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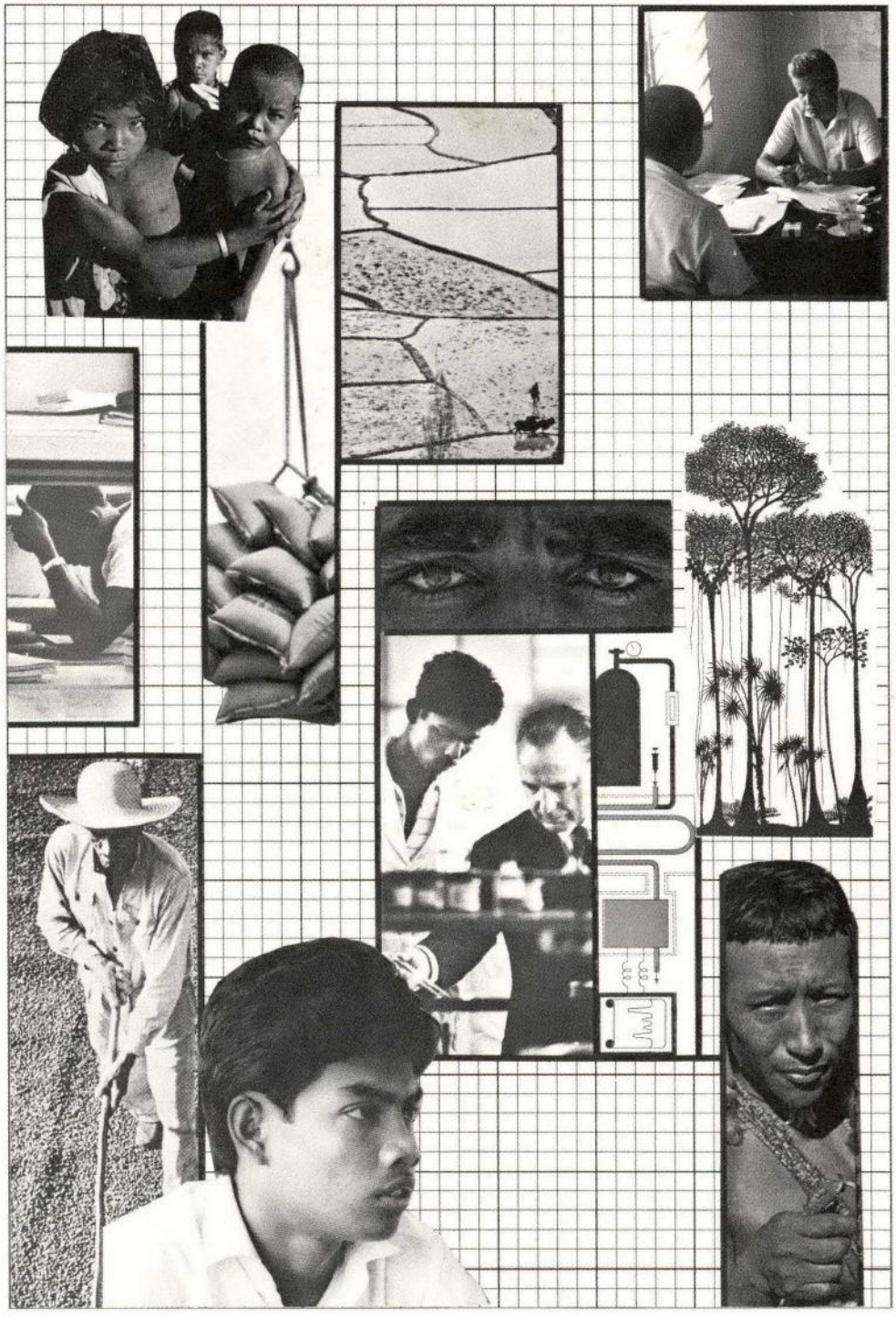
AN EXAMINATION OF MANAGEMENT ACCOUNTING AND REPORTING PRACTICES AND COMPUTING CAPABILITIES



AT THE INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

P. S. ROSS & PARTNERS

MANAGEMENT CONSULTANTS

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July, 1974

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MANAGEMENT CONSULTANTS 90 SPARKS STREET, OTTAWA K1P 5B4, CANADA, 236-9662

July 3, 1974

Dr. W. D. Hopper
President
International Development Research Centre
60 Queen Street
Ottawa, Ontario

Dear Dr. Hopper:

We are pleased to submit our report entitled "An Examination of Management Accounting and Reporting Practices and Computing Capabilities at the International Agricultural Research Centers". This report represents the results of our work over the last five months undertaken at your request on behalf of the Centers and is intended to serve as a basis for specific action by the Center Directors and others on these two topics of major general interest. In addition, specific comments are being provided to each Center Director on matters of local concern, where the level of detail of the discussion would not be of general interest.

In submitting our report, we wish to thank you, the Center Directors and the representatives of donor agencies for the warm reception and full cooperation accorded our study team during their visits. We trust that the resultant understanding of the Centers which we have gained is well reflected in our findings, conclusions and recommendations.

We have appreciated the opportunity of undertaking this important work on behalf of the Centers. If you should wish to discuss any aspect of this report or the work which it represents, we will be pleased to do so at your convenience.

Sincerely,

P.S. ROSS & PARTNERS

Robert V. Brouillard
Partner

TABLE OF CONTENTS

I. INTRODUCTION

Over the last fifteen years, several agricultural research centers have emerged in various geographic locations of the world. Though some of these centers have their origins in older development projects, their growing co-operation in the exchange of scientific and technical knowledge is resulting in an increasingly parallel development in organizational style and management processes. Contributing to these developments is the strong interest of the suppliers of Center research funds in common financial information. Since its formation in 1971, the Consultative Group on International Agricultural Research (CGIAR) has been striving to balance the increasing demands of the Centers with the availability of funds from the sponsors. As part of this activity, the Consultative Group and the Centers recognized the need for common financial reporting procedures across all Centers. A workshop on budgeting and accounting practices was held in February, 1972, followed in June, 1973 by the production of a common framework for budgeting and accounting procedures and practices by the Consultative Group Secretariat. The paper describing these procedures and practices was accepted by the Center Directors for use in preparing the 1974 budget proposals.

However, with the gap between supply and demand for funds continuing to narrow on every front, donors and sponsors increasingly are demanding improved financial forecasting of commitments and expenditures, the introduction of longer term financial planning, and the establishment of management processes which link the technical program with costs to permit an evaluation of effectiveness. As part of this process, the information requirements of the Consultative Group have been the subject of several reports, culminating in the acceptance by the Group in early 1974 of the Report of the Subcommittee on Center Review Procedures.

In parallel with these developments, Center Directors began, during Centers Week of 1973, to express uneasiness with regard to their expanding information processing needs and the manner in which these might best be satisfied. Faced with many common reporting requirements, the Centers would continue their evolution towards common management

practices as expeditiously as possible. But, several questions were arising concerning the extent to which individual practices could be harmonized, the degree of sophistication possible, the time frame within which this could be accomplished, the costs involved and the benefits to be achieved. Somewhat related to this subject was the general issue of computing power capability, not simply to facilitate financial management reporting but more significantly to support program management activities and to meet other research support needs. The differing nature of supply alternatives available to meet these needs and the varying stages of development of the Centers themselves made the question of common or parallel computing capability difficult to address.

In this context of these related concerns, International Development Research Centre engaged P.S. Ross & Partners on behalf of the Centers, to examine their management reporting and computing capability requirements. This report describes the scope of the work conducted and addresses the environment in which the Centers operate. The requirements for management reporting and the question of computing capability both are examined, and recommendations and approaches to satisfy these needs are presented. In addition, a separate report has been provided to each Director, with a view to addressing those topics of particular concern to the individual Center.

II. OBJECTIVES

The objectives of this study are:

* To examine individual and collective requirements for management accounting and reporting at:

  - Centro Internacional de la Papa (CIP)
  - Centro Internacional de Agricultura Tropical (CIAT)
  - Centro Internacional de Mejoramiento de Maiz Y Trigo (CIMMYT)
  - International Institute of Tropical Agriculture (IITA)
  - International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
  - International Rice Research Institute (IRRI)

* To identify their individual and collective computing and information processing requirements.

* To examine the availability of computing resources to each of these Centers.

* To pinpoint opportunities for common action by the Centers, with respect to reporting requirements or computing needs.

* To recommend strategies which will enable the Centers to proceed with the development of these opportunities.

III. SCOPE AND METHODOLOGY

The study was conducted as originally planned, in three distinct phases shown schematically in Exhibit 1. The first phase - Center Visit Preparation - began with initial research into the operations of the Centers. Background information which would be useful in formulating preliminary statements of information requirements for the Centers was collected and examined. Furthermore, since a certain commonality in information requirements was presumed to exist among the Centers, the intention was to clarify generally the extent to which this might be possible. A review of available literature, discussions with IDRC and other personnel in Canada, and visits with representatives of major funding agencies located in New York and Washington were the primary sources of information.

Our examination of the Common Accounting and Budgeting Procedures and Practices and the Center Review Procedures quickly established that a level of harmonization in reporting was possible. Discussions with several donor agencies confirmed this hypothesis and, more importantly, helped to provide an understanding of the framework within which the Centers operate. From these inputs, the study team began the development of a preliminary statement of requirements as a basis for discussion with the Centers. The scheduling of the visits to each of the six international agricultural research organizations completed the work of this phase.

The second phase - Center Visits - was concerned with examining the appropriateness of our preliminary statement of requirements by reviewing the existing management reporting systems and collecting and assessing the individual information and computing requirements of each Center. Each visit began by meeting the Director or his designate to review the overall work program as originally planned, thereby providing an opportunity for the Director to focus our efforts on areas of specific concern to that Center. Subsequent to this initial meeting which established the parameters of our review, we proceeded to interview those senior members of the staff who it had been suggested would provide the most useful information and perspectives. As part of each visit, we conducted an independent review of the local computing

SCHEMATIC OF STUDY METHODOLOGY

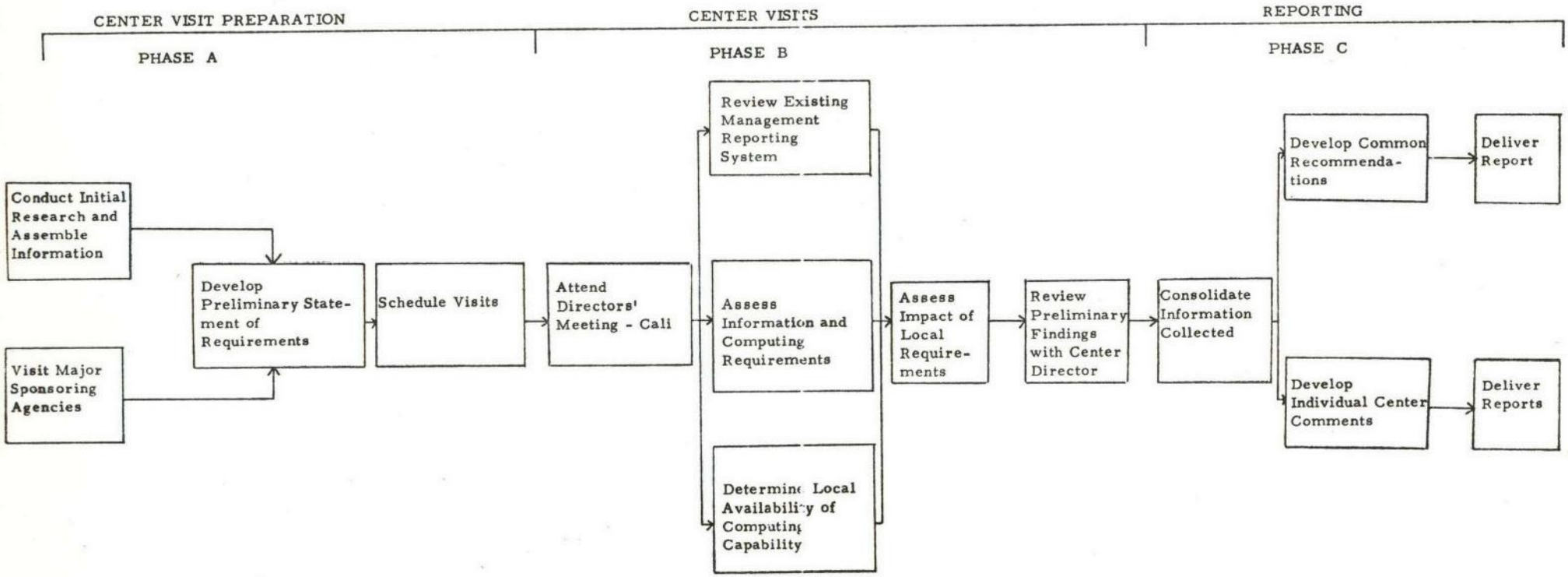


Exhibit 1

capabilities accessible to each Center. This involved a series of interviews with local computer manufacturers, distributors, service bureaux and professionals to determine the extent of capacity available or likely to be available in the near future, the manner in which it could be accessed and the nature of the support available. As a final step in each visit, the study team undertook a brief presentation to the Director of findings and preliminary conclusions.

Shortly after the first Center visit, the study team was offered an opportunity to present its general approach to the Directors who were meeting in Cali, Colombia. Accepting this invitation, the study team invited comments and suggestions from the Directors and, on the basis of these, incorporated certain modifications into the work program. While the Directors expressed interest in having the study explore both the management reporting and the computer capability requirements, it was apparent that their principal concern was with the identification of the need for and the availability of computing capacity to support scientific requirements, and the development of an approach to mechanization in this area. Furthermore, since some progress towards common reporting already had been made, the Directors suggested that an examination of the underlying administrative practices and procedures which would support the development of good reporting practices would be more valuable than simply an examination of the management reporting practices themselves. The incorporation of these suggestions, while not altering the overall study approach, did impact upon certain detailed tasks which then were modified accordingly.

Upon completion of the Center visits, the final phase of the study - Reporting - was begun. This work was concerned with consolidating and assessing all the information collected and identifying those findings, conclusions and recommendations which are common to all Centers. The results of this effort are presented in the following sections of the report. Other findings not of general interest or relevance have been incorporated into individual reports to each of the Directors, commenting on specific concerns either raised by the Director or noted by the study team.

In reading this report, it will be noted that no attempt has been made to comment upon the nature of the research activities, the efficacy of the programs or the quality of results or personnel, since these

matters fall beyond our terms of reference as well as our professional competence. Nevertheless, every attempt has been made to examine the nature of the accounting and administrative systems which support the Centers and the question of computing needs and capabilities in the context of each Center's unique situation, so that the conclusions and recommendations presented will be both relevant and practical.

IV. THE ENVIRONMENT IN PERSPECTIVE

This study focuses on management accounting and reporting requirements and on the needs for computing capabilities at the international agricultural research Centers. The study team's findings and recommendations in these fields have been developed in the context of the environment in which the Centers operate. It is useful, therefore, to highlight briefly certain aspects of this environment as background for the study findings.

Origin of the Centers

The continuing importance of food production has led many nations in the developed world to channel substantial funds and effort into the development of improved agricultural production techniques. Operating in temperate climates and assisted by an infrastructure which provides education, a system of financial credit and a technology for distribution and storage, the developed nations have been able to satisfy virtually their total demand for food. In the lesser developed nations, however, limited funds, rapidly increasing populations, severe climatic conditions and widespread illiteracy are commonplace and the attempt to satisfy the demand for food has not met with the same success. On the assumption that proven technology from the developed world could be transmitted to the less fortunate nations, several government development agencies and philanthropic foundations have for many years supported a variety of agricultural assistance programs in the lesser developed world. Although these programs did flourish, it has been recognized more recently that the provision of bilateral technological and financial assistance was not entirely satisfactory. What was required was the development of a research capability within the lesser developed nations themselves, so that local research and training on specific food crops could be conducted. Such a capability would permit local scientists to work on the development of improved crop varieties and technologies on location, while transferring the results directly to the day-to-day production patterns of local farmers.

As a result, the concept of the international agricultural research Centers was developed to serve the needs of several underdeveloped countries facing similar agricultural production problems. The first of

these research Centers was established in 1960 and others have come into existence since that date. Over the next several years, additional Centers likely will be designated to meet particular research objectives.

Objectives of the Research Programs

The international agricultural research Centers constitute a network for research and training devoted to the problems of agriculture in the lesser developed nations of the world. They conduct a variety of research activities that incorporate many disciplines and, though individual research programs do differ, all Centers contribute to the same basic objective of improved food production. The spectrum of their activities and research programs includes:

* Development and maintenance of libraries, where a Center may also have an international responsibility for a particular crop.

