The design of an information service for the Caribbean Agricultural Research and Development Institute (CARDI) that will serve as a prototype for the larger Caribbean Agricultural Technology Information Service (CATIS)

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The design of an information service for the Caribbean Agricultural Research and Development Institute (CARDI) that will serve as a prototype for the larger Caribbean Agricultural Technology Information Service (CATIS)

by

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A Master's Dissertation, submitted in partial fulfilment of the requirements of the award of Master of Science degree of the Loughborough University of Technology.

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ABSTRACT

The design of a prototype of an information service for the Caribbean Agricultural Technology Information Service was brought about by the Caribbean Agricultural Research and Development Institute's (CARDI) need to re-address the implementation of a regional agricultural information service. This dissertation designed a prototype, 'CARDI-CATIS', on the *hub-and-spoke* information network model, where CARDI headquarters is the coordinating centre and its country offices the satellite nodes. The design was developed through investigations of CAB International, the Natural Resources Institute and CARDI itself. Besides looking at the organizational structures of these organizations, the main focus was on their information services and products. CAB International and the Natural Resources Institute both have communication links internally and externally, which makes accessing information for their information services a lot faster and cost effective. Their collaborative ventures have also assisted them in providing key information services, to a wide range of agricultural organizations including CARDI. The 'CARDI-CATIS' model allows for a two-way information flow through the decentralisation of the information processes, that would assist in achieving the objective of CATIS to collect agricultural technology information. A system of decentralised collection, processing and storage, and a centralised clearing house for Caribbean agricultural information is suggested. This would be achieved through a number of information related functions at both the national and regional levels and a communication infrastructure. The communication infrastructure relies on CARDI implementing its information systems plan in September 1995. Additionally, in order to facilitate the functioning of the prototype, a coordinated set of databases have been identified and one has been designed - the Technology Information Database. A major component of the prototype information service is the repackaging of research results. One of the tools in facilitating this function is the Technology Information Database. The 'CARDI-CATIS' prototype would be used by CARDI to test the systems design of CATIS and provide a basis for its implementation.

ACKNOWLEDGEMENTS

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1 INTRODUCTION

The Caribbean Agricultural Research and Development Institute (CARDI), is presently involved in putting together a plan to implement a regional information system called the Caribbean Agricultural Technology Information Service (CATIS). This system and the corresponding service was endorsed for establishment by CARDI, by the Caribbean Community (CARICOM) in 1987. [1] At that time it was envisaged that an initial system will have to be designed and the corresponding service developed and implemented at the national and regional levels.

A study funded by the United Nations Food and Agriculture Organization (FAO) was conducted by CARDI in 1989 through the services of a consultant. This study identified the current and potential users, current sources of information, existing resources, and current services for disseminating information to agricultural practitioners. The cost of implementing CATIS at this time was US$857, 000. [2] These resources were revised by CARDI in 1991 to be US$1, 479,000. [3] Until now there have been discussions about CATIS and its benefits to regional agriculture but because of a lack of funding there was no movement towards implementation.

At the Regional Advisory Board meeting of the Technical Centre for Agricultural and Rural Co-operation (CTA), at CARDI in 1994, CTA indicated that it would provide funds to establish a regional information service. Since May 1994, CARDI has been undergoing a restructuring process to re-address its role in Caribbean agriculture and its *modus operandi*. The implementation of the restructured organization is due for September 1995. The restructured CARDI will have an integrated Information and Communication programme within which, there are two projects which impact on CATIS: the *Design and Implementation of an Information System* and the *Design and Implementation of the*

Caribbean Agricultural Technology Information Service (CATIS).[4]

This dissertation provides CARDI with a prototype of this service using CARDI headquarters and its country offices as a model for the design. Input for the design, a 'CARDI-CATIS' was obtained from the case studies of two organizations in the United Kingdom, the Centre for Agriculture and Biosciences (CAB) International and the Natural Resources Institute (NRI). Although, these organizations did not exactly fit the 'CARDI-CATIS' model, the nature of their information services and their experience in disseminating agricultural information proved to be an invaluable resource for the design.

The 'CARDI-CATIS' design is modelled on a *hub and spoke* network where CARDI's headquarters is the *hub* of the network and its country offices the *spokes*. This relates to the wider CATIS where CARDI and its offices become the hub of the network and the CATIS participants the spokes. The design relies on a system that is market-driven and is highly geared towards the users' needs.

1.1   REFERENCES

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3.   **Parasram, S.** *The Caribbean Agricultural Technology Information System - A background and justification.* [Unpublished internal document], 1991, pp. 17-20.

4.   **CARDI.** *Information and Communications Programme - Projects.* [Unpublished internal document], 1995, p.1.

2

THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI) - A BACKGROUND

2.1   THE ORGANIZATION

2.1.1   HISTORY AND ESTABLISHMENT

The Caribbean Agricultural Research and Development Institute is a *regional inter-governmental institution* which was established in 1975 to serve the agricultural research needs of the Caribbean Community (CARICOM). [1] CARICOM is the regional integration movement consisting of the twelve English-speaking countries of the Caribbean (see figure 2.1). Although CARDI was established by CARICOM, it is autonomous in its operations. CARDI's predecessor, the Regional Research Centre of the Faculty of Agriculture of the University of the West Indies provided the scientific expertise of the institute. [2]

2.1.2   OBJECTIVES AND MISSION

CARDI as a regional research organization, determines its research programme at the request of the governments and in direct consultation with the Ministries of Agriculture. Since 1975, CARDI's main objectives have been:

- *to provide for the research needs of the region as identified in national plans and policies;*

- *to provide and extend the application of new agricultural technologies in production, processing, storage and distribution of agricultural products of member countries;*

3

The member countries of CARICOM/CARDI.

Figure 2.1

- *to provide for the co-ordination and integration of the research and development efforts of member countries where this is possible and feasible.* [3]

These objectives were reflected in CARDI's original mission statement:

to contribute to the agricultural development through the generation and dissemination of appropriate technology that benefits the Caribbean people. [4]

The institute's budget comes from the member countries according to an agreed formula and from several external agencies (see appendix I). [5] However, in recent times, it has become increasingly difficult for member countries to live up to these commitments. The 1990s has brought new challenges for the region with trade liberalisation becoming a reality and mega trading *blocs* emerging in the North (i.e. the European Community). From 1975 to 1989, CARDI was successfully attracting project funding from donor agencies operating in the Caribbean region but recently this has been fast declining. Additionally, CARDI has been experiencing changes in its internal environment within the last two years and now has a new Executive Director and a restructured senior management. These changes have caused CARDI to address its present objectives and modify its operational strategy so that there is sustainability of the Institute.

Since May 1994, the Institute has been re-addressing its role and is currently in the process of restructuring its organisational structure as well as its *modus operandi*. The mission statement has been modified as a result of this process and now reads:

to accelerate sustainable agricultural development through strategic management of those processes that generate, transfer and commercialize appropriate technology which will improve the social and economic well-being of Caribbean peoples. [5]

In working towards the achievement of this new mission, CARDI will focus on four areas

during the period 1995 to 1997:

- *establishing an effective Caribbean agricultural science and technology system;*

- *application of technology;*

- *access and dissemination of technological management information;*

- *improving the internal efficiency of the institute.* [6]

CARDI's specific objectives are now the following:

- *to support the agricultural diversification efforts of its member countries;*

- *to collaborate with commodity organizations including those working with rice, bananas, sugar, cotton, and coconut in the traditional agricultural sector to increase their productivity and competitiveness;*

- *to collaborate in the generation, adaptation, transfer and commercialization of sustainable and environmentally sound technologies which enhance the productivity and marketability of selected agricultural commodities;*

- *to collaborate in the development and adoption of sustainable production and marketing systems;*

- *to provide timely problem-solving expertise which responds to the needs of CARDI's clients;*

- *to collaborate in the provision of an information collection, analysis,*

repackaging and dissemination service for the region;

- *to catalyse and co-ordinate the design and establishment of a sustainable Caribbean Agricultural Science and Technology System;*

- *to enhance the sustainability and viability of CARDI through its strategic management processes to meet the needs of its clients, and by diversifying and broadening its resource base.* [7]

2.1.3   ORGANIZATIONAL STRUCTURE

CARDI's Governing Body is the Standing Committee of Ministers responsible for agriculture in the Caribbean Community (CARICOM). The Board of Directors consists of representatives from the member countries; the Universities of the West Indies (U.W.I.) and Guyana; the Caribbean Development Bank; the Caribbean Food Corporation (CFC) and the CARICOM Secretariat. A representative from the Inter-American Institute for Cooperation on Agriculture (IICA) has observer status on this board. [8] These two boards are not involved in the daily running of the Institute but are the institutional zone within the organisational structure and have a *trustee* function. Senior management includes the Executive Director, a Deputy Executive Director and five programme managers. They are responsible for the daily management of the Institute, and perform a *facilitating* function within CARDI.

CARDI's organisational structure has been shaped by the wide geographical distribution and broad responsibilities of its staff. The structure is based on: *decentralisation* which gives operational responsibility to the CARDI Representative in each country. To achieve its objectives, CARDI has staff and facilities in all twelve member countries. The institute employs 206 persons, 85 of which are professional staff and 121 support/ technical staff.

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CARDI's Organogram.

GOVERNING BODY

Board Committees
Appointments
Programme and Budget
Audit

BOARD OF DIRECTORS

Executive Committees
Investment
Senior Management
Planning and Budget
Staff Advisory
Information and Publication
Project Appraisal and Monitoring

EXECUTIVE DIRECTOR
Office of the Executive Director
- Executive Assistant
- Executive Secretary
- Internal Auditor

DEPUTY EXECUTIVE DIRECTOR
Office of the Deputy Executive Director
- Programme Manager
- Deputy Programme Managers

Communications
Communications Officer
Communications Assistant
Information (Socio-economic)
Editor (part-time)
Printing Services Supervisor
Production Assts.

Communications Manager

Information
Registry Administrator
  Registry Assistant
  Registry Clerk
Documentalist
  Documentalist Asst
  Clerk/Data Entry
  Operators
Network Administrator

Information Resource Manager

Human Resource & Administration
Human Resource Management Officer
General Services
General Services Supervisor
  Office Asst/Driver
  Office Attendant
  Casual Labour
Secretariat
  Senior Secretary
  Secretaries
  Receptionist/Telephonist
Personnel
  Personnel Assts
  Confidential Secretary

Human Resource and Administrative Manager

Finance
Accountant
  Senior Accounting Assts
    Countries
    Projects
    HQ
    Accounting Assts/Clerks

Finance Manager

Planning, Socio-economics, Business Development
Production Economists
Biometricians
Senior Economist (PME)
Marketing Research Analyst
Rural Sociologist
Project Analysts
Statistical Assistant

Manager Corporate Planning and Business Development

Antigua & Barbuda
Professional (4)
Agronomy
Animal Production
Irrigation
Seed Technology

Technical/Clerical (8)

Barbados
Professional (10)
Vegetable Agronomy
Animal Production (3)
Entomology
Plant Breeding
Tissue Culture (3)
Sen. Acct/Admin Asst

Technical /Clerical (9)

Belize
Professional ((5)
Systems Agronomy
Seed Technology
Livestock
Rice Agronomy
Field Station Mgr

Technical /Clerical (4)

Dominica
Professional (6)
Pathology (2)
Horticulture/Agronomy
Post Harvest Technology
Entomology
Agronomy

Technical/Clerical (10)

Grenada
Professional (4)
Pathology
Horticulture (Fruit)
Minor Exotics
Post Harvest

Technical/Clerical (4)

Guyana
Professional (8)
Pasture Agronomy (2)
Soils
Animal Production
Seed Technology
Horticulture (2)
Rice Agronomy

Technical/Clerical (16)

Jamaica
Professional (10)
Soils
Animal Nutrition
Animal Production
Forage Agronomy
Agronomy
Entomology (3)
Pathology
Sen. Acct/Admin Asst

Technical/Clerical (30)

Montserrat
Professional (1)
Agronomy

Technical/Clerical (4)

St Kitts and Nevis
Professional (3)
Pathology
Vegetable Agronomy
Entomology

Technical/Clerical (6)

St Lucia
Professional (8)
Horticulture (Fruit)
Systems Agronomy
Post Harvest Technology
Irrigation
Livestock
Agronomy (Field Station Manager)
Horticulture
Agronomy

Technical/Clerical (6)

St. Vincent & the Grenadines
Professional (3)
Root Crop Agronomy
Animal Breeder
Fruit Crop Agronomy

Technical/Clerical (5)

Trinidad & Tobago
Professional (6)
Animal Productionist
Agronomy (2)
Rural Sociology
Soils and Water
Ornamental Horticulture

Technical/Clerical (6)

CARDI

Figure 2.2

8

Professional staff consists of a core group of scientists (including entomologists, pathologists, agricultural economist, agronomists, biometricians), senior managers and other professionals. CARDI Representatives and their staff are responsible for implementing CARDI's programmes in cooperation with national agencies. CARDI's organisational structure is described in the organogram in figure 2.2.

The current restructuring has adopted the Logical Framework (Log Frame) methodology as its main planning tool. This methodology specifies the relationship among the hierarchy of planned objectives. The Log Frame provides information on four levels: goals, purpose, outputs, and inputs and activities. All activities of the institute will now be conducted on a project basis, and this tool will assist CARDI in the development and execution of its projects. [9]

2.1.4 PROGRAMMES

From September 1995, under the restructured CARDI, the business of the institute will be carried out in a project mode i.e. at the operational level all the activities conducted will fall within a given project. All projects fall within six programmes. The technical work programme is organized into three programme areas:

TECHNICAL PROGRAMMES

- Commodity Improvement

  This covers the main research work and its purpose is to generate production and marketing information for internationally competitive products on a sustainable basis and within an environmentally sound system. It also covers improved germplasm and breeding stock.

- Natural Resource Management

9

This aims to develop appropriate land use plans for fragile agro-ecological zones in the Caribbean.

- Technology Adaptation and Application

This builds on the Commodity Improvement programme by testing and validating technologies. It facilitates the adoption and application of these technologies on farm with particular emphasis on enterprise development.

These programmes are institute wide and operate on a project basis. Three corporate programmes ensure the smooth running of the institute and provide support to the technical work programmes. These are:

CORPORATE PROGRAMMES

- Information and Communications
- Corporate Services
- Planning and Business Development [10]

A list of the programmes and sub-programmes is given in appendix II.

2.2   CLIENTS AND COLLABORATORS

2.2.1   CLIENTS

CARDI's clients are those involved in the production and marketing of agricultural commodities at both national and regional levels. These are:

- Farmers
- Input suppliers
- Marketing organisations
- Ministries of Agriculture
- National agricultural research institutions

- Processors
- Producer organisations
- Regional agricultural research organisations. [11]

2.2.2 COLLABORATORS

In order for CARDI to support its stated objectives it has collaborative agreements with a number of national, regional and international organizations. A list of these collaborators is given in appendix III. CARDI is also a member of a number of agricultural networks such as BioNET International, a biosystematic network, and its Caribbean LOOP (Local Organised and Operated Partnerships) CARINET. Additionally, CARDI has recently taken a lead role with the Inter-American Institute for Cooperation on Agriculture (IICA) in coordinating PROCICARIBE, a cooperative programme of agricultural research and technology transfer for the Caribbean. [12]

2.3 INFORMATION AND COMMUNICATIONS PROGRAMME

2.3.1 OVERALL GOAL

The goal of the Information and Communication Programme is to satisfy the information requirements of the Institute, other research and development institutions, and the farming and marketing community at large. This programme is divided into two sub-programmes: Information and Communication. Aspects of this programme include: development of systems for determining and tracking clients' needs; the collection, repackaging and

dissemination of technical information; and the establishment and management of information system for the institute. [13]

2.3.2 PROJECTS

Under the integrated programme a number of projects have been identified for implementation in September 1995. These projects are:

INFORMATION

- *Design of an Information and Communication Strategy and System.*
- *Design and Implementation of an Information System.*
- *Establishment of a CARDI Research Database.*
- *Design and Implementation of an Information Service.*
- *Design and Implementation of the Caribbean Agricultural Technology Information Service (CATIS).*
- *Design and Operation of a Policy and System for the Registry and Archives.*
- *Integrated Training for Information and Communication.*

COMMUNICATIONS

- *Design and Implementation of a Public Relations Strategy.*
- *Production of Communications Materials.*
- *Development and Operation of the Regional Rural Radio Network (RRRN).*
- *Provision of Communication Services.*
- *Marketing of Information and Communications Products and Services.*[14]

2.3.3 OUTPUTS

Outputs of this programme will include products and services such as an information system, databases, monographs, bibliographies, technology packages, bulletins, enquiry/reply services, information on the state of on-going research within the region, information to assist in the planning of research activities, and information on experiences in implementing indigenous and other suitable technologies. As far as possible the information provided will include market projections, risk analysis, economic analysis and agro-processing potential. The range of information and communication services and products provided will assist in technology transfer and be a source of generating income for the institute.

The information systems plan is currently being implemented and includes rules and guidelines that ensure hardware and software compatibility throughout the institute; and provide control, security, and maintenance of data integrity that is unique to CARDI (further details in Chapter 7).

The areas of concentration of the Information and Communication Programme programme will be:

- *Data retrieval*
- *Data analysis and interpretation*
- *Data storage*
- *Data collection*
- *Dissemination*
- *Information service and products*
- *Information and Communication Network*

- *Marketing Information*
- *Needs assessment*
- *Operational information management*
- *Packaging*
- *Publications*
- *Strategic information management*[15]

2.4 THE INFORMATION AND DOCUMENTATION CENTRE

2.4.1 HISTORY

Recognising the importance of the researcher, and the need to bring timely research information to them, a system to supply agricultural research information to the Caribbean was established in 1981 as the CARDI Literature Service (CARDILS). The CARDILS project which lasted for three years aimed to formalize and upgrade CARDI's capability to select, repackage, and disseminate information for its field staff, thereby increasing their awareness of current agricultural developments in the Caribbean and elsewhere. [16] This service has now been incorporated into CARDI's Information and Documentation Centre.

2.4.2 SERVICES

The Information and Documentation Centre houses and maintains information produced by CARDI and a specialised collection of agricultural material related to CARDI's work programmes. It also offers an agricultural information service to the general public. However, its main purpose is to serve the information needs of CARDI researchers. The centre provides the following services:

- **Document delivery**
- **Literature searching**
- **Loans**
- **Photocopying**
- **Publication Distribution**
- **Question and Answer**
- **Selective dissemination of information (S.D.I.)** [17]

These services are provided to CARDI's staff; agricultural researchers; policy makers;

students; teachers and lecturers; farmers and other agricultural enthusiasts in the CARDI countries. In the provision of the above services CARDI collaborates with several national, regional and international organizations (see appendix 7.3). The centre inputs CARDI publications into the International Information System for the Agricultural Sciences and Technology (AGRIS) database and is a member of the World Network of Agricultural Libraries (AGLINET).

CARDI serves as the Regional Branch Office for the Caribbean (RBO/C) for the Technical Centre for Agricultural and Rural Co-operation (CTA) based in the Netherlands. As part of this arrangement, CARDI provides a Question and Answer Service to the public and channels information between CARDI, CTA and the national focal points in the Caribbean.

Although CARDI is not an extension organisation, it must reach out to farmers in order that its technology can be available. The essential information is re-packaged in a series of fact sheets and technical bulletins. Further details if the services offered are given in Chapter 7.

2.5   REFERENCES

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agricultural development. 1994, p. 1.

6.   *Ibid.*

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13.   **CARDI,** ref. 11, p. 14.

14.   **CARDI.** *Information and Communications Programme - Projects.* [Unpublished internal document] 1995, p.1.

15.   **CARDI,** ref. 11, p. 17.

16.   **CARDI.** *Caribbean Agricultural Research and Development Institute Literature Service (CARDILS) Final Report.* 1986, p. 2.

17. **CARDI.** *CARDI Information and Documentation Centre Annual Report September 1992 - August 1993.*1993, p. 1.

3 THE CARIBBEAN AGRICULTURAL TECHNOLOGY INFORMATION SERVICE (CATIS) - A BACKGROUND

3.1   ESTABLISHMENT

In 1987, at the CARICOM Heads of Government Conference, the CARICOM Secretariat and the Caribbean Agricultural Research and Development Institute (CARDI) were given the responsibility for the development of a Caribbean agricultural technology information service, at the request of the Standing Committee of Ministers of Agriculture of CARICOM. [1]

At that time it was envisaged that an initial system would have to be designed with the corresponding service subsequently implemented at the national and regional levels. An agreement was made between the CARICOM Secretariat and the Food and Agriculture Organization (FAO) of the United Nations for the design of this system and its corresponding service.

3.2   INITIAL FAO/CARDI STUDY

CARDI with funding from FAO embarked on a study in 1989 to analyse the information requirements of the agricultural community in the Commonwealth Caribbean; and the capacity at the national level for participation in the regional system. [2] The study was conducted by a consultant, Faye Durrant, and it investigated the current and potential users of CATIS; current sources of information; existing resources; and current services for disseminating information to agricultural practitioners. In the process of conducting

this study, meetings were held with representatives from:

> Agricultural aid agencies
>
> Agricultural development credit institutions
>
> Agricultural consulting firms
>
> Agricultural associations
>
> The agro-industrial community
>
> Commodity boards
>
> The farming community
>
> Ministries of Agriculture
>
> Regional agricultural organizations
>
> Research institutions. [3]

The study identified the users and potential users of CATIS as being:

- all members of the agricultural community in the CARDI member states - such as:
    - crop producers
    - livestock producers
    - processors of agricultural products;
- agricultural extension officers;
- librarians;
- technical officers of the Ministries of Agriculture; other public and private agricultural agencies. [4]

Further, the study showed that there was a need to identify appropriate channels for dissemination of information to the agricultural community. In investigating how the information on agricultural technology was being disseminated, it was discovered that this information on technology generated in the region by CARDI and other research and development organizations was disseminated to the Ministries of Agriculture but not to the users and potential users at the optimum levels. The reasons for this were: the lack of

appropriate resources in the extension services, libraries and communication units; and inadequate communication at the national level with the private sector, commodity boards, suppliers of agricultural inputs and private consultants. [5]

The consultant reported that the establishment of CATIS would permit the development of a regional facility to provide information to the farming community through the national extension services and directly to the progressive farmers. She identified seven ways in which this information transfer would occur:

- *packaged information in response to a generally recognized need, or in response to particular problems of individual farmers;*

- *seminars and direct advisory services in the application of particular agricultural technologies;*

- *packaged information on the experiences in implementing indigenous and other suitable technologies;*

- *access to information on agricultural technology generated, tested and validated in the region;*

- *access to information held by other agricultural information systems;*

- *a selective dissemination of information service;*

- *a regional consultancy service for agricultural technology.* [6]

Additionally, it was discovered that there was an urgent need for information on the availability of regional and international markets for agricultural products. This was however, undertaken by the CARICOM Secretariat through the development of the Caribbean Agricultural Marketing and Production Information System (CAMIS). [7]

In her study, Ms. Durrant identified a number of resources including personnel, materials, equipment and financing. The development of a suitable regional service will require the upgrading of CARDI's information resources (as the co-ordinating centre for CATIS), as well as the upgrading of facilities at the national level i.e. Ministries of Agriculture libraries or equivalent agencies. Additionally, she indicated a number of access points for CATIS in each country and these were:

> *Commercial firms*
> *Commodity boards and associations*
> *Consultants*
> *Development banks*
> *Ministries of Agriculture Libraries*
> *Ministries of Agriculture Extension Services*
> *Public Libraries.* [8]

The budget allocations in her study were for a project implementation period of three years and included costs for personnel, publishing, training, travel, research, support services and equipment. The budget allocations (see appendix IV) at 1989 values were at a final cost of US$857, 000. [9] In 1991, CARDI revised this budget (see appendix V) at a cost of US$1,479,000. [10]

Ms. Durrant concluded that the proposed system should be market-driven, that is, there should be emphasis on providing technological information on crops and products for which there are local and external markets. Such a service she says, would permit agricultural producers to be able to plan their planting and production schedules for each season and each year. [11]

3.3   CARDI'S ROLE IN CATIS

CARDI through the execution of its activities in its participating countries is in a position to draw on and apply the technical and managerial knowledge that is available to it. Therefore, there was a need to put in place an effective technical information system that links the various sources of information and documentation at national, regional and international levels; and which could guarantee the provision of expert assistance to the farming practitioners particularly the provision of repackaged information.

CARDI's mandate to establish an agricultural technology information service, precipitated the aim to make available repackaged information in the required format to the end users in the Caribbean region. These users include: the producers of agricultural goods (farmers) as well as planners, administrators, extension agents and scientists.

The basis and justification for CARDI's role in CATIS therefore, is the existence of the need and CARDI's comparative advantage as the regional institution capable of setting up and delivering such a service. CARDI's comparative advantage is based on:

- *CARDI's existing structure - present in all CARICOM countries, infrastructure in place, scientists with requisite skills, and excellent linkages with national, regional and international systems;*

- *CARDI's mandate:*

    - *to perform research based on regional priorities and deliver results at the regional/national level,*

    - *to act as an agricultural information analysis centre - analysing, packaging and disseminating information,*

    - *to co-ordinate agricultural research where desirable,*

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- *to facilitate the adaptation and transfer of technology.* [12]

CARDI will be the regional co-ordinating agency and will be responsible for the organizational structure of CATIS. Therefore, CARDI will need to have regular consultation with the member states to determine an appropriate *modus operandi*, and to confirm that there is consensus at each stage of the development of this regional service. CARDI's Boards which are representative of the member states will review the system design, and confirm its incorporation into CARDI's programme, and into the programmes for national agricultural information development. CARDI through its Boards will also be responsible for confirming organizational linkages between the system, and the related regional organizations.

The development of a Caribbean agricultural technology information service will require expansion of the areas of information resources management handled by CARDI, and the development of an increased capability for information transfer to the extension agents and to the agricultural community.

3.4   OBJECTIVES OF CATIS

The effective utilization of the relevant agricultural technologies, therefore requires the implementation of a system of regular repackaging and dissemination of information on technologies relevant, to the Caribbean agricultural community.

The general objective is to develop a coordinated information service to enhance the current provision of agricultural technological information to the farmers and other users in the Caribbean region with a view to contributing to increased productivity and the competitiveness of the agriculture sector. The specific objectives of the service are:

- *Identification of priority areas for delivery of information services.*

- *Strengthening of the capability of CARDI in information transfer of agricultural technology.*

- *Organization of CARDI's information resources - CARDI and Regional Organizations.*

- *Upgrading of the national agricultural information services and resources.*

- *Development of a regional database on research undertaken by CARDI and the Universities of the West Indies, Guyana and Surinam including technology generated, and experiences in utilizing the research results.*

- *Identification of undocumented areas of research undertaken, and technology validated in priority areas, as the preliminary stage of documenting research results.*

- *Development of national databases on research undertaken by the Ministries of Agriculture, and by other national institutions including technology generated, and experiences in utilizing research results.*

- *Repackaging of research results in the form of fact sheets, technology packages, production guides and other audio-visual materials.*

- *Training of information personnel in the repackaging of agricultural research reports.*

- *Training of users i.e. agricultural producers in the use of information held by the system.*

- *Dissemination of information from the regional system to users through the distribution of repackaged information, through extension seminars and demonstrations, and through the mass media.*

- *Feedback - documentation and evaluation of the experience in implementing certain technologies generated in the region.*

- *Dissemination of information in languages appropriate to the users - English, Spanish and Creole.*

- *Development of an agricultural technology consultancy service linked to the research generated in the region.*

- *Development of national and regional services through appropriate service points.*

- *Promotion of available services through the mass media.*

- *Input of experiences in using regionally generated technology to the design of systems for technology transfer.* [13]

The system for agricultural technology information transfer aims initially to assist large and small farmers of the region in gaining access to agricultural technologies which have been researched and tested by CARDI and other research organizations; and subsequently to establish linkages with other regional and international research and development agencies which are involved in the determination of the technical and commercial feasibility of agricultural production. As the services provided will aim to advise users on technologies which are commercially viable, the initial phase will be followed by the establishment of more systematic linkages with the agricultural research agencies in the region such as: the national, regional and international commodity associations and their

research arms; the Universities of the West Indies, Guyana and Surinam; and the general and specialised national, regional and international agricultural research institutions. It is expected that these linkages will enable the system to develop into a full-fledged regional service, and to establish a channel for input of research into the technology transfer programme of CARDI.

