs. A CD-ROM disc weighs 20 grams. The same amount of data in microfilm form would fill a box 8 x 10 cm.<sup>2</sup> The over 1,800 floppy disks we talked about previously would take up about 1/10 of a cubic meter. And those 330,00 pages would weigh almost two metric tons. Certainly the shipping cost of a single CD-ROM disc is less expensive. In addition, CD-ROM discs do not require special handling or packaging.

Our fourth reason is no telecommunications are needed. Access to computer databases by telephone links can range from impossible to prohibitively expensive in many countries. A computer modem is necessary, as well as telecommunications software, an adequate phone line, and considerable phone charges. CD-ROM bypasses all these problems as the CD-ROM disc can be accessed directly by the computer.

The fifth reason is easy and accurate budgeting. You subscribe to a CD-ROM database on an annual basis, which gives you unlimited access to that database. If you use it one hour a day or ten hours a day, the subscription price will still be the same. A slow, novice user of the system costs no more than a fast, expert user. This is very different from systems accessed by telecommunications where the cost is a factor of time.

The sixth reason CD-ROM is important is that it can be used directly by an end-user. I am using the phrase end-user to designate the person, the researcher, who actually needs the information. A CD-ROM system offers direct access to a database that, if accessed by a librarian via telecommunications, would be very costly. The CD-ROM system is always there. It does not take breaks, or go to lunch, or go on holiday. CD-ROM software is more user-friendly than online systems software. Software developers have learned a lot in the last 20 years, and the process of retrieving information from a database has been greatly simplified with little loss of speed or retrieval quality.

CD-ROM technology is indeed wonderful, but let us take a quick look at some of its disadvantages. One is the high cost of a subscription to a CD-ROM database. These databases are not inexpensive. Publishers must set a relatively high price because a CD-ROM system, whether used one hour per day or ten, will cost the same. The CD-ROM version of a publisher's online system actually puts the publisher in the position of competing with himself.

The cost of a CD-ROM drive is an initial expense. We will talk in detail about drives later on, but for the moment a CD-ROM drive is the piece of equipment that attaches to the computer,

reads information from the compact disc, and sends it back from the disc to your PC. Prices have come down, and continue to drop, for CD-ROM drives. In 1988 a drive cost at least US \$1,000. In 1992 we are now able to get faster, better drives for about US \$400. But even \$400 may be prohibitively expensive for some organizations.

Another disadvantage is that the technology is growing and changing very rapidly. There are many types of optical storage technology--a name for a broader category of technology that includes CD-ROM. The different types and different standards make it difficult to make decisions about formats and equipment. Optical disc technology is in its infancy.

CD-ROM is slower than online systems. While the difference can be measured in terms of milliseconds, it can readily be perceived by a user who has experienced both types of systems.

As I said previously, there are numerous types of optical storage media. We are not going to review all of these, but I would like to explain a few that you may have heard of or will hear about in the near future.

CDA, CD Audio, Compact Disc Audio, is the most common type of compact disc and was the first widespread optical storage product. CDA stores sounds for playback, just like records or tapes. But remember the sound, which is digitized, is stored on the disc with a laser and read back off the disc with a laser--a compact disc player.

You may have heard of WORM, write-once read-many. It is related to CD-ROM. With a WORM drive and a WORM compact disc, you can write to the disc--but just once. Once you have written on a space on the disc, you cannot rewrite on the space. You can, however, read the disc just like a CD-ROM disc. WORM is used for specialized applications.

Coming along are rewriteable discs, MO, magneto-optical. You can write, erase, and rewrite on the same space on a disc. MO is a combination of magnetic and laser technology. It is a new and expensive technology. A drive is about \$4,000 and discs are about \$400. And, as with any new technology, the standards are not yet set.

CD-I, compact disc-interactive or multimedia, uses compact disc technology to store video, audio, and text. It is being developed primarily for the home consumer market. Users can interact with what they see on their displays. Products such as video games, museum explorations, and sports games have been developed.

There are many other types of optical storage media. Many are in the experimental stages and may never be used on a wide scale. Others may be too expensive, but some have, in a very short period of time, made a dramatic difference in this industry.

Now we need to talk about hardware, computer equipment. Obviously, we need a CD-ROM drive to read the disc. There are at least 30 CD-ROM drive manufacturers. And of course, all claim to be the best. Fortunately for us as buyers, CD-ROM drives are fairly simple and really

do not have that many components. CD-ROM drives are computer peripherals, in many ways less complicated than printers.

First we have the drive itself; into which the disc is inserted. This box contains the laser that reads the disc. Then there is an adapter board, sometimes called the controller card. This board fits inside your PC, just as a printer board fits. The adapter board allows your PC to accept data from the drive. And there is a cable that connects the board to the drive.

But simply connecting the drive to a PC is not enough. There is software called MSCDEX--Microsoft Compact Disc Extensions. It is an addition to the PC's operating system that allows the search and retrieval software for the CD-ROM database system to interact with the PC. And, of course, you need a user manual.

You need to be aware of all of these components when you purchase a drive. Make sure the price you are quoted includes: the CD-ROM drive, the adapter board, the cable, MSCDEX, the user manual, and a warranty. Most warranties are for 12 months.

Voltage is an important question when you select a drive. In most cases 220 voltage is necessary. We do not recommend purchasing a 110 volt drive and using an adapter. Too many times someone does not pay attention and plugs a 110 volt drive directly into the wall. Make sure the unit you order operates at 220. There are three ways in which voltage is regulated on CD-ROM drives. The unit can be totally 220--unable to operate at any other voltage or it can be switch-selectable. There is a switch that can be set at either 110 or 220. A third type is autosensing; the drive automatically adjusts to the current.

Other attributes to consider are physical dimensions, ease of use, speed, and price. Drives vary a lot in terms of size. Some are broad but thin, and can go between your monitor and hard drive. Others are shoe-box sized and sit beside your PC.

Most drives are very easy to use. You just insert the disc into the drive and begin. But take a look at where the on/off switch is and examine the disc caddy. Most drives come with a plastic case in which the disc is placed. This caddy protects the disc from dust, scratches, and dirty fingers. Most caddies are simple to open, but some are very difficult.

Speed can vary from 260-800 milliseconds--the time it takes for a drive to pass data from the disc to the PC. The faster the drive, the higher the price. Be careful about the speed criteria. Is a difference of 100 milliseconds really worth \$100? Most drives currently on the market have speeds ranging from 300-350 milliseconds.

And, of course, there is price. There is a wide range--from \$400 to \$1,000 depending on attributes. As I said previously, prices are going down. If you are interested in buying a drive, I invite you to take advantage of our service at the Johns Hopkins University Center for Communication Programs. We supply drives to many organizations in developing countries and are able to buy drives at quantity and educational discounts. We charge a ten percent handling

fee, but even with that we are able to offer much lower prices than you would be able to negotiate for a single drive.

There are a few more things you should know about drives. The style of drive we have talked about so far is external. An external drive is a separate unit attached to the PC with a cable. External drives can be standard or portable. Portable drives attach to the PC with a cable and need a power supply; they are slower than standard drives, but they are smaller and weigh less.

CD-ROM drives can also be internal. They fit inside a floppy disk drive slot on the PC. Since they are internal, they do not require a power supply and there is no voltage problem. Internal drives are less expensive, but they are harder to move from PC to PC.

Another style of drive is the jukebox or cartridge. It is a drive with multiple slots for inserting and reading discs. This type of drive switches from disc to disc according to user instruction. It is good for organizations that have a number of CD-ROM databases. You can also daisy-chain up to seven regular external CD-ROM drives with cables. The user then instructs the PC on which drive to access a particular database.

There is one more factor to take into consideration. CD-ROM drives are either Apple Macintosh-compatible or IBM-compatible. There is some work going on to develop a product that will support both, but nothing is readily available yet.

An attribute that affects both operation and price is the IBM PS/2 model. There are three kinds of adapter boards for drives: one kind for the Macintosh, one for PC/AT/XT and up through PS/2 model 30s, and one for PS/2 model 50s and above. The PS/2 50+ drive will cost about \$100 more than the others.

Now all we need is a microcomputer, a PC. This is one of the nicest parts of the CD-ROM system. You do not need a fancy, powerful PC to run a CD-ROM system. Remember that there are two basic CD-ROM system configurations--Apple Macintosh and IBM-compatible.

For an IBM-compatible system, you will need:

- a minimum of 640K in RAM with at least 512K of free RAM
- a monitor
- a standard keyboard
- a printer
- one floppy drive
- one hard drive
- PC DOS or MS DOS version 3.1 or higher

For an Apple Macintosh system you will need:

- 1 MB RAM

- a hard disk
- system 6.0.2+
- a standard keyboard
- a monitor

It is very desirable to have a printer. You also need to consider the type of CD-ROM databases you plan to purchase in terms of the monitor because databases with images usually require a computer with a graphics adaptor card and a monitor that can display graphics. These monitors range from CGA on the low quality side to EGA in the middle and VGA on the high side. There are also super VGAs and IBM's XGA. Some databases with images can be used on systems without graphics adapters, but realize that, in this case, only the text can be displayed, not the graphics.

I need to make one point about bringing CD-ROM into your organization. You need to know that a local area network (LAN) environment may complicate its installation and use. Putting CD-ROM on a LAN provides multiple user access to CD-ROM databases. LAN CD-ROM may, in the long term, be a less expensive proposition than multiple CD-ROM workstations and multiple subscriptions. But there are technical problems. LAN software has to be adjusted for CD-ROM. LAN CD-ROM systems can be much slower than stand-alone systems, there may be network licensing problems, and there are heavy initial capital expenses.

CD-ROM technology is fairly simple, easy to use, and, relatively inexpensive. But, as with many computer applications, it can become expensive and complicated. Carefully consider its impact on your staff and budget.

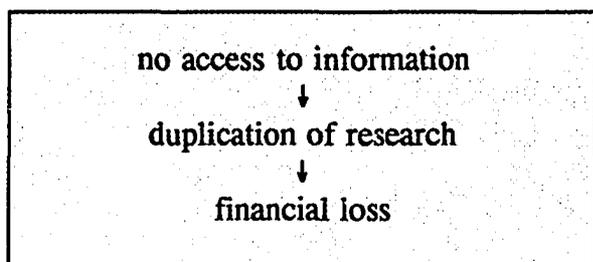
## CD-ROM Databases: Subjects and Formats

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*Marc Keylard<sup>3</sup>*

### Compact Discs and the Information Era

We live in a so-called information era. The growth of scientific literature and data has triggered the need for effective tools to gain access to the right information, at the right time, and in the right place. It has been estimated that the amount of scientific literature doubles about every 17 years. For a researcher, a policy maker, or an administrator, it has become almost impossible to keep abreast of the literature published in his or her specific field.



In the academic world, lack of access to scientific literature generally results in duplication of research efforts. For researchers working in industry, not consulting scientific information can have disastrous consequences; think of inadequate patent information or investing in research strategies that have been proven to fail in the past. Estimates on the losses directly resulting

from duplication of research are difficult to obtain, for no research institute or company has great appetite for publishing these figures. Now and then, however, estimates are published, with illuminating results: In the European Community's private sector, it is estimated that 15 billion ECU are lost annually because of duplication of research.<sup>4</sup>

As a result of the information explosion over the past decades, the industrialized world has been saturated with huge amounts of readily available information. Computers have made it possible for information seekers to find the needle of information in a gigantic haystack of sources. Computerized secondary sources, i.e., bibliographic databases, are now readily accessible from

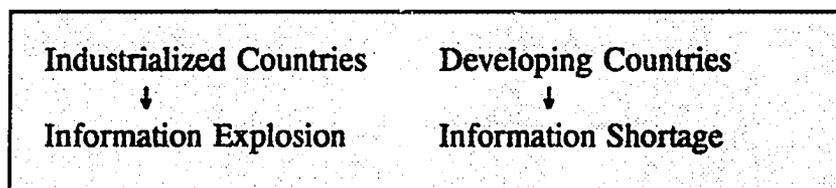
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<sup>3</sup>Until February 1993 Marc Keylard was Sales and Marketing Manager of the Royal Tropical Institute of the Netherlands. He is now POPLINE CD-ROM Manager of the Population Information Program at the Johns Hopkins University Center for Communication Programs.

