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**INFORMATION REQUIREMENTS FOR THE
MINISTRY OF AGRICULTURE'S
FIVE YEAR PLAN**

Agricultural Planning Project
Contract No. LAC-0061-C-00-1003-00
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Submitted to

Mr. Clarence Franklin
Permanent Secretary
Ministry of Agriculture
Hope Gardens, Kingston 6
Jamaica

Submitted by

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June 20, 1984



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June 20, 1984

Mr. Clarence Franklin
Permanent Secretary
Ministry of Agriculture
Hope Gardens, Kingston 6
Jamaica

Dear Mr. Franklin:

I certainly enjoyed the chance to visit with you last month, May 22, 1984, and our subsequent exchange of views on the information requirements of the Ministry and the effective management of its data/information resources to satisfy those requirements. My only regret is that we couldn't get together again to continue our discussion before I left Jamaica.

Enclosed herewith is my report on the "Information Requirements of the Five-Year Plan of the Ministry of Agriculture." In the process of preparing this report, I met with and benefited from the views of Dr. G. Brown, Mr. Lester J. Boyne, Mr. Cyril Buchanan, Mr. Trevor Clarke, Mr. Vin Lumsden, Dr. Malcolm MacDonald, Mr. Charles Rogers, and Dr. LeRoy Taylor. The report also draws heavily on my earlier work with the Ministry.

Although intended primarily to support the Five Year Plan of the Ministry, I believe that the findings of the report are equally applicable to the mission and program objectives of the Ministry. In a very real sense, the report continues our discussion of May 22, and addresses some of the issues you had raised.

Once again, I enjoyed visiting with you and working with your staff. If I can be of any further assistance to you, please let me know.

Regards.

Sincerely,

Rameshwar Paul

Rameshwar N. Paul
Information Management Consultant

cc: Dr. G. Brown
Mr. L. J. Boyne
Mr. Cyril Buchanan, USAID (2)
Mr. T. Clarke
Mr. V. Lumsden
Dr. L. Taylor
Mr. B. Petty

INFORMATION REQUIREMENTS FOR THE
MINISTRY OF AGRICULTURE'S
FIVE YEAR PLAN

1.0 Information is a valuable resource for the Ministry of Agriculture's (MOA) decision-making, policy development, program planning, evaluation, and related functions. While other resources--financial, human, material, natural, and physical--are all important, information is basic to planning. It forms the basis for developing plans; making projections; prioritizing programs; implementing planned activities; monitoring and evaluating plan performance; modifying and updating the plan; and documenting and communicating the plan results and accomplishments. In a very real sense, information is also an important, if not the most important, product of planning activities.

1.1 The figure 1 illustrates the roles of information in the planning process. The process may be described in the following six generalized steps:

1. Goal setting and policy development.
2. Plan formulation.
3. Operational planning and project development.
4. Implementation.
5. Project monitoring and performance.
6. Evaluation and dissemination of project information and accomplishments.