* Evaluation of economic and social factors relating to the implementation of agricultural developments undertaken.

* Design and development of basic farm implements tailored to the needs of the particular environment.

* Development of farming systems of land use appropriate to the local environment.

* Research into means of water conservation and utilization.

* Research directed towards the improvement of animal breeding.

In addition, all Centers encourage the development of strong relationships with local agencies and institutions in the agricultural field. This activity is very much in keeping with the objectives of the Centers, although it does place a further obligation on management to keep the Center's own research objectives foremost in mind.

Funding and Program Management

Historically, financial and research program assistance was provided by two major sponsors - the Ford Foundation and the Rockefeller Foundation. As new sponsoring agencies began to subscribe to the concept of international agricultural research centers, it soon became apparent that a more formal structure was necessary to provide needed financial, managerial and technical support. At the same time, the growth of these research programs and the expansion of administrative and support services were combining with the impact of other external demands to create an increasingly upward pressure on budgets. Inevitably, supporting funds now are becoming even more difficult to attract in increasing amounts, and the pressures of inflation alone are a serious concern.

Consequently, the Consultative Group on International Agricultural Research (CGIAR) was created in 1971 to co-ordinate the allocation of funds to the Centers and to ensure that a sufficient level of financial support was forthcoming from donors. Additionally, a Technical Advisory Committee (TAC) was established to advise the Consultative Group on the priorities of agricultural research, to evaluate existing research programs and to make recommendations on new programs. These two bodies have done much to rationalize the international agricultural research effort and improve the effectiveness of the funding process. Further progress can be expected in the future. However, the Centers find themselves increasingly subject to requests for more information on program and financial matters, as the information requirements of CG and TAC become more extensive. This study is concerned in part with helping the Centers to address these external reporting demands in an effective manner.

Organization and Operations

Though specific functions within each of the Centers do vary, their overall organizations are essentially similar in structure. Each organization has evolved in response to local needs and to accommodate changes which have taken place. Each Center has a Director, supported by a team of senior staff members whose number varies among the Centers. Most senior staff members come from countries other than the

host country. As a minimum, the Director usually will select two key staff members, one to be responsible for Administration and one for Research. Administration typically includes accounting, purchasing, stores, personnel, self-sustaining activities and other non-research supporting operations. Research is concerned with general direction of the scientific programs of the Center. More recently, some of the Centers have appointed a third senior staff member to manage the growing outreach and special project activities.

Efficient operating systems are required to support the physical facilities. Similarly, the services required to support the research operations, to provide housing to the trainees and numerous visitors and to operate motor pools all must be well organized and adequately staffed. Furthermore, the administrative functions such as accounting, purchasing, and personnel require professional skills to develop effective control and reporting practices, to ensure an adequacy of supplies and materials and to attract the skilled human resources necessary to keep the Centers functioning.

The organization and administration of these Centers are becoming increasingly complex and the Centers are finding it increasingly difficult to locate suitably experienced staff. Compounding this problem is the objective of encouraging the introduction of regional personnel into senior administrative positions. This is proving to be a slow process in view of the lower level of experience generally possessed by those regional personnel available to the Centers. Despite these similarities, however, a number of differences can be found in the operations of the individual Centers. Staff-complements vary in size from less than 100 to over 600. Moreover, each Center is located in a different region of the developing world and each is governed by its own Board of Trustees. The locations of the Centers, each of which has been carefully selected, expose scientists to a wide range of social, economic, language and climatic conditions. The degree of isolation of the Center from the local environment varies from country to country. The laws of the host country governing minimum wages and employment practices vary, with consequent impact on both the cost of operations and personnel policies. The range of individual research programs can influence the particular assignment of management and administrative responsibilities. Finally, the variety of management styles and of both senior management and of the Boards of Trustees shape particular organizational and reporting relationships.

Key Management Concerns

The social, economic and climatic conditions in which the Centers operate make it somewhat more difficult to attract scientists to the Centers. The scientist dedicated to his research may not consider location a critical issue. But to his family, the social and personal adjustments required usually are somewhat more difficult to accept. Consequently, these real conditions oblige the Centers to provide as many comforts as possible, and this policy often places the Center in the awkward position of having to defend the extent of these benefits.

With respect to the research program itself, the Centers are not able to restrict their activities to their local programs, since they receive numerous requests and are expected to participate in a variety of programs outside the local environment of the Center, often in a different country. These outreach and special project activities provide a means of transferring knowledge and thus are generally consistent with the objectives of the Centers. Nevertheless, as these activities grow in proportion to the core research program, the capacity of senior scientific personnel is increasingly strained. Administrative workloads also increase as a result of specialized requirements and remote locations generally associated with these activities.

The frequency of visitors to the Centers, both scientific and other, imposes a considerable strain on the Center staff who, despite their other duties, must find the time necessary to meet with the streams of callers. Though the scientific and administrative staff accept this situation, the result is that the working day often extends well beyond what would normally be considered a busy day.

The specialized agricultural research libraries which the Centers maintain in support of their own research programs often create additional burdens for the Center. The information available in these libraries often is requested or accessed by international users and local scientists and students. Except where the Center has accepted formal responsibility for the provision of these library services, such requests represent an additional demand on staff resources which, though real, is difficult to measure and provide for in the annual budgets.

The possible benefits to be achieved through the use of computers is being examined at all the Centers. Increasing numbers of research scientists and economists are joining the Centers who are accustomed to having a computer available as a tool to assist them in their endeavours. Moreover, program support and administrative staff are looking to the computer as a device which can resolve the problems of processing information quickly and accurately. On the other hand, Centers are located in countries of the world where the range of computer equipment and services found in North America is not generally available. Moreover, the increasing use of computers in the developing countries already is outstripping the capability to supply adequately experienced staff to support computer usage. This study is concerned in part with helping the Centers to develop strategies to meet their requirements in this important field.

The Future

The emerging national programs in the developing countries and the Centers' desire to contribute through the provision of resources and technology will expand, as will the need to transfer technology through training and education. The increasing inflationary problems facing donor nations and the planned growth of the Centers will place even greater constraints on the availability of supporting funds. The direction of the Centers will be influenced by the future mix of scientists with their varying backgrounds and management styles. How long a Center will exist and whether it eventually will be turned over to the host government depends in part on the development of key regional personnel. These are all relevant concerns that must be addressed in the future. But in the immediate horizon two important issues will require management attention at all the Centers - the operation of management accounting and reporting systems which satisfy both external and internal needs and the development of a practical computerization strategy which delivers the power of the computer effectively to all the Centers, whatever their environmental constraints. The following sections present our findings, conclusions and recommendations on these two key topics.

V. MANAGEMENT ACCOUNTING AND REPORTING PRACTICES

The responsibility to provide financial information to Center management and several external agencies demands that Center reporting practices be reliable and consistent within each Center and across all Centers. To date, through the initiative and efforts of the Consultative Group, progress has been made in developing generally agreed upon budget terminology and standard financial reports. These developments are reflected in the annual budget submissions of the six international agricultural research Centers who have agreed to present to the Consultative Group similar annual statements of financial position.

These initial practices and procedures are a good starting point, avoiding many of the complexities inherent in some accounting and reporting systems. Their success to date is to be commended inasmuch as a level of uniformity in reporting has been achieved. Nonetheless, with expectations of continued growth, the investment in administrative resources and information systems is attracting considerably more attention from both the Centers and their sponsors. The quality of the content and the comparability of the information from Center to Center now is the principal focus of attention. For this reason, our review, while specifically addressing the possibilities for increased harmonization in reporting, was concerned more fundamentally with assessing the reliability of the information collection process which forms the basis for all accounting reports.

A. FINDINGS

Management accounting and reporting responsibilities under the Center Controllers include all processing of grants, income and expenditures as well as financial statement preparation. The functions of payroll also fall within the duties of the Controller, except at CIAT and CIMMYT where they are specifically excluded. The techniques used to generate and report financial information differ from Center to Center. CIMMYT and IITA utilize computers; IRRI employs accounting posting machines; CIP, CIAT and ICRISAT rely entirely on manual systems.

The timeliness and content of the financial reporting varies from Center to Center, with only IITA currently producing a complete set of budget centre reports, an income statement and a balance sheet within five to six working days after the month end. The established Centers employ approximately the same levels of staff in their accounting departments while CIP and ICRISAT, because of their early stage of development, employ fewer. Though the physical processing and manpower characteristics differ, the primary functions and activities of each Center in supplying financial information are similar. Hence the comments which follow apply generally to all of the Centers visited.

With respect to external reporting requirements and the accounting process, both the Centers and the donors have every reason to be concerned about the quality, reliability and comparability of the information reported. In the first instance, the basis of collecting financial information differs among the Centers, as does the application of financial accounting policies and practices. While most financial officers at the Centers expressed a desire to have these matters clarified, it should be noted that commonality of financial and administrative reporting has not been a major concern to the Centers. In addition, the information reported to the Consultative Group or to special project sponsors frequently is not readily available in a convenient form from the financial records and is subject to special reporting practices.

Accounting responsibilities, procedures and information flows generally are neither detailed nor documented. Similarly, supporting systems that sustain the accounting records lack evidence of formal definition, having evolved as required to meet immediate needs. Indeed, the administrative support functions common to all the Centers differ markedly in operation. These include purchasing, inventory, payroll, self-sustaining activities and auxiliary service operations. It should not be concluded that the accounting processes themselves are unsound nor that the personnel are incompetent. Rather, the pattern of growth of the accounting and reporting systems in the Centers has been reactive and individual, so that the resulting content of accounting information provided the supporting systems makes comparability among the Centers virtually impossible.

With respect to internal reporting, the extent and content of internal financial reports available to managers varies considerably among the Centers. While internal reporting is essentially a monthly or quarterly report of actual expenses against budget by budget centre, in some cases these reports reflect the expenditures of the complete budget centre

while in others only selected categories of expenditure are reported. At the same time, program leaders, managers of support services and auxiliary service operations are becoming increasingly concerned with the management of their costs and their demands for financial information are increasing. Already, several requests for additional information have been expressed. These range from the elementary request of a budget centre wishing to know the extent of budget dollars remaining after deduction of actual expenditures and outstanding purchases to the more complex reporting requirements of a program leader or Center Director searching for the total actual plus committed expenditures of a research thrust crossing several budget centres. These internal requests for management and financial information are not being satisfied fully by existing cost collection and reporting systems and managers and program leaders are depending on private reporting systems to meet their needs. These information demands will expand and must be satisfied. In the majority of cases they remain unsatisfied not from a lack of desire to provide the information but rather from the inability of the system to meet these requests.

With respect to administrative support systems, physical inventory management and record maintenance generally are not operating to the satisfaction of Center management. The very nature of the research activities, the geographical location of the Centers and the scope of activities all impose constraints on the variety and quantity of consumable supplies required to maintain continuity of operations. Investment in physical inventory varies among the Centers but the frequency of shortages, the extent of pilferage, and the amount of annual write-offs are of concern to all Center management. Apart from the operating difficulties which these system deficiencies present, their inadequacy adversely affects the reliability of accounting information.

Another aspect of purchasing causing concern relates to the complexities of purchasing goods from abroad. Without exception the level of inventory carried by a Center is dependent upon its proximity to the source of supply. The further this distance, the greater the investment in inventory. Primary sources of supply frequently are located in foreign countries so that the time lag from the placing of an order through confirmation and shipment, clearing customs and final receipt can take at the best of times approximately six months. These delays are disruptive to the research activity and cumbersome to the administrative routine. Nevertheless, much of this foreign purchasing

is unavoidable and substantial cost savings also can be achieved on many items. Improved foreign purchasing practices and procedures could relieve many of the difficulties currently being encountered, while ensuring the continued cost benefits to the Centers.

One feature of all the Centers visited was the competence of those individuals charged with the responsibility of managing the complex financial and accounting activities. This is fortunate, since in a sophisticated research environment the key resource is personnel. The Controllers have done well in establishing accounting practices and procedures and adapting to the reporting requirements developed by the Consultative Group, particularly since all Controllers, with the exception of one, have been with their respective Centers for less than two years. However, Center Controllers have had little opportunity to meet and discuss their common and unique problems and all Controllers indicated a desire to meet with their counterparts for this purpose. In view of the importance of the financial management function and the increasing external requirements for commonality of reporting, such dialogue would be helpful indeed.

To compound this absence of dialogue, several of the Centers have experienced turnover in their financial support staff. Irrespective of the reasons, financial officers have been faced with the often difficult and certainly time consuming task of attracting and indoctrinating replacement staff. As a result, the requirements in supervision have increased and the time available to plan, administer, and evaluate results has diminished. Only a portion of their time has been devoted to the development and refinement of existing supporting administrative systems and training and development of financial support personnel is limited. Unless appropriate action is taken, these difficulties and constraints will increase to even more serious levels.

B. CONCLUSIONS

As a result of these findings, several important conclusions can be drawn. In the first place, although all Centers are attempting to improve the quality of reported financial information, they have not achieved commonality in content. A common framework for the collection of costs would contribute appreciably to a uniform interpretation and understanding of reported results and budgets. Indeed, harmonization of reporting to external agencies can never really be achieved unless the substance of the information is homogeneous.

Secondly, in pursuing the objective of commonality in content, emphasis should be placed not on the reporting but rather on the underlying collection processes and accounting policies employed. If the information generated from the accounting system is to be useful, consistency in the application of accounting policies and practices is essential. Within any given Center, adherence to well conceived accounting policies can offer reliability and consistency over a period of time. Similarly, uniform adoption of such policies across several Centers can provide the same benefits. Local environments and unique circumstances make it impossible to achieve uniformity among the Centers on all accounting policies. However, consistency in the application of major accounting policies and practices can be achieved. For example, agreement on the method of recording of expenditures (either on a cash basis or on an accrual basis) is one area where uniformity of application is possible. Other accounting policy matters of concern and common to all Centers are:

* donor and other receivable recording policies
* inventory valuation and related policies
* fixed asset valuation and recording policies
* liability recording policies
* overhead calculation policies
* freight allocation policies
* distribution of support service costs policies
* income recording policies
* surplus and deficit policies
* currency translation policies

Thirdly, the steps taken to clarify basic collection processes and underlying accounting policies and practices will have benefits in terms of satisfying internal reporting requirements as well. In the same way that donor agencies are concerned with the quality and reliability of the information reported, so are program managers, Controllers and Center Directors. It is important that the information reported internally be equally as credible as that developed for external purposes. As requests for a variety of internal reports and information grow, it is essential that the basis of collection be firmly established and understood. Since only one set of accounting policies is necessary, steps taken to clarify accounting practices to support external reporting will pay dividends internally as well.

Fourthly, two primary systems, foreign purchases and inventory control, are significantly deficient and their importance warrants immediate attention to their improvement. Their significance to the operations and their interrelationship already have attracted the attention of Center managers. While the function of purchasing must be structured to the individual needs of each Center, all Centers are involved in substantial purchasing from abroad. Because foreign purchases are duty free, they offer a cost advantage which represents a significant portion of the total purchasing activity. Moreover, as a result of the long delivery times, foreign purchase orders often are reflected as outstanding commitments on the Center's financial statements, thereby reducing the availability of budget funds for other expenditures. A common approach to handling foreign purchasing activities clearly would lead to a lessening of some of the difficulties experienced by individual Centers. Moreover, the maintenance of an adequate supply of materials to ensure the on-going operations of the Center demands that the methods employed for the physical control and proper recording of inventory movement be thoughtfully defined. Furthermore, since effective inventory valuation and control procedures are essential to ensure that investment is properly reflected in the financial records of the Centers, their development on a common basis would be desirable.

Fifthly, a number of improvements are required to other administrative and operating systems but these are of lower priority. It is true that self-sustaining operations, physical plant services, buildings and ground services and motor pool operations do feed information through to the accounting records. In addition, these areas have their own requirements for information to assist in effective management. However, the different operating environment of each Center suggests that improvements might best be achieved on an individual Center basis and that no significant advantages are likely to accrue through common development of these secondary systems. Furthermore, these systems are not causing serious operating difficulties and their impact on other information systems such as accounting are less significant, so that it is appropriate to assign to them a lower priority for improvement at this time.

Finally, the question of accounting personnel is and will continue to be a serious concern for all Centers, quite apart from the accounting system and practices themselves. The level of skill of accounting and other administrative support staff varies substantially from Center to Center. In some cases adequate resources are readily available, while in others extreme difficulties are experienced in attracting even a minimally qualified staff. As a result, considerable management time

is devoted to supervising support personnel and the personal development of the staff continues to take second place to the day-to-day demands. More adequate training and development of support staff is essential if the current level of day-to-day supervision is to be reduced in the future.