<sup>4</sup>J. de Lange, "Eureka, alweer n' wiel," *Management Team*, 13(15), 1991

virtually any place in the industrialized world by linking computers via a telecommunications network to a host computer on which several databases are mounted (an online connection).

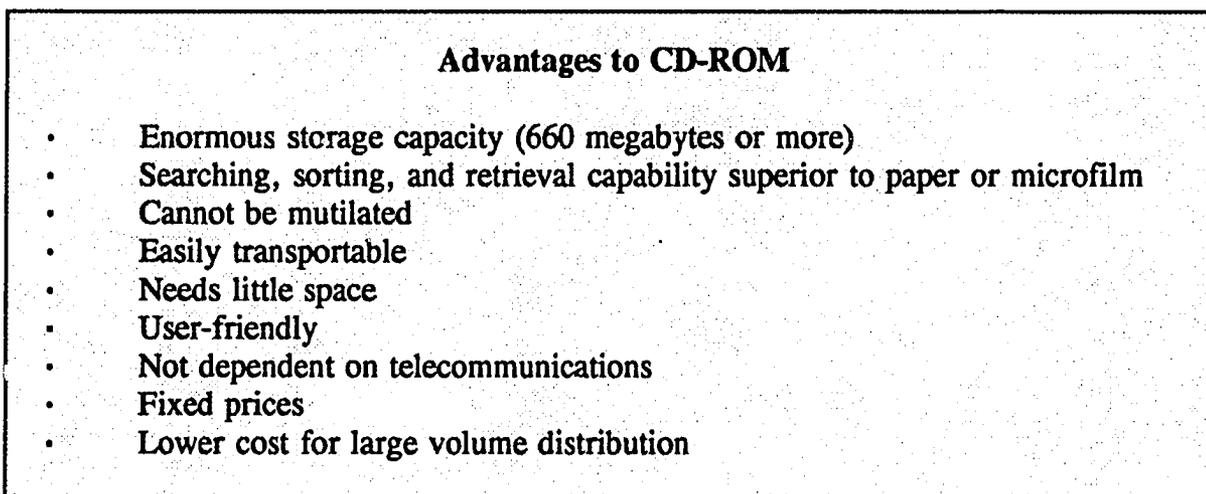
Information seekers in many developing countries, however, have virtually no access to the large computerized information sources, which has resulted in the emergence of an information gap



between the North and the South. Online access not only involves high costs in accessing and searching a particular database, but also includes telecommunications costs. In addition, in many developing countries, the lack

of an appropriate telecommunications infrastructure has made it difficult or impossible to establish online connections to host computers in the industrialized countries.

The compact disc was successfully launched in the audio industry in the early 1980s. The same disc, however, was also capable of storing enormous amounts of data. Thus, database producers who generally distribute their information products in two ways--on paper and through an online connection--were confronted with an opportunity to offer their clients a new way to access their products: the compact disc. Entire databases could be stored on one, or--in the case of extremely large files--multiple discs, at a relatively low cost. The economics of producing these CD-ROMs are favorable because the discs can be manufactured using the same facilities as those used for producing audio compact discs. Consequently, all kinds of databases in the fields of health and medicine, agriculture, the sciences, and humanities will be or have been published on CD-ROM. The chart below demonstrates a few of the general advantages of CD-ROM, particularly in developing countries.



## CD-ROM: Main Applications

- Over 3,000 CD-ROM publications on the market
- CD-ROM databases can contain:
  - text
  - graphics and images
  - audio

In general, CD-ROM databases can hold text, pictures (graphics and images), and sound. The first CD-ROMs to be produced were mainly bibliographic databases and other large text files that were also available in periodicals or in large book volumes. Now there are thousands of CD-ROM titles available, holding a variety of types of information.

Most CD-ROM titles carry bibliographic data. Researchers and students now have their choice of CD-ROM products holding secondary information of relevance to their discipline. To cite just a few examples of well-known databases now on compact disc: *MEDLINE*, *Science Citation Index*, *Social Science Citation Index*, *TROPAG & RURAL*, *AGRICOLA*, and *CAB Abstracts*.

### CD-ROM: Main Fields of Application

- Bibliographic databases
- Full-text journals
- Newspapers
- Directories
- Dictionaries
- Encyclopedias
- Patent specifications
- Legal materials
- Software systems
- Maintenance manuals
- Archives

Many CD-ROM databases contain full-text information on specific topics. You can find CD-ROMs with legal materials, patent specifications, multilingual encyclopedias, dictionaries, maintenance manuals, telephone directories, etc. Some publishers have begun to publish their scientific journals on compact disc in addition to a paper version. There is a wide variety of CD-ROM applications on the market today, including CD-ROM products containing software programs or large collections of graphic images. More and more applications are being considered, and because this technology is still emerging, we expect new and innovative products will enter the market in the future.

## **Purchasing CD-ROM Databases**

Some CD-ROM titles are sold on a one-time purchase basis; others can be acquired by taking out a subscription. CD-ROM databases that are not static are sold on a subscription basis. These include bibliographic databases, full-text journal volumes, financial data, etc. The data on these CD-ROMs become outdated (and remember that CD-ROM is a read-only medium!). Thus, a new disc, which contains the old and the newly added data, is produced annually, biannually, quarterly, or even more frequently. This new and updated disc is sent to the subscriber to replace the old, outdated disc. In many cases, the subscriber is asked to return outdated discs. Once the size of a database becomes too large to store on one disc, an archival disc is produced.

In general CD-ROM databases are sold for a fixed annual subscription rate. In most cases, the subscription is similar to a lease agreement. The subscriber is allowed to use the data and the software for the duration of the subscription. If you decide not to renew your subscription to a certain title, the publisher can request that the discs be returned. Therefore, it is essential to budget for CD-ROM subscriptions over the long term.

Subscription rates can vary substantially. Factors, such as the economic value of the information, the size of the database, the price of the retrieval software, the size of the market, and the update frequency all contribute to determining CD-ROM prices.

Most CD-ROM titles are the result of a joint venture between the data producer--the publisher or institute that produces the information--on the one hand and the CD-ROM vendor--the retrieval software producer--on the other. The agreement between both parties addresses issues such as costs and revenue sharing, production schemes and distribution, pricing, promotion and marketing policies, and update frequency.

For this seminar we have brought together a large collection of CD-ROM titles that we believe will be of interest to the African academic community. We hope that you will use the demonstration periods to familiarize yourselves with their contents.

## CD-ROM Costs and Implementation Issues

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*Lisbeth A. Levey*<sup>5</sup>

In 1990 the AAAS surveyed the more than 150 sub-Saharan African research libraries receiving journals under the auspices of the Journal Distribution Program to ascertain their computer and CD-ROM capability. Approximately 50 percent of these libraries responded to our request for information on equipment, training, and information collection and dissemination. A report was issued in 1991 and is available at no cost from AAAS.

Although about half the libraries had at least one microcomputer, only 15 of them had CD-ROM capability. And almost every one of those CD-ROM workstations had been obtained with donor support. In the two years since that initial survey, many more libraries have acquired computers, and a few more have also been able to procure CD-ROM drives. Thus, although the number of CD-ROM workstations in Africa still lags behind other developing regions, it is nevertheless growing. This presentation on costs and implementation issues is largely based on AAAS studies and staff visits to Africa.

We recognize that for the foreseeable future many sub-Saharan African institutions will continue to need external support in meeting their information needs, whether it be for books, print journals, electronic databases, or computers. A few universities and research institutes, however, do have some foreign currency available, although these funds must be juggled carefully to meet many conflicting demands. We hope that by providing you with an understanding of the costs and benefits involved in buying CD-ROM equipment and databases, you will be better placed to make purchasing decisions, whether your funds come from internal sources or through donor support. I should say at the outset, however, that, with the exception of the section on database subscriptions, I have no cost figures to share with you. Rather I want to raise issues of concern pertaining to costs and tradeoffs that you must consider when you think about obtaining a CD-ROM workstation for your institution.

Some costs, such as equipment costs, are one-time only, others recurring.

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<sup>5</sup>Lisbeth Levey is Director of the AAAS Project for African Research Libraries, which is described in Appendix One.

## **Equipment Costs**

In order to run a CD-ROM workstation you will need a microcomputer, a printer, and a CD-ROM drive. The microcomputer and printer are the most expensive components involved in creating a CD-ROM workstation. Many research libraries already have computers and printers, and there is no reason why a CD-ROM drive cannot be hooked up to one of the computers already in the library, at least at the outset. Thus, if your library has a microcomputer and a printer, your hardware costs can be minimized. At some point in the future, end user demand should mandate the creation of a dedicated CD-ROM workstation. To cite one instance in which demand now exceeds supply: at the University of Zambia Medical School, access to the sole CD-ROM workstation has to be rationed because interest in using the system has far outstripped the time available.

It is very tricky to talk about hardware costs in any developing country situation because the price we pay in New York or Washington is not what you would have to pay in Harare or elsewhere in Africa. As Anne Compton has told you, it is possible to buy a good CD-ROM drive in the United States for less than \$1,000. Shipping charges, customs clearing, and duty (if applicable) will increase these costs significantly. In Dar es Salaam the university library purchased its imported drive for £540.

One hopes that once paid for and installed, your computer, printer, and CD-ROM drive will all work without a hitch. The likelihood of that happening, however, is far from certain. Thus, equipment maintenance and repair costs need to be factored into your CD-ROM budget.

Printer supplies involve additional equipment costs. Questions that need to be asked include the following: Does the library have sufficient paper, ink, and toner to print out literature search results? Should the library try to recover some of those costs from researchers and students requesting literature searches? Would it be more efficient and cheaper to ask end users to supply a floppy disk so that information can be downloaded onto a disk rather than printed? What kind of printer should be used with the CD-ROM workstation? The University of Zimbabwe Medical Library uses a dot matrix printer rather than a laser printer to print out search results because the ribbons are cheaper and can be reused. In addition, feeder paper does not require staples.

## **Human Resource Costs**

### *Training*

CD-ROM managers need to be well trained if they are to be effective users of the technology. They must have basic computer skills (DOS, word processing, database management, etc.). Moreover, they should be able to trouble shoot if there are minor operating difficulties and there is no one available to help diagnose and solve the problem. Thus, it is a mistake to assume that the only training an information professional needs pertains to information retrieval techniques. The person who operates the CD-ROM workstation must also be comfortable with the entire operating system.

In addition, familiarity with the subject content of the databases to which the institution subscribes and an ability to ask end users precise questions are key to eliciting search results that meet the specific research needs of the requester. For example, several months ago a librarian in Angola asked me to conduct a literature search on *MEDLINE* for "malaria." A search of the January-June 1992 *MEDLINE* disc turned up over 500 references. This librarian had not asked the researcher who initially requested the search to be sufficiently specific about her information needs, in large part because he did not understand the magnitude of the database. Thus, I was unable to be of any assistance.

Some donor agencies, most notably the Technical Centre for Agricultural and Rural Cooperation (CTA), fund on-site training for their grantees whenever possible. In the case of CTA, a two-week course is arranged: basic computer training comes first and is then followed by training on information retrieval. Most donor agencies, however, do not automatically include CD-ROM training in their grants, so unless your university's librarian has used CD-ROM elsewhere, training becomes a cost that must be considered carefully.