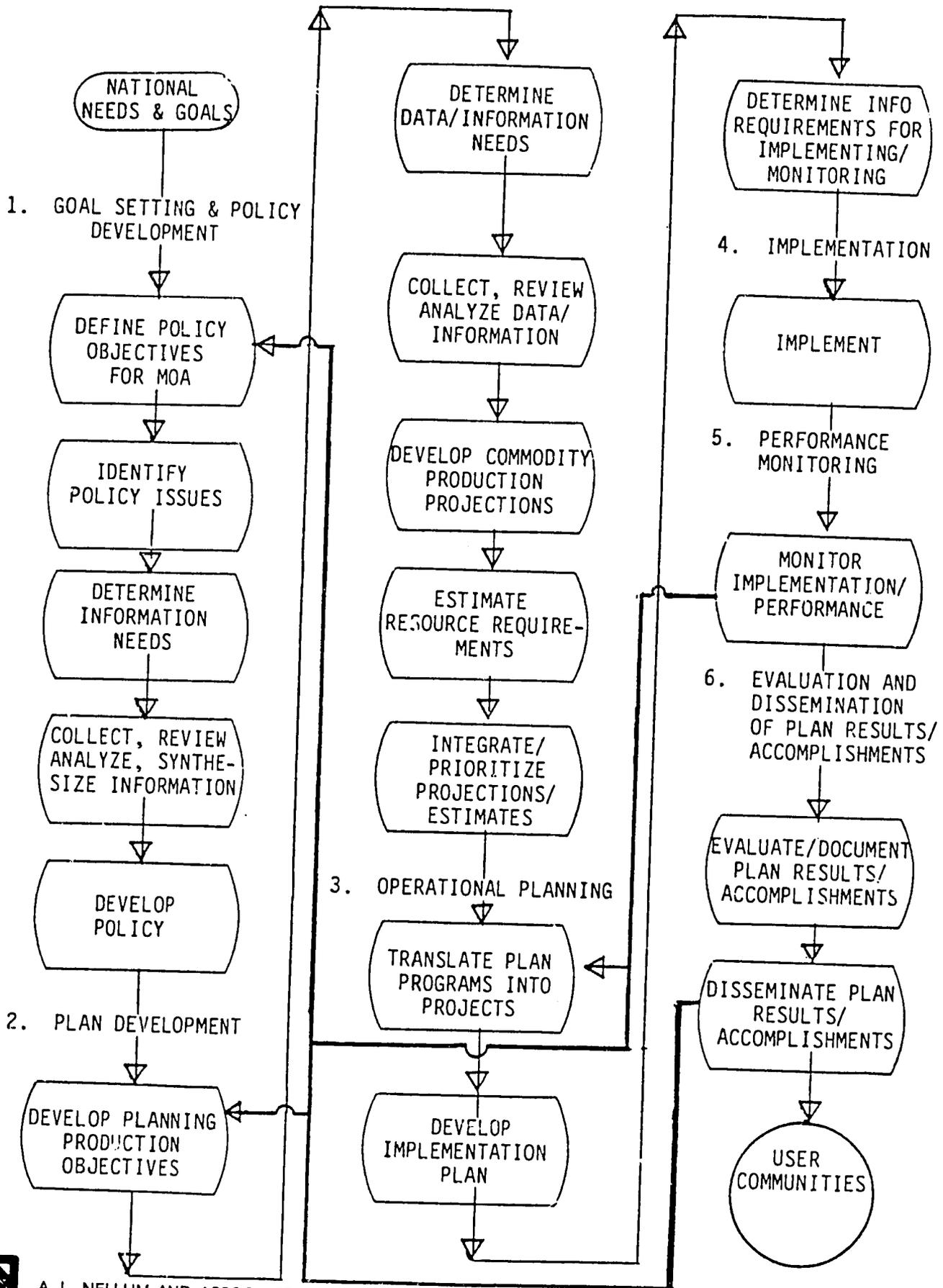
Although it is a somewhat simplified, shortened, and streamlined, schematic portrayal of the planning process (and there may be other similar portrayals), it is clear that information plays an integral and critical role throughout planning. Even when a step is not explicitly labelled as "information activity" (as in the case of "identify policy issues" or "monitoring performance"), the processes are basically information oriented. Moreover, as the planning activities increase, so do the information requirements.

1.2 The information requirements of the Ministry's Five Year Plan emanate from a large number of persons involved in or affected by the plan and/or the planning processes and activities. These persons include:

- MOA management
- Planning team
- Plan project managers
- Operational and support personnel
- Extension and marketing personnel
- Other government departments, statutory bodies, and professional organizations
- Agro-Industry
- Food industry
- Farmers and farm organizations
- Other similar groups.



FIGURE - 1
 ROLE OF INFORMATION IN PLANNING PROCESS



These user communities participate in or interact with the planning process at various stages and levels and have requirements for a variety of information and data. The information needed by these user communities might include: Agricultural data (commodity production, export, import, prices, land use, climate data, farmers, consumption, etc.); highly analytical syntheses, summaries, and reports; planning methodology and reports of similar planning efforts elsewhere; how-to-do type brochures; general broad summaries; press releases; charts; photographs; posters; etc.

1.3 Data are basic ingredients from which the plans are developed. The planners need data and lots of them--relevant, authoritative, current as well as historical. They need data on commodities (export, import, production, consumption, prices, etc.); land and land use; people (farmers); livestock; environment, etc. Section 2 of this report examines in depth the status of agricultural data in Jamaica, their availability, quality and utilization, and related issues. In return, the plan generates its own set of data in the form of plan projections and production targets as well as monitoring data. These data, together with other relevant plan information, must be processed, packaged in appropriate forms, and disseminated to those involved in the Five Year Plan. Aspects of this problem form the subject matter of section 3 of this report.

1.4 A basic requirement of MOA management for the successful implementation of the Five Year Plan is to have an adequate control on the implementation of the plan and provide for an effective monitoring system. Also, planning, at least, is a dynamic process. The information requirements of the planners do not stand still. Instead, they change with time, with circumstances, with shifting priorities, with changing opportunities, and with new risks that must be taken into account. The use of the information often leads to new information, new insights, new issues, and new problems that create new requirements. An active information system, therefore, must provide for, besides project monitoring, adequate feedback with respect to program objectives and user needs, as well as suggest other options. These issues are discussed in section 4.

1.5 As indicated earlier, the planning process both uses as well as produces information. As a producer of information, the Five Year Plan will require a host of information handling technologies to process, package, store, and disseminate information. The role of some of these technologies is reviewed in section 5.

As users of information, persons associated with the formulation and implementation of the plan, have and will continue to have needs of a wide range of information services including:

Current Awareness Service

Ready Reference (for quick facts, data, directory assistance, etc.)

Retrospective Literature Searches

Documents, reports, books, periodicals, etc.

Referral

The information services and materials needed by the MOA Five Year Plan are administered by a number of MOA units and activities, including:

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Data Bank
Library
Learning Resources Center
Computer Facility
Publishing (Information Services)
Print Shop
Registry
Various MOA units that collect and maintain their own data/information collections.