3.5   PARTICIPANTS' ROLE IN CATIS

The Member States of CARDI will participate in the system through their information services which will be responsible for collecting, processing and disseminating information on the research undertaken by CARDI; and subsequently other relevant research. The system when fully implemented would therefore be able to provide one regional and several national centres through which the agricultural community can have access to the services.

The information centres involved in the regional network will include:

- libraries of the national, regional and international agricultural research and development institutions;

- libraries of universities and other tertiary educational institutions in the region which are involved in agriculture;

- information analysis centres which would be responsible for analysing and repackaging the research reports for dissemination to a wider audience;

- information dissemination centres which would be responsible for research/extension liaison activities; and for dissemination of information through the mass media, and specialized newsletters, through the

mounting of seminars, and demonstrations, and through individual consultancies for the development of specialized agricultural services. [14]

3.6   CURRENT SITUATION WITH CATIS

Since the initial FAO/CARDI study was conducted nothing has been done with respect to implementing CATIS. The recent restructuring of CARDI has seen the inclusion of CATIS under the Information sub-programme as a project entitled *The Design and Implementation of the Caribbean Agricultural Technology Information Service (CATIS)* (see Chapter 2) .

In 1994, at the Technical Centre for Agricultural and Rural cooperation (CTA) Advisory Board Committee meeting in Trinidad there was discussion of a regional information service that would be funded by CTA. The terms of reference of this agreement has set in place a study to update the Faye Durrant study carried out in 1989. This current study will address the areas of research, extension, information and documentation, publication, radio and other types of communication. The study will be conducted by a consultant in collaboration with CARDI's staff. Incorporated in this study will be a user needs analysis and is expected to be completed by November - December 1995.

This dissertation will look at the design of a service that will suit CATIS but on a smaller scale using CARDI headquarters and its country offices as a prototype. The reason for using CARDI as the prototype is because of the similar networked model that CATIS would be based on i.e. a hub and spoke network model. The design will incorporate the resources required for such a service as well as what services will be provided.

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3.7   REFERENCES

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5   *Ibid.*, p. 48.

6.   *Ibid.*, p. 8.

7.   *Ibid.*

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12.   **Parasram,** ref. 10, p. 3.

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4 METHODOLOGY

4.1 RATIONALE

As the restructuring process at CARDI continues, CATIS begins to play an important role in the institute achieving its objective of providing information services to the Caribbean agricultural community. CATIS will serve as the central input and dissemination centre for Caribbean agricultural information.

Discussions with CARDI's management resulted in the decision to do a dissertation that will design an information service for CATIS. There was a problem with the time frame in which to conduct this exercise, given the number of countries and organizations that will eventually be involved in CATIS. Hence, a further decision was taken to use CARDI's headquarters and its country offices as a model for the design. The reason for this was the similar environments of CARDI and CATIS, both being made up of a centre with satellite nodes. Additionally, it was easy to contact CARDI's country offices from headquarters by fax and telephone for conducting the information gathering process for the dissertation. This model, which is in fact a 'CARDI-CATIS', will be used by CARDI as a prototype to test the systems design and as the basis for the implementation of CATIS.

In order to develop proposals for the design the following steps were undertaken:
- a case study of the Natural Resources Institute (NRI);
- a case study of the Centre for Agriculture and Biosciences International (CAB International or CABI);
- a survey of CARDI's existing information service.

These studies provided parameters for the design of an agricultural information service.

4.2 A CASE STUDY OF THE NATURAL RESOURCES INSTITUTE (NRI)

4.2.1 RATIONALE

The Natural Resources Institute (NRI) was chosen as a study because of the similar nature of the services provided by NRI with those that are to be provided by CATIS. Additionally, although NRI does not exactly fit the CATIS model, it was chosen because of its experience in gathering, processing and disseminating scientific information.

4.2.2 METHODS

The study involves the use of a structured questionnaire (see appendix VI) supported by interviews with the Head of the Library and Information Services Group, the Head of the Information Technology Services Group and the Publications Manager. Some questions were repeated within the questionnaire to accommodate overlap of roles within the organization. A visit was also made to the library at Chatham during May 1995, where there was a first hand look at the facilities and operations. The interviews were recorded and later transcribed to support the information received from the questionnaire.

4.3 A CASE STUDY OF THE CENTRE FOR AGRICULTURE AND BIOSCIENCES (CAB) INTERNATIONAL (CABI)

4.3.1 RATIONALE

CAB International (CABI) is one of the foremost international agricultural organizations involved in the accession, processing, disseminating and storing of agricultural and bioscientific information. CABI also does not exactly fit the CATIS model, but has similar features such as its worldwide branch offices and repackaging information into highly successful information products.

4.3.2 METHODS

The study of CAB International followed the same pattern as that for NRI, and the same questionnaire with slight modifications (see appendix VII) was used. The results of the questionnaire was supported by interviews with the staff at CABI's headquarters in Wallingford: the Information and Training Specialist (Information Services), the Head of Development Projects and the Database Services Group Manager. These interviews were supplemented with an E-mail interview (see appendix VIII) with the Library Services Manager at CABI's Library Services Centre in Ascot. Additionally, an opportunity was taken whilst in Trinidad to interview staff at CABI's Regional Office for the Caribbean located there (see appendix IX). This particular interview provided details of CABI's information service from a branch office point of view.

4.4   A SURVEY OF CARDI'S EXISTING INFORMATION SERVICE

4.4.1   RATIONALE

In order to design an information service for CATIS using CARDI a model, it was appropriate to investigate the existing information service of the institute so that the existing information resources including information held and other sources (linkages - see Chapter 7); and users' needs could be identified. The CARDI offices which are located in the twelve CARICOM countries were used as the sample of the survey because they were easily reached by telephone and fax. Although personal visits would have been ideal, financial and time constraints did not allow this.

4.4.2   METHODS

In determining what information resources were held in the CARDI country offices, and what other sources (via linkages) were available, a questionnaire (see appendix X) was used. This questionnaire examined the types, quantities and formats of the information held; the technologies used to access, process, store and disseminate information; the linkages which exist; the ease with which information is accessed using these linkages; and the time frame for accessing information from these linkages. The questionnaire was faxed to all the country offices excepting headquarters, together with a letter of endorsement from the Executive Director of CARDI.

CARDI's Information and Documentation Centre is located at the headquarters in Trinidad and interviews (see appendix XI for a list of questions asked) were conducted with its staff. Statistical information for the existing service was also gathered from the Information and Documentation Centre through the examination of the in-house databases, *PROFIL* and *MAIL*, and the centre's records.

In determining the users' needs, a sample of CARDI's researchers (scientists) to whom the CARDI Information and Documentation Centre provide information services was used. These researchers were pinpointed as being the CARDI Representative in each of the countries, and who because of their positions, were better able to provide an overview of the needs of the particular office. The same questionnaire used for surveying the information resources was used, with relevant questions added, to identify these users' needs. In addition to the questionnaire, the interest profiles of CARDI's researchers held by the Information and Documentation Centre and the feedback that was received from researchers in the last year were examined.

4.5 THE RE-DESIGN OF CARDI'S EXISTING INFORMATION SERVICE AS A PROTOTYPE FOR CATIS - A 'CARDI-CATIS'

CATIS will be a new agricultural information service for the Caribbean region and the model designed in this dissertation will provide CARDI with a prototype for this service. The model will be based on a re-design of the existing information service at CARDI to suit the needs of the users, the institute's present and future programmes, and the objectives of CATIS. This design is based on a service provided by CARDI headquarters to its country offices and incorporates the information gathered in the three developmental studies. Figure 4.1 describes the two-way channels of information flow that will exist between CARDI and its country offices.

The 'CARDI-CATIS' design proposes a centralised facility at CARDI headquarters for accessing, processing, storing and dissemination agricultural information. This design incorporates consultancy, information transfer, dissemination of information and question and answer services. These services are based on a set of coordinated databases and functional areas that would achieve the repackaging objective of CATIS.

A study being conducted by CARDI to analyse the users' needs of the wider regional

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CATIS. The results from this study (due in November -December 1995) will be used together with the design in this dissertation to implement the wider CATIS.

The channels of information flow between CARDI headquarters and its Country Offices.

Figure 4.1

5 THE NATURAL RESOURCES INSTITUTE - A CASE STUDY

5.1 THE ORGANIZATION

5.1.1 HISTORY AND ESTABLISHMENT

The Natural Resources Institute (NRI) originated from three scientific units of the Scientific and Practical Department of the Imperial Institute: the Tropical Products Institute (TPI), the Centre for Overseas Pest Research (COPR) and the Land Resources Development Centre (LRDC). These units developed individually but were brought together in 1965 under the Ministry of Overseas Development. They joined in 1987 to form the Overseas Development Natural Resources Institute (ODNRI) and adopted the name NRI when it became an Executive Agency of the Overseas Development Administration in 1990. NRI's chronological history is given in figure 5.1.[1]

5.1.2 MISSION

As the scientific arm of Britain's Overseas Development Administration, NRI's main purpose is to improve the productivity of the natural resources of developing countries, through the proper application of science and technology, so that they eventually become sustainable. Internationally, the institute has been the centre point for the research, consultancy and project management areas of natural resources. [2]

In 1994, NRI was restructured to a Next Steps Agency. [3] The organization was downsized and efforts were channelled into bridging the gap between research results and adaptation of research. NRI's main thrusts are concentrated in research and technology transfer to the British aid programme; environmental concerns; the role of women in the

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development process; and development aid community.

The Chronological History of the Natural Resources Institute

1894 The Imperial Institute 'Scientific and Practical Department'	1929 Imperial Institute of Entomology	1946 Directorate of Colonial Surveys	Colonial Office
1958 Tropical Products Institute	1971 Centre for Overseas Pest Research	1964 Land Resources Division	
	1983 Tropical Development and Research Institute	1978 Land Resources Development Centre	Department of Technical Cooperation
	1987 Overseas Development Natural Resources Institute		
	April 1990 Natural Resources Institute		Overseas Development Administration

Figure 5.1

5.1.3 ORGANIZATIONAL STRUCTURE

NRI is headed by a chief executive and four other directors: the Director of Corporate Services, the Director of Development Services, the Director of Professional Services and the Director of Research Services. The Director of Corporate Services is responsible for six groups within the institute, each with a Head of Group. Three of these groups are: the Information Technology Services Group, the Library and Information Services Group and the Publishing and Publicity Services Group. The Director of Professional Resources in is charge of a number of resource areas including Livestock, Crop Utilisation, Food

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The Organizational Structure of the National Resources Institute.

Figure 5.2

Security, Pest Management and Environmental Sciences. NRI's organizational chart is given in figure 5.2.

5.1.4 CLIENT BASE

NRI's client base includes: the British Government, the Commission of the European Communities, the main multilateral development banks, international donor agencies and bilateral donors. NRI also collaborates with a number of overseas organizations such as: government ministries and agencies, research institutes (eg. CARDI), training organizations, agricultural extension services, NGOs (Non-Governmental Organizations) and the private sector. [4]

5.2 DISSEMINATION OF INFORMATION

Information is disseminated through the cooperation of three of NRI's groups: the Library and Information Services Group, the Publishing and Publicity Services Group and the Information Technology Services Group.

5.3 LIBRARY AND INFORMATION SERVICES GROUP

5.3.1 STRUCTURE

The Library and Information Services has a Group Head and a member of staff in charge of each of the following: Library Services; Library Desk; Document Management; Book

Orders; CD-ROM and On-line databases; CAIRS databases and Help Desk; Library Loans; Journals Management and Photocopying. NRI's library which is situated in Chatham was formed through the merger of its antecedents. [5]

5.3.2 INFORMATION RESOURCES

NRI's Library has the largest collection of tropical agriculture literature in the United Kingdom, some of which date back to the end of the nineteenth century and includes much grey literature unavailable elsewhere. The library specialises in: land resources, pest management, food science and crop utilization. In addition to these main subjects, the library also has or has access to information on areas in agriculture in which NRI has projects. [6] Some of the project areas in agriculture are:

- Agricultural Marketing Systems
- Biomass Energy
- Crop Utilisation
- Environmental Sciences
- Fisheries and Aquatic Resources
- Food Security and Famine Preparedness
- Forestry

- Handling, Storage and Marketing of Tropical Foods
- Horticulture and Tree Crops
- Land and Water Development
- Livestock
- Natural Resource Management
- Pest Management
- Pest Biology

The library has two computerized databases: *TRAIS* (Tropical Agriculture Information Service) and *TRADIS* (Tropical Resources for Agriculture Development Information System). *TRAIS* has three sub-libraries: *TRAIS* database, *CONFIDENTIAL* database and *JOURNALS* database. *TRAIS* is the library's combined database/catalogue which has over 120,000 references of material published mainly from 1980. All new books, pamphlets, reports, microfiche and journal articles received by the library are added to this database. The journal articles are taken from over 2,000 technical journals. *CONFIDENTIAL*

includes the NRI Report Series, World Bank Reports and other report series. *JOURNALS* is a holdings list of journals in the library. *TRADIS* is the database that was produced by the LRDC and has approximately 40,000 references. [7] It covers information on land and water resources, soil surveys, remote sensing and Geographic Information Systems.[8]

In addition to the above databases, NRI manages an ODA database called *RNRRS* (Renewable Natural Resources Research), *SPAR* (United Nations Special African Research Project) database, and many other project databases that cover fisheries and integrated pest management.

The library accesses information from several other databases either from in-house CD-ROM products or from the online host, DIALOG. The major CD-ROM products which are available to the staff on the institute's local area network (LAN) are listed in table 5.1.[9]

In addition to the CD-ROM products listed in table 5.1, NRI's library also has the following CD-ROM products on a standalone system:

- *USAID projects database*
- *IDRC projects database*
- *CARIS* (Current Agricultural Research Information System)
- *SESAME* (CIRAD agricultural database)
- *CIARL-BRS* (CGIAR full text agricultural database)

- *World Climate*
- *Oxford English Dictionary*
- *Hutchinson Multimedia Encyclopedia*
- *ASLIB Information Sources in the UK*
- *Current Contents on CD* (Agricultural, Biological and Environmental Sciences)[10]

As an AGRIS Input Centre, NRI new publications are included in the *AGRIS* database which is available on CD-ROM or online through DIALOG. NRI also inputs into two

other databases: *TROPAG & RURAL* and *CABPEST CD*. NRI receives these two databases free of charge because of its contribution.

CD-ROM products available on NRI's Local Area Network.

PRODUCT	DESCRIPTION
AGRICOLA	The US Department of Agriculture National Agriculture Library database (1970-1995).
AGRIS	The Food and Agriculture Organization (FAO) agriculture database (1975-1995).
AGRISEARCH	The database of agriculture, food and nutrition research projects in developing countries (1994 edition). Information from *CRIS/ICAR* (US and Canada), *ARRIP* (Australia), *SPAAR* (World Bank) and *AGREP* (European Union).
CAB CD	The CAB International agricultural database (1984-1992).
CABPEST CD	The CAB International database covering pests, plant pathology and weeds (1973-1991).
CD-ROM DIRECTORY	A directory of CD-ROM products currently available including discs and software packages (1993 edition).
COUNTRIES OF THE WORLD	Multimedia information on over 190 countries (1991 edition).
FSTA	The International Food Information Service (IFIS) database on food science and technology (1969-1995).
TREECD	The CAB International database which includes Forestry Abstracts, Forest Products Abstracts and Agroforestry Abstracts (1939-1991).
TROPAG & RURAL	The Royal Tropical Institute of the Netherlands (KIT) Abstracts on Tropical Agriculture and Abstracts on Rural Development database (1975-1995).
URBADISC	The London Research Centre database on urban regional planning and policy issues from various European information sources (1994 edition).

Table 5.1

5.3.3 USERS

The users of NRI's information service include: NRI's staff; staff and postgraduate students of the University of Greenwich; academic institutions; research organizations; other libraries and other international organizations. The library also answers questions from individuals from the public from time to time.

There is no instrument for monitoring the needs of the users. Also, it is difficult to do this because of the contract basis under which NRI operates where the needs are constantly changing. No major survey has been done on user needs, but if one was to be done, it would be out of date in six months. Additionally, the monitoring of users' needs has become more difficult in recent times because with the increase in information technology there is less control over the use of services. The Library and Information Services depend upon voluntary feedback from staff for refining the services offered.

5.3.4 SERVICES

The Library and Information Services Group provides several services:

- **Consultancy**
- **Enquiry**
- **Document supply**
- **Literature searching**
- **Photocopying**
- **Selective Dissemination of Information (S.D.I.)**
- **Loans**

CONSULTANCY AND TRAINING

The Library and Information Services Group provides a consultancy service to other libraries and organizations. This can be advice on the setting up library services; setting up and managing large bibliographic databases; and selection, acquisition and storage of

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stock. The Group also conducts training on online and CD-ROM searching; thesaurus construction; indexing; abstracting and all aspects of library work but especially in the use of agricultural information. [11] The training is usually arranged on a one to one basis between NRI and the interested organization for which a cost is attached.

ENQUIRY

Generally, the enquiries come from members of the public via letters which are answered or referred to a relevant source. These enquiries are usually on topics covered by the library.

DOCUMENT SUPPLY

This service draws on the large in-house collection and numerous contacts with other libraries within UK Government Departments, research institutions and partners in the European Consortium for Agricultural Research in the Tropics (ECART). There is a charge for document supply to such countries as the United States and The Netherlands. Certain categories such as aid countries and non-profit organizations receive this service free of charge.

LITERATURE SEARCHING

Literature searches are conducted for users on the in-house, CD-ROM and online databases mentioned in section 5.6.2. These may be requests or part of the S.D.I. service.

PHOTOCOPYING

Photocopying is included in the document supply service for which the charging policy for that service applies. The library also has self-service photocopying at a cost of £0.15 plus VAT. A stipulation that applies to photocopying due to the conditions of the

copyright laws, is only one article per journal or 5% of a book may be copied. [12]

SELECTIVE DISSEMINATION OF INFORMATION (S.D.I.)

The S.D.I. service operates on two levels: internally to NRI's own staff and externally to other organizations on a contract basis. The service to the staff is fed through searching the online and CD-ROM sources only, since staff has access to the in-house databases. Staff can also search the in-house CD-ROM products discussed in section 5.6.2. The service provided through contracts with other organizations is sourced from in-house, online and CD-ROM databases. An example of such a contract is the one with the Technical Centre for Agricultural and Rural Cooperation (CTA). Under the terms of this contract, NRI supplies organizations in the African, Caribbean and Pacific states with an S.D.I. service in addition to providing: online and CD-ROM searches; document supply (mainly photocopies of journal articles) and expert advice from NRI's staff. The library also answers requests under another contract with CTA, the CTA Question and Answer Service. One of the terms of this contract is that queries must be answered within ten days of receipt.

LOANS

Books can be borrowed from NRI's library on a library to library basis. These requests have to be submitted on BLDSC (British Library Document Supply Centre) inter-library loan forms. No loan service is offered to individuals,, however, books and series are loaned to staff and postgraduate students of the University of Greenwich. Journals are not loaned to these users.

5.3.5 PRODUCTS

The products of the Library and Information Services Group are the in-house database *TRAIS* and the collaboratively produced databases. A crude accessions list is produced and is available through NRI's World Wide Web Home Page. These information products

are listed in table 5.2.

Products of NRI's Library and Information Services Group.

INFORMATION PRODUCT	COLLABORATOR	FORMATS
TRAIS	None	CAIRS (Computer Assisted Information Retrieval System)
AGRIS	FAO	CDS/ISIS; CD-ROM; Online
CABPEST CD	CAB International	CD-ROM; Online
TROPAG & RURAL	The Royal Tropical Institute (KIT)	CD-ROM; Online
Accessions List	None	Online (World Wide Web)

Table 5.2

5.3.6 FUNDING

The services offered are funded by contracts with other organizations and from ODA. Income is also generated through the charges for services mentioned in section 5.6.4 and from the sale of its products.

5.4 PUBLISHING AND PUBLICITY SERVICES

The Publishing and Publicity Services Group aids in the dissemination of information produced by NRI through the publications of books, technical booklets, posters, information leaflets, technical guides and a journal (see appendix XII for examples). Approximately fifty monograph titles are produced yearly usually in print format. Since 1993, some monographs have been published on floppy disk. NRI is involved in the publication of one journal, *Tropical Science*, which is produced externally but edited by

the Publishing and Publicity Services.

An annual newsletter, *Resource*, is produced which includes updates on NRI's research projects, institutional events and new publications. A number of posters are also produced as extension tools for the various projects areas. As a publicity and marketing tool, a series of information leaflets, *Services for Development*, are produced for each of NRI's services.

The Group also offers services in writing, editing, graphic design and desktop publishing. The Publicity and Publishing Services are also responsible for the marketing of the products and services of the institute.[13]

5.5   INFORMATION TECHNOLOGY SERVICES

NRI has a Local Area Network (LAN) which is managed by the Information Technology Services Group. The LAN consists of four file servers, and standard 486 and 386 PCs. There is also a Unix server. The network operating software is Novell NetWare 3.1 and Novix is used for connectivity between the Unix file server and the PCs. All PCs on the network run on DOS and Windows. NRI is an Internet site which gives it the facility for wider networking. [14]

An Elonex CD-ROM server consisting of three towers with a capacity for 28 compact discs provide technological support for the CD-ROM services of the Library and Information Services Group. The software used for NRI's *TRAIS* database is CAIRS, whilst CDS/ISIS is used for inputting bibliographic data for the *AGRIS* database. The Microsoft Access database package is used for NRI's other project databases.

NRI's LAN permits the dissemination of information internally by providing access to

services located throughout the site and through a number of documents for use by staff called *electronic books*. Information is disseminated internationally via the Internet through the use of World Wide Web pages. The Internet is also being used to set up collaborative work programmes with a number of international organizations.

For NRI, the advent of information technology (IT) has made access to information easier, improved communication, improved the processing facilities and reduced equipment costs through the sharing of resources. Another major benefit, is the ability to share information with others for example, the ease with which contributions to the collaborative databases listed in table 5.2 are made.

5.6 RELEVANCE TO 'CARDI-CATIS'

Although NRI's information service does not fit the model of CATIS, the investigation provided information on NRI's experience in the provision of information services, the exchange of information and the infrastructure that is necessary for such a service. This information was used in the development of the 'CARDI-CATIS' prototype.

5.7 REFERENCES

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6 THE CENTRE FOR AGRICULTURE AND BIOSCIENCES (CAB) INTERNATIONAL - A CASE STUDY

6.1 THE ORGANIZATION

6.1.1 ESTABLISHMENT AND MISSION

The Commonwealth Agricultural Bureaux (CAB), the Centre for Biosciences International (CAB) International's predecessor, was established in 1928 [1] by the Imperial Conference in the United Kingdom. [2] From 1913 to 1956, research bodies in the fields of entomology, mycology, parasitology and biological control became individual bureaux under the umbrella of the Commonwealth Agricultural Bureaux (CAB). By 1970, they were all raised to the status of institutes, the predecessors of CAB International's Scientific Institutes. [3]

In 1985, the organization changed from Commonwealth to international status and the name of the organization was changed to the Centre for Agriculture and Biosciences International. The acronym CAB was kept but centre points on either side of the 'A' were introduced and the word international added to form **C•A•B International or CABI.** [4] The change also included a new logo and a new mission which reads:

> *C•A•B (Centre for Agriculture and Biosciences) International is an intergovernmental not-for-profit organization dedicated to improving human welfare world-wide, through the dissemination, application and generation of scientific knowledge in support of sustainable development, with emphasis on agriculture, forestry, human health and the management of natural resources, and with particular attention to the needs of developing countries.* [5]

These changes were brought about because of the organization widening its spectrum of activities in the fields of biosciences as well as agriculture; and as of 1993, have incorporated the Bureau of Hygiene and Tropical Diseases into its fold. Additionally, its member countries were no longer only Commonwealth countries but non-Commonwealth countries as well; and its services are being provided not only to its members but to the wider international community, hence its international status. [6]

6.1.2 OWNERSHIP AND FUNDING

The governments of the following thirty-six countries are the owners of CABI:

Australia	**Hungary**	**Philippines**
The Bahamas	**India**	**Sierra Leone**
Bangladesh	**Jamaica**	**Solomon Islands**
Belize	**Kenya**	**Sri Lanka**
Botswana	**Malawi**	**Tanzania**
Brunei Darussalam	**Malaysia**	**Trinidad and Tobago**
Canada	**Mauritius**	**Uganda**
Cyprus	**Myanmar**	**UK Dep. Territories**
Fiji	**New Zealand**	**United Kingdom**
The Gambia	**Nigeria**	**Vietnam**
Ghana	**Pakistan**	**Zambia**
Guyana	**Papua New Guinea**	**Zimbabwe** [7]

Until 1990, these countries were the major contributors to CABI's income. However, several changes in the world economic environment and in CABI's environment deemed a necessary re-addressing of the organization's operational and financial strategy. At the Review Conference in 1990, a strategy for CABI to become self-sufficient was adopted.

As part of this new strategy, CABI has restructured its financing policy and is now almost largely self-sufficient with its member countries now contributing approximately 9% of its budget income. [8] Presently, CABI's major financing is achieved through its products and service and project funding comes from several donor agencies (see appendix XIII).

6.1.3 ORGANIZATIONAL STRUCTURE

Recently, CABI's Director General said that CABI should, *"see itself as an intergovernmental organization that happens to have its headquarters in the UK".* [9] CABI's headquarters is situated in Wallingford, England and has three regional offices in Asia, the Caribbean and Africa. As an international intergovernmental organization, CABI's first contact with its member countries is through their London-based diplomatic staff. The governments of the member countries designate Liaison Officers who are usually from their Ministry of Agriculture and are formal points of contact for CABI. They inform CABI on the needs and developments within each of the countries.

The Regional Offices are CABI's formal representations in the regions and have been established by agreement with the host governments. The role of these offices are in the development of direct contacts at the government and technical levels with member countries within each region. Additionally, they make sure that CABI as an organization and its functions are known to its member countries; and inform the Liaison Officers and research networks of developments. [10]

Three of CABI's four scientific institutes, the International Institute of Entomology (IIE), the International Mycology Institute (IMI) and the International Institute of Parasitology (IIP) are all located in the United Kingdom and is each headed by a Director. The International Institute of Biological Control (IIBC) however, although it has its headquarters in the UK, it also has field stations in Trinidad and Tobago, Switzerland, Pakistan, Kenya and Malaysia, and is headed by a Director who is stationed in the UK. The field stations in Trinidad and Tobago, Kenya and Malaysia are located at the Regional

Offices for the Caribbean, Africa and Asia respectively.

A Triennial Review Conference of Member Countries is held to make policies and finalise the organization's decision making process. [11] This Triennial Review Conference is the highest decision making body within CABI and is followed in the organizational structure by a Governing Board, an Executive Council and Senior Management. The Governing Board consists of a Chairman and eight members. The Executive Council is made up a Chairman, a Vice-Chairman and Representatives of all the Member Countries. Senior Management consists of the Director General, two Deputy Director Generals and four Directors who oversee: Scientific Services, Information Services, Marketing and Administrative Services. Presently, Scientific Services and Information Services is handled by the two Deputy Director Generals. Figure 6.1 shows the organizational structure of CAB International. [12] Additionally, in appendix XIV is a description of all the human resources existing at CABI.

6.1.4 SERVICES

CABI's initial mandate as a centre for gathering and disseminating agricultural and related scientific information continues with the added area of human health. [13] In carrying out this mandate, CABI provides two major services: an information service; and a scientific service, with the main users being scientists and information specialists. The information services are provided from the CABI bibliographic databases - *CAB ABSTRACTS* and *CAB HEALTH*. Various other associated services are provided under information services and these will be discussed in section 6.2.

CABI's scientific services are provided through its four institutes (formerly bureaux), in addition to the Bureau of Hygiene and Tropical Diseases. Three of the four institutes - Entomology, Mycology and Parasitology - are biosystematic and conduct taxonomic research and provide diagnostic identification services for organisms of agricultural and

CAB International's Organizational Structure.