Arranging training yourself can be accomplished in a number of ways. Short courses, preferably in-country, are probably the most efficient. In Nigeria the University of Ibadan has volunteered to be responsible for CD-ROM training at the national level, if its expenses can be met either through a government grant or by the universities themselves. The training would be carried out by University of Ibadan librarians, who are already familiar with CD-ROM technology, with assistance from the African Regional Centre for Information Sciences (ARCIS), which is located on the university campus; the International Institute for Tropical Agriculture in Ibadan; and the Nigerian Institute for International Affairs (NIIA) in Lagos.

Where might one go for assistance in paying for training? You might want to contact any of the UN agencies, particularly UNESCO. But don't leave out UNDP and UNFPA (which funds Anne Compton's POPLINE project). The British Council and USAID are two additional possibilities. In francophone countries BIEF (Banque Internationale d'Information sur les Etats Francophones) has been very active in funding CD-ROM activities, and might be a source of training assistance. It would certainly help to demonstrate that the training you envision would be of national benefit rather than to your institution alone.

Another possibility is to ask for one or two days of on-site training assistance from another institution in your country where CD-ROM is already in use. Any of the CGIAR centers, for example, might be willing to help out on an ad hoc basis. In addition, US Information Service (USIS) Regional Librarians have told me on several occasions that they would be willing to assist with training. I doubt whether USIS has funds available to underwrite training costs, but hands-on training assistance from its library staff could prove invaluable. The AAAS would be happy to provide you with names and addresses of libraries in your country that already have experience with using CD-ROM technology.

### *Staff*

At most of the university sites with which I am familiar, literature searches are conducted

primarily by someone on the library staff rather than by the end user. Therefore, it is absolutely essential to have enough trained staff in the library to satisfy demand. At the University of Ghana Medical School, for example, the librarian has had to train one of his assistants to conduct literature searches because of increased demand for CD-ROM services. This particular library is now servicing the medical information needs of the entire country.

### Database Costs

CD-ROM is useless without subscriptions to databases, which can be quite expensive, and this is a recurring cost. It is very difficult to provide precise information on database subscription costs because almost every CD-ROM vendor offers discounts and complicated options, based on purchase of backsets. The Institute for Scientific Information (ISI) and CAB International both provide substantial CD-ROM database discounts to subscribers of their print products. ISI also has a "grants" program under which it will provide qualifying developing country institutions discounts of up to 50 percent. In addition, for those of you in the agricultural sciences, FAO will give developing country subscribers a 50 percent discount for purchase of the *AGRIC* database. FAO focal points receive the disc free of charge.

According to an article published in the February 1992 issue of *Database*,<sup>6</sup> CD-ROM disc prices have been declining on average for the past four years, and the median price of a CD-ROM database now stands at \$702. The authors go on to provide the disciplinary breakdown shown in the table below:

humanities	\$ 300
business	\$2,000
law	\$1,237
science and technology	\$ 500
medicine	\$ 795
social sciences	\$ 850

I should say, however, that our experience is that S&T databases are more expensive.

To give you a few specific examples cautiously extrapolated from the 1992 edition of *CD-ROMs in Print*:<sup>7</sup>

#### *Health and Life Sciences*

Let's start with *MEDLINE*, the best-known database on compact disc. An annual subscription to the Dialog version of the

complete *MEDLINE* costs \$995. If you want to begin your subscription with an archival collection dating back to 1984, the initial cost is \$1,895. Silverplatter subscriptions are a little more expensive--An archival collection from 1966 to the present would cost \$2,250, with the

<sup>6</sup>Paul Nicholls and Trish Sutherland, "CD-ROM Databases: A Survey of Commercial Publishing Activity," *Database*, February 1992, page 40

<sup>7</sup>*CD-ROMs in Print*, Norman Desmaris, editor, Meckler Publishing, 1992

price of a current subscription at \$1,045. A current subscription to *MEDLINE* from Compact Cambridge costs \$1,250. The current year plus nine backfile years costs \$1,495, while a complete backfile to 1966 comes to \$2,795.

An annual subscription to Compact Cambridge *Life Sciences* costs \$1,395. A current subscription plus a backfile to 1989 costs \$1,895. If you want a full archival collection back to 1982, it would cost you \$4,995. The *AIDS Compact Library*, produced by Macmillan New Media, \$695 a year, with quarterly updates. This database is a hybrid in that it contains bibliographic citations and some full-text articles.

Full-text medical journals are less expensive than *MEDLINE*. The CMC ReSearch version of the *New England Journal of Medicine (NEJM)* costs \$395 for the initial purchase, i.e., coverage from 1989-91, and then \$150 annually. The Macmillan New Media version of the same publication costs \$595 annually. I should point out, however, that the MacMillan *NEJM* also contains *MEDLINE* citations, whereas the CMC edition does not. It is up to you to decide whether these citations are sufficiently important to warrant the increased subscription cost. *Lancet* on compact disc, also produced by MacMillan, costs \$590 for an annual subscription, as does the *British Medical Journal*.

#### *Science and Technology*

These databases are more expensive than the median prices cited in the article above, but here goes:

Dialog is now producing two broadbased engineering databases on compact disc, with data supplied by Engineering Information, Inc. An annual subscription to *Compendix Plus* costs \$3,450. An archival collection back to 1988 would cost \$1,000 more. The second database, *EI Page One*, is of comparable price. The *Science Citation Index*, produced by ISI, is the most expensive database on this short list--an annual subscription costs \$10,950. The disc for 1991 is \$10,280. Real price cuts don't begin until the '80s--a mere \$2,900 will get you any of the discs produced between 1980 and 1984.

#### *Agriculture*

A subscription to *CAB Abstracts* entails the following possible costs: \$3,450 for the disc covering 1984-86, \$6,900 for 1987-89, and \$6,910 for 1989-91. A disc for 1990-92 is expected in March 1993, at a price of \$9,350. *TROPAG & RURAL* costs \$750 annually. A one-time purchase of the *AGRIS* archival set costs \$700; the price for a current subscription is \$750 per year. *Sesame*, a French-language database produced in France, costs 4,000 French francs (about \$800) for an annual subscription. It covers research in the French-speaking world in the fields of tropical agricultural and rural development.

Please bear in mind, however, that all of the costs listed above are for individual subscriptions. Subscription prices for databases run on a Local Area Network (LAN) are almost invariably higher.

Granted, databases can be quite expensive, but they can also replace some serial subscriptions, which are sometimes even more expensive. At Virginia Polytechnic Institute and State Library, for example, the library has cancelled about \$300,000 in journal subscriptions. Some of this money will be used to subscribe to several new electronic databases and some will be put into a special fund so that faculty members can purchase specific articles that they need from commercial article services. The university will continue to subscribe to some heavily used journals in paper, but believes that by "using the on-demand article suppliers...[it] can offer wider access to information without the costs of cataloging, binding, and shelving."<sup>8</sup>

What about cancelling subscriptions to hard copy bibliographies and replacing them with their compact disc versions? Two years ago, the University of Natal decided to buy *Compendix Plus* on compact disc on an experimental basis, and cancel its subscription to the print equivalent, *Engineering Index*. The Medical Library, however, decided to keep its subscriptions to *Index Medicus* and also to *MEDLINE* because both are so heavily used.<sup>9</sup> User-access considerations should weigh heavily in making these decisions, particularly where researchers and students are accustomed to using a hard-copy version that is conveniently available on the library shelves. In addition, unfair as it might seem, the compact disc database to which you subscribe does not belong to the subscriber, rather to the publisher. If you cancel your subscription to *Index Medicus*, for example, you will be able to keep and use the volumes the library received through its subscription. If you cancel your subscription to *MEDLINE*, the publisher has the right to request that the discs be returned, leaving your library with no reference tool at all.

On a more positive note, it might be useful here to compare CD-ROM database costs to those entailed in utilizing online database services. I recognize that very few universities in sub-Saharan Africa have access to US or European online services because of technical or financial reasons, but that will change in the coming years. In 1988 the University of Zimbabwe medical library estimated that the cost of an online *MEDLINE* search was about \$50.00 an hour, whereas the cost of searching *MEDLINE* on compact disc was a little over \$1.00 an hour.<sup>10</sup> The table below, from a recent article in *CD-ROM Professional*<sup>11</sup> examines the tradeoffs between utilizing CD-ROM products as opposed to online services.

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<sup>8</sup>Paul M. Gherman, "Point of View," *The Chronicle of Higher Education*, August 14, 1991, page A36

<sup>9</sup>Catherine E. Dubbeld, "CD-ROM-A Viable Alternative to Online Searching for Academic Libraries," *The Electronic Library*, Volume 9, No. 4/5, August/October 1991, page 249

<sup>10</sup>See Page 30

<sup>11</sup>"Online or On Disc? When to Choose CD-ROM for your Database," Barry Richman, *CD-ROM Professional*, March 1993, page 54

## CD-ROM versus Online Searches

### CD-ROM

fixed price  
searchable, compact print substitute  
PC based  
LAN/WAN attuned  
portable medium  
multimedia  
independent of telecommunications

### Online

pay as you go  
fast updates  
extensive backfile data  
extensive related files  
sophisticated software  
support services

### Document Delivery Costs

Clearly document delivery is key to maximum usage of CD-ROM databases. And I should say here that, in the African context, bibliographic databases that do not also include abstracts are virtually useless unless the library also has an adequate serials collection. There is no way to tell from a bibliographic citation whether the document is worth ordering. And even abstracts are not always sufficient, although they are better than nothing.

Document delivery can be costly. A booklet of 20 British Library Document Supply (BLDS) coupons costs £135. One coupon is good for three-four pages, and it can take up to three coupons to photocopy one scientific article. The BLDS booklets can be purchased with UNESCO coupons, however, thus making it possible to pay for them in local currency.

Medical librarians, in general, are better off than their colleagues; WHO has worked out an agreement with the National Library of Medicine to supply photocopies for African medical libraries that do not subscribe to the journal in question. I should warn you that the arrangement is extremely cumbersome: requests must first go to WHO/Brazzaville, after which they are forwarded to WHO in Geneva and then to the NLM in Bethesda, Md. In addition, the British Council has arranged for document delivery assistance in a number of African countries through the British Medical Association library, which provides discounted photocopies to selected institutions.

Some university libraries have benefitted by twinning programs in securing document delivery. UNESCO, for example, has underway a pilot project to provide discounts to developing country libraries when they purchase BLDS coupons. At the University of Zambia, the medical school library receives *MEDLINE* through the Health Foundation and has been twinned with the University of Florida library, from which it receives free photocopies. The Zambian model is particularly interesting because the documents are pouched to Lusaka by the Zambian Mission to the UN on a monthly basis.

In any case, however you plan to handle it, document delivery costs will have to be included in your CD-ROM budget.

<b>Document Delivery Costs</b>	
British Library Document Supply Centre	£5.00 (up to 10 photocopied pages)
Institut National pour l'Information Scientifique et Technique (INIST)	45 French francs
National Library of Medicine	\$9.00
Southern-Africa Inter-Library Loan Coupons	14 Rand

### **Intangible Costs**

There are costs that are qualitative in nature rather than quantitative, and these are the costs that try one's soul, not one's pocketbook. To cite a few examples:

- The Institute for Agricultural Research in Ethiopia recently moved to new quarters. In the course of the move the driver for the CD-ROM reader was inadvertently deleted from the computer hard disk, and the installation software was lost. As a result, the IAR CD-ROM workstation was out of service for several months because the replacement disk had to be sent to Ethiopia by the supplier, in this case Phillips.
- In 1990 UNDP arranged for the purchase of computers and CD-ROM drives for the University of Asmara. One drive arrived broken, but the local Phillips representative in Addis Ababa has refused to take responsibility for it.
- The University of Ghana Medical School was the first CD-ROM site in Ghana. Its CD-ROM drive had to be installed by a long (and expensive) phone call to New York because the donor did not send anyone to help with installation. The first two drives were not functional for a variety of reasons. Then a third drive was finally installed, but there were numerous problems for the first two years of operation until an outside expert came to Accra to reinstall the software. The librarian had absolutely no local support on whom to call and insufficient expertise to fix the problem himself.
- The University of Zimbabwe Medical School came close to buying an incompatible CD-

ROM drive on the advice of its software vendors in New York. The librarian commented in a letter, "CD-ROM is such a new and fast-changing field that even experts can go wrong, it seems, and they too work on trial and error, which we can't afford to do here."