A basic issue is: how best to marshal and manage all these information resources as well as information handling technologies to provide the most efficient and responsive information support to the Five Year Plan at the least cost? This issue is discussed in Section 6.

It should be noted here that the objective of this report is not to present a blue-print but to identify and raise issues which must be addressed to before a detailed design of the information system is prepared. Hopefully, this report would point out the direction in which the Ministry should proceed.



2. AGRICULTURAL DATA

2.0 Data are representations of raw facts, concepts, or instructions in a formalized manner, suitable for communication, interpretation, or processing by humans or by automatic means. They are the basic ingredient of which the plans are made. The planning process uses data as the basis for developing projections or targets, thereby creating new data of its own.

2.1 Some of the data needed by the MOA's Five Year Plan include:

- Agricultural commodities, including data on
 - production
 - consumption
 - acreage
 - export
 - import
 - prices
 - cost of production
- Land and other natural resources
- Land use
 - cultivation practices
 - major activities
 - farm size
 - commodity groups
- Climate/weather data
- Livestock
- Demographic Data
 - farmers
 - agricultural labor force
- Aquaculture
- Farm credit
- Related non-agricultural data from agro-industry, food industry, and similar areas.

2.2 The major source of agricultural data in Jamaica is the Data Bank of the MOA's Data Bank and Evaluation Division. The Data Bank collects data on a continuing basis on the following topics:

- Crop production
 - (includes land utilization; crop acreage; production and prices; fertilizer and pesticides; irrigation; goats, and labor force)
- Domestic agricultural production and farm gate prices
- Domestic food crops
- Domestic crop production and acreage
- Meat statistics
- Pig farmers
- Fishing industry



In addition, the Data Bank has conducted a number of special one-time surveys, including the Farmers Register (1982); Agro-Socio-Economic Survey of Banana Farmers (1982); Screw Worm Eradication Programme (1982); Agro-Industry Survey (1981); Coconut Oil Survey (1981); Logwood Survey (1981); Survey of Wholesalers (1981); Fishing Survey (1980); Ornamental Horticultural Industry in Jamaica (1980); Cassava Farmers (1980); Family Planning in Rural Jamaica (1980), and many others. Data Bank is planning to update some of these surveys.

The other sources of agricultural data include Economic Planning Unit, Marketing Division, Extension Services, Rural Physical Planning Unit, and the National Statistical Institute of Jamaica (previously, the Department of Statistics).

The Rural Physical Planning Unit maintains a land resource data base which incorporates soil data, current land/cover use, and agricultural production potential ratings at the parish and national level. The Ministry is also planning to set up in the Lands Department a National Land Data Bank and Land Resources Information Center which would permit rapid identification of land parcels and their tenancy conditions in addition to their physical and social resources, and limitations.

2.3 It is apparent from the above description that the data resources of MOA are scattered with many MOA units collecting, processing, and storing the data they need. While there is nothing wrong with the various MOA units collecting, processing, using and retaining the data they need, lack of coordination and management review and control lead to unnecessary duplication of effort as well as less than cost-effective development and utilization of the Ministry's data resources. Therefore, there is an immediate need to define, as a part of the over-all information policy, the role of the Data Bank as a planner, coordinator, collector, developer, processor, provider, keeper, administrator and manager of the Ministry's data resources.

Towards that end, and along with defining its above role, the Data Bank should emphasize its role as a provider of data. It should conduct a survey and compile a directory of the agricultural data available from or through:

- Data Bank
- Other MOA units
- Other Jamaican government and/or statutory agencies
- Other Jamaican organizations
- USDA, US/AID, FAO, and other similar organizations for related data and methodology.

Data Bank should develop appropriate interfaces and working relations with all the sources identified in the directory to dip into their resources effectively to meet the data requirements of Ministry personnel. In disseminating data, the Data Bank should work with and through the MOA



program units, such as the Economic Planning, Extension Service, and Information Branches. These units interface with their clientele, and user communities on a regular basis and have the primary responsibility to disseminate and promote the utilization of information. The Data Bank should support their function in this respect.

To discharge its role as a planner, developer, and provider of data, the Data Bank, working with the various MOA units--particularly, those with expressed needs in the use of agricultural data such as economic planning, marketing, etc., should determine the current and anticipated needs of MOA personnel for data.

Its data collection efforts should reflect the specific needs and concerns of these units. To the extent feasible and cost effective, the data collection effort should be organized to collect multiple data at the same time for various applications. Data should be structured and organized to permit the aggregation of data in a variety of ways to meet the needs and the applications of the various MOA units. The data should be furnished to the users and MOA units in the format in which they can use it effectively for further analysis, interpretation, or presentation. If necessary, the Data Bank should support these units through providing additional information processing support as well as consultation.

To meet these needs cost effectively, the Data Bank should develop short-range (one year or less) as well as long-range (more than one year) work plans for developing the Ministry's data resources. Naturally, its work plans should reflect the Ministry's priorities as well as the constraints or the available resources. In addition, the Data Bank should develop capability and procedures to respond effectively to emergency needs for data on ad hoc basis.

