

Institut Pertanian Bogor * University of Wisconsin

GRADUATE EDUCATION PROJECT



Aid Project 497-0290

Report No. 34
Brenner

REPORT OF SHORT-TERM ADVISOR
on
IMPLEMENTATION OF MANAGEMENT INFORMATION SYSTEMS
to
INSTITUT PERTANIAN BOGOR (IPB)
Bogor, Indonesia

by
Charles J. Brenner, Ed. D.
Director of Administrative Computer Services
and
Associate Professor of Mathematics and Computer Systems
University of Wisconsin
River Falls, Wisconsin 54022
September 1984

Counterparts:

Dr. Zahrial Coto
Director, Management Information Systems (SIMS)
IPB

Dr. Ansori Mattjik
Director, University Computer Center
IPB

USAID Project 497-0290

FOREWARD

The extent to which a consultant is successful in carrying out the responsibilities of his consulting assignment is dependent, in large measure, on the assistance rendered by local support staff and faculty. I would like to take this opportunity to acknowledge the support of many people who gave generously of their time and expertise to assist me in understanding the history, development, and problems associated with management information systems at IPB. A special note of thanks is due to Dr. Ikin Mansjoer, Head of the Planning Board, Dr. Zahrial Coto, Director of SIM and, Dr. Ansori Mattjik, Director of the Computer Center. Their knowledge of computing and administrative structures at IPB was invaluable to me as I formulated the recommendations of this report. Dr. John Murdock, Project Director, USAID/UW Graduate Education Project and Mrs. Fatma Rahardjo were most helpful in providing information and support during my visit. I am also grateful to the people listed in the appendix who were contacted in the course of my investigation.

A special note of thanks is also due to Ms. Nancy Brendlinger, Ms. Nellie McCannon, and Ms. Joan Schroeder long-term University of Wisconsin consultants, and to IPB and residents of the IPB Guest House. They willingly shared their knowledge of Indonesian geography, culture, and traditions with me and as a result I have a far better understanding of this beautiful country than I could have achieved on my own.

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I. DURATION OF CONSULTANT'S VISIT:

The consultant left the U.S. on September 1, 1984, arrived in Indonesia on September 3, and left Indonesia on September 29, 1984.

II. OBJECTIVES OF VISIT:

In a meeting with Dr. John Murdock on Tuesday, September 4, 1984, the following objectives were developed and discussed:

1. Review the developmental plans for management information systems at Institut Pertanian Bogor (IPB) recommended in Consulting Report No. 3 by Beaver and Cammack and Consulting Report No. 13 by Cammack. Ascertain the feasibility of implementing these plans under current conditions.
2. Review current microcomputer technology to ascertain whether or not recent advances in this field are applicable to the information processing needs of IPB.
3. Formulate a plan for the phased implementation of automated record keeping systems that will permit IPB to meet the information processing needs that will be dictated by the growth patterns projected in Institut Pertanian Bogor Academic Plan to the Year 2000.
4. Recommend support programs or structures that will permit IPB to achieve its information processing goals.

III. CONSULTANT'S PLAN OF WORK AND METHODOLOGY:

A number of activities were undertaken within and outside IPB in order to achieve the objectives. A daily itinerary and a list of persons contacted is included in the appendix of this report.

The first activity was to review Consultant Report No. 3, Report on Management of University Records, by Albert J. Beaver and Elwin F. Cammack, 1981. This was followed by review of Consultant Report No. 13, Management Information System Development, by Elwin F. Cammack, 1983. Since these reports formed the bulk of the early planning activity in information processing, they were examined in great detail to ascertain their applicability to current conditions at IPB. These reports served to focus the consultant's interviews with IPB faculty and staff involved with management information systems.

Following the above review, a series of meetings was held with a wide range of offices that had demonstrated needs for information processing. In these meetings the consultant sought information concerning the types of processing IPB would require and its readiness to function effectively in an environment based on computerized access to data as opposed to manual access.

At the same time, meetings were being held with the potential users of computerized information systems, parallel discussions were being held with technical staff at IPB who were currently involved with information processing activities or who could potentially become involved in the future.