The common thread tying together all of these examples is the fact that help is often too far away, which results in a feeling of isolation and sometimes helplessness. And the only solution to this dilemma lies in creating a nucleus of knowledgeable CD-ROM experts on the continent who can be called on for help and advice in a wide range of areas--from installation to choosing appropriate databases.

### **Funding CD-ROM Costs**

Now that you have an idea of cost considerations, how do you obtain funding to pay for your equipment, training, databases, document delivery, etc? In the preceding sections, I have mentioned a few donor agencies that have funded CD-ROM projects in Africa. An inventory of organizations funding and implementing CD-ROM activities will be found in Appendix Three and proposal guidelines in Appendix Four.

In thinking through the information that needs to go into a CD-ROM proposal, you need to be sure to include all relevant costs--equipment, consumables, database subscriptions, document delivery, etc. How will CD-ROM improve the ability of your institution to carry out its mandate? Will there be national or regional ramifications? The University of Ghana medical school library, for example, conducts literature searches for clinicians and researchers on a national basis. L'Université Cheikh Anta Diop helps several francophone universities gain access to scientific information through its CD-ROM service. And the AAU Food Nutrition Project aims to be of assistance to researchers on a continent-wide basis. A third component relates to evaluation. How will you determine or measure whether CD-ROM has had the desired effect? Issues or questions to consider include the following: Will the library keep records of literature searches and then analyze them? Are users satisfied with the service? Have numbers gone up appreciably over time? What problems have been encountered, and how have they been handled? Sustainability is a key issue. How can an institution ensure that its CD-ROM activities will be maintained once grant funds, earmarked for CD-ROM, are no longer available? The Swedish Agency for Research Cooperation with Developing Countries (SAREC) requires that university libraries receiving financial assistance must at some point underwrite a share of the costs. Thus, the University of Dar es Salaam, which receives 227 journals as a result of SAREC support, also subscribes to 387 journals, paid for by the library's own budget.<sup>12</sup>

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<sup>12</sup>University of Dar es Salaam response to 1992 AAAS survey of information management issues in sub-Saharan African research libraries. Report to be published in 1993.

One possible avenue to explore to guarantee the continued viability and vitality of your institution's CD-ROM services would be to allocate a certain portion of every research grant to pay for CD-ROM database subscriptions and document delivery costs. If access to information is key to the conduct of research, then research grant proposals should include a line item to support essential library services. The point I really want to make is that enriching a library for two or three years is senseless if its ability to serve students and researchers grinds to a halt at the end of the grant period.

I want to conclude by referring to a World Bank technical report on African universities that we received recently. In it, Bill Saint referred to CD-ROM as "a viable alternative to bibliographic databases." He placed his discussion of CD-ROM, appropriately enough, in the chapter on "Preserving Quality."<sup>13</sup> We very much believe in the power of CD-ROM and hope that in the coming year or two CD-ROM technology will be as commonplace in Africa as it is elsewhere in the world.

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<sup>13</sup>William S. Saint, *Universities in Africa: Strategies for Stabilization and Revitalization*, World Bank Technical Paper Number 194, Washington, DC, 1992, page 101

## CD-ROM Database Production

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*Robert Stunt*<sup>14</sup>

### Introduction

During this presentation, I will take you through the various stages of CD ROM production, indicating the extent to which you can be actively involved in actual production and some of the costs. You will find that CD ROM production is largely a matter of making decisions.

Interestingly, optical disc technology grew out of the video rather than the computer industry. This type of technology was a sequence to the development of videodisc systems, but, although technically viable, these early videodiscs were overtaken by the videocassette as the standard product. Following from this early technology, audio compact discs appeared in the early 1980s. The major actors in this market quickly agreed on a standard format for CD audio, which facilitated widespread consumer acceptance of the technology. In other words, the concept of storing digital data on optical discs became economically feasible.

### Stages of CD ROM production

There are three stages involved in CD-ROM production, which I will list briefly and then describe:

- 1\* defining the scope of your database
- 2\* data preparation:
  - data input
  - file structuring
  - data manipulation (merging, sorting, and editing)
  - determining the CD-ROM format (indexing, data compression, disc geography)

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<sup>14</sup>Robert Stunt is Editor-in-Chief of *Abstracts on Rural Development in the Tropics*, which is published by the Royal Tropical Institute (KIT) of the Netherlands. More information on KIT will be found in Appendix One.

--testing (CD-ROM simulation at high speed)  
--premastering

3\* mastering, replication, and distribution

### **Defining the Scope of Your Database**

This stage may be the most important phase in creating a database. You must conceptualize the content scope of the database and determine its subject coverage, i.e., what will be **in** the database and, equally important, **what to exclude**. You will also have to decide what type of source documents will be included. Your decision concerning subjects to be covered cannot be altered easily since this would interfere with database consistency. Concerning identification of source documents, questions to ask include: Will it be a full-text or a bibliographic database? Will it include only one type of document, such as journal articles or conference proceedings, or a combination of different types of documents?

### **Data Preparation**

#### *Field Structure*

First you must consider what kind of information will be extracted from each document. This information will be stored in fields: author field, title field, keyword field, abstract field, etc.

Categorization of information into separate fields allows the computer to recognize the information as separate sets of data, thus permitting you to retrieve information by searching different fields. Generally, the software used for database production offers a field structure, but the structure can be adjusted according to the needs and wishes of individual database producers.

#### *Data Input*

Data input takes place in the next stage. First, a documentalist, using established classification rules, allocates information to the fields earlier determined. The actual data entry can be carried out by a typist, but it is the documentalist who decides which information goes where. You would not want to find an author's name in a geographical location field, for example.

#### *Data Manipulation*

Various procedures are followed to combine, control, and correct data. These procedures are not specific to CD ROM but are determined by the database software. These merging, sorting and editing activities must be finalized before the CD-ROM can be set up.

#### *CD-ROM Set-Up*

Setting up or installing the CD-ROM refers to various processes involved in adding to or altering

the raw data contained in the database, which will ultimately make it easier for end users to find the information they are looking for. These processes are: indexing, data compression, design of a disc geography.

Indexing refers to the process of creating a location overview of each unique word in the database, so that it will be possible to locate any occurrence of the word without having to search the entire CD-ROM. These indices are stored with the data. The choice of indexing method is related to the retrieval software used, and is affected by the type of application designed. The amount of disc space the indices need is largely determined by the size of the database and the method of indexing. An inverted index as opposed to a single index points to multiple entries and, as such, may take up more space than the indexed file itself.

Data compression is a technique that is used both in CD-ROM production and in storing data on floppy diskettes. It is a software program that allows you, as the word suggests, to compress data in order to save space on the disc by eliminating empty or recurring fields. Data compression also facilitates increased access speed to data because the physical distance between the many bits of information has been reduced.

Design of a disc geography, i.e., mapping out or physically arranging the location of data, greatly affects the access speed to the information searched and to its reproduction on the screen. There are a number of techniques used to determine the geography of the data on the disc, such as storing information in block files, in corresponding files, or in interleaving files. The choice of geography is largely determined by the CD-ROM production software used, but the ideal geography minimizes retrieval time by making the physical distance between the data searched as small as possible.

## **Testing**

Several checks are run to test functionality, access speed, readability, retrieval functions, and interfaces before CD-ROM production can begin.

### *Simulation*

Product evaluation is facilitated by running a check of the compact disc by installing the whole database on the hard disk of a computer. Accessing a hard disk is five times faster than accessing the same information using CD-ROM, so these testing procedures will take considerably less time to carry out. During the simulation phase, simulation software allows the hard disk of the computer to operate like a CD-ROM under production. In other words, the operational behavior of the hard disk will give you clear indications of the future performance of your CD-ROM. Following testing, you may find it necessary to compress the data further, change the type of compression, alter the disc geography, or, very important, modify the retrieval software and interfaces.

## **Premastering and Mastering**

Now that the CD ROM database has been tested and changes made, it is loaded onto magnetic tapes to be sent off to the mastering facility, where a glass master is produced, from which your polycarbonate plastic replicas are made. And here is your CD-ROM.

A word on standards. In order for the data stored on a compact disc to be read under any computer operating system and by any CD-ROM drive, the data must be stored in a standardized way. In 1985 a number of major companies involved in producing CD-ROMs agreed to develop a standard for a logical file structure that would be acceptable to a wide range of operating systems. Their standard was named after the hotel they met in, the High Sierra Hotel in Las Vegas, Nevada. It was then submitted to the International Standard Organisation and accepted as ISO standard 9660. This standard now indicates the rules for data organization on compact disc.

## **In-House CD-ROM Production**

Now, if you would like to consider the creation of your own, let us say bibliographical database, the traditional division of tasks between you, as database producer, and the CD-ROM publisher has been as follows:

**YOU:**

- \* definition of the scope of the database
- \* data input, using existing data input-software or an application
- \* data manipulation: sorting, merging, and editing
- \* storage of the manipulated data on diskettes or tapes in machine-readable format

**CD-ROM PUBLISHER:**

- \* database design
- \* database setup
- \* simulation
- \* premastering
- \* retrieval software
- \* installation software

In 1987, according to the traditional division of tasks outlined above, CD-ROM production costs for the database publisher amounted to US \$100,000. In 1992 production prices had dropped to as low as US \$15,000 (including 100 discs). Remember that these prices do not include your costs, only those of the CD-ROM publisher.

Several software packages are on the market today, however, that permit in-house authoring, indexing, simulation, and mastering. Some of these packages are sold at a price of US\$ 60,000. This figure may seem high, but may be cost-effective if one national-level or regional organization were to produce different compact disc databases on contract, using the same software package.

## CD-ROM Activities of the AAU Food and Nutrition Project

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*O. Onayemi*<sup>15</sup>

In order to improve the food and nutrition condition of Africa on a long-term sustainable basis, the Association of African Universities (AAU) has launched an initiative to strengthen the relevant technical and research capacities of selected institutions in seven African countries. The project has been funded by the Commission of the European Communities under the Lomé III Convention.

Because it is generally realized that many African researchers suffer from geographical isolation, information exchange is an integral component of the Food and Nutrition Project. The RESTREC newsletter<sup>16</sup> was established, for example, with the objective of disseminating information about the activities of the project to researchers and other interested individuals. Nevertheless, although the newsletter has been well received, it does not satisfy the more specialized needs of researchers who require information on research work already completed and published in scientific literature. CD-ROM services at the AAU are designed to fill that gap.

The CD-ROM facility at the AAU is meant to assist African researchers access databases not readily available to them at their own institutions. The following databases on compact disc are available under the Food and Nutrition Project:

- ***FSTA (Food Science Technology Abstracts)***  
*FSTA*, which is published by SilverPlatter, provides comprehensive coverage of all areas of food sciences and technology, including the relevant basic sciences, from 1969 to the present. Some 1,800 journals, books, proceedings, reports, pamphlets, patents, and legislation are scanned for inclusion in *FSTA*.

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<sup>15</sup>Dr. Onayemi is Coordinator of the AAU Food Science Technology Project. For further information on the Food Science and Technology Project and CD-ROM activities at the AAU, write Dr. Onayemi at the AAU, Post Office Box 5744, Accra-North, Ghana.

<sup>16</sup>RESTREC is an acronym that stands for "reinforcing the scientific and technological research capacity in the field of food science and technology in Africa."

- **SESAME**  
*Sesame* is a French-language database, published by the CIRAD Montpellier Research Center. It covers research in the French-speaking world in the fields of tropical agriculture and rural development.
- **FOODS INTELLIGENCE**  
*Foods Intelligence* on compact disc provides comprehensive food industry information from research in the basic and applied sciences as well as business data specific to the food industry. Over 7,600 publications worldwide are scanned for inclusion in the database. It is published by SilverPlatter.