The Ministry should establish procedures and review criteria for developing data resources in-house. It should review all options before a decision to establish a new data resource is adopted. These options might include:

- Use of existing data by aggregating or manipulating them differently.
- Collecting the required data as a by product of an existing data collection effort.
- Using only those data which can be obtained at minimum or not additional cost.
- Avoid data which require several processing steps or which call for excessive clerical judgment.
- Keep the level of difficulty of collecting data no greater than the capacity of a new employee after basic training.
- Assure that data are uniform, highly reliable and up-to-date.



2.4 Data are valuable only when used. The use of data does not diminish its value; it might, on the other hand, increase it. To assure the maximum utilization of its data resources in support of the Ministry's mission and programs, the Data Bank should

- Publicize pro-actively the available data resources to promote their awareness and availability.
- Make it easier to identify, retrieve and use the needed data.
- Seek new applications of the available data through uncovering new relationships, new interpretations, or the use of more sophisticated statistical techniques.
- Provide consultation to MOA personnel analyzing and interpreting data.
- Package data in a format most suitable to the targeted user communities.

2.5 Besides providing data to the MOA personnel, the Ministry also has a responsibility to disseminate agricultural data/information outside the Ministry. The Data Bank, working closely with the Ministry's Information Branch (Mr. Lumsden) and other program units, should develop and implement a program to disseminate these data. This will include identifying the major users of the agricultural data, determining their requirements for the agricultural data, and packaging data to meet those requirements effectively.

The Data Bank should investigate the feasibility of preparing and issuing "Fact" or "Summary" sheets on various topics, indicating how the full data set, if needed, might be obtained.

2.6 To ensure the usefulness and ready acceptance of its data, the Data Bank should develop and institute a quality assurance program emphasizing the quality and precision of the data, including accuracy, level of detail, and uniformity.

Quality addresses the basic questions of credibility, reliability, and validity of data. The precision deals with error tolerance, either in original collection, or in value estimation and significance interpretation of the data, or in all of these steps.

Accuracy deals with required correction of the information. This may range "triple checked and audited" to a +/- 10%, or similar tolerance. In some cases errors in data may be acceptable if their numbers and magnitude will not significantly affect the results desired. It is however, important that the tolerance level is clearly indicated and known.

Level of detail is important--particularly, if the data are to be aggregated in a variety of ways for different applications. This is also true of uniformity in formatting of data by facilities handling data from different sources or from different data sets.



The quality assurance program should also include continuing review of the various data collection programs, particularly, the Ministry's projections and forecasts against actual production data. These reviews should be used if necessary, to modify forecasting procedures, models, and algorithms to ensure more accurate forecasts in the future.

2.7 Data issued by the Data Bank should be regarded as the official data of the Ministry of Agriculture. It should be so recognized and identified. The official seal of approval and authority should enhance its authority, acceptance, and utilization. One way to accomplish this may be to issue MOA data at the highest level of authority and policy. The Ministry should also encourage all MOA units to use these data indicating their source as well as its official approval. This would also ensure that the data policy of the Ministry supports the official policy of the Ministry.



3. COMMUNICATION AND TRANSFER OF INFORMATION

[This section, which couldn't be completed because of the time constraint, deals with users, information needs, information packaging, communication channels, information transfer agents, and dissemination strategies.]



4. PROJECT MANAGEMENT

4.0 A basic requirement for the successful implementation of the Ministry's Five Year Plan is to provide for adequate control and monitoring of the plan activities. At the minimum, this management control should provide for:

1. Project monitoring
2. Feedback on operational matters as well as project impact/utilization
3. Resource management
4. Management analysis and review
5. Project documentation

4.1 Project Monitoring

MOA management needs to know the status of all the projects at any given time. Through timely periodic reports, the system should alert the management about the progress of each project, and, if a particular project fails to meet the scheduled targets or milestones, the reason for that failure. Management can, then, decide if corrective action is needed before it is too late. Similarly, the system should highlight the significant accomplishments of the project. Consequently, the system would provide the management with an opportunity to determine if the original project projections or milestones were realistic, or if they need to be revised downward or upward.

It should be noted here that the Evaluation Branch of the Data Bank and Evaluation Division presently collects much of this information. With some minor modifications and improvements, that information could become the basis for meeting the project monitoring requirements of the Five Year Plan.

4.2 Feedback

Besides the quantitative measure of the project performance obtained in step (1) above, the management also needs to know if a given project is accomplishing the stated or implied program objectives and/or making the desired impact. For example, a project may call for the transfer of a certain technology to 10,000 farmers through the distribution of an especially prepared brochure over a 12-month period. While the project monitoring reports might show that the distribution of the brochure is on target, the management would also like to know to what extent the recipients of the brochure are accepting and adopting the new technology. Despite being on target, if the project is not accomplishing the program objectives, the management may want to review the project methodology, approach, or other aspects of the project.



The project design, therefore, should incorporate a system of formal or informal feedback which would provide management with this critical information. While this system will not obviate the need for a formal project evaluation, the feedback system would assure the management that the project is headed in the right direction.

