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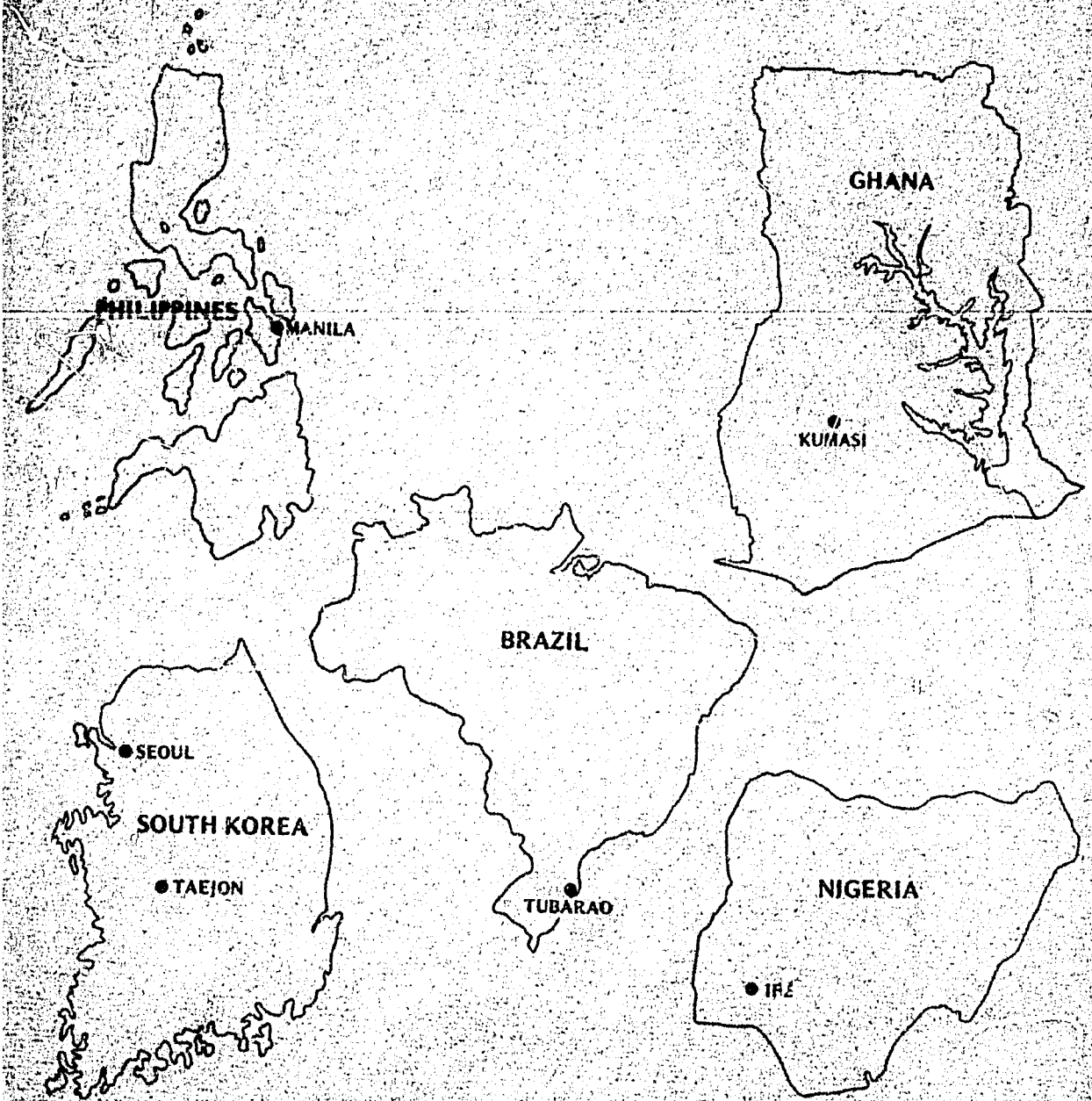
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SMALL-SCALE INDUSTRY GRANT YEAR V



STIMULATING THE GROWTH OF SMALL-SCALE INDUSTRY

GEORGIA INSTITUTE OF TECHNOLOGY

Engineering Experiment Station

Atlanta, Georgia 30332

FINAL REPORT
YEAR V

STIMULATING THE GROWTH OF
SMALL-SCALE INDUSTRY

Prepared for
U.S. Agency for International Development

by
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Office of International Programs
Engineering Experiment Station
GEORGIA INSTITUTE OF TECHNOLOGY
January 1979

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INTRODUCTION

On January 23, 1974, the Agency for International Development (AID) funded for the first time Contract No. AID/ta-c-1062, through which the then Economic Development Laboratory (now Office of International Programs) of the Engineering Experiment Station at the Georgia Institute of Technology was assigned the overall responsibility of implementing a five-year program of work in the area of stimulating growth of small-scale industry by providing grants and technical assistance to counterpart institutions. The administrative portion and project direction of this AID contract were assigned internally to the Office of International Programs (OIP) and given the project number A-1600 by the Office of Contract Administration of the Georgia Institute of Technology.

Second, third, fourth, and fifth consecutive years were funded by the same sponsor. This is the final report for Year V as well as the end-of-project report. This fifth program year was implemented in four different geographical regions of the world, but over the five years implementation was carried out in five different nations. In Year I only two counterparts were funded: Soong Jun University, Seoul, Korea (Project B-426), and the Fundacao Educacional do Sul de Santa Catarina, Tubarao, Brazil (Project B-427). During Year II, the third counterpart institution was funded, the University of Ife, Ile-Ife, Nigeria (Project B-455), and in Year III the fourth counterpart institution, the University of the Philippines, Institute for Small-Scale Industries, Manila, Philippines (Project B-463) was added. In Years IV and V, the University of Science and Technology, Technology Consultancy Centre, Kumasi, Ghana (Project B-492), replaced the University of Ife, which was dropped from the programs.

As established by contract guidelines, the following criteria were used in selecting each of the above counterparts, as specified by the sponsor:

1. Suitability of the national macroeconomic framework for local business conditions.
2. Existence of practicing or potential entrepreneurs.
3. Community concern over unemployment.

4. Existence of potential market for additional products.
5. Linkages (current or potential) with educational, financial, and business communities.
6. Quality of the staff.
7. Institution's potential for utilizing the grant effectively.
8. Potential multiplier effects.
9. Host government's commitments.

One of the basic provisions of the AID contract was that linkages or counterpart relationships with organizations in developing countries would be established and only four of these counterpart institutions would be funded under the present contract. After an extensive survey of 13 countries (Bolivia, Brazil, Colombia, Ecuador, Ghana, Ivory Coast, Indonesia, Kenya, Korea, Nigeria, Paraguay, Philippines and Thailand) was conducted in 1973 the first two institutions were selected for this project. Approximately 30 potential counterpart institutions were reviewed by the OIP staff and the sponsor.

Each of the selected institutions was asked to prepare and submit to OIP its project proposal. These were reviewed with the sponsor and later were funded by separate \$45,000 annual grants as provided by the base project, A-1600.

The terms of the individual grants to the counterpart institutions permitted the grantee to utilize half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The balance of the funds was to be used by the grantee to contract for training and consultation services from U. S. technical assistance-type organizations.

The Office of International Programs, through the Georgia Institute of Technology, subsequently contracted with all five grantees to provide training, consultation, technical support, information and data, as well as audiovisual documentation of the projects.

At the end of the four past program years, each individual project has been reported on separately. The sponsor has been provided with a complete set of the audiovisual documentaries for the individual counterpart institutions.

The sponsor also has been provided with an ample number of copies of the yearly reports ^{1/}. In the past five years, two in-depth project reviews have been conducted by the sponsor, as well as several progress reviews. As needed, minor adjustments to the project plan have been recommended and implemented. The total project came to its programmed end on January 9, 1979.

^{1/} For full details, refer to the respective end-of-the-year reports entitled Final Report--Small-Scale Industry Grant for each year and each counterpart named in this document, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1975, 1976, 1977, and 1978.

PART I
PROGRAM YEAR V

SUMMARY OF PROGRAM YEAR V

Other sections of this final report present in detail the activities and results attained by each of the counterpart institutions during this past year of the program. This section summarizes and highlights some of the results obtained in the past 12 months.

Project B-426--Soong Jun University (SJU), Seoul, Korea

1. Thirty companies were provided with technical-management assistance during this year--25 in Seoul and five in the Taejon area.
2. A survey of 27 companies, 12 in the Seoul area and 15 in the Taejon area, reported a total gain of 119 new jobs.
3. The research staff continued working on the development of a solar flat-plate collector which looks very promising.
4. Several appropriate technology devices have been developed or are being developed, such as a semi-portable methane gas generator, a device to scare birds (protect crops), and a device to assist in the manufacture of gut strings for tennis rackets.
5. SJU established working relationships with several Korean national institutions. The staff at SJU has received national recognition for its work with small-scale industries in that country. Several members of the staff are serving as consultants to national organizations.
6. Several seminars and training courses were presented to groups of small business managers, students, and government employees.
7. Fourteen publications were completed and published during this year.
8. Other donors also provided several grants to SJU to assist them in their research program.
9. The fifth annual audiovisual documentation was completed with coverage of both old and new technical assistance cases.

Project B-427--Fundacao Educacional do Sul de Santa Catarina (FESSC),
Tubarao, Brazil

1. The Basic Data Center (CDB) increased its holdings by 2,152 units during the year, not including some 985 newspaper clippings. Requests for information services reached an all-time high of 707 during the year.

2. Technical-management assistance was provided to 61 companies; of these, 35 requests developed into technical-management assistance cases. The remaining 26 requests from local enterprises received consultation, information, or limited assistance.

3. Twelve of the serviced companies were monitored during the year and reported having increased their employment by a total of 2,721 new jobs.

4. The 3,200-square meter Technology Center was completed and is now in operation. The Center represents a total investment in excess of \$1.2 million, with all funding provided by either federal or state sources.

5. Training of local human resources was continued, with 42 training programs presented and more than 1,600 persons completing them.

6. Members of the staff also received additional training. This year resulted in 107 registrations for a total of 26 different training programs.

7. The counterpart staff completed two feasibility studies, 14 new manufacturing opportunity studies, three management guidelines, and two case studies.

8. During the year the FESSC staff reports having presented five conferences, seminars or lectures, and the OIP staff presented six additional lectures.

9. The fifth annual audiovisual documentation was taped during the year.

Project B-463--University of the Philippines, Institute for Small-Scale
Industries (UP/ISSI), Manila, Philippines

1. The staff of the UP/ISSI Pilot Extension Office in Tacloban, Leyte, provided technical-management assistance to 20 new companies in that area during the year.

2. A selected group of companies (six firms) which had received technical-management assistance during the year reported having increased their labor force by 20 new employees.

3. The Pilot Extension Office staff also assisted in establishing five new enterprises in 1978.

4. UP/ISSI implemented training programs with nine different government agencies during the reporting year, and 20 rural workers also completed a training program in handicraft skills.

5. Two members of the Pilot Extension Office staff participated in special training programs, one with Technonet Asia, the other at OIP headquarters in Atlanta.

6. Three new appropriate technology devices were conceived and produced by the counterpart staff: a wood lathe machine spindle, a steel weaving frame, and a solar dryer.

7. As part of its activity for this year, the UP/ISSI staff published nine feasibility studies, eight case studies, six industrial surveys, and eight project proposals.

8. The third annual audiovisual documentation also was completed during the 1978-79 year.

Project B-492--University of Science and Technology, Technology Consultancy Centre (UST/TCC), Kumasi, Ghana

1. The steel bolts and nuts manufacturing unit continued to operate at a profit level, and during the year additional equipment became available, thus allowing a local entrepreneur to set up a small fabrication unit off the campus.

2. The broadloom weaving unit also continued its operation, and the new technology is slowly being accepted by local craftsmen.

3. A hand-operated screw press was designed and constructed for the extraction of palm oil. Several presses have been fabricated and sold to local farmers.

4. Research continued to identify local plants whose seeds can produce oil suitable for soapmaking. A five-acre pilot plantation was begun by the staff and is now planted in castor beans and physic nuts.

5. Designs were completed during the year for a small-scale sugar pilot plant. The TCC staff plans to build the pilot plant during the following year.

6. The Craft Tourist Center at Wonoo was completed and will begin operation early in 1979.

7. An appropriate technology brass furnace was designed and constructed and is currently being tested. A rubber plantation was reactivated and an appropriate technology device to press rubber sheets was put into operation. An appropriate technology lemongrass distillery also was fabricated during the year.

8. Under a separately funded project, a prototype pyrolysis unit was developed to be used to operate a brick kiln.

9. The second audiovisual documentary was completed during the year.

PROGRAM PLANS FOR YEAR V

Background

The Engineering Experiment Station (EES) at the Georgia Institute of Technology (GIT), a nonprofit organization, was authorized by an Act of the Georgia General Assembly in 1919 and was activated in 1934. EES was re-commissioned by the Assembly in 1960 "to aid in the promotion of scientific, engineering, and industrial research. . . to advance science, technology and education, to encourage further industrial and economic development, provide technical advice and assistance to business and industry . . . to provide an industrial extension service to meet the technical information and other needs of industry and local development groups. . ."

The EES broad program of industrial and economic development research, service, information, and training covers the following major fields of activity: area development, community development, market analysis, industrial economics, management and technical assistance to industry, technical information services and technology transfer, manpower resources, basic data collection and dissemination, industrial and economic development training, and international development services. Special studies relating to natural resources, plant location, industrial land use, and industrial or rural development program planning also are conducted.

In the spring of 1964, EES became interested in the possibility of establishing an international program as a natural extension of its development work in process and that previously carried out in the state of Georgia. Further investigation revealed that at the time there were few, if any, universities in the country actively engaged in the training of foreign students in the basic principles and methodologies of industrial development.

Having recognized the need for and potential of a sound program of economic-industrial development for the emerging nations, EES added to its professional staff bilingual personnel with extensive industrial experience in both Latin America and the United States. This group evolved and began to draw upon experience gained by EES during its earlier years. In 1972, after a series of successful AID-sponsored projects in Latin America, the Georgia Institute of Technology was awarded an AID 211(d) grant.

It was under this grant that the then International Programs Division (now the Office of International Programs) identified the need for stimulating the growth of small-scale industries in less-developed countries (LDCs). In an attempt to respond to this identified need, the International Programs Division prepared a proposal under the title, "Stimulating Growth of Small-Scale Industry," which was submitted to AID for consideration on October 15, 1973. Early the following year (January 23, 1974), the proposal was accepted and funded by AID.

Prior to the funding of this grant, the OIP staff had identified the general problems associated with the expansion and diversification of small-scale industry, as well as the creation of new industries. The following general problems had been identified:

1. Lack of a systems analysis approach to providing research, services, and information to industry.
2. Insufficient funding to expand industrial assistance activities.
3. Continuing need for training of more organizational staff personnel.
4. Lack of knowledge of pragmatic methodologies.
5. A deficient information base related to technical and management problems of small-scale industries.

The Office of International Programs suggested a program which would attempt to cope with these problem areas. Some of the basic elements proposed to the sponsor were:

1. An organizational focus with clearly defined aims.
2. A well-trained and motivated staff.
3. An information base.
4. A technical assistance "delivery system."
5. A pragmatic approach (field-oriented) to the provision of technical and management assistance.

When this proposal program was funded by AID, Project A-1600 was established, and \$45,000 grants then were made to each of the participating counterpart institutions. Mr. Nelson C. Wall, Associate Director of OIP, was named Project Director of A-1600.

As indicated earlier, the terms of the grants to the counterpart institution permitted the grantee to allocate half of the grant funds for personnel, travel, materials and supplies, conferences, etc. The remaining half of the grant funds was to be used by the grantee to obtain training and consultation services from qualified organizations in the U.S.A. All the counterpart institutions contracted with OIP for these services.

The counterpart institutions funded for Year V of the project are briefly described below:

Soong Jun University

Soong Jun University (SJU) was created in September 1970 when Soong Sil College united with Taejon College to form a new cooperative venture in the field of Christian education. Soong Sil College, in turn, had been established in Pyeng Yong (North Korea) in 1897; it was reopened in Seoul in May 1954 by the Korea Mission of the Presbyterian Church after being closed in 1938 during the Japanese occupation. At present, Soong Jun University has an enrollment of some 2,500 undergraduate students and 80 graduate students. The engineering program comprises some 800 students.

The main campus is located in Seoul near the large industrial area of Yong-Deung-Po, with a population well over 1.5 million inhabitants. The second campus at Taejon is near a smaller industrial area with a population of more than 500,000. The government of Korea presently is developing a new "science town" adjacent to the Taejon campus.

To better serve the needs of the nation, and in order to bring technology to the point of practical application, the SJU administration decided in 1973 to form, on each campus, an industrial development assistance program to concentrate on the less-developed regions and the industrial areas in those locations near the two campuses. In this manner, the Integrated Development Center (IDC) was established at Seoul and the Regional Development Institute (RDI) at Taejon.

The operating heads, also full-time faculty members on the campuses, are Dr. Yoon Bae Ouh at Seoul and Dr. Seyeul Kim at Taejon.

The criteria used by both IDC and RDI for the selection of the assistance areas were the following:

- o Underdeveloped
- o Underindustrialized
- o Low income average
- o High unemployment

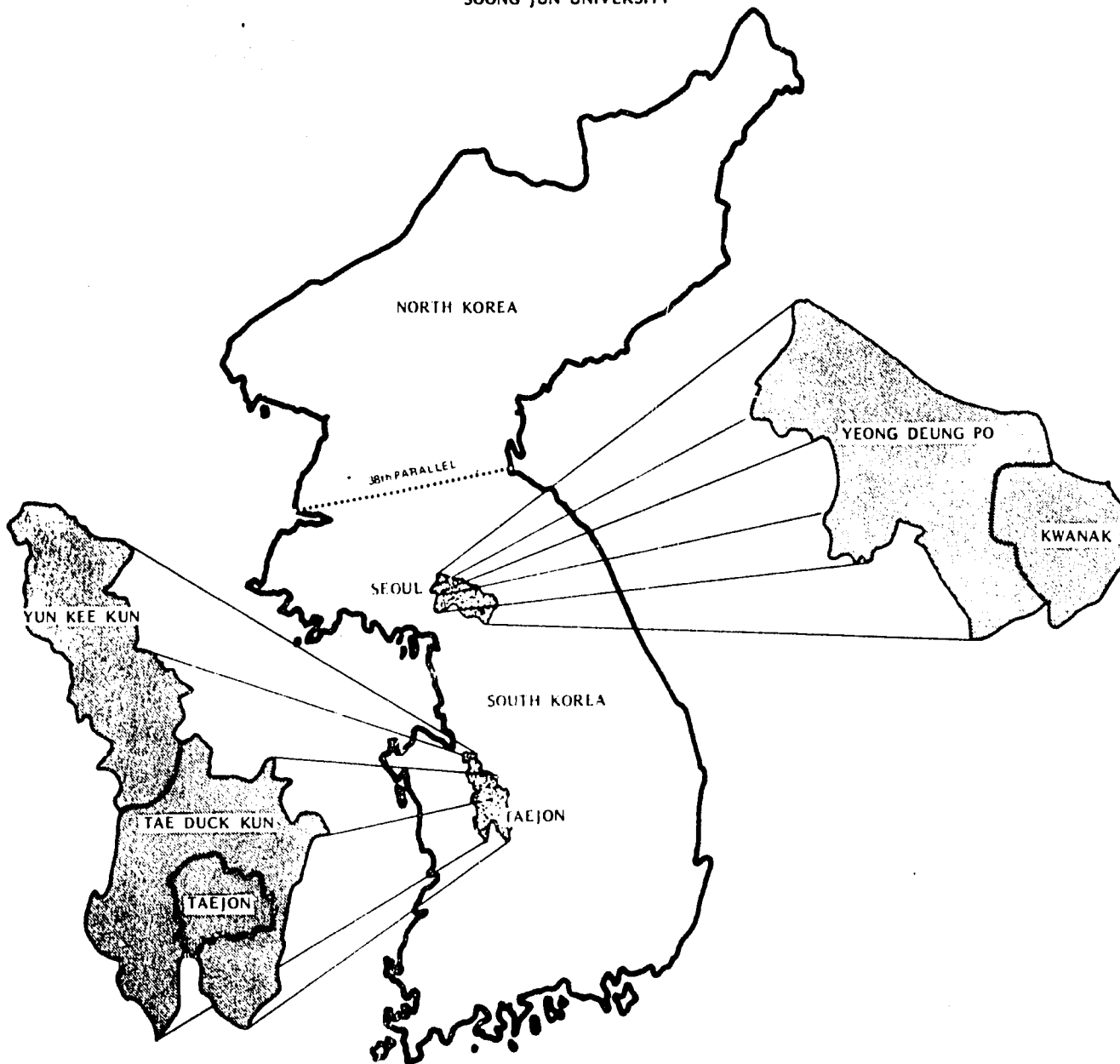
The areas near the two campuses which best fit these criteria were Yeong-Deung-Po and Kwanak, south of Seoul, and Yun Kee Kun and Fae Duck Kun, surrounding and north of the city of Taejon. (See Map 1.) The Integrated Development Center at Seoul was assigned responsibility for all program activities and, for the past five years, has served as the counterpart unit to OIP at the Georgia Institute of Technology. Since the start of this program in 1974, Dr. Yoon Bae Ouh has served as counterpart Project Director.

Fundacao Educacional do Sul de Santa Catarina

The Fundacao Educational do Sul de Santa Catarina (FESSC) is a well-respected, nonprofit, autonomous institution established by the Brazilian Civil Code and national legislation under Decree Laws 200 and 900. FESSC was established by Municipal Law No. 443/67 of October 18, 1967, and its bylaws define the following objectives:

1. Create, integrate, organize, and maintain schools of higher and medium level professional quality, as established by the needs of the labor market of the region, state, and nation.
2. Carry out course programs, training, and specialization for graduates and special courses for post-graduates.
3. Promote study and research in relation to the economic development and social development of the region and state by themselves, or with the assistance, or in cooperation with private and public entities.
4. Promote conferences, debates, and seminars as a dissemination of studies related to economic problems in general, or specifically of the region of South Santa Catarina.

MAP 1
SMALL INDUSTRY STUDY AREAS
SOONG JUN UNIVERSITY



5. Adopt, as needed, the necessary organization to implement the future University of South Santa Catarina.

The Council of Curators is made up of representatives of the entities which created and support the organization. The Executive Secretary is the representative of FESSC; at present, he is the President of the Executive Directorate of FESSC, Mr. Silvestre Heerdt.

The Executive Directorate of FESSC is composed of its President (the Executive Secretary of the Council of Curators) and the Directors of the Department of Higher Education, the Department of Secondary Education, and the Department of Research and Development. There is also an Educational and Technical Advisory Council to the Directorate.

The support organization to the administration includes a Secretary General, Associate Directors, Administrative Assistant, and assistants in teaching and planning.

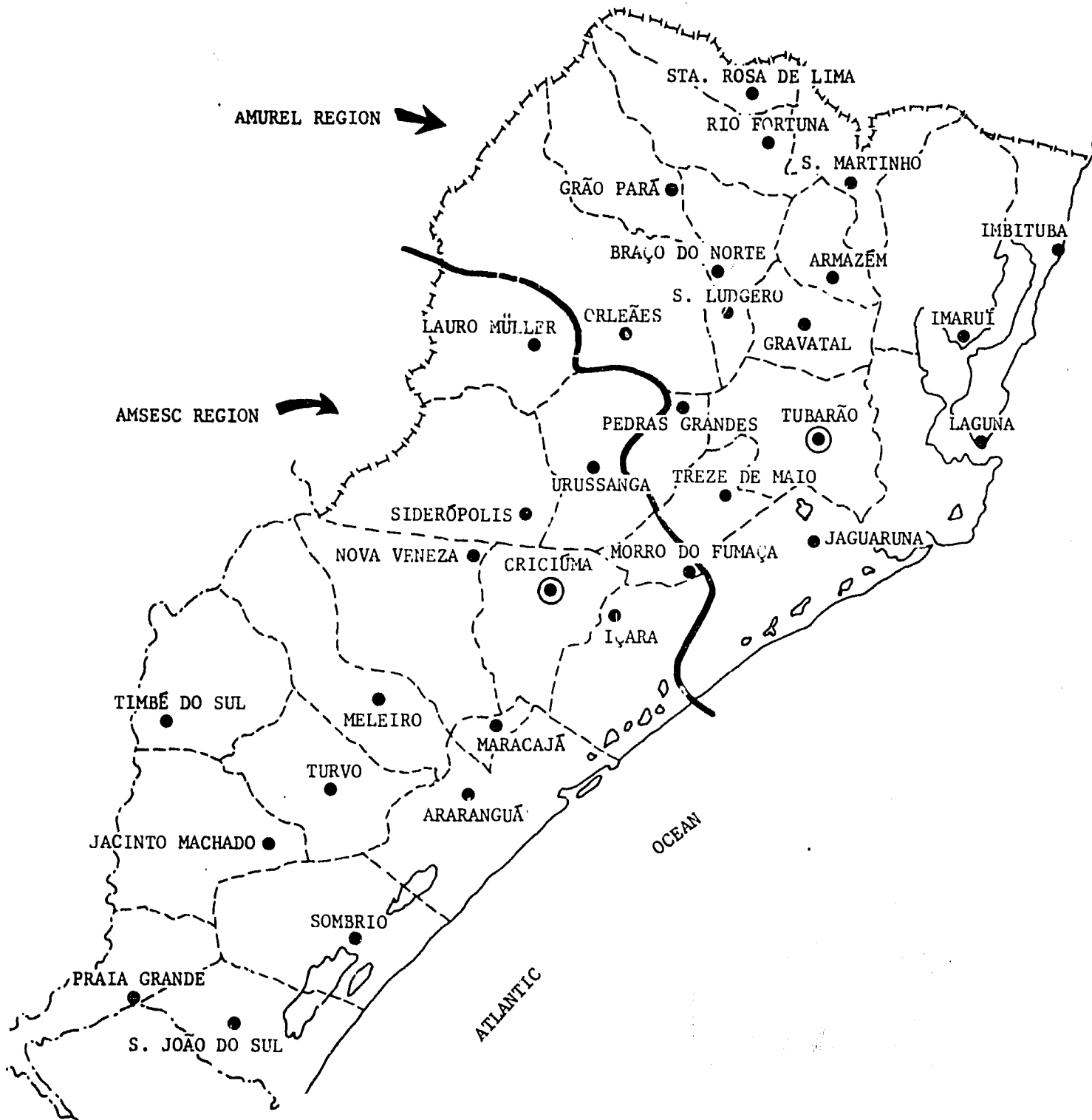
The Research and Development Department has a center or institute to provide technical assistance, research, planning, and information oriented to local development and regional development of private enterprises, communities, municipalities, and other public sectors, as well as the private and civic community.

The campus at Tubarao started with the old Colegio Dehon, a 7,000-square meter building purchased in 1972. The new campus (under construction) covers a land area of 161,000 square meters. At present, enrollment is well over 3,000 students, of whom more than 1,000 are in higher education, 1,500 in high school, and the balance in grade school.

In 1974, when the project began, the Research and Development Department was assigned the responsibility for the program and has served as the counterpart unit to OIP. The Director of that department, Eco. Jose Muller, has been the counterpart Project Director for the past five years.

The area selected by FESSC for this programs covers 9,409 square kilometers, encompassing 32 municipalities forming two micro-regions called AMUREL and AMSESC, with a population of over 650,000 inhabitants by the end of 1978. Map 2 depicts the political divisions of the project area.

Map 2
 POLITICAL DIVISIONS OF
 SOUTH SANTA CATARINA, BRAZIL



University of the Philippines

The University of the Philippines' Institute for Small-Scale Industries (UP/ISSI) is a Philippine national agency and an integral part of the University of the Philippines System. Established in 1966, UP/ISSI is charged with promotion of the development of the Philippine small-industry sector, and its activities are directed to research, training, consultancy, entrepreneurial development, management and technical data development and dissemination, and extension services.

UP/ISSI is particularly concerned with the social advancement of the Philippine rural areas through appropriate industrial development. The organization maintains continuing and active professional linkages with international development organizations.

In August 1975, UP/ISSI decided to widen its professional capacity, particularly the intensification of its programs for direct rural development. This came about in response to government executive directives to governmental agencies to "intensify efforts for the establishment of appropriate industries in regions outside the Greater Manila area."

This counterpart entered the program in 1976. Since then, the development of further Government of the Philippines support to permit UP/ISSI to widen and direct its capacities to rural objectives has been abetted by this grant and by the technical cooperation provided by OIP.