Principle organizations and related support staff interviewed during this phase include the University Computer Center, Director of Management Information Systems (SIM), and staff of several faculties who have recently become involved with the processing of academic data for their respective departments, and the Director of the IPB Planning Board.

A special, and perhaps more in-depth review was made of the operations of the SIM reporting effort at IPB because of its potential to have a major impact on the design of student information systems. The SIM is an information reporting mechanism mandated by the Bureau of Planning of the Indonesian Director General of Higher Education. IPB, along with the other institutions of Higher Education in Indonesia, is required to submit standard data in a standard format to the Planning Bureau for administrative purposes. Because the majority of these data are also required for university management, it seemed wise to explore ways in which a single data gathering effort could serve both purposes. To that end, one day was spent visiting the Bureau of Planning's Computer Center in Jakarta.

Finally, an effort was made to gauge the extent to which microcomputers were having an impact at IPB. General information was sought as to the number and types of microcomputers in use; the extent of use of microcomputers in the pursuit of curricular as well as administrative goals; and, the extent to which there was a commitment to obtain additional microcomputers and for what purposes they would be acquired.

Concurrent with this investigation was an effort to gauge the professional readiness of academic and administrative personnel to accept and be able to effectively use microcomputer systems.

IV. SUMMARY OF FINDINGS:

A. Implementation of a Centralized Management Information System

The implementation of a centralized management information system as described and recommended in Consulting Report No. 3 and Consulting Report No. 13 cannot be achieved at IPB at this time. Interviews and discussions with IPB staff revealed the following impediments to this worthwhile goal.

1. Current administrative structures at IPB do not lend themselves to a highly centralized information processing system. For example, the processing of student data associated with registration, grade reporting, and class scheduling, is normally handled exclusively by the Registrar's Office in colleges and universities in the United States. Under this scheme it is easy to implement an integrated system because authority and responsibility for all of these interrelated functions resides in a single office. At IPB these functions are currently shared by several offices in the Bureau for Administration of Academic Student Affairs (BAAK) and the individual faculties where the majority of class registration and grade reporting functions are performed. Until such time that responsibility and authority for a system or sub-system resides in a single administrative office little progress will be made toward the goal of an integrated management information system.

A similar observation can be made concerning the administrative functions of other offices at IPB. By and large, they are quite decentralized with functions being spread across several offices. This is not to imply that doing things in this manner is wrong because it is not. It simply means that when it comes time to bring everything together into a unified management information system, it will be more difficult to do so because of the fragmented lines of authority and responsibility.

2. An integrated management information system assumes the availability of computer facilities of sufficient size, speed, and reliability to carry out the required processing. Computer facilities at IPB are not large enough or of sufficient reliability to implement a large integrated information system at this time. The current equipment is certainly too small to support both administrative processing and a full range of services in support of academic instruction and research.

3. A fully integrated management information system assumes user access through an extensive network of terminals accessing the data bases which are resident on the mainframe computer. If it were possible to acquire computing equipment of sufficient capacity it still would be difficult to implement this processing scheme because the lack of data communication facilities are virtually nonexistent at IPB and the current telecommunication system does not lend itself to carrying out this function. Until such time that data communication facilities become available which will provide ready computer access

to all campuses of IPB it will be impossible to implement an integrated management information system.

4. An information system of the size and complexity proposed in the two previous consulting reports assumes a computer center support staff of sufficient size and depth to carry out the functions required to write and maintain it. The current Computer Center staff is inadequate to support an information system of the size proposed. All of the staff within the computer center are assigned there on a part-time basis and have heavy academic and teaching responsibilities in other departments. At best they could be called on to contribute no more than 15 to 20 percent of their time in support of administrative processing systems. To put this deficiency in perspective, it is estimated that in order to implement an information system of the magnitude proposed by the previous consultants, it would be required to have a full-time computer center staff of at least eight professionals. These people would be in charge of systems analysis and design, programming, program maintenance, computer operations, and data entry functions. In all probability, if IPB decided to staff the computer center at this level it would be unable to employ the required professionals because of the inability to compete with the pay scales of private industry.