4.3 Resource Management

The project management system should also provide for the effective management and utilization of the resources committed to a given project, including financial, human, material, and physical resources. This should permit the management to (a) optimize the volume and the mix of the various resources required to successfully implement a given project, (b) schedule the availability of the resources as they are needed without delay or without overbuilding the inventory, and (c) provide for the accountability of these resources.

It is clear that this component of the project management system will have to be interfaced with the Human Resources Information System, Financial Management/Accounting System and Property Management System. However, this component of the project management system is extremely important if the plan is to be accomplished in a responsible and cost effective way.

4.4 Management Analysis and Review

Planning is a dynamic process. Planning requirements do not stand still. Instead, they change with time, with circumstances, with shifting priorities, with changing opportunities, and with new risks that must be taken into account by the management. This system must take these factors consideration and, through analytical reports and reviews, provide management with new insights, new problems, new issues, new options, and new approaches. Through the incorporation of a Decision Support System Component, the Project Management System should enable management to ask "what if" types of questions, develop different planning models, investigate various options available, and stay on top of the Five Year Plan and the planning process. Presently, the Economic Planning Division has the responsibility for performing analyses of this type. Clearly, there is need for the Project Management System to support Economic Planning and other MOA Units who may have a need to conduct similar analyses or reviews through providing needed data/information in a timely fashion and the necessary tools (information processing technology).

4.5 Project Documentation

Finally, the Project Management System must provide for complete documentation and record of each project. Besides serving as the history and "institutional memory" of the Ministry, this documentation would provide (a) valuable data for future planning and operational activities, (b) input to MOA's annual or similar reports, (c) input to related project proposals to international donor and technical assistance (T/A) agencies, and (d) interface with the Ministry's programmatic/statistical and bibliographic data bases.



4.6 All of these project management requirements can be met from an integrated data base built as a part of the Plan Implementation Phase. The basis of such a data base will be a copy, perhaps somewhat modified or edited, of a project profile prepared as a project is initiated. (Much of this information is already collected when a new project is initiated.) This profile may include some of the following or similar data:

- Project number
- Project name
- Program name
- Project start date/end date
- Project component(s) responsible for implementation
- Sponsors(s) (if other than MOA)
- Funds committed/allocated
- Project director
- Other project personnel
- Other resources required/committed
- Project schedule/milestones/outputs
- Days committed
- Person-days committed for each
- Project description/summary

4.6 The Project Management System (PMS) will be an important tool for the successful implementation of the Ministry's Five Year Plan. To be effective, PMS must actively interface with other administrative and management systems, such as the Human Resources Information System, Financial Management/Accounting System, and Property Management System. The system would also provide input to the Ministry's programmatic/statistical and bibliographic data bases. It will thus play a key role in the management and utilization of the Ministry's information resources. Moreover, the System will be used primarily by or for the MOA management.

For these reasons, it is imperative that the Project Management System be developed and designed with top-down planning with the full commitment and involvement of the Ministry's top management.



5. COMPUTER/INFORMATION TECHNOLOGIES

5.0 It is clear from the foregoing discussion that the Ministry of Agriculture will need a range of information handling technologies with capabilities to handle numbers, words, voice, graphic, text and bibliographic data to meet the information requirements of its Five Year Plan. The Ministry is already in the process of upgrading its computer facility and expects to have an IBM 38 Computer System together with associated peripherals and software. This added capability should place the Ministry in a much better position to respond to the information requirements of the Five Year Plan.

The range of demands likely to be made on the MOA's Computer facility might be categorized as follows:

1. On-demand data processing
2. Administrative and management information systems
3. Programmatic/statistical data bases
4. Bibliographic data bases
5. Used applications support and education.

5.1 On-Demand Data Processing

Presently, the MOA computer facility appears to be operating under this mode of operation, namely, to process each job as it is presented to it. Naturally, the capability of the MOA Computer facility to respond to jobs as presented to it will continue to be needed. This capability should be further enhanced by (a) anticipating the needs for such jobs as early as possible, (b) educating MOA staff in the effective use of computer resources and services, and (c) operating the computer facility under the data base management (DBMS) environment.

5.2 Administrative/Management Information Systems

These systems include:

- a. Project Management System
- b. Human Resources Information System
- c. Financial Management/Accounting System
- d. Property Management System

There could be others to deal with other specialized functions.

As discussed in section 4, a well designed and properly implemented Project Management System is a must and would play a key role in the successful implementation of the MOA's Five Year Plan. The functional requirements of the desired Project Management System for the Five Year Plan have already been discussed in section 4. To be effective, the System will need to be interfaced actively with other administrative/ management information systems through the use of common data elements, a data dictionary/directory and compatible file structures.

The Ministry already has plans to implement some or all of these systems. Since these systems affect the major management functions of the Ministry and will be used primarily by or for the management, it is imperative that these systems be the result of a top-down planning with the full commitment and involvement of the Ministry's management.

