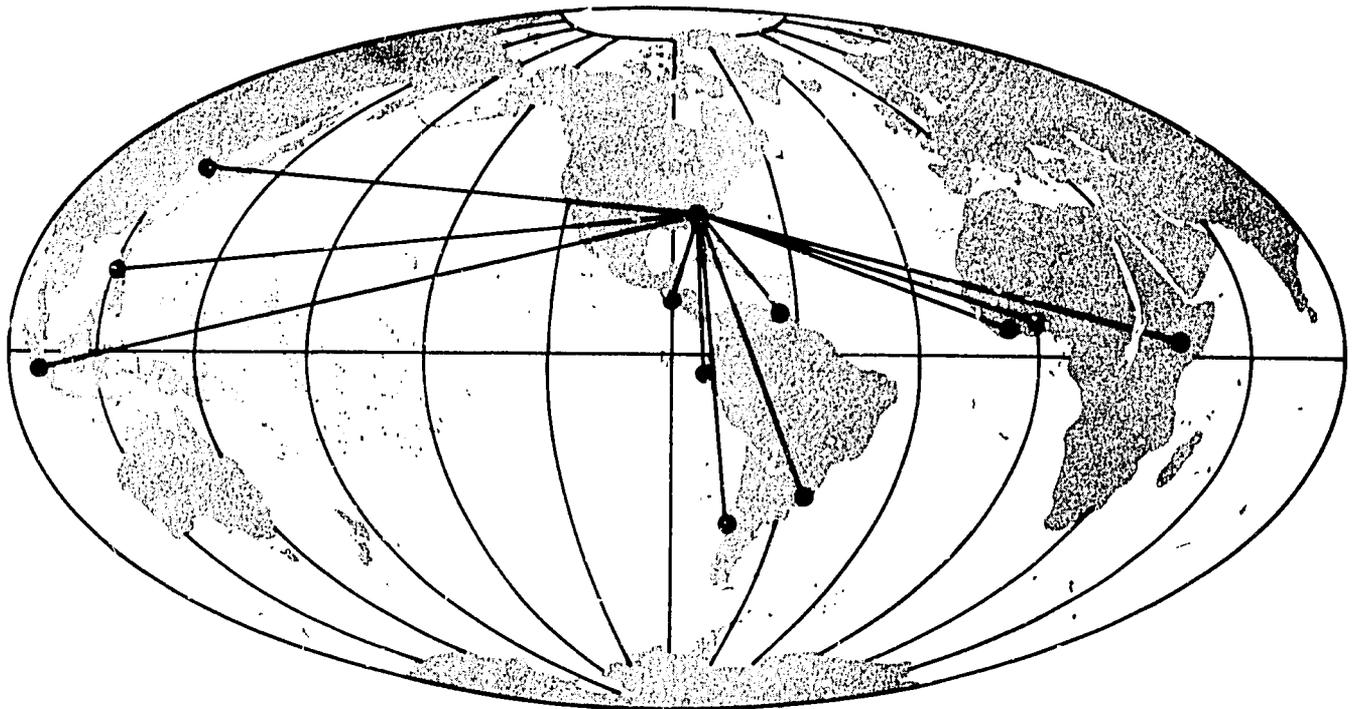


EMPLOYMENT GENERATION THROUGH STIMULATION OF SMALL INDUSTRIES



FOURTH ANNUAL REPORT
211 (d) GRANT YEAR—FEBRUARY 23, 1976—FEBRUARY 22, 1977

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332
U.S.A.

Fourth Annual Report

EMPLOYMENT GENERATION THROUGH
STIMULATION OF SMALL-SCALE INDUSTRY

211(d) Grant Year: February 23, 1976 - February 22, 1977

Prepared for
Agency for International Development

Georgia Institute of Technology
Atlanta, Georgia 30332

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211(d) Annual Report
Date due: April 22, 1977
Date submitted: April 22, 1977

Grant Title: Employment Generation through Stimulation of Small-Scale Industry (Institutional Grant AID/CM/ta/G-73-18)
Grantee: Georgia Institute of Technology
Grant Program Director: Ross W. Hammond, Economic Development Laboratory, EES
AID Sponsoring Technical Office: Technical Assistance/Office of Science and Technology

STATISTICAL SUMMARY

Period of Grant: February 23, 1973 to February 22, 1978
Amount of Grant: \$800,000
Expenditures for Report Year: \$175,743
Accumulated: \$677,560
Anticipated for Next Year: \$122,440

NARRATIVE SUMMARY: Georgia Tech 211(d) Program

EMPLOYMENT GENERATION THROUGH STIMULATION OF SMALL-SCALE INDUSTRY

The primary objective of this four-year-old program is to strengthen Georgia Tech's demonstrated capability in employment generation through the expansion of the small industry sector. This capability is particularly relevant to massive unemployment and rural-to-urban migration problems in many developing countries. The program is integral to the institutional commitment to international education and development.

Activities during Grant Year One included organizational staffing and start-up of the program, the initiation of a small industry data center, the establishment of counterpart relationships with six organizations in developing countries, ten field trips to developing countries, the development of applied research studies relating to small industries, the design of a master's curriculum focused on industrialization, a series of international development seminars, and the maintenance of communications with many international development and linkage organizations. Five published reports and three published papers, as well as two informational brochures, were produced.

During Grant Year Two, the preceding activities were fully implemented and expanded and new activities were generated. The counterpart relationships became more operational and considerable interaction developed. Separately funded but related projects with two counterparts (Soong Jun University in Korea and the Fundacao Educacional do Sul de Santa Catarina in Brazil) were initiated. Twenty-four field trips were made by 211(d)-associated personnel.

Applied research activities in Grant Year Three included production of 14 published reports of various kinds, stemming in part from 25 field trips. The holdings in the International Development Data Center increased by 50% and the staff responded to 2,400 inquiries. The graduate program enrollment expanded to 10. A training program was field-tested in the Philippines, six seminars were held in Atlanta, and staff members attended 15 conferences elsewhere. Georgia Tech hosted an international conference and a symposium in Atlanta. A seventh counterpart was added.

Fourth-year grant activities saw the production of 12 published reports on various development subjects. Thirteen field trips were undertaken by seven staff members. The holdings of the International Development Data Center increased one third and the staff responded to approximately 3,700 inquiries. The graduate program in industrialization now has 18 students, an increase of 80% over last year's enrollment. A successful mini-conference was hosted in Manila, the Philippines. Six international development seminars were held in Atlanta, and the staff attended 15 international development conferences. Significantly, four new counterpart organizations joined the small industry development network.

DETAILED REPORT

I. GENERAL BACKGROUND

One of the massive problems faced by many developing countries is high unemployment and underemployment. In addition, most of these nations have large numbers of young people in their population makeup. These young people are now, or shortly will be, joining the labor force, compounding the existing unemployment and creating more severe pressures for job generation.

An associated and difficult matter in many of these countries is the continuing rural-to-urban migration, generated in part by the quest for employment opportunities.

One of the approaches which can be used to ameliorate these and other developing country difficulties is the generation of industrial activities in the rural areas. Such industries could create employment opportunities and new income in the rural areas and, conceivably, reduce the population migration to the urban centers.

There are, of course, difficulties and inhibiting factors connected with rural industrialization. Rural industries tend to be small in size, unsophisticated in technology, limited in markets, and unresponsive to factor changes. The owners tend to be self-made entrepreneurs with little education or managerial training. The rural areas frequently lack the infrastructure which industry needs.

The small industry segment in many developing countries tends to be owned by nationals, whereas the medium-size and large industries tend to be foreign owned. Hence, there is merit from the viewpoint of the home government in insuring that a viable small industry sector exists. Many governments have recognized this and developed programs to encourage this type of industry.

Moreover, small-scale industries tend to be numerous, diversified as to product, and marginal in profit-making capability. They are too small to support staff specialists who could solve many of their relatively simple problems of management, manpower, training, purchasing, production, and sales. Indeed, specialists in these fields are in short supply in most developing countries,

and generally would not be available even if the rural industries could support them.

II. PURPOSE OF THE GRANT

It is with this difficult small industry area that Georgia Tech presently is concerned in its international development activities. The Georgia Tech 211(d) grant focuses on the mechanisms to generate employment through the expansion and diversification of existing industry and the creation of new industrial enterprises, particularly, but not exclusively, in the rural areas of developing countries.

While this program is only one aspect of Georgia Tech's continuing interest and commitment to international education and development, it is an important aspect. Tech has a long history of applied management and technical assistance to domestic and overseas industry. One unit, the Economic Development Laboratory (formerly Industrial Development Division) of the Engineering Experiment Station, has provided such assistance to approximately 4,000 industrial enterprises over a 21-year period. Other units have had experiences of various sorts with industry of all sizes.

Hence, the 211(d) grant provides the institution with an opportunity to build its capability to assist small industry from a departure point of considerable experience in the field.

III. OBJECTIVES OF THE GRANT

A. Objectives Restated. The general objective of this program is to strengthen the capabilities of the Georgia Institute of Technology to more effectively apply its present interests, skills and experience in developing small-scale industries in Georgia and Latin America to the problems of small industry in the less developed countries.

The program will consolidate presently available methodologies for achieving small-scale industrialization and job creation in the LDCs. It will systematically further the development of these methodologies by research, evaluation, generalization, and codification so that generally applicable and transferable principles and procedures will be readily available for effective application in the less developed countries. Innovation in developing new technological approaches to industrialization and employment generation is another objective.