CAB INTERNATIONAL

Figure 6.1

economic importance. The International Institute of Biological Control provides advice and information on the use of biological control (use of beneficial organisms - insects, nematodes, etc.) to protect crops from pests, diseases and weeds; and to improve crop production. This institute also conducts research and implements projects in the area of integrated pest management in several countries. [14]

The four institutes and their locations are listed below:

INTERNATIONAL INSTITUTE OF ENTOMOLOGY
56, Queen's Gate, London SW7 5JR, UK; and in the Natural History Museum

INTERNATIONAL INSTITUTE OF PARASITOLOGY
395A Hatfield Road, St. Alban's, Herts., AL4 0XU, UK

INTERNATIONAL MYCOLOGICAL INSTITUTE
Bakeham Lane, Egham, Surrey, TW20 9TY, UK

INTERNATIONAL INSTITUTE OF BIOLOGICAL CONTROL
Headquarters at: Silwood Park, Buckhurst Road, Ascot, Berks., SL5 7TA, UK
Field Stations in: Trinidad and Tobago, Switzerland, Pakistan, Malaysia and Kenya [15]

The scientific services available from the four institutes can be summarised into the following:

- *authoritative identification of crop pests and pathogens, and parasitic helminths;*
- *survey and diagnosis of plant health problems;*
- *support for integrated pest management and biological control;*
- *biosystematic research on arthropods, micro-organisms, nematodes and helminths;*
- *diagnosis of biodeterioration problems for industry;*

- *research on human mycoses and tropical parasitic diseases;*
- *training, consultancy and advice in all the above areas.* [16]

As part of its scientific services, CABI also provides the Technical Secretariat of the Consultative Group for BioNET International which is an international cooperative venture to develop biosystematics expertise in developing countries. [17]

6.2 INFORMATION SERVICE

CAB International's scientific and technical information service is based on their built bibliographic databases - *CAB ABSTRACTS* and *CAB HEALTH*. Together the databases cover many subject areas in the field of agriculture and biosciences and were created from the worldwide pool of relevant literature. The subjects covered are:

- agriculture
- agroforestry
- biotechnology
- communicable diseases, including AIDS
- community & public health
- crop protection
- environmental sciences
- field crops
- forest products
- forestry
- grasslands
- horticulture

- human & animal nutrition
- human & animal parasitology
- leisure, recreation & tourism
- medicinal and poisonous plants
- parasitic diseases *
- plant & animal breeding
- rural sociology & development
- soils, land and water management
- Third World development
- tropical diseases (i.e. diseases in the tropics) *
- veterinary science [18]   * [19]

6.2.1 INFORMATION RESOURCES

IN-HOUSE

CABI's Library Services Centre is located at Silwood Park in Ascot, England, manages the organization's library holdings . The headquarters of the International Institute of Biological Control is located at Silwood Park and access library facilities from the Library Services Centre. There are substantial libraries at the International Institutes of Parasitology and Mycology, but these are managed by the central library at Silwood Park. The staff of the International Institute of Entomology use the library facilities of their neighbour, the Natural History Museum.

The backbone of CABI's information resource is the Library Services Centre where there is a 200, 000 volume library holdings. [20] An accessions control system at headquarters in Wallingford manage the entry and location of new material. In addition to the two databases and the physical library holdings, there are a number of specialist files which are not available to the public but provide a rich resource of research information for CABI's trained specialists.

As part of the information gathering process for the databases, approximately 12,000 serial titles (45,000 issues) and 5,000 non-serial publications in any of sixty languages are scanned annually. [21] Approximately, 160,000 new abstracts are added to the *CAB ABSTRACTS* database annually. [22] Only a small percentage of the journals received are subscribed to, the rest is received through the networked libraries, or as pre-copies through arrangements with private publishers.

EXTERNAL

CABI's information resource is supported by a network of collaborating libraries which include the British Library, those of Oxford and Cambridge Universities, the Chinese Academy of Agricultural Sciences and many others within the UK and overseas.

In the provision of its information services, CABI has access to all the world's databases on agriculture and the biosciences which include but is not restricted to those listed in table 6.1. The databases are accessed through the online hosts: DATA-STAR, DIALOG, DIMDI and ESA-IRS.

Some of the databases accessed by CAB International.

AGRICOLA	The US Department of Agriculture National Agriculture Library database of worldwide journal and monographic literature on agriculture and related subjects such as animal studies, botany, chemistry, entomology, fertilizers, forestry, hydroponics, soils and much more. Period of coverage: 1970-1995.
AGRIS	The Food and Agriculture Organization (FAO) agriculture database which covers worldwide agricultural literature that reflects research results, food production and rural development. Period of coverage: 1975-1995.
BIOSIS Previews	This database contains citations from Biological Abstracts, Biological Abstracts/Reports, reviews and Meetings and BioResearch Index which are the major publications of BIOSIS. It is the major English-language service covering worldwide research in the biological and biomedical sciences. Period of coverage: 1969-1995.
CA Search	This database contains the bibliographic information from the printed Chemical Abstracts and covers literature on chemistry and its applications. Period of coverage: 1967-1995.
EMBASE	Formerly Excerpta Medica, this database consists of abstracts and citations to biomedical and pharmacological journals published throughout the world. It is renowned for its coverage on drug-related literature. Period of coverage: 1974 - 1995.
LIFE SCIENCES COLLECTION	This database contains abstracts of literature in the fields of animal behaviour, biochemistry, ecology, endocrinology, entomology, among others. The sources are journal articles, books, conference proceedings and reports.. Period of coverage: 1978-1995
MEDLINE	One of the major sources of biomedical literature that corresponds to three print indexes: Index Medicus, Index to Medical Literature, and International Nursing Index. Period of coverage: 1966-1995.

Table 6.1

6.2.2 USERS

CABI's users do not have to be affiliated to any particular country or organization and they include:

- Academic institutions
- CABI Staff
- Corporate libraries
- Government institutions
- Individuals

- International organizations
- Member countries
- Projects
- Research institutions
- Scientific personnel

CABI's marketing programme is currently developing a system to monitor users' needs. Its services and products are demand-led rather than supply-driven and generally, CABI relies on unsolicited customer feedback and the observation of demand trends to determine users' needs. User satisfaction is usually evaluated to some extent at focus meetings, marketing research and user group meetings.

6.2.3 SERVICES

Six major information related services are provided by CABI:

- Literature searches
- Document delivery
- Current awareness

- Enquiry
- Consultancy
- Training

LITERATURE SEARCHES

All subject enquiries are handled by the Library Service Centre where a search strategy is developed by experts both from the information side as well as the subject matter side.

All available sources, starting with the *CAB ABSTRACTS* or *CAB HEALTH* databases followed by the online databases and specialist files are searched. If the search involves locating older material manual searches are carried out. The end product of this service is a bibliography of material relevant to the search topic.

Trained specialists (approx. 100) [23] at CABI conduct more than 2,000 online searches annually for research programmes around the world. [24] A free cost estimate for searches can be obtained from the Library Services Centre. Retrospective searches are based on a search fee of £50/$100, plus £0.25/$0.45 per record with full bibliographic details and informative abstract. [25]

DOCUMENT DELIVERY

The *CAB ABSTRACTS* database has material dating back to 1973 and approximately 95% of the material cited can be obtained. CABI's Document Delivery Service is backed by its comprehensive library holdings and is supported by the network of collaborating libraries. Photocopies of most articles cited in CABI's family of information products can be supplied but there is a limit because of the Copyright Law, which permits the supply of only one paper from one journal issue, or one chapter from a book, on any one occasion. CABI's service in this respect offers to obtain the copyright clearance, or to source and supply whole books, reports, theses and journal issues.

A new special copyright-cleared service DOCUMENTS NOW has been made available since January 1995 to the subscribers of CABI's current awareness service CAB ACCESS. This service covers journals in agriculture, forestry, veterinary and related disciplines. [26] DOCUMENTS NOW is able to provide users with a rapid response at a competitive price by supplying them with more than one copy of an article and more than one article from one of the journals mentioned above. [27]

Orders for document delivery can be made through the post, fax, e-mail or online through DIALORDER, DIMDI, ESA-IRS or PRIMORDIAL. Documents can be delivered depending on the customer's urgency by post, fax or courier. The charging policy for

document delivery is a standard and is given in table 6.2. Prepayment is required for all orders except where the order is an online one, or the user has an established CABI account.

CAB International's Document Delivery Charges.[27]

By Post	£7.50/US $14.00 per article (any length) + VAT in the UK
By Fax	£17.50/US $33.00 per article (any length) + VAT in the UK

Table 6.2

CURRENT AWARENESS

Current awareness can be provided by CABI in one of four ways: CAB ACCESS, CAB ALERTS, CAB PROFILES and by Contract.

CAB ACCESS is a weekly electronic current awareness service which uses CABI's expertise in selecting appropriate agricultural research literature with modern technology and proven delivery methods. It is a timely, generalised service that is aimed at anyone who wants to know what's new in agricultural research. The service provides access to all the papers published in over 1,000 primary journals in agriculture, forestry, veterinary science and related disciplines from 40 different countries. CAB ACCESS is delivered on floppy disk with a built-in user-friendly retrieval software, and has been designed to run on any IBM compatible PC that has the minimum requirements of a hard disk with 2Mb free, MS-DOS 3.3 or higher and 500Kb base memory for the largest executable file. The service is also available on the Internet through SilverPlatter's Electronic Reference Library (ERL). [28]

A companion service to CAB ACCESS is the document supply service DOCUMENTS NOW, which was mentioned under the section on document delivery. DOCUMENTS NOW is at an added cost which can be requested through the electronic order form

included in the CAB ACCESS disk. An annual 50 week subscription cost for CAB ACCESS is given in tale 6.3.

Member Country	£288
Non-member Country	£360
Americas	$490

Table 6.3

CAB ALERTS is a low cost monthly current awareness service where the *CAB ABSTRACTS* are searched for a number of pre-selected topics of current interest. Each issue contains all of the bibliographic citations and abstracts added to the *CAB ABSTRACTS* database for that topic. CAB ALERTS is available in either floppy disk or print format. The cost for the service is based on an annual subscription which is given in table 6.4.

Annual subscription cost for CAB ALERTS. [30]

Computer printout	£80 (US$150)
Floppy disk	£100 (US$180)

Table 6.4

CAB PROFILES is a personalized current awareness service that is designed to meet the needs of the user who is not satisfied with the topics covered by the CAB ACCESS or CAB ALERTS services. Customized current awareness profiles are designed through consultations between the user and CABI subject specialists, which are then used to extract the appropriate information from the *CAB ABSTRACTS* database on a monthly basis. The service is offered in either print or floppy disk format. The costs for the service

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are given in table 6.5.

Costs for CAB PROFILES.[31]

	Computer Printout	Floppy Disk
Set-up Fee	£25 (US$45)	£25 (US$45)
Annual Subscription	£95 (US$170)	£115 (US$205)
Annual Record Allowance	450	450
Cost per extra record	£0.25 (US$0.45)	£0.25 (US$0.45)

Table 6.5

Special Selective Dissemination of Information (S.D.I.) services are provided by CABI to several organizations through contractual arrangements. One such contract is with the Technical Centre for Agricultural and Rural Cooperation (CTA), where CABI provides an S.D.I. service on the relevant agriculture research literature to the African, Caribbean and Pacific states, based on agricultural interest profiles of researchers in those regions.

ENQUIRY

The CABI Library Services Centre acts as a clearing house for all subject enquiries received by CABI. In dealing with a request, a process of searching all available sources is carried out with the eventual response being either a comprehensive bibliography or a single journal article. This service simply provides references or an article but does not provide an answer to a question or give a value added response. There is a review of this service with the hope to introduce an enhanced response for the user.

CONSULTANCY AND TRAINING

Presently, CABI's information service offers consultancy in the form of advice and practical assistance in the design and implementation of science-based information

systems; and in the use of information technology. This service is at a cost which is arranged between CABI and the client.

CABI has also been involved in the training of information professionals in information management, especially in developing countries.There is also a CABI Placement Programme where CABI either does the training themselves or identifies the appropriate training for information professionals from developing countries.

6.2.4 PRODUCTS

CABI produces a wide range of information products from its *CAB ABSTRACTS* and *CAB HEALTH* databases. These products are listed in CABI's Annual Information Products Catalogue. CABI's information products are produced in several formats; print, magnetic tape, floppy disk, online and CD-ROM. Other electronic formats are available.

PRINT PRODUCTS

CABI's printed information products include: **abstract journals; primary journals; annotated bibliographies, taxonomic guides** and **looseleaf products**; and the current awareness services **CAB ALERTS** and **CAB PROFILES**. A full list of these products are given in appendix XV.

PRODUCTS ON MAGNETIC TAPE

CABI has two information products which are available on magnetic tape: the *CAB ABSTRACTS* database and the **CAB Thesaurus (1995 edition)**. Organizations with mini or mainframe computers can lease the *CAB ABSTRACTS* database or a subset of it at a cost that ranges between £2,500 to over £15,000 per year. The CAB Thesaurus is available at a cost of £500 (US$900).[32]

CAB International has its *CAB ABSTRACTS* database and several of its printed products available on 3.5" high density floppy disks. These electronic publications are available with a built-in user-friendly retrieval software. The records can be searched by author, journal title, keyword, year or title and the resulting references saved for future use.[33]

CABI's printed abstract journals are availableon floppy disk as **E-Journals**. The frequency of update of these are equivalent to the printed versions: monthly, bimonthly and quarterly. The cost of the E-Journals is 20% more than their printed equivalents but offer the user fast retrieval and flexibility of use.[34]

E-Bibs are CABI's electronic bibliographies which are the floppy disk versions of the printed annotated bibliographies. They are retrospective compilations (at least 10 years) on topics of current interest that have been selected by CABI's information specialists. The product comes with an integrated search software. Appendix XVI gives a list of the E-Bibs currently available.[35]

CABIKEY, Computer Aided Biological Identification Key, is an innovative software programme that allows the user to taxonomically identify insects or other arthropods. The user is prompted with a series of questions about the specimen to be identified through the use of drawings, images and other graphics. A process of elimination with the user's input then occurs with the specimen being eventually identified. Full-colour pictures and textual information are provided for the verification of the identified specimen. The product is available on 3.5" high density floppy disks and is designed to run on any IBM compatible PC with 640K RAM. At the moment, only one of these interactive CABIKEYs is available, *CABIKEY to the Major Beetle Families*. It provides a key to the adults of the major beetle families associated with agriculture in the tropics and sub-tropics and found in stored products. Future CABIKEYs will include: European Thrips, Termite genera, Mosquito genera and Dacine fruit flies from Oriental and Australasian regions.[36]

The *CAB ABSTRACTS* database is available through the online hosts: CAN/OLE, DATA-STAR, DIALOG, DIMDI, ESA-IRS and STN International (see table .6 for more details). This format offers the user easy access to CABI's database at a reasonable cost. Three charges apply: telecommunications charges, online host connect charges (hourly) and per record charges. An average search of 5 to 10 minutes with a 20 record printout would cost approximately US$25.00.[37]

CAB International's Online Hosts.[38]

ONLINE HOST	COUNTRY	FILE	CABI INFORMATION PRODUCT
CAN/OLE (Canada Institute for Scientific and Technical Information)	Canada	CAB	*CAB ABSTRACTS*
DATA-STAR (DATA-STAR DIALOG Europe)	United Kingdom	CABI VETS TOUR	*CAB ABSTRACTS* Veterinary Abstracts Leisure, Recreation & Tourism
DIALOG Information Services Inc.	USA	File 50	*CAB ABSTRACTS*
DIMDI (Deutsches Institut fur Medizinische Dokumentation und Information)	Germany	CV72	*CAB ABSTRACTS*
ESA-IRS (European Space Agency Information Retrieval Service)	Italy	File 16 CAB	*CAB ABSTRACTS*
STN International	USA	CABA	*CAB ABSTRACTS*
The Internet, SilverPlatter's Electronic Reference Library (ERL)			CAB ACCESS

Table 6.6

The *CAB HEALTH* database is loaded on DATA-STAR and will soon be loaded on DIMDI. In the UK, *CAB HEALTH* will soon be available through BIDS. [39] A set of CABI abstracts on biosafety, genetically modified organisms and risk assessment can be accessed free of charge on the Internet through the Biosafety Information Network and Advisory Service (BINAS). BINAS was created and is run by the United Nations Industrial Development Organization (UNIDO) and offers technical assistance through information support, human resource development and expert advice in biotechnology. [40]

CD-ROM PRODUCTS

CAB International produces many CD-ROM products from their *CAB ABSTRACTS* and *CAB HEALTH* databases. For retrieving the information from CABI's CD-ROM products, SilverPlatter Information Retrieval System (SPIRS) software is supplied with the disc. The software is available in DOS and Windows versions. SPIRS is user-friendly and menu-driven and allows the user to search almost every word on the CD-ROM or limit it to a specific field(s). CABI's CD-ROM products are categorised into four main groups: CAB ABSTRACTS, CAB HEALTH, CAB SPECTRUM and CAB COLLECTION.

The *CAB ABSTRACTS* CD-ROM, *CABCD*, which contains abstracts and citations from 1973 onwards is divided into five volumes:

Volume 1	1984-1986
Volume 2	1987-1989
Volume 3	1990-1992
Volume 4	1993-1995 (in production)
Backfile	1973-1983 [41]

The *CAB HEALTH* database on CD-ROM combines the relevant material on human health from the *CAB ABSTRACTS* database and the *Public Health and Tropical Medicine (PHTM)* database which was acquired when the Bureau of Hygiene and Tropical Diseases

became part of CABI in 1993. *CAB HEALTH*'s information date back to 1973 and covers the following topics:

Communicable diseases   Medicinal and poisonous plants

Community and public health   Parasitic diseases and parasitology

Human nutrition   Tropical Diseases (diseases in the tropics)

CAB HEALTH references primary journals, books, research reports, patents and standards, dissertations, conference proceedings, public health literature and annual reports.[42]

CAB SPECTRUM comprises ten subject-specific packages from the *CAB ABSTRACTS* database. Each CD-ROM disc contains 20 years of information on each of the major agriculture and biosciences disciplines. Table 6.7 contains a list of the CAB SPECTRUM titles and a description of their contents.

CAB SPECTRUM Titles.[43 * 44]

TITLE	DESCRIPTION
AgECONCD	agricultural economics and rural development
BEASTCD	animal production and dairy technology
CABPESTCD	crop protection
CROPCD	field crops and grasslands
E-CD	environmental degradation, amelioration and conservation
HORTCD	horticulture and plantation crops
PARASITE-CD *	biology and control of parasites and vector-borne diseases
PlantGeneCD	plant breeding, biotechnology and genetic resources
SOILCD	soils, fertilizers and land management
TREECD	forestry, forest products, agroforestry
VETCD	veterinary medicine

Table 6.7

The **CAB COLLECTION** is another subject-specific set of CD-ROMs which combines data from the *CAB ABSTRACTS* database with complementary information from other sources including relevant databases and specialist files. Table 6.8 lists the titles of the CAB COLLECTION with corresponding descriptions.

<u>CAB COLLECTION Titles.</u>[45]

TITLE	DESCRIPTION
HUMAN NUTRITION	This database covers all aspects of human nutrition and diet and has relevant information produced by the International Food Information Service (IFIS), the US National Library of Medicine (NLM) and the Life Sciences Collection from Cambridge Scientific Abstracts.
PolToxIII:CAB	This database has information from the *CAB ABSTRACTS* database on pollution, environmental chemicals, environmental impact on farming, health hazards of pesticides and drugs, and toxicology. It is part of the PolTox series of CD-ROMs produced by Cambridge Scientific Abstracts.

<u>Table 6.8</u>

Two other CD-ROM products are produced by CABI, *ANI-CD* and *BSM-CD*. *ANI-CD* is an Arthropod Name Index (ANI) which CAB has been compiling for over 80 years. It is an authority file of arthropod names that is used as a tool for checking and indexing of the *CAB ABSTRACTS* database. It comes with a specially designed software. *BSM-CD* is the Bibliography of Systematic Mycology on CD-ROM.[46]

OTHER ELECTRONIC FORMATS

CABI can supply its data in three other electronic formats. These are:

- a **comma delimited version** which is compatible with many commercially available database management or word processing packages;

- the **Pro-Cite version** for use iwth Personal Bibliographic Software;

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- **CDS/ISIS version** for use with the Micro CDS/ISIS software distributed by UNESCO.[47]

Other information products produced by CABI are information support tools, namely: the CAB ABSTRACTS Online Manual (1995 edition), Serial Checklist (1995 edition) and the CABICODE Manual.

PUBLISHING

In addition to these information products, CABI also publishes a large number of books, serials and newsletters (see appendix XVII for some examples). The publications are listed in an annual Book Catalogue which give details of all books, conference proceedings and reference works currently published or in preparation by CAB International. CABI's book publishing programme covers a large number of topics and these are given below. Prices for the publications are also given in the catalogue.

- Agricultural Economics, Policy and Management
- Agricultural Engineering
- Animal Sciences
- Animal Health and Medical Parasitology
- Biotechnology and Plant Breeding
- Crop and Plant Sciences
- Crop Protection
- Directories and Reference Works

- Ecology and the Environment
- Entomology
- Food Science and Human Nutrition
- Forestry
- Horticulture
- Leisure & Tourism
- Mycological Papers
- Mycology
- Phytopathological Papers
- Soils [48]

6.2.5 FUNDING

Approximately 80-85% of funding comes directly from the sales of the products.

Additional funding comes from membership donations and project work. All CABI's services are fee-based and charges are met either by end-users or *en bloc* via donor funded projects. In the latter case the services are free at the point of use. CABI must recover all costs including overheads and therefore a charging policy must exist. The only exception to this is where the cost of the required service is negligible and CABI feels it necessary/appropriate to make a goodwill gesture.

6.2.6   USE OF INFORMATION TECHNOLOGY

In 1993, CABI established a New Production System for the *CAB ABSTRACTS* database. This involved the installation of CABI's local area network (LAN) that consists of a DEC Server 5240, and Ethernet network, a Unix database server, a Unix operating system, a Novell server and a Novell network operating system. A VAX computer is used for accessions. The system uses the graphical user interface Windows with a front-end package called Uniface. The Database Management System (DBMS) used for storing the *CAB ABSTRACTS* data is Basis Plus. Other software in use are Basis K and Pager. [49] Figure 6.2 shows CABI's database production system.

The organization's corporate network is linked to the Internet. This has allowed all staff from around the world to communicate with each other via E-mail. It has also made communication with collaborators and accessing the wealth of information it provides a lot easier. Another benefit of the organization's IT (information technology) structure is the elimination of keyboarding and proof reading by allowing the information staff to enter data (such as indexing, and abstract writing) directly to the database server from PCs on their desks. The system also allows the staff to search for relevant broad subject areas quickly, improves timeliness and has raised the quality of CABI's information products.

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CAB International's Database Production System.

Figure 6.2

IT has also increased the timeliness and methods of disssemination of CABI's information. An IT strategy (not for public use) is in place and is reviewed on an annual basis. IT has allowed CABI to manage its information processes cost-effectively.

6.3   COLLABORATORS

CABI collaborates with many other organizations in the production of information products, provision of information services and publishing. Table 6.9 lists some of these collaborators and a description of the collaborative efforts.

Some of CAB International's Collaborators.

ORGANIZATION	COLLABORATIVE EFFORT
Natural Resources Institute (NRI)	Production of the CABPESTCD
International Board of Plant Genetic Resources (IBPGR)	Production of the PlantGeneCD
The Food and Agriculture Organization (FAO)	The production of a Unified Agricultural Thesaurus (UAT)
The National Agricultural Library (USA)	The production of a Unified Agricultural Thesaurus (UAT)
Australian Centre for International Agricultural Research (ACIAR)	Production of the Electronic Compendium for Crop Protection (in development)
Overseas Development Administration (ODA)	Production of TREECD
Oxford Forestry Institute	Production of TREECD
Cambridge Scientific Abstracts	Human Nutrition and PolToxIII:CAB CD-ROMs
European and Mediterranan Plant Protection Organization (EPPO)	Production of Pest Distribution Maps

Table 6.9

6.4   CAB INTERNATIONAL'S REGIONAL BRANCH OFFICE IN TRINIDAD

The visit to CABI's Regional Office in Trinidad provided a background to the relationship between the headquarters and the branch offices.

When a request for information reaches the office, the information is first sought from the in-house collection. This collection includes the CABI databases and CABI publications.If the requested material still is not found, the request is sent to headquarters (via E-mail, fax or post) to a Line Officer who is in charge of coordinating requests for information from all offices. The request then goes through a process of ordering, processing and supply. The supplied information returns to the branch offices and is passed to the user.

The Regional Office has close ties with the Caribbean's research bodies including CARDI and the University of the West Indies.

6.5   RELEVANCE TO 'CARDI-CATIS

CAB International's organizational structure of branch offices and a headquarters is similar to the network model of 'CARDI-CATIS'. The opportunity to look at the operations of CABI's information service both from a headquarters and a branch office point of view provided information for the operational structure of 'CARDI-CATIS'. CABI's unique product diversification provided input for the 'CARDI-CATIS' design in the use of common databases to produce several end-products.

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28.   **CAB International,** ref. 26.

29.   **CAB International,** ref. 16, p. 16.

30.   *Ibid.*

31.   *Ibid.*

32.   *Ibid.*

33.   *Ibid.,* p. 23.

34.   *Ibid.*

35.   *Ibid.*

36.   *Ibid.,* p. 24.

37.   *Ibid.,* p. 18.

38.   *Ibid.*

39.   **CAB International.** CAB HEALTH online. *Database News.* 1995, 23, p. 3.

40.   **CAB International.** A new initiative in electronic publishing - biosafety information on the Internet. *Database News.* 1995, 24, p. 4.

41.   **CAB International,** ref. 16, p. 21.

42.   **CAB International**, ref. 19.

43.   **CAB International**, ref. 16, p. 22.

44.   **CAB International**. Parasite-CD - Addition to CAB SPECTRUM range. *Database News*. 1995, 24, p. 2.

45.   **CAB International**, ref. 16, p. 21.

46.   *Ibid.*, p. 24.

47.   *Ibid.*, p. 23.

48.   **CAB International**. *Books Catalogue 1995*. 1995, 95p.

49.   **CAB International**, ref. 7, pp. 5-6.

7 CARDI'S EXISTING INFORMATION SERVICE

7.1 THE SAMPLE

The sample for the purposes of examining CARDI's existing information service was all CARDI country offices and its headquarters. The questionnaire in appendix X was faxed to all CARDI's country offices for the purposes of evaluating CARDI's existing information service. Seventy agricultural scientists on CARDI's staff in all the country offices, including the twelve CARDI Country Representatives, formed the test group for identifying the users' needs. The needs were identified from two sources: the questionnaire in appendix XVIII and the interest profiles of the CARDI researchers in the *PROFIL* database (see table 7.2).

7.2 INFORMATION RESOURCES

7.2.1 INFORMATION HELD

The collection of the CARDI Information and Documentation Centre (CIDC) is a specialised one and consists of: the CARDI Collection and other agricultural material (see figure 7.1). The CARDI Collection (approx. 2,000 items) comprises all documents, research and administrative, that have been produced by CARDI. In this collection, there are 96 fact sheets and 28 technical bulletins. The rest of the holdings are made up monographs (approx. 6,500), journal articles (approx. 4,500) and serials (approx. 700). CARDI does not subscribe to a large number of primary agricultural journals because

most of them can be accessed through interlibrary loans with collaborating libraries. There are a large number of newspaper articles and microfiche for which an approximate figure could not be obtained. Theses of research conducted by CARDI's staff over the years are also housed.

Information held by CARDI's Information and Documentation Centre.

Figure 7.1

The centre also has a number of CD-ROM and other electronic databases (Tables 7.1 & 7.2). The CD-ROM station at the centre is funded by the Technical Centre for

CD-ROMs held by CARDI's Information and Documentation Centre.

DATABASE	SUBJECT AREA	PERIOD COVERED	TYPE OF DATA	PRODUCER
AGRICOLA	Agriculture	1970-1993	Bibliographic	National Agricultural Library, U.S.A.
AGRIS	Agriculture	1986-1993	Bibliographic with abstracts	Food and Agriculture Organization (FAO), Rome
CAB ABSTRACTS CD	Agriculture	1984-1992	Bibliographic with abstracts	CAB International, U.K.
CABPEST CD	Plant Protection	1973-1990	Bibliographic with abstracts	CAB International, U.K.
CIARL-BRS	Agriculture	1965-1986	Full text with images	Consultative Group on International Agricultural Research (CGIAR), U.S.A.
SESAME	Tropical Agriculture and Rural Development	1945-1993	Bibliographic	Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement (CIRAD), France
TROPAG & RURAL	Tropical Agriculture and Rural Development	1975-1993	Bibliographic with abstracts	Koninklijk Institut voor de Tropen (KIT -Royal Tropical Institute), The Netherlands

Table 7.1

Other Electronic Databases accessed by CARDI's Information and Documentation Centre.