B. Coordination of Information System Development

During the interview process an attempt was made to ascertain the extent to which there was a coordinated effort to design information systems that were useful to a single office or agency. In this effort,

primary attention was paid to the student records area because of its wide impact in many different offices across the university. As a result of the interviews, it was concluded that little coordination of design has occurred in the past. The factors contributing to this situation are as follows:

1. Prior to recent times there was little reason to coordinate information systems between offices because the need did not appear to exist. With the management of the university being based upon manual record systems each office operated as a separate entity with no responsibility to share data with other offices. If the need for common data existed, the offices in question simply duplicated their efforts and gathered the same data twice. Because of the increasing complexity of the university and the projected growth to the year 2000, the coordination of the design of information systems will become an activity essential to the smooth running of IPB.

2. Within the offices of BAAK there was recognition of the need to coordinate the design of information systems but a lack of the requisite skills to accomplish the task. Key administrators time and again expressed a genuine interest in using the computer to assist them in accomplishing their assigned tasks but were frustrated because they did not understand the concepts or required steps to design an information system that would serve multiple needs. As a result of this situation, offices within BAAK were starting to look to the microcomputer to implement individual tasks within their respective offices without regard to their being integrated into a coherent system that would have the potential to serve different offices.

3. The SIM effort introduced the first level of coordinated planning for management information systems at IPB. Funded directly by the Director General of Higher Education, SIM is a data gathering process by which information about IPB students is sent to Jakarta for statistical and planning purposes. The Director of SIM has worked closely with the Registration and Statistics Office in BAAK to coordinate the gathering of the required information as a part of the registration process. The Director of SIM has been trying to assist in the design of a common microcomputer data base that will not only serve the needs of SIM, but also the needs of the Registration and Statistics Office of BAAK. Progress to date has been slow because of the limited amount of time that can be devoted to the task by the Director of SIM. Two additional limiting factors are the physical distance between the SIM Office in BIOTROP and the central campus and the lack of computer background of the staff in BAAK.

4. Until just recently the Computer Center was an academic facility administratively controlled by the Faculty of Mathematics and Statistics. Under this organizational arrangement it was given major responsibility to support academic instruction and research. As a result of directives from the Office of the Director General of Higher Education, the Rector of IPB reorganized the Computer Center as a separate administrative entity with the responsibility to serve both academic and administrative needs. With the reorganization came the responsibility for the Computer Center to act as a coordinator in the design of management information systems. The Computer Center has

accepted responsibility in this area but at this point it is too early to expect concrete results.

5. There is a need for increased contact between the Computer Center and the SIM Office for the purpose of coordinating design efforts in the student information area. The improvement in this common effort will require mutual understanding between the two offices in regard to their respective roles at IPB. The SIM effort is primarily a function of the Director General of Higher Education and as such may not always respond to the internal administrative needs of IPB. On the other hand, there is a tendency on the part of other units of IPB to design information systems to meet the internal needs of IPB and to ignore the constraints on this process that are imposed by SIM requirements. If the role of the Computer Center is to design information systems for IPB, efforts should be made to coordinate both internal and external information requirements.

C. Status of Microcomputers at IPB

Because of explosive growth and increasing world-wide acceptance of microcomputers an attempt was made to gauge their impact at IPB. This investigation revealed that microcomputers were playing an increasingly important role both academically and administratively. The following conclusions can be drawn concerning microcomputer use at IPB:

Microcomputer use was initiated in several academic departments as a result of faculty returning to their positions from leaves of absence for advanced study at foreign universities. Having

been exposed to microcomputers as a function of their advanced education they were anxious to introduce this new technology in their respective disciplines. To this end microcomputers were obtained that had for the most part limited capacity. In spite of the limited capacity of these first machines they were rapidly utilized as a supplement to enhance instruction in the academic discipline. In most cases the computer was used for its capabilities as an efficient high speed calculator. As a result of this orientation most programming was based on the BASIC language and was custom written by staff within the faculty. Little use appears to have been made of standardized microcomputer software packages such as spread sheets, data base managers, or word processors.