C. RECOMMENDATIONS

On the basis of our findings and conclusions, the study team presents five recommendations with respect to management accounting and reporting:

* The Centers should develop a common framework for their charts of accounts. Conceptually, the major classifications should be uniform while the detailed accounts should be structured to satisfy the individual requirements of each Center.

The development of effective reporting systems capable of providing comparable management information across all Centers depends upon the existence of a common framework for collection and classification. Without such a framework, confidence in the quality and content of the information reported, irrespective of whether it is distributed internally or externally, will remain illusive. This is not to suggest that each Center must adopt processes of accounting which are identical in all respects; given their respective operating environments, this clearly would not work. However, the Centers must develop an agreed framework within which administrative and supporting systems can evolve to satisfy both the individual and unique requirements of each Center and the common external requirements. Though each will have individual needs for variant operating and administrative procedures, a uniform framework can be constructed which will permit the necessary tailoring to meet individual Center needs. Appendix A presents a concept of a chart of accounts which may be useful as a starting point in this regard.

A number of benefits will accrue from such a common framework. Consistency of application will promote a common interpretation of results. In addition, harmonization of collection and classification methods will give evidence of effective control and suggest a level of uniformity in reporting and interpretation which will rest well with donor agencies. Furthermore, with a uniform framework in place, individual

Centers can make modifications to meet emerging requirements without affecting the overall interpretation of results. Finally, individual flexibility within common structures will permit systems development to proceed independently across the Centers.

* The Centers should identify, develop, and document accounting policies and practices which can be applied uniformly across the Centers.

Once a common framework has been developed to ensure that Center management and donor agencies understand the information reported, it is essential that they be assured of its reliability. This requires that financial policies and practices to be applied to all Centers be identified and defined. The Consultative Group's initial Accounting and Budgeting Practices and Procedures will require further clarification as part of this process. Common accounting policies will contribute to a consistent interpretation of reported information. Once both the classification of information and the underlying accounting policies are applied uniformly across the Centers, the concerns related to the reliability of the accounting reports can be expected to diminish. The financial policies listed previously in this section are not intended to be an exhaustive list but they will, if defined and uniformly adopted, be most useful in moving towards common information reporting.

* The Centers should develop common approaches to operating and managing the primary supporting systems for foreign purchasing and inventory control.

Though it might appear desirable to have all Centers employing similar administrative and operating systems, realistically this can never be achieved. The different characteristics of each Center and the different personnel involved both play a significant role in shaping the number and sophistication of administrative and operating systems in use in each Center. Nevertheless, there are opportunities where a common approach to similar functional activities can be beneficial. The foreign purchasing and the inventory control functions are of this type.

The purchasing function serves both local purchases and foreign purchases. The procedures adopted for local purchases normally are not complicated and reflect the pecularities of the local environment. These characteristics will vary from Center to Center and should be

addressed individually. On the other hand, all Centers are concerned with the complexities involved in purchasing from abroad. Each experiences lengthy delivery times, problems of confirmation, and difficulty in determining and reporting the status of outstanding orders. In addition, foreign purchases usually involve the assistance of foreign agents and always present problems of local customs and clearance. To be able to process these foreign orders and minimize these complexities, to satisfy the queries of the requisitioners, and to reflect accurately the level of outstanding commitments demands that the foreign purchasing system be clearly defined. Moreover, though the materials purchased may differ, the problems of processing are common to all Centers, so that a collective effort to define the important processes can and should be undertaken. We would anticipate that such a common approach will go a long way to satisfying individual commitment reporting requirements and to resolving the numerous queries from requisitioners as well.

Similarly, the management and physical control of inventories lend themselves to a common approach in all the Centers. Clarification of procedures for physical control recording of receipts and issues, valuation and reporting will contribute to smoother operations and a better understanding of inventory costs charged to the operating departments and research programs. Once confidence in the inventory records is established, meaningful minimum balances and re-order quantities can be developed and introduced. Besides relieving the scientist from the need to monitor the balances of essential supplies, this further element of inventory management can reduce substantially the frequency with which orders are placed, thereby contributing to a reduction in administrative effort and costs.

* The Centers must address collectively the question of training and development of administrative support staff, although this training should be undertaken on an individual Center basis.

In conjunction with the systems development activities recommended above, each Center should undertake a program to provide adequate training to the financial and administrative staff. Training in the understanding of the administrative and financial systems will assist in ensuring compliance with the policies and practices to be employed. Training in the management of these specific functions not only will contribute to the personal development of the employee but also will

lessen his dependence on senior management for assistance and supervision. Employee confidence in the performance of duties is essential if further system refinement is to be undertaken.

This kind of training activity requires the senior managers in administration and accounting to identify those functional areas within their organizations where training would yield the greatest benefits. These areas ideally should include accounting, purchasing, inventory management and payroll. The training should not be directed towards the teaching of basic accounting or administrative management, since these topics might better be left to universities or management courses conducted outside the Center. Rather, training should focus on ensuring that supervisory staff have a sufficient understanding of their functions to enable them to make day-to-day operating decisions. Senior managers must train these individuals to understand the purpose of their duties and the specifics of how they are to be performed to satisfy the requirements of the Center. Moreover, senior managers must provide supervisory staff with the support and encouragement needed to carry out the work expected of them.

* The senior financial officers of the Centers should meet to define specific implementation plans for each of the above recommendations.

The introduction of common practices can only be achieved if all the Centers have an opportunity to discuss and express individual concerns. Joint approaches to the chart of accounts, to accounting policies and practices, to the development of primary supporting systems and to training activities cannot be established in isolation. Furthermore, participation by all Centers in resolving these issues will provide a sound basis for future co-operation and development. The study team believes that a meeting should be convened for these purposes as soon as practical.

D. APPROACH TO IMPLEMENTATION

The implementation of the management accounting and reporting recommendations presented in this section must recognize the current status of the Centers and the evolutionary patterns likely to occur over the next few years. Two Centers have been in operation for less than

two years and, while this is not a constraint, varying stages of development do exist among the Centers. Moreover, each has its own individual concerns although there are common requirements to be satisfied.

In the approaching the joint development of common accounting structures, policies and practices, a work program consisting of three phases is suggested. These phases are:

Phase I - Organization and Start-Up
Phase II - Work Sessions
Phase III - Implementation

Phase I - Organization and Start-Up

To achieve the best results in the implementation of the project, a Project Team should be established. Each Center should appoint one senior member of the administrative staff, preferably the financial officer, to be responsible for ensuring that the Center's requirements are fully satisfied. This individual should be committed to the success of the project and should possess strong leadership skills as well as a good background in accounting and management. Once the Center participant has been selected, he should identify the individual requirements of his Center. Additionally, as part of the preliminary work that must be completed in this first phase, each Center representative should examine those accounting policies which require clarification and develop his own thoughts as to how they may best be applied. The criteria to be satisfied by the foreign purchasing and inventory control systems also must be established for each of the Centers at this point.

Once these initial activities have been accomplished the Center participants should convene their first meeting as a Project Team, inviting a representative of the Consultative Group Secretariat to participate to ensure that the concerns of donor agencies are fully addressed. Once the Project Team is convened, a Project Chairman should be selected from among the Center participants and the assignment of specific responsibilities and tasks to project members should be undertaken.

Phase II - Work Sessions

Phase II is concerned with the actual development of the detailed chart of accounts, the accounting policies and practices and the primary systems. To achieve co-ordination of these efforts, all project team members should participate and contribute the results of their individual and preliminary efforts. Project members responsible for specific areas should ensure that any agreed developments realistically can be implemented by all Centers. Where specific ideas present difficulty, they should be highlighted clearly. With regard to the chart of accounts, existing operating and information requirements of each Center must be satisfied and information which might be required later as part of a more complete management information system, must be capable of being captured without the need for a complete redesign at some future date. All necessary accounting policies must be clearly defined, understood and accepted for implementation by each of the Centers. Similarly, the main elements of a system for foreign purchases and inventory control must be clarified and be capable of implementation at each of the Centers. Internal reporting forms and information flows may vary from Center to Center but the major control features should be similar. Furthermore, once the details and common elements have been identified and accepted. by all Centers, an overall time frame must be established for their implementation and detailed individual plans must be prepared and approved.

Phase III - Implementation

This phase involves the implementation of all the decisions reached during the working sessions. It will be the responsibility of each project participant to implement at his respective Center the recommendations developed by the team. Reports on the progress of implementation and problems encountered during the introduction of change should be provided to the Project Team Chairman for follow-up. Through this joint effort to develop solutions to common concerns, the Centers will be encouraging a level of co-operation which is becoming increasingly more important and which will provide significant downstream benefits in the future.

* * * * * * * * * * *

In summary, the above recommendations and implementation suggestions are intended to lead the Centers to improved structures and policies developed through collective action. As a result of these developments, it is anticipated that the Centers will exhibit a posture of strength opposite the donors and external agencies and will be in a position as a group to take the initiative in making necessary reporting modifications in the future. Similarly, on an individual basis, the Centers will be confident in the knowledge that their systems are collecting useful information and the Controllers will be able to satisfy the internal demands for information. Of course, these results cannot be achieved overnight, but they are well within the reach of the Centers in the intermediate future.

VI. COMPUTING NEEDS AND CAPABILITIES

Scientists at the international agricultural research Centers frequently are responsible for maintaining and reporting large amounts of information, as in the area of the collections of genetic material for the various crops. They are involved also in performing statistical analyses of experimental data. Moreover, administrative processes at the Centers require the storing and retrieving of a variety of information. Under certain conditions where complexity is great or volumes of data are large or where speed is of the essence, the computer can be of great value for such applications. In this respect, the international agricultural research Centers are no different from typical computer users throughout the world. What makes the situation of the Centers unusual is that the computing capability available to meet these requirements and the conditions or circumstances surrounding its availability are not ideal in many respects.

In this section of our report, the study team presents its findings, conclusions, recommendations and implementation suggestions concerning the question of computing power needs, the kinds of power desirable and available, the staff required to operate and manage the computing capability and the practices which will ensure that each Center makes maximum use of the computer power it has available, whatever its circumstances.

A. FINDINGS

Applications

In assessing the requirements for a computing capability at the Centers, an examination was made of the existing and potential applications for which a computer might be used. These include research program applications, program support applications and administrative applications.

The research program applications are those which relate directly to the performance of research work. Those of particular interest to the Centers are:

* Design and preparation for experiments
* Engineering design calculations

* Inventory control of physical genetic material
* Mapping of information by geographical area displaying ecological, hydrological, fertility or land use data
* Modelling and simulation of problems in farming systems, watershed management or economics of farming operations
* Storage, analysis and retrieval of data related to experiments, surveys, animal breeding and meteorology
* Storage and retrieval of germ plasm data.

Program support applications are those of use to the staff who provide support services to the research programs. The applications of particular value to the Centers include:

* Compilation of selective circulation lists for information distribution and automatic addressing
* Plant maintenance control
* Preparation of bibliographies and retrieval of abstracts
* Storage and retrieval of laboratory analysis results
* Typesetting and test editing

The final group of applications are those which support administrative processes. Those worthy of note are:

* Cost collection and financial reporting
* Fixed asset control
* Inventory control
* Payroll preparation

The applications listed above are by no means exhaustive of the possible opportunities for computer usage at the Centers. Rather, each of these applications was identified more than once during the visits to the Centers. Of all these applications, the study team found that particular interest was expressed in the analysis of experimental and survey data using computing power and in the storage of data related to genetic material.

Computer Power

Today a wide range of computers are manufactured which could be employed for some or all of the applications above. Desk top computers,

for example, are used for performing mathematical calculations. They require very little in the way of operating or programming skills and do not require stringent control of the temperature and humidity of the operating environment. The range of peripherals available to connect to such equipment is increasing and includes graph plotters, punched card and mark sense readers, random access storage devices, tape storage devices and high speed printers. Secondly, mini-computers, originally developed for specific purposes such as on line control systems in military and manufacturing environments, are now widely in use. Their small size, high reliability and wide range of tolerance of operating conditions have resulted in their increasing use for conventional data processing when connected to appropriate peripheral equipment. Computerized accounting machines are in use for simple administrative processes. Their restrictions relate to the need for manual input of data and their limited storage and limited output reporting capabilities. General purpose computers, the typical data processing computers, range in size from small through medium to large. These generally possess high-speed input devices, storage capability for large volumes of data and flexible report production capabilities.

In all but the most developed countries, computing capabilities are not yet available such that the user can ideally match his requirements. Desk top computers, for example, are available in the countries visited. However, not many are in use and difficulties are being encountered in obtaining adequate maintenance. Little usage of mini-computers for conventional data processing was found during the course of the study. Suppliers or their representatives were not found at all in Colombia or Nigeria. Small computers and computerized accounting machines, on the other hand, were in use and adequate maintenance appeared to be available for their operation in all the countries visited. Medium and large computers also were in use somewhere in all of the countries visited, but on a limited basis. It was found not practical in any country at this time to make computer power available by using a combination approach involving a terminal located at the Center connected to a computer at some other location. This is due to the generally poor quality of telecommunications services available. A notable exception to the comments made above on the availability of computers occurs in the case of Mexico, where large numbers of computers are in use covering most ranges and sizes.

Currently, a Center can meet its computing power needs by:

* Purchasing or renting a computer to be located at the Center, and providing for its own associated services such as keypunching, or by

* Purchasing computer time and services from an outside agency.

In the case of purchasing or renting a computer to be located in-house, all the Centers have access to equipment suppliers or their representatives for all ranges of computers, except as noted previously. However, where suppliers have only a few machines of a specific type in the country, difficulties have been experienced in maintaining a complete range of spare parts. This problem is further compounded in those countries where difficulties are experienced in moving urgent imports rapidly through customs. The alternative involving the purchasing of computer time and services is likewise available to all the Centers although, in the cases of ICRISAT and IITA, the opportunities are much more limited than for other Centers. As part of this second alternative at all the Centers, there are opportunities to access computers at other research or national institutions located within the country. While the capabilities available are not ideal in all cases, these institutions do represent sources of computer power now and for the future. Whatever the source, the utilization of purchased time presents certain problems, since:

* the location of the computer is not always convenient to the Center.
* the service provided is often unreliable due to lack of suitable staffing, computer capacity and varying priorities for processing at the computer centre.
* the time taken to process data at the computer centre may be too long to meet the requirements of the user.

However, the purchase of computer time and services does represent the best option available to meet many of the Centers' needs.

Staff

In any computing environment, appropriately trained staff are necessary to perform computer hardware maintenance, to undertake

systems analysis and programming, and to handle computer operations. The requirements for maintenance, programming and operations personnel generally have been met by training local staff to support the computers in use in those countries where the Centers are located. However, more serious problems are present in all these countries with regard to the adequacy of computer systems analysis competence to assist the user in utilizing the equipment. A shortage of this kind of assistance exists throughout the world, but it is especially acute in the lesser developed countries where rapid growth in the number of installations is increasing the demand while experienced staff regularly move to more developed countries where higher salaries can be obtained and technical aspirations better satisfied. In the case of the Centers, an increasing number of their own professional staff are familiar with computer processing techniques and in many cases are knowledgeable in the use and operation of the computer. This was found to be particularly true in the cases of biometricians and economists, whose prior training appears to have brought them into greater contact with computers.

Operations and Management

The operations function delivers the computer capability to the user. Effective operations require that basic principles in the design and operation of computer-based systems are followed. These principles include accurate and adequate documentation and adherence to defined standards for system design, programming and operation. The study team found that systems and programs at the Centers currently using computers are generally documented. In many cases, however, these require more rigour and completeness to meet acceptable levels. Recognition of the need for standards also is emerging at the various Centers. However, at this time standards have not been documented formally. The process of managing a computing capability requires that annual plans for the function be formulated and that corresponding financial requirements be incorporated into the budget. The Centers have been giving this area more serious attention recently, although greater emphasis has been placed on the budgetary aspects and much less on the plans. Annual performance reviews for the function cannot be undertaken without such plans, and, not surprisingly, the study team found that regular performance reviews of the computing function were not conducted.

B. CONCLUSIONS

On the basis of these findings, the study team has reached several key conclusions concerning the question of computing needs and capabilities at the Centers. In the first place, the eventual requirements for computing capability at all the Centers are similar. However, there are differences in the needs of today and in the availability and suitability of resources. This situation will necessitate the development of separate plans for each Center to meet its unique situation.

Secondly, there are opportunities to assist all functional areas in the Centers through the use of computer power. However, in the light of scarce resources, primary efforts should be directed to the support of the research program with secondary emphasis on the support services and the administrative services. Analysis of the individual applications and the opportunities for common development suggest a further criterion for prioritizing applications - those applications which meet a significant need and where an opportunity exists for common development for use at all Centers. Special efforts should be made in these situations in view of the leverage which can be obtained from their development.