LOCATION	DATABASE	SUBJECT AREA	PRODUCER
IN-HOUSE	*AFLATOXIN*	Groundnut	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India
	CPPC	Pest and Plant Quarantine	Food and Agriculture Organization (FAO) - now handled by the Caribbean Plant Protection Commission and the Inter-American Institute for Cooperation on Agriculture (IICA), Costa Rica
	ORDER	Orders of Publications	CARDI's Information and Documentation Centre
	MAIL	Addresses of information and research linkages	CARDI's Information and Documentation Centre
	CIDLIS	Literature searches conducted	CARDI's Information and Documentation Centre
	PROFIL	Interest profiles of CARDI researchers	CARDI's Information and Documentation Centre
	BIBLIO	Bibliography template	CARDI's Information and Documentation Centre
UNIVERSITY OF THE WEST INDIES, MAIN LIBRARY	*CAGRIS*	Literature on Caribbean agriculture	The University of the West Indies, Main Library
	CARIS Caribbean	Literature on agricultural research projects in the Caribbean	The University of the West Indies, Main Library

Table 7.2

Agricultural and Rural Cooperation (CTA) as part of their CD-ROM Project. This support includes two computers, a CD-ROM drive, diskettes, a laser printer and subcriptions to the CD-ROM databases.

7.2.2 OTHER SOURCES

CARDI's Information and Documentation Centre taps into the national, regional and international community to access information for the services it provides. These sources can be: linkages with other organizations (eg. AGLINET - The World Network of Agricultural Libraries and CGIAR Centres - The Consultative Group on International Agricultural Research Centres); suppliers (eg. The British Library, the publisher - Blackwell's and NTIS - National Technical Information Service of the US Department of Commerce); or collaborators (eg. CTA - Technical Centre for Agricultural and Rural Cooperation, IICA - Inter-American Institute for Cooperation on Agriculture and NIHERST - National Institute of Higher Education and Research in Science and Technology).

CARDI became a member of AGLINET, the World Network of Agricultural Libraries, in 1990, [1] and since then it has found that the cooperation fostered with other agricultural libraries across the world to be an invaluable source of information support. AGLINET, a cooperative library network in the field of agriculture, is composed of approximately 50 libraries (see appendix XIX) in the following three categories:

- *AGLINET Primary Centres*

   Agricultural libraries of national or regional importance with comprehensive collections inclusive of forestry, fisheries and food, with a strong regional coverage as well as an adequate service capacity.

- *AGLINET Subject Centres*

Libraries in special subject fields within the broad domain of agriculture with worldwide coverage.

- *AGLINET International Centre*

   One agricultural library which has comprehensive coverage in its collection, with an ample service facility and the capability to take a coordinating role in the network system. [2]

CARDI's Information and Documentation Centre is an AGLINET Primary Centre in the Caribbean and information support for its document delivery service is received *gratis* from the member libraries of AGLINET. Some of these libraries are already on the Internet, which makes for quick response between members; however, for CARDI this added capability will come with the new Information Systems Plan in September 1995. CARDI is also a member of the International Association of Agricultural Information Specialists, IAALD, [3] which convened AGLINET in 1971 [4] as a voluntary system within its framework.

In addition to AGLINET, the Consultative Group on International Agricultural Research (CGIAR) Centres (see appendix XX), is another important linkage. This group is an informal international association of approximately 41 public and private sector donors that supports the program of a network of 18 international agricultural research centres.[5] They are the producers of the CD-ROM *CIARL-BRS* (Compact International Agricultural Research Library Basic Retrospective Set), a set of 17 compact discs that are the full text databases of the CGIAR member organizations.

There are also a number of other national, regional and international organizations with which CARDI has linkages (appendix XXI). These linkages assist in the acquisition of information and support the document delivery service. They also act as a medium for exchange of views of the latest developments in the information profession, and provide guidance and technical assistance where necessary in the day to day functioning of the CARDI information service. CIDC also has access to a number of agricultural journals

(see appendix XXIII) through its linkages and inter-library loan arrangements (discussed in section 7.6.4).

7.2.3   COLLECTION DEVELOPMENT

Collection development occurs as a result of the publication of CARDI's research into books, reports, fact sheets and technical bulletins. Additionally, there is a continuing process of acquisition of literature on research related to CARDI's work programme. As CTA's Regional Branch Office for the Caribbean, a collection of CTA publications is also maintained.

7.3   USERS

The users of CARDI's information service include:

- **CARDI's staff in country offices**
- **Extension Officers**
- **Farmers/Producers**
- **Librarians/Documentalists**
- **Other institutions**
- **Policy makers**
- **Researchers**
- **Students (including university students)**
- **Teachers/Lecturers**

These categories of users were defined in collaboration with CTA for the purposes of identifying the users of the service, as well as for monitoring the use of the service on a

statistical basis. Monthly statistics are kept for each group of users with respect to the type of service received, i.e. literature searches, document delivery, etc. (discussed in section 7.6). These statistics are gleaned from the enquiry forms which are filled by each user requesting a service from the Information and Documentation Centre.

During 1995, a study is being conducted by CARDI in collaboration with CTA (mentioned in section 4.5) to identify the actual and potential agricultural information needs for the wider CATIS. This study addresses at each country level the areas of research, extension, information/documentation, publication and radio/other communication. It will also look at the roles, methodologies, strengths, weaknesses, linkages and related issues within each of these areas. [6] This study will further enhance the identification of the users of CARDI's information service and is expected to be completed in November-December 1995.

7.4   CARDI COUNTRY OFFICES

7.4.1   INFORMATION HELD

In all of CARDI's twelve country offices, a total of approximately 213 journal titles were held with the total number of research papers/articles numbering from 20 to more than 600. There are some 400+ research reports amongst all the offices, and the total number of newspaper clippings ranges from 5 to more than 500. Among the audiovisuals, there are approximately 300 photographs, 35 posters, 2175 slides, 14 videos and 5 audio tapes in all of the offices. CARDI's Barbados office also has a stock of 1,000 books.

The results of the survey (58% responded) of the information held in the CARDI country offices are summarised in table 7.3. The bar chart in figure 7.2 gives an idea of the amount of information held by the twelve CARDI country offices. Some of the documents

Information Held in CARDI's Country Offices.

	AN	BA	BE	DO	GR	GY	JA	MT	SKN	SL	SV	TB
JOURNALS	*	200	5	2	0	0	*	*	0	*	*	6
RESEARCH ARTICLES	*	>600	200	20	>50	0	*	*	>400	*	*	50
RESEARCH REPORTS	*	200	50	10	>50	0	*	*	>100	*	*	0
NEWSPAPER CLIPPINGS	*	>500	0	>5	>20	0	*	*	>20	*	*	0
POSTERS	*	10	0	15	>10	0	*	*	0	*	*	0
SLIDES	*	>1500	0	>100	>100	50	*	*	>400	*	*	25
VIDEO	*	5	0	0	2	2	*	*	5	*	*	0
AUDIO	*	5	0	0	0	0	*	*	0	*	*	0
PHOTOGRAPHS	*	0	0	0	0	300	*	*	0	*	*	0
BOOKS	*	1000	0	0	0	0	*	*	0	*	*	0

Table 7.3

* indicates no response

Abbreviations of Country Names:

Antigua **AN**	Belize **BE**	Guyana **GY**	Montserrat **MT**	St. Kitts/Nevis **SKN**	St. Vincent **SV**
Barbados **BA**	Dominica **DO**	Grenada **GR**	Jamaica **JA**	St. Lucia **SL**	Tobago **TB**

held may or may not have been processed by the Information and Documentation Centre and within the limits of this dissertation, finance and time, this could not be determined.

Information held in CARDI's Country Offices.

Figure 7.2

7.4.2   OTHER SOURCES OF INFORMATION

All the country offices receive information from the Information and Documentation Centre in one of four ways (post, fax, telephone or by hand) and in one of two formats (print or floppy disk). Approximately 50% of the country offices have in-house collections but these are not sufficient to support their information needs. Hence, they all access information from a variety of sources in addition to the CIDC. These include: international libraries, national libraries, agricultural agencies and other research organizations (figure

7.3).

Figure 7.3

7.4.3 SERVICES RECEIVED FROM CARDI'S INFORMATION AND DOCUMENTATION CENTRE

The Information and Documentation Centre at CARDI's headquarters in Trinidad provides a one-way information service to the country offices (figure 7.3). The survey of the offices revealed that they receive the following services from the centre:

- Bibliography preparation
- Current awareness
- Document delivery

- Literature searches
- Loans
- Question & answer

These services are received from the CIDC at varying frequencies (figure 7.4). All the country offices indicated the need for a more regular service and a quicker response to the requests. The geographic nature of CARDI's offices, and the dependency on traditional methods of information access and dissemination (i.e. post), both at headquarters and throughout the institute, have caused the low rate of response to users' needs. Again, progress in this area relies heavily on the new Information Systems Plan due for implementation in September 1995.

Frequency of services received by the CARDI Country Offices from CARDI's Information and Documentation Centre.

Figure 7.4

7.4.4 EQUIPMENT HELD

All country offices are equipped with telephones, facsimiles, photocopiers, computers and printers (figure 7.5). Some of the country offices have modems but they are not in regular

use and are not a means of communicating with CARDI's headquarters or the other country offices. There are six major types of software in use: word processing, spreadsheets, graphics, database management, communications and desktop publishing. In some offices there are special types of software which have been designed to suit research needs, i.e. monitoring research progress and analysing experimental data.

Total equipment in use at all CARDI Country Offices.

Figure 7.5

7.4.5 USE OF INFORMATION RECEIVED

Four country offices do some organizing of the information they receive (figure 7.6) according to simple subject categories after one of the following four major uses: research support, documentation support, repackaging and information update. One country,

Barbados, has its collection catalogued according to the AGRIS system.

If the information is not relevant to the research being carried out at that office, it is passed on to others in the field.

Information use at CARDI's Country Offices.

Figure 7.6

7.5   USERS' NEEDS

7.5.1   THE SAMPLE

As mentioned in section 7.1, the sample used to analyse the users' needs were 70 CARDI researchers including the CARDI Representatives, who are all agricultural scientists. They

were evaluated using two methods: the questionnaire in appendix X and the interest profiles of CARDI researchers in the *PROFIL* database.

7.5.2   NEEDS

There was an overall need by the sample of users for increased access to information in a shorter time frame. Many users wanted more access to agricultural journals and databases. Additionally, they wanted to see a wider coverage of agricultural subject areas. A list of the subject areas to be covered was developed from the responses to the questionnaires and from the interests listed in the PROFIL database (appendix XXII).

Specific needs which were identified from the user study are summarised below:

- increased access to agricultural journals by subscribing to more titles;

- increased access to national, regional and international databases by online facilities;

- on site information resources at the country offices for example: agricultural databases on CD-ROM, agricultural journals, reference material (such as animal nutrition tables and pest distribution maps) and other agricultural publications, i.e. a library at each office for use by staff and other institutions;

- organization of literature held in-house at each office and stored in a database;

- wider coverage of agricultural literature (see appendix 7.6 for a list);

- faster responses to literature searches and document delivery;

- communication links with other research institutions (nationally, regionally and internationally) especially in agriculture and related fields;

- electronic means of transferring information such as The Internet;

- better flow of information between units within CARDI itself for example: market information from the Planning, Business and Development Unit (PBDU) to the country offices to assist in the evaluation of commodities and opportunities for research and development.

It was thought that subscriptions to more agricultural journals would make access to information easier because it would be in-house and, therefore, the time frame for responding to requests and document delivery would be shortened.

7.6   SERVICES

The CARDI Information and Documentation Centre provides six major services to its users. These services are:

- **Selective dissemination**
  of information (S.D.I.)
- **Literature searches**
- **Document delivery**

- **Loans**
- **Distribution**
- **Question & answer**

7.6.1 SELECTIVE DISSEMINATION OF INFORMATION (S.D.I.)

This service is based on interest profiles of CARDI's scientists, which have been compiled by the CIDC in collaboration with the scientists themselves. Under this service, each scientist receives information pro-actively in accordance with his work programme. These profiles are updated on a quarterly basis and are on a database called *PROFIL* in CDS/ISIS format.

In the past, the printed abstracts of international databases such as *TROPAG & RURAL*, *CAB ABSTRACTS* and *AGRIS* were scanned for information for this service but, with the advent of CD-ROM technology, the CD-ROM versions are now used. This new format, as well as cost constraints, has seen the termination of subscriptions to the printed products. As a result, the information is not as current as before, because the updates to the CD-ROMs are in most cases quarterly, whereas the printed abstracts were monthly issues. Search strategies based on the interest profiles are used to search these databases on a routine basis.

In addition to the CD-ROM databases, S.D.I. is provided from the serials and monographs received by the centre through a content page service. This is supplemented by contents pages received from the Centro Internacional de Agricultura Tropical (CIAT) and the *Current Contents Agriculture & Life Sciences*, which is available from the University of the West Indies Main Library. This service is provided through time-consuming manual processes that involve photocopying, cutting and pasting.

The serials and monographs received, together with other sources such as acquisition listings from various libraries and organizations, annual reports, newsletters and special bibliographies, are scanned for items of interest to the researcher. These may be articles, new publications, notices of upcoming conferences, courses and workshops and other items that would be of general interest to a CARDI researcher. The notices of upcoming conferences, courses and workshops are done in collaboration with the Communications Unit through the *CARDI Update*, a single page monthly newsletter that is faxed to all

country offices.

S.D.I. services are also received from other organizations such as NRI and CABI, through agreements that have been signed and funded by CTA for CARDI. These S.D.I. services take the form of literature searches based on interest profiles of selected agricultural scientists from the region which includes all CARDI researchers. The interest profiles were compiled by the CIDC and sent to CTA for passing on to the information providers.. A similar service is received from FAO's David Lubin Memorial Library in Rome.

7.6.2 LITERATURE SEARCHES

Literature searches are carried out either as a result of a request or pro-actively as part of the S.D.I. service. The CD-ROM databases; electronic databases, a number of printed serials (such as journals, research reports and specialised bibliographies), and proceedings of conferences and seminars are all searched in the process of filling a request for a literature search. Literature searches are carried out for CARDI staff and in some cases for other institutions. A database of literature searches conducted, *CIDLIS*, has been built in CDS/ISIS, but some amount of records are still to be entered.

A monthly list of literature searches conducted is published in the quarterly newsletter *CARDI News*, which is produced by the Communication Units for wider circulation amongst CARDI staff and the Ministries of Agriculture in CARDI's member states.

7.6.3 DOCUMENT DELIVERY

The demand for document delivery comes as a consequence of the literature searches and S.D.I. services, and in some cases from the researcher's own search for relevant research information. Linkages (discussed in section 7.2) established with other agricultural institutions have made a substantial input to the success of the document delivery service.

Approximately 80% of the documents for this service are received *gratis*. CTA contributes to this service by funding a photocopying service for users as well as providing funding for document delivery from other sources where payment may be required.

The process of document delivery involves: the receipt of the request; locating an appropriate source, either through the linkages or from a supplier; sending the order; photocopying the document when received; and sending it to the user. The means by which the document reaches the user depends on two factors: the urgency for the required document and the size of the document. The document is mailed, faxed, couriered or hand delivered by a member of staff travelling to the user's office.

Once a document is available at the CIDC, it is photocopied and sent to the user, the time frame for it reaching the user depends on the means of transmission. The time frame from request to delivery, therefore, varies with the availability and the means of transmission. A document which can be sourced regionally will usually reach the user in 2 to 3 weeks and, if it has to be sourced extra-regionally, receipt is usually in 6 to 8 weeks. There have been cases in the past when these time periods were much longer due to postal delays.

In some cases where a document is too expensive to acquire the user is asked to select the most appropriate section(s) to be ordered. Orders for documents are entered on a CDS/ISIS database, *ORDER*, that is a mirror of the database of holdings - *AGRIN*. When the order is received and all the bibliographic details have been entered, the record is then exported to CARDI's *AGRIN* database. This serves three purposes: keeping a record of orders, reducing data entry and providing a quality check before incorporation into the CARDI database.

7.6.4 LOANS

Only CARDI staff are allowed to borrow publications from the centre. An inter-library loan facility is offered to external users wishing to borrow information from CARDI. The

inter-library loans arrangement is with the following libraries in Trinidad:

- The Main Library, The University of the West Indies
- The Medical Library, Eric Williams Medical Science Complex
- Central Experiment Station Library, Ministry of Agriculture
- CAB International Library, Regional Office for Latin America and the Caribbean

Loans are still handled manually and there are plans in the near future to computerize this service. The CIDC has a specialised collection of which a large majority was received *gratis* from other organizations who published those documents in limited quantities. It is for this reason that external users are not allowed to browse the shelves and are asked to fill in a request form and the information is retrieved for them by the Library Assistant. The loan period is usually one month but this could be changed depending on the demand for the document. A system of reminder and recall for documents which are on loan is in place.

7.6.5 DISTRIBUTION

As CTA's Regional Branch Office for the Caribbean, the CIDC undertakes the distribution of information acquired or produced by CTA, to the region through the CARDI offices and the CTA Focal Points. CARDI documents are also distributed through this channel. A mailing list for distribution has been developed but this needs to be updated and computerized.

In the past, due to the lack of a centralised publishing unit for CARDI publications, some of the information generated within the CARDI system failed to reach the CIDC; however, under the restructured Information and Communication Programme, the Communication Unit will be responsible for all publications which, when produced, will be passed to the centre for processing, distribution and storage.

One problem that continues to delay the distribution process as well as other processes within the information service is the postal service, but this problem needs to be addressed at a higher level.

7.6.6   QUESTION & ANSWER

A Question and Answer service which is funded by CTA is operated from the CIDC as well as in the country offices. However, the service provided does not actually give answers to questions but provides a document or bibliography on the topic queried. Figure 7.6 shows the numbers and sources of requests recived through the Question and Answer service at CARDI in 1993. This service needs to be more clearly defined and more resources allocated for the repackaging of information to provide the user with specific answers.

The numbers and sources of requests from the Question and Answer service at CARDI in 1993.

Figure 7.6

7.7   PRODUCTS AND INFORMATION SUPPLIED

7.7.1   PRODUCTS

The CIDC produces four information products in addition to its in-house databases. These products are:

- a list of contents pages of journals scanned and received
- a list of contents pages monographs received
- a bibliographic list of journal articles received from extra-regional sources
- specialised bibliographies on various agricultural research topics of interest [7]

The lists should be produced on a quarterly basis but due to a lack of resources, human and equipment, they are not as frequent. The same lack of resources has caused the inability of the centre to produce a bibliography since 1992, when the last bibliography, *Dairying in the Caribbean,* was produced. Previous bibliographies covered topics on passion fruit and sweet potato but these need to be updated. A bibliography on diversification in agriculture was started some time ago but is yet to be completed.

A bibliography template has been built in CDS/ISIS, *BIBLIO,* for the purposes of producing bibliographies, and with the help of the conversion software FANGORN (see the glossary for details) bibliographies can now be produced quite easily once there are available human resources to do this.

7.7.2   INFORMATION SUPPLIED

CARDI's Information and Documentation Centre supplies various types of information to its users (see section 7.6). The information supplied may come from one of the sources

discussed in section 7.2. The **types** of information supplied include:

- **Books** - received gratis from CTA or other organizations, or which are purchased from suppliers;

- **Photocopies of articles** - held in-house, from information linkages or purchased from suppliers such as the British Library;

- **CARDI Bulletins and Fact sheets** - held in-house;

- **Bibliographic data** - from in-house and CD-ROM databases, and through contractual arrangements with other organizations;

- **Addresses** - from directories and the *MAIL* database which have the addresses of CARDI's information and research linkages;

- **Statistical data** - from the compiled agricultural statistics from individual Caribbean countries, the CARICOM Secretariat or the United Nations ECLAC agricultural statistics (These may be photocopies of relevant sections or repackaged from these sources based on the needs of the user.).

The centre also supplies bibliographic information to *CAGRIS* (see section 7.12.1), *AGRIS*, and *CARIS Caribbean* (see section 7.12.2). It also services AGLINET members when required. As a participating centre for AGRIS, CIDC is responsible for collecting, recording, processing, reporting and disseminating all documented research generated by CARDI, its projects and individual researchers. [8]

The products and services of CARDI's Information and Documentation Centre are currently supplied free of charge, but with the decline in financial assistance from donor agencies, the restructured CARDI will move towards becoming financially self-sufficient,

through the sale of its products and services.

7.8   TECHNOLOGIES USED

7.8.1   DISSEMINATION OF INFORMATION

All offices receive information from theC IDC either through the post, by fax, telephone and in some cases by hand. The information is delivered in either print or on diskettes (e.g. literature searches). There are no electronic communication methods available from CARDI to its offices but this is being addressed with the impending implementation of the institute's Information Systems Plan in September 1995.

The centre does have electronic mail (E-mail) access through the UNECLAC's Information Exchange System, ECLAC/AMBIONET (see section 7.12.7), but this was never explored as a medium for disseminating information to CARDI offices. The lack of modern information and communication technology has forced the centre to rely on the traditional methods of photocopying and mailing as its dissemination tool.

7.8.2   STORAGE AND RETRIEVAL

Information at the centre is stored in a bibliographic format on UNESCO's database software package CDS/ISIS. The FAO designed CDS-ISIS database *AGRIN* has been adopted as the database application for the storage of CARDI's bibliographic data. The reasons for this are CARDI's input into the international database *AGRIS*, and that this is the standard bibliographic database application being used by a wide range of organizations, including NRI and CABI. The centre's database now has 4,000 records.

Other in-house databases have been created to help with housekeeping and for easy retrieval of certain types of information e.g.: orders, addresses, interest profiles and literature searches. These databases are: *ORDER, PROFIL, MAIL, BIBLIO* and *CIDLIS* (see table 7.2). An additional database, *CADOCS*, which is intended to capture the information recorded on the enquiry forms and act as an evaluation tool is still in the preliminary stages of development. Figure 7.8 shows the quantity of the centre's collection that has been computerized.

The computerization of CARDI's agricultural collection.

Figure 7.8

7.8.3 ACCESS AND ACQUISITION

CD-ROM technology has been in use at the centre through CTA's CD-ROM Project and this has provided access to information in an electronic form. Access and acquisition would hopefully improve when the Information Systems Plan is on stream. Presently, these are done manually through the post, telephone or fax. The sources used to access and acquire information were discussed in section 7.2.

7.8.4 PROCESSING

The centre follows the FAO concept and methodology using the AGRIN software,the AGRIS input method, the *AGROVOC* thesaurus and *AACR2* cataloguing rules. Cataloguing is carried out by the documentalist, who is assisted in indexing by a graduate of the University of the West Indies. The collection is classified according to commodity codes which have been developed by FAO. There is a large quantity (approx. 45%) of the collection still to be catalogued and indexed, the majority of which is the CARDI Collection.

7.8.5 MONITORING AND EVALUATING

There are no means of evaluating any of the services from the centre except from the statistics kept of the numbers of items of output from a particular service. All documents leaving the centre have a form attached with two sections: a description of what is sent and a feedback section to be filled out and returned by the user. This feedback is almost always filled in and returned, but because of lack of resources no analysis of this has been done.

The centre's statistics is compiled using Symphony software, with monthly and yearly

trends produced. These monitoring and evaluating tools are, however, not utilized to evaluate the services provided and it is hoped that with the restructured service (which is apart from the design in this dissertation) the whole issue of monitoring and evaluation will be addressed.

7.9   HUMAN, FINANCIAL AND COMPUTER RESOURCES

The centre is staffed by a documentalist, two library assistants, a data entry operator, two part-time photocopy clerks, an indexing assistant and a National Training Board library technician trainee (who is paid by the Government of Trinidad and Tobago).

As the CTA Regional Branch Office for the Caribbean, a certain amount of funding is supplied by them for the operation of information services. The areas that are funded are: the CD-ROM station, photocopying, document delivery, S.D.I. and distribution. The rest of the funding comes from the institute's core fund.

There are two PCs, a 386 and 286, which are linked by a Novell NetWare Lite networking software and run on DOS 6.0. A laser printer, a tape backup drive, a CD-ROM drive and a modem are all connected to the system. The new Information Systems Plan, when implemented in September 1995, will make more computer resources available, upgrade the present computer hardware and software, and install communication links between CARDI's offices and external organizations.

7.10   THE CARDI RESEARCH DATABASE PROJECT

Within CARDI's new Information and Communication Programme, a project for the establishment of a CARDI Research Database has been identified. This project, which will

officially be implemented in September 1995, will provide: a database of information generated by CARDI; and a database of technology generated, tested and validated that is relevant to CARDI's research. [9] The database of information generated by CARDI has rudimentary beginnings as a CDS/ISIS database, but there are plans to have a full text database of all CARDI documents. The second database, the *Technology Information Database (TID)*, was created in June 1995 in the database management package FileMaker Pro. The creation of this database formed one of the structural inputs of the 'CARDI-CATIS' design for this dissertation as well as a start to one of the sub-projects under the CARDI Research Database Project.

Prior to the creation of *TID*, an evaluation exercise was carried out to determine which software would best suit its needs. Since the centre's database software package is CDS-ISIS, an investigation was conducted to determine its capabilities not only for *TID*, but also for the full text database of CARDI documents. *TID* required the storage of textual, numeric and bibliographic data and production of regular reports and lists. At the CDS-ISIS conference in Colombia in May 1995, [10] new applications were presented but the only new software development, a Windows version, would not be available until the end of 1995. The results of this investigation led to a discussion with CARDI's Information Resource Manager, who is responsible for implementing CARDI's new Information Systems Plan, about the choice of software.

It was felt that FileMaker Pro better suited the information system plan, the information required from the database and the products from the repackaged technology information. It is hoped that this database will form a major repackaging tool and input for the CATIS project. The CARDI document database will be the source of CARDI information for the *TID* when completed. The design of this database is discussed in Chapter 8.

7.11 THE IMPACT OF THE INFORMATION SYSTEMS PLAN

As part of the process of restructuring, CARDI has seen the need for a comprehensive, state-of-the-art information system that would be institute-wide and ensure its survival into the next century. A consultant was hired to develop an information systems plan. CARDI's Board of Directors have agreed with the proposed plan, which was presented at the Thirty-ninth Meeting of the Board of Directors of CARDI in March 1995. [11] This plan envisages the establishment of local area networks (LANs) at CARDI headquarters and in each of the country offices and the standardisation and upgrade of hardware and software on a phased basis over 18 months. The first phase starts in September 1995 and will involve the laying of cabling and the installation of hardware for the LANs at all offices, starting with CARDI's headquarters in Trinidad. [12]

In CARDI's Medium Term Plan 1994-1997, the objectives of the information system were stated as follows:

- *to enable information to flow efficiently and effectively within CARDI and be available through appropriate formats for end-users;*

- *to enable end-users to access information stored in in-house databases and via links with remote databases.* [13]

The consultant developed a plan with these objectives in mind and the following explains how this plan fits into CARDI.

The chosen LAN architecture is client-server, with a Wide Area Network (WAN) to link all the offices planned as the next stage in networking. Standardisation and upgrading will be carried out in two major tasks:

- **Establishment of LANs at headquarters and in each CARDI country office** - this involves: the acquisition of hardware, software and services,

customisation of software, end user education/training, system documentation and conversion.

- **Establishment of application software for office systems** - this is to include:

  - electronic publishing - word processing, desktop publishing and copying systems;
  - electronic communication - E-mail, voice mail and facsimile;
  - electronic meetings - discussion databases, teleconferencing, video conferencing;
  - image processing - document management and multimedia systems;
  - office management - scheduling and task management.

In order to accomplish the above tasks the following recommendations have been made:

- Standardisation on IBM PCs and compatibles with the Apple/Macintosh for electronic publishing and graphic design;

- Installation of client/server architecture so that existing systems can be incorporated into the network and therefore lower costs;

- Installation of the networking operating system - either NetWare 4.x or Windows NT Server 3.5;

- Installation of client software - either Windows NT Workstation 3.5, Windows 3.x or above;

- Installation of telecommunications software;

- Standardisation on the software suite - Microsoft Office Professional 4.3 with Aldus PageMaker as the page layout software;

- Standardisation on the groupware - Lotus Notes;

- Integration of Lotus Notes functional applications into the networked system. [14]

The additional hardware, software and information systems services are to be sourced from suppliers within the Caribbean region. [15] The plan has been estimated at EC$450,00 (approx. £90,000), excluding personnel costs. [16] The successful implementation of the information systems plan depends on the allocation and movement of resources, coordinated training programmes and user input.

This information systems plan will move the institute into an era with simplified organizational procedures, information and task sharing, easier communication and multitasking. It will allow CARDI to communicate with its country offices and others, to access information from its in-house and remote databases from any of its country offices, and facilitate collaborative work amongst staff in its country offices. The plan will allow CARDI's information service to satisfy its users' needs expressed in section 7.5.2.