In particular, emphasis will be placed on the following program elements:

- (1) Establishment and maintenance of linkages with four counterpart institutions in developing countries is an essential component. These linkages will provide a real-world laboratory in which to gather jointly essential data and test alternative approaches to the accelerated development of small-scale industry.
- (2) Case studies of LDC small industry problems will be compiled, analyzed, and codified. This data base will be obtained through literature searches and development organization contacts and will be compiled in the field by the program staff when appropriate.
- (3) Analysis of methods and techniques for solving small-scale industry problems and encouraging expansion and diversification will be made to determine the reasons for success or failure under varying environmental conditions.
- (4) New approaches and alternative methodologies will be evolved and tested in the field to determine their suitability for the accelerated development of small-scale industries and elimination of problems.
- (5) Preparation will be undertaken of a graduate degree program, new courses, seminars, and other training programs for students and faculty who have an interest in small-scale industry development. The preparation and testing of these programs will serve to enlarge the capability of the institution's staff in understanding the small-scale industry problems and employment generation processes, and to broaden the base of knowledge in the institutions.

The objectives will be achieved through a program of sustained activities in applied research, relevant education and training, appropriate seminars and conferences, and program linkages with other institutions. The knowledge base derived from these activities will provide the institution's staff with valuable inputs and insights, as well as being of interest to development practitioners and organizations. To the extent feasible, the above activities will be implemented in collaboration with these institutions.

B. Review of Objectives. As the program developed in the first years of the grant, it became increasingly apparent that the most important single

element is likely to be the relationship between Georgia Tech and the counterpart institutions. This network of organizations with a common interest in stimulating the developing of small-scale industries serves as information-gathering and dissemination loci, as well as a real-world laboratory for testing alternative approaches to industrialization. Moreover, some of the counterpart activities are likely to provide material for new case histories on industrialization which can be written up during the life of the 211(d) grant, thus making a significant contribution to the development literature.

As a consequence of these counterpart relationships, a greater emphasis is being placed on this element of the program than originally contemplated. This will be reflected in larger allocations of resources to on-site work in the counterpart countries. Otherwise, the emphasis on other program elements remains unchanged.

C. Review of Critical Assumptions. Basic assumptions related to this small industry project are as follows:

- o The labor/technology equation will remain of priority concern.
- o U.S. engineering, industrial analysis, entrepreneurial, extension, and economic skills can be more effectively harnessed.
- o There will be opportunities for U.S. inputs -- either bilaterally or through multilateral organizations -- that can significantly influence LDC actions.

It is believed that these assumptions were valid initially, still hold true, and that many of the activities generated by the 211(d) and the associated international activities at Georgia Tech, and by counterpart institutions, demonstrate the basic correctness of these assumptions.

IV. ACCOMPLISHMENTS

The participation of faculty, staff, and students was broadened in the fourth grant year. The broad program of counterpart linkages, applied research, education and training, and conferences and seminars continued at a high activity level. The annual targets and resulting outputs are detailed on the following pages. As in prior years, almost all the annual goals were reached or exceeded.

INDONESIA



A biogas generator under construction by the Development Technology Center at the Institute of Technology Bandung will utilize a cow dung slurry to produce this alternative energy source.



A primitive way of sawing logs lengthwise involving men using a long saw blade and standing above and below the lumber being cut manually.

The specific targets established for the fourth grant year are described in the third-year annual report. For convenient reference, they are repeated in the detail of each objective/output below. A quick reference profile of the fourth-year goals and results is provided in Table 1 on the next pages.

A. Applied Research and Knowledge Base (43.4% of effort -- \$76,343)

1. Description. The fourth grant year applied research activity included the preparation and publication of a total of 11 reports, papers presented at conferences, industry profiles, bibliographies, extension guidelines, and one training brochure. A major expansion of the International Development Data Center holdings occurred.

2. (a) Targets for Reporting Year and Means of Verification

<u>Target</u>	<u>Verification Means</u>
Industry Profiles	Profiles
Economic analysis	Report
Expansion of "Guidelines for Industrial Extension Personnel"	Guideline
Pictorial Monograph Series	Monograph
Expansion of International Development Data Center holdings	New materials

(b) Critical Assumptions. The critical assumptions listed in III (C), page 6, remained valid insofar as the applied research and knowledge base are concerned. Reluctance of one mission to concur in a planned field trip resulted in a change of venue for the 1977 mini-conference from Africa to Guatemala City.

3. Accomplishments

(a) Accumulative. During the first four years of the grant, the applied research activity resulted in the publication of four annual reports and 56 published reports, papers, newsletters, guidelines, monographs, and brochures on various subjects related to small-scale industry development practices and methodologies in various countries. Five slide presentations in various subjects were prepared, two of which included audiotape cassettes. A complete listing of the publications and products can be found in Appendix I.

Table 1

QUICK REFERENCE ACTIVITY PROFILE: GRANT YEAR FOUR

<u>Planned Goals</u>	<u>Actual Results Achieved</u>	<u>Due Date if Goal Not Achieved in Grant Year Four</u>
Industry profiles	Three profiles: "Wood Desks and Chairs," "Wood Chairs," "Fruit and Vegetable Canning"	
	Additional unplanned product: Bibliography of International Development Publications	
Economic analysis	"Nigeria: Small-Scale Industry Financing and Development"	Spring 1977
Expansion of "Guidelines for Industrial Extension Personnel"	Guideline #16 -- "International Operation Guideline for an Industrial Extension Organization"	
Pictorial monograph series	Monograph No. 2 -- "Solar Energy Appropriate Technology Applications"	
Expansion of International Development Data Center holdings	Holdings increased to 4,100 items, a 33 1/3% gain, mainly in areas of small industry, appropriate technology, and alternative sources of energy	
Increased enrollment in industrialization master's program	Present enrollment is 18, an increase of 80% over last annual report	
Support to graduate students in program	Assistantships supported six graduate students	
Presentation of new course in master's program	Insufficient enrollment when course was offered	To be presented in fall 1977

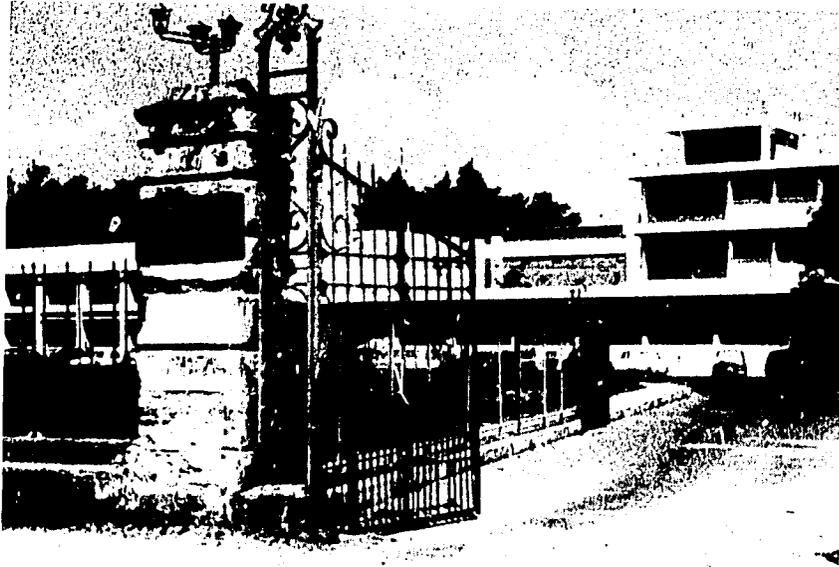
Table 1 (continued)

<u>Planned Goals</u>	<u>Actual Results Achieved</u>	<u>Due Date if Goal Not Achieved in Grant Year Four</u>
On-site testing of new training program	Could not be arranged due to personnel changes at counterpart organization	
Six seminars by invited lecturers	Six seminars	
Participation in relevant conferences and seminars	Staff participation in 16 conferences, seminars, and workshops	
International development mini-conference	Conference held in Manila, May 26-29, 1976	
Frequent counterpart communication	Average of twice monthly communication. Thirteen field trips by seven individuals.	
Involvement of counterparts in associated programs	Involvement of two counterparts in related contracts	
	Additional unplanned product: Addition of four counterpart organizations	
Communication with AID and other international organizations	Weekly contact with AID/Washington	
Two Internal Advisory Committee meetings	Two meetings	
One External Advisory Committee meeting	Held July 19-20, 1976, Atlanta	

Table 1 (continued)

<u>Planned Goals</u>	<u>Actual Results Achieved</u>	<u>Due Date if Goal Not Achieved in Grant Year Four</u>
Program staff coordination meetings	Four meetings held	
Scheduling and reception of program visitors	Twenty-five foreign observers and 24 from domestic and international development organizations visited program in Atlanta	

GUATEMALA



The main gate to ICAITI, a Georgia Tech counterpart research institute which serves the Central American Common Market countries.



Production of clothing material on a hand loom, one of the many small industries in Guatemala.

This body of 211(d) literature represents a considerable aggregation of the programs and procedures used to stimulate small industry development in a number of developing countries.

The International Development Data Center continues to expand its holdings, and the volume of internal and external inquiries has increased with time.

(b) Reporting Year. During the fourth grant year, the following applied research items were produced as a result of staff field trips and Atlanta-based activity:

Industrial Extension Personnel Guideline #16. International Operation Guideline for an Industrial Extension Organization. (Robert Collier -- author)

Appropriate Technology Research at the Georgia Institute of Technology and the Small Industry Development Network. A paper presented at a UNIDO conference in Vienna which describes a methodology for conducting appropriate technology research with examples. (Ross Hammond -- author)

Industry Profile #1: Wood Desks and Chairs. (Socorro Quintero -- author)

Industry Profile #2: Wood Chairs. (Socorro Quintero -- author)

Industry Profile #3: Fruit and Vegetable Canning. (Choon Park -- author)

Nigeria: Small-Scale Industry Financing and Development. This report discusses the small industry sector in Nigeria and the financial resources available to that sector through various programs. (John Kaatz -- author)

Bibliography of International Development Publications (of the Economic Development Laboratory). (Kay Auciello -- compiler)

Appropriate Technology in the Industrial Sector. A paper presented at a University of Arizona international development seminar. (Ross Hammond -- author)

Assisting Small Industry and Generating Employment: A Ghanaian Example. A paper presented at the African Studies Association Annual Meeting. (Martha Ann Stegar -- author)

Appropriate Technology Around the World. A paper and slide presentation at the International Division of the American Society for Engineering Education winter meeting. (Ross Hammond -- author)

Fourth Annual Report - 211(d) Grant Year (February 23, 1976 - February 22, 1977).