Thirdly, within the research program the principal area of opportunity is in the development of a system of programs for handling the storage and retrieval of the large volume of information on the germ plasm collections. This area rapidly is becoming of major significance to the Centers, in that all are involved in assembling large collections of genetic materials for specific crops. There is a demand from scientists around the world for catalogues of the material in these collections. Scientists currently spend time searching for materials possessing specific sets of characteristics; the effort required in this task can be reduced significantly by utilizing computer techniques. Indeed, both the production of current catalogues of the varieties and the performance of searches of the varieties are major problems to the scientist, which represent a major opportunity for the utilization of computer systems. The development of a capability of this nature will yield an extremely valuable tool for the International Board for Plant Genetic Resources, established by members of the CGIAR to co-ordinate the process of collection and preservation of genetic material throughout the world. The study team believes that the most cost effective approach to the development of a system of computer programs for the storage and retrieval of germ plasm information will involve a combined effort by a group on behalf of all the Centers.

Fourthly, there are several opportunities for using computer power which should be considered as second priority applications. These should be approached on an individual basis by each Center and include the following:

* Design of and preparation for experiments
* Engineering design calculations
* Modelling and simulation
* Storage, analysis and retrieval of data
* Storage and retrieval of laboratory analysis results

Other applications previously discussed would not impact significantly on the scientific program and should be considered of low priority at this time. It should be noted, however, that improved manual systems or alternative forms of mechanization are available and practical to meet some of these needs, such as the use of the Remac System for preparing bibliographies. With respect to the administrative functions, regular meetings of the financial staff of the Centers will provide an appropriate vehicle for the exchange of information relating to the degree of and approach to computerization being adopted by each Center in the administrative area.

Fifthly, the strategies adopted by the various Centers to obtain computer power will vary, depending on the immediate requirements and on the availability of the computer power. Exhibit 2 identifies the suitability of the various alternative types of computers for each application. Generally, the needs of all Centers would be met best by a medium to large scale computer with comprehensive libraries of prewritten computer programs. However, no individual Center currently has sufficient usage of such a machine to justify its own . Furthermore, the ability of the Center to meet its needs in some cases is limited by the availability of computer power in an appropriate form, since not all of the Centers can obtain access to such machines located at commercial service bureaux in the countries where they are located. Despite the growing use of computers in many of the countries, a general availability of computers will continue to be restricted due to limited foreign exchange by local businesses to purchase equipment from outside the country and as a result of opposition to the use of computers to perform tasks which otherwise could be carried out on a manual basis by an under-employed work force. These disparities which exist from Center to Center in the availability of computer capabilities will continue in the coming years.

SUITABILITY OF COMPUTING ALTERNATIVES BY APPLICATION

Application Areas	Computer Equipment Suitability						Special Application Packages
Research Program Applications	Desk Top	Mini	Accounting	Small	Medium	Large	
a) Design and preparation for experiments	*	Yes	*	Yes	Yes	Yes	
b) Engineering design calculations	*	Yes	No	Yes	Yes	Yes	
c) Inventory control of physical genetic material	*	Yes	No	Yes	Yes	Yes	
d) Mapping of information by geographical area	*	*	No	Yes	Yes	Yes	
e) Modelling and simulation	*	*	No	*	Yes	Yes	
f) Storage, analysis and retrieval of data	*	*	No	*	Yes	Yes	File Management Statistical Analysis
g) Storage and retrieval of germ plasm data	*	*	No	*	Yes	Yes	File Management
Program Support Applications							
a) Compilation of selective circulation lists for information distribution and automatic addressing	*	Yes	*	Yes	Yes	Yes	
b) Plant maintenance control	*	Yes	No	Yes	Yes	Yes	
c) Preparation of bibliographies and retrieval of abstracts	*	*	No	Yes	Yes	Yes	Bibliographic
d) Storage and retrieval of laboratory analysis results	*	*	No	Yes	Yes	Yes	File Management
e) Typesetting and text editing	No	*	No	*	Yes	Yes	Typesetting
Administrative Applications							
a) Cost collection and financial reporting	*	*	*	Yes	Yes	Yes	Financial
b) Fixed asset control	Yes	Yes	Yes	Yes	Yes	Yes	
c) Inventory control	*	Yes	*	Yes	Yes	Yes	Inventory Control
d) Payroll preparation	*	*	*	Yes	Yes	Yes	Payroll

* The suitability is dependent on both the sophistication of the proposed application and the particular computer configuration.

Exhibit 2

However, the use of computers by the Centers will continue to increase as the availability of suitable computers improves and as the users become more familiar with the benefits that can be obtained. In the meantime, it is likely that all Centers will develop some in-house capability for computing using some combination of the equipment types available, but excluding medium and large computers. Exhibit 3 presents the study team's assessment of the availability of computing power to the various Centers.

Sixthly, the provision of a computer capability requires that all Centers have available computer systems analysts capable of translating user requirements into delivered operational systems and programs. A shortage of systems analysis skills exists at the Centers which must be corrected if the computers are to be utilized effectively. Moreover, all Centers have a particular requirement for the skills of a biometrician who will be a significant user of the computer and who will contribute in the areas of design of experiments and the utilization of the most appropriate techniques for analysis of the data. Such skills are available only to some Centers at this time.

Finally, there is a need for strong technical management of the computer function, placing emphasis on standards and policies for the development of computer applications and their documentation. Standards must be developed for use at each Center covering the areas of systems design and development, programming and system operations. Moreover, a formal planning process is required, such as takes place in other Center operations, including the provision of adequate budget resources, and an on-going assessment of the ability of the function to meet its goals. The degree of success achieved in this function will be related directly to the level of service provided to the user. This in turn depends upon the computing power available and the ability of the systems analyst to take maximum advantage of the available power to meet the user needs.

The similarity of some potential applications for computer processing from Center to Center could present opportunities in the future for programs and systems developed at one Center to be converted for use at another. For example, the user of the same series of programs for statistical analysis of data and data storage and retrieval would provide benefits to the users if the experiences and developments could be shared. The use of general purpose, high-level programming languages such as COBOL or FORTRAN, coupled with standards for the development and documentation of systems and programs will maximize the opportunity for the conversion of such systems from one Center to another.

COMPUTER AVAILABILITY IN THE COUNTRIES WHERE CENTERS ARE LOCATED

TYPE OF COMPUTER	SERVICE BUREAUX	ACCOUNTING MACHINES	DESK-TOP	MINI	SMALL	MEDIUM	LARGE
FULL RANGE OF U.S. PRICES FOR EQUIPMENT MANUFACTURED	Not Applicable	$7,000 to $55,000	$2,000 to $55,000	$7,000 to $175,000	$40,000 to $270,000	$200,000 to $1,000,000	$800,000 to $12,000,000 +
PRICE RANGES APPROPRIATE TO THE CENTERS	See Note 1	$25,000 to $40,000	$10,000 to $35,000	$20,000 to $175,000	$120,000 to $140,000	Not Applicable	Not Applicable
CIP	Yes See Note 2	Yes	Poor	Poor	Yes	Not Applicable	Not Applicable
CIAT	Yes See Note 2	Yes	Yes See Note 2	No	Yes	Not Applicable	Not Applicable
CIMMYT	Yes	Yes	Yes	Poor	Yes	Not Applicable	Not Applicable
IITA	Poor	Yes	Poor	No	Yes	Not Applicable	Not Applicable
ICRISAT	Poor	Yes See Note 2	Yes See Note 2	Poor	Yes	Not Applicable	Not Applicable
IRRI	Yes See Note 2	Yes	Poor	Poor	Yes	Not Applicable	Not Applicable

Notes: 1. Impossible to make general statement due to variation in supplier and country.
2. Country has few installations and/or Center is in poor location.

Exhibit 3

C. RECOMMENDATIONS

The primary thrust of the following recommendations is aimed at enabling the Centers to proceed with the difficult task of planning their computing capabilities. In preparing these recommendations the study team has taken into consideration the varying environments of each Center and the differing stages of development reached by each. At the same time, maximum advantage has been taken of the similarities that exist in the application areas.

* The most appropriate general strategy for the Centers in approaching the procurement of computing power is:

  1. To the extent possible utilize medium and large scale general purpose computer systems available from an outside group, and purchase desk top computers to meet statistical analysis and other related requirements.

  2. Obtain an in-house small general purpose computer or mini-computer, if the previous alternative is not practical for the Center.

In general, a computerized accounting machine should only be used to meet administrative requirements when it is the most cost effective alternative and provided that other possible needs for in-house computer power for other areas have been taken into account.

Continued attention should be given to the development and maintenance of close professional relationships with members of national research institutes located in the same country, in order that the Centers can make maximum use of any computing power available through these institutes.

The plan required by each Center for the procurement of computer power is different and each Director has recieved individual recommendations specific to his Center. In summary, the computer power acquisition recommendations for the Centers are as follows:

* CIP — CIP should invest approximately $18,000 U.S. to acquire a desk top computer to satisfy statistical analysis requirements. More extensive computing power, to meet other research needs should be obtained from local service bureaus. A small general purpose or mini computer should be considered only when service bureau costs begin to exceed $3,000 U.S. per month or if the service is unsatisfactory. Mechanization of accounting and administrative systems should not be undertaken at this time.

*CIAT — CIAT should expand its computation capability by the purchase of a second desk top computer at a cost of approximately $18,000 U.S. Requirements of the research programs which cannot be satisfied by the desk top computer should be met by utilizing computers located at other agencies in the country. Acquisition of a computerized accounting machine, currently under consideration by CIAT, should only be undertaken after a more thorough assessment. The required steps in this assessment are outlined in the detailed recommendations provided directly to CIAT.

*CIMMYT — CIMMYT is in the process of upgrading its desk top computer capability for statistical analysis. Adequate computing power is available from outside sources to satisfy the other requirements of the Center. In the short term, accounting and administrative applications can be satisfied by the recently acquired accounting machine; however, a thorough assessment of its appropriateness should be undertaken again within eighteen months.

*IITA — IITA meets its computing requirements by renting a small general purpose IBM 1130 computer. IBM has indicated that maintenance of this machine will be discontinued in two to three years. The essential steps required to plan for the replacement of this computer are outlined in the detailed recommendations provided directly to the Center.

*ICRISAT — ICRISAT should purchase a desk top computer at a cost of approximately $18,000 U.S. to satisfy statistical analysis requirements; at the same time other external sources of computing power should be used to service requirements not appropriate to this computer. In the future, if the Center cannot obtain adequate computing power from external agencies, the in-house capability should be upgraded by acquiring a small general purpose or enhanced mini-computer.

*IRRI — IRRI should acquire a more sophisticated desk top computer to meet current statistical analysis requirements at a cost of approximately $18,000 $U.S., additional computing power can continue to be obtained from external agencies to meet other data processing requirements. Mechanization of accounting and administrative requirements should only be considered after improvements in the management accounting and reporting have been implemented.

* The Centers should make maximum use of available computing power by the provision of suitable computer support staff to the users.

Those Centers having insufficient computer systems analyst support available to them must take steps to meet the shortage. This can be done in one or more of the following ways:

a) by training scientific staff to use the equipment available, particularly where only desk top computers are involved

b) by recruiting the necessary staff

c) by sub-contracting the systems and programming to outside firms

However, the Centers should obtain locally any computer operators and programmers required to meet their needs. With respect to biometrician skills, this opportunity to reinforce computer systems analyst skills should be exploited to full advantage. Centers deficient in the skills of a biometrician should assess the requirement and meet it by recruiting a biometrician to the staff or identifying sources external to the Center which can be used on a consulting basis.

* The Centers should include in their annual program and budget adequate provision for the planning and operations of the computing function, including the allocation of specific responsibilities for its management.

Both the function and its position in the organization should be defined and, inasmuch as the Centers already are utilizing computers to some extent, the responsibility can be allocated formally in the immediate future. The management of the computing function includes responsibility for the preparation of the program and the budget, for the adherence of applications to policies, for design, programming and operations standards, for the production of the necessary documentation and finally for obtaining adequate staff for the function.

The position of the person charged with those responsibilities will vary from Center to Center. Where the major user and coordinator of the function is already the statistics department, the head of this department could be responsible. On the other hand, where there are two major users, one in the administrative area and the other in the research area, the responsibility should be given to an Associate Director, with further delegation of these responsibilities to personnel in each area.

* The Centers should develop and implement policies and standards for the development and documentation of systems and programs and for operations management.

All programs and systems in regular operational use require to be documented. The documentation process should take place over the period from original design of the system to on-going operation. All Centers are in the position either of having programs utilized on a regular basis or of considering the development of them. At the present time, no Center has formal standards for documentation in the computer area. It is possible to obtain documentation standards from many sources. However, it would be most appropriate to select a particular set of standards and tailor these to the specific environment of the Centers. This work could be performed by anyone familiar with the development of such standards and with the requirements of the Centers themselves. Standards developed for use at one Center then would be equally applicable to any other Center.

* Immediate action on behalf of all the Centers should be taken in the area of storage and retrieval of germ plasm data. The Centers should support the establishment of a group with responsibility for the development and implementation of a series of programs capable of storing and retrieving germ plasm data in a form that would be of use to all Centers.

The requirements for such a system are in the present, although the major benefits will accrue in the longer term. Poor decisions and the development of inappropriate techniques for storage and retrieval will be costly over the long term. Moreover, the ability to make changes in the strategy and approach, once the individual systems are developed and operational, will be difficult to obtain. A united approach to the development of a general purpose program on a limited international basis could ensure the establishment of standard definitions and units of measurements associated with describing plant material and would simplify the interchange of material in computerized format. Furthermore, the development of sophisticated search techniques could be more easily justified on a joint basis.

The implementation of such a system will involve the consideration of hardware and software implications, the development of a general system concept and the provision of adequate project management to ensure its satisfactory implementation. With respect to the hardware implications, the study team believes that the execution of our previous hardware recommendations by each of the Centers will provide the computing resources necessary to support the system. The questions of software, system concept and project management will warrant careful consideration, since the level of effort and the nature of the skills required to de sign and implement such a system capable of general purpose usage is beyond the capability of any one Center. Accordingly, a specific approach to these matters is suggested in the implementation section of this report.

D. APPROACH TO IMPLEMENTATION

The first major recommendation with respect to the development of computing capability involves the evaluation and selection of equipment for purchase by the Centers. Funds must be identified and agreement

obtained on their use, following which detailed evaluation and selection processes can be undertaken. Of particular importance to the Centers in the acquisition of computing equipment are the following factors:

* quality of maintenance services based on vendor history
* cost of the various components involved in the maintenance agreement including travel and parts
* amount of training and technical assistance available to the user
* availability of back-up equipment
* availability of special purpose packages applicable to the users' requirements

The second major recommendation involves the development of a computer systems analyst capability at the Centers. An example of a job description for a senior systems analyst suitable to the needs of the Centers is presented in Exhibit 4. In those cases where Centers have to recruit senior computer systems analysts from abroad to assist in the formation of their computer capability, they should consider joint recruiting process to identify suitable candidates. This should lead to cost savings for the Centers.

The third major recommendation relates to the set of computer programs capable of being used for the storage and retrieval of information on germ plasm. This recommendation should be met by developing a system which can be adapted easily for use at any Center with any crop. The development and implementation of such a system over all the Centers will be a lengthy process. For this reason, criteria should be devised early such that the system developed can be expanded over the long term to meet the requirements of a comprehensive system, while enabling a more restricted version to operate in the short term (fifteen to eighteen months). It is anticipated that these criteria would constrain mainly the reporting component of such a system.

In order to proceed with the development of this genetic materials information system, a work program of four phases is suggested. These phases are:

Phase I - Project Organization and Start-Up
Phase II - Requirements Definition and Conceptual Design
Phase III - Detailed Design and Development
Phase IV - Implementation

Exhibit 4

JOB DESCRIPTION FOR A SENIOR SYSTEMS ANALYST AT AN INTERNATIONAL CENTER

Core Function

Provides for the delivery of the necessary computing capability to the Center including selection and provision of appropriate equipment and computing power, systems analysis, programming and operations. Provides liaison with users.

Responsibilities

1) Maintenance of standards for programming, systems analysis, operations and documentation.

2) Provision of cost estimates for proposed applications.

3) Evaluation of requirements for and availability of computing power.

4) Provision of the necessary computing power.

5) Provision of the resources and management for the implementation of application systems.

6) Provision of the necessary resources and management for the operation of systems.

7) Maintenance of security and back-up for files and programs.

Duties

1) Organizes the development and operations of systems.

2) Arranges for necessary computing power and ancillary services to be made available to the user.