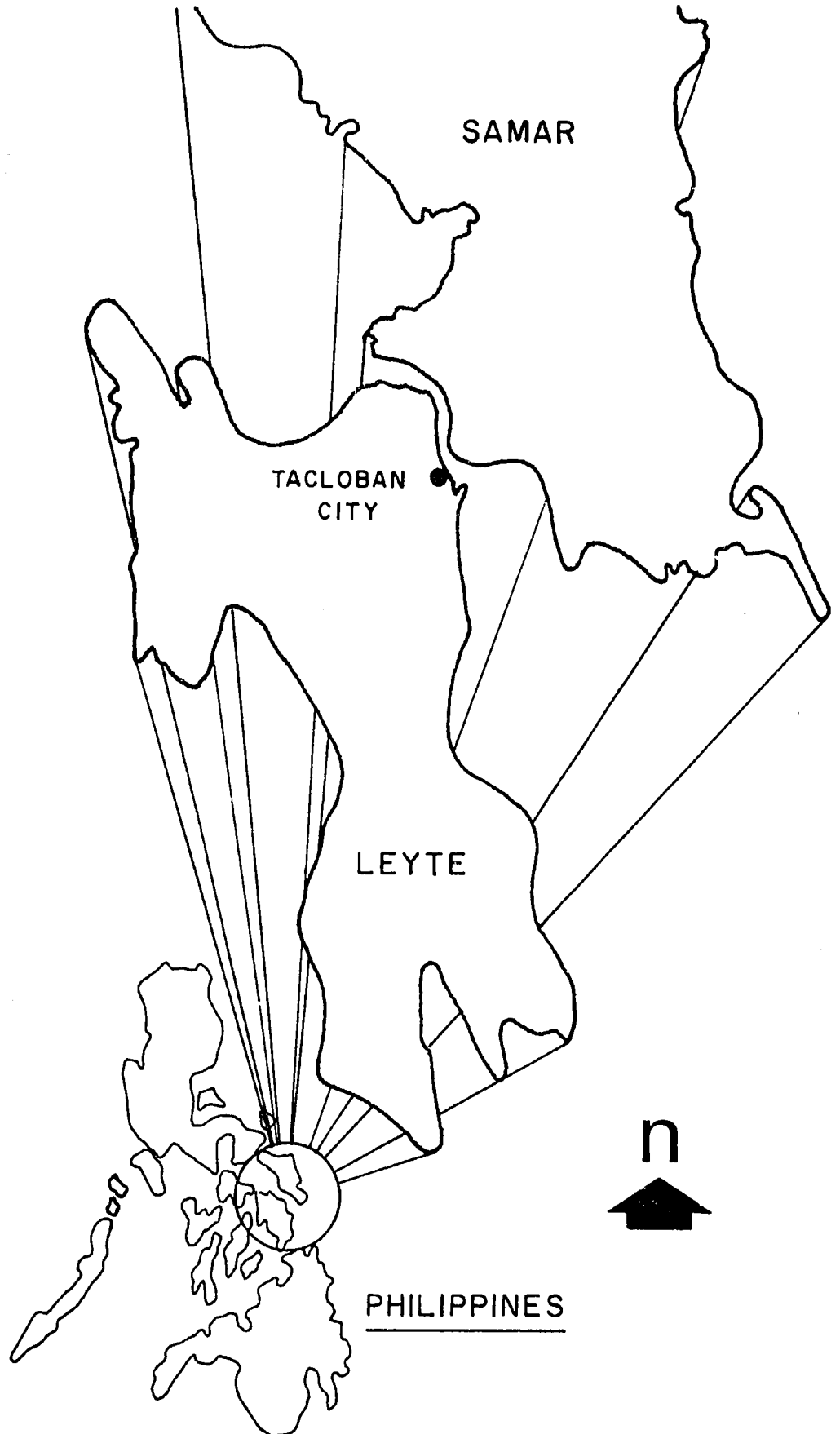
At the start of the program, UP/ISSI designated Mr. Paterno V. Vilorio, Director of ISSI, as counterpart Project Director, and he has served in that position to date. In 1976 it was decided that the target area of assistance would be the whole of Region VIII, comprising Leyte, Southern Leyte, Eastern Samar, and Northern Samar (see Map 3), with Tacloban City as headquarters. The total area of this region is 21,431.7 square kilometers, and its population in 1975 was 2,585,797 persons.

University of Science and Technology

The University of Science and Technology is located at Kumasi, in the central part of Ghana, about 200 kilometers from the capital city of Accra. The Technology Consultancy Centre (UST/TCC) was established in January 1972.

Map 3

SMALL INDUSTRY STUDY AREA,
UP/ISSI -- EASTERN VISAYAS



TCC was created to act as an agency for the stimulation of grass-roots development by means of "intermediate" or "appropriate" technology. It seeks to upgrade existing craft industries such as textiles, pottery, and woodworking, by the introduction of new products and improved manufacturing techniques. TCC also endeavors to generate new small-scale industries based on products developed by the Academic Faculty of the University and utilizing, insofar as possible, locally produced raw materials.

Between 1972 and 1976, TCC established a number of production units which have yielded useful commercial and industrial experiences under local conditions. These production units, making steel bolts and nuts, bar soap, and textile products, have been effective in training a number of craftsmen. Aided by grants from overseas in foreign exchange, TCC has imported over the years the tools and equipment for the production units. The University then uses its influence to secure small consignments of raw materials. In this manner, the manufacturing units are able to operate.

The functions of TCC are:

1. To offer consultancy service of a conventional, sponsored nature to government agencies, public corporations, and large industries.
2. To stimulate small-scale industry through free or low-cost consulting services, the establishment of production units by TCC, and the provision of manufacturing equipment, personnel training, and other appropriate means.
3. To collaborate with the faculties in the encouragement of research and development of an applied and practical nature aimed at solving problems of immediate importance to native industry.

On May 24, 1977, the sponsor advised OIP that it concurred with OIP's recommendation that the Nigerian Small Industry Grant not be extended and that the grant instead be initiated with TCC. The University of Science and Technology then entered the program, and Dr. John W. Powell, Director of TCC, was appointed as counterpart Project Director.

Objectives

At the initiation of this program, the continuing objectives were clearly defined, and they have been reviewed by the sponsor at each of two comprehensive reviews and several progress reviews since January 10, 1974.

The objectives are threefold:

1. To encourage selected developing country organizations to focus on employment generation through programs which accelerate the expansion of existing industry and the creation of new small industries.
2. To demonstrate and document the impact of alternative approaches to the stimulation of industry.
3. To create in the appropriate governmental, industrial, and financial sectors of small industry an awareness of potentials and ways to maximize these potentials.

To further ensure compliance with these program objectives, the Project Director, OIP, established two main areas of activities for his staff:

1. Training of selected counterpart staff, both on site and in the U.S.A.
2. Provision of on-site consulting services to the different programs implemented by the counterpart institutions.

It was also established that the OIP project staff would assist the counterpart teams in providing managerial, engineering, scientific, and technical assistance to selected small and medium-sized industries in the participating host countries. The established objectives for Year V were met during this reporting year.

Total Project Goals of the AID/ta-c-1062 Contract

The project goals were delineated by the Agency for International Development (AID) at the start of the Small-Scale Industry Grant on January 23, 1974. The established goals to be achieved over a five-year period are as follows:

The general objective of this contract is to generate employment in developing countries, particularly outside of the metropolitan centers, by: (a) strengthening the capability of a selected institution in each country to provide effective technical assistance to local small industry, (b) demonstrating and documenting the impact of alternative approaches to technical assistance to small industry, and (c) infusing the governmental, industrial and financial sectors of the local community selected to provide employment with the understanding of the techniques of generating jobs. The above objectives will be carried out through the use of grants to selected Lesser Developed Country (LDC) organizations.

Once the total project goals are attained, the sponsor anticipates the following outputs:

1. Increased job opportunity in four countries.
2. Increased viability of indigenously owned enterprises.
3. Improved capability of four LDC institutions to serve small industry.
4. Tested methodologies for strengthening LDC industries.
5. Evaluation report on successes and failures in assisting small industry.

The total project goals have been met over the past five years, plus several additional accomplishments during this year and the life of the project, all of which are presented in further detail in the balance of this final report.

Programs of Work

Under Project A-1600, the role defined for the Office of International Programs was that of administering the program, providing guidance to the participating institutions in designing and developing their own projects, providing advice and counsel as required, suggesting alternative options for their consideration, monitoring the implementation, and in general, providing the necessary leadership, all leading to the enhancement and assurance of positive results as established by the project goals.

For the past five years, the OIP Project Director has provided suggested programs for each of the participating counterpart institutions. These suggested programs of work were reviewed and modified by the counterpart Project Directors and their staffs in order to achieve their own goals and to meet established needs. In an attempt to create a basis for some degree of comparison, and to establish criteria applicable to all projects, the following guidelines were recommended to be incorporated in all counterpart projects, starting in Year I of the program.

1. Counterpart Organizational Functional Activities
 - a. Organization. The counterpart will administratively designate a unit to mount a program of research, service, training, and technical information for the small industry sector.

Staff personnel will design the program based on the organization's goals and motivations.

b. Facilities and Staff. The counterpart will provide adequate office, equipment, and other resources to the designated unit to permit its staff to function effectively. Staff personnel who have appropriate backgrounds and who, with appropriate training, can implement the program of assistance will be assigned to the unit.

c. Technology Transfer. An information collection will be established by the counterpart, where one does not already exist, to permit the staff to conduct research on industrial problems, needs, processes, and products, especially as they relate to small-scale industry, and to disseminate technical information.

d. Delivery System. The counterpart will design and implement a procedure to permit direct contact with small industries and entrepreneurs for the purpose of ascertaining their needs and problems and for the provision of staff assistance and research in the solution of problems, both management and technical in nature. This industrial extension activity will have as its aim the establishment of new industry and the expansion and diversification of existing industry.

e. Education and Training. The counterpart will design and deliver appropriate training programs related to small-scale industry. Educational programs related to industrialization will be encouraged.

2. Independent Continuing Activities. The counterpart will design, in cooperation with the OIP Project Director, a specific program of continuing activities which should include, but not be limited to, the following major subject areas:

a. Research Activities. For example, this could be in the areas of: (1) preparation of case histories; (2) approaches leading to employment generation; (3) analysis, evaluation, and development of new industrialization techniques (if appropriate), products, and processes. Other research activities also will be considered.

b. Industrial Extension Activities. This should be a pragmatic type of program related directly to serving the new and existing small-scale industries. Sample activities would be: (1) industrial problem-solving; (2) advice to and consultation with industry; (3) survey of small-scale industry problems and needs.

c. Training Activities. The counterpart institution should consider the possibility of providing on-site training to persons in industry. This training may be to management, supervisors, or employees, as needed. Some sample subjects to be considered are: (1) market analysis, (2) small industry operation, and (3) survey of small-scale industry problems and needs.

d. Educational Activities. This is an option, but if the counterpart is an educational institution, it is highly recommended.

e. Training and Consultation. This task will be the responsibility of the OIP staff. As needed, selected counterpart institution staff will receive appropriate training at OIP headquarters in Atlanta, Georgia. The training may take various forms as appropriate, including classroom work, on-the-job training, consulting and advisory services, plant tours, and other pertinent topics.

Using the established program guidelines, the individual counterpart institutions then developed their corresponding programs for this year. The individual programs are summarized as follows:

B-426--Soong Jun University (SJU)

1. Technical/Managerial Assistance

a. Emphasis will continue to be placed on the mechanical engineering area, but expansion into other technical areas will proceed as begun in 1975 and carried forward in 1976 and 1977. During the latter year, assistance was provided in textile engineering, electrical engineering, chemical engineering, electronic engineering, and commercial design in both the Seoul and Taejon areas.

b. Managerial and industrial engineering assistance will continue to be expanded, with emphasis on quality control and general industrial management techniques.

c. During 1978-79, emphasis will continue to be placed more on adaptive technology and improvement of management practices in small-scale industries. During 1977-78, there has been an increasing demand on these areas from the small-scale industry sector.

2. Solar Energy and Small-Scale Industries. With continuing technical assistance from the Office of International Programs (OIP), SJU's engineering staff will seek to develop simple and inexpensive devices to utilize solar energy. These may be usable in small-scale industries or be suitable for production and sale by small firms. During 1977, work was begun by the Seoul campus engineers on a more efficient flat-plate solar energy collector which is being made of lighter weight, less expensive materials. Using published material furnished by OIP, SJU is developing this solar collector, which will be constructed of local materials, not relying on foreign-made materials. On the other hand, the Taejon campus staff developed and constructed a low-cost improved greenhouse for use by small farmers, which is being demonstrated to area residents.

As in 1977, SJU will continue to work with OIP and the Korea Institute of Science and Technology (KIST) in matters related to practical, marketable solar devices for production and use in Korea.

3. Appropriate Technology. The SJU staff has been engaged in the development of appropriate technology for several years.

During 1977 the Taejon campus staff has designed and tested two improved versions of the wheeled "cheegay." The latest model has been approved by the panel of users and a plant has been located, the management of which is willing to produce 500 units for sale next year. Application has been made for a Korean patent. Royalties from the sale of any units beyond the initial test run of 500 will be utilized by SJU for further work in appropriate technology. A traditional Korean scythe and a very dangerous cutting device already have been identified by SJU for improvement and production. On the other hand, at the Seoul campus SJU engineers have already developed a very simple device for utilizing wind power to pump water.

4. Organizational Linkages and Information Exchange. The joint SJU/OIP program, from its inception, has sought to facilitate linkages between various industries and governmental agencies interested in small-scale industries. During 1978-79, an information exchange between SJU and various agencies will be continued. Information useful to small-scale industry will be made available via SJU's Small-Scale Industry Information Center.

During 1977, SJU has begun to see the payoff from the groundwork laid during the previous years of the joint SJU/OIP program. Linkages have been established with the Korea Credit Guarantee Fund, the Korea Federation of Small Business, the Korea Ministry of Commerce and Industry, and the Korea Medium Industry Bank.

Discussions were in progress at year's end with representatives of the Korea Credit Guarantee Fund regarding substantial contractual work for SJU/OIP during 1978. As in past years, emphasis will be placed on the audiovisual material collection.

5. Training Programs. During 1977 SJU presented five seminars regarding various aspects of small business. One of these was presented to engineers, owners, and managers from member firms of the Korea Association of Communication Instrument Manufacturing Industry. A similar seminar had been conducted by SJU in 1976. Korean government and industry continue to be strongly interested in training in such fields as quality control, energy management, and production control. Such programs will be continued during 1978-79.

6. Educational Activities. 1977 was the third year of operation for SJU's new Industrial Engineering Department, which resulted from the joint SJU/OIP project.

As in 1977, it is planned that the following activities will be carried out:

- a. Various training seminars for the faculty and students.
- b. Assessment of the joint SJU/OIP program.
- c. Development of written and audiovisual case histories.
- d. U.S. training for faculty members.

7. General. During the last quarter of this final year, SJU together with an OIP staff representative will prepare an in-depth end-of-the-project report. This final report will present in detail the accomplishments and shortcomings of the total program (five years). A baseline study also will be prepared by the SJU staff during the year; it will be compared with the one published during Year I and appropriate conclusions will be drawn from this comparison.

B-427--Fundacao Educacional do Sul de Santa Catarina (FESSC)

1. Basic Data Center (CDB). In the past four years, the CDB more than doubled its holdings, but it is still developing. This important unit of the Department of Research and Development will be assisted in expanding its collection of information of social, economic, industrial, and technological origin. In the past year, this collection has been widely used by the staff in the day-to-day solving of the problems of the small-scale industries in the area. The collection also is open to the students and general public.

The systematic expansion of the existing center, within the specialty of providing information to small-scale industries, will continue to be of the highest priority during this proposed program year.

During Year V, emphasis will be given to the following areas of work within the CDB:

- a. Collection, classification, and dissemination of pragmatic, up-to-date information on Brazilian and international material relevant to small-scale industries and appropriate technology.
- b. Additional on-site consultation and assistance from the OIP senior staff as needed.
- c. Implementation and expansion of the guidelines established during the Year I for the operation of the CDB.
- d. Training of staff in audiovisual documentation.

2. Center for Management and Technical Assistance (CETEG). This is the strongest unit which has developed from this program over the past four years. For Year V, the following activities are planned:

- a. Continue to provide continuous technical assistance service to a total of 11 companies.
- b. Continue to provide discontinuous (as needed) technical assistance service to a total of 30 companies during the year.
- c. Conduct and complete two feasibility studies.
- d. Determine, select, and complete eight manufacturing opportunity studies.
- e. Continue the audiovisual case histories and documentation begun during Years I, II, III, and IV.
- f. Prepare two management guidelines for small-scale industries.
- g. Prepare a baseline study at the end of the year.
- h. Prepare two industrial case studies.

The staff of OIP will provide support, assistance, and consultation to the CETEG staff in the above program activities.

3. Adaptive Technology Center (CATT). This growing center is in need of additional staff training. It is anticipated that during Year V a training program will be presented jointly with the OIP staff and assisted by the faculty at the Georgia Institute of Technology.

The OIP staff representatives on site will work closely with the CATT staff in developing guidelines, initiating activities, determining needs, identifying data requirements, and providing other assistance as necessary during the year.

4. Department for Permanent Education (DEP). As in the past years, the OIP staff on site will participate with FESSC staff in the presentation of short courses, lectures, and workshops. Three training programs are planned for on-site presentation during the project year. Dates will be established by the respective project directors for FESSC and OIP. Three lecture series also are planned for this year. The lectures and training programs will be presented at the same time that the OIP staff is on site at FESSC. During past years this activity was well received and programs were offered to the graduating classes of different disciplines.

5. General. During the last quarter of this final year, FESSC together with an OIP staff representative will prepare an in-depth end-of-the-project report. This final report will present in detail the accomplishments and shortcomings of the total program (five years). The baseline study which will be prepared this year shall be compared to the one published during Year I and appropriate conclusions will be drawn from this comparison.

B-463--University of the Philippines, Institute for Small-Scale Industries (UP/ISSI)

1. Extension Office - Tacloban City

The now-established Pilot Extension Office will continue to undertake the following services:

a. Extension Services

- general information: handouts and reports
- general management consultancy
- direct plant assistance
- project feasibility studies
- industry and entrepreneurship promotion on the regional level

- b. Research
 - provincial surveys
 - industry profiles/studies
 - technological studies
 - product research
- c. Training
 - management and technical courses (short- and long-term)
 - seminars for selected industries
 - seminars on entrepreneurship

2. Industrial Extension - General

Industrial extension will be continued as a major thrust. Strategies to be followed are as follows:

- a. The utilization of an industry-organization approach to industrial extension in order to provide a wider impact of assistance rendered.
- b. The introduction of appropriate technology to labor-intensive production processes.
- c. The continuation of entrepreneurship training.
- d. The preparation of project feasibility studies involving plant expansion or new projects which are labor intensive.
- e. The dissemination of information on technology.
- f. The selection of projects having high impact potential will be done using the following criteria:
 - appropriate technology applications 40%
 - employment and productivity levels 30%
 - resource-orientedness 20%
 - capital/labor ratio 10%

(Weight has been arbitrarily assigned, depending on perceived importance and impact of criteria.)

3. Industrial Training and Education

To continue the training and education activities started the previous year, the following are to be implemented:

- a. To continue to upgrade, through training/recruitment, the skill level and performance effectiveness of the UP/ISSI Pilot Extension Office (Redentor Dakanay to GIT).
- b. To continue to follow up the trainees on the Entrepreneurship Training programs conducted in Maasin, Tacloban, and Catarman on a bimonthly basis.

4. Research

The following research activities will be considered as priorities:

- a. To continue to develop the bandsaw design and belt-switching mechanism for San Juanico Industries, Inc.
- b. To conduct a baseline study during the last half of the year to be compared with the published study done during Year I.

5. Linkages

In order to reinforce the linkages established in the past, these actions are recommended:

- a. DSSD/NSDB/UPISSI Joint Project on Fermentative Food Processing and Food Preservation.
- b. LSBDA/LDS/NACIDA/UPISSI Handicraft Project.
- c. Survey of Small-Scale Industry and Pre-Investment Study of Leyte with UP College, Tacloban.
- d. Introduction of EDP in business courses at the college level in Region VIII.

B-392--University of Science and Technology, Technology Consultancy Centre (UST/TCC)

1. Industrial Training and Education

a. To establish optimum objectives for TCC professional staff training to be subsequently provided in Atlanta by the Georgia Institute of Technology. It is anticipated that these training courses may include the following:

- o Field office management for industrial extension services
- o Industrial data gathering and dissemination for rural users
- o Vegetable oil processing, soap making, and rubber processing

2. Technical Assistance

a. To better utilize scheduled visits by OIP staff members to TCC facilities in support of technical assistance transfer activities. The activities are to include:

- o General management consultancy
- o In-plant assistance
- o Feasibility analysis
- o Entrepreneurial promotion
- o Development of appropriate rural technology

3. Research

To support, as indicated, related research activities of TCC through interaction with OIP staff and through continuing contact with the International Development Data Center (IDDC) at OIP. This support will be particularly directed to:

- a. Appropriate technology
- b. Alternative sources for scarce raw materials, such as palm oil for the production of soap
- c. Techniques for ferrous and nonferrous casting

4. Applied Research

Under a separately funded budget, OIP and TCC will continue to develop a project to demonstrate pyrolysis as a feasible and economic alternative energy source for Ghana and possibly for other developing countries. The pyrolytic converter system, once developed, would be used to provide energy for a brick kiln.

In the following section of this final report, each of the counterpart programs for Year V is described in detail and in Part II, a five-year summary is presented.

Use of Grant Funds

Each of the grantees participating in the Year V program was funded for a one-year period in the amount of \$45,000. The following institutions participated:

Year V Funding

| | |
|---|---------------|
| Soong Jun University | Project B-426 |
| Fundacao Educacional do Sul de Santa Catarina | Project B-427 |
| University of the Philippines | Project B-463 |
| University of Science and Technology (six months only, July 1978-January 1979) | Project B-492 |

In addition to the \$45,000 grant, Soong Jun University received \$4,974 from the terminated grant to the University of Ife (B-455), and the University of Science and Technology received an additional \$7,600 from the same fund. Both these additional grants were authorized by the sponsor. Disbursements of all these funds are shown in Tables 1 through 4 for the corresponding counterpart institutions.

All of the four counterpart institutions described in this part of the report have shown commitments to the program by investing their own funds in their respective projects. For example, during Year V, SJU spent \$50,000 (50.4% of the total); FESSC invested \$59,900 (57.1% of the total); UP participated with \$1,226 (2.7% of the total); and UST contributed \$45,000 (59.9% of the total).

The first two counterparts mentioned have contributed heavily to the program over the past five years. A complete analysis of the disbursement and use of grant funds from 1974 to 1979 is presented in Part II of this report.

Table 1
DISBURSEMENT OF GRANT AND PROJECT FUNDS
SOONG JUN UNIVERSITY (B-426)
YEAR V
(in dollars)

| <u>Expenditures</u> | <u>Funds by Source</u> | | <u>Project Total Year V</u> |
|-----------------------------------|----------------------------|--------------|-------------------------------------|
| | <u>AID</u> | <u>SJU*</u> | |
| Direct Salaries and Wages | 16,987 | 29,000 | 45,987 |
| Travel | | | |
| International | 1,300 | 3,000 | 4,300 |
| Local | 1,700 | 3,500 | 5,200 |
| Materials and Supplies | 3,000 | 2,000 | 5,000 |
| Conferences/ Seminars | 1,000 | 1,000 | 2,000 |
| Contract Services (GIT) | 22,987 | - | 22,987 |
| Audiovisual Documentation | 2,000 | 200 | 2,200 |
| Technical Research and Support | 1,000 | 3,000 | 4,000 |
| Overhead | - | <u>9,000</u> | <u>9,000</u> |
| Total | <u>49,974^{1/}</u> | 50,700 | 100,674 |
| Participation: AID | | | 49.6% |
| SJU | | | 50.4% |

* Includes cost sharing from industry, university and foundations.

^{1/} Year V includes \$45,000 grant plus an additional \$4,974 from B-455, as authorized by sponsor, for a total of \$49,974.

Sources: OIP accounting and counterpart financial reports.

Table 2
 DISBURSEMENT OF GRANT AND PROJECT FUNDS
 FUNDACAO EDUCACIONAL DO SUL DE SANTA CATARINA (B-427)
 YEAR V
 (in dollars)

| <u>Expenditures</u> | <u>Funds by Source</u> | | <u>Project Total Year V</u> |
|------------------------------|------------------------|---------------|-------------------------------------|
| | <u>AID</u> | <u>FESSC*</u> | |
| Direct Salaries and Wages | 11,700 | 42,900 | 54,600 |
| Travel | | | |
| International | 6,000 | - | 6,000 |
| Local | 1,200 | 1,500 | 2,700 |
| Materials and Supplies | 3,600 | - | 3,600 |
| Contract Services | | | |
| Local | - | 5,000 | 5,000 |
| GIT | 20,500 | - | 20,500 |
| Audiovisual Documentation | 2,000 | - | 2,000 |
| Consultants (Local) | - | 5,000 | 5,000 |
| Overhead | - | 3,500 | 3,500 |
| Other (Publications) | - | 2,000 | 2,000 |
| Total | 45,000 | 59,900 | 104,900 |
| Participation: AID | | | 42.9% |
| FESSC | | | 57.1% |

* Includes cost sharing from federal and state governments as well as industry.

Sources: OIP accounting and counterpart reports.

Table 3
 DISBURSEMENT OF GRANT AND PROJECT FUNDS
 UNIVERSITY OF THE PHILIPPINES (B-463)
 YEAR II
 (in dollars)

| <u>Expenditures</u> | <u>Funds by Source</u> | | <u>Project Total Year III</u> |
|------------------------------|------------------------|------------|---------------------------------------|
| | <u>AID</u> | <u>UP*</u> | |
| Direct Salaries and Wages | 12,900 | 1,226 | 14,126 |
| Travel | | | |
| International | 4,300 | - | 4,300 |
| Local | 2,300 | - | 2,300 |
| Materials and Supplies | 3,000 | - | 3,000 |
| Contract Services (GIT) | 20,500 | - | 20,500 |
| Audiovisual Documentation | 2,000 | - | 2,000 |
| Equipment | - | - | - |
| Total | 45,000 | 1,226 | 46,226 |
| Participation: AID | | | 97.3% |
| UP | | | 2.7% |

* Includes cost sharing from other sources.

Sources: OIP accounting and counterpart financial reports.

Table 4
DISBURSEMENT OF GRANT AND PROJECT FUNDS
UNIVERSITY OF SCIENCE AND TECHNOLOGY (B-492)
YEAR II
(in dollars)

| <u>Expenditures</u> | <u>Funds by Source</u> | | <u>Project Total Year II</u> |
|------------------------------|------------------------|-------------|--------------------------------------|
| | <u>AID</u> | <u>UST*</u> | |
| Direct Salaries and Wages | - | 45,000 | 45,000 |
| Travel | | | |
| International | 4,760 | - | 4,760 |
| Local | 1,000 | - | 1,000 |
| Materials and Supplies | 2,400 | - | 2,400 |
| Contract Services (GIT) | 14,050 | - | 14,050 |
| Audiovisual Documentation | 1,000 | - | 1,000 |
| Equipment | <u>6,890</u> | <u>-</u> | <u>6,890</u> |
| Total | 30,100 ^{1/} | 45,000 | 75,100 |
| Participation: AID | | | 40.1% |
| UST | | | 59.9% |

* Includes cost sharing from other sources.

^{1/} Year II is from July 1, 1978, to January 9, 1979, and includes \$22,500 plus \$7,600 additional from B-455, as authorized by sponsor, for a total of \$30,100.

Sources: Accounting and counterpart financial reports.

GENERAL ACTIVITIES DURING PROGRAM YEAR V

In the Introduction section of this final report, it was indicated that Project A-1600 was established by the Georgia Institute of Technology as the base project and that all implementation would be carried out under the four companion projects: B-426, B-427, B-463, and B-492.

It was considered necessary by the Project Director to structure this final report in such a manner as to permit this section to highlight the relevant activities implemented under each companion project by the participating counterpart institutions. Year V was initiated on January 10, 1978, and came to its programmed end on January 9, 1979.

Soong Jun University (SJU)

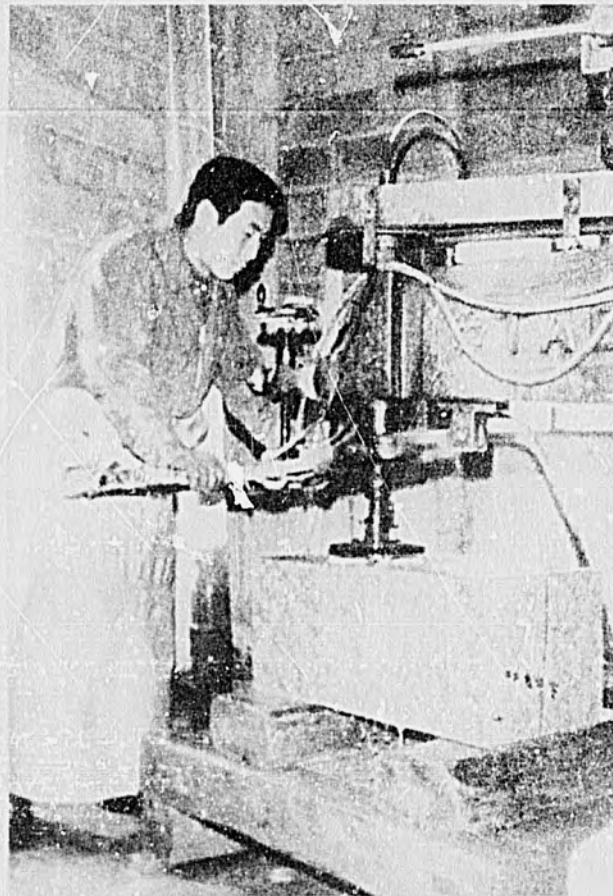
This institution has been in the program since 1974, so this was its fifth year with the Small-Scale Industry Grant.

1. Technical/Management Assistance. The end-of-the-year report presented by the SJU project staff indicates that during this year 25 companies were provided with technical/management assistance by the Seoul campus staff, and another five companies were assisted by the Taejon campus staff. The firms assisted manufacture a wide variety of products, such as cotton fabric, racket gut, adhesives, capacitors, electric motors, radial drilling machines, golf balls, toys, and other products, to name a few.

The greater bulk of the assistance required was of a technical nature or related to production problems. Of five companies assisted in Taejon, three cases were completed by the end of the year; the other two were to be continued after the closing date of the program.

Figure 1, on the following page, presents one of the companies assisted by the program this year.

Figure 1
STONE GRINDING AND
POLISHING FOR MONUMENTS



2. Employment Generation. As in other years, the project staff conducted a survey of companies which had received technical/management assistance in the past or present year to determine the increase or decrease in employment of these companies. In Year V, 15 companies were surveyed by the Seoul campus staff and an additional 12 by the Taejon campus staff. The survey reported a gain of 119 jobs during the year.

