A/D 1020-24 (10-69)

AGENCY FOR INTERNATIONAL DEVELOPMENT (A.I.D.)

PROJECT AUTHORIZATION

PDSAL 25512-12
9310978 (3)

1. PROJECT NUMBER	3. COUNTRY	4. AUTHORIZATION NUMBER
931-11-995-976	Worldwide	0144 3p

2. PROJECT TITLE
More Effective Use of Computer Technology in Developing Countries

5. AUTHORIZATION DATE

6. PROP DATED
April 1971

7. LIFE OF PROJECT

a. Number of Years of Funding: 1
Starting FY 19___; Terminal FY 19 72

b. Estimated Duration of Physical Work After Last Year of Funding (in Months): ___

8. FUNDING BY FISCAL YEAR (in U.S. $ or $ equivalent)	DOLLARS		P.L. 480	LOCAL CURRENCY Exchange Rate: $1 =			
				U.S. OWNED		HOST COUNTRY	
	GRANT	LOAN	CCC + FREIGHT	GRANT	LOAN	JOINTLY PROGRAMMED	OTHER
Prior through Actual FY							
Operational FY 72	$20,000						
Budget FY 73	40,000						
B + 1 FY							
B + 2 FY							
B + 3 FY							
All Subsequent FY's							
TOTAL	$60,000						

9. DESCRIBE SPECIAL FUNDING CONDITIONS OR RECOMMENDATIONS FOR IMPLEMENTATION, AND LIST KINDS AND QUANTITIES OF ANY P.L. 480 COMMODITIES

10. CONDITIONS OF APPROVAL OF PROJECT

NESA and VN have no objection but are skeptical about the value of the project.

(Use continuation sheet if necessary)

11. Approved in substance for the life of the project as described in the PROP, subject to the conditions cited in Block 10 above, and the availability of funds. Detailed planning with cooperating country and drafting of implementation documents is authorized.

This authorization is contingent upon timely completion of the self-help and other conditions listed in the PROP or attached thereto.

This authorization will be reviewed at such time as the objectives, scope and nature of the project and/or the magnitudes and scheduling of any inputs or outputs deviate so significantly from the project as originally authorized as to warrant submission of a new or revised PROP.

A.I.D. APPROVAL	CLEARANCES	DATE
for Joel Bernstein	EA/TECH, R. Johnson	5/18/71
SIGNATURE	NESA/TECH, J.Blume	4/26/71
AA Technical Asst. Bur.	LA/DR, Sleeper/Bowie	5/25/71
TITLE	AFR/TAC, M.Belcher	4/23/71
NOV 4 1971	VN/ND, A.Jacobs	5/26/71
DATE	A/CONT AA/A/DS, M.Brown (draft)	5/24/71

MORE EFFECTIVE USE OF COMPUTER TECHNOLOGY IN DEVELOPING COUNTRIES

OBJECTIVES

This project will extend AID's limited in-house capability to relate the use of computers to economic development. It is designed to provide support in the immediate future principally for TAB and other central AID offices but will also be available to respond to specific requests from the regional bureaus concerning AID support for activities in developing countries, mobilization of computer expertise for specific AID projects, and strengthening AID inputs to international forums related to computers and development.

This capability should be particularly helpful in clarifying the most promising manner and extent of practical applicaiton of contemporary computer technology both hardware and software -- to the needs of developing countries. Particular attention will be directed to (a) criteria which should guide decisions to invest in computers in a country-specific situation, (b) possible modifications of specific types of computer programs developed in the U.S. to make these programs more responsive to the needs of a developing country, and (c) the overall national demand for computer services in a country-

specific situation and the role of different types of computer facilities in responding to that demand.

This capability will provide expertise to support AID in the following areas:

-- sharper delineation of the techno-economic factors (e.g. foreign currency, employment, manpower, technological infrastructure) which should be considered in carrying out feasibility studies concerning computer acquisition and usage with particular attention to relating computer services to priority development needs and capabilities and to the systems needed to link computers with the users;

-- knowledge of the growing number of activities of the UN, its economic commissions and specialized agencies, and the OAS in the field of computers and development and sharpening AID response to these activities;

-- response to requests from countries and international development agencies for assistance in identifying U.S. experts for short and long term assignments in the computer field and for the shaping of education and training courses in computer sciences; and

-- response to requests from countries and regional organizations for advice (either on a concessional or a reimbursable basis) on techniques and approaches for establishing policies and goals related to computer acquisition and usage.