3) In conjunction with the user, arranges for systems design, programming and the production of specifications.

4) Selects any necessary permanent or temporary staff and resources for the function.

Interaction

All users at the Center, computer hardware suppliers, computing centres, computer personnel within and outside of the Center.

Required Knowledge and Skills

Bachelor's degree or equivalent. Aptitude in statistics and accounting. Five or more years in data processing, with experience in programming in high level languages, systems analysis, systems implementation and operations.

Salary

In the United Kingdom or Europe	4,000 pounds to 6,000 pounds
In the United States or Canada	$17,000 to $21,000

Phase I - Project Organization and Start-Up

At the outset, it will be necessary to form a team capable of carrying out a project of this nature. This team would include a project manager, agronomists on a consulting basis, systems analysts, programmers and support staff. The manner in which the team will operate, its reporting relationships, its place of operation and other similar administrative matters should be clarified to the satisfaction of both the Centers and the team, before the project begins in earnest. In addition, the systems policies and standards to be used also should be agreed at this time.

Phase II - Requirements Definition and Conceptual Design

The first major activity in the project will be the definition of the requirements to be satisfied by the system. It is anticipated that key areas of interest to the user will include capabilities which:

* permit the specification of input formats and data editing requirements for a particular crop
* provide for the detailed items of information on the crop to be stored in the computer file
* permit the specifications of the format and content of the reports required
* provide for selective searches of the file for items having certain specified characteristics

Once the requirements have been defined and documented, a conceptual design should be prepared. It is envisioned that the design would be based on the concept of a crop profile which would allow the user to adapt the system's full capability to the particular characteristics of the crop. Once the design concept has been prepared, the hardware and software constraints imposed by the existing computing capabilities of the Centers should be identified and a search for appropriate software already in existence should be undertaken. These activities will prepare the necessary groundwork for detailed design and development.

Phase III - Detailed Design and Development

This phase includes the physical design of the system and its specification, and the programming and testing of the system. A carefully developed testing process will be carried out to ensure that the system is fully operational prior to its release.

Phase IV - Implementation

Implementation should be undertaken initially on a single crop at a single Center, in order to ensure that implementation problems can be resolved in a controllable environment. Subsequently, the implementation of the system would be carried to all other Centers, following which it could be made available for use by other interested groups. It should be noted that, by following the recommendations previously presented with respect to the development of computing capabilities, all of the Centers will have access to adequate computing resources to operate a free standing system of the type envisioned for this genetic materials information system. At some point, responsibility for the maintenance and on-going development of the system should be handed over to an agricultural research Center who will be interested in the continuing development of the system.

The success of this project depends in large measure on the ability of the project manager to deliver a free-standing system to the Centers within a reasonable time frame such as eighteen months. To accomplish this, a carefully developed detailed work plan should be prepared for the project and used as a management tool throughout the project's life. Appendix B presents a basic work program which may prove useful as a guideline in developing this detailed plan.

APPENDIX A

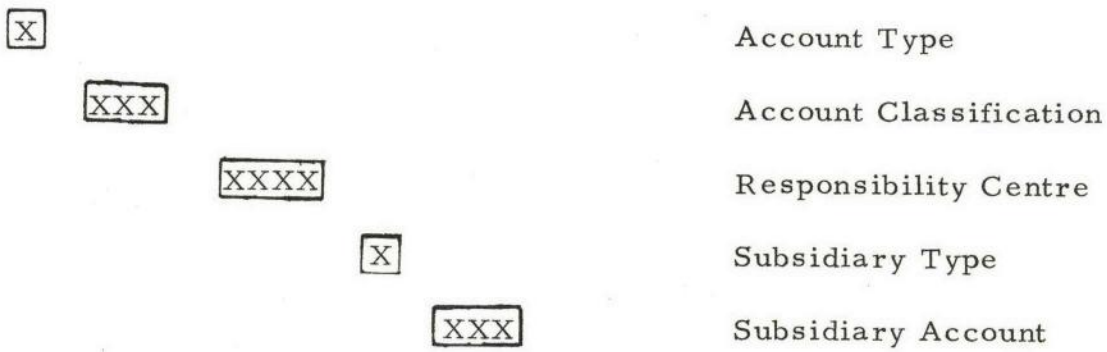
SUGGESTED FRAMEWORK

FOR

CENTERS' CHARTS OF ACCOUNTS

A. GENERAL STRUCTURE

A typical overall framework for the Centers' charts of accounts which each Center could tailor to its own needs is presented in this appendix. The general ledger account number would consist of a maximum of 12 digits divided into five sub-sections which would identify the following information:



Account Type

Purpose: To identify the major type of account, i.e. asset, liability, etc.

Structure: A one-position numeric code.

Detailed Format:

Account Type Code	Description
1	Assets
2	Liabilities
3	Capital Balances and Unexpended Funds
4	Grants
5	Revenues
6	Expenses

Account Classification

Purpose: To identify the nature of each account within an account type.

Structure: A three-position numeric code.

Detailed Format:

Account Type & Code		Account Classification Code	Description
Assets	1	100	Cash
		200	Accounts Receivable
		300	Inventories
		400	Fixed Assets
		900	Other Assets
Liabilities	2	100	Accounts Payable (Donors)
		200	Accounts Payable (Other)
		900	Other Liabilities
Capital Balances and Unexpended Funds	3	100	Capital Grants
		200	Operating Grants
		300	Special Projects
Grants	4	100	Capital Grants
		200	Core Operating - Restricted
		300	Core Operating - Unrestricted
		400	Special Projects
		900	Other or Unspecified
Revenues	5	100	Revolving Fund Income
		200	Interest Income
		300	Crop Sales Income
		900	Other Income
Expenses	6	100	Salaries
		200	Travel Expenses
		300	Training Expenses
		400	Supplies Expenses
		500	Administration Expenses
		600	General Program Expenses
		700	Equipment Replacement Expenses
		800	Laboratory Expenses
		900	Other Expenses

Responsibility Centre

Purpose: To identify any unit within the organization with responsibility for the control of expenses.

Structure: A four-position numeric code.

Detailed Format:

Responsibility Centre Code	Description
1000 - 5000	Direct Research Responsibility Centres
6000	Training
6500	Library and Documentation
7000	Support Units
7500	Administration
9000	Special Projects

The direct research responsibility centres will not be common across the Centers. However, a level of uniformity can be established if all Centers employ the series 1000-5000 for direct research responsibility centres. The balance of the responsibility centres can be established under the major responsibility centre descriptions as identified above. Detailed responsibility centres within these groupings should be established on an individual basis. With respect to the direct research responsibility centres, typical examples which illustrate how these codes should be utilized are:

Institute	Responsibility Centre Code	Description
CIP	1000	Potato Research
	1100	Potato Research - Pathology
	1110	Potato Research - Pathology - Research Contracts

Institute	Responsibility Centre Code	Description
CIAT	1000	Animal Sciences
	1100	Animal Sciences - Beef
	1110	Animal Sciences - Beef-Husbandry
CIMMYT	1000	Wheat
	1100	Wheat - Breadwheats
	1700	Wheat - Agronomy and Physiology
IITA	1000	Grain - Legume Improvement
	1100	Grain Legume Improvement - Biochemistry
ICRISAT	1000	Plant Sciences
	1100	Plant Sciences - Chick Peas
IRRI	1000	Rice Research
	1100	Rice Research - Agronomy
	1250	Rice Research - Agricultural Engineering

Subsidiary Type

Purpose: To provide differentiation between major types of specific subsidiary information

Structure: A one digit numeric code

Detailed Format:

1 Project Subsidiary Information
2 Staff Accounts Receivable Information

Subsidiary Account

Purpose: To provide a unique code for project subsidiary information or staff accounts receivable information

Structure: A three digit numeric code

B. ILLUSTRATIONS OF THE STRUCTURE

The following eight transactions, typical of Center accounting activity, have been classified in accordance with the suggested chart of accounts structure in order to illustrate the structure in an operating manner:

A Grant Pledged by the Danish Government:

1	212	XXXX	X	XXX	Accounts Receivable - Grants - Danish Government	DR.
4	312	XXXX	X	XXX	Grants - Core Unrestricted - Danish Government	CR.

A Grant Received from the World Bank:

1	101	XXXX	X	XXX	Cash - ABC Bank (U.S.)	DR.
1	220	XXXX	X	XXX	Accounts Receivable - Grants - I.B.R.D.	CR.

A Special Project Grant Received:

1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	DR.
4	401	XXXX	X	XXX	Special Project Grant	CR.

Salary Expenditure Against a Special Project:

6	100	9401	X	XXX	Salary Expense - Special Project	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

A Travel Expenditure Incurred by the Purchasing Department:

6	220	7540	X	XXX	Travel Expense - Purchasing Department	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

Income from Sale of Potatoes to an Employee:

1	250	XXXX	2	505	Staff - Accounts Receivable - Mr. X	DR.
5	310	XXXX	X	XXX	Income - Crop Sales - Potato	CR.

Interest Earned on Investments:

1	101	XXXX	X	XXX	Cash - ABC Bank (U.S.)	DR.
5	200	XXXX	X	XXX	Interest Income - Investments	CR.

Supplies Expense in Agricultural Engineering Related to Soil and Crop Management for Rice:

6	400	1250	X	406	Supplies	DR.
1	105	XXXX	X	XXX	Cash - ABC Bank (Local)	CR.

APPENDIX B

BASIC WORK PROGRAM

FOR

GENETIC MATERIALS

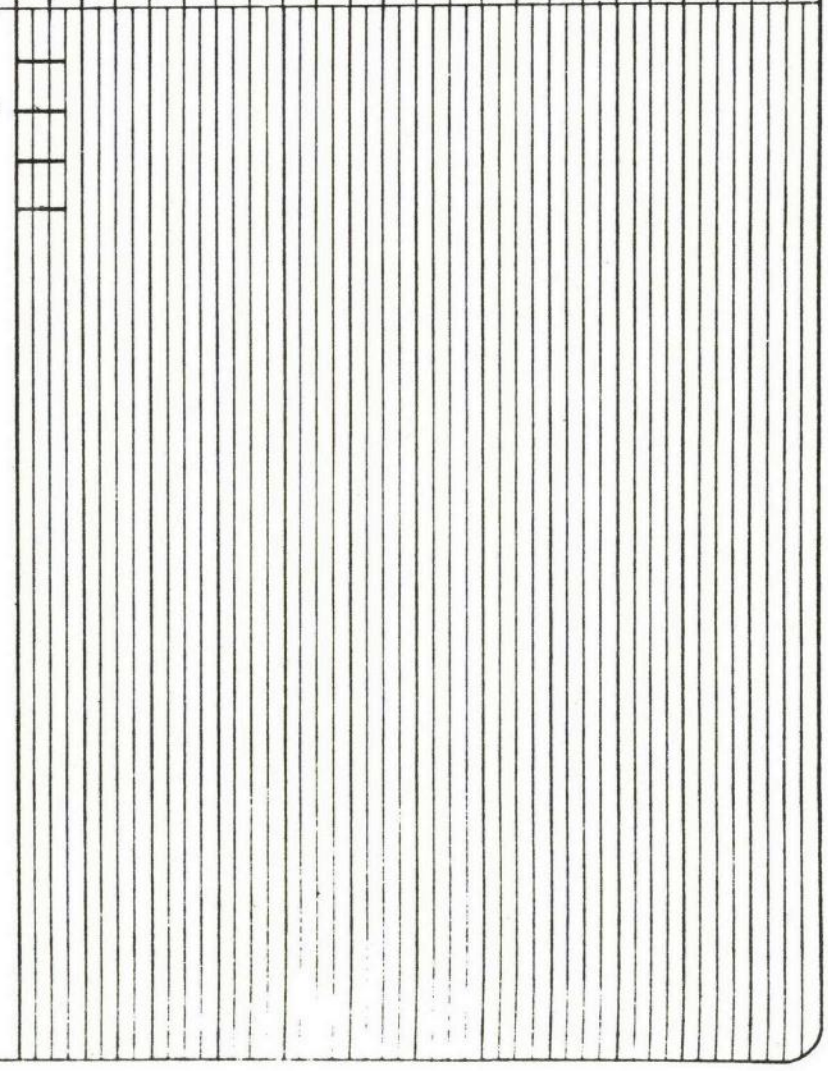
INFORMATION SYSTEM

The success of the project to develop a genetic materials information system depends in large measure on the ability of the project manager to deliver a free-standing system to the Centers within a resonable time frame such as eighteen months. To accomplish this, a carefully developed detailed work plan should be prepared for the project and used as a management tool throughout the project's life. The following is a basic work program which may prove useful as a guidelines in developing this detailed plan.

BASIC WORK PROGRAM FOR GENETIC
MATERIALS INFORMATION SYSTEM
PHASE I - PROJECT ORGANIZATION AND START-UP

REFERENCE		PROGRAM STEPS
Phase	Task	
I	1	Select and organize project team
	2	Identify policies and standards for use of the team during the project
	3	Formalize liaison and approval procedures
	4	Finalize housekeeping and contractual arrangements