Solar Energy Research. A slide presentation and cassette tape which describes solar energy research and development applications at Georgia Tech and other organizations around the world. Solar energy components which lend themselves to small industry manufacture are stressed.

Pictorial Monograph #2: Solar Energy Appropriate Technology Applications. A review with photographs and text published as an outgrowth of the slide presentation mentioned above. (Ross Hammond -- author)

This production considerably exceeds the grant-year targets. A complete listing of publications and products under the 211(d) grant can be found in Appendix I.

The International Development Data Center staff, in addition to production of some of the above listed items, continued to increase the Center's holdings. By the end of the fourth grant year, the Center had more than 4,100 serials, pamphlets, books, etc., an increase of about one third over the previous year.

The volume of inquiries, internal and external, to which the staff responded was approximately 3,700.

(c) Total Expenditures. Accumulative expenditures for the four years under the category of Applied Research and Knowledge Base total \$290,429, of which \$76,343 occurred in the fourth grant year.

B. Education and Training (23.7% of effort -- \$41,700)

1. Description. The major thrust of this activity has been to design, obtain approval of, and offer a graduate program of industrialization at the master's level. This has been achieved and the program is housed in the School of Industrial and Systems Engineering. The curriculum draws from existing and new multidisciplinary courses. Spin-off short-term training programs are being developed and tested.

2. (a) Targets for Reporting Year and Means of Verification

<u>Target</u>	<u>Verification Means</u>
Increase number of students in industrialization program	Enrollment
Support graduate students	Dollar support
Present new course in industrialization program	Presentation
Test new training program	Presentation

(b) Critical Assumptions. No untoward circumstances have developed which impact on the graduate program in industrialization.

3. Accomplishments

(a) Accumulative. To date a new Master of Science curriculum has been designed, developed, approved, and presented in the School of Industrial and Systems Engineering. It has been publicized, and the initial enrollment of four had increased to 18 at the beginning of the third academic year. Two new courses have been developed: ISyE 6211 -- Analysis and Evaluation of Industrial Projects; ISyE 8100 -- Projects in Small Industry Development.

(b) Reporting Year. The program was initiated at the start of the Fall Quarter 1974 with four students. Since that time interest in the program has increased steadily. This interest is indicated in Table 2 which shows quarterly matriculation since the program started. At the present time 18 students from nine countries are enrolled in the program. Four students have completed their course requirements.

One of the factors which limits enrollment is the shortage of funds for student assistantships under the 211(d) grant. Student assistantships totaling \$16,722 were provided in the reporting year.

In addition to the new courses developed in previous years, the program has led to a revision and revitalization of an existing course, ISyE 6218 -- Work Systems Design.

A number of special training courses have been presented to small groups of trainees. An industrial extension training program was presented for groups from Korea, the Philippines, and Brazil. In addition, a solar energy training program was presented to Soong Jun University and KIST personnel.

(c) Total Expenditures. Accumulated expenditures for the four years total \$133,032, of which \$41,700 was expended in the fourth grant year.

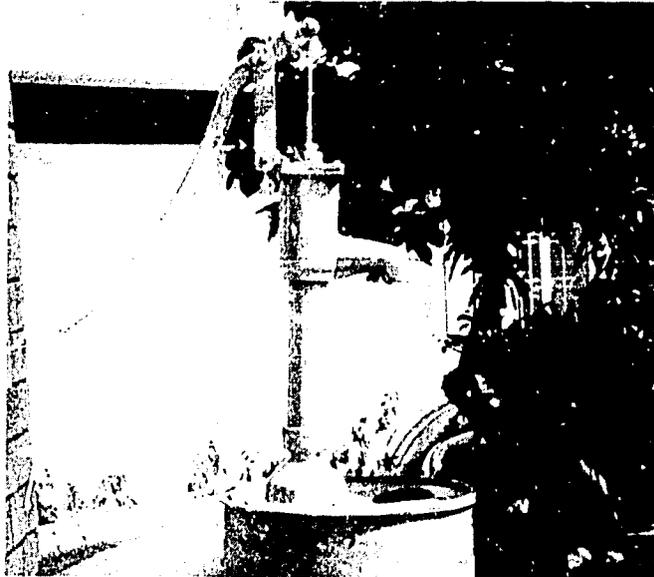
C. Conferences and Seminars (11.5% of effort -- \$20,200)

1. Description. The purpose of this activity is to expose Georgia Tech faculty members, staff, and students to international development activities of other organizations and the state of the art, and to promote understanding and communication with these organizations. In addition, the 211(d) program staff attends and participates in relevant small industry conferences, seminars, and workshops.

Table 2
INDUSTRIALIZATION PROGRAM ENROLLMENT

	1974-75		1975-76		1976-77	
Fall	Arguelles, Jorge	Mexico	Batterman, Charles	U.S.A.	Abrenillo, Andres	Philippines
	Gochicoa, Gerardo	Mexico	Chung, Soo Chin	Korea	Dunia, Jaime J.	Venezuela
	Jaramillo, Jaime	Colombia	Lee, Jang Y.	Korea	Galan, Juan D.	Colombia
	Quezada, Antonio	Ecuador	Park, Choon Y.	Korea	Hefferan, Juan E.	Mexico
			Quintero, Socorro M.	Philippines	Lopez, Ricardo R.	Mexico
					Oyaga, Javier	Colombia
				Slochowski, Nathan	Peru	
				Velasco, Oscar	Mexico	
Winter	None		Givetash, Hamid	Iran	Boglam, Lanine	Algeria
			Ogba, Onyekwere	Nigeria	Lezzam, Larbi	Algeria
Spring	None		Hidalgo, Julio C.	Ecuador		
			Sanchez, Jose L.	Mexico		
Summer	None		Guardia, Jose G.	U.S.A.		

COSTA RICA



A related project involves the field testing of the AID water pump in two Central American countries. The first pump constructed under the project in Costa Rica is shown here.



A well in Nicaragua which will be utilized as a site for a manually operated water pump in the field test.

2. (a) Targets for Reporting Year and Means of Verification

<u>Target</u>	<u>Verification Means</u>
Six seminars by invited lecturers	Seminars
Participation in relevant conferences and seminars	Papers
International development mini-conference (Manila)	Conference

(b) Critical Assumptions. This activity was carried out as planned, with no external factors impacting.

3. Accomplishments

(a) Accumulative. Twenty-eight formal and four informal seminars have been held at Georgia Tech in the four-year grant period as part of the 211(d) international development seminar series. Total attendance has approximated 1,000 persons, made up of Georgia Tech faculty and staff, students, and interested participants. Two international development seminars and one strategy symposium have been hosted by Georgia Tech.

In addition, 211(d) staff personnel have participated in a total of 62 domestic and international conferences, seminars, and workshops. Program-associated staff members made presentations at many of these meetings.

(b) Reporting Year. During the reporting year, six international development seminars were presented at Georgia Tech, as listed in Table 3.

These seminars were publicized on campus by means of posters, notices to faculty, and mailings to foreign students. A typical poster is included as Appendix II. Average attendance was 30.

The 211(d) program staff participated in the following conferences, seminars, and workshops:

- Ross Hammond attended the inauguration of the Center for Economic and Social Studies of the Third World in Mexico City, Mexico.
- Nelson Wall participated in a symposium sponsored by the Center for Economic and Social Studies of the Third World in Mexico City, Mexico.
- Phillip Potts participated in an International Workshop on Hand Water Pumps sponsored by the International Reference Center for Community Water Supply of WHO at the Hague, Netherlands.
- Ross Hammond presented a paper at a Conference on Appropriate Technology Research held in Vienna, Austria, by UNIDO.

Table 3
INTERNATIONAL DEVELOPMENT SEMINAR SERIES
Atlanta - Grant Year Four

<u>No.</u>	<u>Date</u>	<u>Lecturer</u>	<u>Title of Seminar</u>
24	March 16, 1976	David Gordon Ernst Loeschner (IBRD)	DFC Activities of the World Bank
25	May 3, 1976	Jack Johnson (University of Arizona)	Semi-Arid Land Studies in Ghana
26	June 14, 1976	James Blackledge (Denver Research Institute)	Linkages with Industrial Research Institutes in the Developing Countries
27	Nov. 8, 1976	Hugh Miller (National Academy of Engineering)	The International Industrialization Institute
28	Nov. 15, 1976	Bart Duff (International Rice Research Institute)	An Update on IRRI Activities
29	Dec. 2, 1976	Francisco Aguirre (ICAITI)	Activities of the Instituto Centroamericano de Investigacion y Tecnologia Industrial

- Ross Hammond attended Secretary of State Kissinger's Conference on International Development in Washington, D. C.
- Nelson Wall participated in a symposium on evaluation of the publication Termos de Referencia sponsored by FESSC in Criciuma, Brazil.
- Philip Koos attended a conference on surface bonding techniques for low-cost housing in Cartagena, Colombia.
- Nelson C. Wall presented a seminar on U.S. financial organizations to bank managers in Tubarao, Brazil.
- Ross Hammond attended the World Congress on Engineering Education sponsored by ASEE in Estes Park, Colorado.
- Richard Johnston was an invited participant in a planning workshop dealing with information acquisition, processing, and dissemination held at the East-West Center in Honolulu, Hawaii.
- Martha Ann Stegar spoke on "Assisting Small Industry and Generating Employment: A Ghanaian Example" at the African Studies Association meeting in Boston, Massachusetts.
- In the Philippines, Ross Hammond, Howard Dean, and H. A. Corriher made presentations to the Asian Development Bank, the Development Bank of the Philippines, and the Energy Development Board.
- Bill Howard attended a three-week workshop to evaluate extension programs and research methodology at the East-West Center in Honolulu, Hawaii.
- Kenneth Stephens was co-leader of a quality control workshop in Bangkok, Thailand.
- Ross Hammond was on the program of the winter meeting of the International Division of ASEE in Atlanta, Georgia.
- Ross Hammond presented seminars on appropriate technology at the University of Arizona, in Tucson, Arizona, and at ICAITI, in Guatemala City, Guatemala.