7.12   RELATIONSHIP WITH OTHER INFORMATION SYSTEMS IN THE REGION

In the Caribbean, agricultural information systems focus on several types of information; the following explains these systems and how they relate to CARDI's information service.

7.12.1 CARIBBEAN AGRICULTURAL RESEARCH INFORMATION SYSTEM (CAGRIS)

In 1986, the CARICOM Heads of Government and the Caribbean Development and Coordination Committee (CDCC) of UNECLAC agreed to establish the Caribbean Agricultural Research Information System (CAGRIS). The system was established with funding from the International Development and Research Centre (IDRC) and had the University of the West Indies Main Library at St. Augustine, Trinidad, as its Regional Coordinating Centre. [17] The CAGRIS network comprises National Focal Points in each of the English-speaking Caribbean states, Belize, Surinam and Haiti. The objectives of CAGRIS are:

- *to collect and process all research information documented about Caribbean agriculture, nationally, regionally and internationally;*

- *to bring this information under bibliographic control and build a regional database of the agricultural information resource in the Caribbean;*

- *to share the agricultural information regionally and internationally.* [18]

CAGRIS, therefore, became the regional component for the international system AGRIS and is the input centre for the Caribbean. [19] During 1990 to 1994 however, although there are more than 10,000 records in the *CAGRIS* database, database and collection development has ceased due to a lack of funds. CARDI used to input its bibliographic data into this system for the eventual incorporation into *AGRIS* but now, because of the static nature of *CAGRIS*, the institute does this directly.

The *CAGRIS* database consists of bibliographic information summarising the results of local research which has been documented. This documented research includes the results of research undertaken as well as technology generated. [20] The database is stored on the

UNECLAC's host computer and can be accessed through the direct dial facilities of the ECLAC/AMBIONET information exchange system (see section 7.12.7). A printed agricultural index from the database *CAGRINDEX* is also available. In 1994, attempts were made to revive the system and maybe with the new interest in CATIS there would a new place for *CAGRIS* (see chapter 8 for more details).

7.12.2 CURRENT AGRICULTURAL RESEARCH INFORMATION SYSTEM (CARIS) CARIBBEAN

CARIS, the Current Agricultural Research Information System, is an international system coordinated by FAO, and is the cooperative network for collecting information on current agricultural research projects internationally. [21] CARIS Caribbean is the regional component of this system, with the regional coordinating centre being the University of the West Indies Main Library in Trinidad. A *CARIS Caribbean* database and corresponding directory are produced. CARDI operates in a project mode and its research projects which funded by a number of international donor agencies, are listed in *CARIS Caribbean.*

7.12.3 CARIBBEAN AGRICULTURAL MARKETING INFORMATION SYSTEM (CAMIS)

The Caribbean Agricultural Marketing Information System, CAMIS, has been designed and implemented by the CARICOM Secretariat, as a marketing information system to support the development of trade in primary agricultural commodities. [22] By nature of its establishment, CARDI has a direct link to the information generated by this system.

7.12.4 CARIBBEAN TRADE INFORMATION SYSTEM (CARTIS)

The Caribbean Trade Information System, CARTIS, is an information system that supports information on trade and is linked to the CAMIS information system. [23] Trade information is important to the survival of any commodity in the international market and CARDI has a rich resource of this type of information from CARTIS.

7.12.5 CARIBBEAN ANIMAL AND PLANT HEALTH INFORMATION NETWORK (CARAPHIN)

The Caribbean Animal and Plant Health Information Network, CARAPHIN, which is co-coordinated by IICA, and funded by IICA and the Canadian International Development Agency (CIDA), aims to improve the flow of information on animal and plant health generated in the region, including a reporting scheme for diseases and pests of trade significance. [24] Its intent is to strengthen the regional capacity, particularly the human resource base, for diseases and pest management. The network's source of information is the Caribbean Plant Protection Commission (*CPPC*) database which was established by FAO. This database consists of information on 2,700 organisms, a digest of plant quarantine regulations for 54 countries, as well as information on 200 insect families. [25] CARDI's Information and Documentation Centre uses this database a one of its sources of information on pest and disease management in the region.

7.12.6 THE ORGANIZATION FOR EASTERN CARIBBEAN STATES (OECS) and INFONET

The seven small island states of CARICOM - Antigua & Barbuda, Dominica, Grenada, Montserrat, St. Kitts/ Nevis, St. Lucia and St. Vincent & the Grenadines - form an organization known as the Organization for Eastern Caribbean States (OECS), with headquarters in St. Lucia and an office in Antigua. The OECS Secretariat Library in St.

Lucia is the sub-regional coordinating centre for a number of regional networks, including *CAGRIS*. [26] INFONET is the regional socio-economic information network co-ordinated and managed by the OECS. It has developed and maintained a database called INFONET which feeds its agricultural component into CAGRIS. [27] The OECS Secretariat's Library is one of CIDC's collaborating libraries in the region.

7.12.7 THE UNITED NATIONS ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN (UNECLAC) and ECLAC/AMBIONET

The United Nations ECLAC has its sub-regional headquarters for the Caribbean in Trinidad and coordinates an information network on economic and social planning called CARISPLAN. In 1992 the office was asked by the United Nations Environment Programme (UNEP) to become the Caribbean node for the United Nations Environment Programme Regional Electronic Information Exchange System (UNEPNET). This node is now known as ECLAC/AMBIONET. [28]

ECLAC/AMBIONET enhances linkages between various individuals and groups in the Caribbean and provides them with access to databases on the environment and sustainable development. The CAGRIS database is housed on ECLAC's host computer. Additionally, ECLAC/AMBIONET complements and strengthens the existing regional information networks in the Caribbean by providing users with a gateway to databases and services.

Four main system facilities are provided through ECLAC/AMBIONET: Electronic Mail, File Library, Forum and Gateway. These facilities allow users to communicate, access full text documents and statistical data, form discussion groups and access national, regional and international databases. [29] CARDI's Information and Documentation Centre is one of the users of the ECLAC/AMBIONET system and benefits from all the facilities offered.

7.12.8 THE ASSOCIATION FOR CARIBBEAN TRANSFORMATION (ACT)

The Association for Caribbean Transformation (ACT) operates a system on agricultural marketing and production information from Trinidad and Tobago, Dominica and Antigua and Barbuda. [30] CARDI's Information and Documentation Centre relies on ACT as a source of regional marketing information for a variety of commodities.

7.13 THE RELATIONSHIP BETWEEN CARDI AND THE TECHNICAL CENTRE FOR AGRICULTURAL AND RURAL COOPERATION (CTA)

CARDI's headquarters provides facilities for CTA's Regional Branch Office for the Caribbean (RBO/C). The office is supervised by CARDI's Director of Research and Programmes (now Programme Manager for Commodity Improvement and Natural Resource Management [31]), with the staff of CARDI's Information and Documentation Centre providing part-time services. A secretary is provided for the office by CARDI's Executive Director. [32]

CTA's RBO/C services the Caribbean through a number of national focal points which include:

- CARDI's offices in the twelve english-speaking CARICOM countries;

- the Ministries of Agriculture in Surinam and the Bahamas;

- the office of the Inter-American Institute for Cooperation on Agriculture (IICA) in the Dominican Republic.

Haiti is serviced directly from CTA's headquarters in The Netherlands. [33] CIDC is responsible for channelling information between CARDI, CTA and these national focal

points.

Through the RBO/C, CTA supports the region through the sponsorship of seminars and workshops, and funding for documentation and publishing. CIDC has benefited from two workhops on *The Use of Micro-computers in the Management of Agricultural Information Services* conducted in 1992 and 1993. In section 7.6 mention was made of CTA's support of CARDI's information service. The centre also houses a collection of CTA publications, distributes these publications, and acts as coordinator for information workshops held in the Caribbean.

7.14   SUMMARY

The survey of CARDI's existing information service provided an insight into its information resources, including the information held and linkages, and into its users' needs. The investigation of CARDI's headquarters and its countries offices gave an in depth evaluation of the information services provided by CARDI's Information and Documentation Centre. One of the most serious constraints that affects the timeliness of the information services provided is communication. In order for the centre to improve the timeliness of information supplied and increase access to more sources of information, a comprehensive information systems needs to be in place. This plan has been developed and is due to be implemented in September 1995. Hopefully, this would alleviate the communication problems and satisfy users' needs.

The existing service is one-way, with the *hub* being CARDI's headquarters. This dissertation incorporates a two-way information flow into the 'CARDI-CATIS' design, where CARDI's headquarters and its offices share information. In the wider CATIS, it is envisaged that CARDI and its offices will be the *hub* of the service, and the CATIS participants, will be the *spokes* in the two-way flow of information gathering and dissemination. Additionally, CARDI's information service is based on what information

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it holds or is able to source externally. The wider CATIS will offer a wider information base both to CARDI and the members of CATIS.

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8 THE RE-DESIGN OF CARDI'S INFORMATION SERVICE AS A PROTOTYPE FOR CATIS - A 'CARDI-CATIS'

8.1 OBJECTIVES OF CATIS

Although the prototype 'CARDI-CATIS' is a re-design of CARDI's existing information service, it must be remembered that it must serve as a model for CATIS. Hence, the objectives of CATIS must be reiterated to bring into focus the requirements of the model. The overall objective is the development of a regional information system for collection, organization and dissemination relating to priority areas of agricultural technology [1]. The specific objectives CATIS can be summarised as:

- *identification of target areas for delivery of the information services;*

- *development of a system for collection of agricultural research information that includes technology that has been generated, validated and utilized and which is both documented and undocumented at the national and regional levels;*

- *development of regional and national databases to organize and store research results, bibliographic data and repackaged information;*

- *development of a system to repackage research results into fact sheets, technology packages, production and marketing guides and other audio-visual materials;*

- *development of a strategy to strengthen CARDI's capability to conduct agricultural technology transfer;*

- *upgrade the resources of the national agricultural information services;*

- *train information personnel in the repackaging of research reports;*

- *educate users in the use of the information available from CATIS;*

- *market the information services and products;*

- *disseminate the services and products through the mass media and in appropriate language(s) to users;*

- *development of an agricultural technology consultancy service that draws on the research generated in the region;*

- *development a system for information transfer;*

- *identification of service points throughout the region.* [2]

8.2 THE RATIONALE FOR A 'CARDI-CATIS' PROTOTYPE

Under its restructuring process CARDI has repositioned itself to execute its mission by focusing its efforts on four main areas:

- *the establishment of an effective Caribbean agricultural science and technology system;*

- *the application of technology;*

- *the access and dissemination of technological and management information;*

- *the improvement of the internal efficiency of the institute.* [3]

In the access and dissemination of technological and management information, CARDI will actively collect, analyse and repackage technological information for dissemination to the regional agricultural community. [4] This function will be undertaken through a project entitled the *Design and Implementation of the Caribbean Agricultural Technology Information Service (CATIS).* [5] The ' CARDI-CATIS' prototype will serve to test the systems design for CATIS and so provide a basis for the implementation of the wider CATIS.

8.3   STRUCTURE OF 'CARDI-CATIS'

The 'CARDI-CATIS' structure is designed along the lines of an information network in the form of a *hub-and-spoke* model. [6] An information network can be said to be a system whereby a number of institutions/organizations/agencies (CARDI headquarters and its country offices), come together for the common goal of providing a discrete set of users (the Caribbean agricultural community) with relevant information irrespective of its origin, format or physical location. The *hub-and-spoke* model has a centralised structure, the coordinating centre, and a number of satellite nodes, the members. [7] The basic structure of 'CARDI-CATIS' would have the coordinating centre as CARDI headquarters and the members as CARDI's country offices (figure 8.1). It must be noted here, that this model also fits the wider CATIS, but in this case the coordinating centre is CARDI as a whole, with the participants of CATIS becoming the members.

The *hub-and-spoke* model of 'CARDI-CATIS'.

Figure 8.1

The 'CARDI-CATIS' design incorporates a number of functions (discussed in section 8.5) some of which will be centralised at headquarters and others decentralised to the country offices. In this prototype, CARDI headquarters has a coordinating as well as a managerial role, and its country offices, because of the decentralisation of some functions are contributors as well as functional arms. This sets the stage for a two-way flow of information within the model and provides the operational structure for the achievement of objectives of CATIS (figure 8.2) and therefore, those of 'CARDI-CATIS'. This structure is different from the existing information service where information flows in one direction from headquarters (the Information and Documentation Centre) to the country

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offices, and the country offices have no part in the provision of services except in the case of the Question & Answer service.

The service points in the prototype are all CARDI's offices including headquarters which will serve as the medium through which the services offered by 'CARDI-CATIS' reaches the users.

The direction of flow of information in the 'CARDI-CATIS' prototype.

Figure 8.2

Given the geographical distribution of CARDI's offices in twelve states across the Caribbean, an institute wide strategic information system is necessary for the sustainability of 'CARDI-CATIS' and, in fact, for the wider CATIS. The implementation of CARDI's information systems plan in September 1995,will provide the infrastructure that would

ensure the effective functioning of the 'CARDI-CATIS' model. This plan enables CARDI's staff to communicate with each other, access remote databases and conduct collaborative work despite the fact that they will be in different locations. [8] The 'CARDI-CATIS' prototype envisages an automated information service and, since all CARDI offices are equipped with computers and the implementation of the institute's information systems plan is apparent, the move to this type of service will be much easier.

8.4   PRIORITY AREAS OF FOCUS OF 'CARDI-CATIS'

Agricultural technology information in the Caribbean is lacking in co-ordination and organization. CATIS will attempt to rationalise this situation through the collection, analysis and dissemination of this type of information. Areas of emphasis for accomplishing this task in the 'CARDI-CATIS' prototype must be line with CARDI's work programmes. In CARDI's Medium Term Plan 1994-1997, the areas of focus for technology development were outlined. [9] These areas have been chosen as priority areas for 'CARDI-CATIS' (table 8.1).

BROAD AREAS	SPECIFIC AREAS
GERMPLASM	• Development of germplasm for vegetables, cowpea, pigeon pea and root crops. • Cultivar selection for fruits and minor exotics. • Multiplication - tissue culture and seed multiplication.
INTEGRATED PEST MANAGEMENT	Pest and disease management for solanaceous crops, forages, crucifers, curcurbits, amaranthus, sugarcane, fruits and minor exotics.
POST HARVEST	• Physiology • Quality Assurance • Post harvest studies in grain legumes, vegetables, minor exotics, fruits and root crops.
COMMODITIES - CROPS	Rice, Fruits, Minor exotics, Root crops, Vegetables, Grain legumes, Ornamentals
COMMODITIES - LIVESTOCK	• Goat germplasm • African Hair Sheep • Barbados Black Belly Sheep • Sheep germplasm multiplication • Cattle breed improvement and multiplication • Forage production on alkaline and acid soils • Tree legume development
NATURAL RESOURCE MANAGEMENT	• Agro-ecology • Geographic information systems • Soil and water conservation • Environmental impact assessment
SOCIO-ECONOMICS	Socio-economic studies

Table 8.1

8.5   FUNCTIONS OF THE 'CARDI-CATIS' DESIGN

Considering the objectives of CATIS mentioned in section 8.1, CARDI's pending information system and the information gathered in the developmental studies in Chapters 5, 6 and 7, the 'CARDI-CATIS' prototype design will now be further developed through the identification, description and allocation of functions. The functions of 'CARDI-CATIS' are:

- **Accessions**
- **Processing**
- **Database production**
- **Training**
- **Repackaging and publishing**

- **Marketing**
- **Distribution**
- **Dissemination of information**
- **Consultancy**

8.5.1 ACCESSIONS

Accessions would involve the collection of documented and undocumented material on local research and technologies, and published material on agricultural technologies that relate to the region from sources worldwide. This function would be on two levels: the national level (CARDI country offices) for information on national research and would be the information resource for a national database; and the regional level which would be carried out by CARDI's headquarters and would involve the collection of information from the region and internationally, as well as for Trinidad and Tobago, for input into the regional databases (see section 8.5.3).

These different centres and sources for collection raise the questions of data integrity and duplication. The 'CARDI-CATIS' model incorporates an accessions control system to alleviate these problems (figure 8.3). Scanning of all documents collected at the national and regional levels for duplicates must be carried out. CARDI has in place ISBNs (International Standard Book Number) and ISSNs (International Standard Serial Number) for its documents and these would be used as the accessions control factors.

The capability for CARDI to access international databases must be put in place to capture the agricultural technology information in the international community. Additionally, there must be access to the other existing regional information systems (see Chapter 7) so that all sources of information are accessed. It is hoped that this would occur with the implementation of CARDI's information systems plan.

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Accessions control system for 'CARDI-CATIS'.

Figure 8.3

Although there are a number of agricultural databases presently held by CARDI on CD-ROM and other electronic formats, there is a large gap in the information being accessed. as well as a lag in the timeliness of access. Online access is a good way in which to get access to current information from remote sites. This would address the needs expressed by CARDI's users in Chapter 7 for wider coverage and wider access. It would also provide access to the latest agricultural technology information available worldwide. The adoption of this method of access would depend heavily on the financial resources available to support this type of system.

The use of primary journals is another way of accessing current information and subscriptions to the relevant journals should be procured. However, if funds for this are not available there a number organizations such as the British Library who have good

document delivery services and, after the bibliographic details have been accessed, online document delivery would be the next step.

8.5.2 PROCESSING

Processing involves the cataloguing and classification of research material which is received from the national, regional and international communities. There is a need to rationalise and coordinate national information. A central processing unit at headquarters would mean that documents or the relevant information from the documents to be processed must be physically brought to the site. This poses several problems. The physical movement could cause damage to older material; untrained personnel extracting the relevant details for input into the databases could lead to corruption of data; and, given the nature of the postal services, such movement could also result in untold losses of valuable information.

Processing in 'CARDI-CATIS' should occur at the national level in all CARDI's country offices and at the coordinating centre at CARDI headquarters. At the coordinating centre, the material received from the wider regional and international communities would be processed. A processing standard must be adopted across the institute to ensure that there is data integrity and to facilitate quality control. Presently, CARDI inputs to the international AGRIS system, and the Information and Documentation Centre follows the AGRIS methodology for its bibliographic data. The *AGROVOC* thesaurus and *AACR2* cataloguing rules are being used. This should be adopted as the 'CARDI-CATIS' processing standards for the bibliographic data of all documents received.

The AGRIS method is also used for the Caribbean component of AGRIS and CARIS, *CAGRIS* and *CARIS Caribbean*. These databases should become components of CATIS. The reason for this is that all the Caribbean agriculture information would be coordinated by a Caribbean agricultural organization. Also, since CARICOM was part of the establishing mechanism for all of these systems, it would serve the region and the

agricultural community better to have a centralised clearing house for agricultural information. The coordination of the respective databases will be discussed in the next section.

In the 'CARDI-CATIS' prototype, the information received at the CARDI country offices would be processed there, the bibliographic data would be stored on the respective national databases and then downloaded into the regional bibliographic database. Information received from the international and wider regional community would be processed at CARDI headquarters and the bibliographic details stored directly on the centralised bibliographic database. Two considerations must be taken into account at this point. Firstly, duplicates, must be picked up through one of the two check points: accessions control and data integrity checks. Secondly, international or regional material which has been acquired by the country offices, must be picked up through the same methods described for duplicates and would indicate at the coordinating centre level if a document has or has not been obtained. AGRIS has an Input Checking Program called AGCHKE which checks records in a batch mode resulting in a list of the record numbers and error messages which can then be used for data correction. [10] AGCHKE offers the facility to validate what information is processed and eventually stored and this should be part of the accessions control system.

Basically, processing for the national material would occur at the CARDI country offices and at CARDI headquarters for that received from Trinidad and Tobago, the wider regional and international community.

8.5.3 DATABASE PRODUCTION

Again, a standard computerized format must be used for the creation of bibliographic databases. The bibliographic data will be stored in FAO's CDS-ISIS application AGRIN for reasons of compatibility with international and regional databases into which CARDI

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inputs its data. As part of the restructuring of the Information and Documentation Centre, an evaluation exercise was conducted into the present and future capabilities of CDS/ISIS (see Chapter 7). CDS/ISIS is being used not only at CARDI's Information and Documentation Centre but also at many other institutions and organizations regionally and internationally for bibliographic data on agriculture. This further justifies using this format as the standard for bibliographic data. CARDI's information systems plan will look further into the new developments of CDS/ISIS and its compatibility with the proposed plan.

The CARDI country offices would be responsible for storing the bibliographic data on the national material. CARDI headquarters would be responsible for storing both the national bibliographic data from all the country offices (including Trinidad and Tobago) and also that which is obtained from the wider regional and international community.

The *CAGRIS* database which was discussed in chapter 7 should be used as a starting point for CATIS. This would be appropriate because it already has some amount of material on research done in the Caribbean. Additionally, the database follows the AGRIS methodology, one that should be adopted by 'CARDI-CATIS'. The *CAGRIS* database which was established in agreement with CARICOM should be integrated into the CATIS system so that there would be a central holding place for Caribbean agricultural information. *CARIS Caribbean* is another Caribbean agriculture information database that should come under the CATIS umbrella for the reasons.

As part of this dissertation and with agreement by CARDI, the storage of technology information for the purposes of monitoring research status and repackaging was started. The *Technology Information Database (TID)*, was developed in July 1995 using the database management package FileMaker Pro. FileMaker Pro was used for the following reasons:

- its high compatibility with other systems, networking capability, and windows version that would allow a FileMaker Pro database to fit in with the upcoming Information Systems Plan (see Chapter 7);

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- its availability at the institute;

- it allows fields to be defined for different types of data: text, numbers, date, images and calculation;

- it has a facility for data verification that ensures that the correct data is entered into each field;

- it allows both field names and field values to be displayed on the screen (This has implications when designing to ensure that things go in their correct places.);

- it automatically indexes data that is entered;

- its ability to produce reports and lists (an important criterion for the *TID* database);

- the ease of use of the information in the database by allowing automatic browsing, having an easy-to-use search language (Query by Example), and allowing faster manipulation and retrieval of data.

The objectives of the Technology Information Database are:

- to assist researchers in avoiding duplication of research efforts by providing information on technologies developed and the status of research;

- to assist in the production of technology packages (production and marketing guides) for distribution to the farming community. [11]

Technological information on eleven commodities researched by CARDI was compiled by John Hunt (a member of CARDI's staff) as The *Technology Information Files* (TIFS) in 1993. The TIFS manual files were a means of identifying the status of research in various commodities associated with CARDI's Technology Transfer and Applied Research Project (TTARP). The commodities were: Small Ruminants, Hot Pepper, Yam, Peanut, Pineapple, Tannia, Cowpea, Anthurium, Orchid and Heliconia.

On examination of the TIFS, it was found that the files contained different types of information: articles, lists of references, fact sheets, mission reports, abstracts, research data and excerpts from various documents. The files were divided into the ten commodities which were further categorised into various aspects of production of those commodities. The material within the files did not have complete bibliographic details and information on the commodities listed were missing. A plan was developed to bring the information under bibliographic control and the database was designed. The small ruminants were separated into sheep and goats making the number of commodities eleven.

Four files were created within *TID* to store the information relevant to the commodities:

Code.fm   for codes of the eleven commodities e.g. CA001= Anthurium (This is a link file of the database);

Biblio.fm   for bibliographic data on all the information collected on research conducted on the eleven commodities;

Status.fm   for textual and numeric data on the technologies, generated, tested and validated on each of the eleven commodities according to predefined categories (This file monitors the status of research);

Techpack.fm   for textual data (in the first instance, may hold numeric data and images if required) gathered to form the technology packages or production and marketing guides for each of the eleven

commodities. [12]

The fields of the files of this database and sample records can be found in appendix XXIII. In August 1995, there were 1,200 bibliographic records and an ongoing process of analysis, repackaging and recording is currently taking place. In 'CARDI-CATIS', the bibliographic input for the Caribbean material for *TID* should come from *CAGRIS* and *CARIS Caribbean* providing a smooth flow from accessions to processing to repackaging. When this coordination of information flow is in place, the maintenance of *TID*'s **Biblio** file would involve the exporting the relevant material from *CAGRIS* or *CARIS Caribbean*. Although *TID* is slotted in under the restructured Information and Communication Programme as part of the CARDI Research Database Project, it should form the major repackaging tool for 'CARDI-CATIS'.

Five other databases that relate to the functions of distribution, consultancy and dissemination of information should be created in 'CARDI-CATIS'. These databases - *STOCK, MAILING LIST, CONSULTANT, QUESTIONS & ANSWERS* and *PROFILE* - would allow for the systemizing of functions, monitoring and evaluation (see table 8.2). *MAILING LIST* and *PROFILE* have beginnings as *MAIL* and *PROFIL* under the Information and Documentation Centre and these could be used as prototypes for the 'CARDI-CATIS' databases.

Other databases of 'CARDI-CATIS'.

DATABASES	DESCRIPTIONS
STOCK	For recording and monitoring the stock of products of 'CARDI-CATIS'.
MAILING LIST	For recording the names, addresses and information related to the distribution of the products of 'CARDI-CATIS'.
CONSULTANT	For recording the skills, locations and experiences of CARDI's scientists.
QUESTIONS & ANSWERS	For recording frequently asked questions and their resulting answers.
PROFILE	For recording the interest profiles of the users of 'CARDI-CATIS'.

Table 8.2

The databases of 'CARDI-CATIS'.

Feeds into a Database   ———————▶

Feeds into a Function/Service   ················▶

Figure 8.4

8.5.4 REPACKAGING AND PUBLISHING

Repackaging in 'CARDI-CATIS' would involve analysis of the research material and repackaging these into formats that would serve two purposes, monitoring the status of research and the production of technology packages. The Technology Information Database (*TID*) should be used as the repackaging tool. The fields of the *TID* **Status** and **Techpack** files (see appendix XXIII) are the categories into which the repackaged information should be recorded.

The need by farmers for information on research information in a format which they can understand justifies the production of the repackaged information into fact sheets, technology guides (e.g. for the production and marketing of various commodities), posters (e.g. production techniques, fertilizer use, etc.) and videos. Additionally, in order to keep researchers abreast of technologies being developed in the Caribbean and those being developed internationally that are relevant to the Caribbean, bibliographies on such research should be produced.

8.5.5 TRAINING

Training must take place at all levels in the system: accessions control, processing, database production, data entry, quality control, repackaging, marketing and information retrieval. The lack of expertise in repackaging research results deems it necessary for training in this area as well. Additionally, 'hands on' training will be necessary for all the institute's staff on all software being used as well as in retrieval techniques. There would also have to be a programme to educate users in the use of the products and services of 'CARDI-CATIS'. This would have to be an institute wide function and be conducted through the dissemination of information and marketing functions.

8.5.6 MARKETING

Agriculturalists have always been concern about the gap between research and adoption of research by the farming community. Much of this stems from the fact that the farmer does not know what research is being done and what technologies are being developed. Even if he does, most times it is not in a format that he can understand. Additionally, it has been observed that farmers coming to CARDI's Information and Documentation Centre for information are not aware of what services and products are available to them. On many of occasions the staff at the centre are asked, "How much does this cost?". The answer, is of course, "It is free of charge". The 'CARDI-CATIS' model must look at becoming self-sufficient since this is the only way to ensure survival of the service in the years to come. Although initial funding will be available, it has become known only too clearly in recent times that this soon declines. It is therefore suggested, that a pricing policy be adopted for the services and products offered by 'CARDI-CATIS'. This would require further detailed analysis which was not possible within the parameters of this dissertation.

'CARDI-CATIS' must incorporate a marketing campaign aimed at selling the products and services through the mass media to ensure that users are acutely aware of what services they can receive, and at what cost. Marketing strategies would have to be developed to sell the products and services. Marketing also has to take place on a person to person/organization to organization level which will bring in valuable partnerships for the service and encourage a wider clientele.

A marketing campaign such as described above is sure to increase the demand for services and products and infrastructure (especially human resources) must be in place to sustain this increase. This could be achieved through constant monitoring and evaluation of the services and product movements, and resources deployed as and when required. The *STOCK* database (see section 8.5.3) would assist in this monitoring. The priority areas mentioned in section 8.4 will surely channel demand for products and services.

8.5.7 DISTRIBUTION

CARDI's headquarters would coordinate and manage the distribution of the repackaged information products. Databases of stock levels and mailing lists should be created as these would allow distributions to occur smoothly and replenish supplies when demand is high. The stock database would monitor and evaluate the levels of stock and indicate that either to send supplies from headquarters or tell publishing that more copies need to be printed. The mailing list database would allow for the monitoring and evaluation of distribution channels from time to time. Fields should be incorporated into this database so that users' needs at the points of distribution could also be monitored for product and service refinement.