Tables 5 and 6, following, summarize the employment changes in the companies surveyed as reported by the SJU staff on each campus. In Part II of this report a five-year summary also is presented so as to provide an overall project recapitulation.

A significant result of previous work in this area was the granting in 1978 of several contracts by the Industry Development Office, Credit Assurance Fund, and the Small Business Association to expand further the provision of technical assistance and the employment generation activities of SJU.

Table 5

SUMMARY OF EMPLOYMENT CHANGES OF
SURVEYED COMPANIES ASSISTED BY SJU,
SEOUL CAMPUS, 1978-79

| <u>Company Name</u> | <u>Employment, 1978-79</u> | | <u>Variation</u> | |
|---------------------|----------------------------|------------|------------------|----------------|
| | <u>Start</u> | <u>End</u> | <u>Absolute</u> | <u>Percent</u> |
| Dae Won Textile | 60 | 72 | 12 | 20.00 |
| Samkang Textile | 65 | 74 | 9 | 13.84 |
| Kukie Industrial | 5 | 7 | 2 | 40.00 |
| Chungang Hwashin | 12 | 15 | 3 | 25.00 |
| Hyundai Oil-Press | 50 | 52 | 2 | 4.00 |
| Chilsung Polymer | 10 | 12 | 2 | 20.00 |
| Dae Yang Paper | 52 | 55 | 3 | 5.77 |
| Sejin Electronic | 436 | 450 | 14 | 3.21 |
| Daehan Marcon | 151 | 163 | 12 | 7.94 |
| Hankwan Industrial | 110 | 121 | 11 | 10.00 |
| Samjin Electric | 120 | 128 | 8 | 6.66 |
| Hungsuk Industrial | 30 | 36 | 6 | 20.00 |
| Dongbang Industrial | 52 | 56 | 4 | 7.09 |
| Suho Industrial | 65 | 68 | 3 | 4.61 |
| Samil Industrial | 45 | 52 | 7 | 15.55 |
| Total | 1,263 | 1,361 | 98 | 7.76 |

Source: Soong Jun University, Final Report 1978-79, Seoul Campus.

Table 6
 SUMMARY OF EMPLOYMENT CHANGES OF
 SURVEYED COMPANIES ASSISTED BY SJU,
 TAEJON CAMPUS, 1978-79

| <u>Company Name</u> | <u>Employment, 1978-78</u> | | <u>Variation</u> | |
|--------------------------|----------------------------|------------|------------------|----------------|
| | <u>Start</u> | <u>End</u> | <u>Absolute</u> | <u>Percent</u> |
| Dong-A Pencil Industry | 300 | 300 | - | - |
| Measung Agr. Chemical | 120 | 120 | - | - |
| Kyung In Moolsan | 3 | 5 | 2 | 66.66 |
| Hong Do Food | 3 | 5 | 2 | 66.66 |
| Han Mi Towel | 290 | 299 | 9 | 3.10 |
| Tae-A Industrial | 20 | 20 | - | - |
| Han Mi Paint | 80 | 86 | 6 | 7.50 |
| Sam Sung Sodium Chloride | 5 | 5 | - | - |
| Tae Ginang Oxygen | 31 | 32 | 1 | 3.22 |
| Tae Dong Food | 11 | 11 | - | - |
| Dae Won Food | 7 | 8 | 1 | 14.28 |
| Hwashin Industrial | <u>37</u> | <u>37</u> | <u>-</u> | <u>-</u> |
| Total | 907 | 928 | 21 | 2.32 |

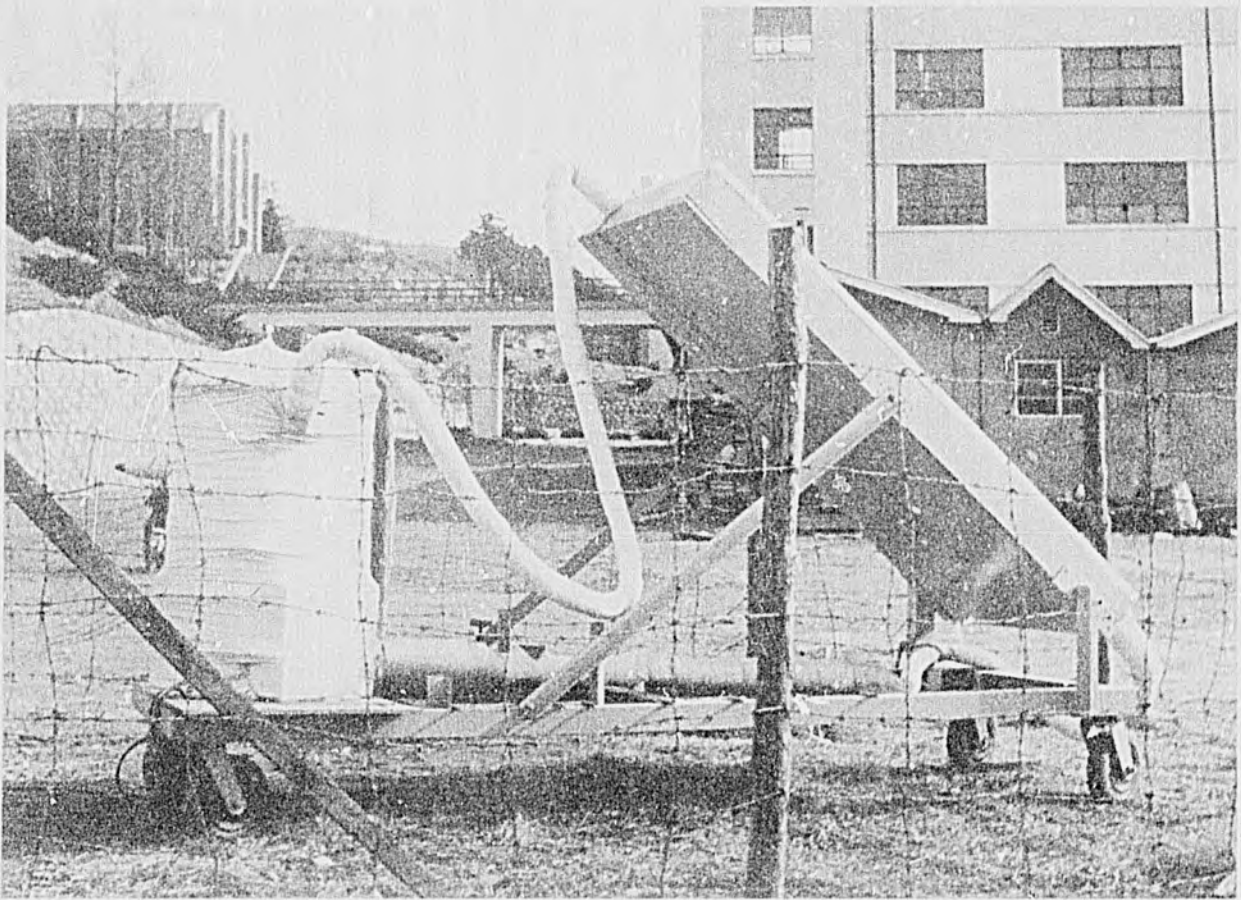
Source: Soong Jun University, Final Report 1978-79, Taejon Campus.

3. Energy and Small-Scale Industries. The SJU research staff continues working in the area of solar energy, and during the program year several items of solar energy hardware have been developed or improved. As early as 1976, the Seoul campus staff developed a solar flat-plate collector. A second-generation collector was designed in 1977 utilizing lighter materials, less costly indigenous products, and providing a better efficiency. The ultimate goal is to produce a design which can be manufactured in commercial quantities by small-scale industry at a price affordable by the Korean consumer. During this reporting year this activity was continued and a solar plate collector was constructed as per the new design generated. Figure 2 presents a picture of the second-generation solar plate collector.

During the year, experiments were continued on the solar water heater which was built at Ma Dong Village in Wae-San Myon during Year IV by Professor Charles Krauth of the Taejon campus. The hothouse has proven very successful so far in the experiment, and due to its location in Ma Dong, close to a favorite resting place of local farmers, it has had maximum exposure.

Figure 2

EXPERIMENTAL SOLAR PLATE COLLECTOR-SJU



4. Appropriate Technology. The staff of the Taejon campus has continued working on the development of a semi-portable methane gas generator using animal dung as raw material. At the Seoul campus, in response to the needs of two local companies (Kukie Industries and Chungang Hwashin), an appropriate technology device was developed to assist in the manufacture of gut strings for tennis rackets. This device was developed by Professor Yeong-Seok during the reporting year. At the Taejon campus the staff is now developing an appropriate technology device to frighten birds away from the planted crops (rice). They are being assisted by the Intermediate Technology Development Group, Ltd., London, in the development of this device.

5. Organizational Linkages and Information Exchange. During Year V SJU continued working with the Korea Credit Guarantee Fund (KCGF), the Korean Federation of Small Business (KFSB), the Korean Ministry of Commerce and Industry (KMCI), and the Korea Medium Industry Bank (KMIB). Additional linkages were established at the Taejon campus with the Institute of Internal Revenue Services, the Asia Foundation, the Ministry of Trade, Industry and Labor of the Solomon Islands, the Taejon Chamber of Commerce and Industry, the Village Technology Innovation Experiment (Ethiopia), the Deutsche Gesellschaft Fur Technische Zusammenarbeit (West Germany), and the Settlement Study Center of Israel. During the year, Dr. Seyeul Kim, Director of the Regional Development Institute, Taejon, was appointed as a consultant to the Korea Credit Guarantee Fund.

6. Educational and Training Activities. The Seoul campus presented an industrial seminar on electric correspondence technique and some 40 persons participated. The Taejon staff presented, in conjunction with the Taejon Chamber of Commerce and Industry, a short course on industrial design. The course was presented in two segments: theory and practice. More than 50 participants were present, among them local managers, engineers, and industrial designers. Other lectures, workshops, and speeches were presented on such topics as regional development planning, central government training, new community development movement, and rural regional development. Dr. Yoong Bae Ouh visited the OIP headquarters in Atlanta during the month of November 1978 to exchange information and to obtain guidance in the preparation of the final report.

7. Publications. Five publications were completed by the counterpart staff at the Seoul campus and another nine prepared by the Taejon staff. The titles of these publications are as follows:

- a. "A Study on Improvement of the Domestic Racket Gut," by Professor Yeong-Seok Kim.
- b. "A Study of Lighting Performance Calculation and Shielding Angle on the 345 KV EHV Transmission Line," by Professors Kyung-Yal Kim and Bo-Ho Ree.
- c. "Study on the Fabrication of CaTe-Cds Solar Cell and Its Properties," by Professor Myung-Soo Kim.
- d. "The Performance of a LiBr-Water Absorption Refrigerator," by Professors Yung-Pil Kwon and Jae-Bok Yun.
- e. "Probability of Error for Frequency-Shift Keying," by Professor Seung-In Yang.
- f. "A Study on Referral and Clearance System in the Small Industry Sector of Korea," by Dr. Hae Byeong Lee.
- g. "Systematic Linkages between RDI Activities and the Department of Regional Development Model Curriculum Building," by Dr. Seyeul Kim.
- h. "The Function of Total Quality Control and Management," by Professor Bang Sun Park.
- i. "A Study on the Electrical Properties of Glass Semiconductors," by Professor Byung Woo Koh.
- j. "A Study on Water-Soluble Proteins of Wheat Flour," by Professor Chong Ick Kim.
- k. "Chemical and Nutritional Studies on Dioscorea Japonica Thunberg," by Professor Chong Ick Kim.
- l. "The Role of Entrepreneurship in Regional Development," by Mr. Myeong Kee Chung.

- m. "Extension Service Report-Case of Sunnam Industrial Co.," by staff.
- n. "Extension Service Report-Case of Kukje Special Metal Co.," by staff.

8. Audiovisual Documentation. The fifth year of audiovisual documentation was completed by the joint project staff. Mr. F. Malvar of OIP taped some of the old technical assistance cases presented in Years I-IV as well as some selected new cases from this year. Copies of the corresponding tapes and photographs have been made available to the sponsor and counterpart institution.

9. Other Activities. Again this year, the grant to SJU generated other significant activities of benefit to the grantee. For example: (a) the Korean Federation of Small Business granted \$1,800 to assist in supporting the industrial extension services; (b) the United Board for Christian Higher Education in Asia provided a grant of \$8,750 for a three-year research project on intermediate technology development.

Figure 3, on the following page, is the Project Plan for the activities scheduled and implemented during Year V.

Fundacao Educacional do Sul de Santa Catarina (FESSC)

One of the two original counterparts, FESSC entered the program on January 10, 1974, for the full five years to January 9, 1979.

1. Basic Data Center (CDB). As in the past years, the CDB continued to expand its holdings as well as users of the system. For Year V, new acquisitions were on the order of 2,169 items plus well over 985 additional newspaper clippings (about two file cabinet drawers). Table 7 presents the acquisitions made by CDB during this program year. A five-year summary of acquisitions also is presented in Part II of this report. It is only proper to note the fact that following the 1974 flood, the Project Director conducted an inventory of the CDB holdings and found that only 241 units had been saved from the flood; since that time, the collection has grown to over 6,300 units through this program.

At the start of the 1976-77 project year, the Project Director suggested to the CDB staff that they initiate a register in order to record the number of users of the CDB collection. This year 707 requests for information were made to the CDB staff, seven times as many as recorded for the initial year.

Table 7

CDB - PUBLICATIONS ACQUIRED
FESSC, PROGRAM YEAR 1978-79

| <u>Type of Publication</u> | <u>Items Added to Collection</u> |
|----------------------------|--------------------------------------|
| Periodicals | 1,791 |
| Annuals | 12 |
| Articles | 25 |
| Catalogs | 22 |
| Books | 146 |
| Manuals | 2 |
| Maps | 4 |
| Reports | 39 |
| Profiles | - |
| Monographs | - |
| Journals | 17 |
| Censuses | 12 |
| Calendars | - |
| Studies | 72 |
| Booklets | 5 |
| Pamphlets | 22 |
| Newspaper Clippings | 985* |
| Miscellaneous | - |
| Total | 2,169 |

* Newspaper clippings not included in total.

Source: FESSC, Final Report 1978-79.

2. Center for Management and Technical Assistance (CETEG) For the past five years, CETEG has been responsible for the implementation of this project. The very successful operation of CETEG has been the key to the project's success. The CETEG staff has provided pragmatic technical and management assistance to the small and medium-scale industries of the area since Program Year I, when the director of CETEG, Mr. Humberto Dalsasso, completed his training at OIP in Atlanta, Georgia.

During the 1978-79 year, a total of 61 local industries requested assistance, but only 35 of these were considered as technical or management assistance cases. In the past five years, the counterpart staff has serviced a total of 196 technical or management assistance cases. The counterpart staff covers a geographical area of about 9,500 square kilometers, as shown on Map 2 of this report. Table 8 presents a recapitulation of the technical or management assistance cases by municipalities for the reporting year. Figures 4 and 5 are representative of two of the small-scale industries which have received technical-management assistance, and Table 9 presents the new jobs generated during the year.

Table 8
 RECAPITULATION OF TECHNICAL-MANAGEMENT
 ASSISTANCE CASES BY MUNICIPALITIES
 CETEG, YEAR 1978-79

| <u>Municipality</u> | <u>Technical Assistance</u> | | <u>Total</u> |
|--------------------------|-----------------------------|----------------------|--------------|
| | <u>Continuous</u> | <u>Discontinuous</u> | |
| Criciuma | - | 1 | 1 |
| Gravatal | 1 | - | 1 |
| Laguna | - | 1 | 1 |
| Lauro Muller | - | 1 | 1 |
| Orleans | - | - | - |
| S. Ludgero | 1 | - | 1 |
| Treze de Maio | - | 1 | 1 |
| Tubarao | 3 | 22 | 25 |
| Urussanga | - | 2 | 2 |
| Other Locations in State | - | - | - |
| Out of State | <u>-</u> | <u>2</u> | <u>2</u> |
| Total | 5 | 30 | 35 |

Source: FEISSC, Final Report 1978-79.

Figure 4

INDUSTRIA DE DOCES AUREA
(Producer of Jellies and Jams)

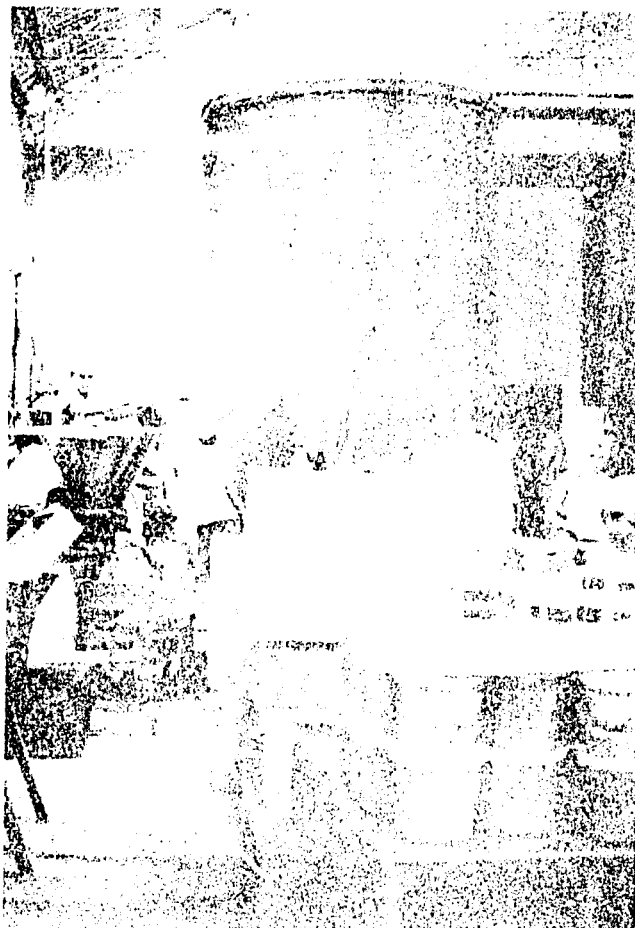




Table 9
 VARIATION IN EMPLOYMENT OF SELECTED COMPANIES RECEIVING
 TECHNICAL ASSISTANCE DURING FESSC PROGRAM YEAR V

| <u>Company Name</u> | <u>Employment 1978-79</u> | | <u>Variation</u> | |
|-----------------------|---------------------------|------------|------------------|----------------|
| | <u>Start</u> | <u>End</u> | <u>Absolute</u> | <u>Percent</u> |
| Isaltino Pandini Lima | 13 | 13 | 0 | - |
| Inel | 98 | 73 | -25 | -25.5 |
| Indarmeling & Filho | 35 | 35 | 0 | - |
| Rodflex | 115 | 83 | -32 | -27.8 |
| N. Brunato & Co. | 21 | 42 | 21 | 100.0 |
| Metalurgica Souza | 39 | 48 | 9 | 24.3 |
| Incoseja | 911 | 1,094 | 183 | 20.0 |
| Metasul | 9 | 19 | 10 | 111.1 |
| Grupo Gaidzinski* | 1,200 | 3,750 | 2,550 | 212.5 |
| Fomar Ind. y Com. | 13 | 15 | 2 | 15.4 |
| Nivaldo Cunha | 21 | 22 | 1 | 4.7 |
| Moveis Santa Barbara | <u>6</u> | <u>8</u> | <u>2</u> | 33.3 |
| Total | 2,481 | 5,202 | 2,721 | 109.6 |

* Grupo Gaidzinski included two new industries started by Ceramica Eliane, which reported 800 employees at the end of the 1977-78 year.

Source: FESSC, Final Report 1978-79.

3. Adaptive Technology Center (CATT). The Adaptive Technology Center was one of the first units established by this program during Year I. CATT was designed to serve as the focal point around which FESSC could start developing engineering and technical disciplines. During Year IV of the program, FESSC finally was able to obtain financial support from the state government to build a Technology Center to house CATT and other units. Construction began in July 1977 and the Technology Center was completed early in 1978.

At present, the Technology Center (3,200 square meters) houses CATT, which is responsible for the review and evaluation of existing technology, and will attempt in the future to adapt technologies for use by local, small-scale industries. Within the Technology Center, there are also a Food Technology Center and the Industrial-Chemical Engineering Faculty.

Figure 6 presents a phase during construction in 1978, and Figure 7 shows the Chemistry Laboratory being used by the students. The now completed Technology Center has four laboratory areas (11 classrooms and laboratories), four support areas (nine classrooms, and five offices, plus the water, power, and drainage support system. The total cost is in excess of 23 million cruzeiros (over \$1.2 million at present rate), all of which is being financed by federal or state funds. This may well be the single most important accomplishment of the program.

Figure 6
TECHNOLOGY CENTER UNDER CONSTRUCTION
FESSC, JANUARY 1978



Figure 7
CHEMISTRY LABORATORY
CATT, 1978



4. Industrial Training and Education. This segment of the program is being implemented by the newly created Department of Permanent Education (DEP), which is a spin-off of the Center for Permanent Education established by this project during Year 1. During Year V, DEP presented 42 courses and 1,658 adults completed the program. Of these 42 courses, 11 were in the area of industrial management, three in health sciences, 11 in electrical-mechanical, 10 in education, one in social studies, and the balance of six can be classified as "general knowledge." Classroom hours ran from as few as eight per course to as many as 255 per course. Well over 6,000 adults have completed courses at DEP since the beginning of this program in 1974.

Staff training was continued this year and 107 registrations for training programs were made by the staff. Most of these programs were offered by other institutions in cooperation with the FESSC staff; some were presented in Tubarao, others in Florianopolis and in other cities in Brazil. The 107

participants from the FESSC staff attended a total of 26 different training programs during the past year.

5. Audiovisual Documentation. The fifth annual audiovisual documentation was carried out in mid-1978 by a member of the OIP staff, assisted by the FESSC staff. Copies of the tapes and still photographs have been made available to the sponsor and the participating counterpart institution.

6. Other Activities. Training and upgrading of the project staff has continued during this fifth year. The OIP staff on site presented a series of lectures for the senior staff of FESSC. Table 10 lists the lectures and subjects presented. The FESSC staff also completed and published two feasibility studies, 14 new manufacturing opportunity studies, three management guidelines, and two case studies.

As usual, a Project Plan was developed for Year V. This is presented as Figure 8.

University of the Philippines, Institute for Small-Scale Industries (UP/ISSI)

Most of the activities reported in this section for UP/ISSI were carried out by the Pilot Extension Office, Tacloban City, Leyte. The University of the Philippines entered the program at the start of Year III (January 10, 1976) and has now completed three years of programmed activity.

1. Extension Service. The overall project plan called for the initiation of this service during UP/ISSI Year I. Thus, early in that year the Pilot Extension Office was established in Tacloban City, Leyte, in Region VIII. Map 4 presents more detail on the area covered by this office.

During the year the Pilot Extension Office staff continued working with nine companies which had requested technical assistance during the 1977-78 program year. Of these nine firms, five were located in Tacloban City, two in Jaro, and one each on Sogod and Pinamopoan. These last four are situated in southern Leyte. Twenty additional technical assistance cases were initiated in this reporting year. Table 11 shows the geographical distribution of these 20 cases. At the end of the 1978-79 program year, a survey of a selected group of firms which had received technical assistance was conducted to determine whether there had been changes in employment figures. Table 12 presents these results.

Additional information on the employment generated in the past three years is presented in Part II of this document. As has been indicated in earlier reports, one must note that small-scale industries in the Philippines are usually quite small in employment; normally a small industry is a family group with perhaps two or three employees. Some of the firms assisted in the past have developed well and are now beginning to show good financial returns.

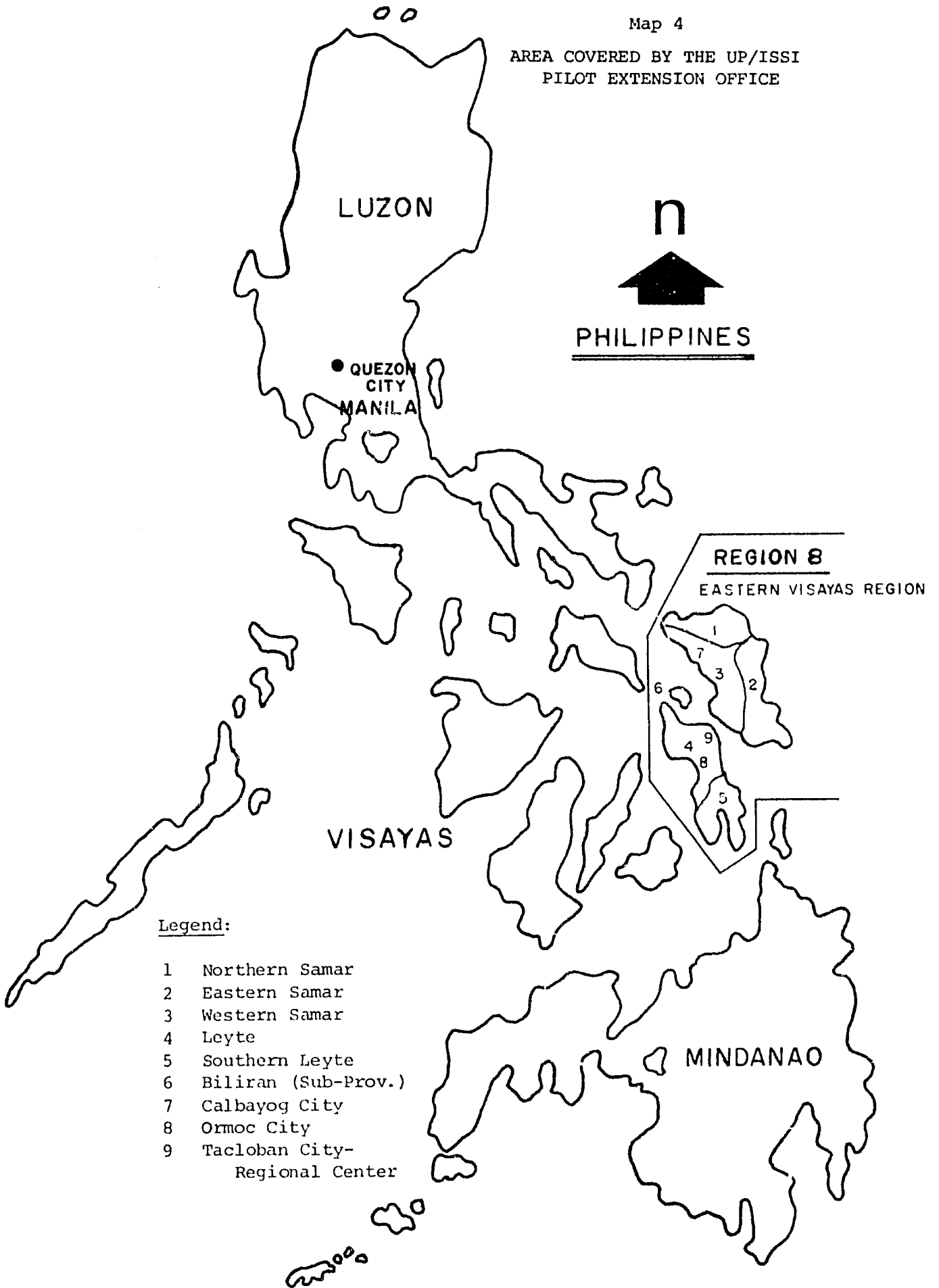
Table 10
LECTURES PRESENTED BY OIP STAFF
AT FESSC, 1978-79

| <u>Date</u> | <u>Participants</u> | <u>Subject</u> | <u>OIP Staff</u> |
|----------------------|--|---|------------------|
| March 30, 1978 | 18 members of project staff | Review of the 211(d) Grant and | N. C. Wall |
| March 30, 1978 | 10 members, administration | Review of the Small-Scale Industry Grant | N. C. Wall |
| April 2, 1978 | 170 persons, students: economics, management, accounting and engineering | Role of the Uni- versity in Economic Development | N. C. Wall |
| August 24, 1978 | 40 students and professors: management and economics | Electrial Power Transmission | F. Malvar |
| August 25, 1978 | 50 students: management, economics and engineering | Industrial Development | N. C. Wall |
| December 18, 1978 | 35 persons: City Council of Laguna | Tourism Potentials of Laguna | N. C. Wall |

Source: OIP records.

Map 4

AREA COVERED BY THE UP/ISSI
PILOT EXTENSION OFFICE



Legend:

- 1 Northern Samar
- 2 Eastern Samar
- 3 Western Samar
- 4 Leyte
- 5 Southern Leyte
- 6 Biliran (Sub-Prov.)
- 7 Calbayog City
- 8 Ormoc City
- 9 Tacloban City-
Regional Center

Table 11
GEOGRAPHICAL DISTRIBUTION OF UP/ISSI
TECHNICAL ASSISTANCE CASES, 1978-79

| <u>Case No.</u> | <u>Location</u> | <u>Product</u> |
|-----------------|------------------------|-----------------------|
| 10 | Padre Burgos, S. Leyte | Salt |
| 11 | Bato, Leyte | Wood Furniture |
| 12 | Maasin, S. Leyte | Charcoal |
| 13 | Padre Burgos, S. Leyte | Salt |
| 14 | Macrohon, S. Leyte | Hollow Blocks |
| 15 | Baybay, S. Leyte | Wood Furniture |
| 16 | Tacloban City | Wood Sash |
| 17 | Malitbog, S. Leyte | Hollow Blocks |
| 18 | Abuyog, Leyte | Wood Furniture |
| 19 | Calbayog City | Canned Food |
| 20 | Catarman, N. Samar | Printing |
| 21 | Catarman, N. Samar | Feedmill |
| 22 | Catarman, N. Samar | Coconut Products |
| 23 | Catarman, N. Samar | Farm Products |
| 24 | Tacloban City | Public Transportation |
| 25 | Tacloban City | Packed Paper |
| 26 | Alang-Alang, Leyte | Deep Sea Fishing |
| 27 | Can-Avid, E. Samar | Shells - Decorations |
| 28 | Llorente, E. Samar | Palm Wood |
| 29 | Maasin, S. Leyte | Car Batteries |

Source: UP/ISSI, Final Report 1978-79.