2. The penetration of microcomputers into administrative offices has been less dramatic than that achieved in academic departments. This is understandable because most administrative staff did not have the benefit or exposure that was true of many academicians, and as a result were less knowledgeable of this new technology. However, due to this delay, the microcomputers installed to support administrative offices tend to be of the more recent 16 Bit architecture. Because the machines are newer, larger, and faster they should lend themselves to a wide range of administrative tasks.

3. Administrative offices in BAAK are acceptant of the new microcomputer technology but are much bewildered by developments in this area. They expressed concern about their lack of understanding of the concepts involved and felt that their use of microcomputers was

being hindered by this lack of knowledge. BAAK staff expressed a keen interest and need for microcomputer training programs and seminars that would introduce this new technology at a non-computer science level. They indicated that this had been attempted in the past but more at a minicomputer level and that it had not been successful because it was too oriented to computer science. Because of the need expressed for some type of training program a seminar dealing with introductory microcomputer concepts was presented by the consultant during the course of his stay. An outline of that seminar with copies of the materials used is presented in Appendix 2.

V. RECOMMENDATIONS AND PROGRAM OF ACTION:

The findings and conclusions previously stated in this report would seem to indicate that IPB has little chance of realizing all its information processing goals. In terms of achieving the original goal of a campus wide integrated information system this is probably the case, for the near future. However, many things can be done that will make a significant contribution toward this ultimate goal and provide a level of administrative computer support that will significantly enhance the administrative capabilities in the student records and registration areas. Many of the ideas presented here were discussed in the formal seminar that was presented on September 19, 1984. From discussion which followed this seminar as well as conversations with the IPP/UW Project Director, Director of SIM, Director of the Computer Center, and the Director of the IPB Planning Board the original concepts were modified and refined to their present form.

A. Long-Term Goal For Information Processing

The long-term goal for information processing for IPB should be the establishment of a university-wide data base resident on a mainframe computer system. Because of the previously stated constraints to achieving this goal on a short-term basis the problem should be approached using smaller data bases that are resident on 16 Bit microcomputer systems with hard disk drives. These subsystems should be developed on a functional basis (student records, financial records, personnel records etc) and designed in such a way that duplication of effort is minimized. In addition, the design concept should support the idea of ultimately shifting the individual data bases to a single data base on a mainframe computer system that would then use the microcomputer as a terminal in a campus wide network.

B. Coordination of the Design of Distributed Systems

Since distributed data systems have the potential of creating chaos if not properly designed and coordinated it is essential that particular attention be given to this problem. Normally, some organization such as the planning office, or computer center would be given this responsibility. However, at IPB because of limited staffing levels neither of these organizations is strong enough to effectively carry out this role. Therefore, it is recommended that a separate Information Planning Committee be established to provide the required coordination. Membership on this committee should include the Director of the Planning Board, Director of the Computer Center, at least one Computer Center programmer, the Director of SIM, and the

head administrator of the unit that the information system is being designed for. In addition, this planning board may include members of the faculty who possess expertise that would prove helpful to the task at hand. Where possible, this planning board should be given released time or additional compensation for providing these services.

C. Implementation of a Student Record System

The first distributed data system implemented should be in the student records area and should combine the functions of student registration, SIM reporting for the Director General of Higher Education, and class registration and grade reporting for the faculties at IPB. The class registration and grade reporting function should be designed as a subsystem residing on microcomputers in the various departments. The ultimate goal should be for each department to have their own microcomputer to perform the registration and grade reporting function. To begin with, however, it would be quite adequate to share one microcomputer between two departments. The system should be designed in such a way that all information transfers between microcomputers is done via magnetic diskette.

D. Selection of Microcomputer Hardware

The same brand and model of 16 Bit microcomputer should be selected and designated for all administrative offices. If different offices use different brands of computers to address their processing needs it will be impossible to implement a distributed data base system. It is highly recommended that the computer selected be the IBM PC XT with hard disk storage or an IBM PC XT compatible product.