Packages of information about the acquisition of these CD-ROM databases were circulated widely to many African institutions across the continent. A flier was prepared, and sent to members of the Association of African Universities, as well as to researchers in national food research institutions who are participating in Food and Nutrition Project activities. Each package contained a brief description of CD-ROM technology and database coverage, sample searches for the three areas on which the project is concentrating (roots and tubers, weaning foods, and cereal legumes), and a service request form. Because many researchers are located far away from AAU, the request form is designed to elicit as much information as possible about the fields of interest to the researcher because this form must take the place of a personal interview.

More than 120 requests for searches have been received and answered since the announcement was made in December 1991. About 70 percent of them have come from university researchers and postgraduate students in anglophone West Africa and East Africa (Nigeria, Ghana, Uganda, Tanzania, Zambia, and Sudan). Francophone university requests constitute about 10 percent, with the remaining requests coming from national research institutes. Abstracts of the literature retrieved from relevant databases are mailed to researchers free of charge.

An evaluation was conducted to assess the impact of the CD-ROM services provided by AAU; feedback received from those who have received copies of the searches conducted for them has been quite encouraging. Some respondents described the acquisition of the CD-ROM service as a major benefit, for the Project has helped them bridge an information gap created by their institution's inability to subscribe to new journals. Other respondents would be willing to pay for copies of the original articles, if these could be provided. In fact, although considerable interest has been shown in this service, AAU is encountering some problems pertaining to document delivery. Having received bibliographic citations and abstracts, researchers frequently ask for copies of the original article, as well. We are now exploring ways to satisfy these requests.

In order to complement the flow of information from the North to Africa, the AAU plans to establish an in-house database on research projects completed within African institutions in the area of food science and technology. We will use CDS/ISIS software, which UNESCO makes available to developing country institutions free of charge.

The AAU also plans to expand its continent-wide CD-ROM services into other disciplines such as chemistry and engineering. Progress has been made along this line through collaboration with AAAS, which has provided AAU with two engineering databases on compact disc--*EI-Page One* and *Compendix Plus*. The publisher of these databases, Dialog Information Services, Inc., is donating to AAAS 10 subscriptions to each database, as part of a pilot effort to increase access to S&T information in Africa.

## **MEDLINE in Zimbabwe**

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***Helga Patrikios***<sup>17</sup>

### **Introduction**

The University of Zimbabwe Medical Library (UZML), as the country's national--and only--medical library, is responsible for supplying information support to the country's health professionals, in cooperation with the Ministry of Health. In 1984 we conducted a survey of information needs and priorities of doctors and senior nurses in provincial and rural hospitals.<sup>18</sup> The survey confirmed serious deficiencies and an urgent need for core collections of books and journals in all hospitals, and for current information on current developments in the health field.

The UZML moved to respond to these needs through the production of a digest of locally relevant *MEDLINE* abstracts (with hard copy provided by WHO headquarters in Geneva), attempts to gain online access to the *MEDLINE* database at the US National Library of Medicine, and finally the acquisition of CD-ROM workstations and subscriptions to *MEDLINE* on compact disc.

### **Online versus CD-ROM *MEDLINE* Searches**

Scientists in developed countries have access to distant online databases, as well as to CD-ROM, but at the UZML this has not been the case. Attempts to access the *MEDLINE* host failed, largely because of Zimbabwe's prevalent lack of foreign currency. There were other serious disincentives, as well--an overloaded telecommunications system, offering at that time only a 300

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<sup>17</sup>Helga Patrikios is Medical Librarian of the University of Zimbabwe. For further information about this project, write Mrs. Patrikios at the University of Zimbabwe Medical School, P.O. Box MP 45, Mount Pleasant, Harare, Zimbabwe

<sup>18</sup>Helga Patrikios, "Socio-Economic Changes in Developing Countries: the Concern of the Medical Librarian," *Medical Libraries, One World: Resources, Cooperation, Services*, Proceedings of the Fifth International Congress on Medical Librarianship, Tokyo, Keio University Medical Library, Tokyo, 1985

baud transmission, and the notoriously tricky command language needed to access *MEDLINE* online at the US National Library of Medicine. It was unlikely that UZML staff could acquire the considerable training and experience needed for cost-effective and satisfactory search results. We compared, in 1988, the costs of distant online searches with those of the inhouse CD-ROM database. Cost comparisons are difficult to make, North or South, because of variable and unknown factors, such as training needs, and the number, duration, quality, and complexity of searches achieved. However, even when one budgets for the need to purchase extra hardware (the CD-ROM drives) and database subscriptions, we estimated that the cost of an online search to be \$50.00 an hour as opposed to \$1.00 or \$2.00 for CD-ROM searches. Reactions of researchers and librarians to CD-ROM as an appropriate medium for accessing current or archival databases in developing countries, where the online option is not viable, are increasingly enthusiastic. An appropriate technology has at last been found that can bridge the information gap between industrialized and developing countries.

### **CD-ROM at the University of Zimbabwe Medical Library**

With the support of the Carnegie Corporation of New York, we are now at the end of a highly successful two-phase feasibility study of a CD-ROM literature search service. At the outset we installed one workstation, but were able to add two more during phase two. Reactions of our users to this service have been very positive. They--and we the librarians--continue to be amazed and delighted at our dramatically increased access to current health literature. Growth in demand for searches at the UZML has also been dramatic--from about 80 searches a month in the first year to about 250 a month in 1992. In February 1993 368 searches were done.

Who uses the CD-ROM service? About 21 percent of the searches have been for academic staff and government health professionals, 26 percent are for postgraduate students, and 45 percent for undergraduates. In an early evaluation, users gave their searches a rating of five on a scale of one to five. At present our staff is almost overwhelmed with search requests. The Carnegie Corporation has renewed its financial support, which will enable us to increase our CD-ROM capacity to meet the ever-growing demand. With a small local area network of five or six CD-ROM workstations, we hope to train technicians or medical students as trainers in search techniques, and in this way encourage more health professionals to undertake their own literature searches. This will also serve to reduce the workload of library staff.

Donations of *POPLINE* (Johns Hopkins University), *Oncodisc* (US National Cancer Institute), and the *AIDS Compact Library* (Macmillan New Media) have increased the range and depth of subject coverage. The lengthy abstracts and full-text material of these databases are particularly valuable in a remote centre where current monographs are scarce. In general, the abstracts contained in *MEDLINE* and other databases, while not always sufficient to replace the need for full text, at least enable the user to make an informed decision as to whether to incur the cost and delay of sending for the complete document or journal article.

The value of abstracts, where no other current literature is available, should be emphasized here.

In many African contexts there is no way of getting the full text: the abstract, from a printed bibliography, or ideally, from a literature database on CD-ROM, is all there is likely to be. But an abstract is a significant advance on nothing at all. This writer hopes to see more publishers following the example set by preeminent medical journals, where structured abstracts are now essential.

## **Spinoffs of the Technology**

### *National Medical Digest*

The UZML now produces a quarterly digest of citations and abstracts retrieved from the *MEDLINE* database for rurally-based health professionals, which serves as an alternative source of news of international developments in health care. About 1,200 copies of *Current Health Information Zimbabwe (CHIZ)* are circulated to health professionals in Zimbabwe, the Ministry of Health, and WHO offices in neighboring countries.

### *Selective Dissemination of Information*

Until the advent of CD-ROM, our Reference Librarian spent most of her working life scanning the latest journal issues for articles on the special interests of individual clinicians and researchers. She would note any relevant articles, after which the references were typed up and sent to the user. Now the Reference Librarian is able to print out individual updates every month by downloading the information from *MEDLINE*. It is an automatic process that takes a few minutes to execute and a few hours of machine time. A secretary then addresses the printouts to each individual researcher.

## **Sustainability**

Sustainability is largely a question of priorities. The need for this kind of information resource is increasingly acknowledged throughout Africa, and yet information delivery continues to rate low in the priorities of information planners and policy makers. The concept of information use and of spending money on information resources needs promotion and marketing, particularly in those countries where it has always been in chronically short supply.

But librarianship in developing countries remains a profession that enjoys a mediocre status and is not characterized by assertiveness or entrepreneurial skills. In many countries librarians are leaving the public sector in increasing numbers to find the better rewards offered by nongovernmental organizations and the private sector. Can those who remain devise and implement survival strategies to minimize the effects of budget cuts and maximize the resources available to them? Donors in the United States, in particular, have recently enabled libraries to acquire the hardware and software which bring the new information technologies to bear on scientific and technical information for the first time. Forward-looking librarians see in these technologies a real possibility of narrowing the information gap between the industrialized and

the less developed countries.

In Harare our experience with the power of the PC has been an unequivocal and decisive success. CD-ROM is the medium that has brought unprecedented access to current health information. How can we be sure of keeping our subscription to *MEDLINE*? Will the University of Zimbabwe's science and other faculties be able to obtain--and maintain--the kinds of databases we have come to depend upon? What tactics can we use to influence our planners and policymakers to value, and pay for, maintaining access to essential information sources? Given the status--and wastage--of the library profession, we should ask whether the onus for in providing and sustaining the delivery of health information should have to rest entirely with librarians. Experience shows that librarians are more likely to attain their objectives if they enlist the sympathy and the ciout of Vice Chancellors, Deans, and government ministers, together with such bodies as WHO and the professional associations.

It is essential to demonstrate to our planners all of the present and potential benefits of the information resources and technologies. Data to establish the beneficial outcomes of information support are hard to come by, but for the benefit of policy makers one might mention a study of the perceptions by hospital doctors in New York State of the impact of hospital library services on patient care. Significant numbers of doctors reported changes in diagnosis, choice of drugs, and reduced length of hospital stays; they also reported that information from the library enabled them to avoid hospital admissions, patient mortality, hospital-acquired infection, surgery, and additional tests or procedures.<sup>19</sup> Further evidence for cost-benefits of that kind, and of the kind offered by CD-ROM databases, needs to be documented.

Because it is notoriously difficult to bridge the communications gulf between scientists or development workers and policymakers, the promotion, and "marketing" of the technology become key elements in any drive toward sustainment. Sustainability may ultimately depend on demand. Unfortunately, where there is a lack of resources, the dema.nd for information tends inevitably to decline. Seeking information becomes a frustrating experience; isolation from information increases. However, the reverse is also true. Since we have acquired CD-ROM capability at the Medical Library, we have seen a steady and significant increase--not only in the demand for *MEDLINE* searches, but also in the use of our own journals and of our interlibrary loan service. Our statistics of library use demonstrate that by satisfying the demand for bibliographic searches, we have renewed an appetite for and dependency on information. We hope that this dependency will create an energetic and influential lobby to help the library sustain our CD-ROM services once donor support is no longer available.

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<sup>19</sup>R.J. Joynt, J.G. Marshall, and L.W. McClure, "Financial Threats to Hospital Libraries," (letter), *JAMA*, Volume 286, Number 9, page 1219

## **CD-ROM Activities at CTA**

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**Andries Dusink<sup>20</sup>**

Lack of access to information is one of the most important constraints to agricultural development in developing countries. An initial step towards self sufficiency is for developing countries themselves to have direct access to relevant information sources, even though a considerable part of this information is still being processed in the developed countries.

The Technical Centre for Agricultural and Rural Development (CTA) was established under the Lomé Convention--an agreement between the member states of the European Community and 69 African, Caribbean, and Pacific (ACP) countries--with a mandate to improve ACP access to scientific and technical information in the field of agriculture.