Figures 9 and 10 present two small companies which have done very well in the past two years and have been assisted through this program.

The Pilot Extension Office also assisted in establishing five new industries in the area during 1978-79:

| | |
|-----------------------|---------------|
| Sash Manufacturing | Tacloban City |
| Motor Repair Shop | Tacloban City |
| Land Transportation | Tacloban City |
| Bakery | Catarman City |
| Agricultural Products | Catarman City |

Table 12

VARIATION IN EMPLOYMENT OF SELECTED COMPANIES
RECEIVING TECHNICAL ASSISTANCE-UP/ISSI, YEAR III

| Case No. | Location | Employment 1978-79 | | Variation | |
|----------|--------------------|--------------------|-----------|-----------|---------|
| | | Start | End | Absolute | Percent |
| 11 | Bato, Leyte | 5 | 5 | 0 | - |
| 14 | Macrohon, S. Leyte | 109 | 129 | 20 | 18.34 |
| 15 | Baybay, S. Leyte | 14 | 14 | 0 | - |
| 17 | Malitbog, S. Leyte | 3 | 3 | 0 | - |
| 18 | Abuyog, Leyte | 4 | 4 | 0 | - |
| 19 | Calbayog City | <u>15</u> | <u>15</u> | <u>0</u> | - |
| | Total | 150 | 170 | 20 | 13.33 |

Source: UP/ISSI, Final Report 1978-79.

Figure 9

SAN JUANICO MANUFACTURING INDUSTRIES



Figure 10
NEW FRONTIER MOTORS
METAL SAFER WHEEL



2. Industrial Training. The UP/ISSI staff is heavily involved in industrial training programs, at its headquarters in Manila as well as in other locations throughout the Philippines. Usually these industrial training programs are in cooperation with other agencies or institutions in the country. During the year, UP/ISSI implemented training programs with the following government agencies:

- Entrepreneurial Development, University
- Leyte Sab-A Basic Development Authority
- Entrepreneurial Development, Ministry of education
- Philippine Business for Social Progress
- Rural Workers Office
- Ministry of Social Services and Development
- Information Technology
- Coconut Board
- Ministry of Agrarian Reform

From these programs a series of publications also resulted, as well as several feasibility studies. A complete listing of publications generated in the past three years is presented in Part II of the report. As a result of this activity, 28 trainers were taught to instruct rural workers in the basic concepts of business; 28 entrepreneurs participated in a training seminar on project feasibility study preparation, and a group of 20 rural workers completed a training program in handicraft skills.

3. Education and Staff Training. Mr. Cesar E. Lee, Research Assistant with the Pilot Extension Office, received a fellowship from Technonet Asia and attended a one-month Industrial Extension Training Course at UP/ISSI, Diliman, Quezon City.

The officer in charge of the Pilot Extension Office, Mr. Redentor C. Dankanay, participated in a three-week Residency Program in Industrial Extension at OIP headquarters in Atlanta, Georgia. He also attended a one-week training program on Group Technology conducted by the Asian Productivity Organization and the Productivity Development Center.

4. Appropriate Technology. The Pilot Extension Office continues to be heavily involved in the development of appropriate technology. In Year III three new appropriate technology devices were conceived and produced.

Wood Lathe Machine Spindle. Last year the UP/ISSI staff developed an inexpensive wood lathe. This year, a new spindle was designed and fabricated to improve the original lathe.

Steel Weaving Frame. This metal frame was designed to replace wood frames presently used as users had been experiencing difficulties in obtaining the wood required for the frames. The modified metal frame has an estimated life span of three years, which makes them less expensive in the long run than the wood frames.

Solar Dryer. The staff has been experimenting with a solar dryer based on the Brace Research Institute design. They are attempting to modify it to serve local needs and conditions.

5. Audiovisual Documentation. The audiovisual documentation was initiated during UP/ISSI program Year I and was continued this year. Mr. F. Malvar of OIP, together with Ms. Dotsie Vinuya, completed Year III audiovisual documentation in the provinces of Leyte and southern Leyte.

6. Other Activities. The staff continued to work with the Divine Word University in the area of entrepreneurship development. During this year the UP/ISSI staff completed nine feasibility studies, eight case studies, six industrial surveys, and eight project proposals. Figure 11, on the following page, presents the Project Plan for Year III.

University of Science and Technology, Technology Consultancy Centre (UST/TCC)

In 1977, when the University of Ife (UI) grant was discontinued, the OIP staff recommended to the sponsor that UST/TCC replace UI as a funded counterpart. The sponsor approved the recommendation and UST/TCC entered the program on June 27, 1977. This report is for the last six months of the program, the period from June 27, 1978, to January 9, 1979.

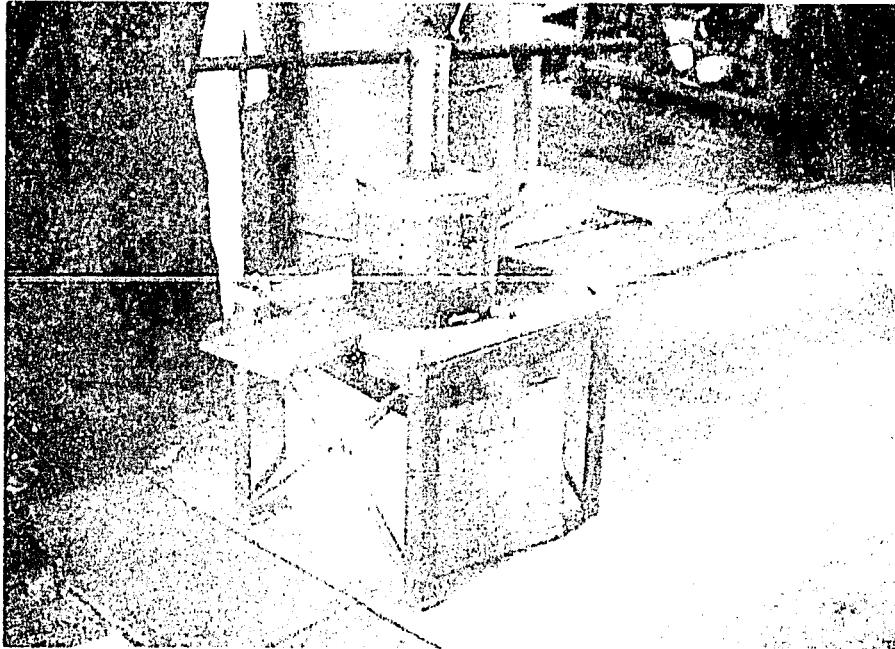
1. Stimulation of Small-Scale Industry Development. TCC considers its most important role to be the transfer of technology from the campus to the small-scale indigenous industries of Ghana. Over the years, TCC has established small demonstration enterprises in order to show local entrepreneurs how to operate these firms while, at the same time, testing technologies and adapting them to local conditions.

- a. Manufacture of Steel Bolts and Nuts. In February 1973, TCC started a small unit to manufacture steel bolts and nuts, using local steel rods. This unit has proved very successful and is now a viable business. Several entrepreneurs have been interested in setting up similar operations, but were unable to do so for lack of equipment (import prohibition). During the past year, TCC was able to obtain some additional lathes and help establish one local industry to manufacture steel bolts and nuts. Also during the year, Mr. J. Russell of the Department of Economics and Industrial Management completed two reports or studies on the productivity of the unit at TCC. These studies will assist the TCC staff in continuing their experiments and technology transfer.

- b. Broadloom Weaving. The weaving of narrow strips for the beautiful and well-known "Kente" cloth is a traditional craft in several Ashanti villages near TCC. In 1972 TCC began the introduction of a new technology, the "broadloom," to the local weavers and the broadloom weaving unit began operating. The unit has been very successful and has introduced not only the new technology, but also many products such as tablecloths, curtains, cushion covers, table mats, babies' shawls, bedspreads, napkins, fancy towels, and cloth for garments.
- c. Soap Pilot Plant. TCC constructed a prototype soap manufacturing plant in 1973. It produced 39,000 bars of soap during the first year of operation. Later, another plant was built in the village of Kwamo which still serves as a demonstration operational plant. During this year the high cost of palm oil has been a big threat to the native soap industry, so TCC has been carrying out research to identify alternative raw materials. A short-term solution has been to encourage farmers to produce more oil at a relatively low cost. TCC designed and constructed a hand-operated screw press for the extraction of palm oil. The press is capable of pressing 20 kgs of pounded boiled palm fruit at one time with an efficiency rating of 75% to 80%. Figure 12 shows an oil press being completed at the TCC shop. At the same time, the TCC staff has been involved in finding local plants with seeds which can produce oil suitable for soap making at lower cost than that of palm oil. So far, experiments have been conducted with oils extracted from several local plants; namely, castor beans, physic nuts, monkey cola, and neem. During this year a three-acre planting of castor beans was begun as well as 1½ acres of physic nuts.

Figure 12

PALM OIL PRESS DEVELOPED BY TCC



- d. Sugar Pilot Plant. For several years TCC negotiated with government agencies for a contract to build a sugar pilot plant on the lines of the soap plant. The idea was to develop a rural industry with a daily output of around one ton of sugar. In April 1977 TCC was awarded a 12-month contract to design such a plant. The work was partially completed during this reporting year, and plans are now being developed to finance construction of the pilot plant.

2. Rural Industries of Ashanti. The Ashanti traditional craft industry promotion program was begun at TCC in 1974. The program was continued this year as part of the main activities. The Craft Tourist Centre at Wenoo was completed under separate funding from Oxfam in the U.S. When the Centre is opened in early 1979, it will be a regular stopping and resting place and will provide the following facilities:

- o A craft area where both traditional and broadloom weaving will be on display.
 - o A refreshment area where drinks and food will be sold.
 - o A sales area where "Kente" cloth, "Adinkra" cloth, brass castings, and glass beads will be sold at controlled prices.
 - o Two bedrooms to accommodate four persons at a minimal fee.
 - o A courtyard whose walls are decorated with symbolic mural designs which will be used for showing films in the evenings or at other social functions.
- a. Brass Casting - Korofofurom. Over the years, TCC has been attempting to help traditional Korofofurom brass founders diversify their products. It was decided to investigate seriously the possibility of applying their lost-wax method of casting to the production of simple architectural fittings, such as window catches, knobs, and door handles. During the program year, the successful reproduction of wax castings has been introduced by the use of plaster of Paris molds, and beeswax used has been improved by the addition of appropriate amounts of tallow. The TCC staff also developed an appropriate technology furnace for brass casting which is presently being tested by one of the craftsmen from a nearby village. A picture of this furnace is presented in Part II of this report.
- b. Glass Beads. During this year, TCC continued its research work to upgrade the glass bead industry in the area of Daabar. TCC has been able to obtain coloring for the beads and also has introduced appropriate techniques for polishing the finished product.
- c. Rubber Products. An existing rubber plantation has been re-activated and an appropriate technology roller press is now in operation making coagulated rubber sheets. Figures 13 and 14 depict a rubber tree producing latex and the device now in operation. In order to dry the coagulated rubber sheets, the TCC staff converted an existing appropriate technology dryer (designed for drying fish) to be used in the drying of the rubber sheets.

Figure 13

RUBBER TREE - TCC PLANTATION



Figure 14

APPROPRIATE TECHNOLOGY PRESS FOR
MAKING RUBBER SHEETS



- d. Lemongrass Distillation. Several years ago, another OIP counterpart institution, the Central American Research Institute for Industry (ICAITI), developed an appropriate technology device to distill lemongrass. This technology was transferred to TCC, which built on the campus an adapted device. The lemongrass extract is currently being tested in the manufacture of toilet soap. Figure 15 shows the still at the TCC shop.

Figure 15
LEMONGRASS DISTILLER



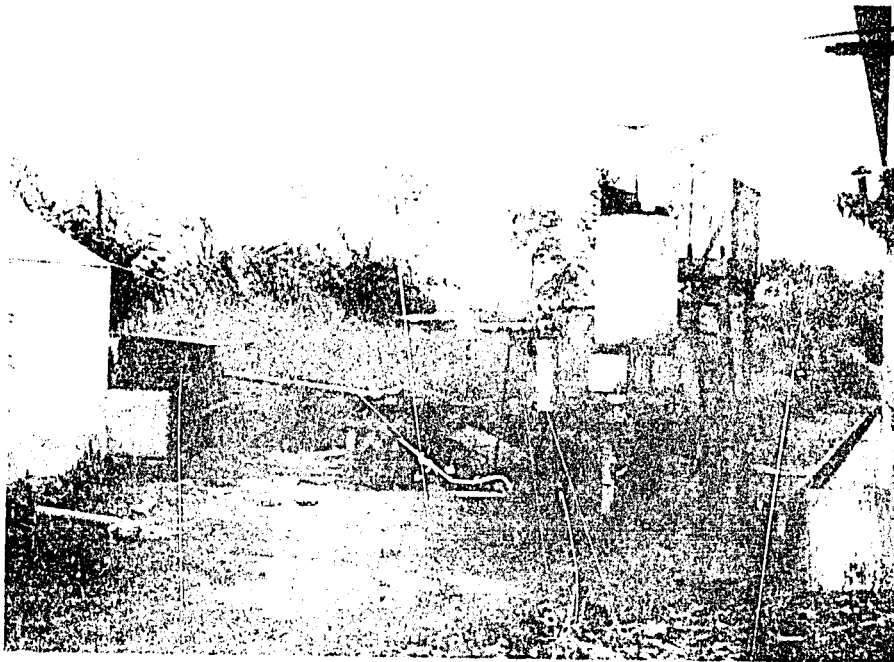
3. Training. A member of the TCC staff, Mr. K. Opoku-Debrah, visited the OIP headquarters in Atlanta and participated in a three-week Residency Program in Industrial Extension. The training program incorporated various training methods, including tours and exposure to local small-scale industries.

Local training programs were offered by TCC in the various pilot plants and manufacturing units. Details of the numbers of persons trained are presented in Part II of this report.

4. Pyrolysis. Under a separate project, TCC, the Building and Road Research Institute of Ghana, and OIP have been developing a prototype pyrolytic convertor to produce charcoal and fuel oil from sawdust and sawmill wastes. The test unit has been completed and at present is being tested. Once the prototype is operational, three additional units will be built and installed at a location selected by the Building and Road Research Institute.

The four pyrolytic convertors will be used to operate a brick kiln. Figure 16 shows the prototype unit at the TCC campus.

Figure 16
PYROLYTIC CONVERTOR, TCC CAMPUS



5. Audiovisual Documentation. The second annual audiovisual documentation was completed during the year. Copies of the tapes and still photographs have been made available to the sponsor and to counterpart institutions.

6. Other Activities. At the request of TCC, the OIP staff completed literature searches and provided materials on a series of topics. Figure 17, which appears on the following page, is the Project Plan for this year.

Project No. B-492

Project Title Small-Scale Industry Program--TCC

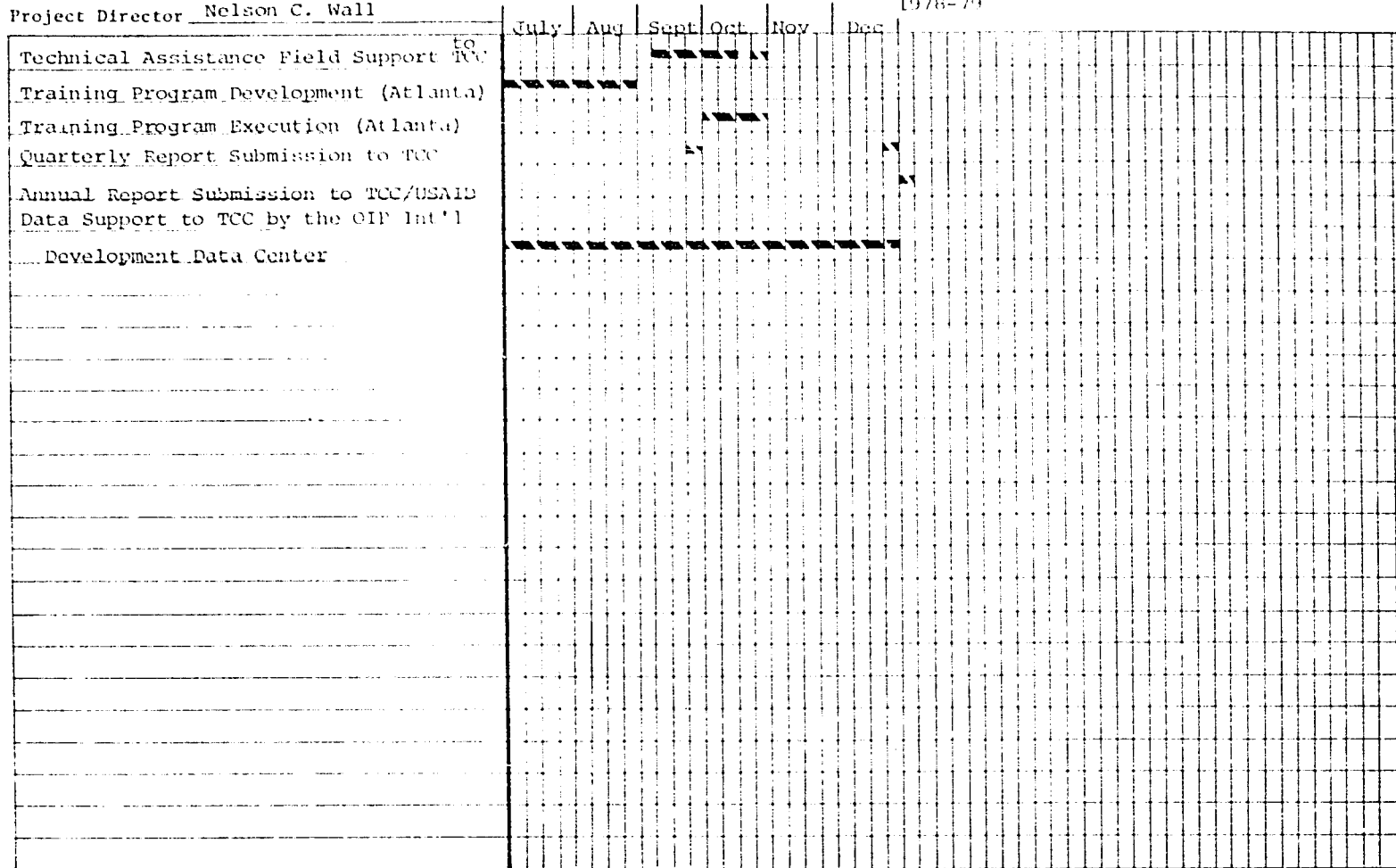
Project Director Nelson C. Wall

Figure 17

PROJECT PLAN

Year II

1978-79



LEGEND

Office of International Programs (OIP)

As in past years, each of the counterpart institutions invested 50% of its grant funds to contract with the Office of International Programs to provide the required technical support, training, and consultancy assistance, as well as the audiovisual documentation of the individual projects. Detailed accounts of actions taken and on-site assistance provided by the OIP staff are given in the individual trip reports for the year, but are not included with this document. Copies of the trip reports are available to the sponsor upon request.

A number of members of the OIP staff were on site during Year V to provide the above-mentioned support services. Listed below are the names of all members of the OIP staff who were on site under these four projects during the 1978-79 grant year.

Soong Jun University (B-426)

| | |
|--------------------------------|------------------|
| April 30 - May 12, 1978 | Richard Johnston |
| July 14 - July 31, 1978 | Frank Malvar |
| July 15 - August 14, 1978 | Donald E. Lodge |
| November 22 - December 2, 1978 | Nelson C. Wall |

Fundacao Educacional do Sul de Santa Catarina (B-427)

| | |
|---------------------------------|----------------|
| March 16 - April 7, 1978 | Nelson C. Wall |
| August 13 - August 30, 1978 | Nelson C. Wall |
| August 13 - August 30, 1978 | Frank Malvar |
| December 17 - December 21, 1978 | Nelson C. Wall |

University of the Philippines (B-463)

| | |
|---------------------------------|------------------|
| April 8 - April 28, 1978 | Richard Johnston |
| July 2 - July 14, 1978 | Frank Malvar |
| August 21 - September 6, 1978 | Ross W. Hammond |
| November 12 - November 21, 1978 | Nelson C. Wall |

University of Science and Technology (B-492)

| | |
|---------------------------------|-----------------|
| April 22 - May 6, 1978 | Donald E. Lodge |
| May 30 - July 9, 1978 | Ross W. Hammond |
| September 30 - October 26, 1978 | Frank Malvar |
| October 27 - November 10, 1978 | Nelson C. Wall |

PART II
LIFE OF PROJECT

SUMMARY OF ACCOMPLISHMENTS, 1974-79

At the end of the five years of this program (A-1600), OIP has successfully established four counterpart projects with operations overseas; a fifth was started but had to be terminated. Two of these counterparts participated the full five years and have shown that they are capable of continuing to assist their local small-scale industries if funding support is provided by their institutions. All four existing counterparts are fully dedicated to the basic concept of generating employment, expanding small-scale industries, and providing pragmatic technical assistance to local entrepreneurs.

The existing counterparts are capable of operating with minimal technical support from outside sources and have proved their ability to implement action-oriented programs of technical-management assistance to small-scale industries. The accomplishments highlighted in the previous sections speak for themselves. Each of the counterpart institutions had to adapt the methodology offered by OIP, and assisted by the technical staff of OIP, was able to implement the methodology.

Among the five counterparts, more than 5,100 new jobs have been generated in rural areas of developing nations. These institutions have now trained 16 staff members at OIP. These persons are capable, to varying degrees, of (a) conducting appropriate research, (b) transferring technology, (c) managing technology, (d) adapting existing technology, (e) developing methodology, as well as designing, implementing, and managing industrial programs and industrial training programs.

Some 29 appropriate technology devices or manufacturing processes have resulted from this program. At the same time, some 515 technical-management assistance cases were serviced by the counterparts and more than 8,600 persons participated in and completed industrial training programs.

The counterpart institutions have started their own data bases and some have good-sized holdings at this time. A great number of research papers, feasibility studies, monographs, and other data have been published by the participating institutions. The following sections will highlight the individual accomplishments of the participating counterparts.

SOONG JUN UNIVERSITY, 1974-79

Starting in calendar year 1974, Soong Jun University (SJU) received a grant and assistance from the Office of International Programs (OIP) of the Engineering Experiment Station at the Georgia Institute of Technology. The principal objective of this cooperative program has been to generate employment by the expansion of existing small-scale industries, as well as to help, where feasible, other small-scale industries in that country.

Reports of past activities and accomplishments have been submitted on schedule.^{1/} Presented below is a summary of the achievements over the past five years.

1. Appropriate Technology. The counterpart staff has actively pursued the concept of appropriate technology and, over the past five years, has developed, constructed, and field-tested 12 appropriate technology devices. These devices are:

- o Low-cost tensile strength tester
- o Sizing or shaving die for truing metal cross sections
- o Low-cost immersion pyrometer
- o Flat-plate solar collector
- o Multi-tapping machine
- o Drilling fixture
- o Filter press
- o Bicycle brake testing device
- o Semi-portable methane gas generator
- o Third generation "cheegay" (traditional backpack)
- o Device to assist in manufacturing gut strings for tennis rackets
- o Device to frighten birds (crop protection)

Detailed drawings of these devices may be requested directly from the counterpart institution. Many of these appropriate technology devices were developed during the provision of technical assistance to local firms. Usually, the developed tool was donated to the company being serviced.

^{1/} For full details, refer to the respective end-of-the-year reports entitled Final Report--Small-Scale Industry Grant, Soong Jun University, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1975, 1976, 1977, 1978.

2. Employment Generation. One indicator used in this project to determine the possible impact of the services provided has been the number of new jobs directly generated by the program.

Table 13 presents the employment variance reported by the SJU staff in the companies they have monitored.

Table 13
VARIATION IN EMPLOYMENT OF
COMPANIES RECEIVING TECHNICAL ASSISTANCE
SJU, 1974-79

| | <u>Monitored Companies</u> | <u>Employment</u> | | <u>Variance</u> |
|---------|--------------------------------|-------------------|------------|-----------------|
| | | <u>Start</u> | <u>End</u> | |
| 1974-75 | 19 | - | 868 | - |
| 1975-76 | 19 | 868 | 1,444 | +576 |
| 1976-77 | 18 | 1,371 | 1,188 | -183 |
| 1977-78 | 17 | 810 | 930 | +120 |
| 1978-79 | <u>27</u> | 2,170 | 2,289 | <u>+119</u> |
| | 100 | | | +632 |

Source: SJU Annual Report, years 1974-79.

According to this information, the 100 companies which were monitored experienced an average increase of 6.32 jobs per company in the five-year period.

In the Taejon area, 10 of these 100 companies were monitored for all five years. Their labor force changes are presented in Table 14.

Table 14
 VARIATION IN EMPLOYMENT OF
 TEN SELECTED COMPANIES, TAEJON AREA
 KOREA, 1974-79

| <u>Name of Company</u> | <u>Employment</u> | | | |
|------------------------|-------------------|-------------|-----------------|----------------|
| | <u>Start</u> | <u>End</u> | <u>Variance</u> | |
| | <u>1974</u> | <u>1979</u> | <u>Absolute</u> | <u>Percent</u> |
| Shin Sung Paper Mill | 77 | 96 | 19 | 24.67 |
| Kook Ri Machinery | 10 | 13 | 3 | 30.00 |
| Shin Kinang Textile | 105 | 127 | 22 | 20.95 |
| Nam-Il Machinery | 25 | 130 | 105 | 420.00 |
| Hae Ryuk Machinery | 115 | 135 | 20 | 17.39 |
| Moon Kinang Towels | 13 | 25 | 12 | 92.30 |
| Dae Won Paper Mill | 270 | 334 | 64 | 23.70 |
| Nam Sun Machinery | 92 | 204 | 112 | 121.73 |
| An Jon Bicycle | 83 | 106 | 23 | 27.71 |
| Don Jin Leather | <u>46</u> | <u>66</u> | <u>20</u> | 43.47 |
| Total | 836 | 1,236 | 400 | 47.84 |

Source: SJU, Taejon Annual Report, years 1974-79.

As may be noted, the companies monitored over the full five-year period have reported a much higher number of new jobs generated than the 100 shown in Table 13. These 10 companies have averaged 40 new jobs per company during the life of the project.

The SJU project staff also kept records on increase/decrease of productivity of the selected companies. This information was gathered to be used as another indicator in determining the results or accomplishments achieved by the project. Table 15 presents the information reported by the counterpart staff.

Table 15
 PRODUCTIVITY INCREASES IN SELECTED COMPANIES
 TAEJON AREA, 1974-78*

| <u>Name of Company</u> | <u>Products</u> | <u>Units</u> | <u>Production</u> | | | |
|------------------------|------------------|-------------------|-------------------|-------------|-----------------|----------------|
| | | | <u>1974</u> | <u>1978</u> | <u>Variance</u> | |
| | | | | | <u>Absolute</u> | <u>Percent</u> |
| Shin Sung Paper Mill | Paper | Tons | 12.2 | 21.3 | 9.1 | 74.59 |
| Kook Ri Machinery | Milling Mach. | Units | 20.0 | 30.0 | 10.0 | 50.00 |
| Shin Kinang Textile | Textiles | 1,000 sq. mts. | 282.7 | 627.2 | 344.5 | 121.86 |
| Nam-Il Machinery | Milling Mach. | Units | 50.0 | 96.0 | 46.0 | 92.00 |
| Hae Ryuk Machinery | Farm Equipt. | 1,000 units | 32.5 | 69.8 | 37.3 | 114.76 |
| Moon Kinang Towels | Towels | 1,000 sq. mts. | 600.0 | 780.0 | 180.0 | 30.00 |
| Dae Won Paper | Paper | Tons | 32.1 | 69.8 | 37.7 | 117.44 |
| Nam Sun Machinery | Milling Mach. | Units | 120.0 | 278.0 | 158.0 | 131.66 |
| An Jon Bicycle | Bicycle Gears | 1,000 units | 550.0 | 671.0 | 121.0 | 22.00 |

* Fifth year (1979) statistics not available at the time of preparation of this report.

Source: SJU, Taejon Annual Report, years 1974-78.

The basic action was, as has been indicated, to provide technical-management services to small-scale industries in the target areas. During the life of the project, the SJU staff reports having provided these services to 137 companies, as detailed in Table 16.

Table 16
 SUMMARY OF TECHNICAL-MANAGEMENT
 ASSISTANCES CASES, SJU, 1974-79

| <u>Year</u> | <u>Number of Technical Assistance Cases</u> |
|-------------|---|
| 1974-75 | 18 |
| 1975-76 | 28 |
| 1976-77 | 33 |
| 1977-78 | 28 |
| 1978-79 | <u>30</u> |
| Total | 137 |

Source: SJU Annual Report, years 1974-79.

Details of the problems and solutions suggested by the counterpart staff are presented in the individual year reports.

3. Education and Training. When this program was initiated in 1974, it was determined that since SJU was a technologically oriented institution, it would be desirable to assist it in expanding its engineering programs to include industrial engineering. It also was anticipated that through such an extension, future SJU graduates could participate more usefully in the industrial development of Korea.

As a result of this single action, the appropriate national authorities eventually allowed SJU to establish the Department of Industrial Engineering as part of the College of Engineering at SJU. Several members of the OIP and GIT academic staffs were involved in assisting the new department while it was being established. The impact or benefit which this single accomplishment may produce cannot be quantified at this time, but all members of the joint staffs consider it to be significant.

Industrial training also has been an objective of this program. In the past five years, the two staff groups (Seoul and Taejon) have presented 16 industrial training programs for local participants. Table 17 is a summary of these programs.