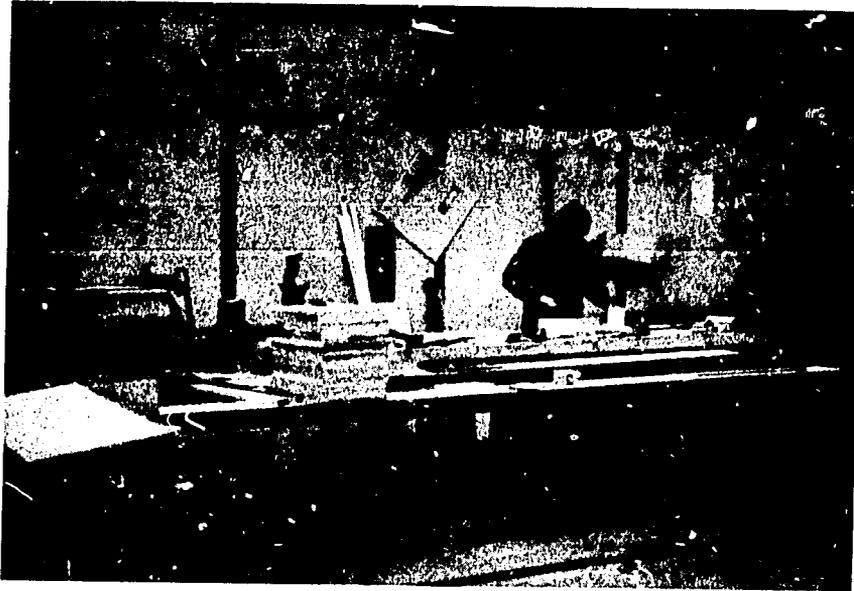
In addition, a mini-conference on "Adaptive Technology and Small Industry Development" was hosted in Manila, the Philippines, May 26-29, 1976. Participants included 25 persons from 11 developing countries, six persons from Georgia Tech, and representatives of AID, the World Bank, and the Asian Development Bank. This highly successful meeting allowed an interchange of information on programs, problems, and results.

(c) Total Expenditures. Four-year expenditures for conference and seminar activity total \$69,757, of which \$20,200 was expended in the fourth year.

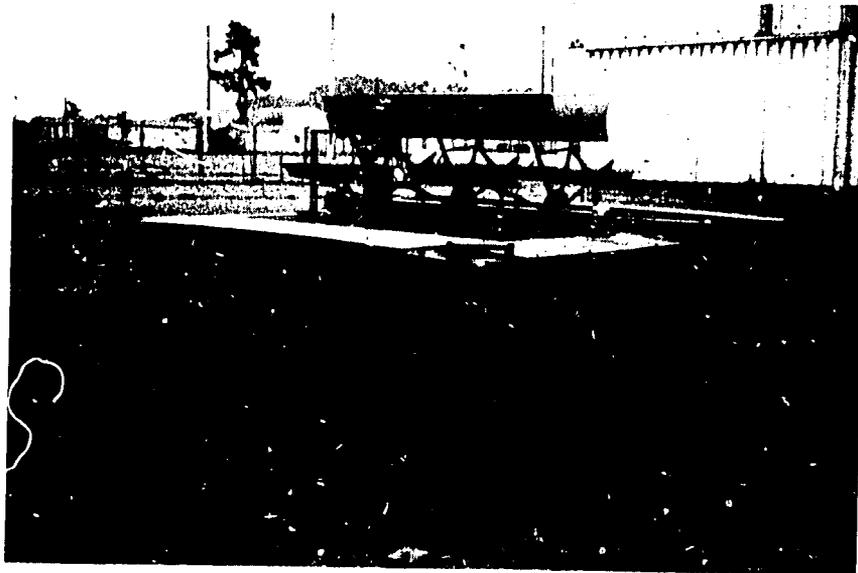
D. Counterpart Linkages (11.4% of effort -- \$20,000)

1. Description. The primary goal of the 211(d) grant to Georgia Tech is to strengthen the institution's capability to successfully stimulate

CHILE



A typical small woodworking industry in Chile.



A raft designed to be anchored in a river to produce electricity by river current rotating the paddle wheel. This model was photographed on the grounds of INTEC, a Georgia Tech counterpart in Chile.

small industry development in developing countries, building on the existing experience base at Georgia Tech. The grant called for a linkage with overseas institutions in order to facilitate the achievement of the 211(d) primary goal. This linkage network has grown with the passage of time and presently includes 11 organizations in Asia, Africa, and Central and South America. They are listed in Table 4.

These organizations are the principal communications and linkage elements in the program. They serve as vehicles for the transmittal of information and technology, provide knowledge of their countries' small industry environment, facilitate program staff interactions, and provide in-country bases for research related to small industry development.

These 11 counterpart organizations, along with Georgia Tech, now compose a linkage network with a common interest in the development of the small industry sector in their respective countries.

2. (a) Targets for Reporting Year and Means of Verification

<u>Target</u>	<u>Verification Means</u>
Frequent communication with counterparts	Files
Possible selection of additional counterpart	New counterpart

(b) Critical Assumptions. Assumptions that Georgia Tech has capabilities in small industry development have been borne out by the increasing number of counterparts which are interested in interacting with Tech. However, a number of factors beyond the control of Georgia Tech have inhibited interaction with some counterparts.

For example, the desire to interact with the Kenya Industrial Estates organization more actively was not possible when AID/Kenya refused to provide travel clearance to Tech personnel to do so. The University of Ife in Nigeria had administrative changes in the Department of Economics and the Industrial Research and Development Unit and a resultant lack of responsiveness to communication which raises questions about future interactions under the program.

3. Accomplishments

(a) Accumulative. A total of 12 organizations (including Georgia Tech) now comprise the small industry network. Contacts are maintained on an average of once a month. A considerable interchange of personnel has occurred.

Table 4

COUNTERPART ORGANIZATIONS AND CONTACT INDIVIDUALS
IN THE SMALL-SCALE INDUSTRY NETWORK, 1977

Professor Jose Muller Fundacao Educacional do Sul de Santa Catarina (FESSC) Caixa Postal 370 Tubarao, Santa Catarina, BRAZIL	Mr. K. Arap Ng'eny General Manager Kenya Industrial Estates, Ltd. P. O. Box 18282 Likoni Road Nairobi, KENYA
Sr. Dr. Ricardo Berner Berndt Director de Comercializacion Instituto de Investigaciones Tecnologicas Casilla 667 Santiago, CHILE	Dr. Yoon Bae Ouh, Director Integrated Development Center Soong Jun University 135 Sang-do Dong Seoul, KOREA
Sr. Antonio Teran Salazar Director Ejecutivo Centro de Desarrollo Industrial del Ecuador (CENDES) Casilla Postal 2321 Quito, ECUADOR	Dr. Seyeul Kim, Director Regional Development Institute Soong Jun University at Taejon 1330 Jung Dong Taejon, KOREA 300
Dr. Victor Martinez, Jefe Servicio de Informacion Tecnica Centro de Desarrollo Industrial del Ecuador (CENDES) Apartado 5833 Guayaquil, ECUADOR	Professor R. O. Ekundere, Director Industrial Research and Development Unit University of Ife Ile-Ife, NIGERIA
Dr. J. W. Powell, Director Technology Consultancy Centre University of Science and Technology University Post Office Kumasi, GHANA	Dr. Herminia Fajardo Director of Research and Consultancy Institute for Small-Scale Industries University of the Philippines Diliman, Virata Hall, UP Campus Quezon City, PHILIPPINES
Dr. Francisco Aguirre Instituto Centroamericano de Investigacion y Tecnologia Industrial (ICAITI) Av. la Reforma 4-47 Zona 10 Guatemala City, GUATEMALA, C.A.	Mr. Ross Hammond, Director Economic Development Laboratory Engineering Experiment Station Georgia Institute of Technology Atlanta, Georgia 30332, U.S.A.
Dr. Ir. Filino Harahap, Director Development Technology Center Institute of Technology Bandung P. O. Box 276 Bandung, INDONESIA	Mr. Tulio Hidalgo Oficina de Desarrollo Industrial (ODIUC) University of Carabobo Valencia, VENEZUELA

The flow of information from and to Georgia Tech has steadily grown through correspondence and interchange of reports and newsletters.

A four-year total of 67 field trips have been made to counterpart countries by the 211(d) program staff. These field trips have resulted in a broadening of understanding and mutual trust, a better knowledge base at Georgia Tech, and a number of the reports under the program. Personnel from all 11 counterparts have visited Georgia Tech for conferences, seminars, and interactions of various types.