While the planning and design work on these Administrative/Management Information Systems would probably run concurrently, the first priority should go to the Project Management System. This is both to assure its timely availability for the implementation phase of the Five Year Plan as well as to ensure that other administrative/management information systems are properly interfaced with it. Also, as a part of its planning and design process, the Ministry should look into the feasibility of using one of the currently available systems without or with some minor modifications.

5.3 Programmatic/Statistical Data Bases

These include data/information on subject areas or issues generated, collected, and often maintained by the various MOA components in the course of their official businesses. Most of the statistical data bases are generated and kept in the Ministry's Data Bank; others are available in the Rural Physical Planning Unit, Marketing, Extension, Economic Planning, etc. As the tempo of the Five-Year Plan activity picks up, the number of such data bases is likely to increase much faster, making more demands upon the resources of the Computer Facility.

Presently, the computer is used to process the data collected through surveys, censuses, etc. in batch mode. The requirements of the Five Year Plan are almost certainly likely to require the use of computer/information technologies not only to process the raw data, but to also to analyze it, investigate relationships among various data sets, seek new applications to develop new planning models and support the planning process, and for ways to present data graphically. To accomplish this, the MOA Computer Facility will need to (a) implement user-friendly data base management (DBMS) environment, (b) add a statistical software package, and (c) provide computer support in user work places through hard-wired or dial up type interactive terminals or micro-computers. The proposed IBM 38 configuration includes 10 on-line terminals.

5.4 Bibliographic Data Bases

A bibliographic data base provides the key to the access and use of the Ministry's publications and the institutional memory. It is the key element in the control, management, and use of the MOA publications, including reports, significant correspondence, memoranda, speeches, and related documents discussing or enunciating significant policy or operational issues.*

*See my earlier report, Publication Management in Agricultural Planning Project, October 1982.



A bibliographic data base is the nucleus around which all the information services of the Ministry should operate. Lack of such a tool or delay in implementing one can impede the effectiveness of these programs. The data base should be developed by preparing for each MOA publication a record consisting of title, abstract, keywords, data, and other bibliographic data and including these records into the proposed data base.**

5.5 User Applications Support and Education

With increasing tempo in the planning activity, it is likely that the MOA Computer Facility will not be able to operate in isolation, nor meet all the specialized needs of its users in a timely fashion. Already, a number of MOA units have acquired or plan to acquire micro computers for those specialized applications. These units include Rural Physical Planning Unit, Economic Planning, Finance Division, and Inland Fisheries Division.

The question is no longer: Should individual MOA units acquire micro computers? With the increasing availability of sophisticated micros and associated software, the trend is, and will continue to be, to rely more and more on such devices in the office environment. The Ministry should recognize this trend and encourage the use of the micros when such use would be (a) more cost-effective, (b) justified by the specialized needs of the acquiring unit, (c) unit's data processing needs cannot be effectively met by the MOA Computer Facility in a timely fashion, (d) equipment/software acquired is compatible with the Ministry's main-frame computer system and does not require costly conversion of software or data files, and (e) adequate and reliable software and equipment maintenance support are readily available.

The Computer Facility should develop and administer a regular program of user education and support at various levels. At the minimum, this program should include:

a. Computer Literacy

A general introductory course dealing with computer concepts, components and capabilities, aimed at those persons who do not expect to use the computer right away but might get involved in preparing or planning jobs requiring computer support.

b. Computer Utilization

A hands-on working level course for those who expect to use micros and/or interactive terminals to access the Ministry's main frame computer system.

**See Library Information System Task, A Program to Manage the Information Resources of the Agricultural Planning Project. January 4, 1983.



c. Consultation

The Computer Facility should provide consultation to all MOA Units, as needed, to handle or prepare for specialized applications.

It is clear that these courses will have to be supplemented, from time to time, with other specialized courses as the need or demand for them arises. Also, perhaps working with the MOA Library and the Learning Resources Information Center, a small library of the training materials in computer utilization should be developed.



6. MANAGEMENT OF MOA INFORMATION RESOURCES/SERVICES

The information requirements of the MOA's Five Year Plan emanate from a large group of persons involved in or affected by the planning processes and activities. These persons include MOA management, MOA professional personnel, extension agents, farmers, agricultural organizations, agro-industry, and similar groups. The user communities interact with or participate in the planning process at various levels and stages, and have a variety of information providing MOA units, such as the Library, Data Bank, Extension Services, etc., using in-house as well as outside resources.

Similarly, as a producer of information, the Five Year Plan activities will make heavy demands on a host of information processing/handling technologies, including computers, word processing, graphics, printing, micrographics, telecommunications, etc. The problem is: How best to marshal and manage all the information resources as well as the investments in information technologies to provide the most efficient and responsive service at the least cost.

6.1 There is a number of factors contributing to the complexity of the problem. First, the information requirements of the Five Year Plan are likely to place a heavy burden on the data/information resources of the Ministry. Second, the capital investment and associated expenses of new information handling technologies are simply too large to be treated casually. The problem is further aggravated because of rising administration expenses, inflation, and budget cuts. In-depth cost-benefit analyses must be performed and all options and trade-offs reviewed before major investments are made.