8.5.8 DISSEMINATION OF INFORMATION

In 'CARDI-CATIS', information would be disseminated to users through the **distribution of repackaged information, exhibitions, seminars, workshops, the mass media** and **selective dissemination of information**. As indicated in the objectives of CATIS, there must be a concerted effort to disseminate information in a language that is appropriate to users. English is used in all the CARDI member countries but Spanish is required in Belize and Creole in St. Lucia and Dominica. [13] This would be possible through the use of the AGRIS methodology which has indexing and retrieval in English, French and Spanish. The *AGROVOC Thesaurus* is now a multilingual agricultural thesaurus. [14]

Repackaging would occur as outlined in section 8.4.5. CARDI has been involved in the information transfer process for a long time through exhibitions, seminars, workshops and demonstrations. These methods disseminate information to users on a face-to-face basis. Information transfer brings the researcher and the end-user, the agricultural practitioner, into contact with each other. This will serve to bridge the gap between research and

adoption of technologies. Additionally, it provides a forum for new ideas and feedback. This process should continue but in a formalised manner under 'CARDI-CATIS'. Although the Internet is not a face-to-face method of information transfer, it offers the facility for discussion groups. This method would allow for the dissemination of Caribbean agricultural technology information to a wider audience.

Selective Dissemination of Information (S.D.I.) is currently provided by CARDI's existing information service. There are mechanisms in place, such as contracts with international information providers, for the provision of current awareness on topics of interest to agricultural scientists in the region. The present service also provides S.D.I. from its in-house sources. However, the profiles of scientists need to be updated to be in line with the priority areas outlined in section 8.4. There are problems inherent to the existing service with access and dissemination, but these would soon be alleviated with the implementation of the information systems plan. One consideration would be the introduction of the electronic document transmission system Ariel, which scans documents directly and transmits this via the Internet to users. [15]

Once established and operational, the databases of 'CARDI-CATIS' would provide an excellent source for disseminating information through computer-generated bibliographies with abstracts based on the profiles received. The database of profiles would assist in the generation of S.D.I. outputs from the 'CARDI-CATIS' databases. The information systems plan would allow faster dissemination of information through E-mail facilities.

Dissemination of information through radio and television programmes and through the newspaper provide excellent ways of reaching a wider audience. Under the 'CARDI-CATIS' model, it is suggested that arrangements be entered into with radio and television stations and newspapers in all CARDI member countries for the purposes of disseminating agricultural technology information. Repackaged information or specially designed products can be used, for example videos on propagation techniques. The mass media is also one of the ways in which the products and services of 'CARDI-CATIS' can be marketed. There could be a tradeoff between broadcast material or newspaper articles and

advertising time or space.

Again, the Internet can be used to offer products and services for sale by having a Home Page on the World Wide Web. This require further investigation.

8.5.9 CONSULTANCY

One of the objectives of CATIS is *the development of an agricultural technology consultancy service that draws on the research generated in the region.* [16] The consultancy provided under the 'CARDI-CATIS' model would be an advisory service that calls on CARDI's scientists to advise on problems and do troubleshooting when problems arise across the region. The scientists would tap into the research and technologies generated in the region as well as the documented experiences in using validated technologies. This function would be coordinated from headquarters and carried out by CARDI's scientists in their respective research areas throughout the region.

A database of the scientists, their location, their skills and experience would have to be developed so that when a problem arises, the coordinating centre could select the most appropriate scientist and delegate the duties to be performed.

8.6 SERVICES

'CARDI-CATIS' would offer the Caribbean agricultural community information services based on repackaged agricultural technology information. These services would function as discussed in sections 8.5.4, 8.5.8 and 8.5.9. The services of 'CARDI-CATIS' should be:

- **Consultancy**
- **Information Transfer**
- **Dissemination of Information**
- **Question and Answer**

8.6.1 CONSULTANCY

In providing consultancy services CARDI would have to work closely with the Ministries of Agriculture - Extension services to build on the wealth of experience in dealing with agricultural technology. CARDI's sub-programme on Technology Application and Adaptation and the Commodity Improvement Programme could offer the technical expertise required for consulting at several stages of design, selection, etc. in the agricultural process. The consultant database would be a tool for operating this service by activating a selection process for experts based on their skills. Skilled personnel (scientists) who have had years of experience in dealing with agricultural technology problems would be required to travel to problem sites. Financing could be obtained for this through a charging policy.

8.6.2 INFORMATION TRANSFER

Information transfer should occur in the forms mentioned in section 8.5.8 and could be collaborative efforts with other agricultural agencies, commodity boards or commercial firms.

8.6.3 DISSEMINATION OF INFORMATION

Under this service, the user would be able to obtain repackaged information to suit his needs be it a fact sheet, technical bulletin, bibliography or production and marketing guide. Additionally, this service would provide the user with technology information and advice

not mentioned as a separate service, through the Dissemination of Information service, users can be provided with copies of documents at a cost.

8.6.4 QUESTION AND ANSWER

The Question and Answer service provided by CARDI's existing information service needs to be restructured, coordinated and resourced to effectively service the agricultural practitioners in the region. The service under 'CARDI-CATIS', should supply the user with the answers to questions, i.e. giving a value added answers. This would require information professionals with agriculture training to be the contact persons when a question comes in. These information professionals can then either provide the user with a repackaged document, prepare a repackaged document to suit the user's needs, or refer the user to an appropriate person(s) (within or outside of CARDI) or alternative sources of information.

A database of frequently asked questions and the corresponding answers has been included in the 'CARDI-CATIS' design to act as a valuable resource and for avoiding duplication of efforts.

8.7 PRODUCTS

A number of products would be made available to the agricultural community under 'CARDI-CATIS'. These are:

- **repackaged information in print, floppy disk, CD-ROM or video;**
- **radio and television programmes;**
- **newspaper articles;**
- **bibliographies on various commodities;**

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- bibliographies on various commodities;
- databases in print, floppy disk, CD-ROM or online formats;
- videos of validated technologies.

These products must be self-financing with a suggestion that initial funding come from the CTA fund that has been provided for the establishment of the regional information service.

8.8 RESOURCES FOR 'CARDI-CATIS'

The resources for an operational 'CARDI-CATIS' can be divided into five categories:

- System changes
- Funding
- Staffing
- Information resources
- Other resources

8.8.1 SYSTEM CHANGES

For 'CARDI-CATIS' to become operational the following changes would have to take place:

- Accessions, processing, storage and distribution would have to be decentralised.

- A policy for collection of agricultural information would have to be developed.

- A standard methodology would have to be adopted for processing and storing bibliographic data, with the inclusion of a comprehensive abstracting component.

- Personnel would have to be trained in cataloguing, classification, abstracting, data entry, information retrieval, repackaging research results, editing, database development and maintenance, and desktop publishing.

- A production system for outputs would have to be developed.

- A marketing strategy would have to be developed.

- Databases would have to be designed for storing bibliographic data, mailing lists, stock, questions and answers, scientists' skills and users' interests.

Figure 8.4 can provide additional information on the databases to be designed. Figure 8.5 shows how the 'CARDI-CATIS' prototype would incorporate the above system changes.

8.8.2 FUNDING AND BUDGET

Although funding for the establishment of a regional information service has been agreed to by CTA, this must not be the only way in which CATIS must obtain funds if it is to survive. As mentioned before, income generation through the sale of products and services would be the part of the 'CARDI-CATIS' business plan. Donor funding works well in the initial stages of any programme but when worldwide demands increase, as is the case with many organizations today, the programme suffers. This has happened with CAGRIS.

A large proportion of the 'CARDI-CATIS' budget would be for staff, equipment and information resources. Once CARDI's information systems plan is implemented, the cost for equipment will be much lower.

The organizational structure of 'CARDI-CATIS'.

Accessions and
Acquisitions Unit

Processing Unit

Data Storage and
Database Systems Unit

Database Development
Quality Control
Training
Database Production

Repackaging Unit

Repackaging
Training

Publications Unit

Publishing
Training

Marketing and
Distributions Unit

Marketing Plan
Distribution Channels
Public Relations

Dissemination Unit

Information Transfer
Selective Dissemination of
Information
Question and Answer

Consultancy Unit

Advisory Services
Training

↔ Has a decentralised
component

Figure 8.5

The following are costs which must be included in the budget.

- **Salaries**
- **Upgrade of computer systems** (*part of CARDI's information systems plan*)
- **Database development costs**
- **Training costs**
- **Database subscriptions**
- **Journal subscriptions**
- **Database licences** (for multi-site CD-ROMs)
- **Book purchases**
- **Document delivery**
- **Advertising costs**
- **Publishing materials**
- **Information transfer costs** (for exhibitions, workshops, etc.)
- **Mass media costs**
- **Postage costs**
- **Infrastructural costs** (shelving, office space, etc.)

A cost analysis for these items would have to be carried out as this was not possible within the parameters of this dissertation. Some of the costs identified in 1991 could be revised to 1995 values (see appendix V).

8.8.3 STAFFING

Given the nature of 'CARDI-CATIS', human resources is an important component to ensure the proper functioning of all services. Table 8.2 shows what human resources would be required by 'CARDI-CATIS'. In the 'CARDI-CATIS' prototype, there would be a need for a service coordinator in each country. This could be undertaken by the agriculture information specialists.

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POSITION	NUMBER	LOCATION
Agriculture Information Specialists	13	11 CARDI country offices 2 CARDI headquarters
Cataloguers/Indexers (part-time in country offices)	13	11 CARDI country offices 2 CARDI headquarters
Abstracters (part-time in country offices)	13	11 CARDI country offices 2 CARDI headquarters
Database Administrator	1	Travelling to all offices
Library Assistants	12	1 in each country
Data Entry Operators	13	11 CARDI country offices 2 CARDI headquarters

Table 8.3

8.8.4 INFORMATION RESOURCES

Although the users' needs in Chapter 7 indicated information resources on site, this would not be feasible because of the extremely high costs. Therefore, there should be a pool of resources at headquarters which can be accessed through the information system. Once implemented, the information system will make communication within the organization, easier and faster. These resources should comprise a wide range of agricultural journals (a priority selection from appendix XXI), CD-ROM and online databases which have a wide agricultural coverage (see table 8.4 for suggested titles and subscription costs) and a number of agricultural reference material.

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Suggested CD-ROM and Online Databases for 'CARDI-CAGRIS'.

TITLES	SUBSCRIPTION COST	DATABASE PROVIDER
CD-ROM [17]		
AGRICOLA	US$ 1200 - full set	SilverPlatter Information Inc.
AGRIS	US$1375 - full set	SilverPlatter Information Inc.
CABCD	US$6000 - full set	SilverPlatter Information Inc.
SESAME	Ffr4000	CIRAD, France
TROPAG & RURAL	US$825	SilverPlatter Information Inc.
ONLINE [18]		
AGRICOLA	$.75/connect minute; $.55/full format online type or offline print	DIALOG Information Services Inc., U.S.A.
AGRIS	$1.00/connect minute; $.55/full format online type or offline print	DIALOG Information Services Inc., U.S.A.
THE AGROCHEMICA LS HANDBOOK	$5.75/connect minute;$4.90/full format or offline print	DIALOG Information Services Inc., U.S.A.
BIOSIS Previews	$1.60/connect minute; $.90/full format online type or offline print	DIALOG Information Services Inc., U.S.A.
CAB Abstracts	$1.00/connect time; $.98/full format online type; $.98/full format offline print	DIALOG Information Services Inc., U.S.A.
CRIS/USDA	$.75/connect minute; $0.00/full format online type; $.15/full format offline print	DIALOG Information Services Inc., U.S.A.

Table 8.4

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8.8.5 OTHER RESOURCES

A physical infrastructure for such things as storing collected material (shelving) and computer stations would have to be put in place. The publishing activity would require desktop publishing and printery facilities. These are currently available at CARDI headquarters but would have to be upgraded to industry standards.

8.9 REFERENCES

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9 RECOMMENDATIONS

'CARDI-CATIS' will provide CARDI with a prototype to test the systems design for CATIS. In this respect, the functions and structure of the prototype play an important role. In order that 'CARDI-CATIS' should fit the needs of CATIS the following recommendations are made:

- **Accessions, acquisitions, processing, storage and distribution should be decentralised** to include the CARDI country offices.

- The **AGRIS methodology** for processing and storage of bibliographic data should be used. AGRIN and AGCHKE software should be installed in all offices.

- A **comprehensive abstracting** scheme should be part of the processing function.

- The **Technology Information Database (*TID*)** should be the repackaging tool for 'CARDI-CATIS'.

- The *MAIL* **and** *PROFIL* **databases of the Information and Documentation Centre should be adopted** as the *MAILING LIST* and *PROFILE* databases of 'CARDI-CATIS'.

- **A database of scientists' skill** must be created. This could be done in FileMaker Pro.

- **A database of question and answer, and stock** should be created. This could be done in a relational database package to allow for manipulation of individual

sets of data. More research would have to be done for this.

- **Ariel** workstations should become part of CARDI's information system. This would involve the installation of a PC, a printer, a scanner, Ariel software and communications links at each country office.

- *CAGRIS* and *CARIS Caribbean* should be brought under 'CARDI-CATIS'. This would ensure that all research information on technologies developed in the Caribbean is in one place. For this to occur, discussions would have to be held with FAO and the University of the West Indies.

- **Information resources should be centralised** at headquarters. A cost analysis should be carried out for the acquisition of additional information resources.

- **Additional personnel** especially agriculture information specialists should be hired.

10 CONCLUSION

Caribbean agricultural technology information needs a home. The Caribbean Agricultural Research and Development Institute (CARDI), has been given the responsibility by CARICOM to establish such a home, the Caribbean Agricultural Technology Information Service (CATIS). As part of its restructuring process (1994-1995), CARDI has undertaken to look into the requirements for the implementation of CATIS. As part of this undertaking, two processes have begun: a user needs analysis for CATIS and the design of a prototype to test the systems design of CATIS.

Funds for the establishment of a regional information service, have been agreed to by the Technical Centre for Agricultural and Rural Cooperation (CTA). Under the terms of this agreement, the user needs analysis for the wider CATIS was initiated, and is due to be completed in November-December 1995.

This dissertation provides CARDI with a prototype for CATIS, a 'CARDI-CATIS', that uses CARDI's headquarters and its country offices as the model for the design. 'CARDI-CATIS' is a *hub-and-spoke* information network model, where CARDI is the coordinating centre and its country offices the satellite nodes. This model also fits in with the wider CATIS, where CARDI and its country offices would become the coordinating centre, and the participants of CATIS, the satellite nodes.

CARDI's existing information service would have to be remodelled to suit the requirements of 'CARDI-CATIS', through the decentralisation of a number its information processes: accessions, processing, storage and distribution. This would allow for the two-way flow of information in the 'CARDI-CATIS' model. The existing service however, does offer 'CARDI-CATIS' a pool of valuable information resources: the

CARDI Collection, its information linkages, in-house databases and CD-ROM agricultural databases. Even though the other information resources for 'CARDI-CATIS' do not exist in this service, the linkages and relationships with other agricultural information services, provide a means of accessing these.

One important criterion that must be part of 'CARDI-CATIS' is systems. There must be a clear identification of activities, and the systems put in place to carry out these activities. The information systems plan due for implementation in September 1995, weighs heavily on the success of the networked model of 'CARDI-CATIS'. Communication links within CARDI and outside of CARDI is a necessary part of the infrastructure of 'CARDI-CATIS'. As this is being put in place, CARDI must now look at the acquisition and coordination of resources for CATIS. Since CARDI's governing body comprises of representatives from each of the member countries, they are poised to negotiate the participation of all countries in this effort.

The 'CARDI-CATIS' prototype and the results of the user analysis would give CARDI the basis for implementing the wider CATIS however, much analysis into the marketing of information services, pricing of information products and repackaging of research results would have to be done.

APPENDICES

CARDI'S DONORS

GOVERNMENT

The governments of the CARDI member countries:

Antigua & Barbuda	Jamaica
Barbados	Montserrat
Belize	St. Kitts/Nevis
Dominica	St. Lucia
Grenada	St. Vincent & the Grenadines
Guyana	Trinidad and Tobago

NON-GOVERNMENT

MAJOR DONORS

Barclays Bank International Development Fund (BBIDF)

British Development Division in the Caribbean (BDDC)

Canadian International Development Agency (CIDA)

European Development Fund (EDF)

Inter-American Institute for Cooperation on Agriculture (IICA)

International Development Research Centre (IDRC)

International Fund for Agricultural Development (IFAD)

United Nations Development Programme (UNDP)

United States Agency for International Development (USAID)

COMMODITY ORGANIZATIONS/FOUNDATIONS

Coffee Industry Board (CIB)

Peter Moore's Foundation

Coconut Industry Board

CO-OPERATIVE PROGRAMMES/TECHNICAL ASSISTANCE

Collaborative Research Support Programme (CRSP)

Technical Centre for Agricultural and Rural Cooperation (CTA)

French Government

International Service for National Agricultural Research (ISNAR)

Jamaica Agricultural Development Fund

Source: **CARDI.** *CARDI Annual Report 1993/94.* St. Augustine, Trinidad: CARDI, 1994, pp. 30-31.

CARDI'S PROGRAMMES AND SUB-PROGRAMMES

COMMODITY IMPROVEMENT

Caribbean Rice Industry Development Network

Development of Traditional Export Commodities

Integrated Pest and Disease Management Systems

Livestock Feed and Feeding Systems

Plant Genetics Resources Management

Post Harvest Technology Systems

PROCICARIBE - Network of Agricultural Science and Technology Institutions

NATURAL RESOURCE MANAGEMENT

Development of a Natural Resource Management Database

Development of Hillside Farming Systems (OECS and Jamaica)

Development of Intermediate Savannahs of Guyana

Development of Low Rainfall Systems (OECS and Jamaica)

Development of the Belize River Valley

Preservation of Biodiversity

TECHNOLOGY ADAPTATION AND APPLICATION

Application of Commercial Production and Marketing Systems

Cattle Production and Marketing Systems

Crop Production and Marketing Systems

Low Input Sustainable Systems

Small Ruminant Productionand Marketing Systems

INFORMATION AND COMMUNICATIONS

Communications

Information

CORPORATE SERVICES

Administrative Services

Finance

Human Resource Management

Organization and Development

PLANNING AND BUSINESS DEVELOPMENT

Corporate Planning

Programme and Project Monitoring and Evaluation

Project Planning and Appraisal

Resource Mobilization

Socio-economic Evaluation of Production and Marketing Technologies and Systems

Technical and Support Services

Source: **CARDI.** Operational Plan. CARDI News - Special Supplement. July 1995, 1, pp. 2-3.

CARDI'S COLLABORATORS

GROUPS OF ORGANIZATIONS *(include)*

Commodity Organizations

Communication Organizations

Farmer Organizations

Information Organizations

International Agricultural Research Organizations (IARCs)

Marketing Organizations

Ministries of Agriculture

National Agricultural Research Systems (NARS)

Private Sector Agencies

Research and Development Organizations

Universities of Latin America and the Caribbean

INDIVIDUAL ORGANIZATIONS *(include)*

Agricultural DiversificationUnit (ADCU), Dominica

Caribbean Industrial Research Institute (CARIRI), Trinidad

Caribbean Trading Company (CATCO)

Caribean Association of Industry and Commerce (CAIC)

CARICOM Secretariat, Guyana

Continuing Education Programme in Agricultural Technology (CEPAT), U.W.I.

Dominica Export Import Agency (DEXIA), Dominica

French Technical Commission (FTM)

Institute National de la Recherche Agronomique (INRA)

Inter-American Institute for Co-operation on Agriculture (IICA), Costa Rica

International Service for National Agricultural Research (ISNAR)

National Agricultural Research Institute (NARI), Guyana

OECS Secretariat, St. Lucia

Organization for Rural Development (ORD), St. Vincent & the Grenadines

Regional Extension and Communication Unit (RECU), U.W.I.

Technical Centre for Agricultural and Rural Cooperation (CTA), The Netherlands

University of Guyana (U.G.)

University of the West Indies (U.W.I.)

University of Florida, U.S.A.

Winward Islands Banana Association (WINBAN)

CATIS BUDGET 1989 - PREPARED BY FAYE DURRANT
(PROJECT DURATION - 3 YEARS)

BUDGET COMPONENTS	YEAR 1 (US$)	YEAR 2 (US$)	YEAR 3 (US$)	TOTAL (US$)
SALARIES AND ALLOWANCES	47,000	106,100	111,600	318,300
CONSULTANTS	47,000	46,000	46,000	139,000
PUBLICATIONS	41,800	44,000	46,600	132,400
TRAINING	35,000	52,000	52,500	139,500
TRAVEL	12,000	13,000	14,000	39,000
RESEARCH EXPENSES	5,500	6,000	7,000	18,500
SUPPORT SERVICES	9,000	9,000	9,000	27,000
CAPITAL EQUIPMENT	36,000	8,000	0	44,000
TOTAL	286,900	284,100	286,700	857,700

REVISED CATIS BUDGET 1991 - PREPARED BY S. PARASRAM
(PROJECT DURATION - 3 YEARS)

Source: **Parasram, S.** *The Caribbean Agricultural Technology Information Service: Background and Justification.* St. Augustine, Trinidad: CARDI, 1991, pp. 18-20.

BUDGET COMPONENTS	YEAR 1 (US$)	YEAR 2 (US$)	YEAR 3 (US$)	TOTAL (US$)
COORDINATING CENTRE	176,000	131,000	176,000	483,000
IN COUNTRY	55,600	55,600	55,600	166,800
CONSULTANTS (International)	60,000	60,000	60,000	180,000
PRINTING AND PUBLICATIONS	93,400	63,400	63,400	220,000
TRAINING	38,600	38,600	17,000	94,200
GENERAL OPERATING EXPENSES	38,000	38,000	38,000	114,000
EQUIPMENT	191,000	15,000	15,000	221,000
TOTAL	**652,400**	**401,600**	**425,000**	**1,479,000**

NATURAL RESOURCES INSTITUTE QUESTIONNAIRE

Loughborough University of Technology

Department of Information and Library Studies

Loughborough, Leicestershire, LE11 3TU, United Kingdom

MSc Information Studies

AGRICULTURAL INFORMATION SERVICE QUESTIONNAIRE

Natural Resources Institute (NRI)

SECTION A

Library and Information Services Group - Tim Cullen (Head)

1.	Is there any report with management information about your information service?

	YES ❏			NO ❏

	If yes, could I have a copy?

	_____

	_____

2.	What services do you provide?

	a.	Consultancy or Advisory ❏		e.	S.D.I. ❏

	b.	Document Delivery ❏			f.	Training ❏

	c.	Literature Searches ❏			g.	Other ❏

	d.	Question and Answer (Enquiry) ❏

3.   Who are the users of each of your services?

    a.   _____

    b.   _____

    c.   _____

    d.   _____

    e.   _____

    f.   _____

    g.   _____

4.   Do you have a service that specifically provides agricultural technology information?
       YES ❑   NO ❑
       If yes, is there a description of this service available?

       _____

5.   How are user needs for your information service monitored?

       _____

       _____

6.   Can you give me a history of your information service?
       a. When it was implemented?

       _____

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b. How long was the implementation period?

_____

c. What sort of inputs were required?

_____

d. Were sources of information readily available and accessible?

_____

e. What problems were incurred?

_____

f. What subject areas are covered by the service?

_____

7.   a. How is user satisfaction evaluated?

_____

_____

b. Is this described in any document of which I could have a copy?

_____

_____

8.   How are each of your services funded?

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a.   _____

b.   _____

c.   _____

d.   _____

e.   _____

f.   _____

g.   _____

9.   Is there a charging policy for the services provided?

YES ❑   NO ❑

If yes, is this described in a document of which I could have a copy?

_____

_____

10. What information products do you produce and in what formats?

Product	**Format**			
Monographs ❑	Print ❑	Online ❑	CD-ROM ❑	Other ❑
Journals ❑	Print ❑	Online ❑	CD-ROM ❑	Other ❑
Guides ❑	Print ❑	Online ❑	CD-ROM ❑	Other ❑
Databases ❑	Print ❑	Online ❑	CD-ROM ❑	Other ❑
Other ❑	Print ❑	Online ❑	CD-ROM ❑	Other ❑

11.   What information products do you produce from original research?

_____

_____

12.   With respect to your databases:

a.   How many are produced?

_____

b.   What are they?

_____

_____

c.   What are their sizes?

_____

d.   What computer system (hardware) is used in their production?

_____

e.   What software is used?

_____

f.   How is the information from these databases disseminated to users?

_____

_____

13. Do you access external databases?

    a.   How many?

_____

    b.   Which ones?

_____

_____

    c.   What system is used to access these databases?

_____

    d.   If these databases are computerized, how many databases licences do you have for each?

_____

14. Which organizations do you collaborate with in the production of your information products?

_____

_____

15. Which organizations do you collaborate with in the provision of your services?

_____

_____

16.   a. How successful has information networking been in facilitating this collaboration?

_____

_____

b. Were there any problems?

_____

_____

17.   a. Do you participate in information exchange with other organizations?

_____

_____

b. Which organizations?

_____

_____

c. What information is exchanged?

_____

d. How effective has this system been?

_____

_____

18.   What benefits have there been for organization in using IT for:

a. the management of information

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_____

_____

b. dissemination of information?

_____

_____

SECTION B

Publishing and Publicity Services Group - Valerie Howe (Publications Manager)

1. Do you produce an annual report or any other document that would provide information about the organization such as history, mission, size, organizational structure and layout (branches)?

    YES ❏   NO ❏

    If yes, could I have a copy?

    _____

2. What publications do you produce and in what formats?

Product	**Format**			
Monographs ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Journals ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Other ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏

_____

SECTION C

Information Technology Services Group - Jim Dougan (Head)

1.   With respect to your databases:

   a.   How many are produced?

   _____

   b.   What are they?

   _____

   _____

   c.   What are their sizes?

   _____

   d.   What computer system (hardware) was used in their production?

   _____

   e.   What software was used?

   _____

   f.   What computer networking is used to disseminate the information from these databases?

   _____

   _____

2.   Do you access external databases?

    a.   How many?

    _____

    b.   Which ones?

    _____

    _____

    c.   What computer system is used to access these databases?

    _____

    d.   How many databases licences do you have for each of the databases that you access?

    _____

3.   Do you have a systems specification for your IT?

    YES ❑   NO ❑

    If yes, could I have a copy?

    _____

4.   How is this IT system used in the provision each of your services?

    a.   _____

    b.   _____

    c.   _____

    d.   _____

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e. _____

f. _____

g. _____

5.   a. How has the IT system been used to disseminate your information?

_____

_____

b. Are any technical upgrades planned for your IT?

YES ❑   NO ❑

If so, why?

_____

_____

6.   Is there a policy for upgrading your IT system? Please explain.

_____

_____

7.   a. How often do you have a major system upgrade?

_____

_____

b. What are the reasons for this?

175   *Continued on the next page*

8.   Is there a policy for managing your IT system?

YES ❑   NO ❑

If yes, is this described in a document of which I could have a copy?

_____

9.   What is the size and structure of your technical support staff for the IT system? Could I have a copy

of an organizational chart?

_____

10.   How is IT upgrading funded?

_____

11.   How is maintenance for IT funded?

_____

12.   a. What was the implementation period for your IT system?

_____

b. What problems were incurred in setting up this IT system?

_____

_____

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13.   What benefits have there been for organization in using IT for:

a. the management of information

_____

_____

b. dissemination of information?

_____

_____

_____

Thank you for your cooperation.

Sharon Premchand

CAB INTERNATIONAL QUESTIONNAIRE

Sharon Premchand
16 May, 1995

Loughborough University of Technology

Department of Information and Library Studies

Loughborough, Leicestershire, LE11 3TU, United Kingdom

MSc Information Studies

AGRICULTURAL INFORMATION SERVICE QUESTIONNAIRE

Centre for Ariculture and Biosciences (CAB) International

SECTION A

Library and Information Services -   *Peter Gooch (Information and Training Specialist - Information Services)*

1. Is there any report with management information about your information service?

    YES ❑   NO ❑

    If yes, could I have a copy?

    _____

    _____

2. What services do you provide?

    a.   Consultancy or Advisory ❑   e.   S.D.I. ❑

    b.   Document Delivery ❑   f.   Training ❑

    c.   Literature Searches ❑   g.   Other ❑

    d.   Question and Answer (Enquiry) ❑

3.   Who are the users of each of your services?

a.   _____

b.   _____

c.   _____

d.   _____

e.   _____

f.   _____

g.   _____

4.   Do you have a service that specifically provides agricultural technology information?

YES ❑   NO ❑

If yes, is there a description of this service available?