In order to fulfill its mandate, CTA carries out several different types of information activities:

- seminars for scientists, decisionmakers, and experts
- publishing
- question and answer services
- assistance to agricultural documentation and information services

CTA was aware of the potential of CD-ROM technology at an early stage. In 1986 it assisted the Commonwealth Agricultural Bureaux (CAB) International in its pilot project to test CD-ROM in developing countries. Based on its positive experience with the CABI initiative, CTA launched its own CD-ROM pilot project in 1989, which was carried out by the Royal Tropical Institute (KIT). The objectives of this latter project were to improve national self sufficiency in the dissemination of scientific agricultural information and to introduce computer technology in Third World information services as a way of encouraging the production of local databases.

Twelve developing country agricultural information services were chosen to participate in the pilot project. Criteria used for selection were:

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<sup>20</sup>Andries Dusink is CD-ROM Project Manager at the Technical Centre for Agricultural and Rural Cooperation (CTA).

- The organization disseminates scientific agricultural information at a national level. This includes ministerial libraries, university libraries, or regional development centers.
- The organization has qualified documentalists on staff.
- The organization has asked to participate in the project.

Sites in Cameroon, Kenya, Mali, Papua New Guinea, Trinidad and Tobago, Western Samoa, Zaire, Zambia, and Zimbabwe were chosen to participate in this initial pilot activity.

On the basis of the success of the pilot project, CTA expanded the project to ten additional sites in 1990. In Africa libraries in Burkina Faso, Chad, Côte d'Ivoire, Ethiopia, Nigeria, Sierra Leone, Sudan, and Tanzania were equipped with CD-ROM workstations. Ten more countries were added in 1991 and 1992; further expansion is planned for the coming years.

Each site receives a microcomputer, computer software (Word Perfect and PC-Tools), a CD-ROM player, a laser printer, and a voltage stabilizer. In addition, sites receive four databases on compact disc: *TROPAG & RURAL*, *AGRIS*, *CAB Abstracts*, the *CGIAR Compact Library*, and the *Maize Germplasm Bank*, a statistical database produced by CIMMYT (the Centro Internacional por la Maejoramiento de Maiz y Trigo). Finally, projects receive a budget for operational costs, such as paper, toner, floppy disks, and service contracts together with document delivery assistance through KIT or coupons (UNESCO, British Library, etc.).

Training is an essential component of the CTA CD-ROM program. Each recipient institution receives up to two weeks of on-site training provided by KIT personnel. This training covers basic computer skills (MS-DOS, word processing, etc.), CD-ROM literature retrieval techniques, and an introduction to computerized bibliographic databases in order to facilitate the creation of national agricultural databases. After installation and training, KIT services in Amsterdam are also available for troubleshooting and remote assistance.

Six months after installation of the equipment, sites receive an evaluation form, which must be completed if they are to continue to receive CTA assistance. This method ensures a 100 percent response rate. From these completed forms, it is possible to say the following of CTA sites:

**Location of CD-ROM equipment**

university libraries	30%
regional organizations	30%
research institutes	20%
agricultural ministries	20%

**Who uses CD-ROM equipment**

own organization	60%
local	18%
elsewhere in country	8%

elsewhere in region	12%
outside the region	2%
<b>Access to CD-ROM workstation</b>	
all endusers	20%
staff only	40%
library staff only	40%
<b>Amount of assistance needed for searches</b>	
no help needed	20%
help in devising search strategies	20%
help in using retrieval language	20%
help in printing search results	40%
<b>Other uses to which system put</b>	
word processing	80%
maintenance of local databases	70%
inputting into international databases	40%
online access to remote databases	10%

CD-ROM equipment has been installed in a wide range of organizations, each of which has its own rules pertaining to access to information and equipment. In general, the equipment is used for literature searches about half the time, with the applications listed above filling the remainder of the time.

The following factors account for the success of the project:

#### **Efficiency and status of CD-ROM technology**

When information professionals have immediate access to recent scientific findings, they can offer better service. With a powerful technology at their command, they feel that their own image is improved, and gain confidence in dealing with researchers.

#### **Multifunctionality of computer equipment**

The microcomputer and laser printer are used not only for the CD-ROM service, but also for word processing and other applications. Recipient institutions, for instance, can automate their library catalogues and build local agricultural databases. These records can then be entered into the *AGRIS* or other international databases. Examples of locally generated data include project catalogues, expert files, current research files, and bibliographical information.

#### **Value of CD-ROM databases**

The compact discs furnished by CTA give worldwide coverage of agricultural literature. In addition, they provide vital information for isolated information centers, such as the addresses of authors. Such information can promote the establishment of direct contacts between scientists and researchers on a global basis. Finally, in some instances the abstracts contained in the

databases are sufficiently detailed to render access to the primary document superfluous.

**Integration of project elements**

CTA has ensured a greater likelihood of sustainability by adopting an integrated approach relating to hardware and software provision, training, and an annual allowance for maintenance of equipment and necessary supplies.

## Appendix One

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### *About the Organizers*

The CD-ROM seminars were organized by the AAAS Project for African Research Libraries in collaboration with the Johns Hopkins University Center for Communication Programs and the Royal Tropical Institute of the Netherlands. The activities of these three organizations are described below. Addresses and contact names will be found in Appendix Three.

#### **AAAS Project for African Research Libraries**

Starting in 1987 with an initiative to provide African libraries with current subscriptions to journals in the sciences and the humanities, this project has broadened its focus to incorporate activities that promote CD-ROM usage and strengthen the institutional capacity of research libraries. The overall objective of the project remains the same: to collaborate with African institutions in an effort to meet the information needs of scientists and scholars who require access to current literature in their disciplines. The project is supported by grants from the Carnegie Corporation of New York, the Ford Foundation, and the US Agency for International Development.

#### *Journal Distribution*

In partnership with US scientific and learned society publishers, AAAS is able to supply almost 200 journal titles in the sciences and humanities to research libraries in 38 sub-Saharan African countries. As a result of this effort, over 3,000 subscriptions reach African institutions hard put to find funding to maintain their serials collections. The prestigious and immensely valuable journals provided through this effort are made available to AAAS at little or no cost. Grants cover air freight shipment to Africa. In 1991 AAAS was able to supplement the print journals already in the program with a small number of bibliographic and full-text databases on compact disc. We expect that the number of CD-ROM materials available through the project will grow in the coming year.

#### *CD-ROM Initiatives*

AAAS activities in the area of CD-ROM (Compact Disc-Read Only Memory) concentrate on enhancing the environment for CD-ROM usage in sub-Saharan Africa. The AAAS has held a number of "sensitization" seminars for decisionmakers and a workshop for African research

libraries on marketing CD-ROM services. In addition, the Sub-Saharan Africa Program is launching a biannual newsletter on CD-ROM for development, available at no cost by writing AAAS.

### *Strengthening the Capacity of African Research Libraries*

The AAAS is engaged in a number of initiatives to promote communication among African librarians and to examine the capacity of research libraries to provide services. In 1991 the Sub-Saharan Africa Program launched a biannual newsletter, NOTES, for librarians receiving journals under the auspices of the program.

AAAS has conducted several studies as well, all resulting in reports available free of charge from AAAS:

- 1990 survey of computer and CD-ROM capability in African university and research institute libraries.
- 1992 followon analysis of information management issues in sub-Saharan African research libraries, with a focus on budgets, acquisitions, planning and equipment.
- 1992 study in Mozambique and Angola: "Confronting the Demand and for Scientific and Scholarly Literature in Portuguese: An Assessment of African Needs and How to Meet Them."

The University of Zimbabwe and the AAAS are co-organizing a workshop for African university librarians on strategic planning issues, with a focus on how technology can improve services. The workshop, which is timed to coincide with the Zimbabwe International Book Fair, will take place in Harare in August 1993.

And, finally, having examined information management issues from the perspective of library services, AAAS plans in 1993-94 to scrutinize the critical question of readership and patterns of library usage within the African scientific/academic community. This work will be done in collaboration with African researchers--end users--and librarians.



### **The Johns Hopkins University Center for Communication Programs**

The Center for Communication Programs brings together resources, talents, and new ideas on health promotion. The Center has been established at The Johns Hopkins University School of Hygiene and Public Health in recognition of the proven importance of communication in public health programs and the leadership that the Johns Hopkins University has provided in this field. The Center offers enhanced opportunities:

- to expand the frontiers of health education through research-based projects and modern

- technology;
- to implement health communication in varied settings worldwide;
- to develop innovative approaches in mass media programs, interpersonal communication, national campaigns, and training workshops;
- to apply new concepts and technology in evaluating health communication projects; and
- to be more responsive to health communication needs.

Internationally the Center focuses on family planning, maternal and child health, and AIDS prevention programs. A wide variety of services, training, and educational materials is available to health professionals and programs throughout the world. Major components of the Center--the **Population Information Program** and **Population Communication Services**--are funded by the US Agency for International Development. The Center receives additional support from the United Nations Population Fund and private foundations.

The **Population Information Program**, established in 1972, is internationally recognized for its authoritative journal *Population Reports*, and for POPLINE, the largest computerized bibliographic population database.

The **Population Communication Services** project provides technical and financial assistance for information, education, and communication projects to promote family planning and health in more than 30 developing countries. Established in 1982, PCS emphasizes audience research, pretesting, the use of creative communication professionals, and regular monitoring and evaluation to link communication activities with service programs.



### **The Royal Tropical Institute/Koninklijk Instituut voor de Tropen**

The Royal Tropical Institute (KIT) is a research and training organization with the objective of improving communications between the Western and the non-Western world. KIT gathers information on the developing world and distributes it to various target groups in the Netherlands and abroad. The institute also conducts research and disseminates the results through publications, international debate, training, library services, documentation, exhibitions, and theatrical performances.

On the international level, KIT's tasks include rural development, health, cultural, and educational activities. Following the policy of the Dutch Minister for Development Cooperation, it is particularly interested in research and technology, the fight against urban poverty, women and development, and the environment. But KIT also has its own specialized approach and concerns.

KIT attaches great importance to institutional cooperation and interdisciplinarity. It views its role primarily as an adviser and supporter, placing great emphasis on the quality of its

assistance. Setting targets and implementing programs, however, remain the responsibility of partner institutions. These partners are located in developing countries, the Netherlands, and, increasingly, in other European countries.

### **Department of Information and Documentation**

The Department of Information and Documentation (ID) collects and disseminates information on tropical agriculture and rural development in the tropics. The department also functions as a clearinghouse for information related to AIDS health promotion. And, finally, ID staff carry out consultancies in developing countries in the field of information handling.

ID currently produces two bibliographical databases. The *TROPAG* file covers literature on the cultivation of food crops and industrial crops, animal husbandry, forage and pastures, agroforestry, postharvest operations, farming systems, and environmental management in tropical and subtropical regions. The *RURAL* file brings together abstracts from recent literature on economic and social development in rural parts of the tropics. It focuses on a wide range of topics including development strategies, international cooperation, health development, agriculture, income creation, education, women in development, and environmental policy. The databases are available in print form through the monthly journal *Abstracts on Tropical Agriculture (TROPAG)* and the bimonthly journal *Abstracts on Rural Development in the Tropics (RURAL)*. In addition, both journals are produced on compact disc (*TROPAG & RURAL*), in cooperation with SilverPlatter Information.

In addition to the Department's database publishing activities, more than 50 CD-ROM projects have been executed for a variety of donor agencies in countries in Africa, Asia, the Pacific, and the Caribbean, including CTA and the Johns Hopkins University.

KIT expertise in CD-ROM implementation in developing countries is aimed at the following areas:

- \* Providing technical advice (hardware, software, CD-ROM titles)
- \* Assessing and advising on management and training requirements
- \* Conducting on-site training courses and workshops

Training primarily takes place in-country at the institutions themselves. The KIT approach is very flexible, so that each syllabus is adjusted to take into consideration the specific needs and experience of those to be trained.