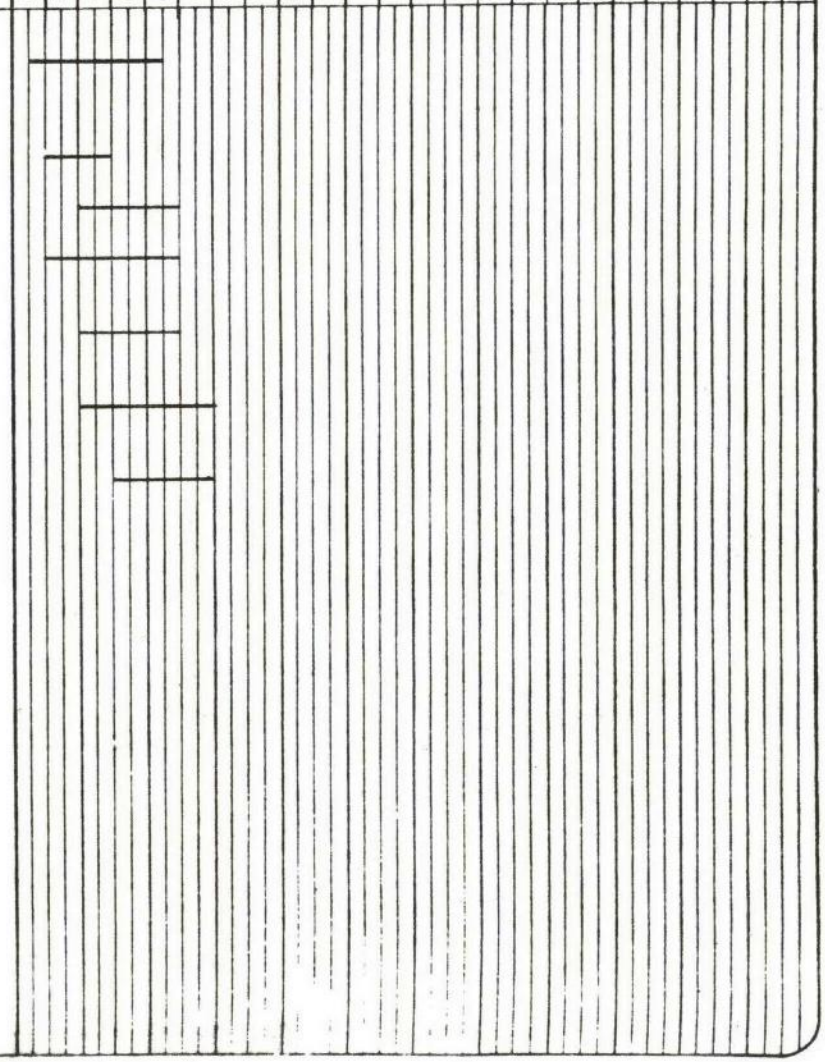
PROGRAM SCHEDULE
In Months



BASIC WORK PROGRAM FOR GENETIC
MATERIALS INFORMATION SYSTEM
PHASE II - REQUIREMENTS DEFINITION AND CONCEPTUAL DESIGN

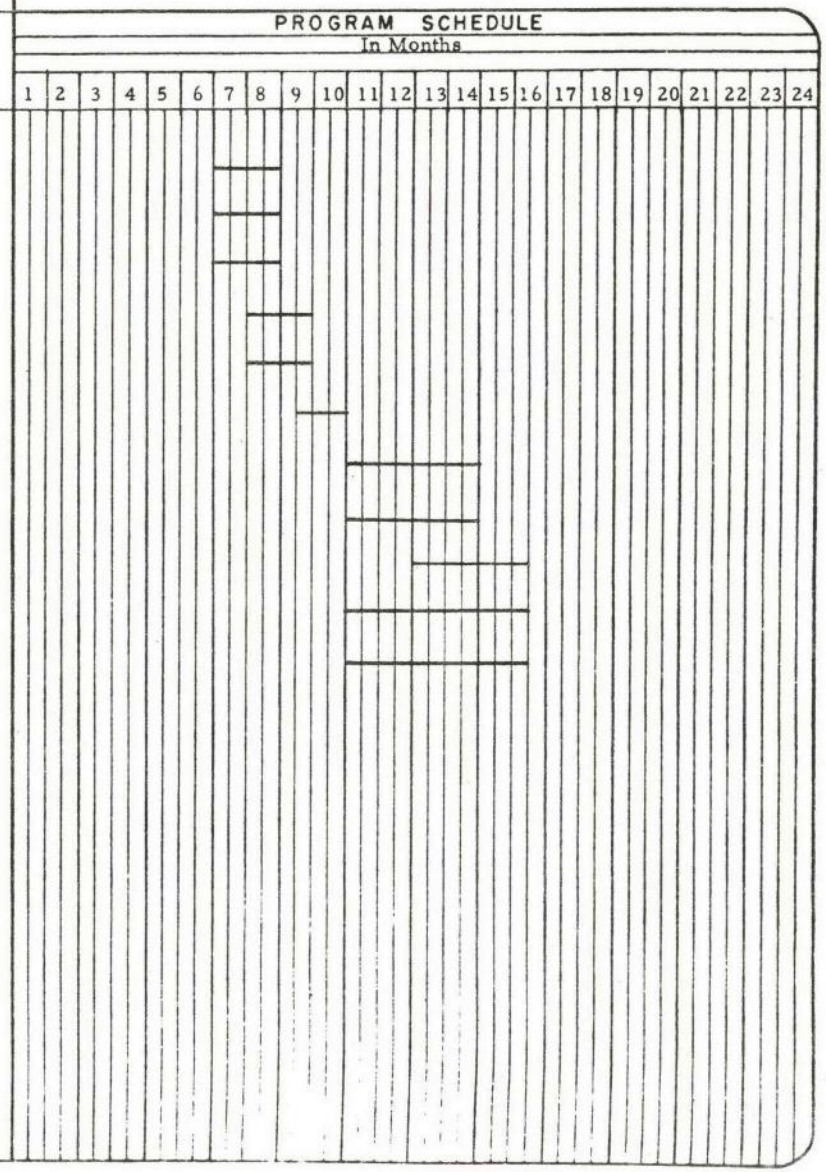
REFERENCE		PROGRAM STEPS
Phase	Task	
II	1	Specify, for all crops for which the Centers maintain genetic material, the areas and detailed elements of information to be stored in the data bank
	2	Specify the retrieval requirements of the system
	3	Prepare a conceptual design for the system
	4	Identify computer hardware constraints to be applied to the components of the conceptual system design
	5	Review other mechanized systems for storage and retrieval of genetic information
	6	Survey existing software systems that could be used for such a system
	7	Develop a statement of the conceptual functions of the proposed system

PROGRAM SCHEDULE
In Months



BASIC WORK PROGRAM FOR GENETIC
MATERIALS INFORMATION SYSTEM
PHASE III - DETAILED DESIGN AND DEVELOPMENT

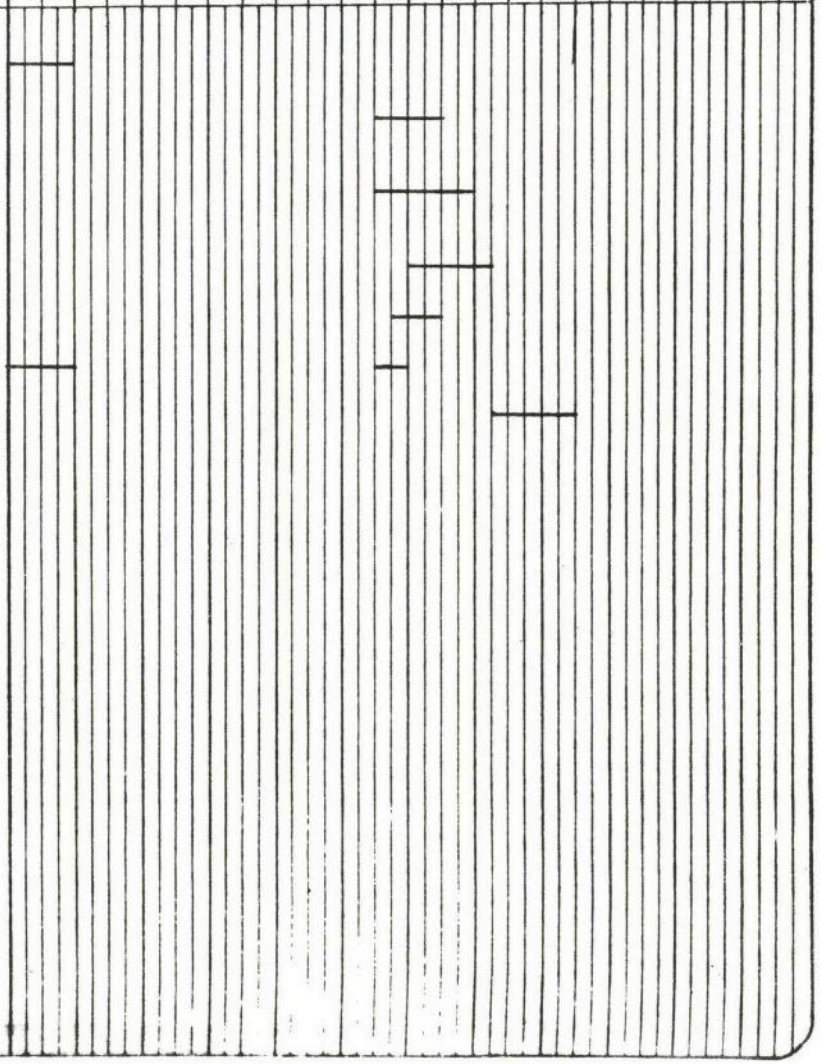
REFERENCE		PROGRAM STEPS
Phase	Task	
III	1	Design the system module for input
	2	Design the system module for file maintenance
	3	Design the report production module
	4	Design system reports, files and inputs
	5	Integrate the modules and document the system design
	6	Prepare program specifications
	7	Code and test programs
	8	Develop systems test data
	9	Perform system tests
	10	Prepare procedures for computer operations
	11	Prepare user instructions



BASIC WORK PROGRAM FOR GENETIC
MATERIALS INFORMATION SYSTEM
PHASE IV - IMPLEMENTATION

REFERENCE		PROGRAM STEPS
Phase	Task	
IV	1	Select crop for first implementation
	2	Develop profile for the crop describing input data, file information and reporting requirements
	3	Develop and document all coding systems required to describe the characteristics of the selected crop
	4	Collect data for conversion
	5	Design and implement procedures for maintenance of the data base
	6	Identify the computer for operating the system
	7	Implement on the selected computer system

PROGRAM SCHEDULE
In Months



CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

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61

July 11, 1974

TO: Participants in International Centers Week

FROM: Executive Secretariat

SUBJECT: Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers

1. Participants in International Centers Week will recall the consideration by the Consultative Group last year of a paper entitled "Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers." It was remarked that the paper would be revised from time to time in the light of experience.

2. A new draft of the paper has now been prepared. As did the earlier version, it describes the use of funds, the preparation of budget requests, and the accounting for funds by the centers. It has been somewhat expanded from the 1973 draft, but otherwise is not fundamentally revised.

3. The new draft is for discussion as Item 3 in the provisional agenda for the Consultative Group meeting which begins on August 1.

Attachment

DRAFT

BUDGETING AND ACCOUNTING PROCEDURES AND PRACTICES OF INTERNATIONAL AGRICULTURAL RESEARCH CENTERS

ICW/74/3

DRAFT

Budgeting and Accounting Procedures and Practices of International Agricultural Research Centers

1. This paper describes a common framework of budgeting and accounting procedures and practices for the international agricultural research programs supported by the Consultative Group on International Agricultural Research (CG).

2. The concepts, definitions and report formats proposed in this paper are still evolving. It is desirable that work be continued to refine and extend the statements contained in the paper.

Section I: Definitions and Usage

A. Program

3. A program is defined as a set of organized activities designed to progress toward defined objectives.

4. The core program of a center or institute is a set of long-term activities designed to progress toward the center's fundamental objectives in research and training, as described in a basic statement approved by the center's governing board (which some centers refer to as their "mandate"). The hallmark of the core program, so far as content is concerned, is that it represents the initiative of the center and carries the approval of the governing board. So far as finance is concerned, the core program is funded by several donors (often eight or more).

5. The core program need not be confined to the headquarters of an institute. A core program may be carried on away from headquarters and even outside the host country, by an institute's own staff, by contract with another research organization or laboratory, or by other cooperative arrangements with national or regional institutes (sometimes called linkages, although this term seems to be obsolescent).

6. A core program may consist of a number of different activities aimed at different research questions or action targets. These activities may be referred to as programs or program elements; centers sometimes call them "thrusts." A multiple-crop center, for instance, is considered to have a program for each crop (or group of related crops) with which its activities are concerned (e.g., the Grain Legumes Improvement Program of IITA).

B. Special Projects

7. Special projects usually are highly specific in purpose and limited to a definite span of time. They are often financed by a single donor, and may or may not be continued or renewed when the donor's support comes to an end.

8. In contrast to the content of a core program, the content of a special project is often stipulated by the donor and/or by the client. The project usually consists, basically, of making practical use of a center's research results or its expert staff in a single country (which may or may not be the center's host country).

9. A large class of special projects is composed of outreach programs. These typically are programs of technical assistance by the personnel of an international institute to research or extension efforts in a developing country, carried out under a contract with the recipient country and financed by that country with the help of an outside donor or donors. Examples include IRRI outreach projects in Bangladesh and India, and CIMMYT's assistance to wheat programs in countries of northern Africa.

10. Another class of special projects is composed of training exercises, carried out for the benefit of trainees from a particular country or region, and financed by a donor particularly interested in that country or region. Examples are some of the training exercises carried out by CIAT with the financial support of the Inter-American Development Bank.

11. Special-project funding also is used for other purposes, for instance:

a. Urgent projects to solve an urgent problem which an international center is particularly qualified to handle and which presumably can be solved in a short time (e.g. IITA's program on bacterial blight in cassava).

b. Pilot activities in which an untried concept needs to be tested before its larger application or wider funding can be proposed (e.g. IRRI's machinery-development program).

c. Short-term holding operations, pending the permanent assignment of a research problem to the international center which will have the long-term responsibility for it (i.e., sorghum research at CIMMYT which will eventually pass to ICRISAT.

12. The funds for special projects are not included in the allocations made within the framework of the Consultative Group. It often is not possible to understand the budget of a center, however, without knowledge of special project activities, and these should be adequately described in the budget presentations of the centers.

C. Capital Expenditures and the Capital Development Plan

13. The research institutes classify as capital those tangible assets which are not consumed in current operations: for instance, buildings, land, vehicles, equipment and furniture. In instances where it is desirable to buy a substantial part of imported items of supply in advance of actual use, a base stock inventory is established and is treated as a capital requirement.

14. Replacement of capital assets and nominal additions to them (for instance, vehicle replacements and additional library books), however, are not classed as capital items. They are considered to be running expenses and are charged to the core budget.

15. It has been a common practice for the established research centers to devote as much as 10-12 per cent of their combined core and capital budget to capital expenditures. Some institutes, however, have much larger requirements, since in their present state of evolution, many of them have yet to complete their basic physical facilities of land, buildings and equipment.

16. The plan for the creation of a center's basic physical facilities should be described in a plan or program for capital development, approved by the Board of Trustees and presented to potential donors of the Consultative Group in advance of commitments for construction or large purchases of equipment.

17. The capital development plan includes the cost of acquiring land, of construction, of equipment and furnishings, of developing land for cultivation, and of services and fees associated with these items, including fees for architects and consultants. Expenditures for the plan usually extend over a period of years and should be programmed year by year.

18. Capital expenditures obviously are of central importance to the planning and budgeting of an institute, since the capacity of the institute's facilities will have an important influence on the level of operations and running costs. These expenditures may also provide an element of flexibility in an institute's financial commitments and cash flow, since (unlike the recurring expenditures of the core program) they may be speeded up or slowed down according to the availability of funds.

19. Apart from the financing of capital purchases, most centers have or are creating funds for working capital. They are used to cover core or capital (but not special project) expenditures when cash transfers from donors lag behind commitments; and they are replenished to their original level when donor commitments are fulfilled. The Consultative Group has accepted that center budget proposals may include provision for working capital equal to 40 days' average cash requirements for core expenditures and acquisition of capital items. For the purpose of calculating the amount of working capital needed, cash requirements are not considered to include funds whose flow is assured (e.g., capital grants, mentioned in paragraph 23(d) below).

20. In some circumstances (e.g., when a building program is completed), the need for working capital may decline. In such a case, the superfluous part of the fund should be transferred to income and used for the approved core and capital program.

D. Funding and the Use of Funds

21. The resources for the work of a center are provided partly in the form of grants or contracts made by donors and partly from the income of the

center itself. They are applied to purposes (core, capital, special projects or other) approved in detail by the center Trustees for a specific year and (apart from special projects) accepted by the Consultative Group for that year.

22. When an unforeseen change of funding leads a center and its Board of Trustees to desire a substantial change in its distribution of expenditures in a year for which grants already have been approved, the center will ask for the concurrence of the Chairman of the Consultative Group. In considering concurrence, the Chairman will consult donors concerned and also, if necessary, the Chairman of the Group's Technical Advisory Committee.

23. Grants are made by donors on various terms:

(a) Some donors simply make funds available for a center within a given budget year (which for all centers is the same as the calendar year), without a particular specification of purposes for which the funds may be used. Such funds, however, usually are meant for core programs, and a center wanting to use them for any other purpose should obtain the permission of the donor.

(b) Most donors indicate that their funds may be used both for core operations and capital expenditures; and they are satisfied to let the center decide the distribution between the two.

(c) Some donors limit their funds to use in the core program of a center. If their assistance is available, at the center's discretion, for any part of the core program, such funds are customarily referred to as "unrestricted core" or "core unrestricted" grants. In other cases, funds are made available to apply to or to offset costs of, elements of the core program specified by the donor; and funds of this kind are customarily referred to as "restricted core" or "core restricted" grants.

(d) Grants limited to capital expenditures are rare, but sometimes occur, especially for the purpose of financing a capital development plan. Some donors must follow special and rather difficult procedures in order to make grants for the costs of construction, and some prefer to avoid grants of this sort altogether.

(e) Special projects are not presented to the Consultative Group for funding. Funds for this purpose are likely to be offered by, or solicited from, an individual donor interested in the type of project in question. Grants for special projects nevertheless have a relationship to the financing of a center's other activities; they should not only be adequate to pay the direct costs of the project, but should include amounts sufficient to compensate the center for any burden put on its general services and staff.

24. Grants made for a specified purpose may not be used for another purpose. For example, grants made for core operations may not be used for the capital development plan, and vice versa; nor may core and capital grants be used for special projects.

25. Apart from funds directly provided by donors, centers have other income, referred to variously as "earned income" or "special income." Earned income results from the incidental sale of animals, crops and assets, from interest earned on cash balances; and from recovery from special-project grants of a fair share of general operating costs attributable to such projects.

26. Such income is intended for use in the year in which it is earned. It may be used anywhere within the approved core or capital program (but not for special projects) of a center. It reduces by the amount of the income the amount of funding requested from donors for the year in question.

27. Centers also have income from special projects which is intended to offset core expenditures occasioned by such projects (paragraph 22(e) above). This is often referred to as "indirect income," and is treated in the same way as earned income.

28. At the end of a year, a center may have funds which it has not spent and which it has not committed or obligated for the year's activities. These are to be treated in the same way as earned income in the following year. It should be remembered, however, that some donors are not authorized to permit the carry-over of their grants from one year to the next. The carry-over of funds by a center therefore should not exceed the amount of grants it has free from such limitation unless carry-over of additional funds is specifically negotiated with as many donors as may be necessary to make up the total amount of the carry-over. The Secretariat of the Consultative Group is prepared to lend its good offices for such negotiations.

E. Classification of Expenditures

29. To make the annual budgets of international agricultural research institutes comparable with each other and more easily evaluated by donors, recurring expenditures are assigned by the centers to more or less standard program and activity headings. The following are commonly used:

(a) Research. This category shows the cost of study and investigation aimed at the improvement of crops, animals or agricultural systems. Separate totals are shown for each program element or thrust.