Third, the various information handling technologies as well as the information services and fields of specialization, although they developed more or less independently, are fast converging, breaking the traditional boundaries. (See figures 6.1 and 6.2.) This is leading to the integration of heretofore independent technologies into coordinated hardware, software, and procedural framework. Thus text, voice, visual, and graphic technologies, when integrated offer a far more effective and efficient array of capabilities than each of the separate ones did taken individually. The users and producers of information, scientists, executives, planners, managers, financial analysts, librarians, and researchers, all can now move back and forth swiftly between digital and analog modes, between data and word processing modes, between full text/bibliographic and abstract mode, and so forth. It is clear that conventional approaches to managing the information services, library, information center, computer facility, microfilm operations, publishing, printing plant, and other central information activities as separate independent units no longer adequately illuminate risks, trends, opportunities, and deficiencies in information resources utilization.

6.2 As indicated earlier, information constitutes a critical resource in the planning process. Properly developed, managed, and utilized as a resource, information can make a significant contribution towards accomplishing the organizational goals and objectives; enhancing



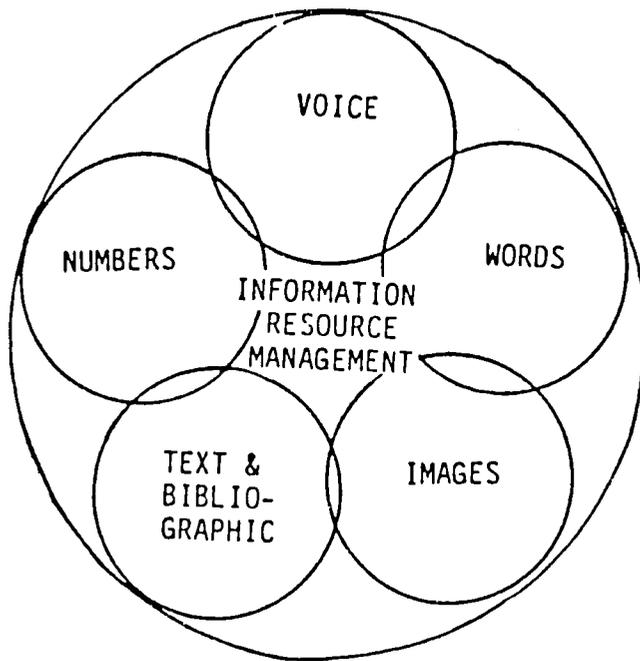


FIGURE 6-1. CONVERGENCE OF INFORMATION HANDLING TECHNOLOGIES

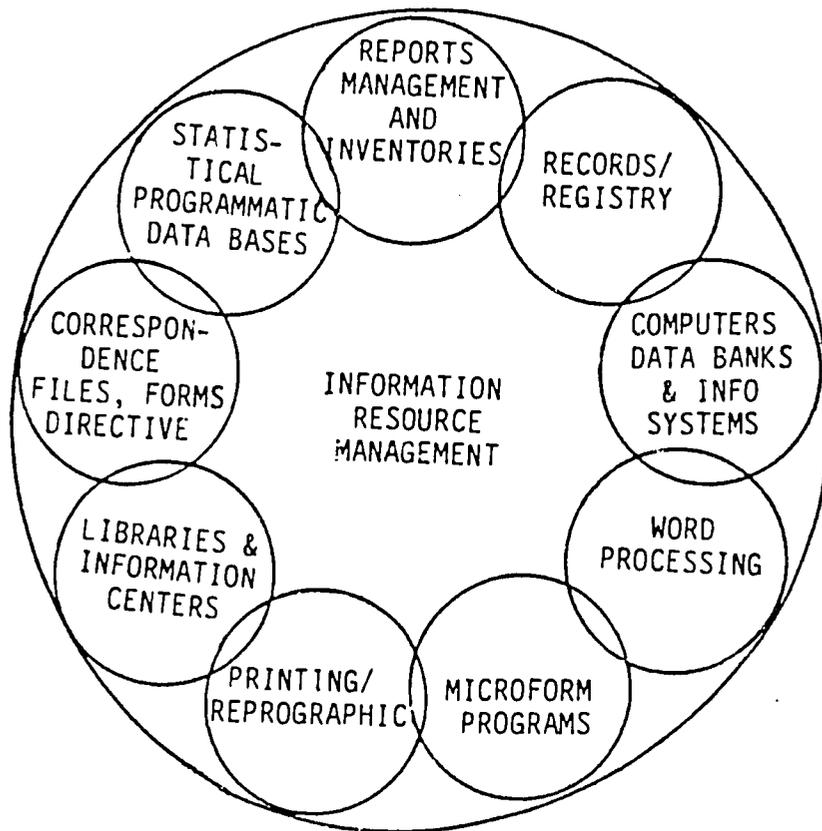


FIGURE 6-2. CONVERGENCE OF INFORMATION FUNCTIONS AND FIELDS OF SPECIFICATION
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productivity of the professional staff as well as improving the quality of its decision making and output; reducing the unnecessary redundancies and duplication of effort; and obtaining the economics of operation. As such, it is only appropriate that information be managed as other resources, such as financial, human, material and physical resources.