_____

5.   How are user needs for your information service monitored?

_____

_____

6.   Can you give me a history of your information service?

a. When it was implemented?

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b. How long was the implementation period?

c. What sort of inputs were required?

d. Were sources of information readily available and accessible?

e. What problems were incurred?

f. What subject areas are covered by the service?

7.   a. How is user satisfaction evaluated?

b. Is this described in any document of which I could have a copy?

8.   How are each of your services funded?

   a.   _____

   b.   _____

   c.   _____

   d.   _____

   e.   _____

   f.   _____

   g.   _____

9.   Is there a charging policy for the services provided?

   YES ❏   NO ❏

   If yes, is this described in a document of which I could have a copy?

   _____

   _____

10.   What information products do you produce and in what formats?

Product	**Format**			
Monographs ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Journals ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Guides ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Databases ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏
Other ❏	Print ❏	Online ❏	CD-ROM ❏	Other ❏

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11.   What information products do you produce from original research?

_____

_____

12.   With respect to your databases:

a.   How many are produced?

_____

b.   What are they?

_____

_____

c.   What are their sizes?

_____

d.   What computer system (hardware) is used in their production?

_____

e.   What software is used?

_____

f.   How is the information from these databases disseminated to users?

_____

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13. Do you access external databases?

    a. How many?

    b. Which ones?

    c. What system is used to access these databases?

    d. If these databases are computerized, how many databases licences do you have for each?

14. Which organizations do you collaborate with in the production of your information products?

15. Which organizations do you collaborate with in the provision of your services?

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16.   a. How successful has information networking been in facilitating this collaboration?

_____

_____

b. Were there any problems?

_____

_____

17.   a. Do you participate in information exchange with other organizations?

_____

_____

b. Which organizations?

_____

_____

c. What information is exchanged?

_____

d. How effective has this system been?

_____

_____

18.   What benefits have there been for organization in using IT for:

a. the management of information

_____

_____

b. dissemination of information?

_____

_____

19.   What information sources are used in the provision of your information services?

_____

_____

20.   Do you produce an annual report or any other document that would provide information about the organization such as history, mission, size, organizational structure and layout (branches)?

YES ❑   NO ❑

If yes, could I have a copy?

_____

SECTION B

Database Services Group - Ruth Ibbotson (Group Manager)

1.   With respect to your databases:

a.   How many are produced?

_____

b.   What are they?

_____

_____

c.   What are their sizes?

_____

d.   What computer system (hardware) was used in their production?

_____

e.   What software was used?

_____

f.   What computer networking is used to disseminate the information from these databases?

_____

_____

2.   Do you access external databases?

a.   How many?

_____

b.   Which ones?

_____

_____

c.   What computer system is used to access these databases?

_____

d.   How many databases licences do you have for each of the databases that you access?

_____

3.   Do you have a systems specification for your IT?

YES ☐   NO ☐

If yes, could I have a copy?

_____

4.   How is this IT system used in the provision each of your services?

a.   _____

b.   _____

c.   _____

d.   _____

e.   _____

f.   _____

g.   _____

5.   a. How has the IT system been used to disseminate your information?

_____

b. Are any technical upgrades planned for your IT?

YES ☐ NO ☐

If so, why?

_____

_____

6. Is there a policy for upgrading your IT system? Please explain.

_____

_____

7. a. How often do you have a major system upgrade?

_____

_____

b. What are the reasons for this?

_____

8. Is there a policy for managing your IT system?

YES ☐ NO ☐

If yes, is this described in a document of which I could have a copy?

_____

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9.   What is the size and structure of your technical support staff for the IT system? Could I have a copy of an organizational chart?

_____

10.   How is IT upgrading funded?

_____

11.   How is maintenance for IT funded?

_____

12.   a. What was the implementation period for your IT system?

_____

      b. What problems were incurred in setting up this IT system?

_____

_____

13.   What benefits have there been for organization in using IT for:
      a. the management of information

_____

_____

b. dissemination of information?

_____

_____

_____

Thank you for your cooperation.

Sharon Premchand

QUESTIONS USED IN AN E-MAIL INTERVIEW WITH CAB INTERNATIONAL'S LIBRARY SERVICES MANAGER
- Chris Hamilton

1. Is there any report that contains management information about this service?
    If there is could I have a copy?

2. Please indicate from the list below which information services are provided by the Library Services Centre:

    Document delivery ......   Question and Answer .....
    Literature searches ......   S.D.I. .....
    Training .....   Other .....

3. Who are the users of each of the services mentioned in question 2.

4. How are user needs for your information service monitored?

5. How are each of the services mentioned in question 2 funded?

6. Is there a charging policy for the services provided?

7. What information sources are used in the provision of your information service?

8. Do you access external databases? If yes, then answer the following:
    a. Which ones?   b. What system is used to access these databases?
    c. How many database licences do you have for each?

9. Which organizations do you collaborate with in the provision of your information services?

10. With which organizations do you exchange information?

11. What services are provided to your own branch offices and what system is in place for this?

QUESTIONS USED IN AN INTERVIEW WITH STAFF AT CAB INTERNATIONAL'S REGIONAL OFFICE IN THE CARIBBEAN

- Dr. Roger Hammond and Ms. Theresa Alexis

1. Could you explain the process for filling a request received at this office?

2. How does the process in question 1 relate to CABI's headquarters in the United Kingdom?

3. How has IT affected your functions at this office?

4. What is your relationship with the Library Services Centre in the United Kingdom?

5. Do you have a library holdings at this site?
    If yes, is the material included in the CAB ABSTRACTS database?

6. What special functions if any does this office carry out in terms of marketing the information services provided by CABI?

CARDI INFORMATION SERVICE QUESTIONNAIRE

Sharon Premchand
5 July 1995

Loughborough University of Technology

Department of Information and Library Studies

Loughborough, Leicestershire, LE11 3TU, United Kingdom

MSc Information Studies

CARDI'S INFORMATION SERVICE QUESTIONNAIRE

Date   _____

Country   _____

Filled by   _____

Position   _____

1.   Do you hold any agricultural information i.e. journals, monographs, articles, posters, etc.?

         YES   ☐   NO   ☐

         If yes, please fill in the relevant details in table 1.

Sharon Premchand
5 July 1995

Table 1

TYPE	NUMBER	FORMAT	MAIN SUBJECTS COVERED
Example: *JOURNALS*	*15*	*PRINT*	*Pest Management*
JOURNALS			
ARTICLES/ RESEARCH PAPERS			
REPORTS			
NEWSPAPER CLIPPINGS			
POSTERS			
SLIDES			
VIDEO			
AUDIO			
OTHER			

2.   Please identify the sources which provide you with information?

In-house material	❏	National Libraries	❏
International Libraries	❏	Agricultural agencies/societies	❏
University library	❏	CARDI Info. & Doc. Centre	❏

Other, please specify   ❑   _____

3.   How is the information you receive transmitted to you?

Mail	❑	Telephone	❑
Fax	❑	E-mail	❑
Other, please specify	❑	_____	

4.   In what forms do you currently receive information?

Print	❑	Diskettes	❑
Other, please specify	❑	_____	

5.   When received is the information processed?

YES   ❑   NO   ❑

If yes, please describe briefly.

_____

_____

6.   Is the information held organised and stored in any particular manner?

YES   ❑   NO   ❑

If yes, please describe briefly.

_____

_____

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7.   What is the information received used for?

Research support   ❏   Documentation support   ❏

Repackaging   ❏

Other, please specify   ❏   _____

8.   Do you use any special equipment in your unit?

        YES   ❏   NO   ❏

        If yes, please fill in the details in table 2.

Table 2

EQUIPMENT	TYPE	NUMBER	CAPACITY
Photocopier			
Computer(s)			
Printer			
Modem			
CD-ROM			
Other			

9.   If there are computers, please indicate in table 3 the name and versions of the software used.

Table 3

SOFTWARE	VERSION

198   *Continued on next page*

10.   What services do you currently receive from the Information and Documentation Centre at headquarters?

Current Awareness ☐   Question and Answer ☐

Bibliography preparation ☐   Literature searches ☐

Document Delivery ☐

Other, please specify ☐   _____

11.   How often do you receive information from the information and Documentation Centre at headquarters?

Weekly ☐   Biweekly ☐

Monthly ☐   Quarterly ☐

Occasionally ☐   Not at all ☐

12.   Are your present sources of information adequately meeting your needs for information?

YES ☐   NO ☐

If no, what suggestions can you make for improvements?

_____

_____

13.   What types of information would you like to receive on a regular basis?

Animal Production ☐   Cropping Systems ☐

Economic ☐   Extension ☐

Feeds and Feedstuffs ☐   Fertilizers ☐

Integrated Pest Management ☐   Marketing ☐

Post harvest ☐   Crop Production ☐

Statistical ☐   Storage ☐

Tissue Culture ☐   Weed Control ☐

Other, please specify ☐   _____

14.   What information needs do you perceive for the future given CARDI's new thrust?

_____

_____

_____

15.   Are there any other improvements you would like to see in the current information service provided?

_____

_____

_____

Thank you for your cooperation.

Sharon Premchand.

QUESTIONS USED IN INTERVIEWS WITH THE STAFF OF CARDI'S INFORMATION AND DOCUMENTATION CENTRE
- Mrs. S. Manjoo, Mrs. V. Taylor, Ms. L. Braithwaite and Ms. D. Reid

1.   Where is the information for your services accessed from?

2.   How is the information accessed? How long does this take?

3.   How is the information acquired once accessed? How long does this take?

4.   What methods are employed in the processing of information received?

5.   What percentage of the collection has been computerized?

6.   What percentage of the collection is still to be computerised and what plans have been made to have this accomplished?

7.   What services are currently provided to CARDI's country offices?

8.   What systems are in place to ensure that the services mentioned in question 7 are provided?

9.   What method is used to evaluate those services?

10.   What are the information resources of the Information and Documentation Centre, i.e. Journals, Monographs, Articles, CARDI documents, etc.?

11.   What methods are used to disseminate information from the information and Documentation Centre?

12.   Who are your main users? How are your users' needs identified? How are your users'satisfaction evaluated?

PUBLICATIONS PUBLISHED BY THE NATURAL RESOURCES INSTITUTES IN 1993-1994

Source: **Natural Resources Institute**. *Resource*. 1995, 7, p. 23.

NRI. *A guide to the UK Suppliers of equipment for Post-harvest horticultural crop management*.

P. Reupke and A. Duff. *Review of the activated carbon industry and scope for oil palm kernel shell as a raw material*.

E. A. Williams and A. P. Robinson. *Survey of equipment for small-scale motive power and electricity generation from wood and agricultural residues*.

M. Matthews, A. Kremer and J. Grunshaw. *Millet Pests of the Sahel*. Poster set.

W. D. Hawthorne. Forest regeneration after logging. *Findings of a study in the Bia South Game Protection Reserve, Ghana*. ODA Forestry Series No. 3.

J. J. Coppen and L. R. Dyer. *Eucalyptus and its leaf oils: An indexed bibliography*.

J. Falconer. *Non-timber forest products in Southern Ghana. Main Report*.

R. T. Paterson and N. J. L. Clinch. *Use of trees by livestock: Cassia*.

R. T. Paterson. *Use of trees by livestock: Quercus*.

R. T. Pennington. *The Commonwealth and Government of Guyana Iwokrama Rain Forest programme botanical studies. Phase 1 Site Resource Survey*.

CAB INTERNATIONAL'S MAJOR PROJECT FUNDING SOURCES

Source: **CAB International.** *CAB International at a Glance 1994/95.* p.2.

GOVERNMENT AND GOVERNMENT AGENCIES

Overseas Development Administration (ODA), UK

Canadian International Development Agency (CIDA)

United States Department of Agriculture (USDA)

National & Provincial Governments, Canada

Department of the Environment (DOE), UK

Swiss Development Cooperation (SDC)

Commonwealth Scientific & Industrial Research Organization (CSIRO), Australia

State Departments of Agriculture, USA

Australian Centre for International Agricultural Research (ACIAR)

Land Care Research New Zealand Ltd.

INTERNATIONAL AND MULTILATERAL AGENCIES

Asian Developement Bank (ADB)

World Health Organization (WHO)

Food and Agriculture Organization (FAO)

European Union (EU)

United Nations Environment Programme (UNEP)

CAB INTERNATIONAL'S HUMAN RESOURCES

Source: **CAB International.** *CAB International at a Glance 1994/95.* p.2.

LOCATION OF STAFF	NUMBER
Benin	1
Colombia	1
France	1
Kenya	22
Malaysia	13
Nigeria	1
Pakistan	26
Phillipines	8
Switzerland	17
Trinidad	7
United Kingdom	461
Number of staff worldwide	561
CORE STAFF BY FUNCTION	**NUMBER**
Management	33
Information Scientists	129
Research Scientists	102
Information Technologists	17
Librarians	4
Marketing	36
Administration & Technical Support	153

CAB INTERNATIONAL'S PRINTED INFORMATION PRODUCTS

Source: **CAB International.** *Information Products Catalogue 1995.* 28p.

* Source: **CAB International.** *Database News.* 1995, 23, p.3.

Abstract Journals

Abstracts on Hygiene and Communicable

Diseases

Apicultural Abstracts

AgBiotech News and Information

AgBiotech News & Reviews

Agricultural Engineering Abstracts

Agroforestry Abstracts

Animal Breeding Abstracts

Biodeterioration Abstracts

Biocontrol News and Information

Crop Physiology Abstracts

Current AIDS Literature *

Field Crop Abstracts

Forest Products Abstracts

Forestry Abstracts

Helminthological Abstracts

Helminthological Abstracts - Series A: Animal

and Human Helminthology

Helminthological Abstracts - Series B: Plant

Nematology

Grasslands and Forest Abstracts

Herbage Abstracts

Horticultural Abstracts

Index Veterinarius (12 month compilation)

Irrigation and Drainage Abstracts

Leisure, Recreation & Tourism Abstracts

Maize Abstracts

Nematological Abstracts

Nutrition Abstracts and Reviews - Series A:

Human and Experimental

Nutrition Abstracts and Reviews - Series B:

Livestock Feeds and Feeding

Ornamental Horticulture

Pig News and Information

Plant Breeding Abstracts

Plant Genetic Resources Abstracts

Postharvest News and Information

Plant Growth Regulator Abstracts

Potato Abstracts

Poultry Abstracts

Protozoological Abstracts

Review of Agricultural Entomology

Review of Applied Entomology - Series A:

Agricultural

Review of Applied Entomology - Series B:

Medical and Veterinary

Review of Aromatic and Medicinal Plants

Review of Medical and Veterinary Entomology

Review of Medical and Veterinary Mycology

Review of Plant Pathology

Rice Abstracts

Rural Development Abstracts

Seed Abstracts

Soils and Fertilizers

Sugar Industry Abstracts

Soyabean Abstracts

Tropical Diseases Bulletin *

Veterinary Bulletin

Weed Abstracts

Wheat, Barley & Triticale Abstracts

World Agricultural Economics and Rural
Sociology Abstracts

Annotated Bibliographies

Medicinal and Poisonous Plants - Plants with
Antimicrobial Properties Volume 1: Antiviral
and Antibacterial Properties
Medicinal and Poisonous Plants - Plants with
Antimicrobial Properties Volume 2: Antifungal
Properties
Medicinal and Poisonous Plants - Metabolite
Production *in vitro*
Medicinal and Poisonous Plants - Medicinal,
Essential Oil, Culinary Herb and Pesticidal
Plants of Labiatae : Parts one and two
Medicinal and Poisonous Plants - Plant
Poisoning Animals: A Bibliography from the
World Literature No.3, compiled by Michael R.
Hails
Human Health - Malaria Immunology: From
Antigen to Vaccine
Human Health - Opportunistic Infections in
AIDS
Rural Women: Women and Rural Development
in the Third World
Seed Pathology

Soil Fertility Research in East Africa

Primary Journals

Bulletin of Entomological Research

Journal of Helminthology

Meat Focus International

Outlook on Agriculture

Seed Science Research

Soil Use and Management

Taxonomic Guides/Looseleaf Products

Descriptions of Fungi and Bacteria

Distribution Maps of Plant Diseases

Distribution Maps of Pests

Systema Ascomycetum

Bibliography of Systematic Mycology

Index of Fungi

Index of Current Research on Pigs

Current Awareness Service

CAB PROFILES
CAB ALERTS

206

CAB INTERNATIONAL'S ELECTRONIC BIBLIOGRAPHIES

- E-Bibs-

annual compilations

Animal Disease Occurrence #

Cotton and Tropical Fibres #

Forest Resources Biodiversity

Intellectual Property Rights in

Biodiversity

Malaria Immunology: From Antigen to

Vaccine

Medicinal and Poisonous Plants -

Metabolite Production *in vitro*

Medicinal and Poisonous Plants -

Plants with Antimicrobial Properties

Volume 1:Antiviral and Antibacterial

Properties

Medicinal and Poisonous Plants -

Plants with Antimicrobial Properties

Volume 2:Antifungal Properties

Medicinal and Poisonous Plants -

Medicinal, Essential Oil, Culinary Herb

and Pesticidal Plants of Labiatae : Parts

one and two

Opportunistic Infections in AIDS

Organic Waste Composting

Plant Poisoning Animals

Rural Women: Women and Rural

Development in the Third World

Seed Pathology

Small Animals #

Socioeconomic Impacts of Resource

Conservation at Community Level

Soil Fertility Research in East Africa

Tropical Oilseeds #

Tubercolosis

SOME EXAMPLES OF CAB INTERNATIONAL'S
PUBLICATIONS

Source: **CAB International.** *Books Catalogue 1995.* 1995, 95p.

CAB International. *Information Products Catalogue 1995.* 1995, 28p.

Newsletters

AIDS Newsletter

CAB International News

Database News

Legionnaire's Disease Update

Public Health News

Serial Publications

Bibliography of Systematic Mycology

Descriptions of Pathogenic Fungi &

Bacteria

Distribution Maps of Plant Diseases

Distribution Maps of Pests

Index of Fungi

Index of Current Research on Pigs

Systema Ascomycetum

Books

Biotechnology and Integrated Pest

Management

Environmental Valuation: New

Perspectives

French-English Agricultural Dictionary

Progress in Agricultural Physics and

Engineering

The Tourism Industry: An International

Analysis

CARDI'S LINKAGES - AGLINET LIBRARIES

ARGENTINA

Universidad de Buenos Aires, Biblioteca Central, Facultad de Agronomia

BELGIUM

Faculte des Sciences Agronomiques de Gembloux, Bibliotheque Centrale

BRAZIL

Ministerio da Agricultura e Reforma Agraria, Coordenacao de Informacao e Documentacao

CANADA

Agriculture Canada, Canadian Agriculture Library

COLOMBIA

Centro Internacionalde Agricultura Tropical (CIAT), Library and Information Services

COSTA RICA

Centro Interamericano de Documentacion e Informacion Agricola (IICA-CIDIA), Biblioteca Commemorativa Orton

CZECHOSLOVAKIA

Institute of Agriculture and Food Information, Central Agricultural and Forestry Library

DENMARK

The Royal Veterinary and Agricultural University, Danish Veterinary and Agricultural Library

ESTONIA

Estonian Agricultural University, Library

FINLAND

University of Helsinki, Agricultural Library

FRANCE

Institut National de la Recherche Agronomique, Unite Centrale de Documentation

GERMANY

Zentralbibliothek der Landbauwissenschaft und Abteilungsbibliothek fur Naturwissenschaft und Vorklinische Medizin

Biologische Bundesanstalt fur Land-und Forstwirtschaft, Bibliothek

INDIA

International Crops Research Institute for Semi-Arid Tropics (ICRISAT), ICRISAT Library and Documentation Service

Indian Agricultural Research Institute, Library

INDONESIA

Agency for Agricultural Research and Development, National Library for Agricultural Sciences

ITALY

Food and Agriculture Organization of the United Nations, David Lubin Memorial Library

JAPAN

Japan Association of Agricultural Librarians and Documentalists, AGLINET Liaison Office c/o Library of Tokyo University of Agriculture

KENYA

Kenya Agricultural Research Institute, Muguga Library

KOREA

Academy of Agricultural Science of the DPR Korea, Library

LATVIA

Latvia University of Agriculture, Fundamental Library

MALAYSIA

Universiti Pertanian Malaysia, Library

MEXICO

International Maize and Wheat Improvement Centre (CIMMYT), Scientific Information Unit

NIGERIA

International Institute of Tropical Agriculture (IITA), Library and Documentation Centre

THE NETHERLANDS

Wageningen Agricultural University, Library

NORWAY

Agricultural University of Norway, Library

PHILLIPINES

University of Phillipines at Los Banos, Library

International Rice Research Institute (IRRI), Library and Documentation Centre

PORTUGAL

Instituto Superior de Agronomia, Biblioteca

SPAIN

Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria (INIA), Bibliotheca del Instituto Nacional de Investigacion Agraria

SWEDEN

Sveriges Lantbruksuniversitets bibliotek, Ultanabiblioteket

TRINIDAD & TOBAGO

The University of the West Indies, CAGRIS Regional Co-ordinating Centre, Library

Caribbean Agricultural Research and Development Institute (CARDI), Information and Documentation Centre

UNITED KINGDOM

Ministry of Agriculture, Fisheries & Food, Main Library

UNITED STATES OF AMERICA

United States Department of Agriculture, National Agricultural Library, Lending Branch

CARDI'S LINKAGES - CGIAR CENTRES

Asian Vegetable Research and Development Center (AVRDC)

Centro Internacional de Agricultura Tropical (CIAT)

Centro Internacional de la Papa (CIP)

Centro Internacional de Mejoramientoi de Maiz y Trigo (CIMMYT)

International Board of Plant Genetic Resources (IBPGR)

International Board of Soil Research and Management (IBSRAM)

International Centre for Agricultural Research in the Dry Areas (ICARDA)

International Centre for Integrated Mountain Development (ICIMOD)

International Centre of Insect Physiology and Ecology (ICIPE)

International Centre for Living Aquatic Resources Management (ICLARM)

International Council for Research in Agroforestry (ICRAF)

International Crops Research Institute for Semi-Arid Tropics (ICRISAT)

International Fertilizer Development Center (IFDC)

International Food Policy Research Institute (IFPRI)

International Institute of Tropical Agriculture (IITA)

International Laboratory for Research on Animal Diseases (ILRAD)

International Livestock Center for Africa (ILCA)

International Rice Research Institute (IRRI)

International Service for National Agricultural Research (ISNAR)

West Africa Rice Development Association (WARDA)

CARDI'S LINKAGES - OTHER LINKAGES

NATIONAL LINKAGES (Trinidad and Tobago)

Agricultural Development Bank (ADB)

Caribbean Industrial Research Institute (CARIRI)

CARONI Limited

Central Experiment Station Library, Ministry of Agriculture of Trinidad and Tobago

Faculty of Agriculture, University of the West Indies (U.W.I.)

Inter-American Institute for Cooperation on Agriculture (IICA)

Main Library, University of the West Indies, St. Augustine

Medical Science Library, Eric Williams Medical Science Complex, Mt. Hope

Ministry of Agriculture of Trinidad and Tobago

National Institute for Higher Education and Research in Science and Technology (NIHERST)

National Marketing and Development Company (NAMDEVCO)

Sugar Cane Feed Centre

United Nations Economic Commissin for Latin America and the Caribbean (UNECLAC)

United Nations Food and Agriculture Organization (UNFAO)

REGIONAL LINKAGES

CARICOM Secretariat, Guyana

Caribbean Development Bank (CDB), Barbados

Ministries of Agriculture of all (Caribbean Community) CARICOM countries

National Agriculture Research Institute (NARI), Guyana

Organization of Eastern Caribbean States (OECS), St. Lucia

University of Guyana

University of Surinam

Windward Islands Banana Growers'Association (WINBAN), St. Lucia

INTERNATIONAL LINKAGES

Agriculture and Rural Development Department, World Bank, Washington, U.S.A.

Centre for Agriculture and Biosciences International (CABI), United Kingdom

Commonwealth Science Council (CSC), United Kingdom

Consultative Group on International Agricultural Research (CGIAR) Centres **

Department of Agriculture and Livestock, Papua New Guinea

Mauritius Sugar Authority, Mauritus

Mauritius Sugar Industry Research Institute (MSIRI), Mauritius

Natural Resources Institute (NRI), United Kingdom

Sonoma State University, California, United States of America

Technical Centre for Agricultural and Rural Cooperation (CTA), The Netherlands

United Nations Food and Agriculture Organization (UNFAO), Rome

University of Swaziland

World Network of Agricultural Libraries (AGLINET) *

**   see appendix XXVII

*   see appendix XIX

LIST OF JOURNALS ACCESSED BY CARDI'S INFORMATION AND DOCUMENTATION CENTRE

ACTA Horticulturae

Advances in Agronomy

Advances in Veterinary Science and Comparative Medicine

Agricultural Economics Research

Agricultural Engineering

Agricultural Experimental Station Circular of the University of Florida

Agricultural Mechanization in Asia, Africa and Latin America

Agricultural Systems

Agriculture International

Agronomy Journal

American Journal of Agricultural Economics

Animal Feed Science and Technology

Animal Production

Annals of Applied Biology

Annual Review of Entomology

Annual Review of Phytopathology

Annual Review of Plant Physiology

Australian Journal of Agricultural Research

Australian Journal of Animal Nutrition

Australian Journal of Animal Production

Australian Journal of Biotechnology

Australian Journal of Experimental Agriculture

Australian Journal of Soil Research

Australian Veterinary Journal

Biological Agriculture and Horticulture

Biometrics

Biometrika

Biotechnology

British Journal of Nutrition

British Poultry Science

Bulletin of Entomological Research

California Agriculture

Canadian Entomologist

Canadian Journal of Agricultural Economics

Canadian Journal of Animal Science

Canadian Journal of Soil Science

Citrus and Sub-Tropical Fruit Journal

Cornell Veterinarian

Crop Science

Cuban Journal of Agricultural Science

Dairy Farmer

Developing Economies

East African Agricultural and Forestry Journal

Economic Botany

Entomophaga

Environmental Entomology

Experimental Agriculture

Experimental Horticulture

Farming Systems Research and Extension Journal

Fertilizer Technology

Field Crops Research

Fiji Agricultural Journal

Florida Entomologist

Fresh Produce Journal

Fruits

Geoderma

Grass Forage Science

Harvard Business Review

Hawaiian Planters Record

Hortscience

Indian Journal of Agricultural Economics

Indian Journal of Agricultural Science

Indian Journal of Agronomy

Indian Journal of Animal Science

Indian Journal of Horticulture

Indian Journal of Nematology

Insect Science and its Applications

International Journal of Tropical Agriculture

International Sugar Journal

JARQ (Japanese Agricultural Research Quarterly)

Journal of Agricultural Economics

Journal of Agricultural Economic Research

Journal of Agricultural Research of China

Journal of Agricultural Science

Journal of Agriculture and Food Science

Journal of Agriculture of the University of Puerto Rico

Journal of Animal Physiology and Animal Nutrition

Journal of Animal Science

Journal of Applied Entomology

Journal of Dairy Science

Journal of Development Studies

Journal of Economic Entomology

Journal of Environmental Biology

Journal of Environmental Quality

Journal of Experimental Botany

Journal of Horticultural Science

Journal of Indian Society of Soil Science

Journal of International Development

Journal of International Food and Agribusiness Marketing

Journal of Invertebrate Pathology

Journal of Nematology

Journal of Plant Nutrition

Journal of Production Agriculture

Journal of Soil Science

Journal of the Agricultural Society of Trinidad and Tobago

Journal of the Amercan Society for Horticultural Science

Journal of the American Statistical Association

Journal of the American Veterinary Medical Association

Journal of the Australian Institute of Agricultural Science

Journal of the Japanese Society for Horticultural Science

Journal of the Science of Food and Agriculture

Journal of the Scientific and Technical Communicators

Journal of the Society of Dairy Technology

Livestock Production Science

Livestock Research for Rural Development

Management Today

MARDI Research Bulletin

Mycologia

Nematologia

Nematropica

Netherlands Journal of Agricultural Sciences

Netherlands Journal of Plant Pathology

New Zealand Journal of Agricultural Research

New Zealand Journal of Experimental Agriculture

Outlook on Agriculture

Parasitology

Pest Management News

Pesticide Science

Pflanzenzurchtung (Plant Breeding)