Table 17
INDUSTRIAL TRAINING PROGRAMS
SJU, 1974-79

| <u>Year</u> | <u>Number of Participants</u> | <u>Number of Industrial Training Programs Offered</u> |
|-------------|-------------------------------|---|
| 1974-75 | 40 | 1 |
| 1975-76 | 500 | 5 |
| 1976-77 | 98 | 2 |
| 1977-78 | 310 | 8 |
| 1978-79 | <u>90</u> | <u>2</u> |
| | 1,038 | 18 |

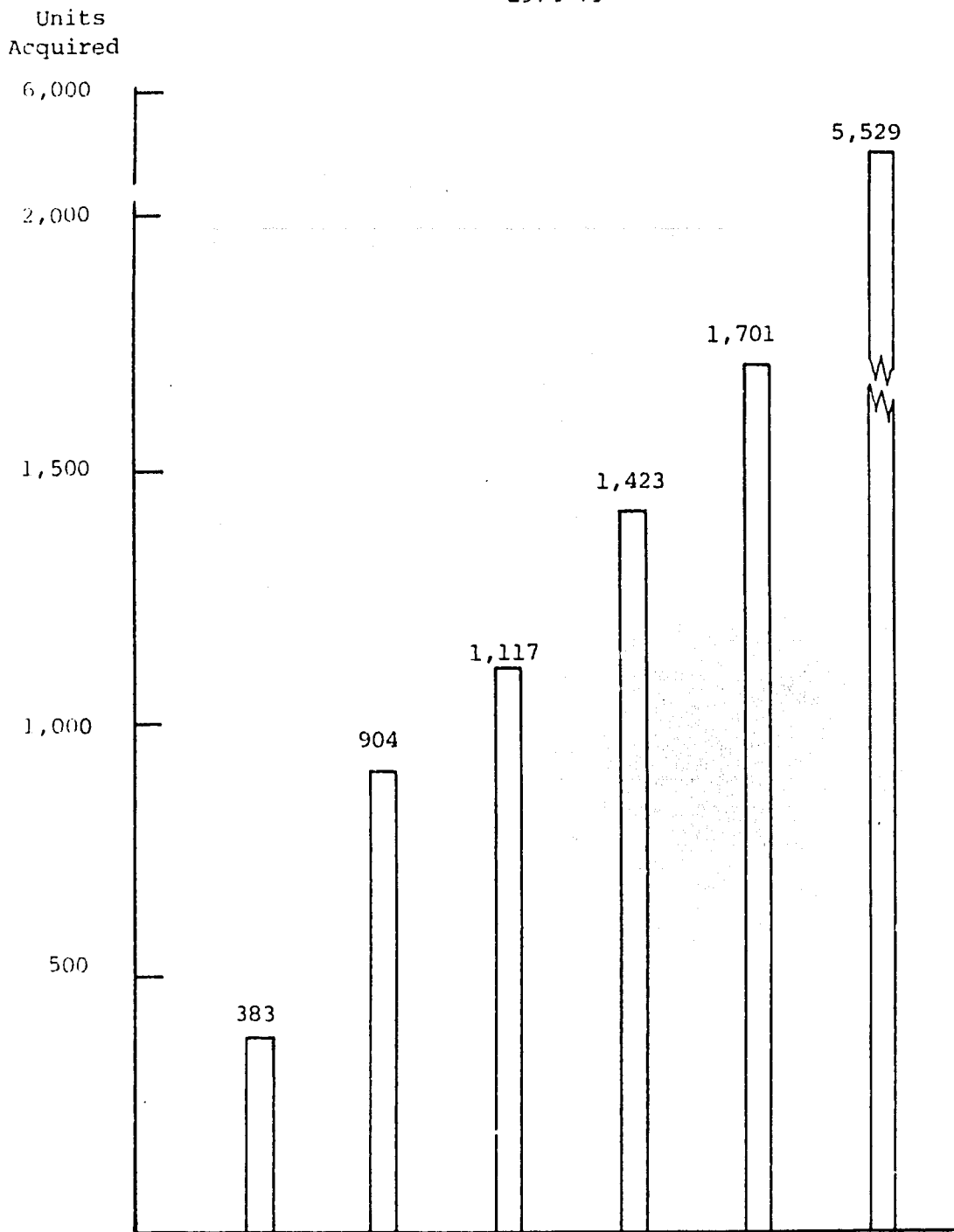
Source: SJU, Annual Report, years 1974-79.

Also as part of the program of work in the area of industrial training and education, several members of the SJU staff participated in special training programs offered by OIP at its headquarters in Atlanta, Georgia. Table 18 provides details on this activity.

Other staff members, including the President of SJU, visited OIP headquarters in Atlanta, but they have not been listed. Many other educational seminars, conferences, and workshops were presented in loco by the joint project staff during the life of this project.

4. Data Collection Development. The Small-Scale Industry Information Center (SSIIC) was established on the Seoul campus during Year I. In 1975, this unit was relocated to the Department of Industrial Engineering and the project staff did not continue keeping records of the data acquisitions. A similar unit was started on the Taejon campus, and these records are available for the past five years. Figure 18 shows the number of books and other documents acquired yearly by the collection. Of the total of 5,529 units added to the data center, many were donated by institutions and individuals.

Figure 18
GROWTH OF ACQUISITIONS
DATA CENTER, SJU, TAEJON
1974-79



Source: SJU Project Records - Taejon Campus

Table 18
SJU STAFF TRAINING AT OIP, 1974-79

| <u>Participant</u> | <u>Title</u> | <u>Starting Date</u> | <u>Duration</u> |
|--------------------|---------------------------------------|----------------------|-----------------|
| Hae Byung Lee | Assoc. Director, RDI | July 1, 1974 | 4 weeks |
| Jae Bok Yoon | Chairman, Dept. of Mechanical Eng. | July 1, 1974 | 4 weeks |
| Clarence Prince | Dean of Engineering | July 1, 1974 | 4 weeks |
| Won-Hoe Koc | Head, Chemistry Dept. | July 1, 1975 | 5 weeks |
| Young-Ho Lim | Asst. Head, Mech. Engineering Dept. | July 1, 1975 | 5 weeks |
| Young-Ho Chae* | Pres., Sam Ho Machine Co. | July 1, 1975 | 5 weeks |
| Byoung-Kyu Choi | Acting Chairman, Dept. of Engineering | July 10, 1976 | 2 weeks |
| Yoon-Bae Cuh | Counterpart Proj. Director | November 17, 1978 | 1 week |

* Not a staff member of SJU.

Source: Project Director's records.

5. Research Papers and Publications. A significant number of research papers, industrial case studies, and other publications have been completed by the SJU staff during the life of the project. The following listing highlights the more important documents published.

- 1974-75: "Trends of Korean Small-Scale Industries During the Period 1974"
 "Study on Park Development Planning in Chonan"
 "A Preliminary Study on the Small-Medium Industries Potential in the Regional Development of the Taejon Area"
 "A Study on Industrial Site Selection and the Types of Industry for Choong Nam Province"
 "Final Report: Small-Scale Industry Grant - Soong Jun University Activities 1974-75"
- 1975-76: "A Study on Small-Medium Entrepreneurs in Korea"
- 1976-77: "The Sam-Ho Woodworking Machine Manufacturing Company - A Case Study"
 "Low-Cost Tensile Strength Tester and Immersion Pyrometer"

- 1976-77: "Sam-Shin Sewing Machine Company - A Case Study"
 (cont'd.) "A Study on the Marketing Structure of Textiles in Choong Nam Province"
- 1977-78: "A Case Study on the Possibility of Improving Simple Traditional Farm Equipment in Korea"
 "Theory and Practice of Community Development"
 "Model Curriculum for a Department of Community and Regional Development"
 "The Economic and Social Determinants of Rural-Urban Migration in Korea"
- 1978-79: "A Study on Improvement of the Domestic Racket Gut"
 "A Study of Lighting Performance Calculations and Shielding Angle on the 345 KV EHV Transmission Line"
 "A Study on the Fabrication of a CaTe-CdS Solar Cell and Its Properties"
 "A Study on the Performance of a LiBr-Water Absorption Refrigeration"
 "Probability of Error for Frequency-Shift Keying"
 "A Pictorial History on the Development of an Improved Cheegay"
 "Sungham Industrial Co. - A Case Study"
 "Kukje Special Metal Co. - A Case Study"

6. Organizational Linkages. As a result of the AID-sponsored grant, over the past five years SJU has been able to lay the necessary groundwork to gain recognition as a leading Korean institution in the field of stimulating and fostering small-scale industry. The institution has established linkages with the Korea Credit Guarantee Fund, the Korean Federation of Small Business, the Korea Ministry of Commerce and Industry, the Korea Medium Industry Bank, and many others.

7. Audiovisual Documentation. Five years of audiovisual documentation are now available as a result of this program. Furthermore, the SJU staff has been trained and equipment purchased so that in the future they may continue this documentation on their own.

8. Financial Commitment. The administration of SJU has committed itself to supporting this project in the past and plans to continue it once the grant funds cease as programmed. As shown in Table 19, over the past five years, AID has provided \$229,974 through this grant and SJU has matched this investment with an additional \$104,950. Over the life of the project, a total of

Table 19
DISBURSEMENT OF GRANT AND PROJECT FUNDS
SOONG JUN UNIVERSITY (B-426)
YEARS I-V
(in dollars)

FUNDS BY SOURCE

| Expenditures | Year I | | | Year II | | | Year III | | | Year IV | | | Year V | | | Project Total Years I-V |
|--------------------------------|---------------|----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------------------------------|
| | AID | SJU | Total | AID | SJU* | Total | AID | SJU* | Total | AID | SJU* | Total | AID** | SJU* | Total | |
| Direct Salaries and Wages | 11,100 | - | 11,100 | 13,500 | 5,000 | 18,500 | 9,952 | 5,250 | 15,202 | 9,720 | 8,500 | 18,220 | 16,987 | 29,000 | 45,987 | 109,009 |
| Travel | | | | | | | | | | | | | | | | |
| International | 4,810 | - | 4,810 | 4,000 | - | 4,000 | 4,500 | - | 4,500 | 3,940 | - | 3,940 | 1,300 | 3,000 | 4,300 | 21,550 |
| Local | 1,500 | - | 1,500 | 2,000 | 750 | 2,750 | 2,474 | 750 | 3,224 | - | 1,000 | 1,000 | 1,700 | 3,500 | 5,200 | 13,674 |
| Materials and Supplies | 2,900 | - | 2,900 | 2,000 | - | 2,000 | 3,647 | - | 3,647 | 6,660 | - | 6,660 | 3,000 | 2,000 | 5,000 | 20,207 |
| Conferences/Seminars | 1,000 | - | 1,000 | 1,000 | - | 1,000 | 1,927 | - | 1,927 | 2,180 | - | 2,180 | 1,000 | 1,000 | 2,000 | 8,107 |
| Contract Services (GIT) | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 22,987 | - | 22,987 | 104,987 |
| Audiovisual Documentation | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | 200 | 2,200 | 10,200 |
| Technical Research and Support | 1,190 | - | 1,190 | - | 3,000 | 3,000 | - | 3,000 | 3,000 | - | 3,000 | 1,000 | 1,000 | 3,000 | 4,000 | 14,190 |
| Overhead | - | - | - | - | 8,000 | 8,000 | - | 8,000 | 8,000 | - | 8,000 | 8,000 | - | 9,000 | 9,000 | 33,000 |
| Total | 45,000 | - | 45,000 | 45,000 | 16,750 | 61,750 | 45,000 | 17,000 | 62,000 | 45,000 | 20,500 | 65,500 | 49,974 | 50,700 | 100,674 | 334,924 |
| Participation Ratio: | AID | | 100.00% | | | 72.8% | | | 72.6% | | | | | | 49.6% | 68.7% |
| | SJU | | 0.00% | | | 27.2% | | | 27.4% | | | | | | 50.4% | 31.3% |

* Includes cost sharing from industry, university, and foundations.

**Includes \$45,000 grant plus an additional \$4,974 from B-455, as authorized by sponsor, for a total of \$49,974.

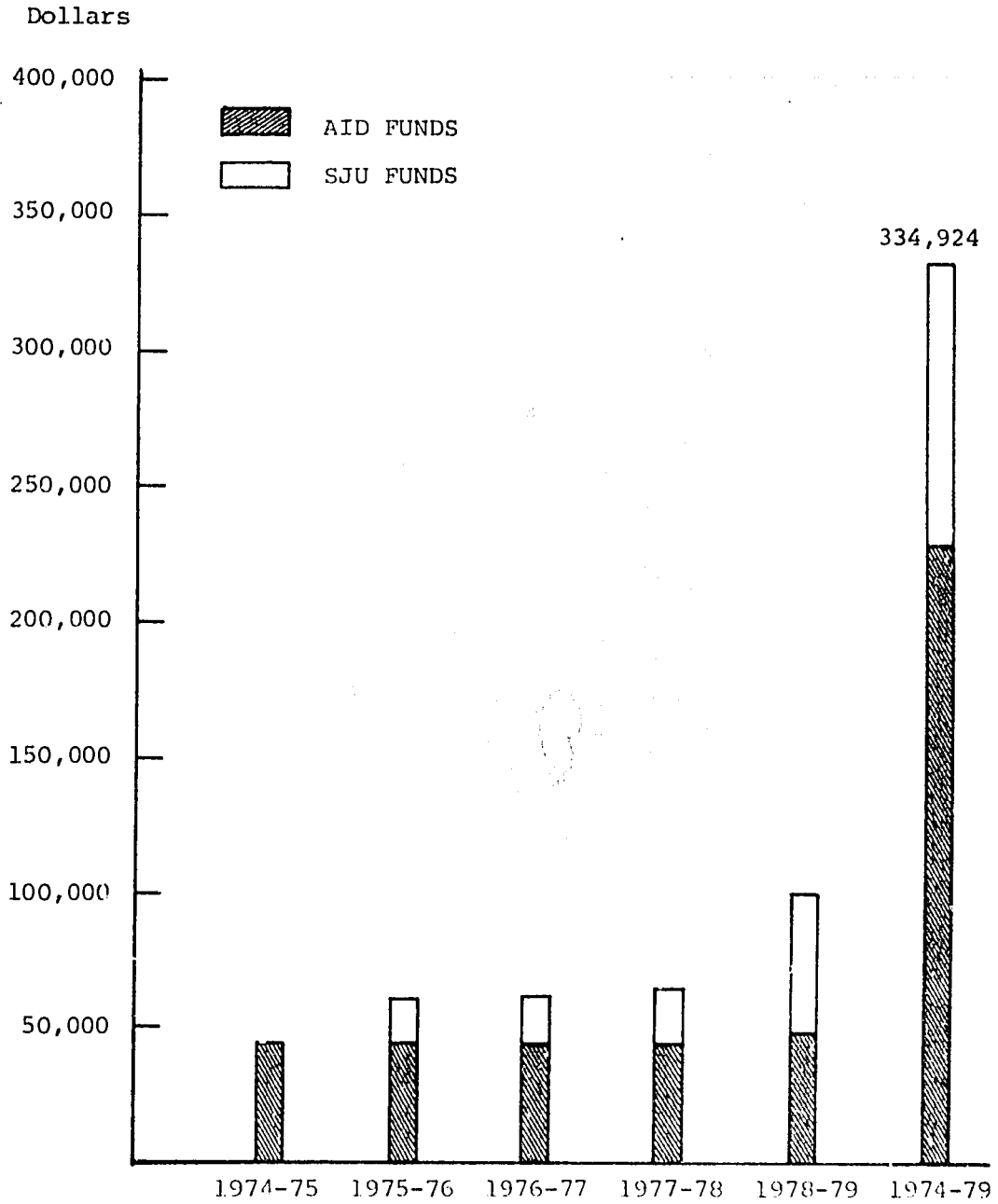
Source: Project accounting files and counterpart financial records.

\$334,924 was disbursed, of which AID contributed 68.66% and SJU matched 31.34%. Figure 19 is a graphic summary of the year-to-year funding of this project.

In addition to the above AID funding, SJU has received grants from many other institutions for research projects and general support to the university.

Much of the credit for these accomplishments belongs to the counterpart staff. Figure 20 is a photograph of the two Counterpart Project Directors, Dr. Yoon-Bae Ouh and Dr. Seyeul Kim, but many other staff members were involved in this work.

Figure 19
 SOONG JUN UNIVERSITY
 GRANT AND PROJECT FUNDS
 1974-79



Source: Table 19

FUNDACAO EDUCACIONAL DO SUL DE SANTA CATARINA, 1974-79

The Fundacao Educacional do Sul de Santa Catarina (FESSC) project also was initiated at the start of calendar year 1974. The Office of International Programs (OIP) and FESSC had been working together since 1972, at which time a senior member of the FESSC staff participated in a 13-week internship program at OIP headquarters in Atlanta. As part of his program of work, the FESSC staff member developed a long-range economic development plan for South Santa Catarina. Many of the actions outlined in that long-range plan were later implemented under this program.

Reports of the past years' activities and accomplishments have been submitted to the sponsor annually,^{1/} and the following section is only a highlight of the accomplishments over the past five years.

1. Employment Generation. In 1973-74, the target area had a population of 541,000 inhabitants^{2/} living in a land area of 9,400 square kilometers. At the time, this huge area encompassing 32 municipalities was considered "depressed" by the government of Brazil, and one of the principal objectives of this project was to assist in the generation of employment within the area.

From the start, records were kept on as many companies as possible to determine if any new jobs were being generated and, if so, how many. Thirty companies receiving technical-management assistance were monitored to determine their variation in employment. Of this number, 16 were followed for the full five years, three for the years 1975-79, five for the period 1976-79, and six cover the period 1977-79. In total, FESSC reports the generation of 4,504 new jobs in the 30 companies monitored over the five years. (See Table 20.)

From the reported information, it appears that these 30 companies have done well in generating new employment at an average of 150 new jobs per company over the five-year period. In a further attempt to quantify the development of these selected companies, the FESSC team also kept records on their annual sales. Table 21 presents this information in detail.

^{1/} See Final Report--Small-Scale Industry Grant, Fundacao Educacional do Sul de Santa Catarina, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1975, 1976, 1977, and 1978.

^{2/} The 1970 Census of Brazil reported 496,765; the above figure is adjusted to 1973-74.

Table 20
 VARIATION IN EMPLOYMENT OF MONITORED COMPANIES
 RECEIVING TECHNICAL-MANAGEMENT ASSISTANCE
 FESSC, 1974-79

| <u>Case No.</u> | <u>Period Monitored</u> | <u>Employment</u> | | | |
|-----------------|-------------------------|-------------------|------------|-----------------|----------------|
| | | <u>Start</u> | <u>End</u> | <u>Variance</u> | |
| | | | | <u>Absolute</u> | <u>Percent</u> |
| 1 | 1974-79 | 17 | 33 | 16 | 94.11 |
| 2 | 1974-79 | 43 | 48 | 5 | 11.62 |
| 3 | 1974-79 | 12 | 45 | 33 | 275.00 |
| 4 | 1974-79 | 5 | 13 | 8 | 160.00 |
| 5 | 1974-79 | 5 | 8 | 3 | 60.00 |
| 6 | 1974-79 | 43 | 73 | 30 | 69.76 |
| 7 | 1974-79 | 27 | 22 | -5 | -18.50 |
| 8 | 1974-79 | 30 | 35 | 5 | 16.66 |
| 9 | 1974-79 | 60 | 83 | 23 | 38.33 |
| 10 | 1976-79 | 272 | 750 | 478 | 175.73 |
| 11 | 1974-79 | 151 | 445 | 294 | 194.70 |
| 12 | 1974-79 | 62 | 107 | 45 | 72.58 |
| 13 | 1974-79 | 4 | 5 | 1 | 25.00 |
| 14 | 1974-79 | 999 | 3,750 | 2,751 | 275.37 |
| 15 | 1974-79 | 7 | 32 | 25 | 357.14 |
| 16 | 1974-79 | 13 | 18 | 5 | 38.46 |
| 17 | 1974-79 | 50 | 51 | 1 | 2.00 |
| 18 | 1975-79 | 416 | 1,094 | 678 | 162.92 |
| 19 | 1975-79 | 25 | 12 | -13 | -52.00 |
| 20 | 1975-79 | 26 | 25 | -1 | -3.84 |
| 21 | 1976-79 | 8 | 9 | 1 | 12.50 |
| 22 | 1977-79 | 3 | 5 | 2 | 66.67 |
| 23 | 1976-79 | 20 | 15 | -5 | -25.00 |
| 24 | 1976-79 | 16 | 19 | 3 | 18.75 |
| 25 | 1977-79 | 32 | 64 | 32 | 100.00 |
| 26 | 1976-79 | 43 | 48 | 5 | 11.62 |
| 27 | 1977-79 | 45 | 150 | 105 | 233.33 |
| 28 | 1977-79 | 109 | 65 | -44 | -40.36 |
| 29 | 1977-79 | 21 | 42 | 21 | 100.00 |
| 30 | 1977-79 | 13 | 15 | 2 | 15.38 |
| Total | | 2,577 | 7,081 | 4,504 | 174.77 |

Source: FESSC, Final Report, Year V.

Table 21
 VARIATION IN SALES OF MONITORED COMPANIES
 RECEIVING TECHNICAL-MANAGEMENT ASSISTANCE
 FEISSC, 1974-79

| Case No. | Period Monitored | Annual Sales (000 Cruzeiros) | | | |
|----------|------------------|------------------------------|--------------|------------|-------------|
| | | Start | End | Variance | |
| | | | | Absolute | Percent |
| 1 | 1974-79 | 6,548 | 18,000 | 11,452 | 174.89 |
| 2 | 1974-79 | 4,102 | 7,000 | 2,898 | 70.64 |
| 3 | 1974-79 | 2,366 | 9,240 | 6,874 | 290.53 |
| 4 | 1974-79 | 823 | 3,600 | 2,777 | 337.42 |
| 5 | 1974-79 | 219 | 1,800 | 1,581 | 721.91 |
| 6 | 1974-79 | 2,760 | 13,941 | 11,181 | 405.10 |
| 7 | 1974-79 | 8,775 | 12,000 | 3,225 | 36.75 |
| 8 | 1974-79 | 9,126 | 12,000 | 2,874 | 31.49 |
| 9 | 1974-79 | 10,625 | 17,400 | 6,775 | 63.76 |
| 10 | 1976-79 | 243,187 | 462,000 | 218,813 | 89.97 |
| 11 | 1974-79 | 28,939 | 240,000 | 211,061 | 729.33 |
| 12 | 1974-79 | 8,142 | 24,000 | 15,858 | 194.76 |
| 13 | 1974-79 | 183 | 540 | 357 | 195.08 |
| 14 | 1974-79 | 272,606 | 576,000 | 297,394 | 106.74 |
| 15 | 1974-79 | 658 | 6,000 | 5,342 | 811.85 |
| 16 | 1974-79 | 88 | 6,000 | 5,912 | 6,713.18 |
| 17 | 1974-79 | 10,238 | 11,000 | 762 | 7.44 |
| 18 | 1975-79 | 194,682 | 384,000 | 129,318 | 97.24 |
| 19 | 1975-79 | 2,290 | 2,880 | 590 | 25.76 |
| 20 | 1975-79 | 3,155 | 14,400 | 11,245 | 356.41 |
| 21 | 1976-79 | 6,051 | 2,400 | -3,651 | -60.33 |
| 22 | 1977-79 | 664 | 2,400 | 1,736 | 261.44 |
| 23 | 1976-79 | 3,040 | 1,800 | -1,240 | -40.78 |
| 24 | 1976-79 | 4,864 | 6,000 | 1,136 | 23.35 |
| 25 | 1977-79 | 2,840 | 4,500 | 1,660 | 58.45 |
| 26 | 1976-79 | 4,053 | 9,500 | 5,447 | 134.39 |
| 27 | 1977-79 | 2,840 | 36,970 | 34,130 | 1,201.76 |
| 28 | 1977-79 | 8,707 | 10,824 | 2,117 | 24.31 |
| 29 | 1977-79 | 611 | 4,000 | 3,389 | 554.66 |
| 30 | 1977-79 | <u>2,840</u> | <u>3,000</u> | <u>160</u> | <u>5.63</u> |
| Total | | 852,022 | 1,903,195 | 1,051,173 | 123.37 |

Source: FEISSC, Final Report, Year V.

According to the FESSC report, the annual sales figures reported have been adjusted for inflation of the cruzeiro. It appears that the 30 monitored companies have had a very healthy growth over the period of time that they have been assisted by the counterpart staff.

The main action provided, as has been indicated, was technical-management assistance to small-scale industries located in the selected area. During the life of the project, the FESSC staff provided technical-management assistance to many companies in addition to the 30 monitored firms, as shown in Table 22.

Table 22
SUMMARY OF TECHNICAL-MANAGEMENT ASSISTANCE CASES
FESSC, 1974-79

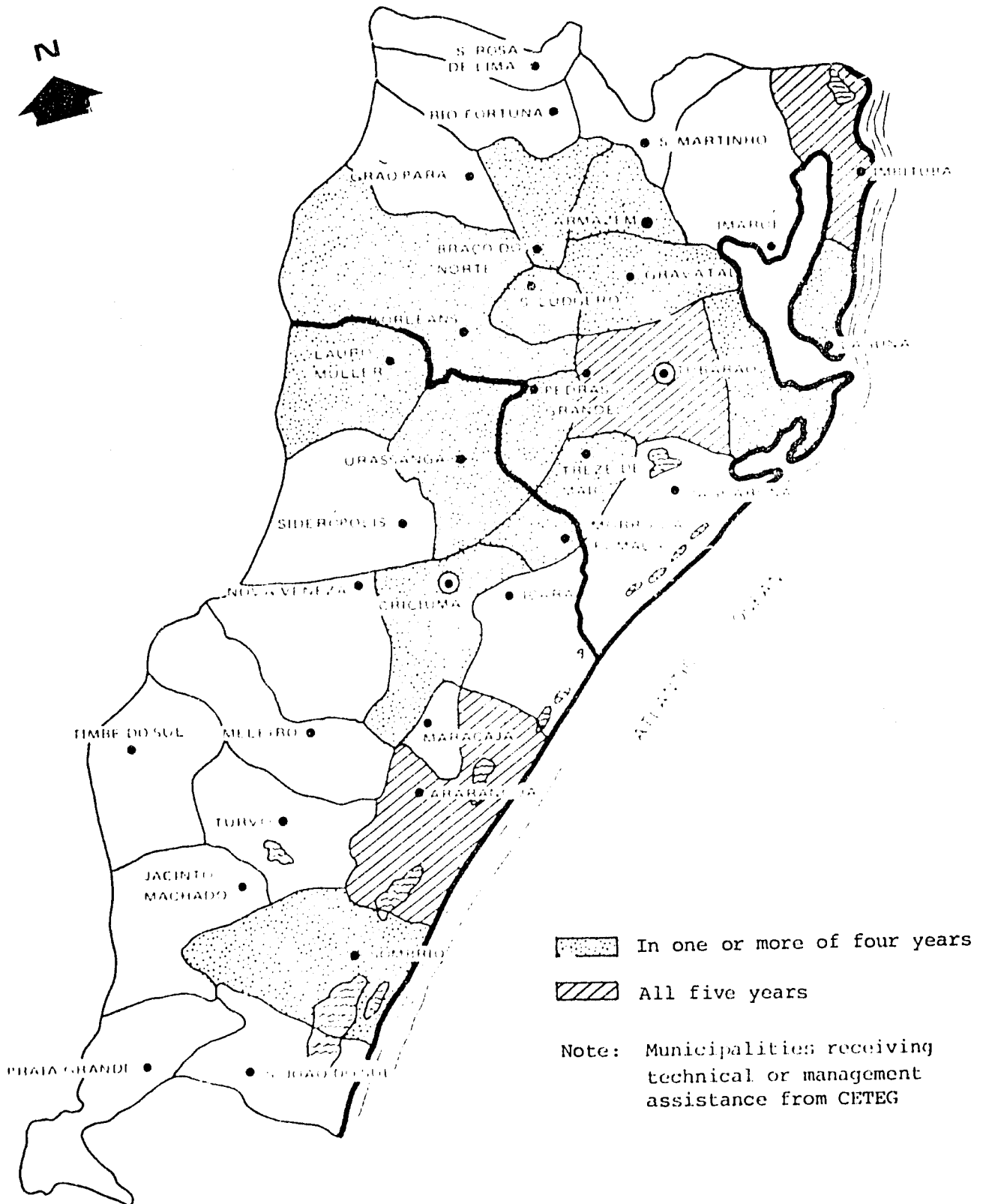
| <u>Year</u> | <u>Total Number of Cases</u> | <u>Number of Technical Assistance Cases</u> |
|-------------|----------------------------------|---|
| 1974-75 | 45 | 24 |
| 1975-76 | 57 | 37 |
| 1976-77 | 70 | 45 |
| 1977-78 | 62 | 34 |
| 1978-79 | <u>61</u> | <u>35</u> |
| Total | 295 | 175 |

Source: FESSC, Final Report, Year V.

Of the 32 municipalities in the target area, 16 received technical-management assistance during the life of the project. Due to the limited funding available, it was not possible to cover all of the area. Map 5 delineates the territory serviced by the FESSC staff during the past five years.

There is no doubt that both of these mini-regions were showing some signs of growth prior to the initiation of this project, but it is also true that the manufacturing/industrial and commercial sectors were the weak points in the economy. Since 1973, the FESSC staff has been keeping records on the revenue from two taxes that are representative of these activities: (a) tax on circulation of merchandise (imposto sobre circulacao de mercadorias--ICM) and

MUNICIPALITIES RECEIVING TECHNICAL-
MANAGEMENT ASSISTANCE, FESSC, 1974-79



(b) industrial production tax (imposto producao industrial--IPI). The program does not claim the increase in these revenues as a direct achievement, but the program did help some companies become more productive and indirectly contributed to the increases shown in Tables 23 and 24. It is interesting to note from both of these tables that the index for South Santa Catarina is consistently higher than that for the nation.