The IBM product enjoys worldwide acceptance for data processing applications, has an abundant selection of software, and is supported through the IBM office in Jakarta. Under no circumstances should administrative processing be attempted on microcomputers with an 8 Bit architecture.

E. Development of Application Software

Because of the shortage of computer professionals with experience in administrative languages such as COBOL or PL/1 it is recommended that all application software development be accomplished using high level data base management software. Because of its wide acceptance and excellent reputation it is recommended that the data base language selected for use at IPB be the DBase II package. By approaching software development in this manner it will be possible to minimize the need for traditional applications programmers, and at the same time significantly speed up the development process.

F. Translation of DBase II Instructions to Bahasa Indonesia

For many potential users of the DBase II package at IPB there will be a big impediment to its effective application because all of the on screen "HELP" facilities are written in English. Thus, if a problem is encountered it will be difficult to resolve because of the language barrier. Because the capability exists within the DBase II package to change these "HELP" instructions it is recommended that they be translated into Bahasa Indonesia. Dr. Ikin Mansjoer, Head of the IPB planning Board, has been instrumental in initiating microcomputer use at IPB, has a thorough knowledge of DBase II and an excellent command

of the English language and would be capable of making this translation. It is recommended that he be given released time or extra compensation to accomplish this goal.

G. Application Software Selection and Standardization

In addition to using whatever information systems are developed using the DBase II language, various offices will also want to use the microcomputer for other purposes by utilizing standard software packages. The most likely needs in this area would be for software to do spread sheet processing, a graphics package, a word processor, and a less sophisticated data base package that would handle address lists etc. Because there is a wide variety of software packages to select from it will be necessary to standardize their use across the campus. In this manner, everybody using computers administratively will become familiar with these standard packages. This will significantly increase the computer literacy level of the people involved and provide for maximum flexibility should people move from one office to another because they will find the same software in use. It is recommended that two software packages be selected to address the above listed needs. For word processing, the Volkswriter II package should be selected and for the other functions a combined package called Lotus 1, 2, 3 should be used.

H. Staff Training and Computer Literacy

During the interview process the staff at IPB were almost universal in their desire to know more about microcomputers. Time and again they expressed frustration at not understanding computers and

how they might be used to assist in the completion of normal everyday office tasks. Because of this unmet need it is recommended that a formal staff training program in microcomputers be started. The class should include 20-25 hours of instruction and should concentrate on the use of the microcomputer and associated operating system software and the use of the Volkswriter and Lotus 1, 2, 3 software packages. Under NO circumstances should this training program include any instruction in computer programming using BASIC or any other higher level language. It is further recommended that a minimum of 60 percent of the time devoted to this course be spent actually using the microcomputer. There are sufficient number of qualified staff at IPB to teach a course of this nature. In order to minimize the impact on any one person it is suggested that a team teaching approach be used with different people teaching different units of instruction. Implementation of this recommendation will have to be delayed until the computer equipment for the Remote Sensing Laboratory is installed since this will be the only facility on campus with a sufficient number of microcomputers to serve as a training facility.

I. Computer Center Organization

The Computer Center should be reorganized so that the functions of academic and administrative computing are kept separate. Where possible, existing staff should be given responsibilities in one area or the other but not both. The ultimate goal of this reorganization is to prepare for the day when academic and administrative functions are performed on separate computer equipment with specialized

professional staffs. The trend is toward this separation of academic and administrative functions. As computing continues to grow at IPB a similar structure will be required in order to adequately serve the diverse computing needs of the campus.

J. Upgrading of Computer Center Hardware

The currently installed Perkin-Elmer computer system has been a source of frustration to IPB because of difficulties in obtaining adequate service from the dealer. Efforts should continue to resolve the problems with this machine. Should this machine be targeted for replacement in the near future, however, the only vendors who should be considered are those that have a full service staff in Jakarta and a demonstrated ability to service their own equipment.