PROJECT SUMMARY

The general problem is the lack of adequate framework for the delineation of beneficial computer activities at various levels of development. The recent UN Report on Applications of Computer Technology for Development is a compendium of observations and experience -- not a strategy for the resolution of specific issues related to computer systems development in developing countries.

In preparing to meet the objectives outlined in the preceding section, initially the project staff will organize and synthesize available data on the level of computer development, including operational, educational, and manpoer resources, in selected developing countries. This synthesis will be considered in light of prior U.S. experience and experiences outlined in the UN report to develop a unified framework for considering specific issues related to the appropriate nature of computer activities at various levels of national development. The project staff will also initially assess UN and regional

activities related to computer applications in developing countries and identify the significant issues for AID, and appropriate AID strategies for their resolution.

The fact is there have been more failures than successes in implementing computer-related education and service programs in developing countries. At the same time the need for accelerating computer usage is widely recognized in these countries and LDC government efforts to broaden and expand computer facilities and services are intensifying despite currently low utilization of existing facilities. Increasingly technical assistance is being called upon to assist in structuring national computer development policies in these countries, and AID should be better prepared to respond constructively.

The qualifications of the project staff must be relevant to this task. Not only must the staff member have specialized knowledge of computer hardware capabilities and limitations, he must have expertise as well in systems analysis and planning,including software development and transferable programming to facilitate network development. Moreover, the staff member should be familiar with computer related applications and problem-solving in developing countries.

Under a PASA arrangement, the Department of Commerce will provide technical expertise to carry out this project on an 18 months' experimental basis. It is anticipated

that the project staff would be located in the Office of Assistant Secretary for Science and Technology and would draw on both the National Bureau of Standards and the Bureau of Census. A multidisciplinary steering committee, including representatives of TA/OST, TA/DA, PPC, and AAA/DS will provide guidance as to the plan of work and will review draft reports and recommendations to AID developed by the Department of Commerce.

COST

The estimated cost to AID is as follows:

	FY 72	FY 73
Staff	$15,000	$30,000
Travel and support costs	5,000	10,000
	$20,000	$40,000

In addition, because the Department of Commerce has interest in these activities, the Department will provide administrative support at no cost to AID.

While this experimental project is initially limited in duration to 18 months, there is little doubt that a long-term capability in this field will be needed. Therefore, if the project proves as useful as anticipated, consideration will be given to extending the arrangement beyond FY 73.

JUSTIFICATION

The increasing interest in computers and development is indicated in the enclosed summary of a recent UN report (Enclosure 1), the number of meetings being devoted to the topic throughout the world (six formal international meetings in 1971), and the requests to AID for assistance in this area. As the number of computers -- and concomitant foreign exchange costs -- grow in developing countries, there is considerable concern over the capabilities of these countries to relate this new technology to development priorities, to take into account the direct and secondary techno-economic considerations, to select the most appropriate systems, and to utilize effectively the systems that have been selected.

This project is based on the recommendations of the March 22-23 AID-sponsored symposium on computers and development (Enclosure 2). The symposium participants (Enclosure 3) repeatedly stressed the complexity of relating computers to development and fully supported development of a strengthened AID analytical capability in this field.

COURSE OF ACTION

On execution of the PASA agreement, the Department of Commerce will employ one computer systems specialist for assignment to this project. It is anticipated his office will be located in the Office of the Assistant Secretary for Science and Technology. His duties and responsibilities will be to:

1. Survey and synthesize available data on the level of computer development, including operational, educational, and manpower resources in four or five selected developing countries representing a cross section from most to least developed of these countries. Travel to the countries selected will be required in connection with this task to supplement and verify data available in Washington.

2. Based on the foregoing survey, and knowledge obtained from UN computer-related activities, develop a unified framework for considering specific issues related to the appropriate nature of computer activities at various levels of national development (e.g., appropriate balance for investments in hardware, software, and training; relation of computer technology to employment and foreign exchange; priority applications for development; centralized or decentralized systems).