Table 23
REVENUE FROM IPI TAXES, 1973-78
(in thousands of cruzeiros)

| <u>Year</u> | <u>Brazil</u> | | <u>South Santa Catarina</u> | |
|-------------|-----------------|--------------|-----------------------------|--------------|
| | <u>Absolute</u> | <u>Index</u> | <u>Absolute</u> | <u>Index</u> |
| 1973 | 144,699,129 | 1.00 | 254,121 | 1.00 |
| 1974 | 155,901,765 | 1.07 | 286,646 | 1.13 |
| 1975 | 163,748,316 | 1.13 | 369,252 | 1.45 |
| 1976 | 166,151,156 | 1.15 | 386,915 | 1.52 |
| 1977 | 175,766,745 | 1.21 | 571,943 | 2.25 |
| 1978* | 160,676,596 | 1.11 | 500,926 | 1.97 |

* Estimated on the basis of the first 10 months of the year.

Source: FESSC, Final Report, Year V.

Table 24
REVENUE FROM ICM TAXES, 1973-78
(in thousands of cruzeiros)

| <u>Year</u> | <u>Brazil</u> | | <u>South Santa Catarina</u> | |
|-------------|-----------------|--------------|-----------------------------|--------------|
| | <u>Absolute</u> | <u>Index</u> | <u>Absolute</u> | <u>Index</u> |
| 1973 | 93,413,299 | 1.00 | 70,585 | 1.00 |
| 1974 | 102,052,303 | 1.09 | 90,141 | 1.28 |
| 1975 | 101,360,617 | 1.08 | 119,326 | 1.69 |
| 1976 | 103,260,071 | 1.11 | 158,445 | 2.25 |
| 1977 | 105,884,471 | 1.13 | 190,160 | 2.69 |
| 1978* | 96,983,035 | 1.03 | 256,148 | 3.63 |

* Estimated on the basis of the first 10 months of the year.

Source: FESSC, Final Report, Year V.

2. Education and Training. In 1974, when the project was initiated, FESSC did not have a research and development capability. One of the goals established was to create such a capability. Five years later, FESSC has a Technology Center on the campus and is using this facility for research and development as well as for educational purposes. This Technology Center is described in Part I of this report.

Another accomplishment that needs to be highlighted is in the industrial training field. Over the life of the project, FESSC has presented 226 training programs and a total of 6,666 adults have completed these programs. The development of human resources (native manpower) should be considered a significant achievement within the general project goals. Table 25 presents more detail on this subject.

Table 25
SUMMARY OF TRAINING PROGRAMS
FESSC, 1974-79

| <u>No. of Programs</u> | <u>Management</u> | <u>Elec., Mech., Const.</u> | <u>Educa- tion</u> | <u>Health</u> | <u>Social</u> | <u>Misc.</u> | <u>Total</u> |
|----------------------------------|-------------------|-------------------------------------|------------------------|---------------|---------------|--------------|--------------|
| 1974 | - | 18 | - | 2 | - | 92 | 112 |
| 1975 | 4 | 15 | - | 9 | - | 3 | 31 |
| 1976 | 4 | 8 | 2 | 1 | - | 4 | 19 |
| 1977 | 1 | 7 | 2 | 3 | 4 | 5 | 22 |
| 1978 | <u>11</u> | <u>11</u> | <u>10</u> | <u>3</u> | <u>1</u> | <u>6</u> | <u>42</u> |
| Total | 20 | 59 | 14 | 18 | 5 | 110 | 226 |
| | | | | | | | |
| <u>No. of Par- ticipants</u> | | | | | | | |
| 1974 | - | 195 | - | 50 | - | 2,307 | 2,552 |
| 1975 | 131 | 454 | - | 192 | - | 26 | 803 |
| 1976 | 120 | 94 | 56 | 22 | - | 67 | 359 |
| 1977 | 97 | 77 | 31 | 129 | 121 | 839 | 1,294 |
| 1978 | <u>350</u> | <u>155</u> | <u>132</u> | <u>171</u> | <u>70</u> | <u>780</u> | <u>1,658</u> |
| Total | 698 | 975 | 219 | 564 | 191 | 4,019 | 6,666 |

Source: Project files, FESSC.

Staff training has also been continued throughout the five years. Some of the staff received training at OIP headquarters; others attended training programs and seminars offered by OIP staff members while on site, and still others participated in educational and training programs offered by other institutions in Brazil. In total, 372 registrations have been recorded during this five-year period. More than 50% of these registrations were for training programs in the field of management. Three senior members of FESSC, Messrs. Humberto Dalsasso, Marcos Hemkemeier and Adalgiso Dominguez, completed a six-week training program at OIP headquarters which began on January 6, 1975.

3. Data Collection Development. Another unit of FESSC which has shown tremendous growth since 1974 is the Basic Data Center (CDB). When the project was initiated, the CDB and most of the city of Tubarao were severely damaged by a freak flood that occurred in March 1974. After the flood, the CDB was able to salvage only 241 units of its collection; since then, the CDB holdings have grown to some 6,300 units. Table 26 presents annual growth data classified by types and numbers of publications acquired, and Figure 21 is a graphic presentation of the growth of the CDB collection. The present holdings are over 26 times as large as the original collection salvaged from the 1974 flood.

4. Research Papers and Publications. As a result of the research programs conducted by the FESSC staff, many reports, studies, feasibility studies, new manufacturing opportunity studies, and other documents have been published in the past five years. Since the 153 titles of these publications have been mentioned in the yearly reports on this project, Table 27 shows only the total number published in each category in order to summarize the publications generated by this project.

In addition to the publications shown in Table 27, the FESSC staff generated 21 other research studies, under contract to other sponsors, but related to industry, education, and the economics of the area. Some of these studies are at present being used by the state government as part of its long-range plans for South Santa Catarina.

5. Organizational Linkages. The project staff, over the years, has developed very strong linkages with a large number of state and federal organizations, as well as with the industrial/commercial sector. During the life of the project, 23 formal seminars or workshops have been presented in cooperation

with one or more of these organizations. At present, FESSC is continually involved in all major actions that develop in the region and the state government is constantly seeking its advice and guidance on subjects related to the economic/industrial development of the area.

Table 26
CDB-PUBLICATIONS ACQUIRED
FESSC, 1974-79

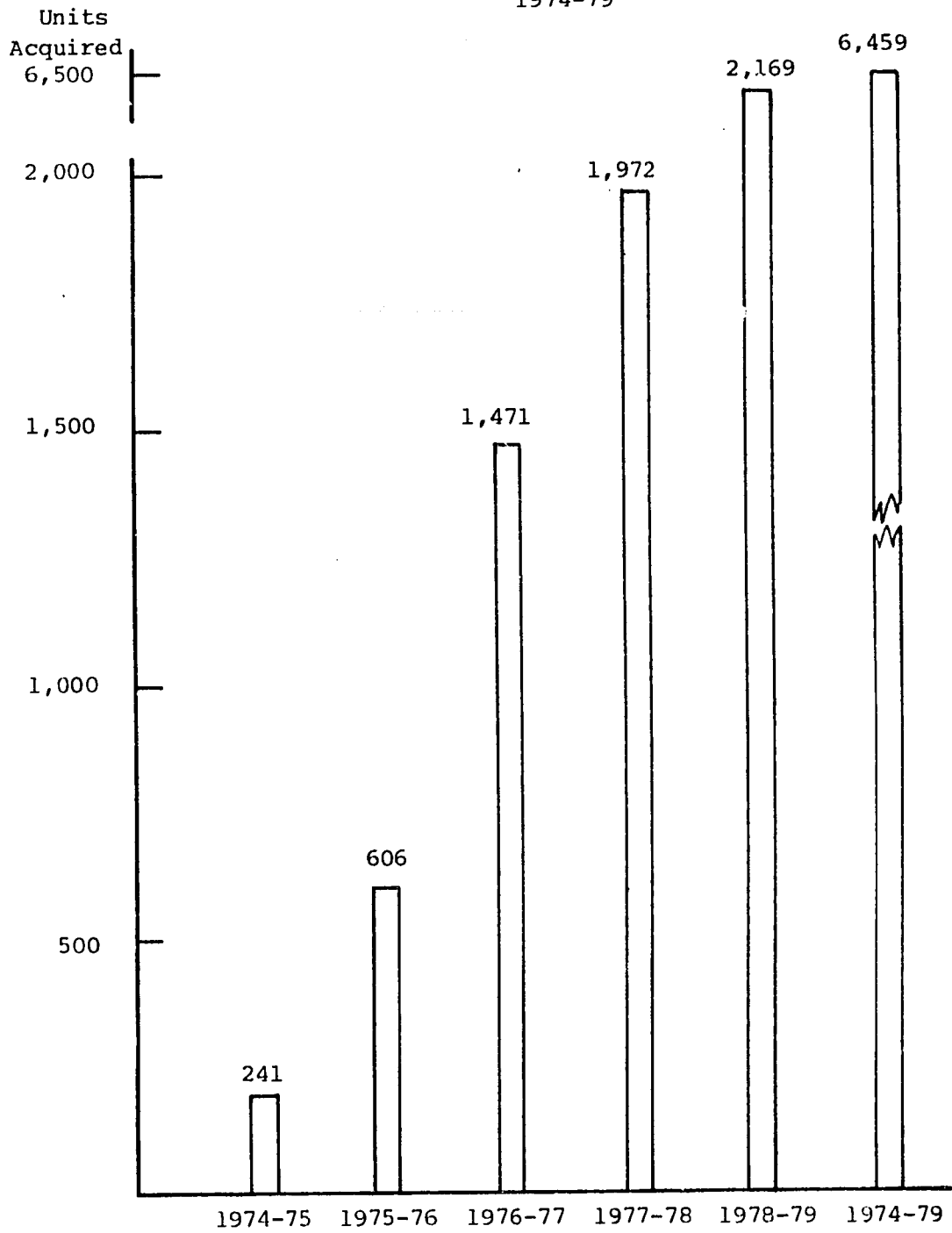
| <u>Type of Publication</u> | <u>Number of Items Acquired</u> | | | | | <u>Total</u> |
|----------------------------|---------------------------------|----------------|----------------|----------------|----------------|--------------|
| | <u>1974-75</u> | <u>1975-76</u> | <u>1976-77</u> | <u>1977-78</u> | <u>1978-79</u> | |
| Periodicals | 120 | 477 | 863 | 1,187 | 1,791 | 4,438 |
| Annuals | - | 9 | 10 | 31 | 12 | 62 |
| Articles | - | 1 | - | - | 25 | 26 |
| Catalogs | - | 33 | 81 | 44 | 22 | 180 |
| Books | 121 | 57 | 107 | 285 | 146 | 716 |
| Manuals | - | 2 | 9 | 38 | 2 | 51 |
| Maps | - | 3 | 1 | 31 | 4 | 39 |
| Reports | - | 15 | 22 | 39 | 39 | 115 |
| Profiles | - | 1 | 74 | - | - | 75 |
| Monographs | - | 3 | 11 | 4 | - | 18 |
| Journals | - | 5 | 12 | 20 | 17 | 54 |
| Censuses | - | - | 2 | 0 | 12 | 24 |
| Calendars | - | - | 1 | - | - | 1 |
| Studies | - | - | 88 | 67 | 72 | 227 |
| Booklets | - | - | 88 | 41 | 5 | 134 |
| Pamphlets | - | - | 53 | 44 | 22 | 119 |
| Newspaper Clippings | - | - | 1,475* | 1,931* | 985* | 4,391* |
| Miscellaneous | - | - | 48 | 132 | - | 180 |
| Total | 241 | 606 | 1,471 | 1,972 | 2,169 | 6,459 |

* Newspaper clippings not included in total.

Source: FESSC, Final Report, Year V.

6. Internal Development. Following the 1974 flood, the losses at FESSC were established at well over one quarter million dollars. Although this

Figure 21
GROWTH OF ACQUISITIONS
BASIC DATA CENTER-FESSC
1974-79



project did not provide any funds for the reconstruction of FESSC, the recognition by a foreign sponsor of the capability of FESSC helped them in seeking local, state, and federal funds to rebuild the institution. At present, FESSC is located on a modern campus, and construction of new buildings continues. The internal organization has also evolved as a result of this program. The Department of Research and Development is an important component of the institution and the educational programs are oriented to solving real-world problems. The institution has grown from a student body of 1,200 in 1974 to nearly 4,000 by the end of 1978. Next year, the first class of industrial-chemical engineers will be graduating from the Technology Center as a direct result of this program. The Department of Research and Development is an important component of the institution and the educational programs are oriented to solving real-world problems.

Table 27
SUMMARY OF PUBLICATIONS BY FESSC
1974-79

| <u>General Classification</u> | <u>Number Published</u> | | | | | <u>Total</u> |
|-----------------------------------|-------------------------|----------------|----------------|----------------|----------------|--------------|
| | <u>1974-75</u> | <u>1975-76</u> | <u>1976-77</u> | <u>1977-78</u> | <u>1978-79</u> | |
| Feasibility Studies | 4 | 4 | 5 | 3 | 2 | 18 |
| Manufacturing Opportunity Studies | 18 | 14 | 24 | 13 | 14 | 83 |
| Case Studies | - | - | 2 | 2 | 2 | 6 |
| Management Guidelines | - | - | 2 | 3 | 3 | 8 |
| Other Studies | <u>-</u> | <u>10</u> | <u>6</u> | <u>12</u> | <u>10</u> | <u>38</u> |
| Total | 22 | 28 | 39 | 33 | 31 | 153 |

7. Audiovisual Documentation. Five consecutive years of audiovisual documentation are now available as a result of this program. FESSC now has its own audiovisual facilities, and two persons were trained by the OIP staff to continue this work. The FESSC staff is currently experimenting with closed-circuit television teaching techniques as well as videotape.

8. Financial Commitment. From the day of inception of this project, the administration of FESSC has been committed to it; one quantifiable indicator

is the amount of funding that FESSC has provided to match or to complement the AID grant. Table 28 presents this information, and Figure 22 graphically illustrates the favorable relationship between the funds invested in the project by AID and those generated by FESSC, either internally or from other national sources (federal government, state government, national agencies, banks, and many other sources).

In addition to the above funding, during the past two years FESSC also obtained a grant of over 23 million cruzeiros (about \$1.2 million at the present rate) to establish the Technology Center on the new FESSC campus.

As has been pointed out, the FESSC staff showed great dedication during the life of this project, and it was they who carried out the bulk of the tasks programmed over the years. Mr. Jose Muller, Counterpart Project Director, and Mr. Humberto Dalsasso, Head of Technical Assistance Services, both appear in Figure 23 representing the many persons involved in this project.

Table 28
DISBURSEMENT OF GRANT AND PROJECT FUNDS
FUNDAÇÃO EDUCACIONAL DO SUL DE SANTA CATARINA (B-427)
YEARS I-V
(in dollars)

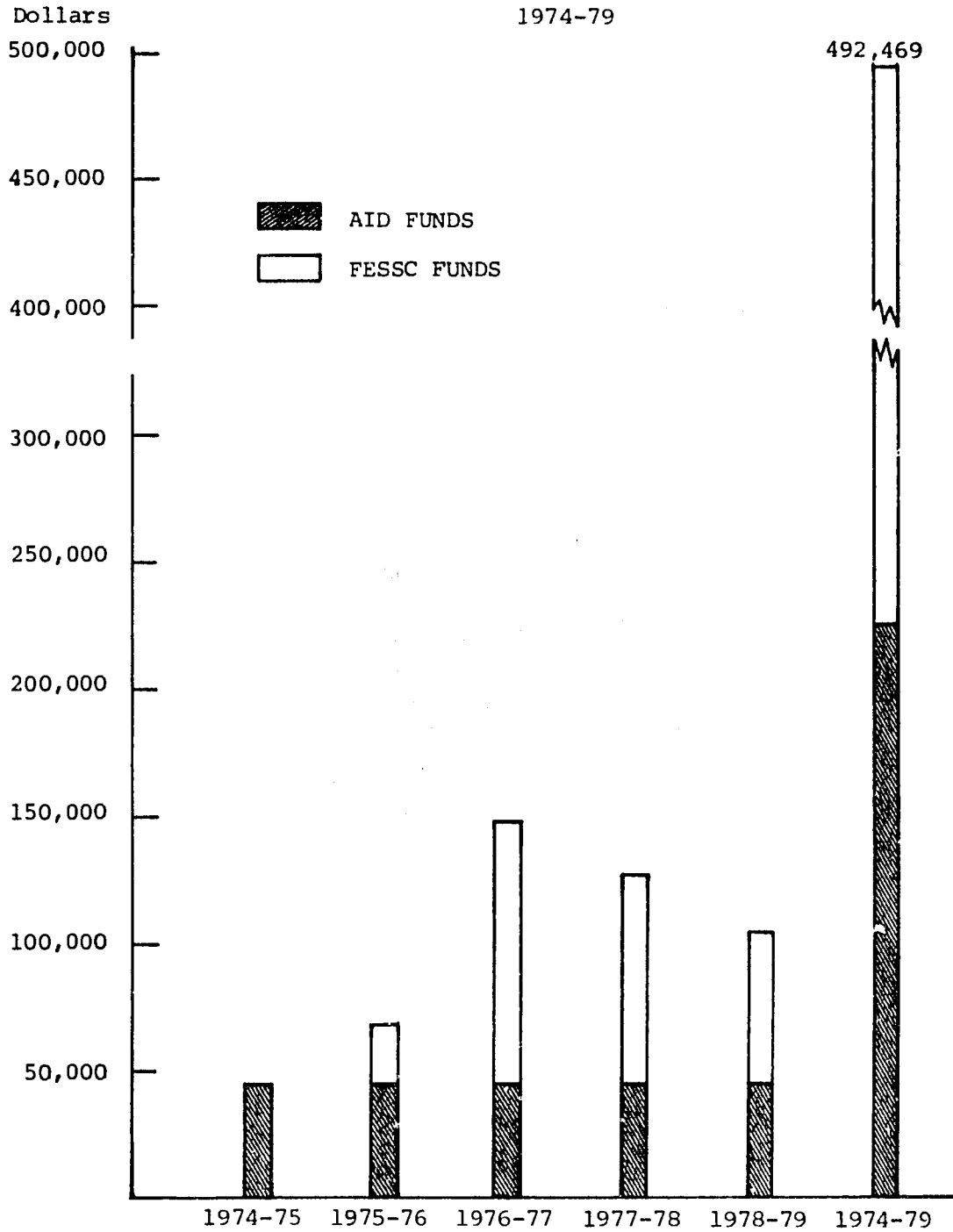
| Expenditures | FUNDS BY SOURCE | | | | | | | | | | | | | | | Project Total Years I-V |
|---------------------------|-----------------|-------|--------|---------|--------|--------|----------|---------|---------|---------|--------|---------|--------|--------|---------|-------------------------------|
| | Year I | | | Year II | | | Year III | | | Year IV | | | Year V | | | |
| | AID | FESSC | Total | AID | FESSC* | Total | AID | FESSC* | Total | AID | FESSC* | Total | AID | FESSC* | Total | |
| Direct Salaries and Wages | 18,000 | - | 18,000 | 16,000 | 13,000 | 29,000 | 17,000 | 73,789 | 90,789 | 19,000 | 65,630 | 84,630 | 11,700 | 42,900 | 54,600 | 277,019 |
| Travel | | | | | | | | | | | | | | | | |
| International | - | - | - | 4,000 | - | 4,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 6,000 | - | 6,000 | 14,000 |
| Local | 4,000 | - | 4,000 | 2,000 | 3,150 | 5,150 | - | 4,152 | 4,152 | - | 2,360 | 2,360 | 1,200 | 1,500 | 2,700 | 18,362 |
| Materials and Supplies | 500 | - | 500 | 500 | - | 500 | 1,500 | 3,191 | 4,691 | 500 | 2,720 | 3,220 | 3,600 | - | 3,600 | 12,511 |
| Contract Services | | | | | | | | | | | | | | | | |
| Local | - | - | - | - | 2,000 | 2,000 | - | 3,204 | 3,204 | - | 3,110 | 3,110 | - | 5,000 | 5,000 | 13,314 |
| GIT | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 20,500 | - | 20,500 | 102,500 |
| Audiovisual Documentation | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 2,000 | - | 2,000 | 10,000 |
| Consultants (Local) | - | - | - | - | - | - | 2,000 | 4,610 | 6,610 | - | 4,560 | 4,560 | - | 5,000 | 5,000 | 16,170 |
| Overhead | - | - | - | - | 4,350 | 4,350 | - | 9,456 | 9,456 | - | 1,290 | 1,290 | - | 3,500 | 3,500 | 18,596 |
| Other (Publications) | - | - | - | - | - | - | - | 4,737 | 4,737 | 1,000 | 2,260 | 3,260 | - | 2,000 | 2,000 | 9,997 |
| | 45,000 | - | 45,000 | 45,000 | 22,500 | 67,500 | 45,000 | 103,139 | 148,139 | 45,000 | 81,930 | 126,930 | 45,000 | 59,900 | 104,900 | 492,469 |
| Participation Ratio: | AID | | 100% | | | 66.6% | | | | | | 35.5% | | | 42.9% | 47.7% |
| | FESSC | | 0% | | | 33.4% | | | | | | 64.5% | | | 57.1% | 54.3% |

* Includes cost sharing from federal and state governments as well as industry.

Source: Project accounting files and counterpart financial records.

Figure 22

FUNDACAO EDUCACIONAL DO SUL DE SANTA CATARINA
GRANT AND PROJECT FUNDS
1974-79



Source: Table 28

UNIVERSITY OF IFE, 1975-77

This project was initiated out of phase with the rest of the grants and was first funded in late June 1975. Originally it was planned to run through January 9, 1979, but instead was terminated at the end of June 1977.

Some accomplishments resulted from Year I of this grant, as reported in the corresponding end-of-the-year report.^{1/} Unfortunately, the grantee did not submit the progress reports (quarterly) for Year II and to date has failed to issue a final report for the year ending in June 1977.

During the first year, the grantee reported having provided 53 small-scale industries with technical assistance. They did establish an industrial extension service during that year and opened two field stations -- one each at Ile-Ife and Ado-Ekiti. Two additional field stations were planned for Year II, but there has been no official report on them.

The UI staff reported having completed and published 16 studies on various aspects of small-scale industry development in Nigeria. They also presented two seminars -- one for government officials occupying small-scale industry positions in all of the states of the federation, the other for some 50 small-scale industrialists interested in the problems of that sector.

The project got off to a normal start, and during Year I the UI reported contributing substantial funding to the project as shown in Table 29 and graphically in Figure 24. At the start of Year II (June 25, 1976), the administration of UI was changed; the new administration either lost interest in this project or had other priorities, and project activities began slowing down, coming finally to a halt by March 1977. The grant, therefore, was not continued by the sponsor at the recommendation of the OIP Project Director.

^{1/} Final Report--Small-Scale Industry Grant, University of Ife, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1977.

Table 29
DISBURSEMENT OF GRANT AND PROJECT FUNDS
UNIVERSITY OF IFE (B-455)
Years I-II
(in dollars)

| Expenditures | FUNDS BY SOURCE | | | | | | Project Total Years I-II |
|-----------------------------------|-----------------|---------|---------|----------|-----|-------|--------------------------------|
| | Year I | | | Year II | | | |
| | AID | UI* | Total | AID | UI* | Total | |
| Direct Salaries and Wages | - | 133,738 | 133,738 | - | NA | NA | NA |
| Travel | | | | | | | |
| International | - | - | - | 10,000 | NA | NA | NA |
| Local | 2,490 | 8,300 | 10,790 | - | NA | NA | NA |
| Materials and Supplies | 15,770 | 53,950 | 69,720 | 12,500 | NA | NA | NA |
| Contract Services (GIT) | 20,500 | - | 20,500 | 20,500 | NA | NA | NA |
| Audiovisual Documentation | 2,000 | - | 2,000 | 2,000 | NA | NA | NA |
| Technical Research and Support | 4,240 | 10,790 | 15,030 | - | NA | NA | NA |
| Publications | - | 1,826 | 1,826 | - | NA | NA | NA |
| Overhead | - | 20,059 | 20,059 | - | NA | NA | NA |
| Technical Equipment | - | 47,791 | 47,791 | - | NA | NA | NA |
| Total | 45,000 | 276,454 | 321,454 | 45,000** | NA | NA | NA |
| Participation Ratio: | AID | | 14.0% | | | | |
| | UI | | 86.0% | | | | |

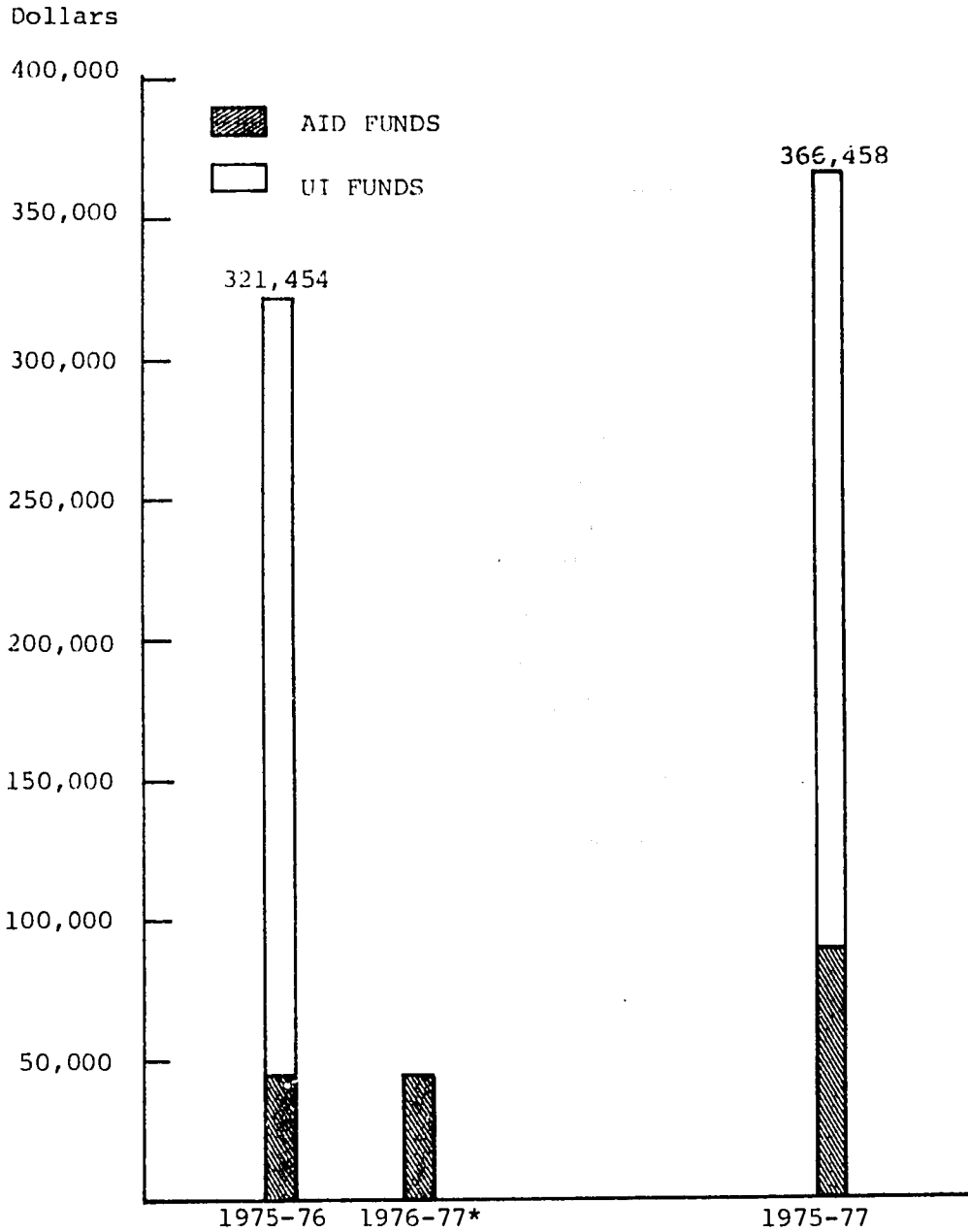
* Includes cost sharing from government sources.

**Of the \$45,000 grant in Year II, \$11,434.87 was not spent and was returned to sponsor.

Source: Project accounting files and counterpart financial records.

Figure 24

UNIVERSITY OF IFE
GRANT AND PROJECT FUNDS
1975-77



*Note: Data not available on counterpart contribution for 1976-77

Source: Table 29

UNIVERSITY OF THE PHILIPPINES, 1976-79

The Institute for Small-Scale Industries of the University of the Philippines (UP/ISSI) was advised by OIP on February 9, 1976, that this grant had been awarded to them with an effective implementation date of January 10, 1976. UP/ISSI took immediate action to nominate a counterpart Project Director and establish a project staff. Soon thereafter, work was begun to provide working space and related facilities for the Pilot Extension Office at the UP facilities in Tacloban City. The extension office was opened officially to the public on May 12, 1976.

The Pilot Extension Office in Tacloban City has five staff members. As embodied in the original design, extension services comprise the main bulk of the involvement of the extension office in the region. Detailed reports of past activities have been submitted on schedule;^{1/} consequently, only the more outstanding accomplishments are summarized below.

1. Appropriate Technology. In the past three years the UP/ISSI staff has developed, fabricated, and field-tested seven appropriate technology devices. These devices are:

- o Mechanical feed mixer (55-gallon oil drum)
- o Material handling -- wooden cart
- o Simple wood lathe
- o Wood lathe spindle
- o Steel weaving frame
- o Solar dryer
- o Band-saw adjuster

Institutions or persons interested in receiving detailed drawings of these devices may request them directly from the counterpart institution. All of these devices were developed during the provision of technical assistance to the local enterprises.