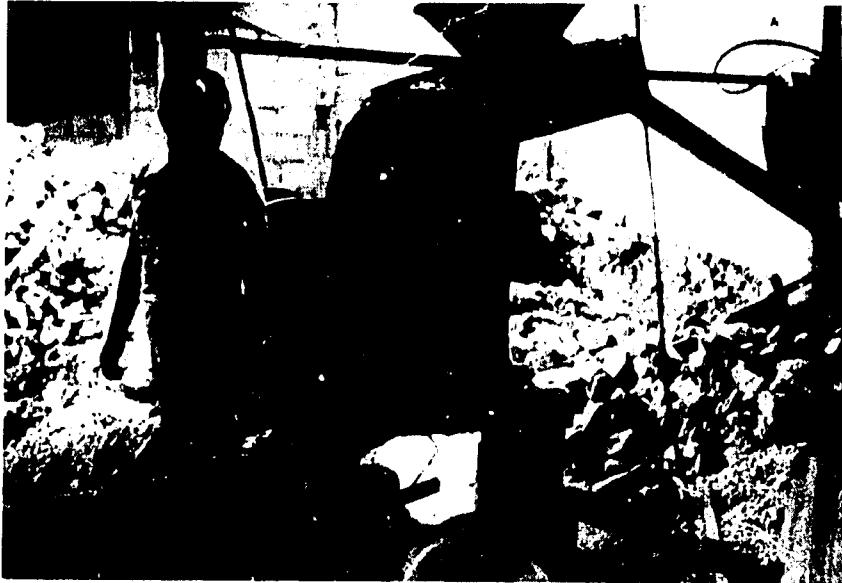
(b) Reporting Year. During the fourth grant year, four additional counterparts were added to the network. A long-standing relationship with the University of Carabobo, Valencia, Venezuela, led to inclusion of this organization in the network. One of the staff from there spent two months at Georgia Tech in research and discussions on future interactions. Earlier in the year, as a result of participation in the Manila mini-conference, a meeting was held with the Institute of Technology Bandung in Indonesia which led to a formal agreement between the Development Technology Center at ITB and Georgia Tech. Initiatives by ICAITI in Guatemala resulted in another counterpart agreement and the decision to hold the fifth-year mini-conference in Guatemala City in September. Finally, the Director of INTEC, a Chilean organization interested in small industry development, visited Atlanta and a counterpart agreement subsequently was signed.

Communication with all counterparts is maintained and field trips are made as appropriate. In addition, eight representatives of the 11 counterparts visited Georgia Tech. Inquiries from counterparts have been serviced, and reports and information interchanged. To the extent possible, counterpart organizations are involved as participants in proposals generated for consideration by funding organizations.

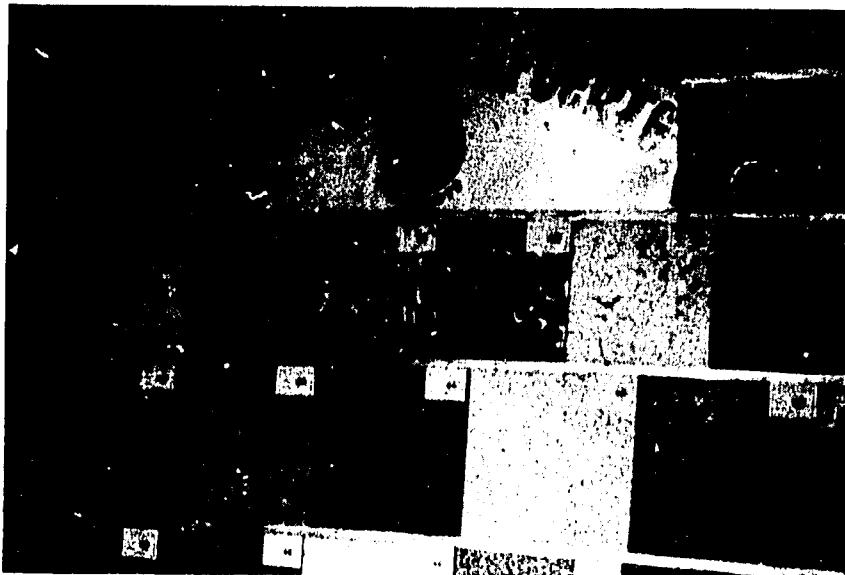
During the fourth grant year, 13 individual field trips were made by seven different individuals under the 211(d) grant. The trips varied in duration from one to five weeks. The shorter field trips involved familiarization or short-term specific interactions. The longer trips involved data collection and research report preparation or the field-testing of ideas and programs.

(c) Total Expenditures. Four-year accumulated expenditures under the category of Counterpart Linkages total \$116,871, of which \$20,000 occurred in the fourth grant year.

ECUADOR



The raw material used to produce mosaic floor tiles by an Ecuadorian company, Mosaicos Rocafuerte.



Samples of the finished product at Mosaicos Rocafuerte.

E. Administration and Coordination (10% of effort -- \$17,500)

1. Description. The Georgia Tech 211(d) program is an interdisciplinary activity, involving three major units of Georgia Tech and the staffs of 11 counterpart organizations. Hence, planning, scheduling, and coordination are important. Elements within the Administration and Coordination function are program planning and scheduling, overseas assignments, day-to-day operations and recordkeeping, internal and external communications, coordination and advisory meetings, and reception of foreign observers of the program.

2. (a) Targets for Reporting Year and Means of Verification

<u>Target</u>	<u>Verification Means</u>
Planning, scheduling, and coordination	Annual Report
Communication with AID and other organizations	Files
Internal Advisory Committee meetings	Meetings
External Advisory Committee meeting	Meeting
Program staff coordination meetings	Meetings
Foreign observers	Visits

3. Accomplishments

(a) Accumulative. Since the initiation of the grant four years ago, annual goals have been met as follows:

(1) Continual project planning and coordination have been carried on.

(2) Communication has been maintained with the sponsor, counterpart organizations, and international development organizations.

(3) Seven Internal Advisory Committee meetings and four External Advisory Committee meetings have been held. Eighteen-month and four-year reviews by AID have been scheduled and held.

(4) A total of 41 program staff coordination meetings have been held.

(5) Some 97 foreign visitors and 110 development organization staff members came to Atlanta for varying periods of time and were provided with program reviews.

(b) Reporting Year. During the reporting year, the following activities took place under the category of Administration and Coordination:

(1) Fourth grant year planning and coordination efforts approximated those in Grant Year Three.

(2) Communications continued at a high level. Only four full-scale 211(d) staff coordination meetings were necessary, due to the familiarity of the staff with the program.

(3) Two Internal Advisory Committee meetings were held during the fourth grant year. Excellent administrative cooperation continued, and the Associate Director of the Engineering Experiment Station made one field trip to Asia at Station expense to review the program progress.

(4) The annual External Advisory Committee meeting was held in Atlanta, July 19-20, 1976, and was well attended. Recommendations of the committee were presented to AID.

(5) Foreign visitors and international development organization representatives continued to visit Georgia Tech. to review the program.

(6) The AID fourth-year review of the 211(d) program was conducted by a four-man team. The team report was generally favorable and recommended a two-year extension of the grant.

(c) Total Expenditures. The four-year expenditures for Administration and Coordination have amounted to \$67,471, of which \$17,500 was incurred in the fourth grant year.

V. IMPACT OF GRANT-SUPPORTED ACTIVITIES IN ACHIEVING GRANT OBJECTIVE

During the fourth grant year, the interdisciplinary 211(d) program involved personnel of three major units of the institution: the Economic Development Laboratory, the School of Industrial and Systems Engineering, and the College of Industrial Management. Southern Technical Institute was again unable to participate because of increased enrollment and faculty work loads which prevented release of appropriate faculty members. During the grant year, a total of 22 faculty members, 10 supporting staff, and six graduate students were involved in the program.

The four-year activity has resulted in a total of 38 faculty members being substantially involved in international development activities. In addition to supporting seven graduate students and two undergraduates under 211(d) assistantships, the program has attracted many other students to the international development seminar series.

By means of periodicals, a large proportion of the Georgia Tech administration and faculty is kept informed of the program activities. The International Informer, a bimonthly bibliography of material available in the

International Development Data Center, was intended as an internal information publication. Its usefulness has brought numerous requests to receive it from outside the organization. Some 300 copies of each issue are distributed to individuals or organizations in many countries.

The Georgia Tech administration continues to exhibit great interest in the 211(d) grant activity. Various top administrators have lent their time and efforts to advance the program, have accepted committee assignments, have assisted in the reception accorded foreign visitors, and have by all their actions supported the goals and activities. During the fourth grant year, two administrative personnel of the Engineering Experiment Station accompanied the 211(d) project director to Asia at Georgia Tech expense, to observe the program at first hand. The President of Georgia Tech and the Director of the Engineering Experiment Station plan to participate in the mini-conference in Guatemala in September 1977. No internal problems in grant management have been encountered to date.

Awareness of the 211(d) program and other synergistic activities generated by it among external organizations have resulted in information requests and inquiries about direct assistance or technology.

The most visible impact of the 211(d) grant on the institution is the steady expansion of contracts for various small industry-related projects which is occurring. Many of these projects are short-term in nature and do not provide long-term base funding. In the aggregate, however, the 211(d)-generated projects reflect a growing utilization of the Tech capabilities.

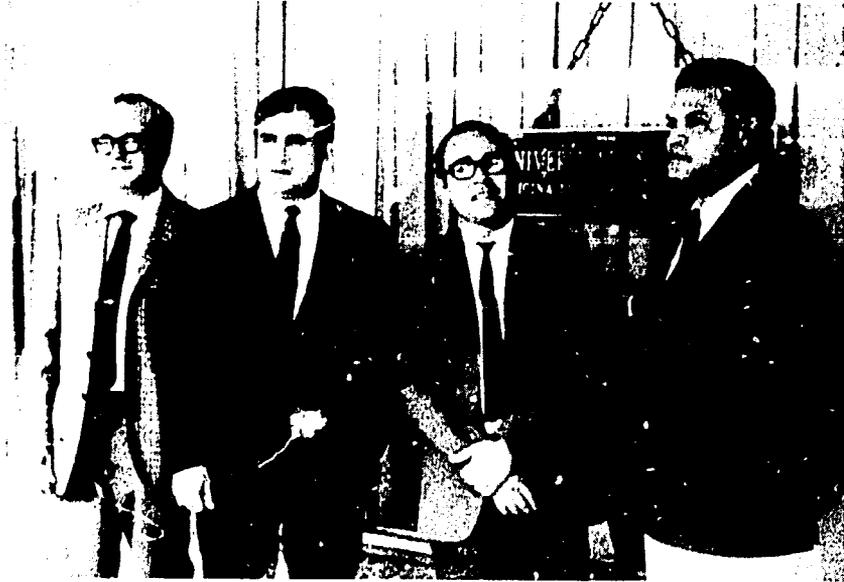
Table 5, which follows, indicates the impact that the 211(d) grant has had on the volume of other international development programs. It should be noted that while the 211(d) expenditures peaked in FY 1975 and have been tapering off since that period, other related programs have grown both in numbers and dollar volume.