K. Computer Center Support for Distributed Processing

The Computer Center should play a major support role in the implementation of distributed computer systems. This role will be as a repository, for backup purposes, of all of the data bases that are resident on the distributed microcomputers. Facilities should be acquired to enable data on 5 1/4 diskettes to be entered to the mainframe computer, loaded to disk files, and then ultimately backed up on magnetic tape. Should data files then become destroyed on the Microcomputer, the Computer Center can then make the backup data available for reloading. Having access to this data will also enable the Computer Center to experiment with data base design concepts in preparation for the day when IPB makes the transition to a unified data base on the mainframe computer system.

In addition to providing backup for microcomputer based files the Computer Center should also provide major design and technical support for the development of a unified management information system. In this role, the personnel from the Computer Center should work closely with the Information Planning Committee referred to previously.

Appendix A

Consultant's Itinerary and Persons Contacted

<u>Day</u>	<u>Date</u>	<u>Activity</u>
Monday	9/3/84	Arrive in Bogor Indonesia
Tuesday	9/4/84	Courtesy call to Vice Rector I. Discussion with Dr. John Murdock concerning goals, methods, and constraints for the MIS consulting project. Meet with personnel and staff of the SIM Office.
Wednesday	9/5/84	Meet with Zahrial Coto IPB SIM Coordinator to SIM development and systems.
Thursday	9/6/84	Holiday
Friday	9/7/84	Discuss with Dr. John Murdock previous MIS development and consulting efforts at IPB. Assist Zahrial Coto to identify hardware malfunction in the IPB PC XT computer system in the SIM Office.
Saturday	9/8/84	Discussion with Pak Ikin concerning long term planning needs of IPB and information processing strategies to meet those needs.
Sunday	9/9/84	Holiday
Monday	9/10/84	Meet with Pak Subroto, Student Affairs Division of BAAK. Discuss information processing needs of the Student Affairs Division and steps being taken to address those needs. Visit Computer Center facilities.
Tuesday	9/11/84	Visit Darmaga's campus and tour the micro-computing facilities of the Forestry and Agricultural Engineering Departments. Discuss registration and grade reporting procedures undertaken at the departmental level. Discuss with Pak Ngadiono and Pak Muryarno microcomputer systems developed to accomplish grade reporting functions.

Wednesday	9/12/84	Meet with Pak Ikin to discuss development of computer capability at IPB. Meet with Pak Mattjik to review Computer Center facilities, organization, and objectives.
Thursday	9/13/84	Meet with Muhammad Syamsun, Abdurrauf Rambe, and Ajihamim Wiugena of the Computer Center to discuss hardware, software, staff expertise, and organization and how these factors affect the mission of the Computer Center.
Friday	9/14/84	Meet with the computer center staff of the Bureau of Planning of the Director General of Higher Education in Jakarta.
Saturday	9/15/84	Holiday
Sunday	9/16/84	Holiday
Monday	9/17/84	Meet with Pak Ikin of the IPB Planning Board to discuss computer issues and to try to resolve a hard disk hardware malfunction with an IBM PC XT.
Tuesday	9/18/84	Prepare handouts and instructional notes for Executive seminar to be held on Wednesday 9/19/84.
Wednesday	9/19/84	Meet with Director of SIM to discuss SIM data gathering instruments. Executive seminar presentation.
Thursday	9/20/84	Meet with Director of SIM to discuss the design of data gathering instruments for a combined SIM and student registration effort.
Friday	9/21/84	Meet with Darwis Gani and all department heads of BAAK to discuss information processing needs.
Saturday	9/22/84	Continue meeting with staff of BAAK for the purpose of discussing data base design and processing concepts.
Sunday	9/23/84	Holiday

Monday	9/24/84	Report writing.
Tuesday	9/25/84	Report writing.
Wednesday	9/26/84	Holiday
Thursday	9/27/84	Oral presentation of final report to Dr. John Murdock, Project Director USAID, IPB/UW Graduate Education Project, Dr. Zahrial Coto, Director of SIM, and Dr. Ansori Mattjik, Computer Center Director.
Friday	9/28/84	Oral presentation of final report to Vice Rector I, IPB, Dr. Sitanala Arsjad.
Saturday	9/29/84	Leave Bogor, Indonesia to return to the United States.