Phillipine Agriculturist

Phillipine Journal of Crop Science

Physiologia Plantarum

Phytopathology

Planta

Plant and Soil

Plant Cell Reports

Plant Cell, Tissue and Organ Culture

Plant Disease

Plant Disease Reporter

Plant Pathology

Plant Physiology

Potash Review

Poultry Science

Proceedings of the Florida State Horticultural Society

Proceedings of the Inter-American Society for Tropical Agriculture

Proceedings of the Soil and Crop Science Society of America

Punjab Horticultural Journal

Queensland Journal of Agricultural and Animal Sciences

Review of Phytopathology

Rural Research

Rural Sociology

Scientia Horticulturae

Seed Science and Technology

Soil Biology and Biotechnology

Soil Conservation

Soil and Tillage Research

Soil Science and Plant Nutrition

Soil Science

Soil Science Society of America Journal

Soil Use Management

South Indian Horticulture

SPAN

The Statistician

Transactions of the ASAE

Transactions of the British Mycological Society

Tropical Agriculture

Tropical Animal Health and Production

Tropical Animal Production

Tropical Grasslands

Tropical Pest Management

Turrialba

Veterinary Journal

Veterinary Record

Weed Research

Weed Science

World Animal Review

World Crops

World Review of Animal Production

Zimbabwe Agricultural Journal

LIST OF AGRICULTURE SUBJECT AREAS AS SPECIFIED BY CARDI'S USERS

BIOMETRICS

Biometry/Biometrics

Experimental Design and Analysis

BIOTECHNOLOGY

Animal Breeding

Germplasm Information

Plant Breeding

Plant Genetic Resources

Selection

Tissue Culture

CROP PRODUCTION

Aloe Vera

Avocado

Banana

Botanical Studies

Cantaloupe

Cassava

Citrus

Cocoa

Coffee

Cowpea

Dasheen

Eddoe

Exotic Fruits

Fertilizers

Fruit Horticulture

Fruit Ripening

Garlic

Ginger

Hot Pepper

Insecticides

Legumes

Maize

Mango

Maturity Indices

Mung Bean

Nutmeg

Onions

Passion Fruit

Pawpaw

Peanut

Permaculture

Pesticide Application

Pesticide Technology

Pesticide Use

Pesticides

Pigeon Pea

Plantain

Plant Physiology

Rice

Seed Germination

Seed Testing

Seed Production

Seed Technology

Sesame

Sorghum

Soursop

Soybean

Tree Crops

Tuber Crops

Tumeric

Vegetable Production

Weed Management

Weed Control

White Potato

Yams

ECONOMICS

Agribusiness Management

Agricultural Price Analysis

Agricultural Trade

Agricultural Marketing

Agricultural Statistics

Agricultural Development

Cost of Production

Farm Management

Farm Planning and Budgeting

GATT

Market Information

Marketing

NAFTA

Policy Analysis

Programme Management

Project Management

Research Management

Structural Adjustment

Trade Policies

Trade Liberalisation

ENVIRONMENTAL MANAGEMENT

Agroecology

Eco-farming

Environmental Contamination

Organic Farming

Pesticides and the Environment

EXTENSION AND COMMUNICATIONS

Communications

Extension

Extension Methodology

Farm Management

Publication Design and Layout

Research-Extension Linkage

Technology Transfer

Technology Validation

FARMING SYSTEMS

Cropping Systems

Intercropping

Livestock Systems

Farming Systems

Low Input Agriculture

Tropical Production Systems

Use of Farm Labour

FORESTRY

Agroforestry

Forestry

LIVESTOCK PRODUCTION

Animal Production

Animal Nutrition

Animal Husbandry

Animal Production Systems

Animal Breeding

Beef

Blackbelly Sheep

Dairy Development

Dairy

Elephant Grass

Feeds and Feedstuff

Forage Legumes

Forages

Forage Agronomy

Forage Agronomy

Forage Management

Goats

Grazing Systems

Livestock Management

Milk Production

Pastures

Pigs

Poultry

Ruminant Nutrition

Sheep

ORNAMENTAL HORTICULTURE

Anthurium

Heliconia

Orchids

Ornamental Horticulture

PATHOLOGY AND ENTOMOLOGY

Anthracnose

Biological Control

Colletotrichum

Crop Protection

Disease Indexing

Disease Control

Entomology

Epidemiology

Integrated Pest Management

Nematology

Pest Control

Plant Protection

Plant Diseases

Plant Pathology

Virus Indexing

Yam Anthracnose

POSTHARVEST AND EXPORT

Export of Fruits and Vegetables

Grading

Postharvest Technology

Postharvest Handling

Storage

Packaging

SOCIAL AND GENDER ISSUES

Gender and Development

Rural Development

Social Gender Issues

Sustainable Development

Women in Agriculture

SOIL AND WATER

Irrigation and Conservation

Irrigation Technology

Soil Amendments

Soil Conservation

Soil Erosion

Soil Fertility

Soils

Water Management

Watershed Management

CARDI'S TECHNOLOGY INFORMATION DATABASE (TID)

designed by

SHARON PREMCHAND

The information gathered was of three main types: bibliographic, numeric and textual. These types of information had to be ordered, made easily accessible and linked. Additionally, the computer program used for this database had to be user friendly and compatible with CARDI's proposed information system. Discussions were held with the Information Resource Manager and it was agreed that FileMaker Pro would be a suitable database management package.

Three files have been created within TID to store the information relevant to the commodities. They are: **Code.fm, Biblio.fm, Status.fm** and **Techpack.fm**. The field descriptions and sample records from each of the files are attached.

CODE.FM

There was a need to introduce a COMMODITY NUMBER field to allow for referencing the three files. This number is included in the file CODE.FM for all the commodities.The following commodity codes have been assigned:

ANTHURIUM	**CA001**		**PEANUT**	**CA007**
ORCHID	**CA002**		**COWPEA**	**CA008**
HELICONIA	**CA003**		**HOT PEPPER**	**CA009**
SHEEP	**CA004**		**TANNIA**	**CA010**
GOAT	**CA005**		**PINEAPPLE**	**CA011**
YAM	**CA006**			

FIELD DEFINITIONS

Field Name	Field Type	Formula / Entry Option
Commodity	Text	
Commodity Code	Text	

SAMPLE RECORD

TECHNOLOGY INFORMATION DATABASE

COMMODITY CODES

Commodity Code   CA001

Commodity   ANTHURIUM

BIBLIO.FM

In order for the information within the TIFS to be accessible and properly documented, a complete bibliography of the documents used was prepared.

FIELD DEFINITIONS

Field Name	Field Type	Formula / Entry Option
Author	Text	
Collation	Text	
Commodity No.	Text	Repeating field with 2 repetitions.
Date of Publication	Text	
Keywords	Text	
Location	Text	
Notes	Text	
Place of Publication	Text	
Publisher	Text	
Record Number	Number	
Source	Text	
Title	Text	

TECHNOLOGY INFORMATION DATABASE
BIBLIOGRAPHY

110

Commodity No.	CA001
Title	**Commercial Anthurium Production.**
Author	CHANDLER, FRANCES.
Date of Publication	1991.
Publisher	C.A.R.D.I.
Place of Publication	St. Augustine, Trinidad and Tobago:
Collation	7p.
Source	
Location	
Keywords	ANTHURIUMS, CULTIVARS
Notes	CARDI Fact sheet, whole document found

STATUS.FM

The status of research is a subfile of TID. The data would be stored in the following format:

Field Name	Type of Data to be Stored
Record Number	a number for each record created on the basis of the categories of the commodities analysed
Date Entered	date of entry of original record
Date Updated	date when record was last updated
Commodity Number	assigned commodity number
Country	country or countries where research was done
Category	aspect of commodity which is being monitored
Status	present state of research
Purpose	reasons why this category of the commodity was researched
Technology Developed	the technologies (for example: systems, cultivars, breeds) generated, tested and validated - by CARDI, in the region and internationally that is related to the category of the particular commodity
Next Steps	ongoing and future research activities related to the category of the particular commodity
Constraints	Problems that have been documented and voiced with respect to the category of the particular commodity

FIELD DEFINITIONS

Field Name	Field Type	Formula / Entry Option
Status	Text	
Category	Text	
Commodity	Text	Lookup: "Commodity" in "CODE.FM" when "Commodity No." matches "Commodity Code" If no match: "Don't Copy"
Commodity No.	Text	
Constraints	Text	
Country	Text	Repeating field with 4 repetitions.
Date entered	Text	
Date updated	Text	
Next Steps	Text	
Purpose	Text	
Record Number	Number	
Technology Developed	Text	

SAMPLE RECORD

TECHNOLOGY INFORMATION DATABASE

TECHNOLOGY STATUS

1

ANTHURIUM

Date entered | 95 - 07 - 28 | **Date updated** | 95 - 07 - 28 |

Commodity No. | CA001 |

Country | Barbados |

Category

In - vitro propagation

225

Status

Techniques proven and in use at - station
- seed (breeding mainly)
- vegetative
- plant tissue, micro - propagation, in vitro

Purpose

To produce healthy planting material rapidly

Technology Developed

Propagation techniques

Next Steps

Further research to optimise in vitro propagation for all varieties
Transfer of micropropagation technology to other laboratories
Distribution of novel varieties and on farm validation

Constraints

For station
- lack funds
  Generally
- linkages to market for novel varieties

The following are the categories which were assigned to STATUS.FM in the Category Field for each of the eleven commodities:

ANTHURIUMS

Control of Diseases
Economic Assessment
Fertilization Practices
Growing Conditions
Harvesting
In vitro Propagation
Infrastructure
Mulching
Pest Control
Post harvest and Marketing
Propagation
Pruning
Soil Conservation
Spacing/Number of Suckers
Weed Control

ORCHIDS

Fertilization Practices
Growing
Harvesting
In vitro Propagation
Pest and Disease Control
Post harvest and Marketing
Propagation (by Conventional Methods)
Soil Conservation
Spacing

HELICONIAS

Fertilization Practices
Growing
Harvesting

In vitro propagation
Pest and Disease Control
Post harvest and Marketing
Propagation (by Conventional Methods)
Soil Conservation
Spacing

YAMS

Appropriate Technology for Harvesting
Develop Anthracnose Tolerant Dioscoreae alata cultivar
Disease Control
Expand range of cultivars and of products to enhance year-round availability
Extending Shelf/Storage Life
Fertilizer Treatments
Mechanization
Minisett Multiplication System
Nematode Control
Soil Conservation
Staking Plants
Weed Control
Yam Intercropping

PEANUTS

Crop Protection
Fertilizer
Land Preparation
Mechanization
Post Harvest/Marketing/Processing
Selection of Varieties/Cultivars

Soil Erosion Management

Soil Management/Adaptability

Spacing

Weed Control

TANNIA

Accession and Characterization of tannia Cultivars

Management of Pythium Root Rot Complex

Providing Disease-free, vigorous planting material

Soil/ Plant Nutrient Studies

Soil Conservation

Tannia Inter-cropping

Weed Control

PINEAPPLES

Crown size Control

Disease Control

Fertilizer Treatment

Flower Induction

Future Prospects

Harvesting

Identification of Commercial Varieties

In vitro Production of Planting Material

Irrigation

Marketing

Pest Control

Post Harvest

Propagation by Conventional Methods

Soil Conservation

Time of Planting

Trace Element Treatment

Weed Control

COWPEA

Agronomic Practices

Crop Protection

Economics

Marketing

Mechanization

Post Harvest

Selection of Varieties

Soil Erosion Management

Soil Management

HOT PEPPERS

Accession, Development of west Indian Hot Pepper

Economics

Fertilization Practices

Fungal Diseases

Harvesting

Land Preparation

Marketing

Pests

Post Harvest Technology

Seedling Production

Soil Conservation

Viral Diseases

Water Management

Weed Control

SHEEP

Cut and Carry Feeding Systems

Economics

Forage Production

Health Care

Housing

Identification and Recording

Marketing

Nutrition

Processing

Production

Selection of Breeds of Goats

Storage

GOATS

Cut and Carry Feeding Systems

Economics

Forage Production

Health Care

Housing

Identification and Recording

Marketing

Nutrition

Processing

Production

Selection of Breeds of Hair Sheep

Storage

TECKPACK.FM

This file will be used for the production of technology packages and includes fields relating to various aspects of production of the eleven commodities. Discussions were held with the Communications Unit in defining the areas where information for the production of the technology packages will be required. Data will be stored in the following format:

Field Name	Type of Data to be Stored
Record Number	A number for each record created on the basis of commodity
Commodity Number	Assigned commodity number
Tech Pack Number	Assigned Tech Pack Number eg. CATP001 CARDI Tech Pack on Anthurium
Market Analysis	Information relating to the present market situation and includes a review of the market that aims to indicate the potential for production of a particular commodity
Site Selection	The optimal or ideal physical conditions necessary for production of a particular commodity
Breeding	Propagation methods, Selection, Breeds, Cultivars
Economics	Cost of production, Processing costs, Profit margin
Crop Management	A description of the agronomic practices related to the production of the commodity
Integrated Pest Management	A review of the options available for controlling pests and diseases and information related to developing combined strategies

Field Name	Type of Data to be Stored
Post Harvest Management	Information relating to suitable transportation methods, optimal atmospheric conditions for storage, adequate facilities and export
Livestock Management	General information on livestock production, farm records
Housing	Suitable methods for structural design for commodity production
Feed Production	Information relating to pastures, forages and appropriate methods for preparing concentrate and feed mixtures
Nutrition	The levels of supplements and feed required the production of healthy livestock
Health Care	Practices employed to control pests and diseases in livestock
Systems	Systems employed in the production of the commodity
Processing	Processing methods available
Environmental Impact	Environmental management methods that must be considered when producing commodity
Marketing Strategy	Procedures aimed at targeting the customer; demand and supply; market channels; market information
Extension	The availability of extension services; guides; training
Socio economic Aspects	Impact on the economy

FIELD DEFINITIONS

Field Name	Field Type	Formula / Entry Option
Breeding	Text	
Commodity	Text	Lookup: "Commodity" in "CODE.FM" when "Commodity No." matches "Commodity Code" If no match: "Don't Copy"
Commodity No.	Text	
Crop Management	Text	
Date entered	Text	
Date updated	Text	
Economics	Text	
Environmental Impact	Text	
Extension	Text	
Feed Production	Text	
Health Care	Text	
Housing	Text	
Integrated Pest Management	Text	
Livestock Management	Text	
Market Analysis	Text	
Marketing Strategy	Text	
Nutrition	Text	
Post Harvest Management	Text	
Processing	Text	
Record Number	Number	
Site Selection	Text	
Socio economic aspects	Text	
Systems	Text	
Tech Pack No.	Text	

TECHNOLOGY INFORMATION DATABASE
TECHNOLOGY PACKAGE

| 1 |

ANTHURIUM

Commodity No. | CA001 | **Tech Pack No.** | CATP001 |

Market Analysis

In a survey done in 1990 by a CARDI team comprising Dr. Janice Bateson, Avis Chaitan, Ms. Frances Chandler, Dr. David Constantine and Ms. Ena Harvey, it was concluded that there were inadequate volumes of exportable blooms and a high cost of production.

Site Selection

A site should be selected that meets the following requirements:
1. Adequate rainfall (60 inches per year minimum).
2. Temperature ideal for anthurium production, 15 degrees (day) 35 degrees (night).
   Site preparation
   Growing medium
   Planting material - highest production
   Spacing
   Irrigation Systems
   Fertilization

Breeding

Propagation methods :
   Seed.
   Conventional vegetative propagation.
   Plant tissue culture.
   Micropropagation.
CULTIVARS:
   Dutch
   Annike 141
   Cuba
   Chaudia 108
   Lydia 420
   Hawaiian Cutivars:
      Ozaki
      Kaumana
      Kansako

   Nitta
   DeWeese
   Marian Seefurth
   Obake Types
Other Cultivars:
   Novelty Types

Economics

Costing Proposal for one acre of Anthuriums - Feb.1992

Land preparation	$2000
Labour requirements	431 Man days
Wages (present)	$42.11
Planting	$632 (15 Man days)
Spraying	$585 (12 Man days)
Fertilizers	$1500
Harvesting	$1150 (year 1)
	$5600 (year 2)
	$10160 (year 3)
Packing material	
Boxes	$1066 (year 1)
	$5333 (year 2)
	$9600 (year 3)
Plants total costs	$32000
Shade house (total cost)	$ 51870. 52
Pruning Equipment	$ 150
Mistblower	$1500
Irrigation system	$9000
Total Project Costs	$111731
Profit	$77580 (year 2)
End of year 5	$210950

Crop Management

Weeding - Whether necessary or if it is economical
Fertilisation - Time, amount and ratio of NPK
Pest control - Techniques employed
Disease control - Quarantine, chemical etc.
Pruning techniques if required

Integrated Pest Management

Looking at all different options available for controlling pests and developing a combined strategy

Post Harvest Management

Best suited transportation methods
Optimal temperature for preservation of the blooms
Suitable facilities to packageand export

Livestock Management

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Housing

The design of the shadehouse i.e. What % of saranetting is required for the different stages of the plant

Feed Production

Nutrition

Health Care

Systems

Intensive, Monocropping system

Processing

Environmental Impact

Ensure that chemicals do not flow into main watercourse
Dispose of all pesticide bottles andcans by burying
Store chemicals in a place far from eating or working area

Marketing Strategy

Competitive prices
Attractive packaging

Extension   Socio economic aspects

Extension methods-
-factsheet
-Government Extension officers
-Private Extension office

Date entered   95-07-21   **Date updated**

Glossary

GLOSSARY OF SELECTED TERMS AND ABBREVIATIONS

AACR2	Anglo-American Cataloguing Rules, Second Edition.
AFLATOXIN	Database on groundnut developed by the International Crops Research Institute for Semi-Arid Tropics (ICRISAT).
AGCHKE	An input checking program for checking AGRIS input records for correctness of AGROVOC terms, subject categories, type of record, literary indicators etc. in a batch mode.
AgECONCD	A CD-ROM database of information on agricultural economics and rural development that is part of CAB International's CAB SPECTRUM series.
AGLINET	World Network of Agricultural Libraries whose members comprise of approx. 40 libraries whose subject area is agriculture.
AGRICOLA	The US Department of Agriculture National Agriculture Library database of worldwide journal and monographic literature on agriculture and related subjects such as animal studies, botany, chemistry, entomology, fertilizers, forestry, hydroponics, soils and much more. Period of coverage: 1970-1995. It is available in CD-ROM and online formats.
AGRIN	A microcomputer package based on UNESCO's CDS/ISIS that was developed by FAO.
AGRIS	International Information System for the Agricultural Sciences and Technology.
AGRIS	The Food and Agriculture Organization (FAO) agriculture database which covers worldwide agricultural literature that reflects research results, food production and rural development. Period of coverage: 1975-1995.
AGRISEARCH	The database of agriculture, food and nutrition research projects in developing countries (1994 edition). Information from *CRIS/ICAR* (US and Canada), *ARRIP* (Australia), *SPAAR* (World Bank) and *AGREP* (European Union).
AGROVOC Thesaurus	An agricultural thesaurus developed by FAO as an indexing and retrieval tool.
Ariel	An electronic document delivery system that transmits scanned text and images via the Internet. It was developed by The Research Libraries Group Inc.

BEASTCD	A CD-ROM database of information on animal production and dairy technology that is part of CAB International's CAB SPECTRUM series.
BIBLIO	A CDS/ISIS database that is a bibliography template. It was created by CARDI's Information and Documentation Centre.
BioNET International	A biosystematic network for which CAB International is the Technical Secretariat. There are several other regional components, such as, CARINET in the Caribbean.
BIOSIS Previews	This database contains citations from Biological Abstracts, Biological Abstracts/Reports, reviews and Meetings and BioResearch Index which are the major publications of BIOSIS. It is the major English-language service covering worldwide research in the biological and biomedical sciences. Period of coverage: 1969-1995.
CAB	Commonwealth Agricultural Bureaux which is now CAB International.
CAB ABSTRACTS	CAB International's agriculture database. Period of coverage: 1973-1995. It is available in print, CD-ROM, floppy disk, magnetic tape and online formats.
CAB ACCESS	A weekly agriculture current awareness service which is provided by CAB International in floppy disk format.
CAB ALERTS	A monthly agricultural current awareness service which is provided by CAB International in print or floppy disk format.
CAB COLLECTION	CAB International's subject-specific CD-ROM databases on human nutrition, pollution and toxicology.
CABI	Centre for Agriculture and Biosciences (CAB) International.
CABIKEY	Computer Aided Biological Identification Key, an interactive taxonomic identification software produced by CAB International.
CAB HEALTH	CAB International's database of information on public health and diseases. It is available in print, CD-ROM, floppy disk and online formats.
CABPEST CD	The CAB International's database on crop protection that is part of the CAB SPECTRUM series.
CAB PROFILES	A personalized agriculture current awareness service which is provided by CAB International in print or floppy disk format.
CA Search	This database contains the bibliographic information from the printed Chemical Abstracts and covers literature on chemistry and its applications. Period of coverage: 1967-1995.
CAB SPECTRUM	CAB International's subject-specific agricultural CD-ROM databases.

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CAGRIS	The Caribbean Agricultural Research Information System which is the regional component of AGRIS. It has a database of literature on Caribbean agriculture.
CAIRS	Computer Assisted Information Retrieval System.
CAMIS	Caribbean Agricultural Marketing Information System.
CAN/OLE	Canada Institute for Scientific and Technical Information, an online host located in Canada.
CARAPHIN	Caribbean Animal and Plant Health Information Network which is coordinated by IICA.
CARDI	Caribbean Agricultural Research and Development Institute.
CARDI Collection	A collection of research, extension and administrative documents which have been produced by CARDI.
CARDILS	CARDI Literature Service.
CARICOM	Caribbean Community.
CARINET	Caribbean LOOP (Local Organised and Operated Network) of BioNET.
CARIS	Current Agricultural Research Information System coordinated by FAO.
CARIS Caribbean	The regional component of CARIS which has literature on current agricultural research projects in the Caribbean.
CARTIS	Caribbean Agricultural Technology Information Service.
CATIS	Caribbean Agricultural Technology Information Service.
CDCC	Caribbean Development and Coordination Committee.
CD-ROM	compact disc read only memory.
CDS/ISIS	Computerized Documentation System/Integrated Set of Information Systems - a database management system for general information storage and retrieval that was developed by UNESCO.
CFC	Caribbean Food Cooperation.
CGIAR	Consultative Group on International Agricultural Research.
CIARL-BRS	Compact International Agricultural Research Library Basic Retrospective Set - a full text agriculture database on CD-ROM is produced by CGIAR.
CIAT	Centro Internacional de Agricultura Tropical.
CIDC	CARDI Information and Documentation Centre.
CIDLIS	A CDS/ISIS database created by CARDI's Information and Documentation Centre for recording literature searches conducted.

Client/Server	A computing architecture which makes computer resources shareable.
COPR	Centre for Overseas Pest Research.
CPPC	Caribbean Animal and Plant Protection Commission database with information on plant and animal protection and quarantine.
CROPCD	CAB International's CD-ROM database on field crops and grasslands that is part of the CAB SPECTRUM series.
CTA	Technical Centre for Agricultural and Rural Cooperation .
DATA-STAR DIALOG	An online host located in the United Kingdom.
DIALOG	An online host located in the USA.
DIMDI	Deutsches Institut für Medizinische Dokumentation und Information, an online host located in Germany.
DOCUMENTS NOW	A copyright-cleared document delivery service provided by CAB International.
E-Bibs	CAB International's printed annotated bibliographies on floppy disk.
E-CD	CAB International's CD-ROM database on environmental degradation, amelioration and conservation which is part of the CAB SPECTRUM series.
ECLAC/AMBIONET	The Caribbean node for the United Nations Environment Programme Information Exchange System (UNEPNET).
E-Journals	CAB International's printed abstracts on floppy disk.
E-Mail	electronic mail.
EMBASE	Formerly *Excerpta Medica*, this database consists of abstracts and citations to biomedical and pharmacological journals published throughout the world. It is renowned for its coverage on drug-related literature. Period of coverage: 1974 -1995.
ERL	Electronic Reference Library.
ESA-IRS	European Space Agency Information Retrieval Service, an online host located in Italy.
FANGORN	A computer programme developed by PUDOC for the conversion of machine readable information that are in text format for reading into a CDS/ISIS database e.g. CD-ROM database to CDS/ISIS database.
FAO	Food and Agriculture Organization.
FSTA	The International Food Information Service (IFIS) database on food science and technology (1969-1995).

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HORTCD	CAB International's CD-ROM database on horticulture and plantation crops which is part of the CAB SPECTRUM series.
hub-and-spoke	An information network model consisting of a centralised structure with satellite nodes.
HUMAN NUTRITION	CAB International's database which covers all aspects of human nutrition and diet and has relevant information produced by the International Food Information Service (IFIS), the US National Library of Medicine (NLM) and the Life Sciences Collection from Cambridge Scientific Abstracts. It is part of the CAB Collection.
IAALD	International Association of Agricultural Information Specialists.
IDRC	International Development and Research Centre.
IIBC	International Institute of Biological Control.
IICA	Inter-American Institute for Cooperation on Agriculture.
IIE	International Institute of Entomology.
IIP	International Institute of Parasitology.
IMI	International Institute of Mycology.
INFONET	The information network of the Organization of Eastern Caribbean States (OECS).
ISBN	International Standard Book Number.
ISSN	International Standard Serial Number.
IT	information technology.
LAN	local area network.
LIFE SCIENCES COLLECTION	A database which contains abstracts of literature in the fields of animal behaviour, biochemistry, ecology, endocrinology, entomology, among others. The sources are journal articles, books, conference proceedings and reports.. Period of coverage: 1978-1995
linkage	Information links with other organizations.
Log Frame	A method used for the development of operational plans of an organization.
LRDC	Land Resources Development Centre.
MAIL	A CDS/ISIS database created by CARDI's Information and Documentation Centre for recording the addresses of CARDI's information and research linkages.

MEDLINE	A database of biomedical literature that corresponds to three print indexes: Index Medicus, Index to Medical Literature, and International Nursing Index. Period of coverage: 1966-1995.
NGO	Non-Governmental Organization.
NRI	Natural Resources Institute.
ODNRI	Overseas Development Administration Natural Resources Institute.
OECS	Organization of Eastern Caribbean States.
ORDER	A CDS/ISIS database created by CARDI's Information and Documentation Centre for recording orders of publications.
PARASITE-CD	CAB International's CD-ROM database on biology and control of parasites and vector-borne diseases which is part of the CAB SPECTRUM series.
PlantGeneCD	CAB International's CD-ROM database on plant breeding, biotechnology and genetic resources which is part of the CAB SPECTRUM series.
PolToxIII:CAB	A CAB International CD-ROM database which has information from the *CAB ABSTRACTS* database on pollution, environmental chemicals, environmental impact on farming, health hazards of pesticides and drugs, and toxicology. It is part of the CAB COLLECTION.
PROCICARIBE	A cooperative programme of agricultural research and technology in the Caribbean.
PROFIL	A CDS/ISIS database created by CARDI's Information and Documentation Centre for recording the interest profiles of CARDI researchers.
RRRN	Regional Rural Radio Network.
S.D.I.	Selective dissemination of information.
SESAME	A CD-ROM database of agricultural literature in French and English and is produced by Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement (CIRAD), France.
SOILCD	CAB International's CD-ROM database on soils, fertilizers and land management which is part of the CAB SPECTRUM series.
STN International	An online host located in the USA.
technology package	A set of guides to the production and marketing of agricultural commodities.
TID	Technology Information Database.
TIFS	Technology Information Files.
TPI	Tropical Products Institute.

TRADIS	Tropical Resources for Agriculture Development Information System - one of the databases of the Natural Resources Institute.
TRAIS	Tropical Agriculture Information Service - one of the databases of the Natural Resources Institute.
TREECD	CAB International's CD-ROM database on forestry, forest products, agroforestry which is part of the CAB SPECTRUM series.
TROPAG & RURAL	The Royal Tropical Institute of the Netherlands (KIT) Abstracts on Tropical Agriculture and Abstracts on Rural Development database (1975-1995).
U.W.I.	University of the West Indies.
UAT	Unified Agricultural Thesaurus.
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean.
UNESCO	United Nations Educational, Scientific and Cultural Organization.
URBADISC	The London Research Centre database on urban regional planning and policy issues from various European information sources (1994 edition).
VETCD	CAB International's CD-ROM database on veterinary medicine which is part of the CAB SPECTRUM series.

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