VI. OTHER RESOURCES FOR GRANT-RELATED ACTIVITIES

A. Related Contracts. The 211(d) grant to Georgia Tech has led directly or indirectly to a number of funded activities with AID and other organizations.

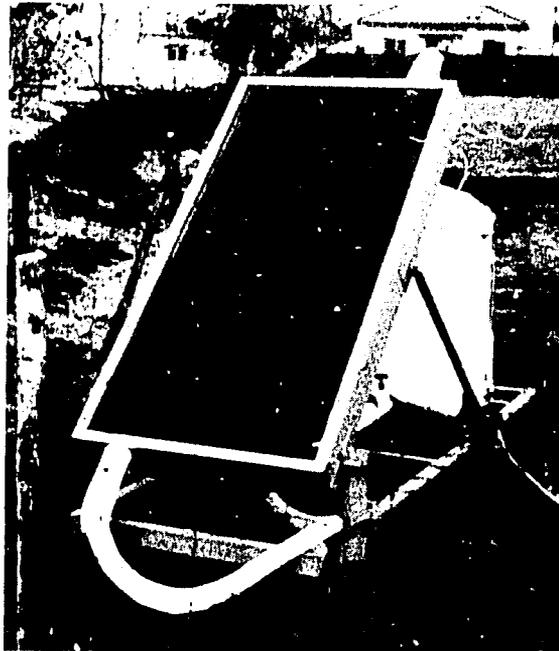
(1) *Small Industry Grant Contract*. This AID-sponsored activity involves the administration of grants to four developing country organizations. Georgia

VENEZUELA



The Office of Industrial Development at the University of Carabobo in Venezuela. This is an applied research counterpart.

KOREA



Solar collector panel and water heater designed and built by the Soong Jun University and Georgia Tech team in Seoul for faculty and student research.

Table 5

211(d) GRANT IMPACT ON GEORGIA TECH
INTERNATIONAL DEVELOPMENT PROGRAMS

<u>Fiscal Year</u>	<u>211(d) Grant Expenditures</u>	<u>Other Intl. Program Expenditures</u>	<u>Direct Tech Support for Intl. Programs</u> ^{2/}	<u>Total Intl. Program Expenditures</u>	<u>211(d) % of Total Intl. Exp.</u>	<u>No. of Intl. Projects in FY</u>
1973	\$ 26,900	\$ 78,100	\$ 13,000	\$ 118,000	22.8	3
1974	170,900	5,600	16,000	192,500	88.8	4
1975	180,600	115,400	29,000	325,000	55.6	8
1976	172,700	187,300	39,350	399,350	43.2	13
1977	167,000	263,000	29,000	459,000	36.4	18
1978 ^{1/}	<u>81,900</u>	<u>383,100</u>	<u>35,000</u>	<u>500,000</u>	16.4	22
TOTALS	\$800,000	\$1,032,500	\$161,350	\$1,993,850		

^{1/} Estimated.

^{2/} Other EDL and Tech programs provide substantial indirect support.

Tech and the East-West Center also have provided small industry-related training consultation to these organizations to supplement their small industry extension programs. The activities under these grants involve problem-solving assistance to approximately 150 small industries in Korea, Brazil, the Philippines, and Nigeria. These efforts have resulted in strengthening the counterpart organizations and have been instrumental in saving or creating employment in the assisted industries.

(2) *Small Industry Development Network* (a quarterly newsletter). Initially supported for two years by AID, the newsletter will continue under a three-year extension which is now being processed. Some 2,500 individuals and organizations in 131 countries receive this publication, which highlights small industry activity in the developing countries.

(3) *Rice Machinery Industrial Extension Program*. A contract with the International Rice Research (IRRI) permits Georgia Tech to provide on-site marketing and other types of assistance to IRRI in its stimulation of manufacturing of the IRRI-designed rice machinery.

(4) *Pyrolytic Conversion of Wood Wastes -- Ghana*. Under AID funding, Georgia Tech determined that the raw material supply was adequate for converting sawdust to alternative energy sources -- charcoal, oil, and gas. A preliminary design and economic analysis for a six-ton-a-day pyrolytic conversion unit was prepared. A follow-on project is in the offing.

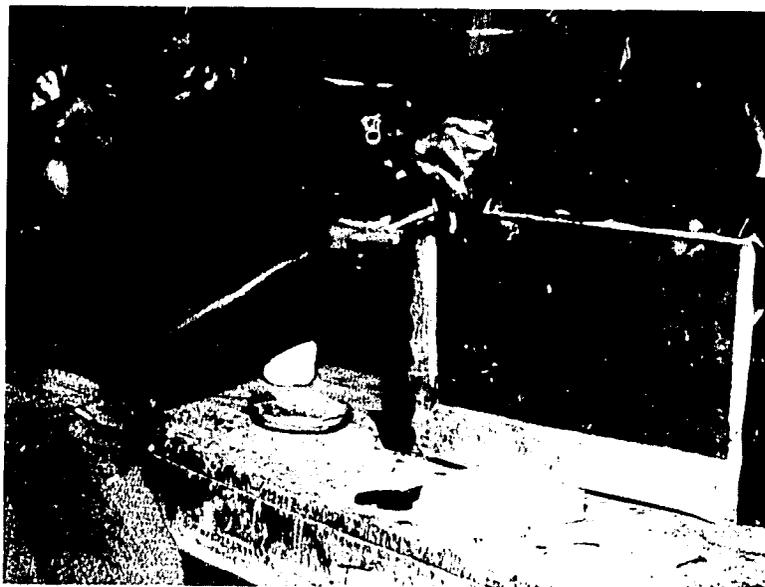
(5) *Pyrolytic Conversion of Agricultural Wastes -- Indonesia*. AID funded a project to investigate the potential for small pyrolytic convertors which would utilize rice hulls as the raw material. A follow-on project may develop to build, test, and stimulate the manufacture of the convertor.

(6) *Solar Energy -- Korea*. This project, funded by KIST in Korea, involved the design of a solar system for heating a typical Korean residence.

(7) *AID Manually Operated Water Pump Field Test*. A two-year AID-funded project was initiated. This will involve the manufacture of the AID manually operated water pump in Nicaragua and Costa Rica and the purchase of competing in-country pumps. These pumps will be installed in village water wells and a program of testing, evaluation, and comparison conducted.

(8) *Science and Technology for Development Newsletter*. A newsletter was initiated for the AID Office of Science and Technology. Its purpose is

NIGERIA



Small-scale furniture manufacturers to whom the University of Ife and Georgia Tech are providing assistance.



A roadside automobile repair shop. Considerable skill and ingenuity are shown by these Nigerian entrepreneurs in repairing vehicles.

to advise AID contractors and other interested parties of the activities being administered by that AID office.

(9) *Chile -- Small-Scale Rural Enterprises and Intermediate Technology.* A team was sent to Chile to prepare background information on two proposed AID loans to the Chilean government.

(10) *Training of Industrial Extension Personnel.* AID funding permitted Georgia Tech to provide a short-term training program for industrial extension personnel from the Instituto Centroamericano de Investigacion y Tecnologia Industrial (ICAITI). The training focus was on industrial extension practices and techniques.

(11) *Rural Development Potentials for the Siliana District of Tunisia.* A team was sent to Tunisia by AID to evaluate the rural development potentials of the Siliana district and to recommend development approaches.

(12) *Desalination Feasibility Study.* A team went to the Cape Verde Islands to review the feasibility of a proposed desalination and power plant for Sal Island. This was done under AID funding.

B. Georgia Tech Support for 211(d) and Associated Activities. In addition to continued administrative support and institutional unit cooperation, the international development activities, centered in the Economic Development Laboratory, were supported during the grant year by approximately \$30,000 of direct funds. Much of the backup staff support, expertise, and information sources developed in other Laboratory and Station units also were supportive of the international program activity.

C. Possible Additional Future Involvements. Discussions are being held with a number of AID/Washington personnel and AID missions relative to possible future projects, including:

- o Pyrolytic convertor design, testing, and replication in Ghana and Indonesia
- o Involvement in an urban development program in Central America
- o Technology referral system for use in Central America
- o Continuation of IRRI industrial extension project
- o Training of Indonesian second-level librarians

In addition, proposals are being submitted to Appropriate Technology International, and a Mexican training program may develop for the Nacional

PHILIPPINES



Kaunluran Industries produces rice machinery based on designs of the International Rice Research Institute.



This successful company has grown rapidly and employs about 90 persons. Products include axial flow threshers and rice dryers.

Financiera. Inquiries and assistance requests from 10 countries are being pursued.

Conversations are being held with various international development organizations as well.

VII. UTILIZATION OF INSTITUTIONAL RESPONSE CAPABILITIES IN DEVELOPMENT PROGRAMS

A. Response to Inquiries. The 211(d) activity has generated a large volume of correspondence, requests for information, and unsolicited mail material. The volume of these items precludes keeping a log, but the following is an approximate breakdown of 3,775 inquiries received and serviced during the fourth grant year.

<u>Users</u>	<u>Number of Requests or Inquiries</u>
Internal:	
EDL staff personnel	2,000
Other EES staff	100
Georgia Tech faculty	50
Georgia Tech students	<u>175</u>
	2,325
External:	
U.S. organizations/industries/individuals	350
Foreign organizations/individuals	800
Counterpart institutions:	
Information	150
Report distribution	<u>150</u>
	1,450
Total	3,775

B. Miscellaneous. Tables III-A and III-B, under separate submission, list the major technical assistance responses made to requests.

A total of 25 students have been involved in the 211(d) Master of Science program in industrialization the first two and one-half years since it was begun. Eighteen students are presently enrolled.

Three hundred and fifty copies of research reports, studies, directories, and other materials have been distributed in the fourth grant year to organizations and individuals on request, in addition to normal distribution of materials to counterparts and sponsors.