Appendix B

Executive Seminar Presentation

EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT COMPUTERS BUT WERE AFRAID TO ASK

- I. Welcome and Purpose of Lecture.
- II. Analogy of Using a Computer to Using any Complicated Technological Device.
- III. What is a Computer - Parts and What They Do.
 - A. Input
 - B. Output
 - C. Central Processing Unit
 - 1. Random Access Memory (RAM)
 - 2. Arithmetic & Logic
 - 3. Control
- IV. Storage
- V. Programming a Computer
 - A. What is a Computer Program?
 - B. How Does a Computer Program Operate?
 - C. Types of Computer Languages
- VI. Using a Computer Without Having to Write Computer Programs - The Use of Prewritten or Canned Software
 - A. Word Processing Packages
 - B. Financial Modeling or Spread Sheet Software Packages
 - C. Data Base Management Software
- VII. Summary and Conclusions
- VIII. Discussion

n.v

A Typical Computer System

I. Input

II. Central Processing Unit (CPU)

A. Memory

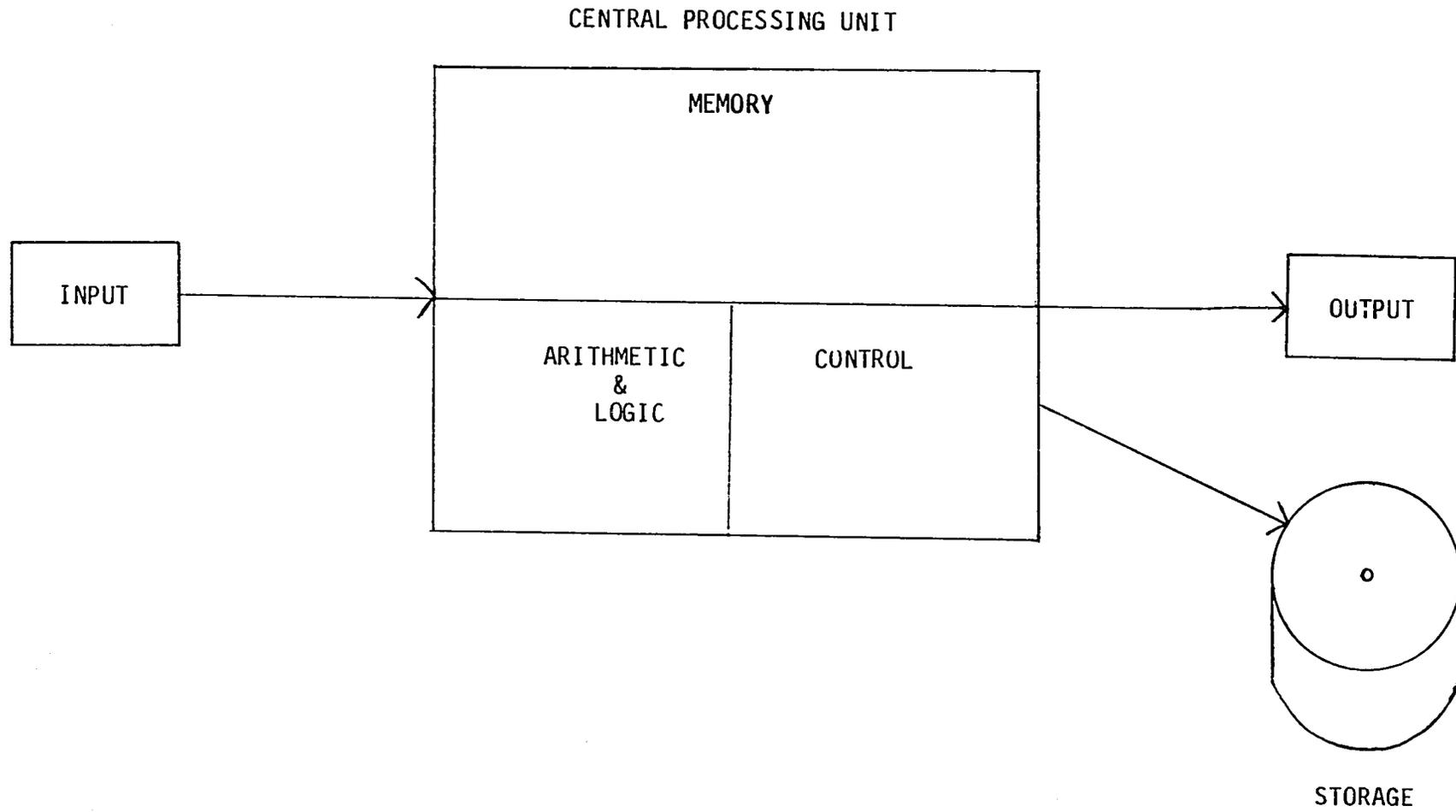
B. Arithmetic & Logic

C. Control

III. Output

IV. Storage

A TYPICAL COMPUTER SYSTEM



(con't. IPB/UW Report Status)

No. 22	Kiefer, Ralph W.	Remote Sensing	
No. 23	Schrader, Lawrence	Crop Physiology	9/11/83-10/6/83
No. 24	Ahearn, Sean C.	Remote Sensing Project	
No. 25	DeWitt, Calvin Paddock, Christine	General Program Statement	1/19/83
No. 26	Grossman, Dennis H.	Teaching Associate in Biology	8/14/82-6/30/83
No. 27	Hall, Robert E.	Veterinary Medicine	10/14/83-11/8/83
No. 28	Foell, Wesley	Energy Research Center	1/14/84-1/27/84
No. 29	Zweifel, L.		
No. 30	Weidemann, J.		
No. 31	Kitchell, James		
No. 32	Murdock, John	Institute for Public Service	Mar-May, 1984