^{1/} For full details, refer to the respective end-of-the-year reports entitled Final Report--Small-Scale Industry Grant, University of the Philippines, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1977 and 1978.

2. Employment Generation. As in the case of the other counterparts, one indicator used to determine the positive impact of the new service being provided has been the increase or decrease in the labor force of the serviced firms. The counterpart staff kept records on 29 companies which have received technical-management assistance over the past three years. According to their records, a total of 37 new jobs have been generated as a result of this program. Table 30 presents this information. In addition to the reported figure, UP/ISSI also indicated having generated 78 additional jobs through handicraft skills training programs offered in the past year.

The UP/ISSI staff has reported servicing 83 technical assistance cases in the three-year period, as shown in Table 31. Details of the problems encountered and the solutions implemented may be found in the counterpart annual reports.

3. Education and Training. The area of human resources has also been high in priority to the counterpart staff and some achievements can be identified.

Table 32 presents the numbers of persons trained by UP/ISSI during the life of the project.

In addition to the training programs offered to entrepreneurs and others, the staff of UP/ISSI has been receiving special training either at OIP headquarters in Atlanta, Georgia, or in other institutions. Table 33 lists the participants and institutions providing the training.

4. Research Papers and Publications. The extension office staff provided information and guidance to the public and private sectors in projects related to the development and promotion of small and medium-scale industries in the region. Research was conducted on subjects either directly related to the inquiry or to the technical assistance cases. As a result, UP/ISSI prepared and published 77 documents in the past three years.

Table 30

VARIATION IN EMPLOYMENT OF MONITORED COMPANIES
RECEIVING TECHNICAL-MANAGEMENT ASSISTANCE
UP/ISSI, 1976-79

| Case No. | Period Monitored | Employment | | | |
|----------|------------------|------------|----------|----------|---------|
| | | Start | End | Variance | |
| | | | | Absolute | Percent |
| 1 | 1976-79 | 4 | 4 | 0 | - |
| 2 | 1976-79* | 0 | 0 | 0 | - |
| 3 | 1976-79 | 2 | 2 | 0 | - |
| 4 | 1976-79 | 3 | 3 | 0 | - |
| 5 | 1976-79 | 5 | 5 | 0 | - |
| 6 | 1976-79 | 22 | 33 | 11 | 50.00 |
| 7 | 1976-79 | 8 | 11 | 3 | 37.50 |
| 8 | 1976-79 | 2 | 5 | 3 | 150.00 |
| 9 | 1976-79 | 29 | 29 | 0 | - |
| 10 | 1978-79* | 0 | 0 | 0 | - |
| 11 | 1978-79 | 5 | 5 | 0 | - |
| 12 | 1978-79* | 0 | 0 | 0 | - |
| 13 | 1978-79* | 0 | 0 | 0 | - |
| 14 | 1978-79 | 109 | 129 | 20 | 18.34 |
| 15 | 1978-79 | 14 | 14 | 0 | - |
| 16 | 1978-79* | 0 | 0 | 0 | - |
| 17 | 1978-79 | 3 | 3 | 0 | - |
| 18 | 1978-79 | 4 | 4 | 0 | - |
| 19 | 1978-79 | 15 | 15 | 0 | - |
| 20 | 1978-79* | 0 | 0 | 0 | - |
| 21 | 1978-79* | - | - | - | - |
| 22 | 1978-79* | 0 | 0 | 0 | - |
| 23 | 1978-79* | 0 | 0 | 0 | - |
| 24 | 1978-79 | 6 | 6 | 0 | - |
| 25 | 1978-79* | 0 | 0 | 0 | - |
| 26 | 1978-79* | 0 | 0 | 0 | - |
| 27 | 1978-79* | 0 | 0 | 0 | - |
| 28 | 1978-79* | 0 | 0 | 0 | - |
| 29 | 1978-79* | <u>0</u> | <u>0</u> | <u>0</u> | - |
| Total | | 231 | 268 | 37 | 16.01 |

* Proposed project; business not yet established.

Source: UP/ISSI, Final Report, Year III.

Table 31
 TECHNICAL ASSISTANCE CASES
 UP/ISSI, 1976-79

| <u>Type of Assistance</u> | <u>Cases Serviced</u> | | | <u>Total</u> |
|---------------------------|-----------------------|----------------|----------------|--------------|
| | <u>1976-77</u> | <u>1977-78</u> | <u>1978-79</u> | |
| Continuous | 15 | 22 | 29 | 66 |
| Discontinuous | <u>-</u> | <u>4</u> | <u>13</u> | <u>17</u> |
| Total | 15 | 26 | 42 | 83 |

Source: UP/ISSI, Final Report, Year III.

Table 32
 SUMMARY OF PERSONS TRAINED
 UP/ISSI, 1976-79

| <u>Type of Training</u> | <u>Number of Participants</u> | | | <u>Total</u> |
|-----------------------------|-------------------------------|----------------|----------------|--------------|
| | <u>1976-77</u> | <u>1977-78</u> | <u>1978-79</u> | |
| Multiplier Level (Trainers) | - | - | 40 | 40 |
| Entrepreneurial Level | - | 16 | 28 | 44 |
| Industrial Skills | <u>-</u> | <u>136</u> | <u>20</u> | <u>156</u> |
| | - | 152 | 88 | 240 |

Source: UP/ISSI, Final Report, Year III.

Table 33
 UP/ISSI STAFF TRAINING, 1976-79

| <u>Participant</u> | <u>Training Institution</u> | <u>Date</u> | <u>Duration</u> |
|--------------------|-----------------------------|----------------|-----------------|
| I. U. Alvizo | OIP | July 13, 1976 | 4 weeks |
| T. Vinuya | East-West Center | Sept. 26, 1976 | 4 weeks |
| T. C. Gotico | OIP | Nov. 7, 1977 | 3 weeks |
| L. Abrugar | Technonet Asia | 1977 | 2 months |
| C. E. Lee | Technonet Asia | 1978 | 1 month |
| R. C. Dakanay | OIP | Oct. 1, 1978 | 3 weeks |

Source: Project Director's records.

Table 34 offers a summary of the publications resulting from this project. Titles of all these documents appear in the yearly reports for the project.

Table 34
SUMMARY OF PUBLICATIONS
UP/ISSI, 1976-79

| <u>General Classification</u> | <u>Number Published</u> | | | <u>Total</u> |
|-------------------------------|-------------------------|----------------|----------------|--------------|
| | <u>1976-77</u> | <u>1977-78</u> | <u>1978-79</u> | |
| Feasibility Studies | 17 | 5 | 9 | 31 |
| Case Studies | 3 | 1 | 8 | 12 |
| Industry Surveys | 4 | 2 | 6 | 12 |
| Project Proposals | - | 5 | 8 | 13 |
| Other Studies | <u>4</u> | <u>2</u> | <u>3</u> | <u>9</u> |
| Total | 28 | 15 | 34 | 77 |

Source: Project Director's records.

5. Organizational Linkages. Recognizing the need to coordinate the extension office activities with other government agencies in the region, UP/ISSI has developed good working relationships with the following agencies:

- National Economic Development Authority (NEDA)
- Leyte Sab-A Basin Development Authority
- Entrepreneurial Development in General Education (EDGE)
- Small Business Advisory Center (SBAC)
- National Cottage Industry and Development Authority (NACIDA)
- Development Bank of the Philippines (DBP)
- Ministry of Social Services and Development (MSSD)
- Ministry of Agrarian Reforms (MAR)
- Divine Word University (DWU)
- Rural Workers Office (RWO)

Other agencies also have linkages to the project, but the above have been the most active ones in the past few years.

6. Audiovisual Documentation. Three years of audiovisual documentation were completed and are now available to the counterpart. Members of UP/ISSI were trained to continue performing this service in the future.

7. Financial Commitment. The administration of UP has shown great interest in this project, but to date its financial assistance has been limited. During November 1978, the Project Director visited Dr. Emanuel Soriano, Executive Vice President of UP, to determine how the project would continue to be funded since the grant came to its programmed end in January 1979. Dr. Soriano at the time assured the author that UP would fund the extension office (at present budget level) for the next year or until other sources are identified.

As shown in Table 35, a total of \$139,358 has been invested in this project, of which 96.9% was provided by the AID grant and 3.1% came from UP funds. Figure 25 presents this information in a graphic manner.

The Counterpart Project Director, Mr. Paterno V. Vilorio, has been most active in the past three years and has greatly assisted in meeting the project goal. Mr. Vilorio appears in Figure 26, together with the author, at a meeting held in Guatemala City.

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ARE MISSING

UNIVERSITY OF SCIENCE AND TECHNOLOGY, 1977-79

Much as in the case of Project B-455 (University of Ife), this grant was initiated out of phase with the rest of the program. The Technology Consultancy Centre (TCC) of the University of Science and Technology has been a counterpart institution of OIP since July 1975. When it became apparent to OIP during late 1976 and early 1977 that Project B-455 would not be extended, it was recommended to the sponsor that TCC be initiated into the program, replacing the University of Ife. On May 24, 1977, the sponsor advised OIP that it concurred with OIP's recommendation, and thus UST/TCC became a grantee for an 18-month period, beginning June 25, 1977.

Reports covering the first year of activity and corresponding accomplishments have been submitted to the sponsor on schedule.^{1/} The balance of this section will highlight some of the achievements attained in the past 18 months.

1. Appropriate Technology. It is generally recognized that the most important role of TCC is the transfer of technology from TCC to the small-scale indigenous industries of Ghana. TCC is, therefore, geared to the concept that what is needed is a multitude of indigenous enterprises which progress technically and economically as rapidly as the abilities of the entrepreneur and the available technological, managerial, and financial assistance will allow. Many of the achievements in the area of appropriate technology are not "devices," but rather demonstrative units that are operational and feasible in Ghana. The following listing is representative, but not all evolved during the last 18 months of work.

- o Manufacture of steel bolts and nuts
- o Broadloom weaving
- o Soap plant
- o Sugar pilot plant
- o Brass casting furnace
- o Glass bead manufacturing

^{1/} For full details, refer to the end-of-the-year report entitled Final Report: Small-Scale Industry Grant, University of Ife and University of Science and Technology, by Nelson C. Wall, published by the Georgia Institute of Technology, Atlanta, Georgia, January 1978.

- o Rubber sheets (latex)
- o Lemongrass distillation
- o Pyrolysis of sawdust
- o Glue manufacturing

These manufacturing units have been discussed in the corresponding end-of-the-year reports, but anyone wishing additional details, drawings, and information may contact the counterpart institution directly.

Due to the indigenous nature of the companies assisted by TCC, it was not possible to keep records on employment generation. The real objective was to help the entrepreneur get started rather than to keep tally on the number of persons employed.

2. Education and Training. As has been indicated, it is not always possible to persuade a local entrepreneur to initiate a new venture. In an attempt to resolve this, TCC has been establishing what it calls "production units." The purpose of establishing these units is fourfold:

- (1) To train craftsmen and managers in the skills of a new industry;
- (2) To complete product development under production conditions;
- (3) To test the market for the product in a realistic way;
- (4) To demonstrate to entrepreneurs the viable operation of the industrial activity.

Since 1972, when TCC started operating and setting up "production units," it has concentrated on the first objective of training craftsmen and managers. During the past 18 months, some 91 persons have participated and received a total of 685 months of training. Table 36 presents a summary of this activity.

The training programs offered by UST/TCC represent an average of seven months of training per person. During the entire training period, the participants receive training wages from TCC on the basis of their skills and production.

Also during the life of this project, two members of the TCC staff came to OIP for special training. They were Mr. S. Buatsi (1977) and Mr. P. Donkor (1978). Mr. Buatsi is a metal products designer, and during his three-week stay he gathered information on this subject. Unfortunately, his interest was

in the "lost wax process," for which little information was available. On the other hand, Mr. Donkor was concerned with the manufacture of soap and the extraction of vegetable oil. OIP was able to assist him in gathering information and meeting with manufacturers in the U.S.A.

Table 36
SUMMARY OF INDUSTRIAL TRAINING
UST/TCC, 1977-79

| <u>Production Unit</u> | <u>Number of Trainees</u> | <u>Aggregate Months of Training</u> |
|------------------------|---------------------------|-------------------------------------|
| Broadloom Weaving | 34 | 260 |
| Steel Bolts and Nuts | 19 | 199 |
| Plant Construction | 18 | 103 |
| Castor Oil | 14 | 82 |
| Rubber Project | <u>6</u> | <u>41</u> |
| Total | 91 | 685 |

Source: TCC project records.

3. Research Papers and Publications. The senior staff of TCC is research oriented. In the past 18 months, they have researched and published 13 documents and studies. The following listing presents these titles for the first time.

- o Dr. J. Powell (editor), Annual Review No. 6, 1977-78, TCC, UST, Kumasi, Ghana, December 1978.
- o Dr. J. Powell et al., Five-Year Development Plan Report, TCC, UST, Kumasi, Ghana, 1977.
- o Dr. J. Powell, An Intermediate Technology Role for a University in the Third World, Paper presented at the American Association for the Advancement of Science, Denver, Colorado, February 1978.
- o Dr. J. Powell, Wood Waste as an Energy Source in Ghana, Paper presented at the American Association for the Advancement of Science, Denver, Colorado, February 1978.
- o Dr. B. A. Ntim, The Role of the Technology Consultancy Centre in Industrial Development, Paper presented at the ITOG Conference in Indianapolis, Indiana, April 1977.

- o Dr. B. A. Ntim, The Status of Engineering Education-Industry Cooperation in Middle Africa, Paper presented at the UPADI-UNESCO Latin American Seminar on Institution-Industry Cooperation in Engineering Education Mexico City, Mexico, January 1977.
- o Dr. J. Russell, Productivity in the Steel Bolt Production Unit, April 1973 - June 1976, TCC, UST, Kumasi, Ghana, January 1977.
- o Dr. J. W. Powell, Appropriate Technology in India, TCC, UST, Kumasi, Ghana, January 1978.
- o Dr. J. Russell, The Performance of the Steel Bolt Production Unit between December 1976 and May 1977, TCC, UST, Kumasi, Ghana, June 1977.
- o Dr. J. W. Powell, Soap Pilot Plant-Review of Progress, TCC, UST, Kumasi, Ghana, July 1978.
- o Mr. Peter Donkor, Extraction of Palm Oil Using Appropriate Technology Hand Screen Press, TCC, UST, Kumasi, Ghana, July 1978.
- o Mr. K. Opoku-Debrah, Traditional Soap-Making (Amonkye) at Wiampoase, Ashanti, TCC, UST, Kumasi, Ghana, April 1978.

4. Organizational Linkages. Overseas support of TCC has been in evidence since the initial phase of the Centre, and the inflow of funds from outside Ghana has been at a record high during the past 18 months. The main organizations linked to TCC are:

The International Development Research Centre of Canada (IDRC)
Oxfam, U.K.

United States Agency for International Development (AID)

Linkages exist with many other organizations, but only the three named are funding research at TCC. At the national level, TCC maintains close linkages with organizations such as:

State Goldmining Corporation
State Transport Corporation
Ministry of Health
Sugar Industry Board

5. Audiovisual Documentation. As part of the activities under this project, two audiovisual documentations were completed by OIP staff members, assisted by the TCC staff. At present, TCC does not plan to continue this activity because of the lack of equipment, videotape, and other support systems.

6. Alternative Energy Sources. Early in 1977, TCC became interested in studying the opportunities in Ghana for utilizing alternative and renewable energy sources. Wood waste as an energy source was the first area of research; as a result, under separate funding, a project was established in connection with OIP and the Building and Road Research Institute of Ghana. OIP designed a prototype pyrolytic convertor to produce charcoal, fuel oil, and heat from sawdust. One unit has been built and is now being tested. Three more units also will be manufactured under this project. All four units will be used by the Building and Road Research Institute to operate a brick kiln.

Several experimental solar water heaters have been built and are being tested currently. Another area of research in the field of solar energy has been the sun-drying of brewers' spent grain for animal feed. This has been successful, but with the increasing price of grain, it may cease to be financially profitable.

7. Financial Commitment. As in the case of the other counterpart institutions, TCC has invested in this program. According to TCC reports, some \$135,000 of its own funds have been matched to the grant funds. Table 37 presents this information, and Figure 27 is a graphic presentation of the 18 months' funding.

The Counterpart Project Director, Dr. John Powell, has been of great assistance to the project and has worked closely with the author. Figure 28 shows Dr. Powell at a meeting at OIP headquarters in Atlanta.

Table 37
DISBURSEMENT OF GRANT AND PROJECT FUNDS
UNIVERSITY OF SCIENCE AND TECHNOLOGY (B-492)
YEARS I-II
(in dollars)

| Expenditures | FUNDS BY SOURCE | | | | | | Project Total Years I-II |
|------------------------------|-----------------|----------|---------------|--------------|----------|--------------|--------------------------------|
| | Year I | | | Year II | | | |
| | AID | UST* | Total | AID** | UST* | Total | |
| Direct Salaries and Wages | - | 90,000 | 90,000 | - | 45,000 | 45,000 | 135,000 |
| Travel | | | | | | | |
| International | 3,000 | - | 3,000 | 4,760 | - | 4,760 | 7,760 |
| Local | 2,000 | - | 2,000 | 1,000 | - | 1,000 | 3,000 |
| Materials and Supplies | 3,000 | - | 3,000 | 2,400 | - | 2,400 | 5,400 |
| Contract Services (GIT) | 20,500 | - | 20,500 | 14,050 | - | 14,050 | 34,550 |
| Audiovisual Documentation | 2,000 | - | 2,000 | 1,000 | - | 1,000 | 3,000 |
| Equipment | <u>14,500</u> | <u>-</u> | <u>14,500</u> | <u>6,890</u> | <u>-</u> | <u>6,890</u> | <u>21,390</u> |
| Total | 45,000 | 90,000 | 135,000 | 30,100 | 45,000 | 75,100 | 210,100 |
| Participation Ratio: | AID | | 33.3% | | | 40.1% | 35.7% |
| | UST | | 66.7% | | | 59.9% | 64.3% |

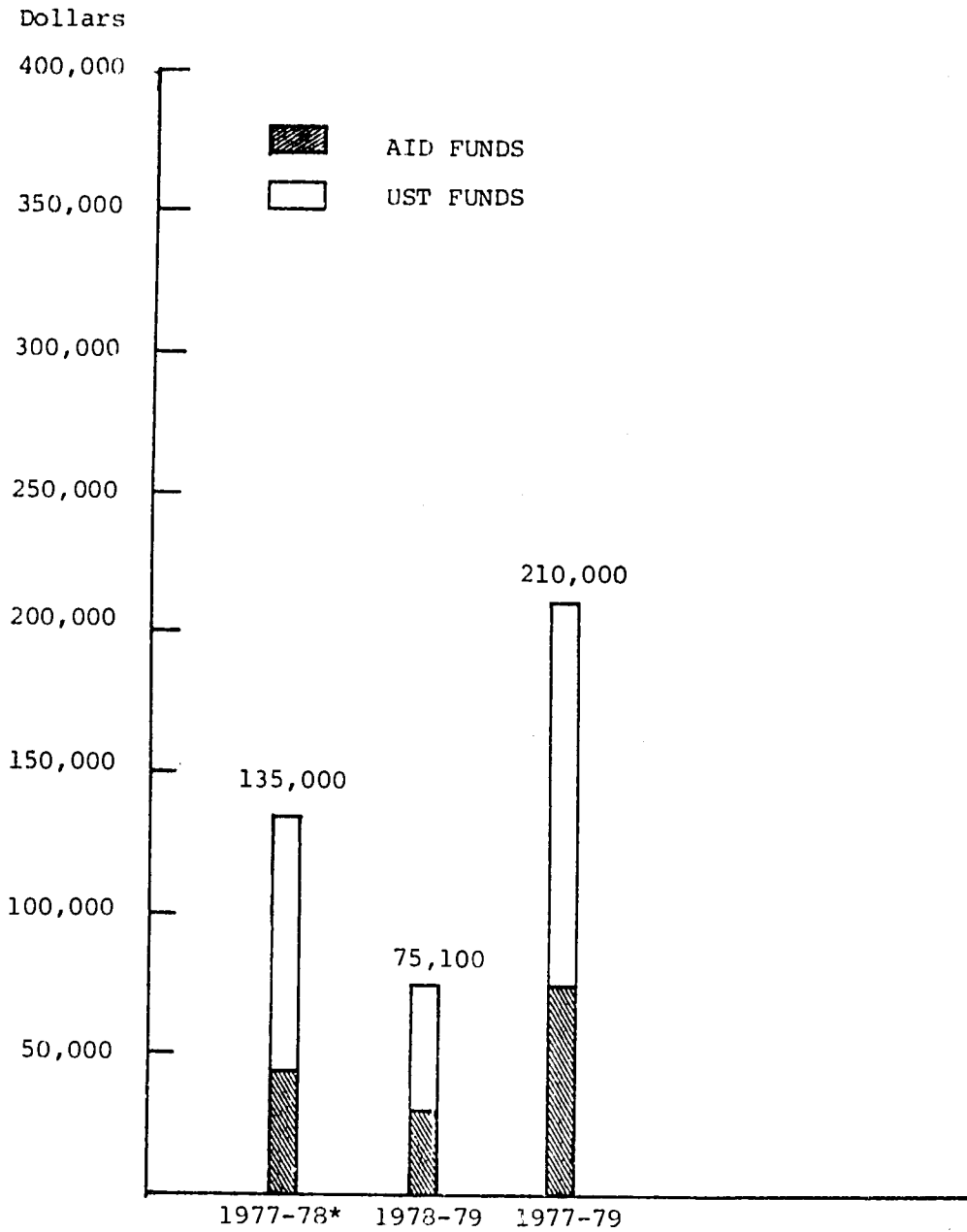
* Includes cost sharing from other sources

**Year II is from July 1, 1978, to January 9, 1979, and includes \$22,500 grant plus \$7,600 additional from B-455 as authorized by sponsor, for a total of \$30,100.

Source: Project accounting files and counterpart financial records.

Figure 27

UNIVERSITY OF SCIENCE AND TECHNOLOGY
GRANT AND PROJECT FUNDS
YEARS 1977-79



* Note: Year I started July 1977

Source: Table 37

OFFICE OF INTERNATIONAL PROGRAMS, 1974-79

At the end of the fifth year of this project (A-1600), OIP has successfully established four operational counterpart programs with units overseas and had to terminate one additional counterpart program. The two counterparts with five years of participation appear to be fully dedicated to the basic concept of generating employment and assisting small-scale industries. The other two counterparts, with three or fewer years, are fully operational and equally dedicated. All four counterparts are now capable of operating with minimal technical support from outside sources and have proven their ability to implement pragmatic action programs.

OIP had two main functions under this program:

- (1) Training of selected counterpart staff both on site and in the U.S.A.;
- (2) Provision of on-site consultative services to the different programs implemented by the counterpart institutions.

Both of these functions have been carried out under the program.

1. Training of Counterpart Staff. Over the past five years, the OIP staff has presented special training programs for selected members of the counterpart staffs. These programs, presented in Atlanta, Georgia, have attempted to enhance the capability of the counterpart staffs to deal with "real-world" problems common to small-scale industries. The training programs were carried out in various forms as appropriate, including classroom activities, on-the-job training, guidance, consultation, industrial tours, and general business contacts, as needed. They also were planned to allow the student to participate in the training activity and develop his research capability. Table 38 lists the counterpart participants trained at OIP.

A total of 16 persons participated in these special training programs at OIP, and some 69 weeks of instruction were offered to these participants. At the same time, the OIP staff presented on-site workshops, lectures, and seminars to the counterpart staffs. These were reported on a year-by-year basis in the respective final reports.

Table 38
COUNTERPART STAFF TRAINED AT OIP, 1974-79

| <u>Name</u> | <u>Institution</u> | <u>Year</u> | <u>Duration of Program</u> |
|--------------------|--------------------|-------------|----------------------------|
| Hae Byung Lee | SJU | 1974 | 4 weeks |
| Jae Bok Yoon | SJU | 1974 | 4 weeks |
| Clarence Prince | SJU | 1974 | 4 weeks |
| Won-Hue Koo | SJU | 1975 | 5 weeks |
| Young-Ho Lim | SJU | 1975 | 5 weeks |
| Young-Ho Chae | SJU | 1975 | 5 weeks |
| Humberto Dalsasso | FESSC | 1975 | 6 weeks |
| Marcos Hemkemeier | FESSC | 1975 | 6 weeks |
| Adalgiso Dominguez | FESSC | 1975 | 6 weeks |
| Byoung-Kyu Choi | SJU | 1976 | 2 weeks |
| I. U. Alvizo | UP/ISSI | 1976 | 4 weeks |
| T. C. Gotico | UP/ISSI | 1977 | 8 weeks |
| S. Buatsi | UST/TCC | 1977 | 3 weeks |
| Yoon-Bae Ouh | SJU | 1978 | 1 week |
| R. C. Dakanay | UP/ISSI | 1978 | 3 weeks |
| P. Donkor | UST/TCC | 1978 | 3 weeks |

Source: Project Director's records.

2. On-Site Consultation. Since OIP had the responsibility of providing on-site consultation and technical support to the counterpart staff members, in the past five years a substantial number of staff man-hours were served overseas. Table 39 summarizes this on-site staff support. As shown, 91 visits were made by OIP staff members to the five counterparts during the life of the project.

3. Information Service. As part of the assistance provided to the counterpart institutions, the International Development Data Center (IDDC) of OIP was made available for specific requests. As the counterpart staff members provided technical assistance, they would address specific requests to IDDC for information on technology, state of the art, background data, appropriate techniques, or other aspects. On an average, the IDDC staff spent two days per month per counterpart institution obtaining the requested information. When staff members of the counterpart institution came to OIP for special training, they used IDDC freely, and much of their research was conducted there.

Table 39

SUMMARY OF OIP ON-SITE STAFF SUPPORT, 1974-79

| <u>Name</u> | <u>Counterpart Institution</u> | <u>Dates</u> |
|-----------------|------------------------------------|---------------------------------|
| R. W. Hammond | FESSC | March 4-March 8, 1974 |
| D. Fyffe | FESSC | March 4-March 8, 1974 |
| N. C. Wall | SJU | April 3-April 16, 1974 |
| R. Johnston | SJU | April 3-April 10, 1974 |
| H. Eller* | SJU | April 21-June 8, 1974 |
| B. James | SJU | April 28-June 14, 1974 |
| G. A. Morelos | FESSC | June 28-July 6, 1974 |
| G. A. Morelos | FESSC | August 16-September 19, 1974 |
| P. Potts | FESSC | August 16-September 19, 1974 |
| R. Johnston | FESSC | August 25-August 31, 1974 |
| M. A. Deadmore* | FESSC | August 25-August 31, 1974 |
| W. Studstill | SJU | September 8-October 13, 1974 |
| V. Crawford* | SJU | September 29-October 13, 1974 |
| R. W. Hammond | SJU | September 29-October 13, 1974 |
| G. A. Morelos | FESSC | December 7-December 19, 1974 |
| N. C. Wall | SJU | December 12-December 18, 1974 |
| J. M. Pettit* | SJU | January 26-February 2, 1975 |
| R. W. Hammond | SJU | January 26-February 2, 1975 |
| N. C. Wall | FESSC | March 31-April 18, 1975 |
| R. Johnston | FESSC | March 31-April 18, 1975 |
| K. Auciello* | SJU | April 3-April 12, 1975 |
| B. James | SJU | April 3-May 11, 1975 |
| G. Parets* | FESSC | April 6-May 3, 1975 |
| N. C. Wall | FESSC | June 25-July 18, 1975 |
| K. Stephens | SJU | June 29-August 2, 1975 |
| E. Udunka* | FESSC | July 5-July 14, 1975 |
| G. Morelos | FESSC | July 5-July 25, 1975 |
| J. Kaatz* | FESSC | July 5-July 23, 1975 |
| R. Johnston | SJU | July 22-August 7, 1975 |
| L. Edens | SJU | September 1-September 20, 1975 |
| H. Diamond* | SJU | September 7-October 3, 1975 |
| E. Udunka* | SJU | September 20-September 27, 1975 |

Table 39 (continued)

| <u>Name</u> | <u>Counterpart Institution</u> | <u>Dates</u> |
|-----------------|------------------------------------|---------------------------------|
| T. Stelson* | SJU | September 20-September 27, 1975 |
| R. W. Hammond* | SJU | September 20-September 27, 1975 |
| N. C. Wall | UI | September 23-October 11, 1975 |
| S. Dudley | UI | September 27-October 14, 1975 |
| N. C. Wall | FESSC | November 7-December 3, 1975 |
| M. A. Deadmore* | UI | November 30-December 6, 1975 |
| F. Kingsland | UI | November 30-December 6, 1975 |
| R. Manoff | SJU | February 11-March 12, 1976 |
| R. Manoff | UP/ISSI | March 12-April 2, 1976 |
| N. C. Wall | UI | March 23-April 16, 1976 |
| N. C. Wall | FESSC | April 17-May 14, 1976 |
| R. W. Hammond* | UP/ISSI | May 23-May 30, 1976 |
| H. G. Dean* | UP/ISSI | May 23-May 30, 1976 |
| D. E. Lodge* | UP/ISSI | May 23-May 30, 1976 |
| K. Stephens* | UP/ISSI | May 23-May 30, 1976 |
| P. Hess* | UP/ISSI | May 23-May 30, 1976 |
| E. Lewis* | SJU | May 24-June 12, 1976 |
| R. W. Hammond* | SJU | June 1-June 9, 1976 |
| H. G. Dean* | SJU | June 1-June 9, 1976 |
| D. Lodge* | SJU | June 1-June 9, 1976 |
| N. C. Wall | UI | July 3-August 7, 1976 |
| E. Udunka | UI | August 1-August 7, 1976 |
| N. C. Wall | FESSC | August 7-August 23, 1976 |
| E. Udunka | FESSC | August 7-August 23, 1976 |
| D. Fyffe | SJU | August 23-September 11, 1976 |
| S. Dudley | UP/ISSI | September 13-September 29, 1976 |
| D. Lodge | SJU | October 31-November 7, 1976 |
| D. Lodge | UP/ISSI | November 7-November 20, 1976 |
| H. Davis | FESSC | November 27-December 10, 1976 |
| R. Johnston | SJU | February 14-March 8, 1977 |
| K. Powell | UP/ISSI | March 2-April 1, 1977 |
| D. Lodge | UI | March 11-March 19, 1977 |
| H. Davis | FESSC | April 14-April 22, 1977 |

Table 39 (continued)

| <u>Name</u> | <u>Counterpart Institution</u> | <u>Dates</u> |
|----------------|------------------------------------|-------------------------------|
| E. Udunka | FESSC | July 24-July 29, 1977 |
| D. Fyffe | UP/ISSI | August 5-August 29, 1977 |
| R. W. Hammond* | SJU | October 10-October 18, 1977 |
| H. Davis* | SJU | October 10-October 18, 1977 |
| D. Lodge | UP/ISSI | November 2-November 13, 1977 |
| E. Udunka | UP/ISSI | November 5-November 13, 1977 |
| E. Udunka | SJU | November 13-November 19, 1977 |
| D. Lodge | SJU | November 13-November 25, 1977 |
| N. C. Wall | FESSC | December 1-December 22, 1977 |
| P. Potts* | UST/TCC | December 4-December 8, 1977 |
| N. C. Wall | FESSC | March 16-April 7, 1978 |
| R. Johnston | UP/ISSI | April 8-April 28, 1978 |
| D. Lodge | UST/TCC | April 27-May 8, 1978 |
| R. Johnston | SJU | April 30-May 12, 1978 |
| R. W. Hammond | UST/TCC | May 30-June 9, 1978 |
| F. Malvar | UP/ISSI | July 2-July 14, 1978 |
| F. Malvar | SJU | July 14-July 31, 1978 |
| D. Lodge | SJU | July 15-August 14, 1978 |
| N. C. Wall | FESSC | August 13-August 30, 1978 |
| F. Malvar | FESSC | August 13-August 30, 1978 |
| R. W. Hammond | UP/ISSI | August 21-September 6, 1978 |
| F. Malvar | UST/TCC | September 30-October 26, 1978 |
| N. C. Wall | UST/TCC | October 27-November 10, 1978 |
| N. C. Wall | UP/ISSI | November 12-November 21, 1978 |
| N. C. Wall | SJU | November 22-December 2, 1978 |
| N. C. Wall | FESSC | December 7-December 21, 1978 |

* Funded under separate AID grants and contracts.