Professional faculty and staff members who have been involved in substantial activities under the 211(d) grant and related projects are listed in Table 6. (This does not include unrelated international activities at Georgia Tech, which are considerable.)

A total of 97 foreign and 110 domestic or international development organization personnel have visited the Georgia Tech campus specifically to review the 211(d) and associated activities.

A continuing long-term activity in international development is in keeping with the institutional commitment to international programs.

VIII. FIFTH-YEAR PLAN OF WORK AND ANTICIPATED EXPENDITURES

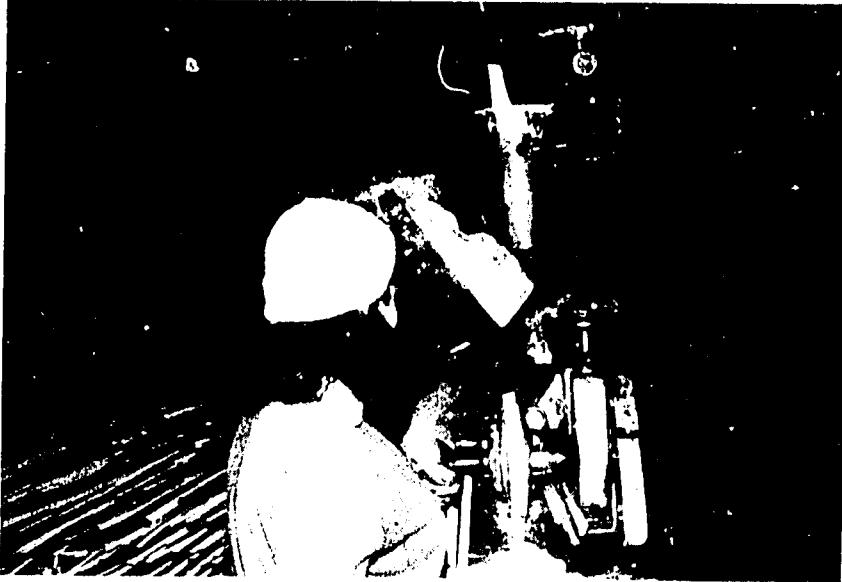
While prior year experience has shown that some modification of annual goals for the year may be required, the following targets are set forth for accomplishment:

<u>Activity</u>	<u>Verification Means</u>
<u>Applied Research</u> (43% of effort -- \$51,940)	
o Analysis of small industry development methods and techniques and applicability	Report
o Appropriate technology	Report
o National approaches to employment generation in selected countries	Report
o Continued expansion of the International Data Center holdings	New materials
<u>Education and Training</u> (23% of effort -- \$28,000)	
o Continue master's program in industrialization	Enrollment
o Assistantships for graduate students	Grant support
o New courses in industrialization	Presentation
<u>Conferences and Seminars</u> (12% of effort -- \$15,000)	
o Four seminars by invited lecturers	Seminars
o Participation in relevant conferences	Papers
o International development conference (Guatemala)	Conference

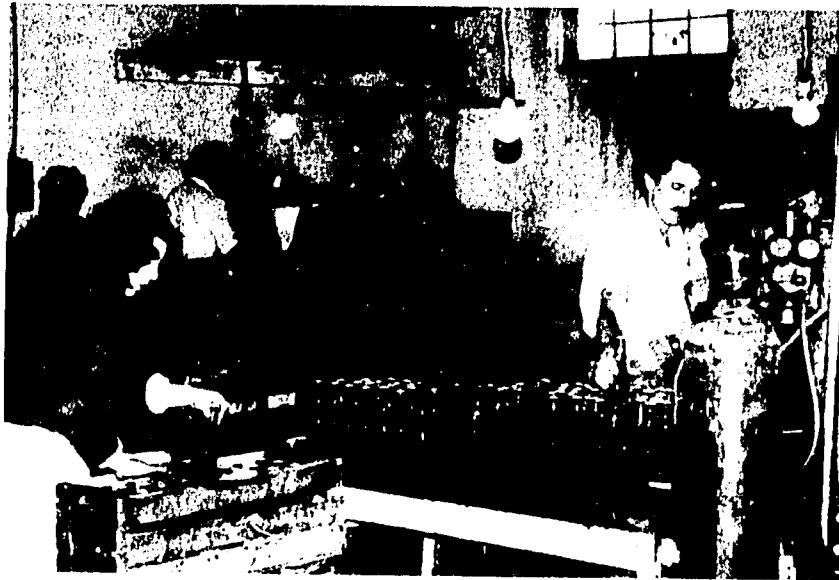
Table 6
 PROFESSIONAL PERSONNEL WORKING ON
 211(d)-ASSOCIATED DEVELOPMENT PROGRAMS
 (Four-year period)

<u>Name</u>	<u>Title</u>
Kay E. Auciello	Assistant Research Scientist
Tze I. Chiang	Principal Research Scientist
Kong Chu	Professor
David E. Clifton	Research Scientist
Robert E. Collier	Senior Research Scientist
Ronald E. Cornman	Research Scientist
Vernon Crawford	Vice President for Academic Affairs
L. Harlan Davis	Professor
Harvey Diamond	Senior Research Engineer
Sherman L. Dudley	Research Scientist
Larry R. Edens	Research Engineer
Herbert Eller	Professor
David E. Fyffe	Professor
Ross W. Hammond	Director, EDL/EES
Philip L. Hess	Research Engineer
William C. Howard	Senior Research Scientist
Ben E. James, Jr.	Senior Research Engineer
Richard Johnston	Senior Research Scientist
John R. Kaatz	Professor
Frank Kingsland	Research Engineer
Edwin L. Lewis	Assistant Research Engineer
Jerry L. Lewis	Principal Research Scientist
Donald E. Lodge	Senior Research Scientist
C. Earl Logan	Senior Research Engineer
Raymond A. Manoff	Senior Research Scientist
George A. Morelos	Research Engineer
Edward A. Nelson, Jr.	Research Scientist
Gaston A. Parets	Research Engineer
Joseph M. Pettit	President, Georgia Institute of Technology
Phillip W. Potts	Research Scientist
Martha Ann Stegar	Research Scientist
Thomas E. Stelson	Vice President for Research
Kenneth S. Stephens	Professor
William T. Studstill	Research Engineer
John W. Tatom	Principal Research Engineer
Edwina W. Udunka	Assistant Research Scientist
Linda T. Wagenveld	Assistant Research Scientist
Nelson C. Wall	Senior Research Engineer
Charles C. Wommack	Research Scientist

BRAZIL



A piece of appropriate technology, designed and built locally, which embosses a decorative design on picture frames. FESSC and Georgia Tech provide management and technical assistance to this plant.



A typical bottling plant operation in southeast Brazil.

<u>Activity</u>	<u>Verification Means</u>
<u>Counterpart Linkages</u> (12% of effort -- \$15,000)	
o Frequent communication	Files
o Field trips	Travel schedule
o Involvement of counterparts in related programs	Participation
<u>Administration and Coordination</u> (10% of effort -- \$12,500)	
o Planning, scheduling, coordination	Annual report
o Communication	Files
o Internal Advisory Committee meetings	Meetings
o Annual External Advisory Committee meeting	May meeting
o Schedule and receive foreign visitors	Visits

IX. INVOLVEMENT OF MINORITY PERSONNEL AND WOMEN

During the fourth grant year, a substantial number of minority and female staff members were associated with the 211(d) and related programs. These individuals are listed in Table 7, which follows. This involvement is expected to continue in the fifth grant year.

X. OTHER

A. By-Product Activities. The 211(d) grant has been the catalyst for and genesis of a number of related activities, including:

(1) Participation by Ross Hammond in two AID-convened meetings to provide inputs to the AID submission to Congress on the appropriate technology portion of the Foreign Aid Amendment.

(2) Increasing involvement in assisting AID missions in the provision of analyses and data to support project PIDs, PRPs, and PPs.

(3) An expansion of training programs for international groups covering various aspects of economic development and specific technologies.

B. Impact of Institute Activities on Counterpart Planning and Projects

(1) The Tech interaction with its counterpart FESSC in Brazil has led to a considerable expansion of its community and industrial outreach and technical capabilities, as well as strengthening the academic and informational resources. Statewide and regional studies have been initiated, funded by the state and federal governments.

Table 7

INVOLVEMENT OF MINORITIES AND FEMALES: GRANT YEAR FOUR
(Georgia Tech 211(d) and Associated Programs)

<u>Name</u>	<u>Title</u>	<u>Origin</u>	<u>Sex</u>	<u>Nature of Involvement</u>
Auciello	Asst. Res. Sci.	-	F	International Development Data Center Information scientist
Cadman	Secretary	-	F	Reports
Camp	Secretary	Ecuadorian**	F	International Programs Division secretary
Carson	Secretary	-	F	Reports
Chung*	Graduate Asst.	Korean	M	International Development Data Center -- research
Cole	Report Typist	-	F	Report typist
Gorman	Secretary	-	F	Clerical duties for SIDN Newsletter and 211(d) activity
Hurd	Secretary	-	F	Processes program material
Lee	Graduate Asst.	Korean	M	International Development Data Center -- research
McHan	Secretary	-	F	Typed trip and research reports
Ogba	Graduate Asst.	Nigerian	M	International Development Data Center -- research
Park	Graduate Asst.	Korean	M	International Development Data Center -- research
Quintero*	Graduate Asst.	Filipina	F	International Development Data Center -- research
Saghini	Secretary	Venezuelan	F	International Development Data Center secretary
Slochowski	Graduate Asst.	Peruvian	M	International Development Data Center -- research
Smith	Secretary	-	F	Typed trip and research reports
Stegar	Res. Scientist	-	F	SIDN Newsletter editor -- participates in 211(d) activity
Textor	Secretary	-	F	Assists in project administration and coordination
Thomas	Secretary	-	F	International Development Data Center secretary
Tully	Secretary	-	F	Typed trip reports
Udunka*	Asst. Res. Sci.	Black	F	Audiovisual specialist
Wall*	Sr. Res. Engr.	Cuban**	M	Responsible for project development, planning, and implementation

* Involved in international travel under 211(d) or other associated programs in reporting year.