The basic objectives of resource management may be summarized as follows:

- Maximizing the value and benefit from the use of the resource in achieving the organizational goals and objectives;
- Minimizing the cost of acquiring, processing, using, and disposing of the resource; and
- Fixing accountability for the efficient and effective use of the resource on named officers and specific departments.

To accomplish these objectives, it is important that data/information resource be:

- Properly understood - that is to say, its role in the organization's stable of resources, its uses, its limitations and opportunities
- Acquired wisely, since it is not a free good (even when it is available free at times, there is a cost involved in acquisition, processing, storing, servicing and disposing it);
- Conserved to avoid waste, abuse, and misuse; and
- Exploited fully to maximize its use and applications.

6.3 The management of information as a resource does not mean that all information services would automatically be centralized. On the contrary, the requirement to maximize the utilization and application of the available information resources may, in fact, mandate the administration of some of these services in the close working environment of the users of these services.

A resource management approach, however, is likely to result in an integrated information system with (a) a unified data base or directory of the MOA's information resources to facilitate locating and assessing information no matter where it is located; (b) common or compatible processing standards and operations/procedures to facilitate searching and manipulating data/information in different files, as well as to obtain savings in costs; (c) new applications of the MOA's vital resource to enhance the productivity of its professional staff; (d) elimination of unwanted duplication of efforts, services, and investments; and (e) a focal point of receiving, handling, channeling or referring most requests for information.



6.4 As a first step towards introducing the resource management approach in handling its information resources, the Ministry needs to recognize and establish a discrete information management function at appropriate organizational levels and vesting a senior qualified official with the overall management responsibility and authority.

A major task under this new management function would be to develop, recommend, and, after management review and acceptance, install the necessary policies, procedures, and management systems to "operationalize" the information management function. At a minimum, the proposed information policy should address and cover the following issues:

- Identify and define the data/information resources of MOA and the role they play or ought to play to support the mission and program objectives of the Ministry.
- Define the role of and inter-relationships among the various information handling MOA units (Data Bank, Library, Learning Resources Center, Registry, Publishing, Computer Facility, etc.)
- Define relationships of the Information Management function with other resource management functions, such as Finance, Human Resource, Property Management.
- Identify the information requirements of MOA personnel at all levels, define the services that would be provided to meet those requirements, and establish minimum acceptable service standards. In particular, the policy statement should state how the special needs of any particular MOA unit, as well as for new applications, would be met.
- Develop guidelines for developing or acquiring major new data/information resources as well as disposition of old obsolete resources.
- Establish minimum processing standards to ensure compatibility among the various information systems and the ease of accessing Ministry's information resources.
- Provide for accountability of the various information handling components to assure the maximum utilization of the Ministry's information resources efficiently and effectively.

6.5 The Ministry official vested with the overall management responsibility for this function (henceforth referred to as Manager, Information Systems and Services or, Manager, ISS) should be assigned specific authorities and responsibilities.

The Manager, ISS, should be responsible for the overall planning, direction, coordination, and administration of the Ministry's total knowledge-based information resources. These include, but are not limited



to: programmatic and bibliographic data bases; reports and publications; copies of memoranda, correspondence; speeches, or similar documents discussing or enunciating significant policy or operational issues; library and learning resource materials; and computer software, documentation and manuals. The Manager, ISS, will manage, administer, and coordinate all MOA information handling program activities, and operations including, but not limited to, data processing; publications and reports management; libraries and information services; printing and reprographic services; micrographics and other records management programs; editorial and graphic services; and administrative/management information systems. As the principal expert in information resource management, the Manager, ISS, will advise and assist MOA in policy formulation for the effective management and utilization of its information, and develop programs, services, and operational procedures to implement that policy.

The Manager, ISS, will also identify and initiate improved ways of achieving compatibility between information systems through programs that standardize definitions and terms for commonly used data elements and codes; develop and maintain a comprehensive inventory of MOA's information resources, monitor short and long-term information needs of the Ministry as a whole as well as those of the individual operating units, and initiate the development of additional information systems/services as needed; communicate with MOA Management regarding on-going or future programs; and evaluate existing services and programs to identify deficiencies.

Working closely with the MOA program units, the ISS Manager will develop specific policies and technical assistance strategies in the utilization of information resources in support of the MOA's mission; initiate and provide training programs to enable the operating units to accomplish effectively the goals and objectives of their programs, and prepare and execute budgets, exercising control over expenditures and assuring that all expenditures are necessary to MOA effort.

As a team leader, the ISS Manager will provide direction and motivation to ISS staff, oversee the hiring of employees and their training programs; review all performance evaluations; and consult with the staff to provide guidance, direction and delegation of authority.

Last, but not least, the Manager, ISS, will open, cultivate, and maintain appropriate outside channels to obtain services and materials on a cooperative basis; represent MOA at professional and intra-governmental meetings; and prepare management reports concerning accomplishments, problems, requirements, priorities, and plans.