3. Consult with A.I.D. field staff and developing country experts in one or two selected countries to develop

operational guidance and refine views on the framework for considering the establishment or expansion of computer facilities in developing countries.

4. Assist AID in responding to requests from developing countries for assistance in identifying U.S. inputs for short and long term assignments in the computer field and shaping education and training courses in computer sciences; also assist AID in responding to issues arising from UN computer-related activities.

These duties will be performed in the following phases:

Phase I. January - June 1972. Complete item 1. Report to steering committee for policy guidance.

Phase II. July 1972 - March 1973. Complete item 2. January 1973, report to steering committee.

Phase III. April - June 1973. Complete item 3. Department of Commerce report to be submitted to AID/W.

Phase IV. Concurrent with Phaes I, II, and III. Complete item 4.

UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

Distr.
GENERAL

E/4800/Summary
22 May 1970

ORIGINAL: ENGLISH

APPLICATION OF COMPUTER TECHNOLOGY FOR DEVELOPMENT

Report of the Secretary-General

Summary

1. At its twenty-third session, the General Assembly in resolution 2458 (XXIII) requested the Secretary-General to prepare a report dealing with computer technology for developing countries which would include a discussion of the results already obtained and the needs and prospects for computer use in accelerating development, the various forms for intensifying international co-operative activity and the role which the United Nations could play therein. In preparing this report, the Secretary-General obtained information from Governments of Member States, and received co-operation from organizations in the United Nations family and from some of the important international professional organizations. A panel of experts was convened and a number of background papers by specialists in particular fields were commissioned. The Secretary-General also received assistance from the Advisory Committee on the Application of Science and Technology to Development. In response to the Secretary-General's letter to Governments fifty-one replies were received, of which thirty-nine were from developing countries.

RESULTS ALREADY OBTAINED IN THE USE OF COMPUTERS IN THE DEVELOPING COUNTRIES

2. The replies contained insufficient data for a comprehensive description or assessment of computer installations and usage in developing countries. However, some useful data were obtained. They indicate that:

(a) Ten to twelve developing countries use computers to a noticeable degree. About the same number of countries are just beginning to use computers; and the others have had no real contact with them.

If the replies received from the developing countries are regarded as representative statistical sample of the developing countries as a whole, the data suggests:

- 16 per cent using
- 16 per cent beginning to use
- 68 per cent no use;

(b) Most governmental applications of computers are essentially mechanizations of major tasks, usually in the following areas:

- government planning and administration
- collection of statistics on production and resources
- management of national industries
- preparation of economic indices
- education and research
- demographic tabulation, analysis and projection;

(c) There exist many organizations or centres with unusual competence in the developing countries, where computers are being used to full advantage, but the mechanisms and means for the transfer or interchange of their knowledge are inadequate;

(d) The United Nations family of organizations has already supported a variety of activities with respect to the application of computer technology for development;

(e) There is often considerable under-utilization of existing equipment and an emphasis on simple applications, which are not necessarily the most useful;

(f) Education and training facilities for computers are inadequate or, in some instances, non-existent. Sending nationals abroad for training leads to problems: the students do not wish to return, or have difficulty in making cultural readjustments on their return. The practice of inviting visiting professors from developed countries is not altogether effective, as their stay is usually short and the activities they initiate often cease after their departure;

(g) Governments and foundations in the industrially advanced countries can provide a vital form of assistance in the field of computer technology, by supporting research and educational institutes in developing countries (for details see section V);

(h) The sparse evidence available indicates that the introduction of computer technology to the industrially advanced countries leads to structural changes in the labour market, but there is no significant unemployment as a result. These findings may not apply to developing countries; however, there is insufficient information for further analysis of the subject at present;

(i) Four levels of computer activity have been defined; initial, basic, operational and advanced. A strategy by which countries can move from one level to the next has been suggested (for details see section VII).