IPB/UW REPORT STATUS

No. 1	Weidemann, Jean	Rural Home & Family Programs	3/9/81-4/8/81
No. 2	Adams, Michael S.	Review of the Center for Natural Management & Environmental Studies	5/22/81-6/13/81
No. 3	Beaver, Albert Cammack, Elwin	Report on Management of University Records	3/7/81-4/5/81
No. 4	Bray, Robert	Research Administration & Research Centers	3/20/81-4/12/81
No. 5	Moore, J. Duain	Management of Agricultural Experimentation Research	3/20/81-4/19/81
No. 6	Pulver, Glen	Public Service	4/29/81-5/27/81
No. 7	Behrens, John	Agricultural Communications	6/3/81-7/2/81
No. 8	Evans, James F. Woodis, Raymond A.	Agricultural Communications	12/30/81
No. 9	Johnson, Nancy	Community Nutrition	3/82-4/82
No. 10	Bray, Robert Hougas, Robert	Research Administration-Policy, Organization, Planning and Implementation	4/8/82
No. 11	Pulver, Glen	Public Service	8/82-1/83
No. 12	Kennedy, James R.	Report for the Institut Pertanian Bogor	5/82-6/82
No. 13	Cammack, Elwin	Management Information System Development	
No. 14	Barrett, Diane M.	Community Nutrition and Family Resources	
No. 15	Roach, Mary A.	Community Nutrition and Family Resources	8/82-1/83
No. 16	Stammel, Josè G.	Liming Acid Soils to Support Production and Sound Agriculture	6/7/82-7/15/82
No. 17	Pigott, Jeri J.	Community Nutrition and Family Resources	8/82-2/83
No. 18	Freire, J.R. Jardim	Rhizobium Technology and Inoculant Production	6/7/82-7/15/82
No. 19	Barrett, Diane M.	Community Nutrition and Family Resources	
No. 20	Adams, Michael S. Peterson, Arthur E.	Natural Resources and Environmental Study	
No. 21	O'Leary, Marion H. Kean, Elizabeth	Creation of a Sarjana (S ₁) Program in Chemistry at IPB	1/83