## Appendix Two

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### Databases Demonstrated in the Harare and Accra Seminars

#### Environment

*ASFA: Aquatic Sciences and Fisheries Abstracts*

*Pest-Bank*

*Poltox I*

*Toxline Plus*

*Waterlit*

#### Food and Agriculture

*Agricola*

*Agris*

*BEASTCD*

*CAB Abstracts*

*Foods Intelligence*

*FSTA (Food Science Technology Abstracts)*

*HORTCD*

*SOILCD*

*TROPAG & RURAL*

*VETCD*

*World List of Agricultural Serials*

#### Health and Life Sciences

*AIDS Compact Library*

*Biological Abstracts on Compact Disc*

*British Medical Journal*

*Cancer-CD*

*Excerpta Medica*

*Human Nutrition*

*Lancet*

*Life Sciences Collection*

*MEDLINE*

*Meyler's Side Effects of Drugs Database (SEDBASE)*

*New England Journal of Medicine*

*Nursing & Allied Health (CINAHL)-CD*

*Pediatrics Infectious Disease Journal*  
*Pediatrics in Review/Red Book*  
*Pediatrics on Disc*  
*POPLINE*  
*Renal Tumors of Children*  
*Year Book of Medicine*

General Reference

*ABI/INFORM*  
*Academic Abstracts*  
*Dissertation Abstracts*  
*Grants Database*  
*Magazine Article Summaries*  
*Newspaper Abstracts*

Science and Technology

*Biotechnology Abstracts*  
*Compendix Plus*  
*CRIS/ICAR*  
*GeoRef*  
*INSPEC*  
*Kirk-Othmer Encyclopedia of Chemical Toxicology*  
*MathSci Disc*  
*Science Citation Index*  
*SIGLE*

Social Sciences and Humanities

*EconLit*  
*ERIC*  
*ILO-LEX*  
*PAIS International*  
*PsycLIT*  
*Social Sciences Citation Index*  
*Sociofile*

## Appendix Three

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### *Inventory of Organizations Funding and Implementing CD-ROM Projects*

This inventory is not a definitive list of all organizations involved in funding and implementing CD-ROM projects. Rather it is meant to provide a description of some of the major initiatives in this area with which the AAAS is familiar. Please bear in mind that, for the most part, donor agencies fund CD-ROM costs within a broad range of information activities. The Overseas Development Agency (ODA) and the US Agency for International Development (USAID), for example, each supply some hardware and software within project support. ODA also provides development funding for the compilation of *PESTCD* and *TREECD*, both produced by the Commonwealth Agricultural Bureaux International.

The program descriptions below focus exclusively on those projects that specifically pertain to CD-ROM. Although specific projects may vary from agency to agency, the common thread tying all of them together is the desire to enhance the flow of information: North-South, South-South, and South-North.

The AAAS plans to maintain a database of organizations funding and implementing CD-ROM projects in Africa. We would welcome your additions to this inventory so that we can publish updates regularly.

#### **American Association for the Advancement of Science**

1333 H Street, NW  
Washington, DC 20005, USA

Telephone: (202) 326-6730

Fax: (202) 289-4958

Contact: Ms. Lisbeth A. Levey  
Director, Project for African Research Libraries, AAAS Sub-Saharan Africa  
Program

*Disciplinary Focus*  
Interdisciplinary

### *Activities Supported*

Database provision; newsletter and other information pertaining to CD-ROM

### *Program Highlights*

With funding from the Carnegie Corporation of New York, the Ford Foundation, and the US Agency for International Development, AAAS is carrying out the following activities pertaining to CD-ROM:

1. Biannual newsletter, *CD-ROM for Development*, which is available free of charge on request.
2. Provision of a small number of databases on compact disc through the journal distribution component of the Project for African Research Libraries. These databases are available to university and research institute libraries in sub-Saharan Africa.
3. Occasional reports on CD-ROM, based on seminars and workshops in Africa and studies of African library capabilities and related information issues.

### **Banque Internationale d'Information sur les Etats Francophones (BIEF)**

Secrétariat d'Etat du Canada  
Ottawa, Canada K1A 0M5  
Telephone: (819) 997-3857  
Fax: (819) 953-8439

Contact: Dr. Suzanne Richer  
Director General

### *Disciplinary Focus*

Interdisciplinary

### *Activities Supported*

Hardware; database provision; database production

### *Program Highlights*

BIEF assists selected francophone institutions in the developing world through a program to subsidize serial subscriptions, including subscriptions to CD-ROM databases. Participating libraries pay 50 percent of the subscription costs the first year, BIEF the remainder. Libraries are expected to pay all costs after a period of three to four years. BIEF has also assisted developing country libraries purchase hardware. In addition, BIEF is a CD-ROM producer--*CDthèque Francophonie*, a collection of four databases on one disc. These include: (1) a multidisciplinary bibliographic database of some 24,000 records from the francophone world; (2) a database of 167 institutions where the documents can be found and obtained; (3) descriptive outlines depicting the capability of 35 francophone countries in the areas of documentation,

information, and telematics; and (4) a list of some 1,900 abbreviations and acronyms used in the francophone world. *CDthèque Francophonie* is available free of charge to developing country institutions in signatory countries of the Sommet francophone. BIEF is working on a project to create national bibliographic databases on compact disc in a number of developing countries. Work began in 1993 in Côte d'Ivoire, Mali, Mauritius, and the Caribbean. BIEF plans to expand its CD-ROM program in coming years.

### **Carnegie Corporation of New York**

437 Madison Avenue  
New York, NY 10022, USA

Telephone: (212) 371-3200  
Fax: (212) 754-4073

Contact: Dr. Patricia L. Rosenfield  
Program Chair, Strengthening Human Resources in Developing Countries

*Disciplinary Focus*  
Interdisciplinary

*Activities Supported*  
Grant support

#### *Program Highlights*

The Carnegie Corporation of New York is funding a number of projects in the broad area of science and technology information (STI). In 1988 the Carnegie Corporation provided the University of Zimbabwe Medical School Library with a discretionary grant in the amount of \$22,000 to establish CD-ROM capability in the library. This allowed the library to purchase hardware (one microcomputer and two disc drives) and subscribe to Medline. The Library has since received two grant renewals to support the purchase of additional workstations, including a public access workstation, facilitate training programs for end users, and pay for database subscriptions. The Carnegie Corporation has also funded the implementation of CD-ROM at a number of institutions, including the University of Dar es Salaam, the Kenya Medical Research Institute, and the Sierra Leone science and technology information network (SALSTINET). At this time, however, the Carnegie Corporation is not accepting unsolicited requests in this area.

### **Cornell University**

Albert R. Mann Library  
New York State College of Agriculture and Life Sciences  
Ithaca, NY 14853, USA

Telephone: (607) 255-8939  
Fax: (607) 255-0850

Contact: Dr. Wallace C. Olsen  
Core Literature Project Director

*Disciplinary focus*  
Agriculture

*Activities Supported*  
Literature assessment

*Program Highlights*

In 1989 the Albert R. Mann Library of Cornell University receive a four-year \$675,000 grant from the Rockefeller Foundation to identify essential core literature (books and journals) in the agricultural sciences for teaching and research in developing countries. The seven areas covered in the Mann Library study include: agricultural economics and rural sociology; agricultural engineering; animal science and health; soil science; crop improvement and protection; food science and human nutrition; forestry and agroforestry. Three books have been published thus far from this study: Wallace C. Olsen, ed., *Agricultural Economics and Rural Sociology: The Core Contemporary Literature* (Ithaca, NY and London, Cornell University Press, 1991); Carl Hall and Wallace C. Olsen, eds., *The Literature of Agricultural Engineering* (Ithaca, NY and London, Cornell University Press, 1992); Wallace C. Olsen, ed., *The Literature of Animal Science and Health* (Ithaca, NY and London, Cornell University Press, 1993).

CD-ROM production of the full-text core collection in agriculture is expected to begin in 1993 through a separate arrangement between the Rockefeller Foundation and a CD-ROM publisher.

**Health Foundation**

205 East 64 Street  
Suite 404  
New York, NY 10021, USA

Telephone: (212) 750-5075  
Fax: (212) 371-2776

Contact: Ms. Suzanne Barnett  
Director of Communications

*Disciplinary Focus*  
Health

### *Activities Supported*

Hardware; database provision

### *Program Highlights*

In 1990 the Health Foundation installed a CD-ROM workstation (microcomputer, disc drive, and printer) at the University of Ghana Medical Library together with MEDLINE. In 1991 the foundation began to provide additional databases: *Compact AIDS Library*, *Viral Hepatitis*, *British Medical Journal*, and *Lancet*. The Health Foundation has since installed a CD-ROM workstation in Zambia, and plans to equip additional medical libraries with CD-ROM capability.

## **International Development Research Centre (IDRC)**

250 Albert Street

P.O. Box 8500

Ottawa, Canada K1G 3H9

Telephone: (613) 236-6163

Fax: (613) 238-7230

Contact: Ms. Martha B. Stone  
Director General, Information Sciences and Systems

### *Disciplinary Focus*

Interdisciplinary

### *Activities Supported*

CD-ROM evaluation, facilitation, and production

### *Program Highlights*

IDRC has supported a range of activities that seek to enhance access to information in developing countries. A few of the major CD-ROM initiatives funded by IDRC include:

1. CD-ROM Evaluation

In 1986 an eight-month evaluation of CD-ROM technology was carried out. A prototype product produced by CAB International, containing 14 months of bibliographic information and abstracts on agricultural topics, was installed in six developing country sites and the IDRC library in Ottawa. The evaluation process was subjective, rather than scientific, but the results pointed to uniform acceptance of the CD-ROM product and the potential for the technology.

2. Preservation and Dissemination of CGIAR Publications

This project, carried out with the Consultative Group on International Agricultural Research (CGIAR) in 1986, assisted CGIAR in preparing for the permanent preservation of CGIAR publications. Along with other donors, such as the International Monetary Fund, IDRC contributed to the costs of physically preparing the CGIAR scientific and

technical literature for conversion to either microfiche or optical disc storage and to the costs of a CD-ROM feasibility study. This was one of the first efforts to publish multilingual, multialphabet texts, images, tables, and associated descriptive databases on compact disc. The project's emphasis on developing countries as its major clients was also considered unique at the time.

3. *Development Activity Information (DAI) on Compact Disc*

IDRC is the lead agency for an initiative to collect development activity information from as many sources as possible and to publish this information on compact disc. *Development Activity Information (DAI)* on compact disc contains almost 70,000 records representing activities of more than 200 agencies working in the field of international development. The first edition of *DAI* is already available; a second edition is planned for early 1993. Future editions will be published, depending on demand. Developing country governments and non-profit-making organizations may receive the *DAI* CD-ROM free of charge.

4. *UNCED Documents on Compact Disc*

Growing out of the UNCED preparatory process and the Earth Summit in Rio de Janeiro, Brazil, IDRC plans to produce a full-text compact disc of the official UN documents. IDRC will also fund the Instituto del Tercer Mundo to produce a complementary CD-ROM database containing the unofficial material from the NGO community, including reports and submissions.

### **Johns Hopkins University Center for Communication Programs**

527 St. Paul Place  
Baltimore, MD 21202, USA

Telephone: (410) 659-6300

Fax: (410) 659-6266

Contact: Ms. Anne W. Compton  
Associate Director, Population Information Program

#### *Disciplinary Focus*

Population and family planning; maternal and child health; AIDS prevention programs

#### *Activities Supported*

Hardware; database provision; installation; training; database design and production

#### *Program Highlights*

The Population Information Program (PIP) produces *POPLINE*, the world's largest computerized bibliographic database on population, family planning, and related health issues. The CD-ROM version of *POPLINE* is available free of charge to selected developing country and international

development organizations. PIP provides free document delivery of the majority of records in the database to developing countries. *POPLINE* production and services are funded by the US Agency for International Development and the Interregional Branch of the United Nations Population Fund.

PIP also sells low-cost CD-ROM drives appropriate for use in developing countries. CD-ROM system installation and database training services are available, as well.