REQUIREMENTS FOR COMPUTER USE IN THE DEVELOPING COUNTRIES TO ACCELERATE THEIR DESIRED ECONOMIC AND SOCIAL GROWTH

3. The primary needs expressed in replies to the Secretary-General's letter are: assistance in training, advisory services from qualified experts, improved methods of disseminating information and more access to computing facilities:

(a) Training and education:

- are necessary at all levels
- should start before the final decision to install a computer is taken, since certain prerequisites and aspects of the technology (e.g. management, and computer systems analysis) require long periods of preparation
- should include actual experience of working with computing machinery of various types
- are needed for government and business decision-makers who must know the capabilities and pitfalls of the computer before they can maximize its usefulness
- require effective, shorter and standardized procedures;

(b) Additional advisory services of qualified experts are needed for developing countries. These may take the form of professional consultants provided the consultants themselves are aware of the special problems of developing countries;

(c) Professional organizations provide a source of assistance and information and their potentialities in this respect should be explored.

4. Other requirements for the developing countries are:

(a) The lack of reliable data. This is a major weakness and one that makes maximum effective computer use impossible;

(b) Policy decisions on the question of centralization or decentralization need to be made by each country. It should be noted that the greatest risk is that of uncontrolled growth resulting from the absence of a policy (the factors to be considered are contained in section III);

(c) Developing countries need to define the role computer technology will play within their national system. This implies a need for specific, defined, national goals;

(d) Regional computing centres may act as a means of co-ordination for information dissemination, preventing duplication and assisting countries in their region as computer usage grows in complexity;

(e) There are three essential conditions for establishing effective computer use:

- the presence of experienced people at all levels
- reliable data bases and information systems
- development of related disciplines (management science, statistics and operations research):

(f) Criteria must be established for the selection of activities or sectors where computer application can be most effective in accelerating the processes of development;

(g) Existing organizations using computers in developing countries must be examined and those that have unusual competence should be strengthened and/or used as examples;

(h) Protection of software (programmes and processing techniques) is expected to become a matter of common practice. Developing countries' access to necessary software must be ensured;

(i) Software and hardware standardization possibilities should be examined, but standardization should be approached cautiously to avoid inhibiting innovations and improvements. Standardization would allow developing countries to utilize advanced concepts faster and more effectively;

(j) Decisions to lease or to purchase must be made for each installation. Factors to be considered are examined in section III;

(k) Computer data banks are useful and are being more widely employed. Attention must be given to ensuring adequate protection of the indidivual's rights to privacy in this context.

THE PROSPECTS FOR USING COMPUTERS IN ACCELERATING THE PROCESS OF ECONOMIC AND SOCIAL DEVELOPMENT

5. During the Second United Nations Development Decade, the developing countries will need to call more fully on relevant technologies to accelerate their development; computer technology is one important element in determining the rate of technological change. The continuing growth of computer technology and its application in the industrialized countries will be a general feature of the 1970s.

(1) The 1970s will be a decade during which the developing countries will be able more fully to utilize computer technology, under sound and realistic conditions, to improve the rate of their desired economic and social change. This will require a long-term commitment by the individual Governments of developing countries, which may in turn contribute to lessening the gap between the developed and the developing countries in the application of computer technology.

(2) Increasingly, it is being recognized that in itself the computer is not a panacea and that all the difficulties and consequences of using computer technology need to be considered.

(3) Computers may be an instrument for the transfer of technology; when a computer is used to help in performing a task, its use forces a reassessment of the way the task should be done and often a re-evaluation of why the task is being done. This analysis is fully as important as bringing in the computer itself.

6. Other observations are that:

(a) The first major applications will be in the processing for Governments of census, financial and related data;

(b) Computer technology presents opportunities for strengthening, rather than weakening, the preservation of individuality, because of its ability to treat cases separately;

(c) The use of computers in regions of high unemployment will generate fears on the part of the public. Computers may have to be introduced to maintain a competitive position in international trade or to carry out an essential activity which cannot, in practice, be done by other means. Labour will not be displaced if the activity is a new one;

(d) To some extent "leap-frogging" (jumping a level of technology) will be possible. It is not necessary for developing countries to follow the same evolutionary paths as the industrially advanced countries. For example, developing countries can acquire "third generation" computers rather than lease or purchase obsolete or obsolescent "second generation" equipment;

(e) A certain amount of under-utilization of equipment and personnel is to be expected for countries at the "initial" and "basic" levels;

(f) Many countries will find it to their advantage to defer some of the more recent computer innovations such as time-sharing and certain sophisticated applications. Manufacture of computer hardware will be feasible for developing countries only in exceptional circumstances;

(g) Eventually, there will be a widespread emergence of integrated information and communication systems, based on the use of computers;

/...