** Now U.S. citizen.

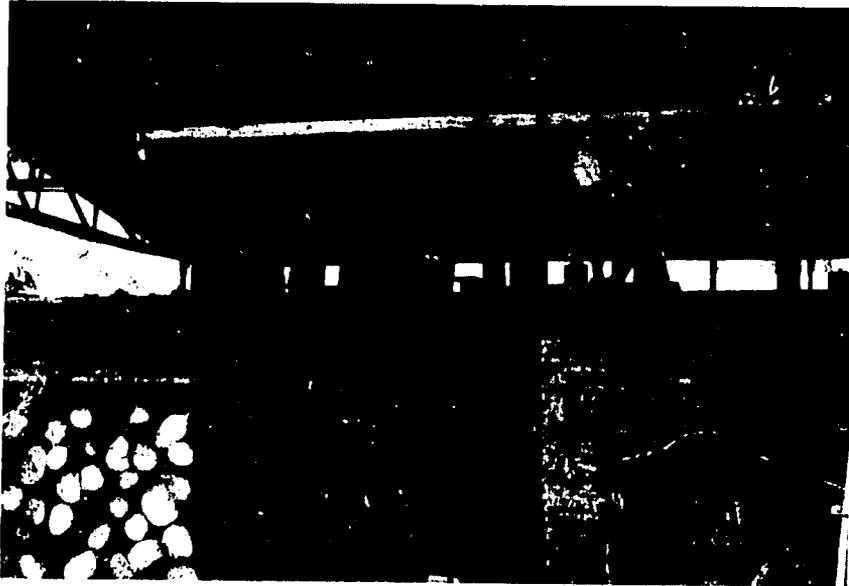
(2) Dr. Hahn Been Lee, President of Soong Jun University in Korea, has stated that the Tech counterpart relationship has motivated many of the Soong Jun students to seek enrollment at Tech under the 211(d) master's program. Soong Jun also has established relationships with a number of Korean development, trade, and technical organizations.

(3) The small industry grants have enabled the Institute for Small-Scale Industries in the Philippines and the University of Ife in Nigeria to establish industrial extension field offices and to test out this approach to grass-roots development.

(4) The University of Science and Technology in Ghana and the Instituto Centroamericano de Investigacion y Tecnologia Industrial (ICAITI) have participated in Georgia Tech 211(d)-related contracts.

(5) A number of counterparts have succeeded in obtaining additional funding for small industry development activities from diversified funding sources.

GHANA



A brick kiln, using wood as the fuel, near Kumasi. Alternate energy sources derived from sawdust may be used to fire this kiln in the future.



A labor-intensive shaping of bricks for use in construction of buildings in Ghana.

Appendix I
ACCUMULATIVE LIST OF PUBLISHED MATERIALS PRODUCED UNDER
THE GEORGIA TECH 211(d) PROGRAM

ACCUMULATIVE LIST OF PUBLISHED MATERIALS PRODUCED UNDER
THE GEORGIA TECH 211(d) PROGRAM

	<u>Report Title</u>	<u>Nature of Publication</u>	<u>Distribution</u>
1.	Employment Generation through Stimulation of Small-Scale Industry (undated)	Brochures (2)	General
2.	An Educational Program with Emphasis on Industrialization Leading to the Degree of Master of Science (undated)	Report	General
3.	An Overview of the Development and Current Operations of the Industrial Development Division (July 1973)	Paper	General
4.	Technology Transfer Systems for Small Industries (July 1973)	Paper	General
5.	Benefits and Problems Associated with University-Community Interaction -- A Case History (July 1973)	Paper	Internal only
6.	Small-Scale Industry Development in Paraguay: A Case Study (February 1974)	Report	General
7.	List of Subject Headings Used by the International Development Data Center (February 1974)	Report	General
8.	First Annual Report - 211(d) Grant Year (February 23, 1973-February 22, 1974)	Report	General
9.	The Prospect for Economic Development in Nigeria (April 1974)	Report	Internal only
10.	A Comparative View of Technology Transfer (May 1974)	Paper	General
11.	Curricula Research and Development, Soong Jun University, Seoul, Korea (July 1974)	Report	General
12.	The Promotion of Industrial Development in Ecuador (August 1974)	Report	Internal only
13.	The International Informer	Bimonthly newsletter	Internal and limited external
14.	Staff Travel Information (undated)	Report	Internal only
15.	Some Issues Related to the Impact of Micro-Development Projects (September 1974)	Paper	General
16.	Guide to International Statistical Sources and National Development Plans at the International Development Data Center (October 1974)	Report	General

ACCUMULATIVE LIST OF PUBLISHED MATERIALS PRODUCED UNDER
THE GEORGIA TECH 211(d) PROGRAM
(continued)

	<u>Report Title</u>	<u>Nature of Publication</u>	<u>Distribution</u>
17.	Guidelines for Industrial Extension Personnel (November 1974)	13 Guideline papers	General
18.	Improving the Productivity of a Small Industry in Rural Korea (December 1974)	Report	General
19.	An International Compilation of Small-Industry Definitions (January 1975)	Report	General
20.	Provisional Keyword Index of the Small-Scale Industry Case Studies (February 1975)	Report	General
21.	Small-Scale Industry Development in Ecuador: A Case Study (February 1975)	Report	General
22.	Second Annual Report - 211(d) Grant Year (February 23, 1974-February 22, 1975)	Report	General
23.	A Seven-Country Survey of Certification Licensing and Quality Marks Programs (March 1975)	Report	General
24.	A Training Program on the Analysis and Evaluation of Industrial Projects (June 1975)	Seminar papers	General
25.	Directory of Consultants to Small Rural Industries (October 1975)	Report	General
26.	Intermediate Technology - A Color Slide Presentation and Cassette Tape Commentary (November 1975)	Slides and tape	General (available on loan)
27.	Bibliography of International Development Publications (December 1975)	Bibliography	General
28.	Finance and Small-Scale Industry Lending in the Philippines, 1967-1973 (December 1975)	Report	General
29.	Financing Small-Scale Industry: The Tubarao, Brazil, Case (January 1976)	Report	General
30.	Export Potential of Selected Korean Small-Scale Industries (January 1976)	Report	General
31.	Pictorial Monograph #1 - Selected Aspects of Intermediate Technology (January 1976)	Monograph	General
32.	Industrial Extension Personnel Guideline #14 - Fundamentals of Quality and Quality Control (February 1976)	Guideline paper	General

ACCUMULATIVE LIST OF PUBLISHED MATERIALS PRODUCED UNDER
THE GEORGIA TECH 211(d) PROGRAM
(continued)

	<u>Report Title</u>	<u>Nature of Publication</u>	<u>Distribution</u>
33.	Industrial Extension Personnel Guideline #15 - Guidelines for Developing a Quality Control System (February 1976)	Guideline paper	General
34.	Interim Observations - Up-ISSI Entrepreneurship Development Program (February 1976)	Report	General
35.	Small-Scale Industry Development in South Santa Catarina, Brazil - A Case History (February 1976)	Report	General
36.	Bibliography of Intermediate Technology Materials Held at the International Development Data Center (February 1976)	Bibliography	General
37.	Third Annual Report - 211(d) Grant Year (February 23, 1975-February 22, 1976)	Report	General
38.	International Education and Training Activities of the Economic Development Laboratory, Engineering Experiment Station (undated)	Brochure	General
39.	Bibliography of International Development Publications (May 1976)	Bibliography	General
40.	Appropriate Technology Research at the Georgia Institute of Technology and the Small Industry Development Network (September 1976)	Paper	Limited
41.	Appropriate Technology in the Industrial Sector (September 1976)	Paper	General
42.	Assisting Small Industry and Generating Employment: A Ghanaian Example (November 1976)	Paper	Limited
43.	The AID-Georgia Tech 211(d) Program -- A Color Slide Presentation	Slides	General (available on loan)
44.	The International Programs of the Economic Development Laboratory - A Color Slide Presentation	Slides	General (available on loan)
45.	Appropriate Technology Around the World - A Color Slide Presentation	Slides	General
46.	Industrial Extension Personnel Guideline #16: International Operation Guideline for an Industrial Extension Organization (February 1977)	Guideline	General

ACCUMULATIVE LIST OF PUBLISHED MATERIALS PRODUCED UNDER
THE GEORGIA TECH 211(d) PROGRAM
(continued)

	<u>Report Title</u>	<u>Nature of Publication</u>	<u>Distribution</u>
47.	Industry Profile #1: Wood Desks and Chairs (February 1977)	Industry profile	General
48.	Industry Profile #2: Wood Chairs (February 1977)	Industry profile	General
49.	Industry Profile #3: Fruit and Vegetable Canning (February 1977)	Industry profile	General
50.	Solar Energy Research at Georgia Tech - A Color Slide Presentation	Slides and tapes	General (available on loan)
51.	Pictorial Monograph #2 - Solar Energy Appropriate Technology Applications (February 1977)	Monograph	General
52.	Fourth Annual Report - 211(d) Grant Year (February 23, 1976-February 22, 1977)	Report	General
53.	Nigeria: Small-Scale Industry Financing and Development (forthcoming)	Report	General

Appendix II
SAMPLE INTERNATIONAL DEVELOPMENT SEMINAR SERIES POSTER

INTERNATIONAL DEVELOPMENT SEMINAR SERIES

SEMINAR NO. 28 - 10:00am, NOV. 8, 1976

15th Floor Conference Room

C&S Bank Building

North Ave. and West Peachtree St.

THE INTERNATIONAL INDUSTRIALIZATION INSTITUTE

Hugh Miller

National Academy of Engineering

**SPONSORED BY: GEORGIA TECH PROGRAM OF EMPLOYMENT
GENERATION THROUGH STIMULATION OF
SMALL SCALE INDUSTRY (IN THE DEVELOPING
COUNTRIES).**

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