(b) Research Support (or Research Services). This item includes activities carried out in direct support of research. It shows totals for the costs of farm (or station) operations, of laboratory services, and of scientific personnel whose time may be divided on an occasional basis among two or more research activities.

(c) Conferences and Training Activities. This category includes the staff, travel, subsistence and other identifiable costs of training programs, conferences, workshops, symposia, seminars and the like. The total for training is shown as an item separate from conferences and similar activities.

(d) Library, Documentation and Information Services. This category shows the annual cost of library services, of the publication of the annual report and of technical bulletins, of translating, of printing and of various public information activities.

(e) General Administration. This item shows totals for the costs of the Board of Trustees, of the office of the Director-General, and of administrative functions such as accounting, personnel administration, and procurement.

(f) General Operations. This category shows the costs of operating and maintaining the physical plant (such as the costs of buildings and grounds maintenance, the motor pool, utilities, telecommunications, office rent, insurance, security guards and the like).

(g) Other. If money is to be allocated to a contingency fund, it is shown under this heading. In projections of expenditures in future years, allowance for price rises is shown here.

i. One center (CIMMYT) shows its headquarters expenditures for special projects here. In other cases, these costs may be shown under General Administration (especially when the Director-General's office includes staff concerned with the development and supervision of outreach programs). No standard treatment of core costs attributable to outreach activities yet exists.

30. In addition, core expenditures are classified not only by individual programs and activities, but also by the kinds of services or materials paid for. These objects of expenditure include personal services, vehicle costs, staff travel and so on.

31. Capital allocations also are shown as a class of expenditure. A distinction is made between actual expenditures, on the one hand, and appropriations to working capital funds (paragraph 19 above) on the other.

F. Staffing

32. The research centers classify staff as well as expenditures, as a help to analysis of activities within a center and within the Consultative Group system as a whole.

33. Staff nomenclature varies among institutes. In general, however, the centers divide staff into three or four broad categories: (a) senior (or principal) staff, sometimes referred to as "international staff"; (b) technical and supervisory staff (often referred to simply as support staff); (c) clerical staff; and (d) other support staff. Categories (c) and (d) often are combined and, in at least one center, are referred to simply as general staff. All categories, however, refer to permanent staff, and not to seasonal or occasional employees.

34. In most cases, numbers of senior (or principal) staff are a major determinant of expenditures. They tend to influence the number of support staff required and the requirements for equipment and other facilities. Ratios of senior to other staff, however, obviously cannot be expected to be uniform among centers.

35. In most cases, the best indicators of the type of staff contained within each classification are (a) the functions performed (e.g. research team leader), (b) the method of recruitment (i.e., whether confined to the host country or extended to other countries as well), (c) qualifications (educational degrees and employment experience) and (d) level of salary paid.

36. The following lists of titles give an indication of how staff tends to be classified at the research centers. Some titles appear in more than one category, since the actual level of the posts designated by them may vary from one center to another:

Senior Staff

Director
Senior Scientist
Associate Scientist
Engineer
Controller
Treasurer
Executive Officer
Visiting Scientist
Statistician
Librarian
Economist
Editor

(Technical and Supervisory) Support Staff

Research Assistant
Research Associate
Laboratory Assistant
Laboratory Technician

Farm Manager
Post Graduates
Statistician
Statistical Assistant
Librarian
Editor
Accountant
Administrator
Supervisor

Clerical Staff

Secretary
Clerk
Accountant
Administrative Assistant

Other Support Staff

Technician
Mechanic
Driver
Laborer
Guard
Messenger
Cleaner.

Section II: Programming, Budgeting and Review

37. The members of the Consultative Group and its Technical Advisory Committee meet periodically during the year for the purpose of formulating positions on research and training programs and providing finance for them. Within the annual cycle of meetings, the research institutes are responsible for providing three documents which serve (a) to set out their financial position, (b) describe their scientific programs and findings, and (c) present their proposals for future activities and expenditures.1/

38. The Center's financial position is shown in an annual report prepared by an independent auditor. The report contains a certified balance sheet showing the position of a Center at the end of its program year. Including the value of fixed assets, cash holdings and liabilities outstanding. The report also indicates what funds were received by the Center for what purposes, indicates how they were applied, and analyzes the year's expenditures as nearly as possible in terms of the kind of expenditure classification suggested in Section I:E of this paper.

1/ Subcommittee on Center Review Procedures, Report, Nov. 20, 1973.

39. Tables illustrating the presentation of these data are given in an appendix to Annex 2 of this paper. The Balance Sheet is discussed more fully in Annex 2: "Practices and Procedures Used in Accounting for Assets, Liabilities, Capital Balances and Unexpended Funds."

40. The auditor's report should be completed by March 1, and should be in the hands of the Consultative Group soon thereafter.

41. Centers commonly distributed scientific and technical information in periodic bulletins, newsletters and occasional publications. The chief single source of scientific and technical information, and the most authoritative one, is expected to be the center's Annual Report. The Report may also, of course, contain other kinds of information, such as a description of training activities, a narrative of administrative developments, and the annual balance sheet.

42. The Report, or at least those parts of it dealing with research and training, should be in the hands of the members of the Consultative Group by July 1 following the end of the program year with which it is concerned.

43. The auditor's report and the Annual Report are concerned with the year that has just passed. The Center also prepares a program and budget proposal to the Consultative Group which describes what the Center proposes to do in the year which has yet to begin.

44. The annual program and budget document is the Center's request to the Consultative Group for financing; it is written to be understood by persons who are not themselves agricultural research scientists. The document describes the work to be undertaken in the following year, as approved by the Board of Trustees. It sets out the objectives of the program and its constituent elements, particularly explains the justification for additions to the program level of the preceding year, and estimates the cost of the program and its elements in manpower and finance.

45. The document also projects annual costs for three years beyond the program year with which it is concerned. These projections may, or may not, be approved by the Trustees. They are presented for the information of, rather than acceptance by, the Consultative Group.

46. The document consists both of a textual narrative and of an appendix of standard budget tables. Other appendices are supplied when the Center desires to give special explanations of new programs or capital additions.

47. Each Center is free to adapt its narrative to suit its own character and special needs. In 1974, however, most of the established centers are following an outline somewhat as follows:

> (a) The narrative opens with a <u>brief</u> statement of the objectives of the center or institute. The statement describes the importance of the crop or the research questions with which it is dealing, in terms, if possible, of areas of the world and numbers of people potentially affected.

(b) The second section of the narrative briefly states the amount of funds requested for the center's core and capital programs in the program year, and compares it to the funds budgeted for the previous year. The differences between the figures are analyzed; increases due to inflation are distinguished from increases due to growth in staff and program. Implications of these increases which extend beyond the program year may be briefly mentioned.

(c) A third section may deal with particularly notable advances and achievements of the Center since the previous annual program and budget document.

(d) A fourth section, at the option of the institute, deals with issues which the management and trustees wish to report to, or raise with, the Consultative Group or its Technical Advisory Committee.

(e) Then follow a number of individual sections, each dealing with one of the important and distinguishable elements of the center program, somewhat as set out in paragraph 29 above, including research, training, administration, and capital expenditures.

(f) Each section justifies or explains increases over or changes from activity of the same kind in the preceding year. In the case of each activity, the number of man-years of senior and support staff engaged in the activity is stated, and a cost figure is given for the year.

(g) In the case of the research elements of the program, each section explains the objectives and techniques of the research involved, and gives whatever indication is possible of the time horizon toward which the program is working.

(h) If the outreach activities or other special projects have any major effects on the core or capital budget, these are explained in a separate section.

(i) Finally, the paper includes a section on capital expenditures intended during the year. Whenever possible, these expenditures are justified by being directly related to program elements, as in the case of a need for additional equipment to help carry out an expanded program of work.

48. The narrative section is followed by a set of five standard budget tables. In combination, they show a center's recent history of expenditures, set out requirements for the coming budget year, and project the cost of the center's activities over an additional three-year period.

49. The tables are: (I) A Summary of Costs by Major Program or Activity; (II) A Summary of Man-Years and Costs by Organizational Unit; (III) A Summary of Sources and Applications of Funds; (IV) A Summary of Financial Data (giving essential information from the balance sheet and adding certain other information concerning sources and uses of funds); and (V) A Summary of Personnel Positions and Man-Years by Major Program or Activity.

50. Further explanations of these tables, together with illustrative formats, are given in Annex 1 of this paper.

51. Each center is asked to provide a draft of its program and budget paper to the Executive Secretariat of the Consultative Group by March 31. This intended to serve two purposes. It will enable the Secretariat to make comments on the presentation in time for them to be taken into account in the drafts prepared by center managements for final consideration by Boards of Trustees. It will also enable the Secretariat to give early notice to the Chairman and Secretariat of the Technical Advisory Committee of the Consultative Group about any points that may need special consideration by TAC before the Committee's summer meeting, usually held in July.

52. Final texts, as approved by Boards of Trustees, should be transmitted by the centers and institutes to members of the Consultative Group as soon as possible after Board action, and in any case not later than July 1. The latter date gives donor organizations a month to study the documents before International Centers Week convenes (usually at the end of July or the beginning of August) and donors make their preliminary and informal statements of intentions concerning financial support for the centers. The earlier the transmission to donors the better, since some donor offices already are beginning in June to consult their technical advisors about the merits of center programs.

53. Donors make their definitive statements of intentions concerning their financial support of research programs at a meeting of the Consultative Group which occurs at the end of October or the beginning of November. Thereafter (often in February or March), Trustees of the centers not uncommonly meet to make adjustments to the budget that may be necessary to bring expenditures within the scope of funds provided by donors or to reflect important developments that have occurred since the budget was approved. A copy of the revised budget should be sent to the Consultative Group Secretariat for information.

STANDARD BUDGET TABLES

The standard budget tables appended to the narrative section of the annual program and budget document of a center are as follows:

Table I: Summary of Costs by Major Program or Activity - see format page 2 of this annex. This table shows the total cost of the center's operation broken down by major "programs" or functional headings. It also shows the principal elements of each program.

Table II: Summary of Man-years and Costs by Organizational Unit - see format page 3. The first section of this table shows man-years (principal and support staff) and costs for program units, and support units according to the center's organizational structure. General operating costs are also shown to balance the table with the totals shown in Table 1. The second section of this table shows expenditures by major expense category (i.e. personal services costs, consultants, travel, etc.).

Table III: Summary of Sources and Application of Funds - see sample format page 4. The first section of this table shows actual and projected funds for core and special projects and breaks down funds by type of grant and major donor.

The terminology used in this table is defined in Section I of this paper. The application of funds section of the table shows the uses of funds for core operations, special projects, capital expenditures and unexpended balances. In cases where funds provided in one category do not equal expenditures for that category, and the difference is not accounted for by unexpended balances, a footnote should be provided which explains the difference.

Table IV: Summary of Financial Data - see format on page 5. This table shows the basic financial characteristics of the center expressed in normal balance sheet terms (i.e. current assets, fixed assets, liabilities and unexpended operating and capital balances). It also shows, in highly summarized form, sources and uses of funds and staffing for core and special projects. Its purpose is to set out on one page the center's main financial characteristics.

Table V: Positions and Man-years - see format on page 6. This table provides the number of authorized positions and manyears according to the past year's actual results, the latest estimate for the current year, and the budget projections for the next year. Positions and manyears are shown by organizational unit and staff category.

Table 1

Annex 1

1975 BUDGET
SUMMARY OF COSTS BY PROGRAM AND ACTIVITY 1971-1978
(US$ Thousands)

Major Activities	Core								
	Actual			Estimated & Budget			Projected		
	1971	1972	1973	Est. Exp. 1974	Budget 1974 a/	Budget 1975	1976	1977	1978
1. Research									
Beef									
Swine									
Rice									
Corn									
Potato									
Food Legumes									
Tropical Root Crops									
Agric. Systems									
etc.									
Total									
2. Conferences & Training									
Fellowships									
Workshops									
Conferences									
Symposia									
etc.									
Total									
3. Library, Documentation & Information Services									
Library									
Documentation									
Information									
Total									
4. Research Support									
Service Activities:									
Common Lab. Services									
Station Operations									
Tractor & Equip. Pool									
etc.									
Total									
5. General Administration									
Board of Trustees									
Office of Director General									
Accounting									
Purchasing									
Personnel									
Other									
etc.									
Total									
6. General Operating Costs									
Buildings & Grounds									
Motor Pool									
Communications									
Office Occupancy									
General Supplies									
etc.									
Total									
7. All Other									
Contingency									
Provision for Future Price Changes									
TOTAL CORE									
TOTAL SPECIAL PROJECTS b/									

a/ Show revised 1974 budget based on final allocation approved by the Consultative Group.
b/ Attach a schedule itemizing all special projects for the budget year.

Table II
Annex 1

1975 BUDGET
SUMMARY OF MANYEARS AND COSTS BY ORGANIZATIONAL UNIT - 1971-1978
(US$ Thousands)

	Actual						Est. & Budget						Projected					
	1971		1972		1973		1974 Est.		1974 Bud.[b]		1975		1976		1977		1978	
	MY[a]	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost	MY	Cost
By Organizational Unit																		
1. Program Units																		
Agric. Economic																		
Agric. Engineering																		
Agric. Production Systems																		
Animal Sciences																		
Plant Sciences																		
Library																		
Training																		
Total Operating																		
2. Research Support Units																		
Service Operations:																		
Common Lab. Services																		
Station Operations																		
Tractor & Equip. Pool																		
Labor Pool																		
etc.																		
Total																		
3. General Administration																		
Board of Trustees																		
Office of Director General																		
Accounting																		
Purchasing																		
Personnel																		
Other																		
etc.																		
Total																		
4. General Operations																		
Buildings & Grounds																		
Motor Pool																		
Communications																		
Office Occupancy																		
General Supplies																		
etc.																		
Total																		
Contingency																		
Provision for Future Price Changes																		
TOTAL CORE																		
By Object of Expenditure																		
Personal Services Costs																		
Consultants																		
Supplies																		
Equipment																		
Travel																		
Vehicle, Machinery & Transp.																		
Other																		
etc.																		
Total																		
Provision for Future Price Changes																		
TOTAL CORE BUDGET																		

a/ Include only manyears of senior staff.
b/ Show revised 1974 budget based on final allocations approved by the Consultative Group.

Table III

Annex 1

1975 BUDGET
SUMMARY OF SOURCES AND APPLICATION OF FUNDS
(US$ Thousands)

	Actual			Est.	Budget		Projected		
	1971	1972	1973	1974	1974	1975[a]	1976[a]	1977[a]	1978[a]
Sources of Funds									
1. Core Operations:									
(a) Unrestricted									
- Rockefeller Foundation									
- Ford Foundation									
- U.S. Aid									
- Unexpended Balances from previous year									
Total Unrestricted									
(b) Restricted									
- CIDA (Swine)									
- CIDA (Cassava)									
- Unexpended Balances from previous year									
Total Restricted									
(c) Gross Core Funds Required [b]									
Less: (1) Unexpended Core Balances from previous year									
(2) Earned Income applied from current year									
(d) Net Core Funds required from the CG									
2. Capital Funds:									
(a) - Rockefeller Foundation									
- U.S. Aid									
- Unexpended Balances									
- Total									
(b) Gross Capital Funds Required									
(c) Less: Unexpended Balances									
(d) Less: Earned Income applied from current year									
(e) Net Capital Funds required from the CG									
3. Total Funds required from the CG [c]									
4. Special Projects:									
(a) Ford Foundation (Rice in Brazil)									
(b) Special Projects (New Grants)									
(c) Special Projects (Unexpended Balances)									
(d) Total Special Projects									
5. Earned Income:									
(a) Earned in Year									
(b) Applied to Core in Year									
(c) Applied to Capital in Year									
(d) Total Applied in Year									
6. Total Gross Funds Required [d]									
7. Less: Funds Available [e]									
8. Net Funds Required [f]									
Application of Funds									
9. Core Operations									
10. Capital Expenditures:									
(a) Revolving Funds									
(b) Working Capital									
(c) Other									
(d) Total Capital Expenditures									
Sub-Total									
11. Special Projects									
12. Unexpended Balances									
(a) Unrestricted Funds									
(b) Restricted Funds									
(c) Capital Grants									
(d) Total Unexpended Balances									
Total Application of Funds									

---

a/ For 1975 through 1978 complete only totals for sections 1(a), 1(b) and 2(a) but give all lines for other sections.
b/ Gross Core Funds Required = 1(a) + 1(b)
c/ Total Funds required from CG = 1(d) + 2(e)
d/ Total Gross Funds Required = 1(c) + 2(b) + 4(d)
e/ Funds Available = 1(c)(1) + 1(c)(2) + 2(c) + 2(d) + 4(c).
f/ Net Funds Required = 3 + 4(b)

1975 BUDGET
SUMMARY FINANCIAL DATA - 1971-1975
(US$ Thousands)

Table IV

Annex 1

	1971	1972	1973	Est. 1974	Budget 1974	Budget 1975
Current Assets						
Cash						
Receivables						
Other Receivables						
Inventories						
Prepaid Expenses						
Other Current Assets						
Total Current Assets						
Fixed Assets						
Revolving Fund Balances						
Operating Equipment						
Research Equipment						
Vehicles						
Furnishings & Office Equip.						
Buildings						
Land						
Other Fixed Assets						
Total Fixed Assets						
TOTAL ASSETS						
Liabilities						
Accounts Payable						
Payables to Donors						
Other Liabilities						
Total Liabilities						
Capital Balances & Unexpended Funds						
Capital Grants:						
- Fully Expended						
- Unexpended						
Sub-Total						
Unexpended Operating Grants:						
- Core						
- Special Projects						
Sub-Total						
Total Capital Balances						
TOTAL LIABILITIES AND CAPITAL						
Sources of Funds						
Core						
Capital Funds						
Special Projects						
Earned Income						
Total						
Application of Funds						
Core Operations						
Capital Expenditure						
Special Projects						
Total						
UNEXPENDED BALANCES						
Memo Items						
Manyears of Staff:						
- Core Program						
- Special Projects						
Total						

Table V

Annex 1

1975 BUDGET
TABLE OF POSITIONS AND MANPOWER

Organizational Units	Senior Staff						Support Staff																	
							Scientific and Supervisory						Clerical Staff						Other Support Staff					
	Positions			Man-years			Positions			Man-years			Positions			Man-years			Positions			Man-years		
	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975	Act. 1973	Est. 1974	Bud. 1975
Research Depts. or Teams																								
Research Support																								
Conference and Training																								
Library, Documentation & Info.																								
General Administration																								
General Operations																								
Total																								

Practices and Procedures Used in Accounting for Assets, Liabilities, Capital Balances and Unexpended Funds

Accounting Procedures

1. In general, accounting procedures for agricultural research centers are designed to provide effective expenditure control and to: (a) measure resources held; (b) reflect claims on and interest in those resources; (c) measure changes in resources over time; and (d) measure the application of resources for approved programs.