Source: Project Director's records.

4. Research Papers and Publications. Many of the studies published were cosponsored by another AID grant (211-d), so it is not appropriate to mention

them as resulting from this project only. Under A-1600, the following publications were issued: SJU, five annual reports and one baseline study; FESSC, five annual reports and one baseline study; UI, two annual reports and one baseline study; UP/ISSI, three annual reports and one baseline study; and UST/TCC, two annual reports. All of these publications were submitted on schedule to the sponsor and circulated to the participating counterparts.

5. Audiovisual Documentation. In the past five years, OIP has developed an audiovisual documentation capability and it presently has the necessary equipment to go on site and tape audiovisual records. A total of 17 audiovisual documentations were performed over the life of the project -- five each at SJU and FESSC, three at UP/ISSI, and two each at UI and UST/TCC. Counterpart staff members were trained to continue with this activity once the project reached its programmed termination. All of the audiovisual material has been submitted to the sponsor and to the participating counterparts.

6. Use of Grant Funds. As designated by the sponsor, OIP and the Georgia Institute of Technology were responsible for the administration of grant funds under Project A-1600. OIP served as the administrator of the program and was responsible for the use of the individual grant funds. Table 40 outlines disbursement of grant and project funds for each participating institution over the past five years. As may be noted from Table 40, AID invested a total of \$837,574 (51.94% of total) and the counterpart institutions report investing \$774,917 (48.06% of total) for a total funding of \$1,612,491. Accounting records are available to the sponsor at both OIP and the Office of Contract Administration of the Georgia Institute of Technology.

Table 40
DISBURSEMENT OF TOTAL GRANT AND PROJECT FUNDS
ALL COUNTERPARTS
(B-426, B-427, B-455, E-463, B-492 and A-1600)
YEARS I-V
(in dollars)

| Expenditures | FUNDS BY SOURCE | | | | | | | | | | | | | | | | | | | |
|--------------------------------|-----------------------|---------|---------|-----------------------|---------|---------|-------------------------|---------|---------|-------------------------|-------|---------|-------------------------|---------|---------|---------------|---------|--------------------------|-----------|--|
| | B-426 (Years I-V) (a) | | | B-427 (Years I-V) (b) | | | B-455 (Years I-III) (c) | | | B-463 (Years I-III) (d) | | | B-492 (Years I-III) (e) | | | Years I-V (f) | | Grant and Project Totals | | |
| | AID | STU* | Total | AID | FESSC* | Total | AID | UI* | Total | AID | DP* | Total | AID | UST* | Total | AID/GIT | AID | Counterparts | Total | |
| Direct Salaries and Wages | 61,259 | 47,750 | 109,009 | 81,700 | 195,319 | 277,019 | - | 133,738 | 133,738 | 26,500 | 4,368 | 30,858 | - | 135,000 | 135,000 | 46,353 | 215,812 | 516,165 | 731,977 | |
| Travel | | | | | | | | | | | | | | | | | | | | |
| International | 18,550 | 3,000 | 21,550 | 14,000 | - | 14,000 | 10,000 | - | 10,000 | 12,800 | - | 12,800 | 7,760 | - | 7,760 | 8,100 | 71,210 | 3,000 | 74,210 | |
| Local | 7,674 | 6,000 | 13,674 | 7,200 | 11,152 | 18,362 | 2,490 | 8,300 | 10,790 | 4,900 | - | 4,900 | 3,000 | - | 3,000 | - | 25,264 | 25,462 | 50,726 | |
| Materials and Supplies | 18,207 | 2,000 | 20,207 | 6,600 | 5,911 | 12,511 | 28,270 | 53,950 | 82,220 | 13,200 | - | 13,200 | 5,400 | - | 5,400 | 3,000 | 74,677 | 61,861 | 136,538 | |
| Conferences/Seminars | 7,107 | 1,000 | 8,107 | - | - | - | - | - | - | - | - | - | - | - | - | - | 7,107 | 1,000 | 8,107 | |
| Contract Services | | | | | | | | | | | | | | | | | | | | |
| GIT | 104,987 | - | 104,987 | 102,500 | - | 102,500 | 41,000 | - | 41,000 | 61,500 | - | 61,500 | 34,550 | - | 34,550 | - | 344,537 | - | 344,537 | |
| Local | - | - | - | - | 13,314 | 13,314 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Audiovisual Documentation | 10,000 | 200 | 10,200 | 10,000 | - | 10,000 | 4,000 | - | 4,000 | 6,000 | - | 6,000 | 3,000 | - | 3,000 | - | 33,000 | 200 | 33,200 | |
| Technical Research and Support | 2,190 | 12,000 | 14,190 | - | - | - | 4,240 | 10,790 | 15,030 | - | - | - | - | - | - | - | 6,430 | 22,790 | 29,220 | |
| Consultants (Local) | - | - | - | 2,000 | 14,170 | 16,170 | - | - | - | - | - | - | - | - | - | - | 2,000 | 14,170 | 16,170 | |
| Equipment | - | - | - | - | - | - | - | 47,791 | 47,791 | 10,100 | - | 10,100 | 21,390 | - | 21,390 | - | 31,490 | 47,791 | 79,281 | |
| Overhead | - | 33,000 | 33,000 | - | 18,596 | 18,596 | - | 20,059 | 20,059 | - | - | - | - | - | - | 25,047 | 25,047 | 71,655 | 96,702 | |
| Other (Publications) | - | - | - | 1,000 | 8,997 | 9,997 | - | 1,826 | 1,826 | - | - | - | - | - | - | - | 1,000 | 10,823 | 11,823 | |
| Total | 299,974 | 104,950 | 334,924 | 225,000 | 267,469 | 492,469 | 90,000 ^(g) | 276,454 | 366,454 | 135,000 | 4,358 | 139,358 | 75,100 | 135,000 | 210,000 | 82,500 | 837,574 | 774,917 | 1,612,491 | |
| % Participation | 68.66 | 31.34 | 100.00 | 45.69 | 54.31 | 100.00 | 24.56 | 75.44 | 100.00 | 96.87 | 3.13 | 100.00 | 35.74 | 64.26 | 100.00 | 100.00 | 51.94 | 48.06 | 100.00 | |

*Includes cost sharing from other sources.
(a) STU (B-426) grant and project started January 10, 1971, and ended January 9, 1979.
(b) FESSC (B-427) grant and project started January 10, 1974, and ended January 9, 1979.
(c) UI (B-455) grant and project started June 25, 1975, and ended May 24, 1977.
(d) UP (B-463) grant and project started January 10, 1976, and ended January 9, 1979.
(e) UST (B-492) grant and project started June 26, 1977, and ended January 9, 1979.
(f) GIT (A-1600) grant and project started January 19, 1974, and ended January 9, 1979.
(g) Of the \$45,000 grant for Year II, \$11,434.87 was not spent and was returned to sponsor.

Source: Project accounting files and counterpart financial records.

EVALUATION, CONCLUSIONS, AND RECOMMENDATIONS

The objectives of this program were defined by the sponsor as follows:

1. To encourage selected developing country organizations to focus on employment generation through programs which accelerate the expansion of existing industry and the creation of new small industries;
2. To demonstrate and document the impact of alternative approaches to the stimulation of small industry; and
3. To create in the appropriate governmental, industrial, and financial sectors of small industry an awareness of potentials and ways to maximize these potentials.

The counterparts selected to participate were institutions in developing countries that were seeking a larger role in solving "real-world" relevant problems associated with the socioeconomic climate of their countries. All had a problem-solving motivation, some manpower and technology, but all were seeking pragmatic know-how. They shared five basic problems associated with the development of small-scale industry:

1. Lack of an organized plan to provide research, service, and information applicable to small-scale industry;
2. Insufficient funding to expand or initiate industrial assistance activity;
3. Need for training of organization staff personnel;
4. Lack of knowledge of practical methodologies;
5. A limited (or deficient) information base related to technical-management problems of small-scale industry.

The program that has just been completed has served as a demonstration to prove that an organization with long-established expertise in the small industry development field can provide training in organization, technical and consulting assistance to counterpart institutions that will enable them to effectively carry out programs of assistance to small industries and generate employment.

The program implemented by OIP had four basic elements:

1. An organized focus with clearly defined aims for each counterpart.
2. A well-trained and motivated staff.
3. An information base.
4. A technical assistance "delivery system," operating on site.

At the initiation of the project, OIP and the counterparts conducted base-line studies of industry status in the target areas. These studies included industrial employment, number of plants, demographic data, industrial financing organizations, profile of counterpart organization, and other appropriate information. These data have served as a "benchmark" for the yearly reports and performance evaluations in trying to determine the success of the project.

On a yearly basis, the sponsor has received individual progress reports on the counterpart projects. On three occasions during in-depth reviews of a companion grant (211-d), these projects also have been informally reviewed with the sponsor.

The anticipated end-of-the-project results were that the activities conducted under this project would result in the establishment of units in developing countries specifically oriented to the generation and expansion of small-scale industry. These units also would generate action-oriented programs of research, service, technology transfer, and industrial training. Further, it was anticipated that over a period of time results would include the expansion of existing companies, the creation of new small-scale enterprises, and the generation of new jobs, with the corresponding beneficial effects on income level and distribution. The bulk of this work was to be carried out in rural areas in order to benefit the low-income regions of the host nation.

The OIP administration conducted a limited evaluation during the last quarter of the fifth grant year, for which purpose the author visited each of the participating counterpart institutions for a period of some 10 days each. The factual information gathered about what had happened will be used as a management tool for improving planning and implementation of future activities.

In conducting these evaluations, the author sought to obtain answers to three basic questions:

1. Effectiveness. Had the targets and purposes been achieved?
2. Significance. Will these achievements contribute to the economic development or other end-of-the-project goals? What side effects occurred?
3. Efficiency. Did the achievements justify the investment, or could the project have been implemented at a lower cost?

It is possible that the sponsor may wish to conduct a more in-depth evaluation of this project at a later date; if so, the author is certain that the findings of the sponsor will be of great value in future decision making regarding programs and projects of this type.

During the final on-site visits by the author, the Counterpart Project Directors were asked to prepare short critiques of the project and their personal evaluations. These critiques are reproduced below in the same order and format as they were received.

* * *

TECHNOLOGY CONSULTANCY CENTRE

A REVIEW OF THE SMALL SCALE INDUSTRY DEVELOPMENT
PROGRAMME WITH GEORGIA INSTITUTE OF TECHNOLOGY
JULY 1977 - DECEMBER 1978

Historical

The association between the Technology Consultancy Centre (T.C.C.) and the Office of International Programs (O.I.P.), Georgia Institute of Technology began in 1975 as a linkage under the USAID 211D funding programme. During the first two years, the association resulted only in exchanges of visits, publications and correspondence. However, in July 1978, it was possible to embark on a joint programme of work when a Small Scale Industries Development Programme (S.S.I.D.P.) was transferred from Nigeria. This programme made available funds of \$45,000 per annum for eighteen months of which the T.C.C. received half and the O.I.P. received half. Five small-scale industry projects of the T.C.C. were selected for promotion under the programme.

Associate Residency Program in Industrial Extension

This programme is run at Georgia Institute of Technology and provides a three week training programme including lectures and field experience in industrial extension. Two T.C.C. Research Fellows were sent on the programme under the S.S.I.D.P. They were Mr. S. Buatsi (1977) and Mr. P. Donkor (1978). Mr. Buatsi is a metal products designer working on a project with a rural lost wax casting industry. His experience in Georgia was useful in a general context but not in relation to his specific project under the S.S.I.D.P.

Mr. Donkor's work is with the soap industry and vegetable oil extraction. His experience in Georgia was both generally interesting and of specific relevance to his project under the S.S.I.D.P.

On the whole the Associate Residency Program in Industrial Extension was useful to the T.C.C. and helpful to its small industry projects. However, the cost was borne out of the T.C.C.'s half of the programme funding and hence diminished the funds available for project work in Ghana. It would have seemed more appropriate if the O.I.P. had carried the costs of the training in Georgia from its half of the programme funding.

Other O.I.P. Activities

It has to be placed on record that from the T.C.C.'s point of view it received very little support from O.I.P. for its small industry projects in Ghana. Several O.I.P. staff visited Kumasi during the period under review but these were mostly concerned with general discussions and collecting data using audiovisual techniques. The T.C.C. requested literature searches, back-up research in Georgia and visits to Kumasi by practical specialists to work on projects with Ghanaian staff. None of this support was forthcoming until the visit by Mr. Frank Malvar in October 1978. Malvar brought useful literature and examples of small, manually operated agricultural tools. He might have contributed to the development of agricultural implements for local manufacture had it not been for the critical stage reached on the pyrolysis project. As it was, Mr. Malvar spent four weeks working on the pyrolytic converter during which he made a significant contribution to its development. It is regretted that this one opportunity to involve an able Georgia Engineer in the S.S.I.D.P. was missed and the whole eighteen months passed without any such contribution from the O.I.P.

Recommendations

The experience of the S.S.I.D.P. suggests a number of recommendations for the planning of future projects.

1. Short visits of less than two weeks are of little value to institutions in African LDCs. They may even be counter-productive in diverting senior staff time from project work. Visits should be long enough to enable a practical input to be made such as supervision of the construction of a prototype device, the field testing of such a device or the training of local technicians in a new technique or product manufacture. Such tasks can seldom be accomplished in less than 3 months and can take up to 2 years or more.

It is preferable for a linked institution to have a permanent representative attached to the staff of the institution in the LDC. This was done by Virginia State College during its 211D link with U.S.T. Staff members from V.S.C. spent one or two years in Kumasi and usually overlapped to ensure good continuity. By these means, a real meaning is given to shared development projects with an effective input coming from the American University.

2. Supporting research resources should be provided at the American University. Practical problems of a complex or fundamental nature could often be solved more quickly in America where facilities are better and staff are more specialised in their knowledge and experience. This supporting effort should include laboratory experiments and engineering development as well as literature searches and report writing. The T.C.C. was expecting such support during the S.S.I.D.P. and referred several problems to O.I.P. concerned with lost wax casting of non-ferrous metals, the extraction of vegetable oils and the design of man-powered village industry equipments. As recorded above, the response was long delayed and involved only literature and samples of commercial models of corn sheller, cassava grater and palm kernel cracker. Adaptations of designs suitable for local manufacture in Ghana would have been much more useful.

3. The courses in industrial extension provided at Atlanta were the single most useful part of the S.S.I.D.P. for the T.C.C. These might have been even more useful if they had been longer and included on-the-job experience preferably in another LDC. Ideally such courses should be mounted in India or the Philippines where the African extension worker could see a wide range of relevant intermediate technologies in everyday use.

4. The last recommendation concerns a less tangible factor and is more difficult to define. It relates to a perceived reluctance on the part of O.I.P. to address itself to real issues and problems of immediate significance to economic development in Africa. There is no doubt that O.I.P. has had a greater involvement with Asia and Latin America and that in these areas its consultative approach may be appropriate to the needs of the people. However, to be effective in Africa, a much deeper involvement is required. Advice, as such, is seldom heeded and guidance needs to be given. Whereas, in Asia and Latin America, development can be seen to be proceeding, albeit slowly and in the teeth of population growth, in Africa the key to progress has yet to be discovered. The challenge of Africa requires a sterner attitude and a more profound involvement on the part of institutions who seek to be involved in its development. These recommendations have been drafted with this in view.

DR. J. W. POWELL
DIRECTOR

3rd November, 1978

Author's Note to the Critique Presented by the UST/TCC

The critique presented by UST/TCC fails to recognize the limitations of the small-scale industry grant. The sponsor determined beforehand the scope of work to be implemented under the grant and all potential grantees were made aware of this. More specifically, the author wishes to note the following points:

1. Funding. The grantee was allocated \$45,000 per year, so for an 18-month program a total of \$67,500 should have been made available. Instead, OIP recommended an increase of \$7,600, bringing the total to \$75,100; the sponsor approved this additional allocation of funds required to complete the program of work. It is true that the cost of travel and per diem were borne by the grantee as established by the grant document, but it is also true that the grantee had some additional funding to assist in supporting its program. Two other grantees in this program received only the base grant and no additional funds, as shown in Table 40.

2. Training. A senior representative of the grantee institution was advised of the fact that it would be difficult to find a "rural lost wax casting industry" in Georgia for their staff member to visit. When Mr. J. Buatsi visited OIP in 1977, he (a) interacted with a mechanical engineer specializing in casting, (b) was taken to a number of foundries in the area, and (c) was assisted in conducting library searches on the subject.

3. Technical Support. The literature searches requested by the grantee were conducted and information was forwarded on the following subjects:

- o Investment casting (lost wax)
- o Manually operated sugarcane crusher
- o Soap manufacturing (oils)
- o Solar water heaters
- o Food processing
- o Briquetting machines
- o Manually operated nutcrackers
- o Cassava grinders

There is no doubt that it would be desirable to be able to provide on-site staff on a year-round basis, but as has been pointed out, the grant funds could not support more than three to four man-months of professional time (including travel) per year.

A more detailed response has been submitted to the sponsor by the OIP administration.

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Pages 143 &

144 ARE MISSING

In this connection, GIT has made it a point to meet every possible needs of the PEO. Its funds have enabled the ISSI to perform its task beyond par. To enhance the office's credibility for extension works, GIT has sent every staff to attend training, seminar and workshop here and abroad. Much needed advices were provided by its pool of consultants who shared their expertise with the staff. It has financed all these activities and all other expenses incurred in the making of the whole program a success.

Definitely, the task is big and the time is short, but no matter what its factors are, the extension's motto will always prevail, "The Greatest Gift We Can Give To Our Fellowmen Is To Help Them Help Themselves."

Redentor C. Dakanay

* * *

SOONG JUN UNIVERSITY
1-1 Sang-Do 1Dong
Seoul, Korea 151

December 1, 1978

Dr. Joseph M. Pettit,
President,
Georgia Institute of Technology
Atlanta, GA. 30332

Dear Dr. Pettit:

Since 1974, as you would recall, our Soong Jun University and your Georgia Institute of Technology have jointly carried out AID-funded small industry development project in accordance with the principle and spirit of an agreement made between our two institutes in July, 1973.

As our annual reports clearly indicate, accomplishments we have jointly achieved in the last five years are too numerous in kind to list down on this limited space. Besides economic aspects of our achievement in terms of employment generation through stimulation of small industry in Korea, I would like to point out that your academic as well as technical assistance through Office of International Programs has brought to our university an enormous impact in developing industrial extension service programs, adaptive technology, a new department of industrial engineering, and so forth. I want you to know that our university enjoys an unprecedented reputation among academic as well as business communities as a pioneer of "university-government-industry cooperation movement."

We wish to strengthen further our relationship beyond AID-funding project which we understand will be terminated at the end of this year.

Once again, on behalf of trustees, faculty members and staff of Soong Jun University, I sincerely express my hearty thanks to all of you for the services and assistance given to us over the years.

We wish you a Merry Christmas and a Happy New Year.

Sincerely yours,

Bum Soe Koh, Ph.D.
President

c.c. - Mr. Ross W. Hammond
Mr. Nelson C. Wall

* * *

FUNDACAO EDUCATIONAL DO SUL DE SANTA CATARINA

Tuabrao-SC (Brasil), December 18, 1978.

MEMORANDUM

From: Econ. Jose Muller/FESSC

To: Eng. Nelson C. Wall/GIT

Subject: Small-Scale Industry Assistance Program - Benefits generated to FESSC during Grant Periods 1974-1978.

The Small-Scale (micro and units of production non-formally organized) Industry Assistance Program, systematically carried out by FESSC in the period 1974/78 - and operated by non-systematically action since 1969 - meant to FESSC, besides other, the following benefits:

- The implementation of organized technical pragmatic action, and more effective, of FESSC (in grant period) concerned to the integration between Science and Technology as well as to the University and the Real World of Work either concerning FESSC and the Enterprise, or FESSC and the Community and Government.
- The generation of significant products, in direct benefit to the industry, to the social and economic development of the community of South Santa Catarina, always considering the basic philosophy of FESSC which result in the technical-pragmatic objective of the institution and of the regional development. Therefore, of 295 assistance cases to industries carried out during the life of the program and generation of 4,500 new jobs in these companies result in a dollar investment of about \$100.00 per new job and this assures FESSC that the technical assistance is desirable. South Santa Catarina has been transformed into an area of "Special Programs" by both the Federal and the State Government. And this occurred as the direct result of the studies and research conducted by FESSC, the

State Planning (Terms of Reference) and the promotion by the Government for the implementation conducted by FESSC. This implementation was aimed at assisting Government, local enterprise, and the community through the provision of scientific analysis of the existing situation and alternatives for the development of the region. The program resulted into a dynamic action with FESSC as the catalytic agent and co-executor of the activities. These programs directly or indirectly implemented by FESSC contributed to the recognition of the institution as a "Regional Developer."

- Another activity may be considered is the generation of support systems to other actions such as research, development, public administration, and investments, to name a few. These actions resulted directly in the conception, design, and implementation of the Technological Center "started in 1978." The center received highest priority and the institution consolidated its resources to create a center to provide technical training, implementation of technology, contractual programs and research programs all focusing on development testing, adapting and disseminating technology. This concept is basic in the economic development and technological education of this region in Brazil. In the same manner, thanks to the direct participation of our professional staff and students, a significant amount of new courses have evolved and are being considered or implemented by the the institution.
- Another achievement may be considered the growth of our human resources following the process of "Theory-Practice-Theory." Through this the staff has developed and the institution has a better potential for self-support "economic-financial." Thus FESSC has developed into a university nucleus and will continue to operate under the objectives of "Science-Technology-Education-Development."
- There has been an increasing relationship with similar institutions "Scientific Community-Technological-Educational-Development Agencies." Not only in Brazil but in other parts of the world. As the result FESSC now has a leading position within the State (there are 18 other Educational Foundations and 1 Federal University) not only as producer of applied research, consultant, and training but also as a strong link in the chain of national development.
- Outlining of the concept based on the backbone of "technology-economy" and "social-economy" as the nucleus of the FESSC activities in the Region and in the Country focusing on appropriate technology, alternate sources of energy and rural industry.
- Through the utilization of outside financial resources (USAID, SUBIN, BBSA) together with technical assistance from Georgia Tech, FESSC was able to assist enterprises and the community. These enterprises there are extremely small and lacking formal management, funding, and technical know-how together with the small communities also lacking these resources became the clients of FESSC. Because these are small industries and small communities they are unable to support the cost of this service and only through the use of outside funding was FESSC in a position to implement these actions.

The outside funding generated by this program permitted FESSC to develop itself, create the Technological Center, acquire the information for the Basic Data Center and many other actions. All of these have greatly enhanced FESSC and through them the institution is now in a position to better serve the region.

These highlights all resulted through this program and on behalf of the staff and FESSC we wish to thank the sponsors.

Sincerely,

Econ. Jose Muller, Director
Research and Development Department

* * *

The critiques presented by the counterpart project directors are self-explanatory and need no further comment. The author's overall evaluation of the program follows below:

1. Effectiveness. The targets established for the project have been met. At least 5,100 new jobs have been generated by this program, some 8,000 persons have received industrial training and over 500 small-scale industries have received technical-management assistance during the life of the project. Many other goals have been achieved; some of these were not considered initially when the project was designed. Many of the by-product achievements are highly important and will have long-term impact on the target areas.

The participating counterparts are now capable of continuing these services, and it is now up to local governments to assist them in their funding needs. The process has been documented, and all counterpart units have had the opportunity of field-testing their individual alternative approaches to the stimulation of small-scale industry.

2. Significance. There is no doubt that these achievements will contribute both directly and indirectly to the economic development of the host nations, with one limitation -- the magnitude of the achievement. In order to achieve a national impact, these programs would have to be implemented nationwide in host countries; thus, instead of generating 8,000 jobs, several hundreds of thousands of jobs would be generated. This sort of impact is desirable, but is not always possible to bring about.

3. Efficiency. It is difficult to determine whether the achievements justify the investment required to produce them since so many of the achievements are not presently quantifiable. For example, the establishment of the Technology Center at FESSC and the generation of a number of appropriate technology devices may, over the next 10 or 20 years, have great multiplier effects. However, such results are presently not quantifiable. Had several counterparts been in existence in each of the participating nations, some travel costs could have been reduced and personnel time better planned.

Underlying this summary evaluation is the basic recognition that much of this project work was experimental in nature, and as such cannot be expected to produce only measurable outputs. There is no doubt that the inputs produced the intended outputs; the author believes also that the greatest single accomplishment resulting from this five-year program may well be the fact that several of the participating counterpart institutions now are capable of developing their own methods and techniques in such areas as research, technology transfer, and appropriate technology. Through participation in the project, they have established their own technological expertise and are beginning to break away from the old process of importing technology.

The problem continues to be that in most LDCs there is no effective mechanism to provide the technical-management assistance required by small-scale enterprises. Through this program it was possible to demonstrate that an LDC can participate with a developed country in developing its own indigenous technological capability and that this can be accomplished through mutual agreement between two peer institutions. It appears to the author that this program established a mechanism capable of developing "centers for small-scale industry development" in LDCs.

The counterpart institutions have developed their own extension-type services and provide this service to a network of small-scale enterprises in their regions. The participating institutions are currently providing technical-management consulting services as well as bookkeeping, accounting, manpower training, and many other services which are necessary for the viability of small-scale and mini-industries. Because the selected counterparts are affiliated with or located within an educational institution, they already have engineering, marketing, economic and management know-how, as well as library and information support -- all of which are also available to the small-scale industries being assisted.

The OIP served as the U.S. institution responsible for providing technical support services, training, and experienced personnel to assist the counterparts. During the development stage, OIP provided the following general services:

- o Served as a training center for counterpart staff members selected to establish similar programs in their native countries;
- o Collected data on small-scale industry development for a wide variety of applications;
- o Served as a collection/distribution center for appropriate technology and general industrial data;
- o Performed limited research and development upon request from participating institutions; and
- o Imparted operational know-how to the LDC staffs by participating with them on site.

The counterparts are now capable of providing most of the services listed above with their own staffs, and it is hoped they will continue to do so for many years. In summary, the program was most worthwhile in both engineering and pragmatic technical assistance. It has proven itself, and in the process produced a large number of measurable results, all within the program objectives and goals. It is the conclusion of the Project Director that the results attained to date surpass those initially conceived by the program.

In view of the above evaluation and conclusions, the question now is, "How best can the experience and results generated by this project be replicated so as to maximize the development of indigenous capabilities in developing areas, especially "the poorest of the poor" countries?" A number of recommendations can be made.

Recommendation No. 1. *Continue the small industry grant mechanism to include a new set of counterpart organizations in the poorest countries of the world.*

Recommendation No. 2. *Support and assist the establishment of centers for small-scale industry and rural development in developing nations.*

Recommendation No. 3. *Promote interchanging of personnel and programs among industrial research institutes in developing countries.*

Recommendation No. 4. *Support continuing research into the process of industrialization.*

Recommendation No. 5. *Support U.S. institutions that are creating and developing engineering and management technology for developing nations.*

Recommendation No. 6. *Assist research institutions in developing countries that are affiliated with U.S. counterparts.*