### **National Cancer Institute**

9000 Rockville Pike  
Building 31  
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Telephone: (301) 496-4761  
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Contact: Dr. Frederico Welsch  
Associate Director for International Affairs

*Disciplinary Focus*  
Health

*Activities Supported*  
Database provision

#### *Program Highlights*

In 1990 the National Cancer Institute (NCI) set up three projects to demonstrate the use of CD-ROM technology at cancer centers in Budapest, Moscow, and Warsaw. It provided (and continues to provide) subscriptions to two CD-ROM databases--*Cancerlit* and *PDQ*. Forty-seven additional sites in Eastern and Central Europe, Latin American and the Caribbean, Asia, and Africa were added in 1991 and 1992. *Cancerlit* contains citations and abstracts from over 3,000 biomedical journals, papers, reports, and doctoral theses. *PDQ (Physician Data Query)* provides state-of-the art prognostic and treatment information on all forms of cancer.

### **Rockefeller Foundation**

1133 Avenue of the Americas  
New York, NY 10036, USA

Telephone: (212) 869-8500  
Fax: (212) 764-3468

Contact: Ms. Meredith S. Averill  
Manager, Records and Library Service

*Disciplinary Focus*  
Interdisciplinary

*Activities Supported*  
Hardware; database provision

*Program Highlights*

Some institutions, such as the Bunda College of Agriculture in Malawi, have received CD-ROM assistance from the Rockefeller Foundation as part of larger library grants. The Rockefeller Foundation is also supporting the Cornell Core Agricultural Literature Project described above.

In addition, the Division of Health Sciences carried two CD-ROM projects, neither of which will be expanded:

1. CISMED, which began in 1985, funded four developing country medical school libraries with 97 journals on microfiche, the Selected Medical Library on Microfiche (SMLM); *MEDLINE* on compact disc (hard copy at the outset); an information workstation consisting of a microfiche reader/printer, microcomputer, CD-ROM drive, and a printer. Document delivery was also provided when necessary. The libraries are in Colombia, Egypt, Indonesia, and Mexico.
2. SISHEALTH, which began in 1990, provides four public health libraries with *MEDLINE*, a core collection of 86 public health journals on microfiche, and the necessary hardware. The libraries are located in China, Egypt, Indonesia, and Zimbabwe.

**Royal Tropical Institute (KIT)**

63 Mauritskade  
1092 AD Amsterdam  
The Netherlands

Telephone: 20-568-8711

Fax: 20-665-4423

Contact: Mr. Hans van Hartevelde  
Head, Information and Documentation Department

*Disciplinary Focus*  
Agriculture and rural development

*Activities Supported*

Hardware; database provision; installation; training

*Program Highlights*

KIT is not a donor agency; rather it provides CD-ROM services on contract for international donors, such as the Technical Centre for Agriculture and Rural Cooperation (see separate entry). KIT services include needs assessment, purchase and installation of CD-ROM workstations, database provision, and training. KIT also publishes *TROPAG & RURAL*, two databases on one compact disc. *TROPAG* covers literature related to the practical aspects of agriculture in tropical and subtropical regions from 1975 to the present. *Rural* dates back to 1985 and covers literature in the broad field of rural development.

**Swedish Agency for Research Cooperation with Developing Countries (SAREC)**

Birger Jarisgaten 61  
S 105 25 Stockholm, Sweden

Telephone: 46-8-791-2100  
Fax: 46-8-791-2199

Contact: Dr. Karin von Schlebrugge

*Disciplinary Focus*

Interdisciplinary

*Activities Supported*

Hardware; database provision; installation; training

*Program Highlights*

SAREC supports major library programs in Tanzania, Ethiopia, Zimbabwe, and Mozambique. Although SAREC does not yet have a specific CD-ROM program, it is willing to provide CD-ROM hardware, training, and subscriptions to any of the participants in its library support program. In addition, SAREC is now considering a pilot project focusing on medicine. SAREC would provide selected libraries with necessary hardware, training, and subscriptions to the *Compact AIDS Library* on CD-ROM and the Selected Medical Library on Microfiche (SMLM). The first library selected to receive assistance through this project will probably be located in Tanzania, where SAREC is already funding a large AIDS program.

**Technical Centre for Agricultural and Rural Cooperation (CTA)**

Postbus 380  
6700 AJ Wageningen  
The Netherlands

Telephone: 31-0-8380-60400  
Fax: 31-0-8380-31052

Contact: Dr. Andries Dusink  
CD-ROM Project Manager

*Disciplinary Focus*  
Agriculture

*Activities Supported*  
Hardware; database provision; installation; training

*Program Highlights*  
CTA, which operates under the ACP-EEC Lomé Convention, has funded the introduction of CD-ROM technology in several ACP (Africa, Caribbean, Pacific) countries. This project, which began in 1989, has as its objective enhancing the self-sufficiency of ACP member states in disseminating agricultural information and stimulating regional networks. Sites selected for CTA assistance are equipped with necessary hardware (microcomputer, laser printer, CD-ROM drive, and voltage stabilizer), necessary software, and a variety of relevant agricultural databases on compact disc. The site also receives funds to cover operating costs. A significant element of CTA assistance is on-site training.

## **UNESCO**

1, rue Miollis  
75015 Paris, France

Telephone: (33) (1) 45.68.10.00  
Fax: (33) (1) 44.49.00.58

Contact: Mr. Abdelaziz Abid  
Division of the General Information Programme

*Disciplinary Focus*  
Interdisciplinary

*Activities Supported*  
Hardware; database provision; installation; training

*Program Highlights*  
UNESCO is actively seeking to promote CD-ROM utilization in a number of ways. It has provided partial funding for a number of workshops in Africa--a familiarization workshop for librarians in Khartoum in 1990, a training course for French-speaking librarians in Bordeaux, and a workshop for research librarians on marketing CD-ROM services in Accra in 1993.

UNESCO is now working on a project to equip several libraries in the developing world with CD-ROM workstations and subscriptions to *Adonis*, which produces full-text biomedical journals on CD-ROM. A third UNESCO initiative involves the production of a CD-ROM version of UNESCO documents.

### **World Health Organization**

CH-1211 Geneva 27  
Switzerland

Telephone: (41 22) 791-2071

Fax: (41 22) 788-1836

Contact: Dr. Deborah Avriel  
Chief, Office of Library and Health Literature Services

*Disciplinary Focus*  
Health

*Activities Supported*  
Database provision; training; information clearinghouse

*Program Highlights*  
WHO is carrying out a number of activities in the area of CD-ROM, as follows:

1. Providing some regional or national focal point libraries with CD-ROM workstations.
2. Some WHO regional offices sponsor training on both a national and a regional basis.
3. Provision of CD-ROM databases. The Acquisitions and Serials Unit, WHO/Geneva, orders subscriptions to CD-ROM databases for WHO technical programs, regional office libraries, WHO projects, collaborating centers, as well as medical libraries in WHO member states. The Acquisitions and Serials Unit also provides a "help line."
4. Facilitation of subscriptions in local currency. The WHO "revolving fund" permits medical libraries to purchase books and periodicals (including CD-ROM databases) using local currencies.
5. Information clearinghouse. The Office of Library and Health Literature Services is willing to answer CD-ROM related questions. It monitors trends, and evaluates new CD-ROM titles for their relevance to health information services in developing countries. The WHO newsletter, *Liaison*, brings this type of information to the attention of its readers.

## Appendix Four

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### CD-ROM Proposal Guidelines

#### Identifying a Funder

The first task is to identify prospective funding sources, and here there are two paramount issues of concern:

- Geographic Region  
Some donors focus on particular regions. SAREC, for example, funds programs in Eastern and Southern Africa, not West Africa. The BIEF mandate is to assist institutions in the francophone world.
- Program Priorities  
Not every foundation is interested in supporting projects pertaining to information. The inventory above lists several donors explicitly concerned with enhancing access to scientific and scholarly information. Do not be discouraged, however, if a donor with which you have worked is not on this list. If, for instance, you are receiving funding to carry out a research project related to health or agriculture, acquisition of a CD-ROM workstation and database subscriptions could be considered integral to the grant--*if a strong case is made for acquiring CD-ROM capability in the text of the proposal.*

The Foundation Directory (Columbia University Press) is a useful source of information on US foundations. Check with the US Information Center to see whether there is a copy in the American Cultural Center Library. You should also consult *Development Activity Information (DAI)* on compact disc, which is published by IDRC, because it will give you information on funders specifically interested in developing countries.<sup>21</sup> Check with IDRC to ascertain which sites in your country have obtained the disc. And, finally, think about the possibility of funding your CD-ROM workstation locally. The University of Zimbabwe library, for example, was able to purchase three workstations through a grant from a local donor in Harare.

Having identified a donor agency whose priorities appear to match those of your proposed

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<sup>21</sup>*DAI on Compact Disc* is described in more detail on page 44.

project, you should first write a letter of inquiry to describe briefly what you want to do and why. Conclude by asking whether the program you have described parallels the interests of the donor agency and, if so, whether the agency has specific proposal guidelines and deadlines. A final request would be for suggestions of alternative funding sources should the answer to the above question be negative.

## **Proposal Preparation**

Just to outline the major components of any proposal:

### *Proposal Summary*

One or two paragraphs that highlight the essential facts, i.e., the purpose of the project, the plan of action, and the specific amount requested of funder.

### *Introduction or Background*

Some issues to address in this section include the following:

- What is the need or problem that this project will rectify?
- How did the idea for the proposed activity evolve?
- Did you consult with other organizations in your country or region in developing the proposal?
- Is the project in any way collaborative in nature?

Be specific and document the problem for which you seek a solution.

The introductory section should also describe your organization, its activities and staff, and why it is well suited to conduct a project pertaining to information. If you have carried out previous projects pertaining to scientific and technical information, this is the place to describe them. Also, describe your library capabilities, if that is where the CD-ROM workstation will be placed.

### *Goals and Objectives*

How will this initiative make a difference in the conduct of research and teaching at your university or research institute? Here, too, focus on concrete and realistic examples that demonstrate how the information problem can be solved by the installation of CD-ROM capability.

### *Program Description*

This is the place to describe in detail your plan of action and expected result. Include information to justify the database subscriptions you wish to have funded. How will these databases serve their purpose? For bibliographic databases, can they replace the need for full-text journals? In addition, be sure to address the document delivery issue.

Bear in mind that in funding information activities, many donors are particularly interested in outreach. Will you promote CD-ROM services to researchers attached to your organization and outside? For example, several African medical libraries conduct literature searches for clinicians and researchers on a national basis. In Zimbabwe and Ghana these libraries also publish current awareness bulletins quarterly, based on MEDLINE searches. In Senegal, l'Université Cheikh Anta Diop conducts literature searches on a national and a regional basis, with requests for assistance coming in from Côte d'Ivoire, Cameroon, and Togo. This kind of resource-sharing is very appealing to donors because it magnifies the effect of the grant.

### *Monitoring and Evaluation*

Evaluation can serve two purposes. It can help you ascertain whether the project has been a success. Equally important, a mid-course evaluation can be used to determine whether changes or adjustments in program activities are necessary. Questions to answer include:

- Are you going to keep records of literature searches and then analyze them?
- Who uses the service, and, equally important, who does not?
- Can you gauge user satisfaction? If so, do they seem satisfied?
- Have numbers gone up appreciably over time?
- What problems have you encountered, and how have you attempted to solve them?

### *Sustainability*

How will the project be supported once outside donor support is no longer available? Will your institution or another organization in your country pay for database subscriptions, for example? Can you generate funds through the project itself? In Dakar, l'Université Cheikh Anta Diop has instituted a sliding scale of charges in order to cover CD-ROM costs: 2,000 CFA for students and 5,000 CFA for lecturers and researchers.

### *Budget*

Be sure to include all relevant costs here. Do not underestimate the cost of equipment and other program expenses. In addition, indicate any contributions that your institution could make to the project.