(h) More national and international professional societies will be formed, which will assist in the transfer of technology.

FORMS OF INTERNATIONAL ACTION TO INTENSIFY CO-OPERATION IN THE FIELD OF COMPUTERS

7. Because computer technology is not dependent on cultural differences, many forms of international action can be taken which will greatly affect the speed and ease with which the transfer of computer technology and its growth can occur in the developing countries.

8. Most of these possibilities have been examined in this summary under the first and second sections. The following list, may, however, be useful:

(a) International seminars and symposia;

(b) Technical assistance in computer technology;

(c) The establishment of regional computing centres;

(d) An international means of providing disinterested advice on equipment acquisition and financing;

(e) International professional organizations;

(f) International agreements for protection and distribution of software;

(g) International agreements to promote compatibility of hardware and software;

(h) Establishment of "twinning" relationships or bilateral links between institutions in developed and developing countries.

THE ROLE WHICH THE UNITED NATIONS CAN PLAY IN PROMOTING INTERNATIONAL CO-OPERATION IN THE FIELD OF COMPUTER TECHNOLOGY

9. Specific action which the United Nations family of organizations could take is discussed in the report. The principal activities are:

(a) Consideration of the possible establishment of an international advisory board on computer technology for development;

(b) Conduct of periodic surveys to determine specific needs;

(c) Conduct of courses, seminars and symposia;

(d) Establishment and, perhaps initially, operation of regional computing centres;

(e) Conducting of studies to determine the relationship of computer technology to employment in developing countries;

(f) Maintenance of a register of computer experts who are willing to serve developing countries and assist countries in obtaining these services;

(g) Development of prototype uniform policies for legal treatment of programmes and data;

(h) Encouragement of standardization of hardware, software and data formats in a way that does not inhibit improvements;

(i) Initiation and encouragement of "twinning" and bilateral links of institutions in industrially advanced countries with similar institutions in developing countries;

(j) Greater use of the professional literature to publicize United Nations activities in computer technology.

ACTIONABLE SUGGESTIONS RESULTING FROM SYMPOSIUM ON ROLE OF COMPUTERS IN DEVELOPING COUNTRIES

1. AID should establish a capability to keep abreast of UN activities in this field, and particularly symposia being organized in developing areas, in order to provide appropriate inputs into these activities, including

   (a) mobilizing US resource people,

   (b) providing technical information and reports, and

   (c) assisting in shaping the character of the activities.

2. AID should consider at an appropriate time the possibility of participating in multi-donor funding of regional or subregional computer facilities.

3. In structuring an OAS study of effective utilizations of computers in Latin America, the following considerations should be taken into account:

   (a) The study should be an in-depth, broadly based analysis to insure adequate consideration of the socio-economic-technological environment and systems surrounding proposed and existing computer facilities and the relationship of computers to priority development needs. The study might be organized along sectoral lines.

   (b) The study should be undertaken only if the host governments are prepared to cooperate in airing past mistakes and in making data fully available.

   (c) The principal objective of the study should be to stimulate the LA Government to undertake hard headed introspections of the many non-technical as well as technical facets of computer investment decisions.

   (d) The study might be separated into three phases: (1) development of an analytical methodology, (2) testing and refining the methodology in a few countries, and (3) extending the methodology to other countries.

4. AID should establish an external focal point for keeping abreast of activities in this field. An initial task for this capability might be to develop a framework for carrying out feasibility studies concerning specific proposed computer facilities in developing countries. This capability could also be used to provide a longer term perspective in this field.

5. AID should consider steps to encourage more effective use of existing computer capabilities in developing countries established by U.S. private firms, including use of the facilities for training.

6. AID should consider assistance in training in the management science aspects of computers.

7. AID should discourage one-shot fragmented efforts.

8. AID should emphasize the institution building aspects of establishing indigenous capabilities to make wise judgements in the use of computers.

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March 22-23, 1971

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