2. This annex sets out the procedures currently used by centers in accounting for assets, liabilities, capital (a & b above) and in accounting for the sources and uses of funds (c & d above).

Accounting for Assets

3. Assets are broken down into two categories - current and fixed assets. Current assets are those which, in the normal course of operations, can be readily used or quickly converted to meet current operating or capital requirements. These include cash, accounts receivable from donors and others, inventory and prepaid expenses. All remaining assets are fixed and cannot under normal circumstances be used or converted to meet current operating requirements. These include the physical plant, various tangible capital assets, land and other assets representing relatively long-term investments.

Current Assets

(a) Cash

(i) Definition - Cash is defined as actual money or instruments which are generally accepted as money and available for ordinary operating or capital needs.

(ii) Procedure - To operate effectively centers must maintain a liquidity position consistent with normal cash flow requirements. The appropriate level of liquidity will vary from center to center, and from year to year for a given center, depending upon the disbursement pattern for a particular set of grants. Since actual cash transfers from donors frequently lag substantially behind commitments, and often do not take place until a center is well into its operating year, the Consultative Group has accepted the principal that centers should include in their budgets provision for working capital equal to 40 days average operating cash requirements.

(iii) Valuation - All cash balances held in non-US currency should be shown on the balance sheet in US dollars converted at the year-end exchange rate. Gains and losses on currency conversion should be accounted for as an adjustment to other income.

(b) Accounts Receivable (Donors and Others)

(i) Definition - Accounts receivable from donors represent the amount pledged in support of the center's approved program of operations. Other receivables cover advances to staff and/or amounts due centers from miscellaneous sales.

(ii) Procedure - Receivables from donors are recorded at the time financial commitments are made (after January 1 of each year) and drawn down as cash payments are received. The audited financial statements should show any amounts due from donors at year-end for commitments made for that year and explain any outstanding balances. In addition, the audited financial statements should include a schedule showing payment dates on all grants. The purpose of this procedure is to identify the sources of cash flow problems. Advances to staff should be identified separately from other types of receivables on the audited financial statements.

(iii) Valuation - All receivables should be shown on the balance sheet at net realizable value.

(c) Inventories

(i) Definition - Supplies or other items not expended at the time of purchase, such as scientific supplies, automotive parts, office equipment, and general supplies.

(ii) Procedure - Where a center finds it necessary to purchase a substantial portion of its supplies well in advance of actual use, a base stock inventory should be established and funded by a capital grant or through an allocation of retained earnings.

In those categories of supply where the majority of stock items can be procured locally or imported without difficulty, capitalization of base stock should not be necessary. Current usage of supplies and materials should, of course, be charged against operations.

(iii) Valuation - Regardless of which method of accounting is used for stock items, a physical inventory of supplies should be taken at year-end and included in the balance sheet under current assets. Outstanding purchase orders at year-end for items which can be identified with specific programs, and which are expenses of the year, should be treated as a current expense of the specific programs involved, rather than as year-end inventory.

(d) Prepaid Expenses

(i) Definition - an expenditure, often recurrent, for benefits to be received in a future period. For example, prepaid rentals, insurance premiums, etc.;

(ii) Procedure - For material amounts, centers should accrue prepayments; and

(iii) Valuation - The balance sheet should show prepaid items at the estimated value of benefits to be received.

(e) Other Current Assets

Items which fall within the definition of current assets not specifically covered above should be classified in the balance sheet under this general heading. The balance sheet should show these assets at cost or net realizable value, whichever is lower.

Fixed Assets

(a) General

(i) Definition - All tangible assets acquired through a capital grant.

(ii) Procedure - Initial acquisitions purchased through a capital grant are treated as fixed assets. Individual assets over $300.00 should be inventoried and controlled by tagging and by appropriate detailed records, combined with a periodic physical check. Items purchased from capital grants costing less than $300.00 should be capitalized under the category, "All Other Fixed Assets".

Asset replacements and nominal additions (e.g. vehicle replacements, additional library books, kitchenware additions, etc.) should be treated as a current operating expense. The following breakdown

of fixed assets should be shown on the audited financial statements: Revolving Funds, Operating Equipment (other than vehicles), Research Equipment, Vehicles, Furnishings, Buildings, Land, and all Other Fixed Assets.

(iii) Valuation - The basis for valuing fixed assets should be cost. If the center wishes to show the approximate book value of assets currently held, it should apply its own schedule of depreciation and indicate the depreciated value in a footnote to the balance sheet.

(b) Revolving Funds

(i) Definition - A fund established out of retained earnings or by a capital grant for a self-sustaining activity, from which monies are continuously expended and which is replenished through a service fee or other income.

(ii) Procedure - Auxiliary activities such as staff housing, guest housing, training dormitories, dining room, cafeteria operations, and laundry services are established as self-sustaining operations and funded through retained earnings or one-time capital grants. Enabling grants should provide for the physical assets required and an appropriate element of working capital. Revenues to cover ongoing operational costs should be generated through appropriate service fees.

(iii) Valuation - The audited balance sheet should show the current value of all revolving funds and in addition show in an attached schedule any depletions or additions to the original capital grants.

Accounting for Liabilities

There are two aspects of liability accounting which require comment: the treatment of outstanding purchase orders at year-end (operating commitments) and payables to donors or sponsors.

(a) Operating commitments - At year-end, centers will have a number of outstanding commitments for items purchased but not received. In order to have a fairly simple and clear-cut rule for handling outstanding commitments, it is proposed that purchase orders dated prior to December 15 be treated as current costs and shown on the balance sheet as accounts payable. Purchase orders dated after December 15 should not be accrued as expenses for the current year.

(b) Payables to donors and sponsors - in cases where donors require reimbursement of unexpended grant balances, the amounts to be reimbursed should be determined and transferred to the liability account at year-end. This liability may result in an actual cash disbursement, in cases where donors are not authorized to permit the carry over of their grants, or they may be eliminated as an offset or "pre-payment" on a new grant.

Capital and Unexpended Balances

The operating resources and assets held by a center are financed in the form of operating grants or contracts and capital grants. Operating grants provide funds to meet the cost of current operations and are used to carry out approved programs. Capital grants are made to enable a center to acquire or expand its basic plant, or other physical assets, to provide base stock inventory levels, to provide working capital, or to establish revolving funds for auxiliary enterprises. In accounting for grants the following practices are in use:

(a) recording the initial grant - at the time firm commitments are made by donors and sponsors a center should record a "Receivable from Donors" on its books. A corresponding entry should be made to an appropriate grant account (e.g. operating grant - core, capital grant - buildings, Capital Grant - Revolving Funds - dormitories, etc.).

(b) receipt of grants - when cash payments are received from donors, an entry should be made to reduce the "Receivable from Donor" account.

(c) disbursements - expenditures for capital items should result in a decrease in cash and an increase in fixed assets. Operational expenditures should be charged at the time of disbursements to various programs, support activity, indirect costs or special projects.

(d) closing entries -

(i) capital grants - annual expenditures for capital items, as measured by the increase in various categories of fixed assets, should be compared with the enabling capital grants. The difference between an increase in a specific fixed asset and the capital grants provided for this asset should be transferred to an unexpended capital grant account at year-end.

(ii) operating grant: core - expenditure accounts established to measure the uses of resources for core operations should be closed at year-end to an appropriate "Operating Grant: Core" account. In cases where total expenses for core operations plus any increase in current assets are less than the operating core grants, amounts to be reimbursed to donors should

be determined and transferred to the liability account, "Payable to Donors and Sponsors". Any balance remaining in the core operating account after this adjusting entry is made should be closed to an unexpended operating grant account.

Accounting for Sources and Uses of Funds

In accounting for sources and uses of funds the objective is to properly and accurately associate various costs with programs, organizational units and specific grants. Given the rather elaborate mosaic of grants and the differing types of financial commitments made to centers the problem of properly associating costs with programs and grants could be inherently complicated unless standard practices are adopted. The following few relatively simple rules and concepts have been adopted to avoid the more difficult aspects of this accounting problem.

Rules for Assigning Costs

At the time disbursements are made, costs are classified by objects of expenditure (personal services costs, travel, supplies, etc.) and charged either to special projects or to an organizational unit (program departments, support departments), or to a general overhead account, (utilities, general, supplies, communications, etc.). The classification of cost at the time of disbursements does not, of course, satisfy all of the centers' costing requirements. For example, it does not enable the center to measure the cost of a specific program or a program element, nor does it assign all costs to specific grants or contracts.

In order tc measure the total cost of the program or program element on a consistent basis, centers should first allocate general operating costs to organizational units using as a basis of allocation the ratio of each organizational unit's regular salaries to the total cost of regular salaries for all departments, and then distribute total support department costs to programs and program elements using the ratio of each program's salary costs to the salary costs for all programs.

In assigning costs to specific grants or contracts, centers generally use the following procedures:

(i) Special projects - individual accounts are maintained for each special project and costs directly associated with the contract are assigned to the account at the time a disbursement is made. Indirect costs for both general and specific support of special projects is "assigned" in the form of an overhead rate which when charged is accounted for as earned income.

(ii) Restricted Core grants - are made to provide support or offset the cost of elements of the Core program as specified by the donor. Costs are associated with a restricted grant on the basis of the procedure for costing a program element as described in the paragraph above. That is, the restricted grant is charged for the direct cost of a program element plus a fair share of general operating and support department costs. Unrestricted core grants - provide for the general support of the centers core program and accordingly absorb, pro rata,all operating costs not specifically charged to restricted grants or special projects.

Appendices

1. Balance Sheet Format

2. Format of Audited Statement
   of Sources and Application of Funds

BALANCE SHEET
December 31, 1975
(US$000)

	Actual			Est.	Budget
	1971	1972	1973	1974	1975
Current Assets					
Cash					
Receivables from Donors 1/					
Other Receivables 2/					
Inventories					
Prepaid Expenses					
Other Current Assets					
Total Current Assets					
Fixed Assets					
Revolving Fund Balances 3/					
Operating Equipment					
Research Equipment					
Vehicles					
Furnishings & Office Equipment					
Buildings					
Land					
Other Fixed Assets					
Total Fixed Assets					
TOTAL ASSETS					
Liabilities					
Accounts Payable					
Payable to Donors					
Other Liabilities					
Total Liabilities					
Capital Balances & Unexpended Funds					
Capital Grants:					
Fully Expended					
Unexpended					
Sub-Total					
Unexpended Operating Grants:					
Core					
Special Projects					
Sub-Total					
Total Capital Balances					
TOTAL LIABILITIES AND CAPITAL					

1/ Provide a schedule of donor payments and note reasons for outstanding balances.
2/ Of which XXX represents advances to employees.
3/ Attach a schedule listing individual revolving funds and show how increase in carrying value has been financed.

STATEMENT OF SOURCES AND APPLICATION OF FUNDS
For the Year Ending December 31, 1975
(US$ Thousands)

	Actual 1971	Actual 1972	Actual 1973	Est. 1974	Budget 1975
Sources of Funds					
1. Operating Grants - Core 1/					
(a) Unrestricted					
(b) Restricted					
Total Core					
2. Special Projects 1/					
3. Earned Income 2/					
4. Capital Grants					
Total Funds					
Application of Funds					
1. To Core Programs 3/					
(a) Research					
Beef					
Swine					
Rice					
etc.					
Sub-Total					
(b) Research Support					
(c) Conferences & Training					
(d) Library, Documentation & Information Services					
(e) General Administration					
(f) General Operating Costs					
Total Core Program Costs					
2. To Special Projects					
Total Operating Costs					
3. To Capital					
Capital Expenditures:					
(a) Revolving Funds					
(b) Working Capital					
(c) Other					
Total Capital					
4. Unexpended Balances					
(a) Unrestricted Funds					
(b) Restricted Funds					
(c) Capital Grants					
(d) Special Projects					
Total Unexpended Balances					
TOTAL APPLICATION OF FUNDS					
Memorandum Section					
Program Department Costs					
Support Department Costs					
General Operating Costs					
Total Operating Costs					

1/ Attach schedule 1 to show funds provided and costs by individual donor.
2/ Attach schedule 2 to show source and use of earned income for the current year.
3/ Attach schedule 3 to show the current year breakdown between core unrestricted, core restricted and special projects.

Schedule 1: FUNDS PROVIDED AND COST OF INDIVIDUAL GRANTS FOR THE YEAR ENDED DECEMBER 31, 1975
(US$ Thousands)

	Approved Grants	Expenses Charged						% of Support & General Operating to Direct	Unexpended Balance	Payable to Donors	Transfer to Unexpended Balance
		Research	Research Support	Conf. & Train.	Library, Doc.& Info.	General Admin.	General Operating				
Unrestricted Core											
Restricted Core											
U.S. Aid											
CIDA											
etc.											
Total Restricted Core											
Special Projects											
Ford Foundation											
U.S. Aid											
CIDA											
etc.											
Total Special Projects											
Capital Grants											
Ford Foundation											
Rockefeller Foundation											
etc.											
Total Capital Grants											
TOTAL GRANTS AND EXPENSES											

Appendix 2

Schedule 2: DETAILED SCHEDULE OF EARNED INCOME
FOR THE YEAR ENDED DECEMBER 31, 1975
(US$ Thousands)

	Approved Budget	Actual
Sources of Earned Income		
Interest on Deposits		
Sale of Crops		
Sale of Assets		
Indirect Costs charged on Special Projects		
etc.		
Total		
Application of Earned Income		
Applied to Core Operations		
Applied to Capital		
Total		

Schedule 3. COMPARATIVE STATEMENT OF ACTUAL EXPENSES
AND APPROVED BUDGET FOR THE YEAR ENDED DECEMBER 31, 1975
(US$ Thousands)

	Core Unrestricted		Core Restricted		Special Projects		Capital	
	Approved Budget	Actual	Approved Budget	Actual	Approved Budget	Actual	Approved Budget	Actual
Programs								
Research:								
Beef								
Swine								
Rice								
etc.								
Research Support								
Conferences & Training								
Library, Documentation & Info. Services								
General Administration								
General Operating								
Total								
Capital								
Revolving Funds								
Plant								
etc.								
Total								
Analysis of Variances								
Budget Surpluses:								
Transfer to Payable Donors								
Transfer to Unexpended Balance								
Transfer to Revolving Fund								
Transfer to Current Assets								
Total								
Deficits:								
Covered by Unbudgeted Additional Income								
Total								